marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

VOLUME 2 | ISSUE 2 | SUMMER 2023

ISSN: 2822-2849

RADICAL SCIENCE MOVEMENTS: PAST, PRESENT AND FUTURE

ISSUE EDITORS: GERARDO IENNA AND SASCHA FREYBERG

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

VOLUME 2 | ISSUE 2| WINTER 2023

ISSN: 2822-2849

RADICAL SCIENCE MOVEMENTS:

PAST, PRESENT and FUTURE

Issue editors: Gerardo Ienna and Sascha Freyberg

Official Information/Künye

Marxism & Sciences: A Journal of Nature, Culture, Human and Society

abbreviation/kısaltılmış adı*: Marxism & Sciences*
Biannual/Yılda İki kez yayınlanır
International Journal/Yaygın Süreli Yayın
Content/Mahiyeti: *Marxist studies on science/Bilim üzerine Marksist çalışmalar*
Owner and Manager/Sahibi ve Sorumlu Müdür: Ali C. Gedik

Logo Design: Nurgül Geçin Aksakal
Cover Design/Kapak Tasarım: Marxism & Sciences

Executive Office/Yönetim Yeri
235 sok. No: 106/7 35150
Balçova-İzmir/Türkiye
phone: +90 505 829 81 94
e-mail: marxismandsciences[at]gmail.com
URL: www.marxismandsciences.org
Publication Date/Baskı Tarihi: 05.11.2023
Typesetting by authors

Layout editors/Sayfa tasarımı:
Mesut Y. Yıldız
Buse Melisa Durukan
Duygu Aralan
Ali C. Gedik

TABLE OF CONTENTS

marxism & sciences
A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY
VOLUME 2 | ISSUE 2| SUMMER 2023

EDITORIAL

M&S and Future Issues

This is the fourth issue of *M&S* published so far. Thanks to our comreditors, also the editors of the issue, Gerardo Ienna and Sascha Freyberg, this issue, dedicated to *Radical Science Movements* represents a milestone for *M&S* after its first publication almost two years ago. Thanks to contributors, this issue seems to be a possible source of reference for the topic, *Radical Science Movements*.

I would like to present only two reviews here, since the editors already presented the topic and other contributions of the issue at the *Introduction* section. The first one is a book review by Damian Moosbrugger. Moosbrugger reviews *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook by Boris Hessen* which is edited by Pietro Daniel Omodeo and Sean Winkler. This review presents not only the complete transcription of the original Russian edition but also four articles introducing Hessen's book.

The second review titled, "*M&S* 2023: Marxism in the Age of Total Crisis," written by Onur Faik Acar, is that of the first symposium of the *Marxism & Sciences*, which took place between September 14 and 17, 2023 at the *Bilimler Köyü* (Village of Sciences), Foça İzmir. Acar provides a thorough survey of the contributions to the symposium.

Contributions to the symposium will be considered for publication at volume 4, issue 1 of *M&S* in January 2025. Call for Papers are announced at the back cover of this issue. Additional contributions related to the topic are also welcome. Comreditor Siyaveş Azeri will be the editor of that issue, which will be titled, "Marxism in the Age of Total Crisis."

Although *M&S* has already devoted a volume to the analysis of Evald Ilyenkov's contributions to Marxist thought, the next two issues of *M&S* (Vol. 3, issues 3 & 4) will also be dedicated to Ilyenkov on the occasion of his hundredth birthday. The title of vol. 3, issue 1 is *Centennial of Evald Ilyenkov-I: Rejuvenating the Revolutionary Essence of Marxist Theory* and is expected to be published as the issue of Winter 2024.

The 1st Call for Papers for *Centennial of Evald Ilyenkov-II* is also published at the back cover of this issue. The issue will be mainly based on *International Friends of Ilyenkov* (IFI) symposium held in London, on November, 11–12, 2022 and two of the organisers of the symposium, Corinna Lotz and Kyrill Popatov, will be the editors of that issue.

ACG.

summer 2023 volume 2 | issue 2 | iii–xiv

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02200 INTRODUCTION

Radical Science Movements: Past, Present and Future

Gerardo Ienna and Sascha Freyberg

> Therefore, only if we acknowledge the crisis which calls into question the meaning, goals and value of science can we overcome the impasse between the antiscientific pessimism of irrationalism and the scientistic optimism of an abstract rationalism. (Ciccotti et al. 1976).

THE AWARENESS OF THE PROBLEMATIC relationship between politics and science in general, as well as the discussions about social orientation and public participation, truth and trust in the sciences in face of continued capitalist extraction and commodification recently led to increasing interest in the history of what came to be known as *Radical Science Movements*.

This term designates retrospectively an actually many-faceted and locally different phenomenon, the history of which to some extent still has to be written. Nevertheless, there are important common features which not only refer to the importance of science for the 'big acceleration' in the 20th century—the development of technology and its social, environmental and planetary impact, but also with the global influence of Marxism in the 1960s and 1970s. In this situation when science began to be seen as a decisive productive force and the system of education, research and development significantly grew, students, scholars and scientists engaged to fight for political reforms in general, for solidarity with emancipation movements in the 'global South' and the realization of a 'common modernity.' Today we would identify the latter issue with the 'Anthropocene' and the problem of modes of production which rather destroy than facilitate the living conditions of humanity. In the late 1960s, particularly in the wake of the '68 social movements, Marxist and New Left activism inspired

Ienna, Gerardo and Sascha Freyberg. 2023. "Radical Science Movements: Past, Present and Future." *Marxism & Sciences* 2(2): iii–xiv. https://doi.org/10.56063/MS.2301.02100

• *Correspondence:* Gerardo Ienna, Università di Verona and University of Maryland.
• e-mail: gerardo.ienna[at]gmail.com
• ORCID: 0000-0001-5278-8838
• DOI: 10.56063/MS.2301.02100
• *Available online*: 5.11.2023

students, scholars and scientists especially to reflect their own position as 'intellectual workers' as well as the general function of science in society. Their idea was to reform science and education according to an ideal of science for the common good. In this way they posed a question, which seems to be of utmost importance still today. *Marxism & Sciences* has thus decided to devote a special issue to the past, present and future of the idea of science activism.

The history, actuality and potentiality of the *Radical Science Movements* can help to understand the polarizing debates of the present conjuncture and, above all, to imagine future scenarios in which political participation and social responsibility take a central role in the scientific enterprise and in the construction of a process of social emancipation.

As mentioned, *Radical Science Movements* often formed in the wake of the international political turmoil generated by the protests of '68. In many different countries a large number of social movements sought to address the problem of science in society and politics in science, thereby contributing to establish a new awareness and a critique of the social function of science not only in 'advanced' capitalist societies. Although the question of scientists' social responsibility had already been addressed before (notably by John Bernal)[1] and movements promoting social responsibility among scientists had already emerged after Hiroshima and Nagasaki (see Moore 2008), they gained impetus as part of larger radical-democratic and socialist struggles in the 1970s. As such, they became part of class and labor struggles, which went far beyond mere appeals to moral values and also began to address ecological issues.

Among the new groups, the *British Society for Social Responsibility in Science* (BSSRS) was founded in 1969. This was an association with a distinctly Marxist character and a structure, which aimed to mobilize those scientists who were concerned about the social effects of their research and work. Shortly afterwards, again in Britain, a community of researchers and scholars began publishing the *Radical Science Journal*. This can be seen as the source of the retrospective name for the more general phenomenon, we have in view.

The BSSRS, included many sub- and working groups, such as: Agricapital, Hazards, Women in Science, Politics of Health, Politics and Energy, and Radical Statistics (Bharucha 2018).

1. Bernal 1946, on this point see also Ienna 2022; Cozzoli 2023.

In 1970, the organization *Scientists and Engineers for Social and Political Action* (SESPA) was created in the United States and soon started the publication of *Science for the People* (the name by which this movement would later be known) (see Schmalzer et al. 2018). In the same period, similar movements in France disseminated their "critique des sciences" through a wide range of journals, magazines, and bulletins such as *Suivre et vivre* (beginning in 1970), *Labo-Contestation* (1970), *Le Cri des Labo* (1969–1972), and *Impascience* (1975) (see, Quet 2013; Debailly 2015).

The Italian context witnessed similar tendencies, following the social unrest of 1968 and of the "*Autunno Caldo*" (Hot Autumn) of 1969.[2] Radical approaches to science in Italy were disseminated through a large number of journals with titles such as *Sapere* (especially during the period 1974–1982), *Medicina Demoratica* (1977 and still active today), *Testi e Contesti* (1979-1982), *SE Scienza Esperienza* (1983–1987), *Rosso Vivo* (1973–1974), *CRS Capitalismo Natura Socialismo* (1991–1997) and through book series such as *Scienza e Politica* (edited by Marcello Cini e Giulio A. Maccacaro) and *Medicina e potere* (edited by Maccacaro) (see Laser 1999; Guerraggio 2010; Baracca et al. 2017; Ienna 2020; Ienna 2023).

Other *Radical Science Movements* developed in the 1970s and published journals e.g. in Denmark (*Naturkampen*), Sweden (*Natur och Samhälle*), the Netherlands (*Revolution and Wetenschap en Samenleving*), F.R. Germany (*Wechselwirkung*), and India (*Science for the Villages* and *Kerala Shasthra Sahithya Parishad Bulletin*) (Jaffry 1983; Kannan 1990; Vitale 2013). They addressed socio-political as well as ecological issues.

Science and Technology Studies (STS) often shared common social and intellectual origins with the *Radical Science Movements*; however they had a different trajectory. After completing the process of theoretical consolidation during the 1970s and 1980s, STS became academically institutionalized. This process has generated a strange de-politicising of the analysis of the relationship between science, technology and society. When the geopolitical and ideological situation changed especially after 1989, the idea of 'Radical Science' almost vanished completely and thus an important juncture between public and scientific discourse was lost.

Today, after a global pandemic made the lack of an informed exchange obvious, the contradictions between ideals, institutions and functions of

2. This expression refers to a season of labor and worker struggles (partly inspired by the student protests of 1968) marked by a conspicuous number of strikes and factory occupations. The central theme of these claims was the demand for higher wages and greater labor protections. As a result of these events, the so-called "Statuto dei lavoratori" [Workers' Statute] was signed on May 20, 1970.

science are focussed again. The increasing political and economic pressure on the scientists and scholars in all fields resulted in the idea to *revive scientific activism,* as can be seen in the declaration of the "World Science Day for Peace and Development," "March for Science," "Science day," and, to some extent, even in eco-activist groups like "Fridays for Future" or "The Last Generation."[3]

If we compare 'old' and 'new' science activism, the continuity of the general issues are as obvious as the changed contexts and the attitudes in the public sphere. Whereas the main concern of the *Radical Science Movements* in the 1970s and 1980s was to denounce the non-neutrality of scientific knowledge and its ideological uses, today's movements want to defend science and refer to the objectivity of scientific facts in an attempt to curb forms of denialism by both political and economic actors. However, this kind of approach often runs the risk of falling into naive forms of scientism, expertism or technocracy as a reaction to the rampant distrust towards science. The reasons for such distrust are manifold and should not be treated as one and the same thing. Their analysis forms one of the major issues of political epistemology today. Of course, it is a crucial difference if critique is meant to improve conditions or just simulated for the manipulation of sentiments. In this respect official political discourse often rather obfuscates than makes transparent, e.g., how much of scientific work is dependend on commercial interests.

In terms of the engagement from within science and education there seems to be a lack of analysis to situate intellectual labor within the structures of domination and thus objectify one's position at the same time. In contrast, the *Radical Science Movements*, thanks to their Marxist theoretical basis, often had a much clearer understanding of the underlying historical and structural issues and were able to elaborate a critical view of science capable of eschewing both scientism and relativism. This kind of approach therefore deserves to be reframed in light of the contemporary scientific-political situation.

3. The interaction of science and society, the role of resource managment and of knwoledge in general is now much more acknowledged by governments, thus (unknowingly) following up on ideas of science activism and on an issue which in the Eastern Bloc states was widely discussed under the heading of "Scientific-Technological Revolution" already in the 1960s. In this respect the status of science and knowledge production in modern societies was often more adequately reflected in socialist science studies, as e.g. in the trail-blazing Richta-Report (Richta 1968). The tension between 'technical intellegenzija' and science activism in that context, e.g. in terms of involvement in the ecological information groups, still remains outside of the focus of recent studies and forms a comparative *desideratum*.

Radical Science Movements for all their differences represent not only a historical phase of disciplinary or institutional formation, but point to an important task of our times, which we try to understand, investigate and unfold further.

In this respect, we have collected contributions aimed at analyzing the ideas and issues of science activism and thereby observed the re-emergence of the need to use Marxist categories to analyze the major issues that afflict contemporary science.

Our issue has been divided into five sections: Articles, Essays, Communications, Interview and Cultural Work.

The first section ("Articles") contains contributions that aim to critically read the current conjuncture. This section opens with Kulyash Zhumadilova's contribution titled *The Dialectics of Engagement: Some critical remarks on contemporary participatory research program*. In this text Zhumadilova analyzes some limitations of a research trend in STS known as the "Engaged Program" proposes direct engagement with extra-academic factors. Some of them involve activism and devlopment of alternative interactions, others require reflexivity or ethical deliberations. The variety of approaches that have emerged in this context, however, do not seem to be effective in that they do not radically challenge the issues they want to overcome, not to speak of "the fragmented structure of contemporary academia" based on neoliberal principles. Thus the author points out the limits of approaches which are well-meant but lack systemic analysis, hinting instead at the ideas of Levins and Lewontin about a "dialectics of engagement."

The second article by Nafis Hasan entitled *Science, Politics, Activism in the U.S.: A Three-Body Problem* offers an interesting reconstruction of the oppositional polarities between positivist naiveté and anti-science skepticism in contemporary U.S. society. The author's goal is to show how U.S. scientists find themselves squeezed within these polarities and how they are unable to find forms of political participation that can critically analyze science as an essential part of the capitalist system of production and enable further organization.

The article interestingly deconstructs the implicit political assumptions of movements largely based on a blind faith in science. In this regard, the author points out the dead ends into which such movements fall if they are not based on a serious materialistic conception of the power of scientists, "which can then be exploited to organize and achieve real victories." A further deconstruction concerns the assumption that scientists moving into politics (which as Nafis shows has been the case especially since the

Trump election) usually stand for a social orientation. Here the task emerges to actually define what is meant by 'defending science.'

The second part of the article addresses the question of unionization of scientists and scholars. The author describes the need to form collective organizations that not only fight for the improvement of individual working conditions but, more importantly, may lead to the construction of scientific practices emancipated from the interests of the capitalist system of production.

The contribution by Dhruv Raina and OmPrasad entitled *Reflections on Social Movements of Science in Contemporary India*, presents the main stages of development of science movements in India and analyzes the effects of the crisis of scientific legitimacy in society in the last decade and its connections with the emergence of right-wing politics. The article especially addresses some of the political issues that the social movements of science face in populist and authoritarian regimes. In India the concerns are varied but reflect the main themes of debate that are discussed in the rest of the world: the emergence of a data society, the management of pandemics, the dramatic results of anthropogenic impact on the environment etc. The authors point out, however, that in the Indian context one finds some differences: neither have social movements of science been reactivated as was the case in the past with the protests against the Kaiga nuclear plant or broader social movements such as the movement against large dams, nor have mass social movements centered on climate change as is the case in the Western world. The authors also highlight some shifts in the interest of social movements as a result of the reception of international demands in local contexts, such as the rise of identity politics. The article concludes by calling for greater engagement with inequality, poverty and understanding their connections with dimensions of nature in the Anthropocene.

The first part of the article *From the Inheritance of Radical Science Movements to a Political Ecology of Knowledges* by Antoine Lalande and Jeanne Le Marec is devoted to reconstructing the main stages that marked the evolution of radical science movements in France in the 1970s. In this section, the authors also describe the variety of the "critique des sciences" in France and the interconnections between these movements and the process of emergence and institutionalization of French STS (e.g., the *Pandore* bulletin created by Latour and Callon).

The second part is devoted to discussing the legacy of this tradition within contemporary debates by reflecting its possible re-actualizations. First, the authors highlight how in recent years various scholars have

recovered the traction of the French *Radical Science Movements* by demonstrating how this tradition represents the political root of French STS largely ignored in standard narratives of this field of research. As an exemplary initiative to that end the authors refer to the online platform https://science-societe.fr/.

The authors describe the main motivations, political themes and groups that have formed in recent decades and in the conclusion envision an "ecology of knowledge," which takes up the crucial concerns and lessons of the older movements.

The next sections of the special issue collect essays, documents and statements by people who are revitalizing some principles of the *Radical Science Movements* nowadays. In those papers, it is therefore possible to see the open laboratory of contemporary radical science in which toolboxes and ambitions are exposed.

The first of these is a retrospective essay by Sigrid Schmalzer, historian of science and one of the leading proponents of the renaissance of the *Science for the People* movement in the U.S.A.[4] In her contribution the author reflexively reconstructs her scientific, pedagogical and political trajectory by showing how these aspects of intellectual life are closely entangled with each other. Beginning with her academic interest in the history of science in the era of Maoist China she shows how the principles of science from below lead her to appreciate the idea of *Science for the People*, how she became a passionate scholar of this movement and, subsequently, how she took part in the process of revitalizing the project.

Calvin Wu and Edward Millar, the authors of the next essay, are also contributing to that project. Wu is currently the publisher of the new edition of the *Science for the People* journal and Millar is one of the members of the publishing collective.[5] Their essay entitled *The Revitalization of Science for the People* traces the process of the formation of the movement's new season by a new generation of science workers but in a in a very different sociopolitical and institutional context. The essay provides valuable reflection highlighting historical continuities and points of rupture between two different generations of science activists. The text shows how the legacy of the activists of the 1970s can be taken as a lesson for the current movement and what scenarios are open within which to recompose a new awareness of the social function of science.

4. https://scienceforthepeople.org/
5. https://magazine.scienceforthepeople.org/

In his remarks on the question of socialism and science, Joost Kircz, a comreditor of this journal and member of the Dutch Soc21 collective (www.soc21.nl), emphasizes the fundamental task of coming to grips with science and technology in extractivist production in order to develop socialist alternatives. Kircz points out that this also amounts to a Marxist and socialist self-criticism in view of those models which were one-sidedly based on industrial development and therefore helped to create the impasse of historical socialist states to expect social progress from an increase of production. Kircz points to this complex issue, to suggest a deeper understanding of science and technology in an eco-socialist perspective. Soc21 is organizing working groups and collaborates with other projects (like this journal) to that end.

In the "Communications" section Jerome Lamy and Arnaud Saint-Martin report about their French journal project. The authors are the creators of the blog https://zilsel.hypotheses.org/ which gradually transformed into the journal *Zilsel. Science, technique, société* https://www.cairn.info/revue-zilsel.htm/. In contrast to the STS field on the transnational academic level, the journal has the ambition to revitalize and question the theoretical canon of this field by comnfronting it with relevant non-canonized intellectual resources. It is for this reason, the authors explain, that the journal has been named after Edgar Zilsel (1891-1944), the famous sociologist and historian of science andMarxist member of the 'Vienna Cirlce.' His contribution in describing the social division of scientific labor as well as the role of technology in modern societies is used as a point of reference for experimenting with new forms of critical science study. The paper thus addresses the legacy of the Marxist interpretation of scientific knowledge proposed by Zilsel.

The last contribution in this section presents the manifesto of the *Politically Mathematics Collective* from India. This collective of scholars and educators formed in 2016 to investigate the political function and significance of mathematics in the broadest sense. Senthil Babu inform in the short commentary about the context and further aims of the group. During the Covid-19 pandemic they engaged in particular in analyzing the models used to communicate with the public and legitimate political measures. The manifesto is an example how a group of different scholars can organize themselves around the common inquiry into politico-epistemic questions, usually left out or only at the margins of public discussion. In this way, we hope to suggest similar formations and further organization in other fields

as well. The interconnection and mutual support of such groups could lead to other forms of transnational collaboration even in the academic field.

The fourth section of the issue contains an interview by Gerardo Ienna with Gary Werskey, who was involved in the older British Radical Science Movements taking part in the *Radical Science* journal as well. The interview presents reflections devoted to the development of the Radical Science Movements in the UK and how it formed a communicative pivot between the old scientific left, the new left of the *Radical Science Movements* and the STS field. Werskey also reports about his contributions to reconstruct the debates on science and Marxism that developed between the 1930s and 1950s and how he, as a member of the Edinburgh Science Studies, gradually distanced himself from the so-called "strong program" in the sociology of science.

In the final section we present a special and in our view exemplary case of politico-epistemic intervention: the "Atlas Project" of the artists Alice Creischer and Andreas Siekmann. Based on investigations to track the commodified and proprietised situation of knowledge in global capitalism, the flows of money and the exploitation of resources for private interests, they use the means of statistical visualization as it was first developed by Gerd Arntz (1900–1988) and Otto Neurath (1882–1945). Neurath and Arnzt collaborated in the 1920s and '30s for the publications of the *Museum für Wirtschaft und Gesellschaft*[6], which influenced the dissemination and visualization of knowledge not only in central Europe and the Soviet Union but throughout the world. The motivation was highly political while the focus was on communicating knowledge about the relations of economy and society. As the artists explain they seek to continue the emancipative and political spirit of the "Vienna Method of Pictorial Statistics" (later renamed *Isotype*), which was revolutionary in its time not only in terms of design, in sharing and spreading knowledge, but in realizing this task as a fundamentally political one. In our view, this still forms one of the important tasks of today, when complex situations on local as well as global levels need to be understood by many people in order to even be able to discuss about possible action. Educating and informing people not only about scientific facts or results, but about actual possibilities and unsecurities in science, about limits of methods and procedures, and about the basic material conditions and infrastructures of knowledge production

6. The Museum for Economy and Society in Vienna was led by Neurath, who, like Edgar Zilsel, was another scholar with ties to Marxism and the philosophical 'Vienna Cirlce' alike.

today, amounts to a neuralgic point in emancipative political action as well as in "rethinking science for the Anthropocene" (Renn 2020). Many debates involving epistemic issues today could be enhanced by new ways of mediating complex epistemic issues as we can see in the work of Creischer and Siekmann. The online version of the printed collection of panels titled "Nature meets itself in the stomach of the predators" is available as an appendix to their text and provides valuable means for politico-epistemic education integrating pictograms, statistics and further explanations of facts.

As seen from the quick recapitulation in the preceding pages, this special issue has the task of bringing together different perspectives connected by a Marxist interpretation of knowledge production and the scientific enterprise and support the idea of epistemic activism in science and society today. This special issue can only be a small contribution, reflecting the current situation, but we hope it will inspire others to take up the thread, which also pertains to the perennial discussion of this journal in terms of the relation of Marxism and (all) the sciences.

ACKNOWLEDGEMENTS

Sections written by Gerardo Ienna of this project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101026146.

REFERENCES

Baracca, Angelo, Silvio Bergia and Flavio Del Santo. 2017. "The Origins of the Research on the Foundations of Quantum Mechanics (and Other Critical Activities) in Italy during the 1970s," *Studies in History and Philosophy of Science. Part B: Studies in History and Philosophy of Modern Physics*, (57): 66–79.

Bharucha, Zac. 2018. *The Radical Science Movement in the U.K. 1968-1978. Struggles Against the Impact of Capitalist Ideology on Science, Technology and Social Relations of Science*. Poland: Amazon Fulfillment.

Bernal, John D. 1946. *The Social Function of Science*, London: Rutledge

Ciccotti, Giovanni, Marcello Cini, Michelangelo de Maria and Giovanni Jona-Lasinio. 1976. *L'ape e l'architetto. Paradigmi scientifici e materialismo storico*, Milano: Feltrinelli (eng. trad. *The Bee and the Architect. Scientific Paradigms and Historical Materialism*, Venice: Verum Factum, in press).

Cozzoli, Daniele. 2023. "John Desmond Bernal and 'Bernalism'." In *Handbook for the Historiography of Science,* edited by M.L. Salomon Condé. Springer, Cham. https://doi.org/10.1007/978-3-030-99498-3_15-1

Debailly, Renaud. 2015. *La critique de la science depuis 1968. Crotique des sciences et études des sciences en france après Mai 68*. Paris: Hermann.

Guerraggio, Angelo. (ed.) 2010. *Il '68 e la scienza in Italia*. Milano: Università Boconi, Centro Pristem.

Ienna, Gerardo. 2020. "Fisici italiani negli anni '70. Fra scienza e ideologia." *Physis* 55 (1–2): 415–42.

Ienna, Gerardo. 2022. "The Double Legacy of Bernalism in Science Diplomacy." *Berichte zur Wissenschaftsgeschichte 45*(4): 602–24.

Ienna, Gerardo and Pietro D. Omodeo. 2023. "An Italian Classic in Political Epistemology from the Seventies." In *Ciccotti, Giovanni, Marcello Cini, Michelangelo de Maria and Giovanni Jona-Lasinio. 1976. L'ape e l'architetto. Paradigmi scientifici e materialismo storico.* Milano: Feltrinelli (eng. trad. *The Bee and the Architect. Scientific Paradigms and Historical Materialism*, Venice: Verum Factum, in press), 11–45.

Jaffry Anwar, Ekbal B. Rangarajan Mahesh. et al. 1983. "Towards a People's Science Movement." *Economic and Political Weekly*,18(11): 372–376.

Kannan K.P., 1990. "Secularism and People's Science Movement in India." *Economic and Political Weekly*, 25(6): 311–13.

Laser (eds.). 1999. *Valle Giulia e la luna. Lotte dei tecnici e critica della scienza*. Roma: Università di Roma La Sapienza.

Moore, Kelly. 2008. *Disrupting Science: Social Movements, American Scientists, and the Politics of the Military, 1945–1975*. Princeton: Princeton University Press.

Quet, Mathieu. 2013. *Politiques du savoir. Sciences, technologies et participation dans les années 1968*. Paris, Édition des archives contempoarines.

Renn, Jürgen. 2020. *The Evolution of Knowledge: Rethinking Science for the Anthropocene.* Princeton: PUP.

Richta, Radovan, et al. 1968. *Civilization at the Crossroads: Social and Human Implications of the Scientific and Technological Revolution.* White Plains: International Arts and Sciences Press.

Schmalzer, Sigrid, Daniel S. Chard and Alyssa e Botelho (eds.). 2018. *Science for the People. Documents from America's Movement of Radical Scientist.* Boston: University of Massachusetts Press.

Vitale Bruno. 2013. "Critique of Science vs Critical Science vs Traditional knowledge (TK)." In *Olival Freire Jr., Saulo Corneiro (orgs.)*. Ciência, Filosofia e Política, Salvador, Editora Edufba.

summer 2023 volume 2 | issue 2 | 1–12

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02201 ARTICLE

The Dialectics of Engagement: Some Critical Remarks on Contemporary Participatory Research Program in STS

Kulyash Zhumadilova

ABSTRACT: This paper will offer a Marxist critique of a recent turn in participatory research within STS tradition. Although in this work, I will focus on examples from the STS community, it is worth mentioning that such a vision of engagement is prevalent in social sciences. STS scholars have been involved in various theoretical and practical attempts which challenge the traditional boundary between academia and the rest of society since the field's inception in the second part of the twentieth century. At first, such practices were informal, but soon became a scholarly topic on their own and gave rise to various participatory, action-based methodologies. Some of them involve activism and search for alternatives, while others call for reflexivity or increased ethical deliberations. Theory and political commitments of these approaches differ greatly. For example, the theory behind contemporary interventions is intentionally apolitical and focuses on processes and accounts of action rather than a certain goal. In this paper I will look closely at the origin of the participatory research program in the North American context and will analyze from a Marxist perspective its recent move towards rejecting normativity and objectivism. I will highlight friction points and possible additions of new methodologies to Marxist scholarship.

KEYWORDS: History of STS, science studies, Marxism, Situated Interventions, Engagement, Participatory research, Engaged STS, dialectics, emancipatory approach.

Philosophers have hitherto only interpreted the world in various ways,
the point is to change it.
–Karl Marx

Introduction

Although this famous quote by Karl Marx seems simple and direct, it has been interpreted differently on how the world can be changed and what that change is supposed to realize. The relations between "theory and practice," "science and society" are among the basic subjects of Science and Technology Studies

Zhumadilova, Kulyash. 2023. "The Dialectics of Engagement: Some Critical Remarks on Contemporary Participatory Research Program in STS." *Marxism & Sciences* 2(2): 1–12. https://doi.org/10.56063/MS.2310.02201

• *Correspondence:* Kulyash Zhumadilova, Department of Science, Technology, and Society Virginia Tech, Virginia.
• e-mail: kulash[at]vt.edu
• DOI: 10.56063/MS.2310.02201
• *Received:* 03.04.2023; *Revised:* 14.07.2023; *Accepted:* 22.07.2023
• *Available online*: 05.11.2023

(STS). Since its inception STS has launched and formalized an interdisciplinary critique of scientism and objectivism. Although STS is known for its empirical studies and philosophical debates on the nature of science, there is a less known research strand that is concerned with the position of the scholar and her relation to the object of study and knowledge. That reflexive scholarship of STS tried to theorize its own position and practices with a hope to answer the bigger question: "how to do scholarship?" Since skepticism about objectivism became a norm in STS, several turns took place within the discipline. And although some of the principles I will discuss below might apply to science at large, I will mostly focus on changes within STS and related social sciences. But it should be clear that the issues of STS pertain to other fields too, not the least because the same logic finds its way through STS practices into scholarship beyond disciplinary boundaries. That is why it is interesting to investigate the history of STS, since its scholarly consciousness, if you will, entails a kind of skepticism about its own actions.[1]

Background

The social consciousness of the political movements of the 1960s influenced scholars well into the 1970s, when many former student activists assumed new roles in institutions and realized that a value-free ideal of science is not only theoretically impossible but also enacts a politics of compliance that helps to preserve the status quo (Burawoy 2021, ix). Such a realization prompted some scholars in the social sciences to formulate research programs that make theoretical and political assumptions explicit. Various critical and emancipatory approaches gained attention and influence in the following decades.[2] According to sociologist Erik Olin Wright emancipatory social science has three components: systematic diagnosis and critique, envisioning of alternatives and formulating theories of social transformation (Wright 2010). Despite their appeal to individual scholars, emancipatory programs uphold a common normative framework that aims to liberate historically oppressed groups and reconfigure our understanding of the society, such as anti-capitalist ethos in Wright's own work. The "engaged" program is somewhat similar, as it also aims for transformation, but not by revising theories and methods, but by engaging with various actors outside of academia. Hence

1. Although there are different origin stories of STS that disagree about where and when the field started, for the purposes of this paper, I will only focus on the Anglophone STS that took place mostly in the USA in the second part of the twentieth century. As has been pointed out by one of the anonymous reviewers, this is important because the field will reflect the ideological nature of the society it is placed in. Also, it reflects my own positionality as graduate student at Virginia Tech.
2. Paolo Freire's "Pedagogy of the Oppressed" (1968), Ivan Illich's work, etc.

diferent names that this approach takes. Douglas Hartman lists these options under a "community-engaged research" umbrella: community-based scholarship, participatory action research, research-practice partnership and collaborative social justice research (Hartmann 2022). The nature of these mutually beneficial engagements varies, as do the normative and policy goals. From the outset, it was recognized that such engagements would not only disseminate knowledge but would also "renew and revitalize" sociology itself (Hartmann 2017). The rise of the "engaged" research program is linked to its institutional recognition in the mid 2000s, as the presidential address of Douglass Hartman and the accounts of Virginia Eubanks show (Hartmann 2017, Eubanks 2009). Various existing and new methodologies have been integrated into these programs: decolonizing and feminist methodologies, legal action, advocacy, militant research, mutual aid, narratives, Participatory Action Research (PAR), Participatory Development, etc. (Action-Based Research Methods 2016). The engaged program in STS found itself in good company with the public understanding of science (PUS) (Wynne 1995), "citizen science," and issues broadly construed under "science and democracy" (Jasanoff 2007). From the earliest attempts to articulate what "engaged STS" is, we see a similar tendency toward utility for the field itself. Sergio Sismondo saw the engaged program in STS as a bridge between theoretical works and action-oriented critique (what Steven Fuller called "High Church and Low Church") (Sismondo 2008). Thus, a close connection of engaged STS and activism can be observed early on. To this day, one of the most popular sites of research (in terms of topic and action) is environmental justice and related public/community health, social justice, and social movements. As the engaged program has become more prevalent, various theories of engaged STS have emerged, such as "embodiment of knowledge," "critical participation," STS sensibilities, reflexive learning, etc. The widespread acceptance of participatory research both within and outside of academia has left some scholars concerned about its misappropriation. Virginia Eubanks, a political scientist whose research has provided important insights into contemporary inequalities, argues that participatory research displaced macrosocial analysis in favor of "personal responsibility" which was also reflected in the acceptance of neoliberal policies in the 1980s (Eubanks 2009). In her attempt to revive critical participatory research, she states:

> This situation leaves reflective practitioners double bound. How do we acknowledge the selective uptake, and internal flaws, of participatory methods without abandoning their liberatory potential? How do we acknowledge the irreducible power relationships embedded in our collaborative work without abandoning hope for solidarity and alliance? How do we develop "good enough" knowledge to move on issues-of-the-moment without succumbing to epistemological relativism? And finally, how do we do collaborative work in institutions that

> neither encourage nor reward developing the skills that make participatory methods practicable? The personal and professional impact of facing these dilemmas, in combination with the co-optation of participatory practice by repressive government agencies and NGOs and the professionalization of the interdisciplines (Women's Studies, Science and Technology Studies, etc.), has resulted in a recent retraction from participatory practices in academia. (Eubanks 2009, 109)

This frustration with engaged practices also coincides temporally with seemingly increased reflexivity and scrutiny within STS, such as Bruno Latour's rhetorical reframing of critique into "matters of concern" (Latour 2004) followed by Maria Puig de la Bellacasa's call for "matters of care" (de la Bellacasa 2011). By the mid-2010s new theoretical visions of participatory research that equally reject "engagement" and objectivism emerged in STS (Zuiderent-Jerak 2015, 1–38). This move rejects any shared normative assumptions and methods and thus solidarity and alliance. In some ways it tried to reclaim what previous methods did: "… working with the notion of interventionist scholarship is a dual attempt to relieve research practices of the moral weight of 'engagement,' simultaneously reclaiming some of the ideas about 'where the action is' from the practices social scientists deal with" (Zuiderent-Jerak 2015, 22). This approach is also very skeptical about any normative positions:

> … but for now it suffices to note that proposing an ethical base for scholarly action has been and is repeated persistently over time, despite the problems of combining ethical strategies with the epistemic authority that sociologists in the 1960s would usually reserve for the top dogs they criticized rather than for the underprivileged they wished to side with. (Zuiderent-Jerak 2015, 13)

It frames participation as "situated intervention" the sole goal of which is the creation of new sociological insights and knowledge rather than practical utility for a community or emancipation at large. Such a preoccupation with itself is not only characteristic of the new method, but also a scholar as such. The scholarly persona is an important site of reflection and action in this approach (Downey and Zuiderent-Jerak 2021). The scholar is asked to reflect on her positionality, situatedness, "attachments" and sensibilities. It is difficult to find a common thread in the resulting menagerie of particularisms. Therefore, I will try to analyze this new turn in participatory research from a Marxist perspective.

Dialectics of Engaged Research

What we deem important enough to intervene and act upon is conditioned by cultural and social environments. Although certain ideals are kept as desirable and acted upon for many generations (social justice, equality, freedom), the

horizon of expectations changes quite dramatically not only among generations, but within different social groups in one generation. For example, contemporary feminist agendas in the "Global South" are different from dominant feminist agendas in "the West." Furthermore, even within individual categories you will find various versions of feminism. But, hopefully, all these manifestations aim at liberating women and men from constraints of patriarchy or at least give women more agency over their bodies and lives. Thus, the processes that activists and action-oriented scholars will choose to participate in vary drastically within and between different social groups. But these are all dialectical processes, where actors both are acting and being acted upon. The change is brought by a resolution of the existing tension between conflicting sides.

Various views on dialectics also posit the role of actor /agent of action differently. In some deterministic views actors don't quite choose their actions; their attempt to displace dominant views is dictated by the environment they are part of. In reflecting upon accounts of participatory research I came to realize that actions vary and depend on how actors diagnose a problem and what tools they have to tackle it. For example, I would consider that the rather symbolic action against the dominant practice of author-order in scholarly publications is a dialectical sign of the urge to restore balance in a messy and corrupt system (Liboiron 2017). But the proposed solution (group vote and equity-based ordering in this case) cannot be classified in dialectical terms, because what and how they produce cannot be predicted by an initial problem definition. Thus, the urge to act can be theorized as dialectical because actors identified a common problem (crisis in scientific publications), but actions that attempted to solve it most likely will be particularistic. In other words, there are many ways to achieve a goal.

If we agree that to intervene is to enact/embody a dialectical change, then the new participatory movement in STS can be considered as a dialectical turn towards a different understanding of change and critique. Marxist scholars have been criticizing the so-called structuralist paradigm, with its focus on power structures and institutions (Anderson 1983). Many agreed that in such a power-hunt, the role of personal agency is being lost.[3] By blaming an abstract power (in Focauldian sense), we lose sight of actors who produce and reproduce the status quo. When analyzed in this vein, situated interventions do bring agency back to the people as they theorize a personal action as a place

3. See Bruno Latour's "Why Has Critique Run out of Steam?: From Matters of Fact to Matters of Concern." *Critical Inquiry* 30 (2): 225–248; and Terry Eagleton's *Literary Theory*. Introduction. Miennapolis: University of Minnesota Press, 1996; as well as Stuart Hall's "The work of representation." In *Representation. Cultural Representations and Signifying Practices*, edited by Stuart Hall. Los Angeles: Sage Publications, 1997.

of intervention. But as Virginia Eubanks warned, personal action may be co-opted in neoliberal logic of being "on your own."

For many years Western Marxism has been divorced from practice (Anderson 1976). And while contemporary times inspire social action, interest in Marxism tends to come from outside of academia. Activists are more likely to check out scholarly work, rather than scholars joining activists' meetings. Perhaps by adding a participatory dimension to their scholarship academics will come closer to the world of political participation.

Richard Levins and Richard Lewontin are good examples of scholars who not only incorporated activism in their later stage of professional lives, but also challenged conceptual underpinnings of the science that they were part of. Their "dialectical approach" does not aim to generate a new research program, but rather to critically examine the existing paradigm to point out errors and suggest ways to supplement the incomplete accounts of current approaches. Their ideological analysis of contemporary biological research reveals that existing approaches misrepresent or only partially account for the observed biological phenomena (Levins and Lewontin 1987). They emphasize that a dialectical approach is not a new research program but rather a way to remedy science from ideological influences and partial perspectives.

Perhaps, STS also should add a "dialectical approach" to its existing practices of reflexivity and critical methodologies. In this way participatory research would not aim to produce new theoretical insights, but rather will aim to challenge and scrutinize existing accounts.

Critique

The new vision of participatory STS is still a continuation of the fragmentary structure of contemporary academia. Neoliberal rules permeate all structures of society. And STS as a discipline is no exception, despite its critical potential and tendency for reflexivity. In this environment participatory research is another project to write a grant for, or a publication about, or a report of. It will nicely fit into existing work routines, without significantly disrupting them. And although Virginia Eubanks was lamenting the lack of institutional encouragement and reward for participatory research a decade ago, my concern is that since the participatory research program became part of someone's job description it may become a subject to the same institutional pressures as the research it tried to displace in the first place. Although institutionalization of participatory research has a promise of more systematic study of emancipatory social science, as envisioned by Erik Olin Wright. Institutionalization of interventionist scholarship will only add to reductionism and incommensurable paradigms of contemporary academic science.

Although collaborations within and outside of academia are a big part of participatory research, the actions they produce are still very fragmentary. First, not all projects in contemporary participatory STS research are of societal importance or have political goals in mind. As we saw from the quotes above such a move is intentional and frames itself as a reaction to politically motivated research. Scholars who call themselves activists or subscribe to a certain political cause, if not scorned for betraying "objectivism," then encounter a stereotypical criticism of partial perspective. In addition, claiming that your work is political brings a certain degree of responsibility and accountability that many scholars don't want or are not ready to take. So, removing political dimension from participatory STS serves to attract scholars, who may be shy of it otherwise. The negative side of such framing is the impossibility to unite many actors into a social action. Theoretical focus on a process rather than a goal further contributes to this fragmentation. Even if some scholars jointly identify a problem of communal importance (author order in publications, for example), their actions will be out of sync and, in fact, may cancel each other out. To bring an effective change, concerted action may be required. Particularism of topic and method rarely will enact something on a large scale. Although I recognize an impulse to act locally that might bring tangible change rather than another grand "change the world" plan, I still maintain that conserving group solidarity is worth it. When a person from Almaty meets a person from Ithaca or from Kolkata and all three identify as Marxists, they might at least get a rough idea of each other's positionality and views. Of course, the degree of such overlap may vary, as we are all differently situated, but solidarity in views still will hold. I don't know what participants in participatory STS research may have in common. Although such research mobilizes scholar's "matters of care," it inevitably results in relativism. In her ending paragraph in "Matters of Care in Technoscience" Maria Puig de la Bellacasa admits:

> The way in which caring matters is not reassuring. It doesn't open the door to a coherent theory, or to the comforting feeling that worries about technoscience would be solved ... if only we would really care. Care eschews easy categorization: a way of caring over here could kill over there. Caring is more about a transformative ethos than an ethical application. We need to ask 'how to care' in each situation. This is attuned to STS's ways of knowing on the ground. It allows approaching the ethicality involved in sociotechnical assemblages in an ordinary and pragmatic way. (de la Bellacasa 2011, 100)

The problem with the formulation of a new ethos is that it's artificial and idealistic. Material relations and conditions have much larger power over decisions and actions of individuals. Can we make people care in an alienated world?

Personality and Work

Another contentious point in theorizing new participatory practice is its emphasis on the personality of a scholar. To be fair, such a move has been initiated in STS tradition long before contemporary versions. Stories of STS sensibilities in personal life or, vice versa, personal experience of a particular professional situation are interesting experiments in narratives of lived experience.[4] In addition, attempts of fusion of life and work have a political promise of ending anomie and alienation, making work meaningful and relevant again. Perhaps it was a dialectical turn from a cold STS neutrality of David Bloor or unapologetic iconoclasm of Bruno Latour towards something with a human face. But from a labor perspective I see this move as problematic. First intervention into "personal" has been made by Donna Haraway with her "situated knowledges" (Haraway 1991). Recognizing your life's trajectory, a standpoint, and telling the reader who you are has been viewed as a fix to the lost objectivist, "God eye" view. Such subtraction of the personal from your work, has been counteracted by a move in the opposite direction, when a personal has been added to work. Personal accounts and autoethnographies are a good example of that. Such stepping beyond "situated knowledges" to an area where personhood fuses with practices until a boundary between "work" and "life" disappears, may be detrimental for several reasons.

Reflexivity is a big part of the new participatory program. In one such exercise a scholar is asked to reflect on her career and biography to see what factors brought her to this position, what are her "matters of care." That personal narrative then serves as a point of departure for subsequent interventions. Although reflexivity is a useful skill, my concern is that such autobiographical vision of scholarly trajectory may obscure factors that we are unable to see due to affective experience of them (even with a sociological training) and thus won't be able to recognize and acknowledge. Introspection might be a useful scholarly tool, but one should be very careful with it and such awareness comes when one seriously thinks about it.

Given the history of STS approaches being co-opted into institutions that they aimed to critique, recognizing what "work" is, for whom and by whom it is done, and being critical towards it is essential for STS scholars. Especially as participatory practices become institutionalized and become a part of routine in a job description. By making "work" a consequence of your personal biography, we neglect to acknowledge power structures that influenced our decisions in the past and therefore accept and normalize them. "… for the eye sees not itself…" Many factors, mostly psychological in nature, will prevent a proper analysis of a personal trajectory. A rich confidential conversation with

4. See the special issue of *Science as Culture* 19, no. 1 (2010)

a personal therapist is not always a version of themselves that many scholars want to publish in peer-reviewed journals. This adds another layer to why the fusion of personal and professional might not only be misleading but also unauthentic. I would argue that it is healthy to maintain a conceptual boundary between "work" and "life" in academic practice of participatory STS. In the end, STS's insight into abuses of scientific practices should prevent it from enacting them in its own community.

That insistence of reflexivity and admittance that your current work is a consequence of your own choices and efforts also has a propensity to put work on an apex of personal trajectory. It is not a coincidence that situated interventions originate and are quite popular in corporate settings as a tool kit of various consultants and quality assessment professionals (Zuiderent-Jerak 2015). Framing work as a center of someone's life is the very thing capitalism wants to do for its workers. A job becomes the only outlet of expression, meaningful life and fulfillment. Such absorption of social obligations to the workplace might neglect responsibilities in civil and personal life. It is dangerous as it has the potential of recreating a "corporate personality," a blind devotion to mechanism. Although Marxism recognizes the importance of creativity and work for self-realization of humans, the assumption is that institutional settings should be different for it to materialize. Is it possible to enjoy your work in a neoliberal paradigm? How does resistance to work and skepticism about its purpose square with interventionist STS?

Re-reading Ernst Bloch

While I was writing this paper, I also revisited Ernst Bloch's commentary on Marx's eleventh thesis on Feuerbach, which opened my essay (Bloch 1971). Bloch is concerned that Marx's call could evoke "associations with pragmatism." He was cautioning against simplified utilitarian attitude. That is indeed an important point and one that should be taken seriously. Co-optation of STS into structures and institutions who aim at change and interventions but for quite different reasons is a good example of that. Politically neutral contemporary participatory STS has taken its place in corporations, consulting firms and contracting research organizations.

Another interesting point that Ernst Bloch inspired me to think about was his caution against framing a call for action as a mere reaction to unproductive philosophizing, as this may bring about anti-theoretical and anti-intellectual attitudes. When Marx wrote his eleventh thesis he had a very specific philosophy in mind, that of Feuerbach. Of course, he also conceived his statement more generally to include philosophers, who feel very comfortable in abstract

worlds they inhabit, without any commitment to the present.[5] But casting all theory as useless and "unproductive" is dangerous. Anti-intellectualism has been long associated with totalitarianism, fascism and other reactionary movements. It is important to acknowledge and diagnose why such attitudes become prevalent, but it is equally worth remembering historical lessons in order not to justify and perpetuate malicious attitudes. Again, this is a perennial problem of the dialectical relation between practice and theory, hand and head, worker and intellectual. But given the history of STS and how often what was supposed to be benevolent critique was appropriated by interest groups, such emphasis on applied social science and call for action may be interpreted as anti-intellectual argument. Anti-theory combined with particularism is a recipe for an epistemic disaster.

Conclusion

In this article I tried to trace the origins of a contemporary interventionist research program within STS and analyze it from a Marxist perspective. Although it seems that the new research program evolved as a reaction to previous research programs in STS, it was in fact largely shaped by institutional installment.[6] The underlying fundamental issue is indeed a hard one, the position of scholar and her relation to the object of study is a deep epistemological problem and formulating research programs that aim to resolve it might be an unattainable task because they are rooted in ideological rather than substantive distinctions. I want to conclude by emphasizing the vision of dialectical approach proposed by Richard Levins and Richard Lewontin.[7] For them a dialectical method rather than a separate research program is what can remedy science from partial perspectives. Systematic critique and examination of science in accordance with dialectical principles is what will weed out science of biased accounts. This is an interesting perspective that doesn't chase "new insights," but rather tries to work modestly with what already exists. Perhaps this is what contemporary participatory STS really needs.

Acknowledgements

This paper was initially written for a seminar course taught by Prof. Garry Downey at Virginia Tech's STS department. I want to thank Prof. Downey and

5. Add to that to impenetrable language and writing style
6. "Making and Doing" section at the Society for Social Studies of Science (4S) conference has been running annually since 2015.
7. Richard Levins and Richard Charles Lewontin, *The Dialectical Biologist* (Cambridge, Mass.: Harvard University Press, 1987).

my fellow students Danielle, Francesca and Tsung-Yen for stimulating discussions and openness to different perspectives. I would also thank anonymous reviewers for their helpful contributions.

REFERENCES

Action-Based Research Methods. 2016. "Action-Based Research Methods. A Bibliography." https://activistresearchmethods.wordpress.com/about/. April 30, 2016.

Anderson, Perry. 1976. *Considerations on Western Marxism*. London: Verso.

———. 1983. *In the Tracks of Historical Materialism*. London: Verso.

Bellacasa, Maria Puig de la. 2011. "Matters of Care in Technoscience: Assembling Neglected-Things." *Social Studies of Science* 41 (1): 85–106. https://doi.org/10.1177/0306312710380301.

Bloch, Ernst. 1971. "Changing the World. Marx's Theses on Feuerbach." In *On Marx*. New York: Herder and Herder.

Burawoy, Michael. 2021. *Public Sociology: Between Utopia and Anti-Utopia*. Cambridge: Polity Press.

Downey, Gary Lee and Teun Zuiderent-Jerak. 2021. "Making and Doing: Engagement and Reflexive Learning in Science and Technology Studies." In *Making and Doing: Activating STS through Knowledge Expression and Travel*, edited by Downey, Gary Lee and Teun Zuiderent-Jerak, 1–36. Cambridge: The MIT Press.

Eagleton, Terry. 1996. *Literary Theory*. Minneapolis: University of Minnesota Press.

Eubanks, Virginia. 2009. "Double-Bound: Putting the Power Back into Participatory Research." *Frontiers: A Journal of Women Studies* 30 (1): 107–37.

Hall, Stuart. 1997. "The work of representation." In *Representation. Cultural Representations and Signifying Practices*, edited by Stuart Hall. Los Angeles: Sage Publications.

Haraway, Donna. 1991. *Simians, Cyborgs and Women: The Reinvention of Nature*. New York: Routledge.

Hartmann, Douglas. 2017. "Sociology and Its Publics: Reframing Engagement and Revitalizing the Field: 2016 Midwest Sociological Society Presidential Address." *The Sociological Quarterly* 58 (1): 3–18. https://doi.org/10.1080/00380253.2016.1248132.

———. 2022. "Community-Engaged Research: What It Is and Why It Matters." Footnotes. *A Magazine of the American Sociological Association* 50 (1). Accessed April 2, 2023. https://www.asanet.org/footnotes-article/community-engaged-research-what-it-and-why-it-matters/.

Illich, Ivan. 1990 [1968]. "To Hell with Good Intentions." In *Combining Service and Learning*, edited by Kendall, J., 314–320. Raleigh: National Society for Internships and Experiential Education.

Jameson, Frederic. 2009. *Valences of the Dialectic*. New York: Verso.

Jasanoff, Sheila. 2007. *Designs on Nature: Science and Democracy in Europe and the United States*. New Jersey: Princeton University Press.

Latour, Bruno. 2004. "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern." *Critical Inquiry* 30 (2): 225–48. https://doi.org/10.1086/421123.

Levins, Richard, and Richard Charles Lewontin. 1987. *The Dialectical Biologist. Cambridge, Mass.* Cambridge: Harvard University Press.

Liboiron, Max, Emily Simmonds, Edward Allen, Emily Wells, Jess Melvin, Alex Zahara, Charles Mather, and All Our Teachers. 2021. "Doing Ethics with Cod." In *Making and Doing: Activating STS through Knowledge Expression and Travel*, edited by Downey, Gary Lee and Teun Zuiderent-Jerak, 137–154. Cambridge: The MIT Press.

Liboiron, Max, Justine Ammendolia, Katharine Winsor, Alex Zahara, Hillary Bradshaw, Jessica Melvin, Charles Mather, et al. 2017. "Equity in Author Order: A Feminist Laboratory's Approach." *Catalyst: Feminism, Theory, Technoscience* 3 (2): 1–17. https://doi.org/10.28968/cftt.v3i2.28850.

Norman, Richard and Sayers, Sean. 1980. *Hegel, Marx and Dialectic. A Debate*. New Jersey: Humanities Press Inc.

Sismondo, Sergio. 2008. "Science and Technology Studies and an Engaged Program." In *The Handbook of Science and Technology Studies*, edited by Edward J. Hackett, 3rd ed. Cambridge: MIT Press.

Wright, Erik Olin. 2010. *Envisioning Real Utopias*. New York: Verso.

Wynne, Bryan. 1995. "Public Understanding of Science." In *Handbook of Science and Technology Studies*. Los Angeles: Sage Publications.

Zuiderent-Jerak, Teun. 2015. *Situated Intervention: Sociological Experiment in Health Care. Inside Technology*. Cambridge: The MIT Press.

summer 2023 volume 2 | issue 2 | 13–28

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02202 ARTICLE

Science, Politics, Activism in the U.S.: A Three-Body Problem

Nafis Hasan

ABSTRACT: The steady depoliticization of science with its concurrent neo-liberalization has brought us to empty epithets such as "believe in science" and the rise of anti-scientific populism, exemplified by the right-wing backlash to COVID vaccines across the globe and on most prominent display in the United States. The fears that propelled scientists to take to the streets in the early days of the Trump administration in the U.S. have largely been assuaged as bipartisan support continues to pour in for profitable chronic diseases, ballooning the budget of National Institutes of Health and continuing the biotech boom. Scientists, who were galvanized into participating in the political sphere and elected to office, have turned out to serve the interests of capitalists instead of the working class. Currently, science activism remains constrained within lobbying and running for office, a politics divorced from material reality. This complex scenario then presents us with a three-body problem—how can scientists practice politics with a material basis? Are politics and activism the same thing? If not, what differentiates them? And lastly, how do we solve it? In this essay, focusing on the political and social landscape of the U.S., I trace the historical class position of scientists in the U.S., and argue that the solution lies in the practice of Marxist politics, one that is grounded in class relations and takes place at the point of scientific knowledge production. Just as there is no general solution for the three-body problem in a closed form, tactics of challenging capitalist power and creating a science for the people will require learning from history and evolving with the shifting political landscape.

KEYWORDS: Science, politics, organizing, activism, labor.

Introduction

The election of Donald Trump as the President of the United States in 2016 was followed by a bloom of "Believe in science" and "In this house we believe science is real" signs in the politically liberal neighborhoods across

Hasan, Nafis. 2023. "Science, Politics, Activism in the U.S.: A Three-Body Problem." *Marxism & Sciences* 2(2): 13–28. https://doi.org/10.56063/MS.2310.02202

• *Correspondence:* Nafis Hasan, Brooklyn Institute for Social Research, New York.
• e-mail: nafis.hsn@gmail.com
• ORCID: 0000-0001-7124-2734
• DOI: 10.56063/MS.2310.02202
• *Received:* 09.04.2023; *Revised:* 25.07.2023; *Accepted:* 27.07.2023
• *Available online*: 05.11.2023.

the country. Trump had run on a platform that denied the scientific basis for the climate crisis, and his election to the highest office in the country sounded the alarm that cuts to the nation's budget for scientific research was coming, along with other strict regulations. True to his campaign platform, Trump did indeed gut the U.S. Environmental Protection Agency (EPA), withdraw the U.S. from the Paris Agreement and re-enacted a prohibition on embryonic stem cell research, overturning the Obama-era decision. Regardless of the nuances of such actions (e.g. did the Paris Agreement actually help combatting the climate crisis), Trump's actions were broadly viewed as anti-science and an attack on the faith that the scientific method had garnered in the public mind in the last two centuries.

Subsequently, scientists across the world organized a million strong March for Science across 600 cities to commemorate Earth Day in 2017, as a protest against the anti-science narrative that Trump embodied and espoused (Wessel 2020). March for Science took on the life of a non-profit with an operating budget of $300,000 and a handful of full-time and part-time employees; however, the lack of concrete goals saw a steep decline in public participation during the 2018 March for Science. By that time, even though Trump had promised cuts, Congress had pushed back against those cuts and throughout Trump's tenure as U.S. President, would continue to do so and in some areas, boost funding compared to previous areas. Under the leadership of Scott Pruitt, a well-known climate change skeptic and ally of the fossil fuel industry, the EPA did indeed see drastic cuts in its budget and rollback of environmental regulations. However, during Trump's presidency, the National Institutes of Health saw its budget increase by nearly $10 billion, the National Science Foundation grew by $784 million and NASA by $3.3 billion, all thanks to bipartisan efforts in Congress (Hourihan 2019). The fear of cuts abated, the materialist basis for bringing forth thousands of scientists, trainees and supporters wobbled leading to the tepid turnout in 2018 for March for Science, which focused solely on the climate crisis (Wessel 2020).

The COVID-19 pandemic saw a revival of such "believe in science" sentiments as the debate over lockdown and masking raged in the media sphere, with anti-vax sentiments gaining prominent ground among the right-wing ideologues and initially in the White House. Interestingly, Trump later took credit for enacting the Defense Production Act, necessary for financing and producing the COVID-19 vaccine at the requisite scale, a move that challenged the anti-science label bestowed upon him. But COVID-19 lockdown and masking debates saw scientists on both sides,

muddying the waters for the general public who were confused as to which science to believe in. This confusion lend more credence for conservatives to push back on liberal public health measures such as masking to the point that even under the recently elected Democrat President Joe Biden, the U.S. federal government lifted the mask mandate amidst celebration, despite public health guidelines recommending that masking still be in effect.

The fundamental issue made stark by the chronicle of events above is the misunderstanding that science is apolitical—an idea that is a product of steady erasure of politics from the scientific enterprise in the U.S. over the last few decades that began with the anti-communist propaganda during the Cold War (Gordin 2019). Under this misconception, advocacy for science turns towards the well-known and practiced, albeit mostly futile, method of pressuring elected representatives for policy changes. However, the levers of power are not moved by such lukewarm activism, as is already proven in the case of the climate crisis. Thus, today some academics and scientists have called for further disruptionary, and mostly pacifist, tactics to put even more pressure on governments to take action. The obviously glaring hole in this strategy is the lack of a materialist basis, which is also a result of the depoliticization of scientific practice. This creates a classic three-body problem, consisting of science, politics and activism, where none of the three components line up to produce a desired outcome. The intent of this essay is to provide a solution to this three-body problem by rooting politics into scientific research and practice, and to explicate the materialist basis for scientists' power which can then be leveraged for organizing to gain real victories.

Science and Politics: A Misunderstanding

The rise of anti-science sentiments in the Trump era also prompted scientists to run for office and dedicated political action committees (PACs) to support them sprang up as offshoots of March for Science (Wessel 2020).[1] Leveraging their identities as scientists, and by extension as heralders of technocracy and proponents of reason, these candidates ran for seats at all levels of governance in 2018—from school boards to congressional seats (Sifferlin 2018). Most of these candidates did not win, and some of them who did, found their application of scientific method in solving problems, to be insufficient in dealing with real life issues. For example, Valerie

1. A prominent example of such a group is 314 Action, its name a nod to Pi Day.

Horsely, a decorated cell and developmental biologist working at Yale, lost her Connecticut state senate election in 2018 and then got elected to the legislative council for the town of Hamden in 2019. In 2020, she voted to cut $2.8 million from the town's education budget that would have helped bridge the achievement gap between students of color and white students (Gurwitt 2020). In an ironical performance of allyship, she took to Twitter the same year to denounce a joke made about the model worm, *C. elegans*, by extrapolating the basis of the joke to be sexist and racist. In 2021, she used her identity as a woman and as a "doctor" (in light of the First Lady of the U.S. Dr. Jill Biden's deserved honorarium), to weaponize parliamentary procedure and prevent a black council member, Justin Farmer, from representing his constituents at a finance committee meeting (Aman and Price 2021). Consequently, Horsely resigned from her position at the end of her term.

The incident with Horsely is not a one-off case where the identity as a scientist does not automatically mean a left-wing orientation to sociopolitical issues. Mark Kelly, a celebrated astronaut elected as a Senator from Arizona in 2020, voted against the Protect the Right to Organize (PRO) Act, which would have enfranchised millions of workers in the U.S. to unionize and afforded greater protections at the workplace (Grim 2021). Joe Cunningham, an ocean engineer elected as a Representative from South Carolina, joined the Blue Dog Coalition—a group of Democrats who consider themselves as moderate to conservative. His political orientation is manifested in his voting record-according to GovTrack, during his two year stint in the U.S. House of Representatives, Cunningham had the fifth least left-leaning voting record compared to other House Democrats (GovTrack 2021). Elaine Luria, a nuclear engineer elected to Congress from Virginia in 2018, was the only Democrat who voted against US military withdrawal from Iraq in 2021; during her 2018 campaign, she backtracked on her promise to not accept any corporate funding and ended up with thousands of dollars from defense contractors and tobacco companies (Fiske 2021).

The decision made by above scientist politicians is not off-the-mark from their fellow Democrat politicians, but their election via the scientist identity as a reaction to Trump and the Republicans' general anti-science views enforces the false dichotomy that Democrats are more "pro-science" than Republicans (Armstrong 2017). While Democrats have paid more lip-service in championing the need for scientific evidence in policymaking, the years of the COVID-19 pandemic under President Biden and his Centers for Disease Control and Prevention administration hardly hold up that

image. Why would then scientists run on the Democrat ticket? And more importantly, once elected, why do they vote along ideologically conservative lines?

The answer to the first question has to do with the class position of scientists in society—scientists as white-collar workers tend to be educated liberals who are more likely to support and vote for Democrats. This voting pattern is consistent with the ideals of a technocratic state that scientists as white-collar workers are dependent on, as C. Wright Mills' classic study has shown (Mills 2002). That, paired with the Republican party's anti-science stance in some cases (e.g. stem cell research, vaccines, climate change, etc.) and the party's "populist" turn against technocratic rule (and by extrapolation, regulations) have made the Democratic Party the easy choice for scientists considering elected offices (Kaurov et al. 2022). This choice is further validated by the dominance of a quasi-two party system within the U.S., where any third party or independent candidates barely make a dent in the polls.

The answer to the second question above lies in the fact that the scientific enterprise has been steadily depoliticized in the decades following the McCarthy era in U.S. history—the separation of politics used as an anti-communist tool—concurrent with its neoliberalization. Despite the explosive growth in scientific research following World War II, driven primarily by infusion of funds from the U.S. federal government, the scientific enterprise became fully subsumed under capitalism, leading Levins and Lewontin to conclude in 1985—"modern science is a product of capitalism" (Levins and Lewontin 2007), turning scientists into mere technicians. To give but one example, the race to sequence the Human Genome Project between 1990–2003 saw the singular focus on decoding the sequence demote scientists to technicians running gels instead of asking questions of what one would do once the sequence was decoded. Interestingly, it is common lore that the private sequencing company owned by Craig Venter had already sequenced the genome, but Venter in his "magnanimity" had allowed the NIH to publish the results first so the public wouldn't lose faith in the institution. As such, the divorcing of social, cultural and political biases from scientific practice has resulted in the widespread belief that science must be apolitical since it is rational—a resuscitation of the Weberian norm of axiological neutrality.

Such a stance has unfortunately served to perpetuate the neoliberal agenda, creating a myriad of issues that shake the trust that both general public and scientists have placed on the scientific method. As André Gorz

once wrote—"the belief that [science and technology] are value free and politically neutral, and that their "advancement" is a good and desirable thing because knowledge can always be put to good uses, even if it is not, presumably—is nothing but an ideology of self-justification which tries to hide the subservience of science and technology—in their priorities, their language, and their utilization—to the demands of capitalist institutions and domination" (Gorz 1972).

Thus, there now exists a "publish or perish" environment within academia, giving rise to the reproducibility crisis, corruption among scientists and misuse of public funds, spawning of predatory journals and conferences and much more (Pagano 2017). The continued influx of money from the federal government has served largely the ancillary industry that profit off of academic research—when NIH's budget doubled between 1997–2003, the growth was mainly observed in ancillary markets such as reagent companies, expansion of universities and number of NIH contractors (Pagano 2017). The blurring of public and private interests in the scientific realm has resulted in scientists for hire by industry, especially the ones facing criticism for exacerbating the climate crisis and other societal ills, as detailed elsewhere by Naomi Oreskes and Erik Conway in their book *Merchants of Doubt* (Oreskes and Conway 2011).

The sterilization of politics from science has resulted in a void filled by a liberal politic which has led to deliberate manipulations of the levers of power in society. Politics has turned into "voting harder" for candidates who "champion science" (e.g. the leading magazine *Nature* endorsing Joe Biden in the 2020 U.S. Presidential elections) or advocating for policy-based changes through congregations like March for Science. But these approaches miss the fundamental point that elected officials are beholden to private interests as much as to their constituents, if not more, and that power to move politicians and policies don't come from unorganized masses, but rather organized workers who would fight for their material interests. This brings us to the issue of activism, the common form of advocacy practiced by scientists on the left.

Partisanship, Political Hobbyism and the Limits of Activism

As the 2017 March for Science took shape, its proponents came under fire for politicizing science—questions about why the March had put out a Diversity statement abounded despite well—known facts that the U.S. scientific community remains largely white and male. Following the March of

Science, scientists were viewed in a more favorable light by liberals whereas conservatives believed that scientists were more interested in their personal gain than solving important problems (Motta 2020). A study published early in 2023 showed that *Nature's* endorsement of Biden in the 2020 U.S. presidential elections cost the magazine scientific credibility among conservatives (Lupia 2023). In both cases, the reason given was the "politicization" of science, or more aptly, the partisanship of science.

Partisanship in U.S. politics has been on the rise since the 1970s; a 2014 study by the Pew Research Center show the increasing polarization between the two camps with concurrent rise in ideological uniformity (Geiger 2014; Brewer 2005). This would explain why "politicization" often is synonymous with partisan bias, despite bipartisan support for increased science funding. This does not mean that certain conservatives question scientific evidence or that certain Democrats do indeed advocate for evidence-based policymaking, but in general this bipartisan support for more funding is largely in the interest of capital and propagation of the "social contract" between the federal government and private interests (Maienschein 2014). However, this aspect of how partisanship operates in the service of capital is largely ignored by scientists taking part in political advocacy as citizens. Further, when scientists do engage in politics, it is mostly in the form of "political hobbyism"—treating politics as entertainment and expression of identity—given their class and social positions and political leanings (Hersh 2019). Hersh's research shows that those who engage in politics via media and complaining tend to be college educated, white and male and on the political center and left—descriptions that would fit an average scientist in the U.S.

But it is also true that much of the same demographics were galvanized into action for the March for Science in 2017 and to a smaller extent beyond that. A prominent field where scientists have actively engaged in political advocacy is the climate crisis, arguably the biggest litmus test of our times on whether one is pro- or anti-science—the test itself a symptom of the increased polarization in our society. Scientists on the liberal to left spectrum continue to participate in various forms of climate activism—participating or donating to non-governmental organizations, lobbying politicians, and non-violent civil disobedience. The need for the latter comes from the realization that the technocratic process of change is neither sufficient nor effective given the power of the fossil fuel industry, and in the shadows, the interest of capital. Thus, scientist activists argue that

non-violent civil disobedience tactics should be undertaken to put more pressure on politicians (Nicholas 2023).

This approach, exemplified by the Climate Youth Strikes and the Extinction Rebellion, again suffers from a misunderstanding of how political power works. For example, while Greta Thunberg, the initiator of the climate youth strike, has been invited to the Davos Economic Forum to speak to world leaders, her speech was treated more as a performance than a serious reckoning of the dire state of the world. The Extinction Rebellion is often derided as having no political orientation, and their public stunts have drawn ire from the working class who have historically been deemed the agents of transition away from capitalism. While the non-violent civil disobedience tactic is highly praised by activists in the U.S., given its effectiveness during the Civil Rights movement and allegedly the decolonization movement in the Indian subcontinent, it also fails to account for the historical trends where violence often accompanied the non-violent movements (Malm 2021). Fundamentally, such tactics ignore the idea that the power of capital cannot be challenged without withholding the labor that produces surplus value for capital. From the New Deal to the 40 hours work week to the formation of the EPA by Richard Nixon and subsequent environmental regulations – all these sociopolitical and economic changes were brought about by organized masses, a social movement that was supported by labor unions, who understood that to successfully challenge the interest of capital, one must realize the power and value of their own labor. Scientists need to be able to do the same if they are to bring forth the changes they advocate for. To do so, we first need to analyze the class position of scientists in U.S. society.

The Curse of the Professional-Managerial Class

The question of where scientists fall as workers has been long discussed since scientists do not produce surplus value, but only "contribute to its realization" (Garner 1974a). In his 1972 article "Technical intelligence and the capitalist division of labor," André Gorz argued that to figure out where scientists and technical workers fall within the class divisions in our capitalist society, we need to first figure out "what functions technical and scientific labor perform in the process of capital accumulation and in the process of reproducing capitalist social relations." Gorz concluded that technical workers, alienated from the process of production, also serve to enact

a social division of labor given the specialized knowledge they need to obtain for their work, and therefore maintain the hierarchical structure of labor as dictated by capitalist social relations.

Gorz's article prompted a discussion among Marxist scientists of the time in the radical publication *Science for the People* on the role of the technical worker. While Gorz's analysis was generally accepted as being true, his conclusion that the managerial role of technical workers makes them the "immediate enemy" of workers on the shop floor was contested. As Jeff Schevitz, a sociologist at University of California Berkeley, pointed out – "[technical workers'] privileged status does not negate the concrete reality of the proletarianization of scientists and technologists" (Schevitz et al. 1973). This reality is portrayed in the fact that the technical workers in the U.S. were organizing as early as 1933 with the formation of Federation of Architects, Engineers, Chemists and Technicians (FAECT) and the World War II years (1943–45) saw one of the largest spikes in unionization by engineers (Garner 1974b; McDonald and Tomasula 2022). FAECT would go on to play a significant role in passing the Housing Act of 1937 that provided millions of dollars in subsidies to build low-income housing (McDonald and Tomasula 2022).

However, the ideological distinction between technical workers and their counterparts on the shop floor interfered with unionization efforts. For example, the Committee to Plan a Computer Union got off the ground in December 1970 in New York with the ambitious goal to create an industry-wide union which would include both professional (programmers, analysts, etc.) and non-professional workers (key-punch operators). However, a year later, the organizers had to admit failure in their efforts to do so—as Larry Garner, writing in *Science for the People* magazine write—"ascribing it to the fact that most computer workers held values which prevented them from seeing the meaninglessness of the work they are doing" (Garner 1974a). In some cases, the ambiguous position of technical workers in the production process has resulted in skirmishes between unions, thus weakening bonds of solidarity across workers against the employer and affecting organizing campaigns negatively. The Society of Professional Engineering Employees in Aerospace (SPEEA), started in 1944 and who waged and won the largest white-collar strike in the U.S. in 2000 against Boeing, came under jurisdictional attacks from the International Association of Machinists (IAM) District Lodge 751, who represented the blue-collar workers at the same Boeing facility. When the same IAM local tried to organize thousands of non-union, white collar Boeing workers in 2001,

they failed by a huge margin. When contrasted with SPEEA's organizing victory in 2000 in Wichita, Kansas, IAM's failure speaks to the role that professionalism and educational attainment can play in weakening worker solidarity (McDonald and Tomasula 2022).

Given the educational levels and perceived income levels, scientists are often relegated to the "professional-managerial class" (PMC)—a class that leans towards voting Democrats in the U.S. elections and have high income and education levels (Fertik 2018). However, a recent dissection of this stratum of class, especially as to who votes for Democrats, reveals that the PMC itself might be fragmenting—higher educational attainment doesn't necessarily translate to higher income levels (Maisano 2023a). While the general presumption has been that low-income folks tend to vote for Republicans, a closer look reveals that low-income low education voters have shifted their allegiance towards conservatives whereas low-income high education voters are still voting for center-left and left parties; high education low-income white voters also form the core social base for the left in capitalist countries. In fact, Maisano argues that "many PMCs are actually working-class" who are "pro-labor and pro-redistribution" (Maisano 2023b).

How do we make sense of this trend within the context of scientists? The term "scientist" has been used as a catch-all term for a diverse array of workers, ranging from graduate students to postdoctoral researchers and professors in an academic setting to technical workers in various engineering and tech industries. The income differential between a fully tenured professor compared to other academic workers, especially graduate workers and postdoctoral researchers, can explain the rise of the high education low-income group who are in favor of redistribution. The rise in living costs over the decades did not result in an adjustment of graduate worker salaries, the dire situation reflected in a 2020 national survey that found more than 25% of respondents suffered from housing or food insecurity (Langin 2022). On the contrary, universities have undertaken austerity measures to shore up their budgets. The increased accessibility of higher education to the public has produced a surplus army of academic labor who produce surplus value beyond the wages and benefits they take home (Torracinta 2020; Hasan and LaRock 2021).

The COVID-19 pandemic worsened the already stifling working conditions of lower-rung academic workers as universities put on hiring freezes and job prospects dried up, resulting in a severe crisis of their wellbeing (Nature Editorial 2020). Even as the NIH and NSF proposed salary scales

for graduate and postdoctoral workers, these guidelines often do not take into account differences in living costs across geographical regions. Moreover, compared to graduate workers, postdocs often do not get additional benefits such as childcare support, health insurance and retirement (Yalcin, Martinez-Corral, and Chugh 2023). It's not just the graduate and postdoctoral workers—in 2021, less than one—eighth academic scientists had tenure compared to more than 50% in the 1970 (Wu 2021).

Gorz had argued that an academic worker cannot succeed "unless [the workers] put the interest of capital (of the company or corporation or the State) before the interest of the people"—the curse of the worker belonging to the PMC (Gorz 1972). What would it take for the scientist to put the interest of the people before their careers in times of such precarity? Or in the words of the historian Gabriel Winant, what would it take "to turn [the PMC] against its masters?" (Winant 2019).

Resolving the Three-Body Problem

> It is a matter of assimilation of the scientist to the cause of the proletariat, to the construction of a new society in which he played his full part within the process and as a scientist. Science was to be developed by scientists, but a new type of scientist, with his feet more firmly on the ground, with his mind more opened to the whole, with his life and work more organically connected to the society of which he formed a part. – Christopher Caudwell[2]

The business model adopted by universities means that universities now actively contribute to social ills as landlords in areas with housing crisis, participants in the prison-industrial complex and exacerbate the climate crisis by investing in fossil fuel industries and deforestation (Torracinta 2020; Hasan and LaRock 2021). The neoliberalization of the laboratory during the 1970-80s incorporated aspects of an assembly line, thus further alienating scientists from the product of their labor and proletarianizing them (Wu 2021). The convergence of these two phenomena can perhaps provide a path to answering Winant's question above—as the contradictions heighten for scientists in the workplace and their daily lives, they can begin to see themselves as part of the proletariat and not apart from them. Thus, they can begin the transformation to the "new type of scientist" as referred to in the epigraph. Such transformation cannot be achieved only through the assimilation that Caudwell writes about, but also requires the self-realization by scientists that they are part of the proletariat—indentured into wage slavery, toiling way in the interest of capital—and the actualization of their organizing as workers, can we move the levers of power against capitalism and towards the greater good and thus, resolve the three-body problem.

2. As paraphrased by Helena Sheehan (Sheehan 2018).

While there is historical precedence of technical worker unions fighting for greater social benefits, e.g. FAECT fighting for housing subsidies as mentioned above, currently the union density in the U.S. is at its lowest. It also stands true that unions are not inherently emancipatory, and it was the communists and socialists within these unions who drove the agenda to fight for the greater good. The once-powerful industrial unions who were critical in passing the New Deal, and environmental regulations during Richard Nixon's presidency, now are on the backfoot after decades of internal corruption, disorganization and increasingly anti-labor legislation passed in the U.S. The working class is increasingly fragmented and decomposing, and mass movements in the last few years in the U.S., such as the Black Lives Matter and George Floyd protests in 2020, did not result in major sociopolitical changes. Given these conditions, the assimilation and actualization of the scientist to the proletariat, admittedly, seems to be a tall order.

The recent surge in STEM worker organizing across the U.S., especially into industrial unions such as the International Union, United Automobile, Aerospace, and Agricultural Implement Workers of America (UAW) and the United Electrical, Radio and Machine Workers of America (UE), can shed light into how this assimilation might take place. Currently, 20% of UAW membership are campus workers; the UE is continuing its streak of graduate worker organizing with announcement of a drive at Stanford University at the time of this writing (McDonald and Tomasula 2022). It's not only graduate student workers—the UAW is currently organizing fellows at the NIH as well (NIH Fellows United). In 2022, academic workers across 25 different universities voted to unionize by large margins (Eidlin 2023).

It's not just new organizing drives. Academic workers are also on a striking streak. Last year, 48,000 graduate workers, student researchers, postdoctoral scholars and academic researchers in the University of California system, represented by two UAW locals, held the biggest academic worker strike in U.S. history (Eidlin 2023). The reverberations of this strike were felt far beyond the state of CA. Emboldened by the offensive nature of the UC strike, the Temple University Graduate Student Association (TUGSA) went on strike for over a month starting at the end of January 2023. The strike ended with major victories including higher wages, paid parental leave and health insurance premiums for dependents (Quinn 2023). Per the Cornell University Institute of Labor Relations, there have been 19 academic worker strikes since January 2022 to date (ILR Labor Action Tracker).

These strikes, as sociologist Barry Eidlin writes, are not defensive, but rather are undertaken to "expand gains" (Eidlin 2023). The gains are not only financial, but also include social causes as well. For example, the bargaining platform of the Graduate Employees Organization at University of Michigan (GEO AFT-Michigan local 3550) include abolitionist measures, transgender healthcare and reproductive rights among others (GEO 3550). In 2021, after a 3-week strike, the Union for Graduate Employees at New York University (GSOC UAW local 2110) won concessions on getting police off of campus, in

the wake of the Black Lives Matter protests in the summer of 2020 (Eshghi 2022).[3] In 2018, the UAW local 4121 that represents over 2000 academic workers went on a strike and won numerous benefits including healthcare benefits for trans workers (Sanchez 2022). Reflecting on how labor unions can shift the balance of power, members of the Student Workers of Columbia (UAW local 2710) wrote "we need to consider the socioeconomic impact of our research and the exploitative relationships in our labs and departments. What motivates our research? Which institutions (military, governmental, or private) fund our research, and why? Finally, who stands to gain from the work we do, and how?" (Bartusek et al. 2022)—questions a scientist, who is a part of the proletariat, might ask.

Beyond social causes in their contracts, academic workers have turned out in solidarity with on campus service workers in a display for cross-class solidarity (Hasan and LaRock 2021). The integration of academic workers into UAW has planted the seeds of such solidarity, as UAW's Region 9 director Vicente called them "an invaluable asset" and that the academic workers "have been able to help us to try to organize ourselves" (Press 2023). With the upcoming contract fights for UAW with the big three automakers in the US, it remains to be seen what roles academic workers will play. But if the solidarity between striking academic workers and delivery drivers represented by Teamsters is any indication, it can be expected that academic workers will be on the picket lines if there are strikes.

It's not uncommon for social causes to be included in union contract fights —teachers' unions across the U.S. have historically employed what is called "bargaining for the common good" to fight for racial justice, climate justice, immigration reform and more (Bargaining for the Common Good 2018). Academic workers unions could also incorporate this strategy within their contract fights, especially considering the multi-faceted oppressive identities that a university inhabits today.

The three-body problem in physics, which involves three bodies orbiting each other trapped in corresponding gravitational forces, has no general solution. Instead, it can only be solved under particular conditions and the solutions found so far have relied on historical precedents (Cartwright 2013). Similarly, the problem of science vs politics vs activism does not have a general solution, but rather depends on the historical precedents and current conditions, as Marx has described in the process of historical materialism. Thus, it is necessary to understand the current class position of scientists and to realize that while scientific labor does not directly involve market exchange, the production of scientific knowledge follows the logic of capitalism, alienating scientists from their labor. To further the cause of the greater good, this alienation needs to be overcome so the power of capital can be challenged alongside social movements, just as history shows us.

3.This is in stark contrast to the performative Diversity, Equity and Inclusion efforts undertaken by universities in the wake of the 2020 uprisings (Prescod-Weinstein 2020)

REFERENCES

Aman, Talat and Zaporah Price. 2021. "Activists Demand Yale Professor Valerie Horsley Resign from Hamden Legislative Council." *Yale Daily News*. April 16, 2021. https://yaledailynews.com/blog/2021/04/16/activists-demand-yale-professor-valerie-horsley-resign-from-hamden-legislative-council/.

Armstrong, Eric. 2017. "Are Democrats the Party of Science? Not Really." *The New Republic*, January 10, 2017. https://newrepublic.com/article/139700/democrats-party-science-not-really.

Bargaining for the Common Good. 2018. "Concrete Examples of Bargaining for the Common Good." https://www.bargainingforthecommongood.org/wp-content/uploads/2019/06/Common-Good-Demands-Memo.pdf.

Bartusek, Sam, Paul Brown, Tess Jacobson, Claire Warner and Avi Zeff. 2022. "More Is Stronger: Only Radical Bottom-up Unionism Can Change STEM." *Science for the People Magazine* (blog). December 11, 2022. https://magazine.scienceforthepeople.org/labor-special-issue/more-is-stronger-only-radical-bottom-up-unionism-can-change-stem/.

Brewer, Mark D. 2005. "The Rise of Partisanship and the Expansion of Partisan Conflict within the American Electorate." *Political Research Quarterly* 58(2):219–29. https://doi.org/10.2307/3595624.

Cartwright, Jon. 2013. "Physicists Discover a Whopping 13 New Solutions to Three-Body Problem." *Science*. March 8, 2013. https://www.science.org/content/article/physicists-discover-whopping-13-new-solutions-three-body-problem.

Eidlin, Barry. 2023. "The Future of Academic Unionism Will Play Out in the University of California System." *Jacobin*. February 15, 2023. https://jacobin.com/2023/02/uc-strike-uaw-contract-academic-workers-conflict.

Eshghi, Iraj. 2022. "Power Struggles: Material and Cultural." *Science for the People Magazine* (blog). December 11, 2022. https://magazine.scienceforthepeople.org/labor-special-issue/power-struggles/.

Fertik, Ted. 2018. "(Occupational) Class and Party Identification." *Medium* (blog). October 30, 2018. https://medium.com/@ted.fertik/occupational-class-and-party-identification-72327cbdc045.

Fiske, Warren. 2021. "Elaine Luria Flips on Pledge to Refuse Corporate PAC Money." *Politifact*. February 5, 2021. https://www.politifact.com/factchecks/2021/feb/05/elaine-luria/elaine-luria-reverses-pledge-refuse-corporate-pac-/.

Garner, Larry. 1974a. "Computer Workers as Professionals." *Science for the People* 6 (6): 28–32.

———. 1974b. "Engineers and Unions." *Science for the People* 6 (6): 23–27.

Geiger, Abigail. 2014. "Political Polarization in the American Public." *Pew Research Center - U.S. Politics & Policy* (blog). June 12, 2014. https://www.pewresearch.org/politics/2014/06/12/political-polarization-in-the-american-public/.

GEO 3550. n.d. "Proposed Contract Changes: 2022-2023 Contract Campaign." Accessed. April 9, 2023. https://www.geo3550.org/wp-content/uploads/2022/09/Proposed-Contract-Changes-%E2%80%93-2022-2023-Campaign.pdf.

Gordin, Michael D. 2019. "Is Science Political?" *Boston Review*. August 21, 2019. https://www.bostonreview.net/articles/michael-d-gordin-science-political/.

Gorz, André. 1972. "Technical Intelligence and the Capitalist Division of Labor." *Telos* 1972 (12): 27–41. https://doi.org/10.3817/0672012027.

GovTrack, 2021. "Rep. Joe Cunningham [D-SC1]'s 2020 Legislative Statistics." *GovTrack.Us*. January 30, 2021.

https://www.govtrack.us/congress/members/joe_cunningham/412814/report-card/2020.
Grim, Ryan. 2021. "Sen. Mark Kelly Is Emerging as an Obstacle to the PRO Act." *The Intercept*. April 12, 2021. https://theintercept.com/2021/04/12/pro-act-mark-kelly-angus-king-dsa/.
Gurwitt, Sam. 2020. "Hamden Council Flat-Funds Ed Board." *New Haven Independent*. May 17, 2020. https://www.newhavenindependent.org/article/hamden_council_flat-funds_ed_board.
Hasan, Nafis and Timothy LaRock. 2021. "The PRO Act Could Be a Game Changer for Academic Labor Organizing." *Jacobin*. April 21, 2021. https://jacobin.com/2021/04/pro-act-unions-academic-workers-universities.
Hersh, Eitan. 2019. "Politics Is for Power, Not Consumption." *Boston Review*. November 4, 2019. https://www.bostonreview.net/articles/eitan-hersh-politics-power/.
Hourihan, Matt. 2019. "Update: In the Age of Trump, Congress Keeps Boosting Science Funding." *American Association for the Advancement of Science.* December 18, 2019. https://www.aaas.org/news/update-age-trump-congress-keeps-boosting-science-funding.
"ILR Labor Action Tracker." n.d. Accessed April 9, 2023. https://striketracker.ilr.cornell.edu/.
Kaurov, Alexander A., Viktoria Cologna, Charlie Tyson and Naomi Oreskes. 2022. "Trends in American Scientists' *Political Donations and Implications for Trust in Science." Humanities & Social Sciences Communications* 9 (1): 368. https://doi.org/10.1057/s41599-022-01382-3.
Langin, Katie. 2022. "Ph.D. Students Demand Wage Increases amid Rising Cost of Living." *Science*. May 23, 2022. https://www.science.org/content/article/ph-d-students-demand-wage-increases-amid-rising-cost-living.
Levins, Richard, and Richard Lewontin. 2007. "The Commoditization of Science." *Libcom.Org* (blog). June 12, 2007. https://libcom.org/library/commoditization-science.
Lupia, Arthur. 2023. "Political Endorsements Can Affect Scientific Credibility." *Nature* 615 (7953): 590–91. https://doi.org/10.1038/d41586-023-00799-3.
Maienschein, Jane. 2014. "Constructing Embryos for Society." In *Embyros under the Microscope: The Diverging Meaning of Life*, 216–52. Cambridge, MA: Harvard University Press.
Maisano, Chris. 2023a. "US Voting Patterns Are Shifting. But It's Not Simply 'Class Dealignment.'" *Jacobin.* February 1, 2023. https://jacobin.com/2023/02/us-voting-patterns-shifting-class-dealignment-education-income.
———. 2023b. "Class Politics Beyond the Blue-Collar?" Substack newsletter." *Labor Politics* (blog). February 14, 2023. https://laborpolitics.substack.com/p/class-politics-beyond-the-blue-collar.
Malm, Andreas. 2021. *How to Blow up a Pipeline*. Brooklyn, NY: Verso Books.
McDonald, Trent and Jewel Tomasula. 2022. "STEM Organizing in Waves: A Macro and Micro View." *Science for the People Magazine* (blog). December 11, 2022. https://magazine.scienceforthepeople.org/labor-special-issue/stem-organizing-in-waves/.
Mills, C. Wright. 2002. *White Collar: The American Middle Classes*. Fiftieth Anniversary Edition, Fiftieth Anniversary Edition. Oxford, New York: Oxford University Press.
Motta, Matt. 2020. "New Activism by Scientists Can Lead to Partisan Backlash." *Scientific American.* October 28, 2020. https://www.scientificamerican.com/article/new-activism-by-scientists-can-lead-to-partisan-backlash/.
Nature Editorial. 2020. "Postdocs in Crisis: Science Cannot Risk Losing the next Generation." *Nature* 585 (7824): 160–160. https://doi.org/10.1038/d41586-020-02541-9.

NIH Fellows United. n.d. "About Us | NIH Fellows United." Accessed April 9, 2023. https://www.nihfellowsunited.org/about/.

Oreskes, Naomi and Erik M. Conway. 2011. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Climate Change*. Reprint edition. New York London Oxford New Delhi Sydney: Bloomsbury Publishing.

Pagano, Michele. 2017. "Don't Run Biomedical Science as a Business." *Nature News* 547 (7664): 381.
https://doi.org/10.1038/547381a.

Prescod-Weinstein, Chandra. 2020. "The Rules of the Diversity and Inclusion Racket." *The Riveter* (blog). June 16, 2020.
https://theriveter.co/voice/the-rules-of-the-diversity-and-inclusion-racket/.

Press, Alex. 2023. "Can the UAW Rise Again?" *Jacobin.* March 31, 2023.
https://jacobin.com/2023/03/uaw-convention-bargaining-shawn-fain-reform.

Prof. Kim Nicholas *WeCanFixIt.substack.com* [@KA_Nicholas]. 2023. "Scientists, Don't Separate Activism and Research, Urges @JKSteinberger. We Need Ongoing Critical Reflection; Only Way to Understand a System Is Try to Change It. Activism Critical to System Change. 1/ Https://T.Co/NQMC0ZlOoH."Tweet.*Twitter*.https://twitter.com/KA_Nicholas/status/1636309592823980032.

Quinn, Ryan. 2023. "Temple Strike Ends after Grad Students Accept Deal." *Inside Higher Ed*. March 13, 2023.
https://insidehighered.com/news/2023/03/14/temple-strike-ends-after-grad-students-accept-deal.

Sanchez, Shua. 2022. "Building Power in STEM Requires Championing Broad and Local Goals." *Science for the People Magazine* (blog). December 11, 2022.
https://magazine.scienceforthepeople.org/labor-special-issue/building-power-in-stem-requires-championing-broad-and-local-goals/.

Schevitz, Jeff, Mike Hales, Joe Neal, Stonybrook SESPA, Britta Fischer, Mary Lesser, Al Weinrub, and Andre Gorz. 1973. "Which Side Are We on - A Forum on the Class Position of Technologists." *Science for the People* 5 (3): 4–29.

Sheehan, Helena. 2018. *Marxism and the Philosophy of Science: A Critical History*. Verso Books.

Sifferlin, Alexandra. 2018. "Why More Scientists Are Running for Office in 2018." *Time*. February 7, 2018.
https://time.com/5134417/scientists-running-for-office/.

Torracinta, Simon. 2020. "Extinction Event." *N+1* (blog). May 28, 2020. https://www.nplusonemag.com/online-only/online-only/extinction-event/.

Wessel, Lindzi. 2020. "Trump Catalyzed the March for Science. Where Is It Now?" *Science*. October 30, 2020.
https://www.science.org/content/article/trump-catalyzed-march-science-where-it-now.

Winant, Gabriel. 2019."Professional-Managerial Chasm." *N+1* (blog). October 10, 2019. https://nplusonemag.com/online-only/online-only/professional-managerial-chasm/.

Wu, Calvin. 2021."Socialize the Lab." *Science for the People Magazine* (blog). September 15, 2021. https://magazine.scienceforthepeople.org/online/socialize-the-lab/.

Yalcin, Esra, Rosa Martinez-Corral, and Mayank Chugh. 2023. "Retaining Postdocs by Recognizing Their Worth." *Nature Biotechnology* 41 (2): 296–98.
https://doi.org/10.1038/s41587-023-01656-4.

summer 2023 volume 2 | issue 2 | 29–42

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02203 ARTICLE

Reflections on Social Movements of Science in Contemporary India

Dhruv Raina and Omprasad

ABSTRACT: Social movements of science in India have had an important role to play in the democratisation of science for more than half a century. The participants in these movements have different understandings of the social relations of science, ideological agendas, and the social origins of the participants in these movements are quite diverse as are their educational backgrounds. The relationship of these movements with the state funded science and technology research system has been marked by ambivalence, now by antagonism and at other times as a resource to be cherished and defended. But the challenges facing them today are of a different order. The ascent of authoritarian regimes globally, as well as in the Indian political sphere pose a threat to the institutions of learning and knowledge production and dissemination. Beyond research institutes and universities facing up to the threat of political intervention and budgetary cuts, the academy that ensconces the three cultures of the sciences, social sciences and the humanities, is a divided house today. While there have been popular movements and democratic struggles led by students and farmers, in a post-truth world defence of the values and ethos of science and the world of knowledge as an open community of scholars oriented towards the production of robust knowledge needs to be defended again. This paper will address some issues presently faced by social movements of science encountering a populist and authoritarian regime. The paper argues why it is important to defend a socially robust theory of knowledge making and one of the arenas for disseminating this conception of knowledge relate to the specific struggles of the social movement of science today.

KEYWORDS: Social Movements, India, March for Science, post-truth, credibility of scientific knowledge, authoritarian governments, populism.

Introduction

The history of science movements in India for purposes of demarcation can be divided into two distinct phases. The first phase coincided with the first two decades of the achievement of Indian independence from British colonial rule

Raina, Dhruv and Omprasad. 2023. "Reflections on Social Movements of Science in Contemporary India." *Marxism & Sciences* 2(2): 29–42. https://doi.org/10.56063/MS.2310.02203

• *Correspondence:* Dhruv Raina, Zakir Husain Centre for Educational Studies, School of Social Sciences, Jawaharlal Nehru University, New Delhi. (retired)
• e-mail: d_raina[at]yahoo.com
• ORCID: 0000-0002-3251-4191
• DOI: 10.56063/MS.2310.02203
• *Received:* 04.04.2023; *Revised:* 24.07.2023; *Accepted:* 27.07.2023
• *Available online*: 05.11.2023

in 1947. During this phase the most prominent science movement was the scientific workers movement inspired by the Bernalist ideas of the relationship between science and society as well as popular front movements of scientists from the inter war period (Petitjean 1997; 2008). This moment is a particularly important one since it sits at the conjuncture of the end of the Second World War, the beginnings of the Cold War and the phase of de-colonisation in the Third world. The 1950s is also the decade marking the phase of institutionalisation of Big Science in India with the imperatives of industrial research, space research and nuclear research dominating funding and attention of science policy makers (Raina and Jain 1997). The second phase of science movements was in the 1970s and after. This phase is characterised by a disenchantment with the top-down model of the expansion of the domain of science and technology championed by the regnant paradigm of modernisation of the previous decades. Thus, this period saw the rise of ecological and social movements raising concerns of livelihoods and ownership of resources, habitats, and energy resources. Science and technology remained a concern of these movements to the extent that its application in aiding the state's development policy affected livelihoods, especially the livelihoods of those sections of society living at the margins (Raina and Omprasad 2023). Amongst the spectrum of social movements of those early decades of decolonisation, the Kerala Sashtra Sahitya Parishat (KSSP), inaugurated in the southern Indian state of Kerala in 1962 probably was the first of its kind dedicated to the democratisation of the cultures of science (Varughese 2002). By 1988 other progressive science movements from different parts of the country coalesced together to form an all-India platform of science movements called the All-India Peoples Science Network (AIPSN), which continues to exist till date and has an annual convention of all its constituent bodies (Venkateswaran 2020).

On the other hand, this essay maybe seen as the first in a preliminary effort on a subject that was researched *de rigueur* in India during the 1980s, when civil society was an important arena of science activism (Issac 1997; Krishna 1997; Raina 1997), as it was for those opposing the developmental agenda of the post-colonial sate from a neo-Gandhian standpoint (Guha 1988). As pointed out above, in the 1970s and 80s these movements were arguing for the democratisation of science and the struggle for its democratisation in the interests of wider social change and social revolution. The last two decades of the twentieth century were emblematic of the high tide of the progressive science movements in the country, while the first two decades of the present millennium appear—as a "business as usual" intermezzo, rather than a phase of permanent or continuing revolutionary struggle. It could be argued, contestably though, that the momentum of the 1980s and 1990s created the space for the stabilization of the programmes and efforts of what these movements

were seeking to achieve and the apparatus of the state proceeded to institutionalize some of these programmes, particularly those with some innovative promise (Delhi Science Forum 1989).[1]

At this juncture, one could ask whether the movements of the 1970s to the 1990s informed the practice of the sciences? And the answer would be that they did so in two ways. The science movements of progressive or the neo-Gandhian orientations played a significant role in placing new priorities for the scientific establishment, and over a period the scientific establishment had to incorporate these priorities into their institutional and funding priorities, although in monetary terms it did lay claim to a very small portion of that funding. But at another level, leading scientific institutions created, such as the Indian Institute of Science at Bangalore, the Indian Institute of Technology at Mumbai and gradually many others, Centres for research into problems of the rural areas and that over the decades grew into centres for the study of sustainable development and futures. But despite significant interest that these centres generated they remained at the margins of the national science and technology research system both in terms of the funding they received and the ability to attract researchers.

This process of institutionalization in the late 1990s meant that the campaigns and objectives of social movements were translated by a neo-liberal state into the language of projects and achievable targets and goals, be it in the area of drinking water or health or non-conventional energy resources or low-cost housing. We could then be led to ask if this transition occurred at the expense of the agitprop mode that characterised the earlier decades of these movements. In fact, several of these movements from the 1990s onwards formed coalitions and alliances with international movements such as the World Social Forum, which provided the banner for both joint and distinct local campaigns in their attempt to give concrete expression to an alternate vision of globalization, distinct from neo-liberal market driven globalization. Some of these programmes undertaken across national contexts were in the areas of health, reaching out to the global dimensions of health care while responding sensitively to specific regional contexts. (Purkayastha et al. 2021; Green 2019).

The Crisis of Scientific Legitimacy

However, over the last decade, following the resurgence of neo-fascist movements and authoritarian regimes, another space has opened for these movements and these have to do with the struggles of farmers and issues of public

1. This was the subject of discussion in a special issue of *Social Scientist* Vol. 17, 1989 to mark 50 years of the publication of J.D.Bernal's *The Social Function of Science*.

health. In these cases, the science movements joined hands with political movements agitating for farmers demands as well as those demanding more equitable health care schemes.[2] These struggles erupted at the national level. But a global movement that appears to have had a world-wide response, involving communities of scientists from across the globe as well as science movements was the "March for Science." This was purportedly a reaction and response to the use authoritarian regimes were making of post-truth rhetoric to delegitimate scientific expertise when the scientific communities' advice ran counter to the interests of the electoral constituencies supporting authoritarian regimes or those of the military-industrial complex.

These developments have been accompanied by structural transformations afoot over the last three decades within the world of science and impacting at the level of the institutional practices of science, that have altered the epistemic norms of science and asymmetrically skewed the internal mechanisms of prioritizing what is considered important in science and steers the efforts of scientists (Gibbons et al. 1995). John Ziman for one has elaborated upon the problems of post-academic science and the shift from CUDOS to PLACE as the new social norms of science (Ziman 2000). On the other hand, those speaking of the new production of scientific knowledge have announced the emergence of mode-2 knowledge production which brings with it a more robust social accountability and prompts the gradual shift from the overall scientisation of society—something that has unpacked over the last hundred years—to the gradual socialisation of science (Nowtony et al. 2001). Even if one were to accept the latter argument, it still needs to be asked which forces and interests steer this socialization. That scientists do feel constrained by the new social contract, that the worlds of the sciences have evolved in different national contexts is reflected in one of the slogans at the march for science campaigns in Europe: "laisse moi-penser."

We do not attempt to paint the 1970s and 80s as a golden age of the science movements in India, though they were animated decades, but there are very important differences between the context of the 1990s and the last decade. In India at least, the 1980s saw the emergence of movements for the democratisation of the sciences, which was part of a much larger process of striving for political and intellectual decentralization, striving for financial and programmatic planning and decision making at the state rather than the federal level (Parameswaran 2013). It was argued that this would facilitate imple-

2. The All India Peoples Science Network (AIPSN) which is a national level platform of different constituent science movements was consistent in its support of the farmers protests against arm laws brought in by the Federal government that took place in India in 2021–22. Their solidarity and support is well documented in the AIPSN website https://aipsn.net/. For the causes leading to the farmers movement and protest see Jodhka (2021).

mentation of plans at the state level and would add up to national development at the federal level. In today's changed world of science there is a patent disregard for the findings of science and the process that leads to the acceptance of well corroborated scientific theories. As McIntyre puts it a "hyperpoliticized do your own research on Google" has eroded trust in science. McIntyre suggests a shift from a preoccupation with scientific method to disseminating the "scientific attitude" that entails in the first instance a respect for and concern with evidence, and the ability to revise our beliefs in the light of evidence. Fundamental to the practice of science is the collective practice of testing and checking one another's findings (McIntyre 2019). In other words, there is the need to reaffirm the idea that the practices of science encode the ethics of science as well (McMullin 1982).

The Fractured Academy

At the turn of the millennium, with the wider distribution and accessibility to technoscientific systems and the ever-expanding applications of information and computer technologies—the digital revolution—the sorts of problems encountered at the societal level were variations of problems encountered across other national contexts.[3] In other words, trouble shooting in the United States could be sorted out sitting in Bengaluru. Nevertheless, the problems that afflicted rural India persisted and many of the problems addressed by the science movements were to be addressed in new formats. The mobilization of technoscience as a transformative practice and knowledge form to the still neglected realms of agriculture, rural livelihoods, energy, health and habitat were important priorities of civil society organization in the 1980s (Raina and Chowdhury 1997). The dimensions of the problems grew manifold over the decades, the research required to cope with these problems has also been institutionalised within the scientific academy as mentioned above. In the 1980s, the scientific infrastructure for "small science"[4] had to be created within "institutions of "big science" and the pressure from the science movements and civil society organizations helped steer this process of institutionalization and conferring on it a legitimacy (Raina 1993). But the more significant change that has taken place is that in the 1980s, a kind of weak technological determinism provided a scaffolding for the movements taking science to the people, as well as the efforts of scientists to develop new technologies (Winner 2001). However, the lessons that have been learned is

3. For a history of India's Information Technology sector see Sharma (2015)
4. We deliberately employ the term small science here as distinct from De Solla Price's "little science." In fact, what we refer to as small science here for convenience, has a great deal in common with Ravetz and Funtowciz's post-normal science (Funtowciz and Ravetz 1993).

that solutions to these problems cannot be technological fixes for the socio-cultural embedding of technology plays an equallly important role in the reception and optimal uptake of a travelling idea or system. Perhaps it is still too early to say but the expansion of AI may reverse some of these changes in perspectives and framings and movements may need to revise their imaginaries once again.[5]

But one says that with a great deal of caution. At another level a divide in the academy has divided movements; and this divide has to do with the cultures of the sciences and social sciences. If the tension between the sciences and the social sciences and humanities manifested itself in the Anglophone world in the debate over two cultures—there were pre-figurations of it in the Popper-Adorno debate. The debate raged over the methodology appropriate for social science research (Raina 2019). Steve Fuller reckons that this was a wasted opportunity for developing a more substantive engagement between the sciences and social sciences. The long-term outcome was that within the academy it dissipated the energy necessary for critique especially during a decade when neo-liberal educational policies began to transform the world of higher education on a global scale. In the process the cultural resources needed for defending the university as a site for autonomous inquiry were also absent (Fuller 2002, 365–80). Three decades later the culture wars were re-enacted, prompted by similar concerns but triggered off by scientists responding to the de-privileging of the epistemic authority of science, by science studies scholars (Gross and Lewis 1997). The science wars were not merely a defensive response from the scientific community but was symptomatic of its unhappiness with the cultural relativism that had received a new legitimacy with the rise of postmodernist thought (Baldwin 2008). We could say that we are now at a third moment in the science wars, which going by Latour's clarification is not so much a moment of rapprochement as one of turning science studies to critically look at science's critics (Latour 2004). In fact, this is a moment when the battle lines are not drawn between the sciences and the social sciences, but where the sciences and social sciences must defend their methods and domain specific expertise from the onslaught of populism (Ruane 2018). The urgency of this change in perspective reflects the exigency of a new concern with what has been termed as 'cosmopolitics' (Stengers 2010; Raina 2019).[6]

Speaking from within the sciences, enhanced computational abilities created a space for addressing increasingly complex problems in ways that

5. There has been an interesting discussion on AI and Society in the Boston Review. See for example (Acemoglu 2021)
6. The paper by (Raina 2019) engages in some detail with how the sciences and social sciences need to be brought into brought into conversation with each other.

criss-crossed disciplinary boundaries. This enhanced capability has encouraged the conversation between disciplines, and to a large extent a conversation between the sciences and social sciences (Chakraborti et al. 2016). However, what may be required is a more substantial conversation between these distinct domains than the extension of big data analytics to the study of social systems. The same can be said about the digital humanities, for the hard task of analysis, explanation and interpretation must proceed nevertheless. The problem is that there are serious concerns about democratic citizenship, since it is creating a system of steering human behaviour, of developing a system of digital surveillance far more efficient and thereby pernicious than the Benthamite panopticon. Byung-Chul Han argues that dataism sets the stage for a second enlightenment that demands that everything becomes data and information, for they afford a 'reliable and transparent lens.' But the soil of the second Enlightenment is data totalitarianism, or data fetishism.' The dream is propagated under the banner of ideological neutrality but is in fact an ideology that reaffirms data totalitarianism. Through a quantification of the self, the new digital pyscho-politics, that differs from the biopolitics driving statistics, intervenes deep into psychic processes (Han 2017, 55–70). The challenge then for the humanities, sciences and social sciences is not just to resist dataism, but to reveal the core premises of its agenda and to ensure the robustness of the concepts and methods of the emerging interdisciplinary fields that bypass this digital totalitarianism by counter posing memory, reflection, and democracy as the foci for defining a new academic culture (Raina 2019).

The last few years have been crucial and difficult for the science movements in India and require a different strategy of coping with issues of public health related crises—the pandemic, the development of vaccines and the controversies surrounding them, the environmental disasters in the form of flash floods, forest fires, drought etc. precipitated by the impact of anthropogenic activity on the climate have indeed been telling. On the Indian sub-continent, we do not witness any widespread mobilization or movements around these concerns, as we see in Europe. e.g., those led by Greta Thunberg. In other words, we do not have a counterpart of the new social movements that emerged in the 1970s in India around Silent valley, the protests around the establishment of the nuclear facility at Kaiga, or wider social movements such as the anti-big dam movement—the Narmada Bachao Andolan was possibly one of the biggest and long-lasting social movements in independent India. In all these cases, the resources of science, whether it related to seismic activity, hydrology, species extinction, forest management practices, were interlinked with the ideology and framework of development, that was constantly challenged and redefined (Raina et al. 1997). The main issue

related to the paradox that developmentalism as understood in the 1960s and early 1970s had contributed to unequal development, not to mention the ecological and environmental destruction it left in behind its wake (Gadgil and Guha 1994; Escobar 2011). The trail of unequal development was manifest in the disruption of rural life and loss of rural livelihoods as agriculture itself was threatened as forms of life and the numbers of the impoverished climbed as populations migrated to the city.[7]

But returning to the Covid pandemic, it appears that there was no significant resistance to the government of India's campaigns to get the population vaccinated, at least not of the order of resistance in Europe and the United States of America. The bottleneck in India was the timely availability of the vaccines. Nevertheless, there were several misplaced beliefs about the pandemic and during the early phases in certain regions doctors were attacked and the state had to respond by elevating them to the status of national heroes in order to protect them and ensure that the hospitals continued to function. In this case, the media informed by the medical profession and the state machinery played a role in dispelling these myths. There were nevertheless moments that had fateful consequences, when the state keeping its interests in mind, acted contrary to the advice of scientists.[8] But there was never really the necessity to take on the anti-vaxxers since that kind of resistance was miniscule.[9] But it is interesting to note that groups that were propagating anti-vaxxer ideas in the wake of the covid vaccination program across the world were relying on digital communication platforms like WhatsApp and Telegram for their propaganda.

While scientists and members of civil society belonging to various peoples' science movements were consulted on international climate change summits as experts, there was no movement for 'Climate Change.' Several university teachers, researchers and ecological activists have organised themselves into a platform called Teachers Against the Climate Crisis.[10] The activities of the coalition are oriented to sharing and disseminating research and initiating discussion around the most significant concerns relating to the Climate crisis. An important objective is to understand the phenomenon and its impact on regions, areas, and nations.

Perhaps one of the biggest challenges posed for science and the integrity of scientific knowledge has been encouraged by the accessibility to digital

7. See the essays titled "House of Bamboo" and "Reinventing Gandhi" in (Visvanathan 1997).
8. Scientists had warned the Indian Govt of a possible surge of covid cases sue to the delta variant. The Govt ignored such warnings. https://www.reuters.com/world/asia-pacific/exclusive-scientists-say-india-government-ignored-warnings-amid-coronavirus-2021-05-01/.
9. India, traditionally hasn't had a strong anti-vaxxer movement. This is partly due to the very successful publicly funded mass vaccination program for diseases like polio and small pox.
10. https://teachersagainstclimatecrisis.wordpress.com/

technologies and the social media and their amplification by political constituencies. This has to do with the increasing circulation of fake news that derives its justification from an epistemology of the post-truth regime. Fake news and disinformation campaigns have played an important role in the global de-legitimation of scientific expertise, that have received a great deal of support in nations with authoritarian regimes in power. Towards his last years the sociologist of science Bruno Latour pointed out that perhaps he had overdone his criticism of science and scientists, and the need of the hour was to defend science from the conservatism of the climate change sceptics (Poulson 2018). The Gifford Lectures that he delivered now published as *Facing Gaia: Eight Lectures on the New Climate Change Regime* is reflective of this turn. There is thus a need to reflect upon more than half a century of scholarship in the sociology of knowledge and the sociology of scientific knowledge and that influenced movements and through movements the wider social imaginaries of science more generally (Jasanoff et al. 1993).

The International of Science and Local Contexts

The de-privileging of validated knowledge claims considered by the scientific community to be robust has triggered off a reflective and assertive movement among scientists that was manifest in cities across the world and several cities of India in the "March for Science." This has since become an annual affair. The long and short of these marches was to foreground the slashing of public funding for research, reaffirm the significance of science in contemporary society and recover the authority conceded to the epistemology of fake news. Clearly, this time around the old positivist defence of science would not have worked and the community would have to take course to its varied resources. McIntyre's argument cited above has its sources in the recognition of these dimensions. In India, the movement was inaugurated by a group of scientists at the Indian Institute of Science Education and Research, Kolkata forming a coalition with colleagues in other colleges and research institutes throughout the country as well as the science movements affiliated, however loosely with the AIPSN. This came to be referred to as the 'Breakthrough Science Movement.'[11] Over the years it has operated as a coalition of diverse institutes and science movements and what really binds them together is a progressive conception of the role of science in society and a commitment to science as a body of valid knowledge. But beyond this it is very likely that these different strands have very different conceptions of the nature of science. The glue binding them to-

11. https://breakthroughindia.org/

gether is as pointed out, the need to defend science as a way of life and scientific knowledge and scientific understanding of the world around us as reliable, valid and robust.

The aftermath of the March for Science in India that first registered its presence in 2017, triggered a discussion in the country whose participants included philosophers and sociologists of science, social scientists and scientists (Sarukkai 2017; Pathak 2017; Siddharthan 2017; Thomas 2017; Surendran 2017). While the debate had echoes of the Science Wars of the previous century, much of it was not alive to the changed place of science in our society and did not engage with the organised efforts that are underway by various political groups to de-privilege knowledge produced on the back of robust empirical investigation. The concerns of those who perceived the demand of the March for Science for 'more science' in our society appeared to be out of place in a political climate which is hostile to the practice of open enquiry, the sharing of divergent opinions and has scant regard for democratic principles. Put in a different way, a critique of science and its relationship with power which was articulated in the 1980s does not have the same kind of purchase in today's context, where the authority of scientific knowledge as well as that of the social sciences stands challenged. A more fruitful engagement with this kind of political action by scientists would have been to examine the changing relationship of science and scientists with politics and the corresponding response of the science movements.[12] In this context, it does make sense to ask some "now and then questions."

The movements of scientists date back to the beginnings of the era of scientific internationalism after the first World War, transitions through the Nazi era with the formation of popular fronts of scientists, the World Federation of Scientific Workers during the Cold War, the movement for nuclear disarmament and non-proliferation, and witnesses some kind of revival in the March for Science (Someson 2008). But between the 1980s and the end of the millennium the world Federation of Scientific Workers appeared to have gone into decline. Thus, between the 1920s and the 1990s the weakening of the internationalism of science, with may be a brief interlude in the 1970's had to do with the retreat of the horizon of these activities from global and transnational engagement towards regional and country-based ones, although the concerns of sustainability and non-conventional energy sources continued to have an international or global dimension.

By the 1980s, the institutionalisation of science and technology even in the developing world was wider than during the decade of decolonisation, as a result of which the dependence on the developed world, at least in India had

12. A good example of this kind of engagement are the articles published in the journal Sociological Forum in the wake of the March for Science marches in the United States of America.

declined. In other words, local problems and local level implementation did not require the support of the developed world in every instance. The transition from the global to the local, not undermining the place that international collaborations continued to have, the deepening of the processes of professionalization and institutionalization in the developing world and the role of transnational organizations such as UNESCO, UNEP, UNDP, OECD etc inadvertently played a role in sustaining the autotelic organized international of science (Salomon 1971; Elzinga 1996). The momentum of these developments impacted upon the science movements at the national level as well.

Nevertheless, in the 1970s the coalitions of civil society organizations that included scientists amongst its members, as well those located at institutes of science teaching and research committed themselves to the problems considered relevant to the developmental needs of different regions of India. The research required to address these issues required contributions from interdisciplinary domains of research that had still to be institutionalised and acquire stability. This required at the time little steering from the outside. Once these interdisciplinary fields acquired institutional stability, they became amenable to the forces of internationalisation in any case. One cannot preclude the possibility that these techno-sciences had themselves entered a phase of finalization or the phase of post-normal science.

This does not mean that movements have run out of issues and concerns - far from it. But what movements have begun to take on as matters of concern has changed. The concern today in India, is that waves of identitarian politics have challenged the ideal of the unity of knowledge. This throws open the concern as to what needs to be popularised, defended and criticized in the sciences and from which vantage point. After one has factored in the voices from the margins and peripheries, the reliability, coherence and robustness of knowledge is still ensured without conceding to relativism. But science still needs greater engagement with inequality, poverty and an understanding of their connections with dimensions of nature in the Anthropocene.

REFERENCES

Acemoglu, Daron. 2021. "AI's future doesn't have to be dystopian." *Boston Review*. https://www.bostonreview.net/forum/ais-future-doesnt-have-to-be-dystopian/

Ashman, Keith M. and Philip S. Baringer. 2001. *After the Science Wars,* edited by Philip S. Baringer. Psychology Press

Baldwin, John D. 2015. *Ending the Science Wars*. London: Routledge

Chakraborti, Anirban, Dhruv Raina, and Kiran Sharma. 2016. "Can an interdisciplinary field contribute to one of the parent disciplines from which it emerged?" *The European Physical Journal Special Topics* 225: 3127–35.

Delhi Science Forum. 1989. "The Notion of Science According to Bernal." *Social Scientist* 17(3/4): 3—12.

https://doi.org/10.2307/3517356
Elzinga, Aant and Catharina Landström. 1996. *Internationalism and Science.* London: Taylor Graham.
Escobar, Arturo. 2011. "Development and the anthropology of modernity." In *The Postcolonial Science and Technology Reader,* edited by Sandra Harding. Durham: Duke University Press. 269-289.
Fuller, Steve. 2002. *The Kuhn-Popper Debate: The Struggle for the Soul of Science.* Icon Books.
Funtowicz, Silvio O., and Jerome R. Ravetz. 1993. "Science for the post-normal age." *Futures* 25(7): 739–55.
Gadgil, Madhav and Ramchandra Guha.1994. "Ecological Conflicts and the Environmental Movement in India." *Development and Change* 25(1):101–136. https://doi.org/10.1111/j.14677660.1994.tb00511.x
Gibbons, Michael, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, and Martin Trow. 1994. *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies.* London: Sage
Green, Andrew. 2019. "Amit Sengupta." *The Lancet* 393(10166): 24.
Gross, Levitt, and Martin W. Lewis. 1997. *The Flight from Science and Reason.* New York: New York Academy of Science.
Guha, Ram. 1988. "The Alternative Science Movement: An Interim Assessment." *Lokayan Bulletin* 6(3): 7–25.
Han, Byung-Chul. 2017. *Psycho-politics: Neo-liberalism and the New Technologies of Power*. London: Verso Books
Isaac, T. M. Thomas., Richard W. Franke, and M. P. Parameswaran. 1997. "From anti-feudalism to sustainable development: The Kerala Peoples Science Movement." *Bulletin of Concerned Asian Scholars* 29(3): 34–44. https://doi.org/10.1080/14672715.1997.10413092
Jasanoff, Sheila, Gerald E. Markle, James C. Petersen, and Trevor Pinch. 1993. *Handbook of Science and Technology Studies*. New York: Sage Publication.
Jodhka, Surinder S. 2021. "Why are the farmers of Punjab protesting?" *The Journal of Peasant Studies* (48)7: 1356–70. https://doi.org/10.1080/03066150.2021.1990047
Krishna, V.V. 1997. "Science, technology and counter hegemony—Some reflections on the contemporary science movements in India." In *Science and Technology in A Developing World*, edited by Terry Shinn et al. 375–411. Netherlands: Springer.
Latour, B. 2004. "Why Has Critique Run Out of Steam? From Matters of Fact to Matters of Concern." *Critical Inquiry* 30: 225–248.
McIntyre, Lee. 2019. *The Scientific Attitude: Defending Science from Denial, Fraud and Pseudoscience.* Boston: MIT Press
McMullin, Ernan. 1982. "Values in Science." *Proceedings of the Biennial Meeting of the Philosophy of Science Association*, 3–28.
Nowotny, Helga and Scott, Peter and Gibbons, Michael. 2001. *Rethinking Science: Knowledge and the Public in the Age of Uncertainty*. London: Polity Press.
Parameswaran, M.P. 2013. *Science for Social Revolution: A Reader*. Thrissur: Kerala Sasthra Sahitya Parishath
Pathak, Avijit. 2017. "Hubris of Science." *Indian Express*. August 12, 2017. https://indianexpress.com/article/opinion/columns/hubris-of-science-scientist-march-religious-intolerance-4792700/
Petitjean, Patrick.1999. "Needham, Anglo-French Civilities and Ecumenical Science." In *Situating the History of Science: Dialogues with Joseph Needham,* edited by S. Irfan Habib and Dhruv Raina. Oxford University Press: Delhi.

Petitjean, Patrick. 2008. "The Joint Establishment of The World Federation of Scientific Workers and of UNESCO after World War II." *Minerva* 46 (2): 247–70.

Poulson, Steve. 2018. "The Critical Zone of Science and Politics: Interview with Bruno Latour." *Los Angeles Review of Books*, February 23, 2018. https://lareviewofbooks.org/article/the-critical-zone-of-science-and-politics-an-interview-with-bruno-latour/#!

Purkayastha, Prabir., Indranil, Richa Chintan. 2021. *Political Journey in Health: Essay by and for Amit Sengupta.* New Delhi: Leftword Books.

Raina, Dhruv. 1993. "Technological determinism embodied in an appro-tech programme: Small science in a high-tech environment." *Journal of Scientific and Industrial Research* 52: 471–82.

Raina, Dhruv and Ashok Jain.1997. "Big science and the university in India." In *Science in the Twentieth Century*, edited by John Krige and Dominique Pestre. Amsterdam: Harwood Academic Publishers

Raina, Dhruv.1997. "Evolving perspectives on science and history: A chronicle of modern India's scientific enchantment and disenchantment (1850–1980)." *Social Epistemology* 11(1): 3–24.

Raina, Dhruv. 2019. "After the Two Cultures Divide: Transdisciplinarity and the Shape of Things to Come." In *Questioning Paradigms, Constructing Histories*, edited by Kumkum Roy and Naina Dayal. New Delhi: Aleph Books. 365–380.

Raina, Dhruv and Omprasad. 2023. "Small Movements, Big Problems: At the Margins of History of Science and Technology." Paper Presented at the *Workshop on"Civil Society, State and Science: Transformative Initiatives in/for Rural India 1980-2020,* January 22–23, New Delhi

Raina, Vinod, Aditi Chowdhury, and Sumit Chowdhury. 1997. *The Dispossessed: Victims of Development in Asia*. New Delhi: Manohar

Ruane, J.M. 2018. "Should sociologists stand up for science? Absolutely!" *Sociological Forum* 33(1): 239–41.

Salomon, Jean Jacquees. 1971. "The internationale of science." *Science Studies* 1(1): 23–42.

Sarukkai, Sundar. 2017. "A March from Yesterday." *The Hindu*. August 10, 2017. https://www.thehindu.com/opinion/op-ed/the-march-from-yesterday/article19459043.ece

Sharma, D.C. 2015. *The Outsourcer: The Story of India's IT Revolution.* Boston: MIT Press.

Siddharthan, Rahul. 2017. "Sundar Sarukkai's Claim That the 'March for Science' Was Unscientific Is Farcical." *The Wire*. August 11, 2017. https://thewire.in/science/sundar-sarukkai-march-for-science-scientific-temper-fundamentalism

Somsen, Geert J. 2008. "A History of Universalism: Conceptions of the Internationality of Science from the Enlightenment to the Cold War." *Minerva* 46(3): 361–79.

Stengers, Isabelle. 2010. *Cosmopolitics I.* Translated by Robert Bononno. Minneapolis: University of Minnesota Press.

Surendran, Aardra. 2017. "Why the 'March for Science' Was About the Social Sciences as Well." *The Wire*. August 20, 2017. https://thewire.in/science/march-for-science-scientific-method-sociology

Thomas, Renny. 2017. "Can Science and Social Science Really March Together?" *The Wire*. August 22, 2017. https://thewire.in/science/march-for-science-superstitions-latour-sal.

Varughese, Shiju Sam. 2002. *People's Science Movements: A Study on the Ideological Orientations of Kerala Sastra Sahitya Parishad*. MPhil Diss: Jawaharlal Nehru University

Venkateswaran, T V. 2020. "'Science for social revolution': People's Science Movements and democratizing science in India." *Journal of Science Communication* 19(6): C08.

Visvanathan, Shiv. 1997. *A Carnival for Science: Essays on Science, Technology and Development*. New Delhi: Oxford University Press.

Winner, Langdon. 2001. "Where Technological Determinism Went." In *Visions of STS: Counterpoints in Science, Technology, and Society Studies*, edited by Stephen H. Cutcliffe and Carl Mitcham. 11-19. SUNY Press.

Ziman, John. 2000. *Real Science: What It Is and What It Means*. Cambridge: Cambridge University Press.

summer 2023 volume 2 | issue 2 | 43–63

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02204 ARTICLE

Towards a Political Ecology of Knowledge: Reconnecting with the Legacy of Radical Science Movements

Antoine Lalande and Joëlle Le Marec

ABSTRACT: In this essay we discuss the legacy of the 1970s French radical science movement (FRSM) and the way they influence contemporary collective inquiries and personal commitments concerning different forms of knowledge production. Among other things, The FRSM explored new ways of knowledge production, inside and outside of academic institutions. However, due to the institutionalization of those critiques and their foundational function for disciplines like STS, their legacy has gradually become forgotten. The current renewal of critiques of science since the 2000s allows for a reconnection with this particular history. We show that even if many of them were more interested in a return to an ideal autonomous science, they often also underline the fact that precariousness constitutes a condition that reveals what really counts in science and knowledge. We claim that in this way those critiques help us seriously consider the living and dead aspects of science and, consequently, how to protect or undo them. Critical approaches that consider actual asymmetries and precariousness could become the basis for a political ecology of knowledge.

KEYWORDS: French Radical Science Movements, legacy, STS, knowledge, precariousness, vulnerability, Political Ecology of Knowledge.

Introduction

In this essay, we would like to discuss a way to continue certain aspects of what we term the French radical science movement (FRSM) of the 1970s. A disclaimer first: we have chosen the term FRSM not to label different social movements, but rather in a generic sense to talk about a set of agents (scientists and workers in universities and research centers), events, ideas and texts, all of which made a selfcritique of the world of research during the 1970s. Indeed, this movement was above all characterized by an intensive production of alternative literature (Babou and Le Marec 2013). Important actors and authors of this period were brilliant young researchers, such as the physicist Jean-Marc Levy Leblond, the mathematician Alexandre Grothendieck, or the

Lalande, Antoine and Joëlle Le Marec. 2023. "Towards a Political Ecology of Knowledge: Reconnecting with the Legacy of Radical Science Movements." *Marxism & Sciences* 2(2): 43–63. https://doi.org/10.56063/MS.2310.02204

• *Correspondence:* Antoine Lalande, GRIPIC - Sorbonne Université, Paris.
• e-mail: antoine.lalande13[at]gmail.com
• DOI: 10.56063/MS.2310.02204
• *Received:* 05.05. 2023; *Revised:* 18.07.2023; *Accepted:* 22.07.2022
• *Available online*: 05.11.2022

biologist Pierre Clément. They preferred to use their reputation to shatter the illusion of a pure science inspired by individual genius, excellence, and scientific neutrality; additionally, they harshly denounced what had until then often been hidden or forgotten: the military, industrial, and political interests behind funding, but also gender and social inequalities, domination, brutality, and precariousness in institutes and laboratories—or a lack of sensitivity, reflexivity, and political consciousness throughout scientific communities. While the eminent researchers of the 1970s can appear today as the main figures of the movement, many others (women, students, technicians, administrators, and all kinds of mental workers) also contributed to alternative press with testimonies, inquiries, and analysis about the internal life of science.

However, all these agents did not consider themselves part of a single collective movement. It was only later that researchers understood them retrospectively in terms of "*critique des sciences*." This kind of rationalization is related to the French STS community (*Sciences, Technologies et Société*) and to science studies in general, although both are more about constructing sociological and historical standpoints about science than a radical transformation of science itself. When the FRSM almost disappeared during the 1980s, science studies developed inquiries based on questions previously discussed in a political perspective, such as feminism or practices of everyday life in the laboratory. In this way, these disciplinary studies followed up on but at the same time moved away from the perspectives of the FRSM.

Now, we would like to show in this essay how the reappropriation of that older legacy suggests new terms of a possible articulation between FRSM and institutional commitments. More precisely, we are looking for a kind of inquiry that is less concerned with conceptual performance and more sensitive to the transformative aspects of knowledge, especially for those who produce and share it from institutional sites or from their fieldwork understood as *social spaces*. In this way, we would like to focus more on the question of knowledge and find a way to characterize it not as a production, used to act on dominant or dominated subjects, but rather as a form of life with bearings on practice. In this way, knowledge can be seriously transformed or redefined from its conditions of existence and collective experiences such as precariousness, and vulnerability.

This question is all the more important to us because today most of scientific communities do not feel committed to the knowledge they produce in terms of their societal, socio-economic and ecological consequences. Indeed, they often even admit in their daily organizations an adherence to harmful reforms and management models—or what has been called "zombies" categories (Beck and Beck-Gernsheim 2002). If in the 1970s FRSM participated in the creation of editorial projects that have since become the corpus of leftwing

critiques of scientific institutions, they do not seem to have had a fundamental impact on the academic and the higher educational system. On the contrary, since the 1980s, this system has kept on organizing itself not as a *place for experimentation* based on what we learn from knowledge about science, but rather as *a place of rationalization or better optimization* of scientific production and professional training.

In the 1970s, FRSM did not only targeted the implication of science in the capitalist system or its participation to a dominant ideology. Some of these critiques also underlined the alienated state of knowledge produced within scientific institutions and their destructive aspect on living beings. Hence, in a contemporary context of ecological ravages which threaten the survival of human and non-human species, a reflection on the legacy of FRSM is for us not only necessary but vital.[1]

Since we both are researchers and activists involved in STS, we feel obliged to reconnect with that history in order to reflect our commitment. Indeed, since many years, we attempted to characterize in what sense knowledge may be said to be alive or dead, or zombie—most of the time in places that are not the big science centers. Just like 1970s FRSM, we are convinced that the realm of the living does not have to be restrained to entities of nature. It also has to encompass the field of cultural productions, such as science, since their products and conditions of production have consequences on human and non-human lives.

However, this kind of reflection on knowledge seems to be largely absent from the political mobilizations in French scientific communities over the last twenty years. From collectives such as *Sauvons l'Université* in 2008 to *Facs et Labos en lutte* in 2019, movements have fought against a series of reforms designed to increase competition, standardization, and 'productivity' in the universities. Their critique, however, focused more on the neoliberal turn within scientific and academic institutions. As a result, the rise of precariousness and the suffering caused by the deterioration of working conditions have marginalized issues related to the relevance of knowledge produced within scientific

1. We do not refer here to what can be understood as anti-science movements. In this text, we study FRSM as a self critique of science, related to reflexivity and to a political vision of knowledge as a common good. However, French public policies for science has kept on trying to rank this type of critique on the side of anti-science movements since the 1980s. In France indeed, this interest of political staff aims at reaffirming a link between science and republican universalism. In this way, the so called struggle against mistrust, ignorance and ideology often has hidden the promotion of a non-critical vision of science. In 2021, Research Minister Frédérique Vidal did not hesitate to highlight the dangers of a so called "islamistic leftism" in French universities. In fact, this attack targeted gender, class, race and decolonial studies that did not match with an universalistic vision of knowledge. The French scientific community has strongly rejected this category and this attack (Vidal 2020).

institutions. From then on, the main problem of science seems to be essentially the loss of autonomy and funding. These are real problems for us, but we also must question the weakness and faults of the knowledge produced and promoted by these policies.[2]

By reconnecting with the history of the FRSM, we want to show that the question of legacy does not only mean accepting to be entangled in a continuum of infrastructures and relations for which we would be forced to take responsibility. Rather, it also implies reflecting on how we want to engage with a history "in a way that acts as a relay, that is, that affirms the new data and new unknowns" that emerge in a particular place and moment (Despret and Stengers 2011, 51). Consequently, the legacy of science in general and the question of ideology in science studies in particular challenges us to think about the living dimension of knowledge in relation to an awareness of vulnerability (Omodeo 2019).

In the first section, we show how the FRSM began to emphasize and to confront the issue of the living dimension of knowledge, but also how this dimension has disappeared through the institutional capture of these critiques and the rise of issues specifically linked to the neoliberal turn. In a second part, we demonstrate how the massive and global dimension of multiple experiences of precarity and forced mobilities in the academic world has influenced reflections on knowledge. In particular, we show how this can be seen as a reactivation due to a densification of situated standpoints produced by these situations of precariousness, connected to a theoretical post-dualistic turn beyond the split between nature and culture since the 1980s.

Finally, in a last part, we explain how this new context allows us to propose the frame of a political ecology of knowledge so as to discuss the ways of inheriting science and its knowledge. This framework has to be understood not only as a theoretical tool that would lead to reproducing the conditions of a non-sustainable form of knowledge, but also as a way to encourage an open and collective inquiry into how to protect what we feel as being alive and to divert what we feel as being zombified or dead in knowledge.

A Brief History of The Reception of The FRSM (1968–2023):

2. Recently the competency-based approach has gone so far as to challenge any reference of research-based knowledge in university trainings (Boutin 2004).

From A Radical Critique of Scientistic Ideology to Knowledge Produced from Precariousness

Until the end of the 2000's, the history of the FRSM has largely been ignored by the official history of French science studies (Berthelot et al. 2005; Pestre 2006; Joly and Bonneuil 2013). Today, thanks to the work of researchers whose project was to demonstrate the political roots of French STS, Ph.D. theses and investigations on the movement have gradually multiplied (Quet 2009; Faury 2012; Debailly 2012; Babou and Le Marec 2013; Pessis 2014–2019). In fact, between 2004 and 2007, several seminars on these topics took place under the name "*Sciences, communication et société,*" organized by *CRICS - Université Paris 7* and *C2SO - ENS Lettres et Sciences humaines de Lyon*. This has led to the creation of a website (https://science-societe.fr/), initiated by Igor Babou and Joëlle Le Marec, which has allowed the publication of documents related to the history of the FRSM and French STS.[3]

By way of a conceptual archaeology, Mathieu Quet showed in his 2009 thesis about *participatory science* during the 1970s that the idea of public participation in science had its origins in critical journals as well as in institutional government reports designed to counter public distrust of science. In 2012, Mélodie Faury defended her thesis which partly focuses on the history of the GERSULP, one of the very first 'laboratories' dedicated to the study of science in France. In the same year, sociologist Renaud Debailly also defended a thesis on the emergence of FRSM in France, focusing on the trajectories and social characteristics of the people behind them. Finally, historian Céline Pessis defended her thesis in 2019 by exploring the history of scientists' ecological commitments from the 1940s to the 1970s. This work led her to produce a precise history of the collective *Survivre et vivre* (Pessis 2014), and it also allowed her to directly question the issue of knowledge by explaining how huge areas such as soil science emerged but had disappeared almost entirely in the 1980s.

Contemporary ecological issues and the neoliberal turn in French universities have rekindled a new interest in these movements (Abreu and Boureau 2020; Hagimont et al. 2021). Still, a lot of work remains to be done. However, in the recent academic struggles in France, there has not been an effective reappropriation of FRSM history and legacy, a circumstance which remains somewhat of a puzzle to scholars who have been working on this topic.

3. The following academics and Ph.D. students have also actively participated to this project: Claudio Broitmann, Sarah Cordonnier, Mélodie Faury, Philippe Hert, Christiane Kapitz, Pierre Mounier, Mathieu Quet and César Carillo Trueba.

This general assessment, however, does not mean that the FRSM has totally disappeared today. Indeed, even if the contemporary movements in universities do not refer explicitly to the collectives and people who fought in the 1970s, they produce critiques about the same problems (entrepreunarial management, competition, etc.) for a new context characterized by the massive number of people in precarious employment and the seriousness of environmental emergencies. The epistemological context also changed with a break-through, following the publication of Philippe Descola's (2005) *Beyond Nature and Culture*, and a strong critical reflexivity about Northen "naturalism" as a specific ontology which is no longer considered a universal point of view.

In this way, the analysis of the living and dead aspects of the FRSM should be made according to the following criteria: 1) The material conditions of scientific institutions and 2) the different means organized by the State to enable a reflexive knowledge of science and its institutions (Pessis and Angeli Aguiton 2015).

Consequently, recent works more specifically attack new public management policies applied to scientific institutions and higher education, as well as the precariousness faced by many students and young researchers who wonder more and more if it seems worthwhile to pursue an academic career.

We claim that despite the different tensions that motivate these critiques, the recent mobilizations can be understood in continuity with the FRSM. If they keep on criticizing the working conditions and the organization of national research, which have always been part of FRSM, some of them are also motivated by a critique of standpoints and ideologies related to scientism. Despite the temptation of defending the autonomy of science, which has been damaged by neoliberal policies, recent movements continue to fulfill the idea of an exploration of knowledge outside the ideological representations of scientism. Indeed, since the 1970s, the idea of finding places and practices for science outside scientific institutions, that would not renew with their antisocial and senseless dimensions, constitutes a continuity of FRSM. Consequently, it is not our purpose here to sum up the whole history of FRSM, which has already been done by the scholars quoted above. We want more essentially to share the way by which this history keeps on motivating the exploration of what constitutes the living dimensions of knowledge.

First of all, the FRSM of course has to be seen in the context of the general contestation of May 1968 and other international radical science movements, especially in the United States and Great Britain.[4] But the birth of FRSM can

4. As they were frequently invited to America or Great Britain for their scientific activities, Renaud Debailly underlines how radical science movements of those countries may had an influence on Jean-Marc Lévy Leblond or Alexandre Grothendieck (Debailly 2015).

also be located by relating it to moment when modern science was institutionalized, from the middle of the 19th century onwards. As explained by Bernadette Bensaude-Vincent, the development of modern science in France has been shaped by debates about how science may be a worldview or a mass culture accepted and shared by the people, while discussing how to make sure that its processes of knowledge production would not be overly transformed by its popular appropriations (Bensaude-Vincent 2003). In this way, the main issue was to discuss who has the right to practice science and to claim its authority and, more essentially, what the limits of science in society are and what legitimate knowledge actually is. Consequently, this is why most working-class activists, from socialists to anarchists, were particularly hesitant about the development of science. If it could be a source of emancipation, its automization through bourgeois scientists could also lead to the oppression and alienation of working class.

This tension continued in France following the end of the Second World War, which was the same period that the radical science movements emerged from. Following the reactions to the atomic bombs used in Hiroshima and Nagasaki, French intellectuals and scientists such as Joliot Curie joined the World Federation of Scientific Workers and the United Nations Educational, Scientific and Cultural Organization (Debailly 2015). At the time, the aim of these international organizations was to create a scientific network so as to prevent the uses of science and technologies from war and destruction of humanity and also to question the implication and the social responsibility of scientists across the world. But as the Cold War and the Lysenko Affair deeply weakened these organizations, the involved scientists' particularity was their use of specific representations of relationships between science and society. According to them, the main issue was not the discoveries that science could make, but rather the uses of science made by political institutions and corporations. Consequently, science was still presented as something pure by nature, and the duty of scientists was to make sure that their creations would not be distorted.

In this way, FRSM was precisely born at the end of the 1960s in opposition to this representation of science and society, but in a very specific context. Indeed, in France from 1945 to 1974—and as in any other Western country—funding in research and development considerably increased in the context of economical planning. After a period of post-war reconstruction, during which scientific research was not a priority, the takeover of Général De Gaulle in 1958 deeply changed research policies in France. From then on, the main goal was to ensure that France could gain its independence from the United States, more specifically in strategic fields such as nuclear power and genetics. Moreover, social sciences such as sociology also benefited from high public investments with the goal of understanding and preventing social issues from the

consequences of France's industrialization. This tendency explains their relatively poor reputation at that time, because they were perceived as sciences of social control.

But while scientific research became more and more dependent on military and economical aims of the State, the 1960s and 1970s were also characterized by a strong boom of student numbers. Indeed, from 1958 to 1968, the number of students in France increased from 180,600 to 508,100 (Debailly 2015). Consequently, governments reacted by hiring new teachers with precarious contracts and building new universities in the peripherals of main academic cities, such as Nanterre near Paris or Luminy in southern Marseille. While these new institutions allowed for new ways of experiencing knowledge by students, their relative autonomy from inner cities also brought students closer to the marginalized population living in these peripheries.[5] This marks a change in the image of modern science in France at the end of the 1960s, which had little in common with the pre-war situation. Along with the political awareness of the time, the spatial transposition of academic and scientific institutions thus made it difficult for people who were about to be involved in FRSM to disconnect science from its social context of production.

In this way, the critique of science related to the critique of society and the state and, starting from May 68, was expressed in regular strikes in laboratories and universities as well as in public statements made by famous scientists, such as Jean-Marc Lévy-Leblond and Alexandre Grothendieck (Lévy-Leblond 1970). Grothendieck even offered his Fields' Medal to the government of North Vietnam in 1967 and then resigned in 1970 from the Institut des Hautes Études Scientifiques (IHES) after finding out that it was partially funded by the Ministry of Defense.

Above all, the FRSM was structured by a lot of DIY journals published between 1970 and 1980. Each of these journals had its own editorial policy and allowed for a structured discussion as well as a formation of collectives by way of their critique of science (Babou and Le Marec 2013). For example, the specificity of *Labo Contestation*, published between 1970 and 1973 in Lyon, was to focus on the struggles against labor's organization inside scientific laboratories, with detailed and situated descriptions of working conditions, for precarious researchers, lab assistants or secretaries, this journal authorized a kind of a free speech so as to criticize the power of lab directors and the division of labour in the production of legitimate knowledge. As another journal of this type, *Le Module enragé* (1975), the aim was also to show all the things that were necessary so as to sustain the infrastructures of Big science.

5. On the case of Nanterre, we can refer to the works of Victor Collet (Collet 2019).

In a very different style, Survivre (1970–1975), which then became *Survivre … et vivre*, had a goal to elaborate an external critique of science according to its social consequences but also to imagine other ways of practicing scientific knowledge outside official institutions. According to Mathieu Quet, the journal, which also served for the organization of a collective of political ecology around Alexandre Grothendieck, was formed for ecology and against the military (Quet 2009). The journal gradually changed: they accepted the idea that laypersons could also have knowledge about science and its consequences, which introduced the possibility of an alternative knowledge on science, related to capacity of creation and wellbeing.

The feminist FRSM had also developed its own reflection about science and how to address some aspects of scientific practices which were not recognized by academic institutions (Peiffer 2000). For a long time, they had targeted the sexist and masculinist conditions of laboratories and questioned the low number of women holding a position as a scientist. They also explored the experience of being a woman in science. Perhaps more than other types of critiques, the feminist standpoints on science had to face the issue of their institutionalization. Indeed, their productions appeared as being strongly split between, on one hand, activist practices, such as in the *Mouvement de Libération des Femmes* (MLF) and its journal *Le Torchon brûle* (1970–1973) and, on the other hand, academic reflections through theoretical publications. Consequently, there appeared very few feminist critiques of science in the ephemeral journals of FRSM.

One reason for this fact may be that radical science movements of that time were predominantly composed of men, similar to the French scientific field more generally (Gardey 2005). This situation left little room for women scientists to express their own experiences in science. However, publications organized around Jean-Marc Lévy-Leblond, such as *Auto-critique de la science* and the ephemeral journal *Impascience*, enabled the expression of women's subjectivities in science so as to transform it from inside. This is what led to the creation of several theoretical journals, such as *Pénélope* (1979–1985) (Dauphin 2001), which aimed to reclaim the power of producing knowledge of women by women in different academical disciplines (history, philosophy, biology, etc.).

Largely, feminist FRSM ideas were produced outside scientific institutions, especially during the birth of ecofeminism in France, inspired by Françoise d'Eaubonne. She proposed a reflection about the embedding of science, patriarchy, State, and capitalism as being responsible of the living's destruction and the cooptation of women's body (d'Eaubonne 1974). In this way, this feminist activist claimed that the preservation of life on Earth was the duty of women, which implied the invention of other types of knowledge. But, on the opposite

of most feminist critiques, ecofeminism had faced the issue of its institutionalization much later, when the works of Françoise d'Eaubonne happened to be rediscovered in the 2010s (Cambourakis 2018).

Beginning in 1980, FRSM declined and became depoliticized. While FRSM was booming in the 1970s, the State and academic institutions had also developed their own analyses of science in society, which gradually absorbed critical perspectives of science and technology. According to Mathieu Quet, France had indeed started a technology assessment policy during the 1970s by following the discussions that occurred in the Organisation for Economic Cooperation and Development (OECD) (Quet 2009). Moreover, the technological controversies of this period favored the constitution of STS in France, then directed by the General Delegation of Scientific and Technical Research to the Prime Minister, so as to understand the consequences of science's development on society.

Those State orientations permitted the constitution of an STS field with the creation of the *Science, Technique et Société*'s CNRS program in 1980, as well as the Conservatoire National des Arts et Métiers (CNAM) and the École des Mines, where Bruno Latour and Michel Callon started to frame their Actor Network Theory (ANT). Even if most French STS works of that time had kept their critical roots, their slow institutionalization had cut those reflections from social movements that contested science and technologies. The journal *Pandore*, directed by Bruno Latour from 1978 to 1983, is a good example of that transition. As the beginning of the journal was radical, it quickly became a tool for editing English-speaking science studies so as to create a new field of investigation in France (Debailly and Quet 2017). In her presentation of the digitized corpus of *Pandore* for the website *Science Société*, Sarah Cordonnier analyzes the transformation of the journal by underlining the increasing of contributions coming from social science's academics and their use as ressources for extended bibliography for the STS community (Cordonnier 2005).

From then on, the French STS field was institutionalized thanks to interdisciplinary fields encouraged by the State (Berthelot et al. 2005). In this way, Information and Communication Science, an 'interdiscipline' officially created in 1975, become a welcoming ground for a significant part of the STS community (Jurdant 1984). This was especially for scholars working on scientific popularization such as Baudouin Jurdant, Daniel Jacobi, and Suzanne de Cheveigné. But disciplinary legitimacy plays a major role in the French academic establishment, which also enabled an epistemological debate about the distance between "excellence" and radicalization of the conception of truth through the relativity of science's knowledge (Quet 2009). Indeed, the more

"political" they were perceived, the less "excellent" they appeared to be and therefore, appeared to be less legitimately part of institutions (Gingras 1995).

The disciplinarization of FRSM also took place due to a change in the State's policy or rather, response to top-down science and technocracy starting from the presidency of François Mitterrand (1981–1995). So as to prevent the risks of "irrationalism" and "anti-science" opinions in society, successive governments tried to silence critical scientists through the creation of institutions which resolved technologies controversies and research orientations' issues (Pessis and Angeli Aguiton 2015).

Consequently, most of the associations that perpetuated the FRSM, such as the Fondation Sciences Citoyennes initiated by the biologist Jacques Testart, had been more and more associated to institutional initiatives (Pessis and Angeli Aguiton 2015). From the end of the 1990s on, the FRSM seems to have disappeared through its recuperation by public policies. Even if this movement could be maintained and updated among a rather informal network of researchers interested in reflexivity and relevance of knowledge, the French academic context was far too busy with performance, competition, and productivity to assume transformations of the relation between science and knowledge.

For most intellectuals in social science, who found a commitment's revival with the general strikes of 1995, science was indeed still perceived as being a source of emancipation for the working class and activists. For most of them, the issue was to find a means of spreading knowledge of social science to the public, often by ignoring ideas produced by FRSM after 1968. For instance, this led to several misunderstandings between social scientists and working-class people, as shown the famous passing of Pierre Bourdieu in the Val Fourré social housings in 1999.[6] Moreover, the liberal turn of scientific policies had above all incited those scientists to call for a stronger autonomy of the scientific field. Consequently, the FRSM was inaudible for those new generations of researchers.

From the 2000s onward, successive neoliberal reforms of universities and scientific institutions put into question the relations between scientists and science. Indeed, since the 1997 Bologna Process, France has increasingly adapted its research policy following the idea of the economy of knowledge directed by the European Union. In 2004, Philippe Aghion and Élie Cohen's report entitled *Éducation et croissance* called for a reform of universities and research so as to offer their services to economical innovation and the labour market. This led to several neoliberal reforms: Licence-Master-Doctorate Reform (2002), *Loi Relative à l'autonomie des universités* (2007), *Loi ORE* (2018),

6. This scene has become famous thanks to the documentary produced by Pierre Carles on Pierre Bourdieu, La sociologie est un sport de combat (2001).

and *Loi de Programmation de la Recherche* (2020). In this way, this structural reform broke with the ideal of a public service university and increased academic instituions' dependency from the market. It also led to a strong deterioration of working conditions, as universities faced less funding and fewer workers, even as the number of students was increasing.

In these conditions, oppositional movements against these reforms appeared divided in their reactions. In 2004, a research collective named Sauvons la Recherche organized to protest the diminution of State funding and the urge for scientific productivity. This movement led to the resignation of 2,000 lab directors from their administrative tasks in order to pressure the government, which finally accepted the organization of the États généraux de la recherche to evaluate the state of national research with scientists. But the focus on funding issues was immediately criticized by other scientist collectives, in particular by the Collectif Oblomoff and Sauvons l'Université.

The latter collective was created during the 2008 academic and student mobilizations against LRU. In opposition wtoith the restrictive lack of funding protests expressed by *Sauvons la Recherche*, the aim of this association consisted of coordinating different universities' mobilizations between 2008 and 2009 by attempting to impart a difficult and fragile professional consciousness from students to teacher-researchers. The aim here was to defend the idea of a public service university, where knowledge would be produced for common interest and would ensure social emancipation for everyone free of any imperative toward professionalization imposed by labour market.

Unfortunately, this conception of science and universities has not been sufficient enough to be successful, since the difference of status and professional interests in universities and scientific institutions have become heterogeneous (Geay 2010). However, this idea has continued until today, with other collectives created during the LPPR protests between 2017 and 2020 such as *Rogue ESR*, *Université Ouverte* or *Facs et Labos en lutte*. But each time, the preoccupation of those collectives appears more to be a defense of a scientific autonomy rather than a questioning of the relevance of knowledge produced within those institutions.

However, this questioning sporadically has reappeared during that last twenty years. When the direction of universities started to shape security policies on campuses in order to protect them from what were considered deviant uses, a few groups of anarchist students in Nanterre decided to break down an entire wall aimed at restricting student's movement (Collet and Lalande, 2021). This action was aimed at preventing universities from becoming a simple place of consumption of knowledge and professionalization, rather than places of life open to everyone and where knowledge could be experienced freely outside of classrooms. In the 2008–2009 and 2020 protests,

Marxist standpoints were expressed to criticize the ideal of an autonomous university separated from society. In this way, they maintained the fact to consider universities within the capitalist system, that is to say as an instrument which above all aims at reproducing the labour force for the expectations of the labour market (Barot 2010; Brick and Albert 2020).

At the end, one of the few collectives which seems to have continued the spirit of the FRSM, by referring explicitly to them, is the *Collectif Oblomoff*. However, we must be cautious, as many informal active networks have not sought to gain visibility but wish to protect their specificity. It is therefore difficult to talk about them, which also runs the risk of perpetuating a distorted image of the state of FRSM.

Collectif Oblomoff was led by scientists of Grenoble, and this informal group maintained a general critique of scientism and was particularly critical of their colleagues who complained about the lack of funding and the loss of their supposed autonomy (Oblomoff 2009). For this collective, the scientific community also had to face the social and ecological consequences of their productions. This is why the collective ironically chose the name of Oblomoff, so as to oppose themselves to the vision of one scientist that could simply retreat from the world so as to think better. In opposition, this group called for an active commitment of scientists in their own professional field, by disturbing scientific events and summits, but also by involving themselves in what constitutes their everyday social environment. However, if Collectif Oblomoff also called for a non-instutional practice of knowledge, as *Survivre … et vivre* in the 1970s, this perspective also appears as being quite unexplored.[7]

The 2010s were characterized by the development of a perspective about precariousness, led by young scholars and PhD students who increasingly faced short term contracts or auto-funded conditions of research (AG des Précaires de l'ESR IDF 2020). As they developed the means to fight against precarious conditions in universities, sometimes by linking themselves to the 1970s movements, these different collectives also investigated the condition of pre-cariousness and how it affects practices of knowledge. If most of those reflections concluded that precarious workers could not constitute a subject of emancipation—because of the many social differences separating people who in this category—they also enabled a discussion about the meaning of carrying on research and teachings within institutions that had become insensitive to scientists and the public.

At this point, we would like to propose a gradual reconsideration of a perspective that links critiques of capitalism and struggles in universities as

7. However, we may quote the activity of a scientific network in science studies that have actively discussed the conditions and the effects of a reflexive condition, a fidelity to inquiries' trajectories and an attention to institutional edges (Faury and Le Marec 2020).

threatened public services. Indeed, the difference between universities and many other public institutions hit by competition, adaptation, and precariousness is their specific relation to science and knowledge. Precariousness has been denounced in research institutions, as it is also denounced in culture, health, and educational institutions: workers, doctors, researchers, and teachers are fighting for security. But recently, the perspective has changed, starting from the observation that precariousness—which of course is undesirable for everyone—is a structural condition, not an accidental one. It is the comfortable position of the fraction of researchers and teachers benefiting from security (political, financial and social) that is an exception.

Inheriting 1970s FRSM From Precarious Places: How to Join a New Theoretical Corpus with The Reclaiming of Precariousness Conditions

The 2010s are characterized by the boom of works and reflections on knowledge and situations of vulnerability. Those reflections were led in the name of very different stakes, but which joined transformations within epistemological turns and social struggles. Without exhaustivity, we may report the following phenomenons.

Some issues that may have been considered as social processes only studied remotely by researchers happened to be in the same time objects of research and realities directly lived individually as collectively. In France, the end of long-term scientific employment perspectives has been for a long time hidden by a very meritocratic conception of academic career and the idea of a natural condition of precariousness of young people and young scholars (Beaud and al. 2006; Moureau 2007).[8] But this also led a part of scientific communities to endure the phenomenon of precariousness. From then on, scholars had to face the fact of experiencing the academic world from precarious conditions, but without being able to produce legitimate knowledge about their own experience of precariousness because they "judge and be judged" (López Alós 2019; Le Marec and du Plessis 2020). But on the other hand, they also had to face the fact of being considered as a scientific object of investigation by people non affected by precarious conditions, but who consequently were not suspected of being "judge and be judged."

This is how a field of perspectives emerged to claim the necessity of a new frame so as to share a knowledge on society thought from structural and precarious conditions. For instance, a link was operated between the gathering of

8. This ambiguous position of intellectuals was already underlined in the work of Pierre Bourdieu (Bourdieu 1979).

political discussions related to vulnerable living situations and a new orientations of science studies that contested standpoints of unconcerned scholars about multiple forms of domination (Harding 1986; 1995; Smith 2005). This led to a critique of objectivity and neutrality in science, which is now definitely integrated to an unequal social operation that reproduces colonial relations. We now know the way women in a situation of scientific subalternity have initiated a specific type of investigative practice that is separate from traditional norms and methods in several disciplines. For instance, Jane Goodall, a student of Louis Leakey, has produced knowledge of chimpanzees by having a direct interindividual relationship with them. This experience led her to produce a critique of knowledge of animals produced apart from any personal interaction with animals, as well as to invalidate a type of Great Divide that has systematically downplayed the value of experiential knowledge.

In a similar way, Carole Gilligan, Lawrence Kohlberg's assistant, has produced a critical knowledge on gendered characteristics of psychological investigation protocols and also framed a care epistemology and ethic based on the integration of women's ordinary perspective and action to the political functioning of societies (Giligan 1982). This is also how Silvia Rivera Cuisicanqui, a Bolivian anthropologist, has for her part analyzed scientific discourses prouduced by Northern researchers about indigenous people of the Americas as a production that masked indigenous perspectives more than it could explain it (Rivera 2018).

In this way, claiming only for material means, times and more scientific workers inside laboratories and scientific institutions now appears as a contingent construction which reproduces ignorance about what makes it possible and also invisiblizes ways of knowing and living. Indeed, it is a large part of scientific knowledge that appears situated within a model of rationalization which relies less on an ethic of reason than on an insensitivity of what may be felt and known in other conditions. But another part of social science has developed the epistemological recognition of multiple knowledges produced from situated experiences. This enterprise has relied on a critical redefinition of objectivity and a reappropriation of inquiry, conceived not as a way to extract data for later analysis, but rather as a practice that enables oneself to participate in other spheres of knowledge questioning, transmission, and protection.

The intersection of feminist approaches, the ethic of care, and pragmatism has contributed to the development and legitimation of a theoretical framework which does not make generalities about concepts or models, but rather by relinking inquiries and situated experiences (Seifried 1996; Laugier, 2013). In this way, a committed position leads social science to revisit their own stories and investigations and also to think about other practices, sociabilities,

and publications. Finally, the recognition of the epistemological aspect of the pre-carious condition is one perspective that currently inspires philosophers and an international community of researchers who chose to work on and from multiples precarious conditions (exile, unemployment, political and economic insecurity, etc.).

We claim that there are now four principles that are being assembled so as to join epistemological evolutions in social science with practices and social struggles related to subaltern conditions. The first one is the questioning of the critic. Indeed, the critic does not have to be only considered as a simple production of theoretical utterances. If critical theory is essential and has fed decades of social science investigations, the reduction to its theoretical aspects appears to be insufficient. Indeed, this condition enables the critic to respond to intellectual and academic stakes, but it cannot guarantee a political transformation even for those who produce it: how many radical analyses are produced by people who benefitted from that production and maintained them in a position of domination? From then on, the critic is dependent on approaches which maintain the emancipative aspect of knowledge for those who produce them.

The second one is related to the experience of inquiry which is not reduced to technical operations of materials' extractions on "fieldworks." Indeed, inquiry has to be understood as a practice of attention and as a way of being available for unexpected meetings which are necessary for the development of emancipatory knowledge' practices. Inquiry is not the privilege of social science, even if it may constitute itself around it. Indeed, it appears that it has been above all investigators or collectives in situation of subalternity who have had an interest to think an inquiry from testimonies from places that were excluded from what really counted for "normal" science. Thirdly, the critiques of hierarchies and priorities made by funders, who based their decision on a confusion between social demand and economic interests, have enabled a reflexive attention to the ways by which an ignorance can be produced and maintained in the field of official scientific research. This has encouraged the development of knowledge relationships that are also ways of experimenting with connections to the other and to operate the responsibility of what we produce.

From then on, there is a link between knowledge and social forms of life. Even if social movements use numerous debates and references that come from universities, the articulation between knowledge and forms of life on which we would like to insist is different. Indeed, it is more about the development of multiples initiatives by people who feel personally concerned with the transformative aspect of knowledge approaches in which they are en-

gaged. Moreover, this commitment above all happens in an in-between of scientific institutions and social environments which overflow and sustain them as fieldworks but also alternative places, etc. So as to illustrate these points, we can develop two specific examples by many others.

The first one is about Turkish women teachers fired and evicted after 2016 for having signed a petition for peace and who are now facing a situation of serious precariousness in multiple European countries (Çıg 2020; Legrand 2018). We know them because they are active members of the network "Endangered humanities." Nowadays, they can benefit from postdoctoral and short-term contracts with universities, but some of them do not have the opportunity to occupy stable scientific jobs. During one of Hope and Solidarity's workshops organized by Bayreuth University, some of them have clearly pointed out the definitive loss of a scientific job, and so the obligation to have another one, did not mean that they considered themselves to no longer be teachers and researchers.

Indeed, it is thanks to parallel networks (online universities, cultural cafes, informal intellectual networks, etc.) that they could maintain a demanding approach by a will to defend emancipatory knowledge. But this painful exercice also opposes to the logics of Northern universities which are embedded in races for international rankings, and which do not feel concern about their own bureaucratized function and competitiveness. In this way, the existence of such a network that gather precarious researchers and full employed scholars has in return some effects on the ways of practicing research, as it enables them to change research priorities and sociabilities.

Another example is the Laboratoire Écologique Zéro Déchet (LE0), an activist squat located in Pantin since 2019, on the periphery of Paris. Recently, the collective has had to face an eviction order and is struggling to preserve this place that has enabled the construction of a community of knowledge and living between local associations, academics, and activists (Babou 2023). By using the word "laboratory," the LE0 chose to focus on the issues about knowledge and experimentations in a working-class and urban political ecology context. In this way, the LE0 is an anti-capitalist place that refuses public and private funding but is also a mix between different kinds of knowledge. Indeed, it is both a place where one can come and learn techniques of repairing or recycling and also a place to learn about ordinary uses of the law. The presence of refugee mothers has also enabled them to find a place to create knowledge about mothering and children. But the LE0 is also a place for students and academics who want to change their life prospects, which leads to the organization of meetings and workshops with the space. In this way, everything that happens is one way or another making inquiry from what one has

to know in conditions of precariousness and risks as well as of experimentation and sharing. For some academics, the LE0 is consequently a home of questioning and creation about forms of life which reveal themselves to be richer than classical academic investigations. Indeed, for them, those types of inquiries cannot allow anymore a scientific, ethical and political coherence.

By exploring these examples, we wanted to characterize a movement where the inheritance of FRSM is being developed between scientific institutions and peripheral places in order to reclaim conditions of precariousness as a legitimate position of knowledge. In return, this gap makes it possible to show another way to speak about professional research places which appear also as being situated and limited but crossed by so many dependencies that they cannot claim for a global point of view. From then on, the prism of precariousness has the particularity of putting knowledge concerns not only in domination relationships, but also as an ontological opening toward the recognition of the irreducible character of vulnerabilities and precariousness.

Conclusion: Towards a Political Ecology of Knowledge?

To conclude, we would like to suggest a link between vulnerability, precariousness, and vitality of knowledge. In their last publication, *Héritage et fermeture*, Emmanuel Bonnet, Diego Landivar and Alexandre Monnin discuss the Capitalocene and the necessity of inheriting the weight of countless objects, technologies, and infrastructures that are described as being "zombified" (Bonnet and al. 2021).

We agree with the idea of exploring this legacy, but we also think that we have to correctly identifywhat constitutes a dead process and distinguishes it from what is alive. Indeed, the meaning of "inheriting" is very different from only preserving and keeping what we inherit so as to share it in our turn. Inheriting is more about identifying conditions of vitality and what is dead or zombified. In this way, according to us, precariousness and vulnerability are conditions that reflect the quality of what is alive. If science keeps on maintaining institutional framings that separate knowledge from living, they condemn themselves to evacuate policy out of experience. Moreover, they also condemn themselves to only discuss ontologies without experiencing the way by which those ontologies can affect them.

This why Mario Blaser's works invite readers to consider academic structures that guarantee the selection and the handover of what is scientific, are finally and essentially more logistical infrastructures that follow a deadly capitalist policy (Blaser 2019). We make the hypothesis that one theoretical frame is incomplete and condemned if it is not felt apart from its disproval and its dependency on situations that can be experienced in relation with political

stakes of protection and recognition of what is experienced and shared with other living beings.

In the end, we can raise the question of knowledge as forms of life and think about the legacy of FRSM (Laugier 2015). With who and in which places and moments are we really questioning what is happening to us? Where and when are we discussing it in collectives that are not limited to the community of fellow academics charged to produce texts, but rather extended to everyone who investigates, experiences, and put into life concepts and stories from their own experiences? We claim the idea of a political ecology of knowledge which does not only consist in describing and producing a knowledge of interdependencies between heterogenous elements that compose science (Lalande and Le Marec 2022). Instead, it relies on the principle of learning how people, places, or infrastructures of science may interact with each other and become dependent on the other. In this way, perhaps collective inquiry would lead us to learn what in our knowledge appears alive, dead, or zombified, and how to treat it with responseability (Haraway 2016).

Acknowledgement

We would like to acknowledge the help of Jarek Paul Ervin and Sascha Freyberg with the English revisions and thank them for their propositions.

REFERENCES

AG des Précaires de l'ESR IDF. 2020. "Se fédérer en tant que "précaires" de l'ESR: histoires des luttes, mobilisations récentes et perspectives." *ContreTemps* (47): 36–48.

Abreu, Maria and François Boureau. 2020. "Précarité de la recherche dans les années 1970–1980. Récits de "hors-statuts" en lute." *ContreTemps* (47): 49–60.

Babou, Igor. 2023. *L'Écologie aux marges. Vivre et créer dans les ruines du capitalisme*. Paris: Eterotopia.

Babou, Igor and Joëlle Le Marec. 2013. "La presse altenative de critique des sciences des années soixante-dix et les études de sciences contemporaines: inspirations politiques et construction académique." In *La presse alternative entre la culture de l'émancipation et les chemins de l'utopie*, edited by Joëlle Le Marec and Pucciarelli Mimo. Lyon: Éditions de l'Atelier de création libertaire.

Barot, Emmanuel. 2010. *Révolution dans l'Université. Quelques leçons théoriques et lignes tactiques tirées de l'échec du printemps 2009*. Paris: La Ville Brûle.

Beck, Ulrich and Elisabeth Beck-Gernsheim. 2002. *Individualization: Institutionalized Individualism and its Social and Political Consequences*. London: SAGE.

Bensaude-Vincent, Bernadette. 2003. *La science contre l'opinion: histoire d'un divorce*. Paris: La Découverte.

Beaud, Stéphane, Lingaard, Jade and Joseph Confavreux (eds.). 2006. *La France invisible*. Paris: La Découverte.

Berthelot, Jean-Michel, Martin, Olivier and Cécile Collinet. 2005. *Savoirs et savants: les études de la science en France*. Paris: Presses universitaires de France.

Blaser, Mario. 2019. "On the Properly Political (disposition for) the Anthropocene." *Anthropological Theory* (19): 74–94.

Bonnet, Emmanuel, Landivar, Diego and Alexandre Monnin. 2021. *Héritage et fermeture: une écologie du démantèlement.* Paris: Divergences.

Bourdieu, Pierre. 1979. *La distinction. Critique sociale du jugement.* Paris: Éditions de Minuit.

———. *2001. Science de la science et réflexivité.* Paris: Raison d'Agir.

Boutin, Gérald. 2004. "L'approche par compétence en éducation: un amalgame paradigmatique." *Connexions* (81): 25–41.

Brik, Anna and Andréa Albert. 2020. "Les universitaires, des travailleur·euse·s comme les autres? Au sujet de la grève à l'université." *ContreTemps* [Online]. https://www.contretemps.eu/greve-universite-precaires/

Cambourakis, Isabelle. 2018. "Un écoféminisme à la française? Les liens entre mouvements féministe et écologiste dans les années 1970 en France." *Genre & Histoire* (22). http://journals.openedition.org/genrehistoire/3798

Çıg, Eylem Çamuroglu. 2020, "Knowledge Production as a Resistance in Precarious Times." In *Savoirs de la Précarité, knowledge from precarity*, edited by Joëlle Le Marec and du Plessis Hester, 179–200. Paris: Éditions des Archives contemporaines.

Collet, Victor. 2019. *Nanterre, du bidonville à la cité*. Marseille: Agone.

Collet, Victor and Antoine Lalande. "Luttes universitaires et luttes des quartiers à Nanterre." *ContreTemps*. https://www.contretemps.eu/luttes-universitaires-luttes-quartiers-nanterre-entretien-avec-victor-collet/

Cordonnier, Sarah. 2005. "La revue Pandore: note critique." *Science Société*. https://science-societe.hypotheses.org/23

Dauphin, Cécile. 2001. "Pénélope, une expérience militante dans le monde académique." *Les Cahiers du CEDREF* (10): 61–68.

Debailly, Renaud. 2015. *La critique de la science depuis 1968. Critique des sciences et études des sciences en France après Mai 68*. Paris: Hermann.

Debailly, Renaud and Mathieu Quet. 2017. "Passer les Science & Technology Studies en revue-s. Une cartographie du champ par ses périodiques." *Zilsel* (1): 23–53.

Descola, Philippe. 2013. *Beyond Nature and Culture*. Chicago: The University of Chicago Press.

Despret, Vinciane and Isabelle Stengers. 2011. *Les faiseuses d'histoire. Ce que les femmes font aux savoirs*. Paris: La Découverte.

d'Eaubonne, Françoise. *Le Féminisme ou la mort*. Paris: Horay.

Faury, Mélodie. 2012. *"*Parcours de chercheurs. De la pratique de recherche à un discours sur la science: quel rapport identitaire et culturel aux sciences?*" PhD Thesis in Information and Communication Sciences*. Lyon: ENS de Lyon.

Faury, Mélodie and Joëlle Le Marec eds. 2020. *Le Métier à penser. Tisser des textes avec Baudouin Jurdant*. Paris: Éditions des Archives contemporaines.

Gardey, Delphine. 2005. "La part de l'ombre ou celle des lumières? Les sciences et la recherche au risque du genre." *Travail, genre et sociétés* (14): 29–47.

Geay, Bertrand. 2010. "La toge, la paillasse et le mégaphone. Retour sur les conditions et les modes de mobilisation des universitaires en 2009." *Savoir/Agir* (12): 51–60.

Giligan, Carole. 1982. *In A Different Voice.* Cambridge (MA): Harvard University Press.

Gingras, Yves. 1995. "Un air de radicalisme. Sur quelques tendances récentes en sociologie de la science et de la technologie." *Actes de la recherche en science sociales* (108): 3–18.

Hagimont, Steve, Hupé, Jean-Michel and Laure Teulières. 2021. "La question écologique dans l'ESR. Jalons pour une histoire immediate." *ContreTemps* (48): 97–105.

Haraway, Donna. 2016. *Staying with the Trouble. Making Kin in the Chthulucene.* Durham (NC): Duke University Press.

Harding, Sandra. 1986. *The Science Question in Feminism*. Ithaca (NY): Cornell University Press.
———. 1995. "Strong Objectivity: A Response to The New Objectivity Question." *Synthese* (104): 331–349.
Jurdant, Baudouin. 1984. ""S.T.S": avec n'importe qui, mais pas avec n'importe quoi." *Cahiers S.T.S (Sciences - Technologie - Société)* (1): 150–156.
Joly, Pierre-Benoît and Christophe Bonneuil. 2013. *Sciences, techniques et société*. Paris: La Découverte.
Lalande, Antoine and Joëlle Le Marec. 2022. "For a Political Ecology of Knowledge. How can we inherit STS?" *Les Cahiers de Framespa* (40). http://journals.openedition.org/framespa/13069
Laugier, Sandra. 2013. "La vulnérabilité de l'ordinaire. Erving Goffman lecteur d'Austin." In *Erving Goffman et l'ordre de l'interaction*, edited by Daniel Cefaï and Perreau Laurent, 339–368. Paris: Presses universitaires de France.
———. 2015. "La vulnérabilité des formes de vie." *Raisons politiques* (57): 65–80.
Legrand, Josquin. 2018. "La purge autoritaire turque vue d'Europe." *Vacarme* (82): 78–81.
Le Marec, Joëlle and Hester du Plessis (eds.). 2020. *Savoirs de la précarité, knowledge from precarity*. Paris: Éditions des Archives contemporaines.
Lévy-Leblond, Jean-Marc. 1970. "Adresse à l'Académie de Lyon." *Les Temps modernes* (288): 131–136.
López Alós, Javier. 2019. *Crítica de la razón precaria. La vida intelectual ante la obligación de lo extraordinario*. Madrid: Catarata.
Mariani, Leo. 2022. *Le goûte des possibles. Enquête sur les ressorts symbolistes d'une crise écologique*. Nanterre: Presses universitaires de Nanterre.
Moureau, François. 2007. *Le nouveau prolétariat intellectuel. La précarité diplômée dans la France d'aujourd'hui.* Paris: Bourin.
Oblomoff. 2009. *Un futur sans avenir. Pourquoi il ne faut pas sauver la recherche scientifique*. Paris: L'Échappée.
Omodeo, Pietro Daniel. 2019. *Political Epistemology: The Question of Ideology in Science Studies.* Cham: Springer.
Peiffer, Jeanne. 2000. "Les débuts de la critique féministe des sciences en France (1978–1988)." In *L'invention du naturel: les sciences et la fabrication du masculin et du féminin*, edited by Delphine Gardey and Löwy, Ilana, 75–86. Paris: Éditions des Archives contemporaines.
Pessis, Céline. 2014. *Survivre et vivre: critique de la science, naissance de l'écologie*. Paris: L'Échappée.
———. 2019. "Défendre la terre. Scientifiques critiques et mobilisations environnementales des années 1940 aux années 1970." *PhD Thesis in History of Science*. Paris: EHESS.
Pessis, Céline and Sara Angeli Aguiton. 2015. "Entre occultation volontaire et régulation publique: les petites morts de la critique radicale des sciences." *Écologie politique* (51): 93–105.
Pestre, Dominique. 2006. *Introduction aux science studies.* Paris: La Découverte.
Quet, Mathieu. 2009. "Politiques du savoir. Une approche communicationnelle des rapports entre sciences, technologies et participation en France (1968–1983)." *PhD Thesis in Information and Communication Sciences*. Paris: EHESS.
Rivera, Silvia Cusicanqui. 2018. *Un mundo Ch'ixi es posible*. Buenos Aires: Tinta Limon.
Seifried, Charlene Haddock. 1996. *Pragmatism and Feminism. Reweaving the Social Fabric.* Chicago: University of Chicago Press.
Smith, Dorothy. 2005. *Institutional Ethnography: A Sociology for People*. Lanham (MD): Rowman & Littlefield.
Vidal, Frédérique. 2020. "Pétition demandant la démission de la ministre de l'Enseignement Supérieur et de la Recherche." *Sociétés contemporaines* (120): 139–141

summer 2023 volume 2 | issue 2 | 65–89

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02205 ESSAY

Weaving on a Radical Loom: History, Epistemology, and Science Activism

Sigrid Schmalzer[1]

ABSTRACT: The author uses personal narrative to advocate for consciously interweaving intellectual, social, and political work to generate robust and liberatory alternatives to the worlds we inhabit. The narrative focuses especially on the author's experiences studying the history of the original Science for the People and then participating in its revitalization, but also includes discussions of the anti-war movement, the history of science in Mao-era China, and radical education at the University of Massachusetts Amherst, among other topics. The author argues that the tools of history and epistemology, informed by Marxist analysis, can help activists navigate the tensions of generational difference, and that ideas generated through activist discussion enrich scholarship, as evidenced in the benefits she has drawn from conversations about indigenous knowledge with generations of Science for the People members.

KEYWORDS: activism, history, epistemology, personal narrative, Science for the People, Maoism, generational difference, indigenous knowledge.

Introduction

Attending an online brainstorming session with Massachusetts environmental justice advocates to develop state legislation on mold and indoor air quality, the usual doubts cropped up: How did I get here? Is this an appropriate project for a historian, especially one specializing in the history of science in modern China? The answer to the second question, I reminded myself, was yes. Most simply put, the reason I often find myself in such situations lies in the continued relevance of the Maoist radical vision

1. The narrative that follows will make clear how much I owe to how many people in formulating the ideas expressed in this paper.

Schmalzer, Sigrid. 2023. "Weaving on a Radical Loom: History, Epistemology, and Science Activism." *Marxism & Sciences* 2(2): 65–89. https://doi.org/10.56063/MS.2310.02205

• *Correspondence:* Sigrid Schmalzer, Department of History, University of Massachusetts Amherst.
• e-mail: sigrid@umass.edu
• DOI: 10.56063/MS.2310.02205
• *Received:* 24.02.2023; *Revised:* 13.07.2023; *Accepted:* 15.07.2023
• *Available online*: 05.11.2023

of science for social movements, especially but not exclusively those involving STEM knowledge.

Answering the first question has been more complicated, but the result is more satisfying, both intellectually and politically. By tracing the journey that brought me to that virtual room, I begin to do justice to the radical philosophical traditions and the social justice movements that have together informed my scholarship and my organization. Through personal narrative, this paper makes a case for consciously interweaving historical inquiry, epistemological theorizing, and active engagement in ongoing social movements, with the goal of cultivating robust challenges to establishment science and generating meaningful alternatives for scientific futures. By focusing on "interweaving," I am drawing inspiration from the Maoist emphasis on *integration* (综合)—"bringing together" (结合) disparate elements, "simultaneously engaging" in diverse activities, and always choosing to "walk on two legs" (两条脚走路) rather than overspecializing. This approach often emerged in Mao-era China as a means of making the most of scarce resources. However, its significance went beyond practical concerns, resonating deeply with the theory of dialectical materialism that Mao and other Chinese Marxists embraced: the principle of integration recognized the analytical and practical benefits of treating things not in isolation or stasis, but rather in dynamic interaction (Schmalzer 2021).

History is vast, as is the political landscape of today. Each of us weaves our parts of this tapestry in different ways, influenced by the networks of people we engage.[2] In this paper, specific episodes from the interweaving of these threads will shed light on pieces of the recent history of science activism rooted in Marxist analysis, while suggesting broader takeaways that should be applicable in the political and intellectual work of many readers of *Marxism & Sciences*.

I want to underscore that my role in this history is a small one: I share my story not because it is especially important, but because in its ordinariness it may speak to the experiences, or possible experiences, of many others similarly seeking to make Marxist-inspired contributions at the intersection of activism and academics.

2. This point was brought home to me again just before I submitted the final version of this essay. I asked my colleague and fellow activist Yige Dong to look it over, and she noted the connection to Sadie Plant's 1995 article "The Future Looms: Weaving Women and Cybernetics." As Yige explained, "The loom is always at the heart of women's work and it's such an empowering tool!"

Discoveries, Imagined and Real

As an undergraduate at Wesleyan University in the 1990s, I pursued a double major in East Asian studies and the Science in Society Program, while also engaging (in an admittedly unsophisticated way) in environmental and social activism. The apparent resonance between radical theories of knowledge production that appeared in my science studies classes (especially those of socialist feminist philosophers), and the Maoist ideology I was encountering in my Chinese history classes, intrigued me. By questioning the nature of expertise and challenging hierarchies of knowledge, both bodies of knowledge offered tools for dismantling systems of power that were oppressing people and killing the planet. And so, it puzzled me that the radical scholars in science and tecnology studies did not appear to have noticed that people in Mao-era China had already put into practice ideas about the social production of knowledge and the inseparability of science and politics.

In graduate school, I continued intellectually much along the same lines, earning a Ph.D. in modern Chinese history and science studies from UCSD in 2004. My dissertation explored "mass science"in Mao-era China, focusing on the science of human evolution. In the book that emerged from that study, I concluded that Mao-era radicals were "right to emphasize the class politics of knowledge and right to think that laborers had something to offer science." Influenced by the cultural turn, I did also worry about the limitations of that vision when it came to "traditional" knowledge forms: it was all too easy for Mao-era scientific and political elites to dismiss ideas emerging from traditional culture as "superstition," thus missing many potential contributions the "masses" were capable of making and trampling or even targeting for destruction many significant ideas and practices. Still, over all the dissertation, and later the book, offered an analysis of Mao-era science "on its own terms." In the process, the picture it painted was unusually positive by academic standards in the China field of the time, which had coalesced around a narrative almost entirely dominated by the persecution of scientists and ideological pursuit of irrational policies.

When I was putting these interests together, I often felt like a pioneer in uncharted territory—a rampant, and invariably false, perception among white Americans studying China. As it turned out, a generation before me, members of the radical US organization Science for the People had themselves "discovered" the connections between socialist-era China and radical critiques of science and technology. The evidence was in a 1974 paperback book titled *China: Science Walks on Two Legs*, bought at a used bookstore by

a faculty mentor and passed along to me. But because it was not academic and not current, the book remained a curiosity on my shelf rather than an object of inquiry.

Then, in 2007 as an assistant professor at UMass Amherst, I became pregnant with my first child—a fact of material consequence that as a good socialist feminist I insist on recognizing. I knew that I needed to find a small research project to tide me over for a few years, one that would not require extended travel while gestating and breastfeeding. In Mao-era China, these would have been considered two of the "four special times" for women, which made the assignment of "light work" and "near work," respectively, appropriate. Socialist feminists today would usually take a less essentialist perspective, pointing to the increase in my "care work," but with a similar justification for labor adjustments.

It seemed a good time to take *China: Science Walks on Two Legs* off the shelf and track down the US-based authors. The book was published in paperback by Avon Press in 1974 and offered eyewitness observations, by the SftP delegates, of science as practiced in Cultural Revolution-era China. With few exceptions, it read as a distillation of the vision of Maoist science expressed in the many PRC state-produced materials I had collected over the years. I began by searching the Internet for information on SftP and soon discovered a listserv with that name. I registered for the listserv and posted an email explaining my interest in the history and asking any members of SftP's China delegation to get in touch. Soon I had developed a network of contacts from the original SftP, and through those conversations and more reading I developed an expanded understanding of what socialist China meant to them.

SftP emerged in the late 1960s out of the anti-war movement in the US and disbanded in 1989 largely due to financial insolvency. Many of its early leaders drew inspiration from the writings of Marxist scientists in Britain before World War II, people like J. D. Bernal, H. B. S. Haldane, Lancelot Hogben, Joseph Needham, and Hyman Levy (Werskey 1988). In the pages of SftP's eponymous magazine, readers frequently encountered references to these authors and information on how to acquire their books, alongside sharp new Marxist critiques of the relationship between science and capitalism, among other structural forces of oppression. Meanwhile, and often intersecting with SftP's networks, the field of science and technology studies was developing an increasingly influential challenge to the notions that scientific research was either politically neutral or intellectually objective. Some of the sharpest of these critiques came from feminist scientists and

scholars. In SftP, scientists Ruth Hubbard, Rita Arditti, Anne Fausto-Sterling, and others deconstructed biological "truths" about women's bodies and minds. At the same time, and deriving from the same larger feminist consciousness-raising movement, scholars like Patricia Hill Collins, Nancy Hartsock, Sandra Harding, Donna Haraway, and Emily Martin—names I had first encountered at Wesleyan through my mentor Sue Fisher—were developing variations of feminist standpoint epistemology: the notion that all knowledge is socially situated and inescapably related to the gendered, racialized, and class-based standpoints of the people producing it.[3]

While the field of science and technology studies had not at that point taken an interest in China, Science for the People did. By 1971, some chapters of SftP had formed study groups on China. The PRC offered a tantalizing opportunity to explore not just the theory but the practice, on a national scale, of revolutionary science. Like Cuba, and later Nicaragua, China represented a communist country that remained inspirational for Western leftists disillusioned by the Soviet Union. What the 1973 SftP delegation saw was very much what they had hoped to find: not only was scientific research organized for social benefit rather than capitalist profit, but laypeople (from peasants to urban housewives) were mobilized to participate in research, and scientists were expected to learn from peasants and workers.

By the time *China: Science Walks on Two Legs* found me, it was clearly "dated" as political analysis: the field of Chinese studies had outgrown the stage where the CCP's claims, especially about the Cultural Revolution, could be so uncritically accepted. But historians (and other historically minded folk) should not succumb to the "dustbin" approach to history. For us, all things are "dated," in the sense that we recognize that all phenomena—including ideas—are products of specific historical processes: as Sandra Harding put it, "the thought of an age is *of an age*" (1992 452). And so dated does not mean worthless, but rather invaluable evidence of the historical emergence and transformation of knowledge. Once compelled to engage seriously with the book and its authors, I began to see the history in a new light—one that justified my instinct that the radical science ideology of Mao-era China was significant; challenged my hubris in imagining myself a pioneer, and so deepened my understanding of the widespread, enduring pioneer fallacy among white Americans interested in China; and,

3. For a fascinating history of these and other women scientists, many of them involved in Science for the People, see Christa Kuljian, *Our Science, Ourselves: How Gender, Race and Social Movements Shaped the Study of Science* (forthcoming from University of Massachusetts Press).

most important, connected me with a vibrant community of activist-academics working to transform science in the US and beyond.

Connecting Dots, Forging Connections, Rebuilding SftP

During my last two years as a graduate student at UCSD, I became involved with the San Diego Coalition for Peace and Justice—one of a series of facts of political consequence that as an activist I insist on including. Until then, I had satisfied my need for service with volunteer work, a liberal political instinct that was a poor fit with the radical intellectual currents informing my studies. As the US marched ever closer to invading Iraq, my partner and I sought a political community and found it in the anti-war movement. With the guidance of seasoned activist Carol Jahnkow, we embraced a consensus model of decision making for every action we planned, enacting revolutionary politics in our own community as we attempted to intervene in US foreign policy. When my partner and I moved to Massachusetts in 2004, we immediately joined the Northampton Committee to Stop the Wars under the leadership of the down-to-earth, but quite legendary antiwar activist Frances Crowe, and so continued our political education. I knew that these experiences mattered for my intellectual development, but in truth organizing against the war in Iraq, writing a book on the history of paleoanthropology, and teaching Chinese history to undergraduates felt like three very different occupations. I kept my eyes peeled for ways I could better integrate activism and academics.

Taking on the Science for the People research project was one such avenue. Researching the history of American radicals who had traveled to China also allowed me to deepen connections with antiwar organizers, because Frances Crowe and a few others in that local network had visited China with their own delegations at roughly the same time that SftP did. In those years, Frances directed the Western Massachusetts office of the American Friends Service Committee, the political arm of the Quaker church; she traveled to China with an AFSC delegation in 1974. Interviewing activists in my own political circles enabled me to think in ways that were simultaneously empathetic and critical about the political significance that China has held for American leftists—myself included. Frances's unusually sharp memory allowed her to convey the experience of visiting Cultural Revolution-era China as an American activist with remarkable clarity. For many years, whenever I offered my Cultural Revolu-

tion seminar on campus, Frances came with her slide projector and delivered what must have been an almost exact replica of the presentation she gave countless times in living rooms and church basements after her 1974 trip.

At the same time, I also began talking with local activists who were organizing around food and agriculture. Just as 1970s feminist consciousness-raising circles nurtured the emerging analysis of Hubbard, Haraway, and others in Science for the People and beyond, the burgeoning permaculture movement of the early 2000s inspired me to think about the intersections between sustainable farming and revolutionary forms of social organization. And so, I was primed to follow up when Vinton Thompson, an entomologist who had participated in the 1973 delegation as a graduate student, said something along the lines, "If you're really interested in mass science, you should find out more about Pu Zhelong. Of all the scientists we met in China, he seemed the most sincerely committed to learning from the peasants." Pu Zhelong, who had featured in SftP's book *China: Science Walks on Two Legs*, was an insect scientist known especially for his work with parasitic wasps as biological control agents, allowing for the management of crop pests while minimizing chemical insecticides. And just as Vinton predicted, research on Pu confirmed that he had collaborated effectively and genuinely with peasants at his research sites. My second book project thus coalesced out of conversations with Science for the People contacts and local permaculture activists.

In 2012, I found another way to link activism and academics by taking a leadership role in a radical undergraduate major at UMass called Social Thought & Political Economy (STPEC), originally formed in 1972. The student leaders who interviewed me for the position specifically asked about my commitment to consensus-based decision making; thanks to my experience with the anti-war movement, I could speak very sincerely on this question.

The highpoint of my STPEC tenure was the 2014 conference we hosted, "Science for the People: The 1970s and Today." Vinton Thompson proposed that I should bring people together for a kind of reunion—a chance to chat about old times and reflect on the significance of SftP's work in the 1970s and 1980s. Testing the waters resulted in a very positive response—so much so that we quickly had to expand our sense of what the event would be. In April 2014, STPEC hosted a three-day con-ference on SftP's history and legacy with more than sixty speakers and more than two hundred participants. We organized most of the panels around specific issues:

each panel included at least one participant in the original SftP work on that issue, and at least one person organizing on the issue today. For example, the panel on the militarization of science included Frances Crowe and former SftP member Jonathan King, who had worked together against anthrax research at UMass in 1980; it also included Derek Denman, a graduate student at Johns Hopkins organizing against drone research, and Elke Heckner, a scholar exploring the militarization of PTSD therapies.

The event attracted not just veterans of the original SftP, but younger folks who had never heard of the organization but felt it was just what they had been looking for. One Ph.D. student from Tennessee, Ben Allen, took the mic at a plenary session and lit a fire under us all to restart the movement. Thanks to him and a number of others, SftP got off the ground again, gaining momentum after the election of Trump in 2016 and the liberal March for Science in 2017, of which the nascent "revitalized" SftP offered a resounding radical critique. In "Which Way for Science?" (its most important early communication), the new SftP argued, "Science is inherently political. What is studied, to what end, by whom and under what conditions, are all political questions integral to the very nature of science. By denying this fact, we risk erasing the struggle of scientists of color, women, disabled scientists, and scientists from the LGBTQ community who have had to fight for education, credibility, funding, and job opportunities within science, technology, engineering, and mathematics (STEM). Concordantly, we risk ignoring and diminishing the struggles of scientists who have resisted the use of science for making war, exploitation of workers, the enabling of environmentally destructive resource extraction, and the support of industries that harm people and the planet" (Science for the People 2017).

In January 2018, the new Science for the People held its first national convention on the campus of the University of Michigan, Ann Arbor. The event brought together members of the original organization along with activists from the younger generation who were leading the way to rebuild the movement. Ann Arbor was an apt site for several reasons. University of Michigan professors John Vandermeer and Ivette Perfecto had been keeping SftP embers alive in the intervening decades, especially through their ongoing work with the New World Agriculture and Ecology Group (NWAEG), which had sprung from the original SftP; and John had been the keynote speaker for the UMass 2014 conference, focusing his remarks on the significance of "mentoring comrades"—indeed, his mentorship since the 1980s has produced multiple generations of radical, politically

engaged ecologists. The University of Michigan was also the institution that fired radical mathematician Chandler Davis back in 1954, after he refused, on First Amendment grounds, to cooperate with the McCarthyist House Un-American Activities Committee. From his post-blacklist home in Toronto, Canada, Davis went on to play an important role in early SftP antiwar organizing, including as co-author of the exposé *Science Against the People*. His return to the University of Michigan in 2018 (at 91 years old) to help usher in the new SftP was deeply inspiring.

At the top of our agenda for the weekend was outlining our common commitments and hammering out a process to resolve disagreements and finalize a set of "Principles of Unity," which we eventually accomplished (https://scienceforthepeople.org/mission/). We also listened to a number of presentations, including from John Vandermeer about his recent engagement with the Zapatistas, and via video call from Dianne Rocheleau, another original SftP member who was then in Mexico involved in her own project with the Zapatistas. For me, their contrasting perspectives on the role of science in the Zapatista movement was one of the most fascinating and challenging moments of a long weekend filled with fascination and challenges. It confirmed for me a suspicion that one of the divides we would face in the revitalization project involved our divergent perspectives on the relationship between science and "traditional" (and/or Indigenous) cultures. John had attended the recent ConCiencias Conference organized to bring Zapatistas together with leftist scientists, where he heard Zapatistas criticizing some of the participating scientists for presenting solutions supposedly based on "traditional" knowledge but lacking in scientific credibility. John felt strongly that what agricultural scientists have to offer leftist peasant movements is rigorous modern science, and he said that was what he heard his Zapatista hosts requesting from him. Dianne's ongoing engagement with Zapatistas outside of the conference setting gave her a somewhat different sense of what leftist scientists need to bring to the table: she heard Zapatistas articulating the legitimacy of traditional knowledge forms and asking for mutual respect. Reflecting back on my struggles to assess the contradictions inherent in Maoist attitudes toward traditional knowledge systems, I bookmarked this contradiction for future reference.[4]

4. When I shared a draft of this paper with John, he emphasized the different contexts of his and Dianne's encounters and said, "In the end, I don't think that Dianne and I disagree at all." However, whether the difference is produced by context or by perspective, it is an issue that will require continued thoughtful debate among leftists.

Local Organizing, Situated Knowledge, Solidarity Science

As Ben Allen and other organizers around the country worked to revitalize Science for the People, I very much wanted UMass to continue to play a role, so I began announcing meetings of a local SftP chapter. In those early days, as I sat in the room wondering if anyone would show up, I tried to channel my inner Frances Crowe. Sometimes when I was running in very late to a meeting of the Northampton Committee to Stop the Wars, I would find the nonagenarian Frances was the sole person present. Invariably, she would have arranged chairs in a circle and would be sitting with her hands folded quietly in her lap, as if in meditation—and then when I entered, she would share what she had been thinking about and launch into the work we could do together. Though a nationally recognized recipient of numerous awards, whose 95th birthday warranted the attendance of Amy Goodman, she did not see this as a waste of her time. Nor did she lose confidence in the importance of the work when she found herself doing something alone. With humble steadfastness cultivated over decades of Quaker-style political action, she had faith that if she carried on doing what she knew was right, sooner or later others would show up.

People did eventually show up, and our chapter adopted the name "Western Mass Science for the People" to include participants beyond UMass—from the community and from other nearby campuses. Our identity has shifted and grown as our membership has changed. Over time, our regular members have included: an agricultural ecologist at Hampshire College who participated in the original SftP; staff members at UMass working in DEI, one of whom trained as an engineer and belonged to the original SftP; K–12 school teachers; undergraduates in the sciences and public health; graduate students in education and engineering; STS scholars (including me) interested in knowledge and power; a UMass staff member in arts programming involved in anti-nuclear activism; and community organizers from Arise for Social Justice, an economic justice group in Springfield, Mass.

Early on, our chapter made contact with an organizer from Arise who was seeking assistance in her struggles around mold and health. Tatiana Cheeks is a Black mother originally from Brooklyn whose youngest child, Khai, suffered from a mold allergy; habitually exposed to mold in shelters and badly maintained rental apartments, Khai experienced constant respiratory symptoms. Tatiana attended a chapter meeting and shared the wealth

of knowledge she had accumulated as she struggled with intransigent landlords, ignorant doctors, scam mold remediators, and housing court judges who clearly did not respect her testimony.

And so, one of our more enduring projects has been supporting Tatiana's Mold Action Committee. On the basis of that work, together with our readings in activist science and technology studies, and what we have learned from one another, we have developed an approach we call solidarity science, and we have shared that vision through Zoom-based "community" workshops. We define solidarity science as the notion that scientists, engineers, and other STEM workers should not just be working for the people in a top-down way as if bestowing charity, but working with the people, recognizing the knowledge that community members hold, and ensuring that community priorities and perspectives are there from the outset as we collectively develop robust scientific knowledge that addresses social needs and furthers social justice.

Our understanding of solidarity science draws especially from the concepts of situated knowledge and strong objectivity advanced by feminist philosophers of science, and we have been particularly indebted to Sophie Wang's highly accessible introduction to these concepts in her comic book, Science under the Scope, published by Free Radicals—a group that overlaps in mission with SftP (Wang n.d.). As we explain it in our workshops (aided by Wang's graphics), situated knowledge recognizes that everyone has knowledge, and that everyone's knowledge comes from somewhere and relates to their specific social, political, and economic situation. This is as true of lab scientists as it is of farmers, as true of doctors as it is of patients: all of these people have valuable knowledge to contribute, and each person's knowledge relates to where they sit in the world. Strong objectivity is the idea that our collective understanding of the world is more robust if it involves a greater diversity of observers. Since all knowledge is partial, we are going to know things better if we bring more people to the table, each examining a phenomenon from their own social location, each contributing their own situated knowledge.

Our work with Tatiana has been the most important inspiration and the most vivid example of how solidarity science, based on situated knowledge and strong objectivity, works. Many community organizers and activist scholars will no doubt immediately recognize the proud tradition of "housewife epidemiology" that Tatiana is continuing: from nuclear fallout in the 1950s–60s, Love Canal in the 1970s, drinking water contamination in Woburn, Mass. in the 1980s, and the PG&E scandal in the 1990s,

to the recent campaigns against coal ash pollution from Duke Energy in North Carolina and the water crisis in Flint, Michigan, mothers based in affected communities have taken the lead. The term "housewife epidemiology" was coined to emphasize the particular ways in which women *as women* and *as caregivers* have taken on very public roles in establishing patterns of disease related to environmental pollution and on that basis calling for effective change at the policy level (Merrifield 1993). By acting publicly *as mothers* these women have claimed an authority within patriarchal, classist, and racist systems that would otherwise have easily marginalized and silenced them. Of course, they are still operating within those systems, and that creates limitations. It's significant, for example, that the women who have been most publicly acclaimed in these roles—and who have been celebrated in film (e.g., Erin Brokovitch)—have been white, while we know that Black and Brown women have fought very similar battles and have had to struggle to achieve even basic recognition. Still, by acting in highly gendered (and often also highly class– and race–conscious) ways, these community organizers have been able to challenge the way scientific knowledge is usually assumed to work.

The diversity of the Western Mass SftP chapter members, and our experience working together to create the community workshops among other activities, has provided us lived experience that reinforces our own understandings of solidarity science. And of course, we each draw on other experiences that enrich our ideas about the concept. Brian Schultz, an agricultural ecologist and entomologist at Hampshire College who did his Ph.D. at University of Michigan with John Vandermeer and participated alongside his mentors and classmates in solidarity work with US farmworkers and with the Sandinistas in Nicaragua, often emphasizes that scientists have global knowledge but farmworkers have local knowledge—they know better than scientists how things work (or don't) in the place they are farming.[5] He is also fond of saying that as a science professor, his job is often to tell students where science stops and other kinds of knowledge (e.g., related to policy) have greater relevance.

For me, the history of Maoist "mass science" continues to supply epistemological and political inspiration. It may well have been in *China: Science Walks on Two Legs* that I first encountered the "three-in-one" model of Mao-

5. Some STS scholars challenge the idea that science (or any knowledge form) should be considered "global" (see, e.g., Turnbull), but this remains a meaningful distinction for many scientists and helps to make sense of the experience in which some types of knowledge travel more effectively than others across diverse sites.

era, commune-based scientific experiment groups. Along with Pu Zhelong, the three-in-one groups became a particular focus in my second book project. The premise was this: establishing the most appropriate new agricultural technologies (crop varieties, fertilizers, insect control, planting strategies, etc.) required the participation of people with diverse forms of knowledge. Technoscientific expertise could be supplied by scientists or technicians, but they were in short supply; in their absence, young people with secondary school education and some training at agricultural extension stations were good substitutes: youth boasted not only some basic scientific knowledge but also a willingness to embrace change. However, such people by no means held all the answers. "Old peasants" with decades of direct experience in agricultural production possessed much deeper knowledge of the realities of farming in their specific locales. Moreover, old peasants were by nature more down-to-earth: they were far less likely than scientists or "educated youth" to charge madly after a fancy new technology, seeking personal glory. Local cadres served as the final leg of the tripod, since they had the "correct" political understanding necessary to keep new agricultural practices consistent with broader policy commitments.

When I began working in the STPEC major at UMass, the administrative structure I inherited also involved a three-in-one combination. (I do not say "coincidentally," since after all, STPEC arose in 1972, a period when Maoism and Maoist-inspired theories of participatory research and pedagogy were deeply influential on leftist academics.) In STPEC, all issues were handled by anti-hierarchical decision-making bodies comprising students, staff, and faculty working through consensus. The most obvious rationale for this system was to ensure equitable opportunities for political participation, and especially to empower students to engage in self-governance. Still, I could not help but think of the system in terms of revolutionary knowledge production along three-in-one lines. Because of our very different positions in the university, students, staff, and faculty have different experiences and perspectives, and thus different knowledge to bring to the table. Decisions made by groups representing all three perspectives are bound to be more robust, reliable, and revolutionary. Studying the history of Maoist three-in-one scientific experiment groups enriched my understanding of what we were doing in STPEC; and participating in STPEC committees made Mao-era history far more tangible. This was the knowledge that I in turn brought to Western Mass Science for the People,

and it informed my contributions to our community workshops, in particular the emphasis on enacting situated knowledge in the promotion of solidarity science.

The Historian's Toolbox

In 2019, Rodolfo Ostilla Mónico, a member of the new SftP, proposed digitizing *China: Science Walks on Two Legs* to make this early and influential SftP publication more widely accessible. Given the personal significance of the book as my introduction to SftP, I was delighted that others recognized its importance and grateful to Rodolfo and other members for their willingness to do the hard work of formatting and proofing the digitized version. I was also concerned about the implications of having the current organization "reprint" the book as though its political analysis reflected present-day wisdom on the subject of science in Mao-era China. In fact, as I've already acknowledged here and as some of the others on the SftP listserv also pointed out, the book was "dated" in multiple, unavoidable ways.[6]

First and most obviously, the rosy picture of socialist science that it presented has been profoundly challenged by mountains of personal accounts detailing suffering, persecution, and political decisions that flew in the face of both scientific evidence and human decency. While some scholars, me included, have begun to insist on writing histories that do justice to the era's revolutionary ambitions and their positive outcomes, no scholar could sign off on an account that failed also to consider the voluminous negative evidence that has accumulated since that time.

Second, and for our movement perhaps even more important, the book's authors were a delegation of entirely white people only one of whom spoke even a little Chinese. Although they were serious in their commitment to learn about China through reading and discussion, they could not (and, to their credit, did not) claim deep knowledge about Chinese history and culture. To suggest, in 2020, that their book represented an essential source of knowledge on science in Mao-era China would be not just misguided but racist: it would deny the existence in our communities of vast numbers of people with far more direct and extensive knowledge of China (including Chinese and Chinese-American people),

6. Consistent with the mixed feelings among US leftists today about Mao–era China (and present–day China as well), the discussion on the SftP listserv was rich and by no means unified. My analysis here should not be taken to represent that of all SftP members.

and so would preserve the fallacy that China constitutes a mysterious, exotic land knowable only through the intrepid feats of white explorers.

The challenge for the historian then becomes how to explain the significance of such a "dated" artifact. And that lies in what it means to be "dated," in the power of recognizing that the "thought of an era is *of an era*," and in the value of understanding that era and how it relates to our own. These were the ideas that were forming in my head as I engaged in the listserv discussion. Out of that discussion came the idea that the new SftP should publish a critical edition of the book. A collection of essays would offer reflection and analysis of the book's significance, and the digitized version of the book would live on a separate website dedicated to the archiving of the history of the original SftP (http://science-for-the-people.org), making clear that the book itself was not a publication of the new SftP. This was an exciting project for me, because it wove together my apparently disparate fields of activity in a far more direct way than I had previously managed, and in the process, I gained a clearer understanding of the value of the historian's toolbox to our social movements—though I do not feel I have been as successful as I hope to become in sharing those tools.

By this time, I had a lot I wanted to say about this book and its historical significance, and so I was grateful for the chance to write the introduction to the collection and to take a leading role in soliciting and editing of the essays. I thought it was important that the first essay be written by someone who possessed both personal and scholarly knowledge of the recent history of science in China, and for this role I thought immediately of Zuoyue Wang. Zuoyue grew up in China during the Cultural Revolution. In the 1980s, he studied physics with the legendary astrophysicist and political dissident Fang Lizhi, who played a leading role in the democracy movement culminating in the Tiananmen Square protests of 1989. Zuoyue then turned to the history of science, and he came to the US where he completed a dissertation and then a book on US science policy during the Kennedy era. We first crossed paths around 2000, when I was a graduate student and he was a professor in the process of shifting his research agenda to include the history of science in modern China. His immersion in the 1980s democracy movement in China and his study of the early twentieth century Science Society of China had given him a strong liberal politics quite different from my efforts to rehabilitate the radical program of the Mao era, and certainly the personal stakes for him were far higher, but this never prevented him from acting as a kind and supportive mentor to me.

We have participated in many collaborations, and just a few years before I recruited him for this essay, we connected in another, unexpected but absolutely fitting, way: when reading the opening autobiographical section of Sophie Wang's comic *Science Under the Scope*, her drawing of her father, identified as a historian of science, made me certain that she must be Zuoyue's daughter, as indeed she is. Of the many insights offered by Zuoyue's contribution to the critical edition, I found especially helpful his provocative challenge to SftP's readers to consider carefully the appeal by liberal dissidents like Fang Lizhi that science should be free from political control. This is where the rubber meets the road, and radicals have to be prepared to confront these fundamental questions, whether in "actually existing socialism" or "actually existing capitalism."

Similar to the logic of the 2014 conference panels, we decided to include a present-day organizer in the collection: JS Tan, a leader in forging solidarities between tech workers in the US and China, proved the perfect choice. He contributed the closing piece, titled, "Why the 996.ICU Movement Must Not Be Forgotten in the United States"; this became SftP's first publication offered also in Chinese translation. JS analyzed the stark inequities in the tech industry in China, explained the exacerbating effects of the deteriorating US-China relationship, and chronicled the rise of opposition among Chinese tech workers to grueling working conditions along with the (sadly all-too-brief) supporting actions in the US. He concluded that "in the face of nationalism, only workers stand to lose," and called for more transnational tech-labor solidarity.

The middle two essays were contributed by former SftP members who had participated in its delegations to China: Vinton Thompson in 1973 and JT in 1978. As a historian of SftP and related movements, I found their reflections on their experiences intrinsically interesting, and I treasured this opportunity to gain a more fleshed-out understanding of the meaning the trip to China held for them and the organization as a whole. However, my conversations with the writers and then with the publishers led me to recognize that this perspective was not obvious—it represented a way of thinking that was strongly shaped by my acculturation as a historian. I decided it was my job to convince the authors that the value of their contributions lay not in what they had to say about China, but rather in what they had to say about their own experiences and about SftP. Every fiber of my being as a historian told me that this was true, and I admit I stuck very rigidly to this principle, but as a science activist it raised uncomfortable questions for me about the politics of expertise: I was essentially telling

two smart and well-informed people that because they were not China experts, their analysis of science in China, then or now, did not have a place in the critical edition. This was a challenge for them to accept, not because they claimed special expertise on China, but rather because it can be extremely difficult for people to internalize the idea that their own experiences are of historical value—the tendency is to think that only what we witness or analyze about "bigger" subjects (like "science in China") is relevant. Through conversation we came to an understanding, and the pieces they wrote worked well with what I had envisioned for the project.

Things got more challenging when the draft was turned over to the publishing committee. A big part of the trouble related to an awkwardly timed transition in the leadership and unclear communications, such that the new publisher and the committee were not aware that the project was moving forward and had not been involved in the conversations that had brought us to where we were. They were taken by surprise and were understandably frustrated. But I think there would have been differences to resolve in any case. During these debates, disciplinary differences (the view of a historian vs. the view of scientists) became entangled with generational differences: we did not see things the same way because of our generational differences, and we had different views on the value of past ideas because of our disciplinary differences.

In assessing the middle two essays written by the former SftP delegates to China, the committee members were perplexed by the impressionistic tone and lack of analysis. To me, the impressionism was entirely appropriate given the historical value of the narratives as primary sources illuminating the significance of China within the political trajectories of these members of the original SftP. In fact, it was precisely the more "dated" elements of their essays that I found most valuable (because they helped capture the "thought of an age"), and that some of the committee members considered most questionable (because they did not square with political sensibilities today). And where I saw evidence of older activists being willing to offer for critical consideration their thought of an earlier age, some on the committee saw problematic ideas that should not be included in a present-day SftP publication.

Generational tensions are by no means uncommon in radical politics today, and compared with many other organizations, SftP can claim some success in bridging them. Nor are these tensions new. In fact, this experience reminded me of a conversation I had with Chandler Davis in Ann Arbor at the new SftP's first national convention in 2018. Born in 1926,

Chandler was a generation older than many of his comrades in Science for the People. In the 1950s, not only was he resisting McCarthyism, but he was also writing cutting-edge feminist science fiction (Davis 2010). Hence the pain when in 1972 an editor at the original *Science for the People* magazine published his article marked up with edits mocking his use of masculine pronouns and sarcastically commended him for "not censoring his doubts and biases" (Davis 1972; Science for the People 1972). Chandler shared this experience with me at the Ann Arbor conference. I don't know how often he had told the story in the past half century; my sense was that he had mostly laid the memory aside but that it continued to rankle because it had never been resolved.

This is about the struggles of movement building and especially struggles around inter-generational differences, and it is about the radical potential of a historical analysis. It's why history is part of the radical loom. Recognizing the historicity of something, taking a step back from it and analyzing it in its historical context, is one of the most profound intellectual legacies of Marxist analysis. It is a radical move to be able to see ourselves in history, and vice versa. When we can view our own words and actions as products of a certain historical context, and as part of a dynamic movement, we enhance our ability to learn from the past and from one another, and to grow as activists. Multi–generational organizing plus a historical analysis is a powerful combination, but one that requires much patience to cultivate.

Activism Feeds Back

I want to close with a current example of how my experience in SftP and other activism continues to feed back into my work as a China historian. Recently, sociologist Joel Andreas invited me to participate in a conference on the history of Mao-era efforts to overcome the boundary between mental and manual labor. Joel has long had feet in both academic and activist worlds: he has worked in labor organizing, and in addition to his many scholarly publications he is the author-illustrator of the well-regarded comic book *Addicted to War: Why the US Can't Kick Militarism*. The other conference organizers, Yige Dong and Pun Ngai, are also prominent sociologists who share an interest in the radical history of the Mao era because of their ongoing political commitments in labor and feminist organizing—and Yige in particular has been an inspiration to me through the work we

have done together in the Critical China Scholars (http://criticalchinascholars.org).

My contribution to this conference draws on my past and current research on the production of agricultural knowledge in the Mao era, especially the emphasis on integrating the knowledge of peasants (manual labor) with scientific workers (mental labor). It also draws substantially, if more abstractly, on conversations with SftP comrades about indigenous knowledge and science. Applied to concrete historical experiences of the Mao era, these become questions of whether efforts to unite "head and hand" could hope to do justice to the knowledge of farmers given Maoist hostility to traditional culture—and, on the flip side, whether the current Western academic and activist interest in indigenous knowledge gives us a critical enough appreciation for oppressive aspects of cultural systems and the workings of class.

In writing the paper, I have found myself going back through extended email conversations with SftP comrades from 2019 and 2020, sparked originally by the controversy over the Thirty-Meter Telescope in Hawai'i. It seems to have begun with Chandler Davis reaching out to a few of us, along with a few of his family members, to express his disquiet over the way activists seemed to be taking for granted that "deference to traditional cosmology" was sufficient reason to call a stop to the construction of the telescope. Michael Harris, another mathematician from the early days of Science for the People, similarly found it troubling that "contemporary activists are comfortable with traditional categories like 'elders' and 'sacred' that they would subject to rigorous analysis if invoked by the Mormons, for example." Michael further highlighted the need to attend to the fact that Hawai'ian "traditional culture" is a "class society," and Chandler expressed concern that we had heard from only "a small group of designated chiefs" rather than people representing the majority of Hawai'ian Indigenous people. As thoughtful Marxist scientists, Chandler and Michael found the activist discourse to suffer from a lack of materialism—both in its failure to attend to questions of social hierarchies and, still more important, in its readiness to discard science when it conflicts with the religious beliefs of indigenous people.

Sympathetic to their call for class analysis and a materialist perspective more generally, I could also hear the objections that others in my circles—younger folks for whom concerns about colonialism often supersede concerns about class injustice—would certainly raise. I responded, "My sense is that a key division among us here is whether we see culture (including

different cosmologies and epistemologies) as a legitimate thing to defend from colonialism alongside people's bodies and their political and economic rights." And it occurred to me that a properly critical, materialist approach would focus on power dynamics—and Maoists in particular would highlight the need to attend to the specific conditions of the time and place. I suggested that "a consideration of power in the colonial history of our continent and the Pacific Islands should extend also to the realm of the superstructure (including spirituality and epistemology)." And I asked what Chandler, Michael, and others on the thread thought of Robin Wall Kimmerer's *Braiding Sweetgrass*, since it seemed to me to be "one of the most influential recent books for young radical scientists."

Chandler's daughter chimed in on the thread promising to buy him a copy for his birthday, and Michael bought his own copy. There followed an exciting, enlightening discussion driven by a thoroughly Marxist analysis. Both of these SftP veterans appreciated the book tremendously and stated their intention to recommend it to friends, family, students, and colleagues. Michael emphasized that he learned "more about ecology than I would have believed possible in the space of 100 pages." Chandler applauded Kimmerer for "treating her own world view as a work in progress: she is trying to learn more of the largely erased Potawatomi heritage and other indigenous thought; she is trying to solve some specific open problems in ecology; she is searching as we all should for levers of influence on the way the land is treated; and so on," and he noted that she "is especially clear in accepting the input from different knowledge schemes whenever they are helpful, and she tells specific things she understands better as a result." Still, Michael noted Kimmerer's frequent use of the word "sacred," which he said appeared to do "no work except to express the author's metaphysical commitments." Further, and "more seriously," he worried about the book's focus on the clash of cultural attitudes toward nature over and above the "conflict over land and resources," which to his mind more accurately explained the "genocidal character of the confrontation between the European colonizers and the indigenous populations"; and he highlighted the lack of attention to "internal class stratifications and power dynamics" and other aspects of the dynamic histories of indigenous peoples. Chandler noted that Kimmerer was at her best when she recognized that "teachings from indigenous lore vary from one teacher to another" and wished she had "made this explicit much oftener," as "it would have helped get away from the suggestion of some mystical source of knowledge."

Into this discussion, Natalie Zemon Davis (the extraordinarily inspiring and influential radical historian, also Chandler's wife) introduced her article, "Physicians, Healers, and their Remedies in Colonial Suriname," which captured the complexity of colonial attitudes toward indigenous knowledge systems, while also highlighting the agency of indigenous people in actively acquiring knowledge and transforming their own ideas. There was much here that related to Kimmerer's work, and I began as well to think about the connection to Mao-era Chinese history of science. Natalie had demonstrated that the colonists perceived the indigenous people as knowledgeable but "superstitious," such that "an experienced and learned physician was needed to collect and communicate their discoveries, to turn their everyday practice into a meaningful pharmacopeia of use to all humankind." The colonists' perception struck me as strikingly similar to Maoist attitudes toward folk knowledge of the natural world (though in Maoist epistemology, "synthesize" would come between "collect" and "communicate"). Stepping back from these disparate cases, and considering them alongside many others, I noted that attempts to foster epistemological pluralism have usually nonetheless maintained some degree of inequality (with indigenous knowledge serving in a subordinate / service role). This is the challenge that I think Kimmerer and others are taking on: how to achieve pluralism (and not just co-existence, but dynamic engagement) on a more equal footing.

Through this conversation with Marxists from (and orbiting) the original Science for the People, I started homing in on what has become my analytical framework for thinking about knowledge production in Mao-era China and beyond. The answer to the concerns that Chandler and Michael have raised about "the sacred" and how to entertain calls for pluralism without opening the door to the religious right, lies in adhering to a materialist analysis: we should analyze ideas within their political, social, and economic contexts. Indigenous knowledge systems and religious-right knowledge systems have had completely different political relationships with modern, Western science. The histories are different and the current power relations are different, and we should not expect a single rule that floats over and above any consideration of the actual political contexts. We should also look at the role "sacred" is playing in each knowledge system and evaluate its political and epistemological significance before we decide whether, in that specific case, it is worth engaging.

I know I did not convince Michael, and probably not Chandler either. Michael recognized Kimmerer's book as a "deeply materialist comparative

analysis of the indigenous and colonial interactions with the natural world." But he also noted that Kimmerer's emphasis remained on "differences on cultural attitudes" rather than "the material reasons for these attitudes," and he feared that the "young radical scientists" I had referenced were similarly swayed by this emphasis on cultural formations rather than material causes. Chandler reminded us that the late Marxist biologist and SftP luminary Richard Levins "would have us learn as we can from non-materialistic belief systems while keeping our own belief structure running and functional (and under critical anti-dogmatic questioning, to be sure)"—and he attached Levins's chapter, "The Science of Dharma and the Dharma of Science," in which Levins engaged with Meera Nanda and Vandana Shiva, concluding:

> Meera Nanda is our ally in the struggle against the Hindu right, the traditional oppressive sexism and inequality, the mystification of nature. But she is not our ally, apparently, against the corporate modernizers or against scientism. Vandana Shiva, on the other hand, is an ally against the technocratic globalizers, against scientism, but not, apparently, against rural mysticism. It is the nature of coalition politics that allies can sometimes be adversaries, adversaries sometimes allies. (Levins 2008 94)

Even as we were wrapping up that conversation, a discussion erupted on the main SftP listserv regarding Marxist biologist and SftP veteran Richard Lewontin's critique of Vandana Shiva. Historian of science Kavita Philip entered the discussion, citing the same work by Levins that Chandler had referenced on the separate thread, noting, "As Levins has written, even if one doesn't have expertise in Indian politics, an honest (dialectical, historical materialist) analysis easily shows up the contradictions and political gaps in Shiva's and Nanda's own positions. What remains, still, is to excavate the politics of Brahminism. This is being debated on India's streets today, with Muslim and Sikh activists carrying Ambedkar posters and signs. Academic insights lag behind the theorizing on the streets. Levins famously combined both. I'd like to find ways for us to do and nurture that same agility and historicized politics."

Kavita also shared a very thoughtful and thorough article she had written on of the concept of indigenous knowledge as discussed in STS literature (Philip 2001). And she recommended an important article by Sinha, Gururani, and Greenberg, "The 'New Traditionalist' Discourse of Indian environmentalism," which offers a critique of traditionalism strongly reminiscent of what Chandler and Michael had raised with respect to "deference to traditional cosmologies." According to the authors, the traditional

cultures held up in global political and academic circles fall far short with respect to crucial goals in "equitable resource use, the participation of women and subordinate classes and castes in local institutions of resource use, decentralised, democratic and collective local control over state institutions for resource use, a priority for the provision of 'basic needs' to the rural and urban poor over other uses, and programs to regenerate resource stocks" (Sinha et al 2008 67).

The email discussion continued, and a number of us began collecting the gems from the email threads and considering whether to propose an issue of the new Science for the People magazine on "Science and Indigeneity"—or, as biologist Kriti Sharma suggested, "Science and the Sacred"—to pursue these debates more thoroughly. This is finally coming to fruition in 2023.

In the meantime, these conversations with SftP activists of multiple generations have profoundly shaped what I am writing for the conference on mental and manual labor in Mao-era China. I am finding myself thinking about what scholars engaging with indigenous knowledge would make of the scientism of Mao-era political and intellectual elites, who spurned traditional knowledge forms as "superstition," doing violence to indigenous cultures and missing opportunities to benefit from their wisdom. And at the same time, I am reflecting on the insights of my SftP comrades, considering that we need to ward against turning indigenous knowledge into a fetish such that we fail to recognize what it masks: in particular, class. For example, if we consider the relevant knowledge brought by an undocumented Mexican farm worker in California's grape industry: while it is possible that she has inherited an ecological epistemology from her cultural heritage that would be recognizable through an indigenous knowledge paradigm, is it not far more likely that she has experiential knowledge based on her practical experience informed by her class perspective as an exploited laborer? In this respect, a Maoist concern for the integration of mental and manual labor would be a more relevant framework for activist scientists (like those in SftP) seeking to collaborate on agricultural sustainability and food justice. And at the same time, again channeling Chandler and Michael, would an indigenous knowledge paradigm lead us to disregard the arguably important project of dismantling irrational ideas from traditional societies that have sustained vast social injustices?

I don't know what my contribution to the Mental and Manual Labor in China conference would look like if not for the time I have spent organizing

in Science for the People and other political spaces. But I have to believe it would be significantly different. If not for those political engagements, I would not have had the experience of consciously enacting forms of knowledge integration to achieve social transformation. And I would not have felt the stakes as deeply, because I would not have participated in conversations among science activists with strong, mostly overlapping political commitments and yet strikingly different analyses based on different perspectives on the relationship between science and other epistemologies, and more broadly on the relationship between cultural and material forms of domination.

Weaving on a radical loom means consciously bringing together the different areas of our intellectual, social, and political work to generate robust and liberatory alternatives for the worlds we live in. This concept may be particularly relevant to radical science movements, where the need to integrate different forms of knowledge and social action, maintaining critical awareness of many kinds of hierarchy and domination, is especially obvious. Marxism not only appears in many of the colors that run through my bits of the tapestry but has also supplied some of the most powerful tools to weave the threads together. No doubt the many other people who have been involved in Science for the People (past and present), and in radical science movements more generally, have similar stories to tell about their own efforts to weave on a radical loom.

REFERENCES

Davis, Chandler. 1972. "Mathematics in Vietnam and China: What Can We Learn?" *Science for The People* 4(2): 19–21.

———. 2010. It Walks in Beauty: Selected Prose of Chandler Davis. Seattle: Aqueduct Press.

Harding, Sandra. 1992. "Rethinking Standpoint Epistemology: What Is 'Strong Objectivity?'" *The Centennial Review* 36(3): 437–70.

Kuljian, Christa. Forthcoming. *Our Science, Ourselves: How Gender, Race and Social Movements Shaped the Study of Science*. Amherst: University of Massachusetts Press.

Levins, Richard. 2008. *Talking about Trees: Science, Ecology, and Agriculture in Cuba*. New Delhi: LeftWord Books.

Merrifield, Juliet. 1993. "Putting Scientists in their Place: Participatory Research in Environmental and Occupational Health." In *Voices of Change: Participatory Research in the United States and Canada*, edited by Peter Park, Mary Brydon–Miller, Bud Hall, and Ted Jackson. Toronto: OISE Press.

Philip, Kavita. 2001. "Indigenous Knowledge: Science and Technology Studies." *International Encyclopedia of the Social & Behavioral Sciences* 11(2): 779–83.

Plant, Sadie. 1995. "The Future Looms: Weaving Women and Cybernetics." *Body & Society* 1(3–4): 45–64.

Schmalzer, Sigrid. 2021. "Connecting the Dots by Sigrid Schmalzer." https://youtu.be/IwzfO9LF1sQ

Science for the People. 1972. "About this Issue." *Science for the People* 4(2): 3.

———. 2017. “Which Way for Science?” Accessed April 18, 2017. https://scienceforthepeople.org/2017/04/18/which–way–for–science/
———. 2021. “Rereading China: Science Walks on Two Legs: A Critical Edition of an SftP Classic.” https://magazine.scienceforthepeople.org/rereading-china-2021-special/
Sinha, Subir, Shubhra Gururani and Brian Greenberg. “The ‘New Traditionalist’ Discourse of Indian Environmentalism.” *The Journal of Peasant Studies* 24(3): 65–99.
Wang, Sophie. n.d. “Science Under the Scope.” Accessed June 15, 2023. https://freerads.org/science-scope-full/
Wang, Zuoyue. 2008. *In Sputnik’s Shadow: The President's Science Advisory Committee and Cold War America*. New Brunswick: Rutgers University Press.
Werskey, Gary. 1988. *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*. London: Free Association Books.

summer 2023 volume 2 | issue 2 | 91–110

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02206 ESSAY

The Revitalization of Science for the People

Calvin Wu and Edward Millar

ABSTRACT: Inspired by earlier generations of Marxist scientists, Science for the People (1969–1989) became synonymous with the radical science movement in the United States, which emphasized the class nature and ideology of knowledge production, and organized scientists toward anti-capitalist struggles. In 2015, the organization and publication were revitalized, under a very different sociopolitical context, by a new generation of science workers. What are the historical continuity and points of departure? What challenges were presented to the activists of the 1970s from which we can draw lessons to build our present movement? What have the radicals across generations achieved and what is left to be done? As workers in science, pupils in the science of science, and as organizers of Science for the People, we offer the necessary self-critique in order to refine the vision, strategy, and plans of action to collectively tackle the pressing issues in science and society of our time.

KEYWORDS: Radical science, science for the people, labor, science activism, new left, social relations of science, science-based social movements.

"Practice without thought is blind; thought without practice is empty."
—Kwame Nkrumah, Consciencism (1964)

Introduction

J.D. Bernal's 1952 pamphlet *Marx and Science* remains a seminal text for its union of historical materialism and the dialectics of nature into an all-encompassing philosophical worldview (Bernal 1952). Bernal, himself a biophysicist (before the term formally existed as a scientific discipline), was inspired by the advancement in the sciences as well as the philosophy of science in the Soviet Union. Together with other prominent radical scientists in Britain, they set in motion what amounted to an ideological scientific revolution in the West that is still relevant today (Sheehan 2022).

The last chapter of *Marx and Science* is titled: "The New Socialist World—Science for the People." The latter half of the title took on a life of its own when

Wu, Calvin and Edward Millar. 2023. "The Revitalization of Science for the People." *Marxism & Sciences* 2(2): 91–110. https://doi.org/10.56063/MS.2310.02206

• *Correspondence:* Calvin Wu, Science for the People and Massachusetts Institute of Technology.
• e-mail: secretary@scienceforthepeople.org
• ORCID: 0000-0002-2622-0576
• DOI: 10.56063/MS.2310.02206
• *Received:* 26.04.2023; *Revised:* 23.06.2023; *Accepted:* 25.07.2023
• *Available online*: 05.11.2023

a group of activist-scientists associated it with a US-based radical science organization and publication. First published in 1969, *Science for the People* magazine was the voice of the organization Scientists and Engineers for Social and Political Action (SESPA)[1], which was reminiscent of Bernal's own World Federation of Scientific Workers founded a generation prior.

From 2015–2019, another generation of radical scientists revitalized the organization and publication. What sets both the original SftP and its recent revitalization apart from other efforts within the sphere of science and technology activism are its efforts to situate itself within a long lineage of radical science that can be traced back to Bernalism, and from there, to the scientific worldview of Marx and Engels. Despite the spatial and temporal separation from both the New Left of the 1970s and the Second World War era in which Bernal was writing, Marxist science, such as it exists in today's late imperialist era, has retained its essence and alignment with a dialectical materialist worldview. An engagement with the contradictions of world capitalism and their necessary entanglement with science remains fundamental to any radical critique of science; the philosophy of praxis requires intellectual development (theorization and publication) guided by action (movement and organization), and vice versa. Then as now, scientists as direct producers of knowledge are appealed to as active agents in political struggle.

At the same time, to understand and to win the struggles of today (i.e., engendering "the new socialist world" imagined by Bernal), we must consider some key differences between the two generations (Table 1). Before we can elaborate on SftP's present and future, we must first situate the organization within its historical contexts. Our unique contribution, perhaps, can be discerned from the fact that we do not approach this analysis as a purely academic endeavor, but as a self-critique and reflection offered by individuals involved in this organization, who are still navigating the many contradictions within the points of intersection between science and society.

SftP and the New Left

As histories and legacies of Bernalism and the radical science movement of the 1930s and 1940s (Foster 2020; Ienna 2022), as well as the origins and activities of SftP (Moore 2008, Schmalzer et al. 2018) have been written elsewhere, we focus on comparing some aspects of the strategies and tactics of the SftP of the 1970s with its revitalization today, with a special attention to the differences between the macro-level political, economic, and historical contexts. In 1973, world capitalism entered an epochal crisis of overaccumulation and

1. The acronym SESPA gradually dropped out of use in the early 1970s as many simply referred to the organization as SftP.

stagnation, just as the United States withdrew combat troops from Vietnam in the same year (Arrighi 1994, 300–317). The interpenetration of these two processes in the preceding decade produced the material conditions that contributed to SftP's early formation. While the founding of SESPA traces back to attempts of conscientious physicists pushing the American Physical Society (APS) to oppose the US War in Vietnam (Moore 2009, 133), the organization's rapid growth throughout the 1970s had as much to do with the structural change in science as with the social currents of progressivism within the broader culture of the United States.

Table 1. Comparison of SftP between the two generations:

	1970s	Today
Political philosophy	SRS, predominantly western Marxism	Influenced by feminist, Indigenous, decolonial scholarship; nascent engagement with ecological Marxism
Class position	Middle class, pivoting against careerism and promoting alternative career choices	Proletarianized student workers with high level of precarity, pivoting toward working-class identity
Tactic	Protest actions, personal confrontations, attempts at subversion, de novo campaigns	Coalition building, support roles for broader social movements, trade unionism
Organizational structure	Decentralized, held together with magazine participation, dominated by few large chapters	Moving away from decentralization as turnover has been too high to sustain local campaigns, resulting from magazine being dissociated from the organization
Organizing energy	Larger social current of anti-war, civil rights, women's rights movements	No coherent radical social currents to latch onto, falling back to institutionalized spheres of political action
Organizing capacity	Organizers have more job security, better social welfare, and most members have access to existing political actions on-campus	Reduced capacity due to increased precarity, exacerbated by social fragmentation and digital alienation
Theories of change	No unified ideology, operated as a "big umbrella"	Centering political education and working on organization's ideological foundation

The mid-1960s saw federal R&D in basic science dwindle for the first time since 1945. Counterposing the previously uninterrupted growth was the uninterrupted decline that was only to worsen in 1973–1974 (Rowberg 1998). What remained of state support for science during the years of escalation of the War in Vietnam was substituted by military-directed research. Not only did the further incursion of militarism into the ivory towers of universities heighten the preexisting tension among politically eclectic academics—who were no strangers to sporadic protests and agitation on campus—the shift in funding sources also meant that the research agendas became subjected to the heavy hands of the military. For those scientists who had been accustomed to the privileged sovereignty during their labor process, the imposed institutional constraints were intolerable. The SESPA founders of the APS stated that their goal of organizing was to "regain our full intellectual and political freedom" (Goldhaber et al. 1968).

Whereas the pivot to individual rights and responsibility was hardly in line with the radicalism of Bernal and colleagues, many who followed suit were rapidly radicalizing in ways that were more aligned with earlier visions of Marxist science. In contrast to the Union of Concerned Scientists, founded in the same year and arising from similar concerns about the weakening of scientists' influence on public policy, SftP attracted the more radical contingents to its rank. Student activists schooled in the civil rights movement, women's rights movement, and the antiwar movement began to apply an explicitly anticapitalist lens to tackle the problems of race, gender, militarism, and their relationships to the production of scientific knowledge. In the December 1970 issue of SftP, the suggested reading list included, among others, Paul Baran and Paul Sweezy's *Monopoly Capital*, Frantz Fanon's *The Wretched of the Earth*, J.D. Bernal's *The Social Function of Science*, as well as Karl Marx's *Economic and Philosophic Manuscript of 1844* (Contreas et al. 1970).

Throughout the 1970s, SftP became associated with "confrontational, uncompromising, and insistent" direct action that included "disruptive tactics such as sit-ins, the appropriation of public and private spaces for political purposes, refusals to leave, vigils and street parties" which "went well beyond the neutral distribution of scientific information, cool logical argument, and gentle moral discourse" (Moore 2008, 164–165). Armed with class analyses and a willingness to subvert professional norms and embrace confrontation, SftP spearheaded critiques of establishment science, the false pretense of scientific neutrality, and oppressive ideologies, while seeking alternatives to the hegemonic mode of knowledge production.

Yet, despite Marx's looming presence in the publication, the organization remained a big umbrella that was open to self-identified Maoists and liberals alike. SftP remained diverse and decentralized, driven by regional chapters,

working groups, and individuals, with no formal set of governing principles uniting the organization (Moore 2008, 158). Throughout 1974–1976, SftP chapters in the Northeast gathered to work on creating a set of "Principles of Unity" that could guide the organization's actions. At these conferences, a group emerged which called itself the "Unity Caucus," and pushed for more working-class leadership within the organization. Some members resisted the suggestion to adopt words like "anti-imperialism," "working class leadership," or "self-criticism" (Greeley and Tafler 1979); even the suggestion to specifically mention capitalism proved controversial (Moore 2008, 182). Despite long and laborious discussions, the Northeast chapters did not arrive at any Principles of Unity.[2] The failure of the Unity Caucus's proposal evoked a constant fear of "cleavage"—though perhaps somewhat ironically, the Unity Caucus themselves left the organization *en masse* soon afterward—which precluded deeper political discussion and ultimately hindered the organization's effectiveness.

The elevation of decentralization, loose-knit ties, and diverse priorities over a formalized leadership structure and codified principles is not unique to SftP; and the weakening of SftP in the mid-1970s cannot be analyzed in isolation from the broader historical trajectory of the New Left. The end of the first iteration of SftP came about in 1990, owing partly to financial difficulties and tax troubles, and in part due to growing discontentment among some members within the organization, particularly in regard to the deprioritization of issues related to gender and race (Schmalzer et al. 2018, 5; Moore 2008, 183–184). However, in terms of organizational capacity and impact on radical science, SftP was already long past its peak of the mid-1970s. There are many factors which play into the decline of any activist group or movement, and we do not claim to have identified or isolated the primary cause for the decline of SftP. Here, we attempt to briefly highlight a few structural and ideological elements that may have contributed to the demise of the previous generation. The subsequent sections will further consolidate these points as we lay out the visions and strategies for the revitalized SftP as discussed in the magazine's chapter reports.

Positionality, Tactic, and Philosophy

The strongest critique of establishment science offered by SftP revolved around two recurring themes that reverberate to this day: "scientists are

2. According to the political sociologist Kelly Moore (2008, 182): "many academic members were uncomfortable with the Caucus's desire for working-class leadership of the group. Others found the Unity Caucus's methods heavy-handed and still others were disappointed that their own views were not considered."

workers" and "science is not neutral." The former positions the organization as agents in class struggle, and the latter presents an ideological challenge to the forces of alienation and to the conventional framing of the role of science under capitalism. However, while SftP explicitly supported proletarian causes, its members largely fell short of identifying themselves as proletarian. Among the chief theorists through which SftP members engaged with the question of class was the leading New Left thinker André Gorz, who at the time was forming his famed thesis *Farewell to the Working Class* (1980) that dubiously steered Western intellectuals away from centering the revolutionary proletariat. As such, SftP's professed class analyses never went beyond investigating the formal differences between scientists and technical professionals vis-a-vis what they called "blue collar workers" (Schevitz et al. 1973). While they strived to emphasize commonality and unity between the "strata of workers," it is the inquiry into the real separation between different strata of workers, through the concrete relations of production, that was sorely missed.

This separation is ultimately rooted in the concrete socioeconomic status of scientists and engineers of the early 1970s. A 1974 census shows that scientists and engineers with doctoral degrees had an income differential of almost doubling the national median salary: $23,100 vs. $12,840 (United States Census Bureau 1975). The unemployment rate for the former was also at a low 1.5 percent compared to 6 percent for the total workforce. The privileged socioeconomic status, of course, did not apply to the 5 percent super-minority of women and even fewer non-white scientists and engineers (Crowley 1972).[3] Thus, the white, male, and middle-class composition of much academic work during the 1970s and 1980s may have materially hindered class consciousness. While some SftP members and chapters participated in community-based research and provided assistance and aid through work alongside other groups like Health/Pac, the Black Panthers, and the Medical Community for Human Rights, and the organization as a whole was in principle opposed to inequality in various forms, there was a latent epistemological tension between their position as technical experts and their commitment to a more radical vision of science by the people, or science in a citizen-shaped world (Moore 2008, 159–160; 180–181).[4]

If not economic conditions generating worker alienation, what was sustaining the energy behind the organization? The antiwar movement was in-

3. Many within SftP recognized the difficulties of centering issues of race and gender in the organization (Moore 2008, 184).
4. As Kelly Moore (2008, 159) writes, "SftP, like many other professional-based, anticapitalist organizations from that era, never collectively resolved the problem of how best to assist the working class without resorting to the use of expertise."

deed the spark that effectively mobilized and radicalized students and academics in the sciences. But the growth of *Science for the People* magazine into 1,800 subscribers and 4,000 in circulation—the Boston chapter, for example, touted membership of up to one thousand—had everything to do with the high-profile confrontation with the American Association for the Advancement of Science (AAAS) (Moore 2009, 19). In 1970–1972, AAAS annual meetings became SftP's arena for political agitation; reactionary research agendas were targeted, and presentations disrupted with banners, attracting nationwide spotlight by the *New York Times* and *Science* (Lyons 1971; Gillette 1973). It is worth noting that in 1976, AAAS incorporated SftP agendas into the meeting program, which accelerated the fracture within the organization along different theories of change: those who distrusted the establishment and those who sought changes within the system. Beyond national conferences, direct action also included public shaming of individual scientists. The Berkeley chapter's scuffle with eminent physicists who work for Jason was a prime example (Berkeley SESPA 1972).[5]

After the initial spikes in membership, coordinated disruptive tactics became less common in the latter half of the 1970s. It is entirely possible that the presence of FBI informants within the organization—revealed in the FOIA-requested file dated December 1972—had played a role in dampening the energy for direct action. What attracted the attention of the state apparatus, besides disruption at scientific conferences, was SftP's internationalism. In the summer of 1972, SftP established contact with the Chinese Embassy and began organizing a delegation to visit the People's Republic of China in the subsequent year. At the same time, the Chicago chapter formed a subgroup Science for Vietnam, which collected nine information packets to be sent to the North Vietnamese authority (Federal Bureau of Investigation 1972). These two activities were the most subversive during the New Left era SftP. Yet, whether they materially contributed toward the goal for international scientific collaboration or enacting socialist scientific practice remain a topic of debate. Reading the trip report, *China: Science Walks on Two Legs* (1974), we cannot but sense a romanticist naivete at best and lingering white gaze at worst (Altendorf et al. 1974). It remains unknown whether the packets of scientific journals, political pamphlets, and school textbooks that Science for Vietnam collected, and which were detailed in the FBI documents actually reached Hanoi, as no records of any subsequent contacts with North Vietnam were found.

During this period, SftP's organizing activity was widespread but eclectic, directed by different chapters consisting of individuals of different political

5. Jason is a Pentagon-affiliated think tank, consisting of prominent physicists, many of whom were Nobel Laureates.

leanings. Critiques of establishment science thus ranged widely from individual scientists' morality to political economy and ideology. It is not an exaggeration to state that there was no coherent philosophy of science for the organization or the publication. The Marxist contingents in SftP, with few exceptions, were heavily influenced by social constructivism of the Frankfurt School. The questions they raised on the social relations of science were crucial; the answers, however, were nearly always ones that condemn instrumental rationality. As such, some admitted in writing that "nobody could conceive of a Marxist method" for natural science (Meertens and Nieman 1979). Such a poverty of philosophy not only precluded developing real alternatives to the subject of their critique—despite the wish to find salvation in Mao-era China—it rendered this version of radical science ill-equipped amidst the Science Wars and the subsequent dismissal of any critical engagements with the socio-political nature of the production of scientific knowledge as mere postmodern relativism (Sheehan 2022). What can we build on, and what is to be redone, for radical science to adequately address the pressing issues of today, a time of unprecedented crises?

The March Toward Revitalization

Over two decades since the initial dissolution of the organization, the presence of SftP has resurfaced once again. The spark this time, distinct from the anti-war outrage that first gave birth to SftP, was the growing reactionary political milieu that swept outwardly fascistic personalities into office, their anti-scientific irrationalism, in tandem with the feeble resistance offered by the liberal scientific establishment. The "March for Science" of 2017, attended by many who were unsettled by the election of Donald Trump alongside the intensification of the climate crisis, pushed a record number of scientists to poke their heads out of the ivory tower. Whereas the March raised important issues of climate justice and science education, it also spewed liberal myths of "science-based policy" or "nonpartisan" [read: neutral] science (Sneed 2017). The AAAS, thirty years ago a target of SftP's protests, itself turned to protest as it organized the "Rally to Stand Up for Science." It is in this context that some saw the necessity to revitalize SftP and to transcend the contradiction of liberal and reactionary views of science to a higher plane.

The initial phase of rebuilding SftP rode on the rising tide of anti-Trump sentiment; the organization leaned into using the label "progressives," attracting many who broadly and amorphously identified with the left. A close tie with the Union of Concerned Scientists—a liberal organization born the same year as and rejected by SftP in 1969—had also been entertained. Organizationally, SftP attempted to replicate the decentralized model of the 1970s,

which—during a period of high energy from 2017–2019—spawned eleven chapters and half a dozen working groups across the United States.[6] When the COVID-19 pandemic hit in February 2020, organizing activity did not immediately cease, as many campaigns shifted to remote settings. However, at the time of writing in April 2023, SftP has dwindled to four local chapters and two working groups.

In 2018, the magazine *Science for the People* was republished. Early in 2020, the publication was designed around themes and issues concerning SftP's various working groups and campaigns. But as the organizing capacity decreased and working groups dissolved, the magazine became more dissociated from the broader organization. Attempts to integrate the central Steering Committee and the editorial collectives have not been forthcoming. Nevertheless, SftP magazine has grown from 200 to 600 in circulation, a sizable increase, but a fraction of the circulation of the original magazine at its peak. The contents—curated by individual editors independent of the Steering Committee—generated a readership beyond SftP but have also raised concerns about the widening gap between action and theory.

Principles of Unity, 2018

At the first national SftP convention held in Ann Arbor in 2018, the aims of the revitalized SftP were laid out in four internal "living documents" which attempt to codify the organization's guiding principles, codes of conduct, decision-making processes, and policies (SftP Steering Committee 2018). Among these documents, the "Principles of Unity and Bylaws" (POU) sketches a vision of SftP as a "science-activist organization dedicated to building a radical political movement in science and society," through which SftP members in national or local chapters should use "bottom-up strategies to build a science-activist organization" characterized by its commitment to twelve core values. The POU span from broader imperatives to "oppose all forms of oppression, exploitation and marginalization, while recognizing the role of science in these conditions" to more concrete objectives to "organize labor in the scientific workforce" and to conduct "radical, politically and scientifically informed investigation into problems of science and society" (Table 2). The early creation of the POU presents a contrast to the original SftP's challenges in coming to agreement about formalized codified principles.

One core guiding principle for the revitalized SftP has been the development of strategies for enlisting scientists in the service of anticapitalist knowledge production, emphasizing the importance of outreach, organizing, and recruitment. In the Chapter Reports published in the early issues of the

6. International chapters of SftP such as Canada and Southern Africa formed later in 2022.

revived magazine, local SftP chapters describe how they formed around the time of the 2017 March for Science protests.

Table 2. Revitalized SftP's Principles of Unity (as of April 2023):

1	Opposes all forms of oppression, exploitation and marginalization, while recognizing the role of science in these conditions, and the responsibility of science in liberatory struggles against all of these conditions
2	Builds parity within the organization for marginalized, oppressed, and exploited peoples
3	Works to organize labor in the scientific workforce
4	Conducts radical, politically and scientifically informed investigation into problems of science and society
5	Promotes positive instances of the use of scientific and technical expertise, providing scientists with knowledge and opportunities to use their specific training in accordance with SftP principles
6	Resists the use of science for exploitation, oppression, capitalism, imperialism, war, and environmental destruction
7	Struggles for system change to address the root causes of social, economic, and ecological problems
8	Affirms a deep respect for all life in the motivation for and practice of science
9	Opposes the assumption that humans have the right to exert violence upon, exploit, and control other humans, non-human animals, and nature
10	Recognizes scientific knowledge outside of establishment institutions
11	Recognizes, supports, and encourages the role of scientific knowledge and scientific investigation in building equitable futures, increasing understandings of our world, and guiding public policy
12	Fights the corruption of science by systems of power and builds democratic forms to expand access to scientific tools and knowledge

These reports describe how members sought to capture the attention of those scientists who had become politicized in response to the attacks on science and evidence-based policy from the political right of the Trump era. During the March for Science protests, local SftP chapters worked toward radicalizing scientists by creating forums for discussion and political education. At the same time, chapters were not entirely antagonistic toward the March for Science, and some helped to co-organize or coordinate local events related to the

march. Strategies included teach-ins, town halls, and reading groups, which attempted to cultivate and disseminate deeper structural analyses of the political economic problems facing science than were present in the dominant framings of the march.

The East Tennessee SftP chapter, which helped coordinate the March for Science in 2017, worked toward "steering the message of the march toward a distinctly radical tone—advocating the necessity of system change to address climate change, lifting up the struggles of marginalized and oppressed people within science, and promoting these struggles above banal 'science advocacy'" (Chapter Reports 2019). Chapter members drew from their previous experiences with labor and environmental movements and hosted regular meetings which discussed organizing practices and tactics for engaging with local issues and organizations. These meetings also provided platforms for scientists to share their own personal experiences with working in a field that actively discourages political organizing, and working with faculty members or supervisors who may have been hostile towards efforts to make visible the latent politics of science. In a chapter report from spring 2019, one East Tennessee SftP member reflects that:

> A common theme in sharing our experiences in the sciences was how institutionally repressed we were from both engaging in political activism and coming to understand science in political terms. Our meetings became a space where we shared our knowledge and skills with one another and introduced each other to concepts familiar to political organizers but less so to scientists while discussing how we could put this knowledge to practical use. When sharing our memories of the past year, many of our members felt strongly that this was one of the more useful aspects of our meetings. (Chapter Reports 2019)

Similarly, the reports from the Boston chapter of SftP describe how they hosted twice-monthly meetings which featured discussions on topics ranging from biological determinism, the politics of genetic engineering, the politics of artificial intelligence, the increasing role of the private sector in science, dynamics of gender/race/caste in science, and the lessons that leftists should draw from the history of Lysenkoism. These meetings tried to create linkages and continuity with the first iteration of SftP, hosting presentations from members of the original organization (Chapter Reports 2019). In 2019, the University of Maryland College Park chapter also formed reading groups and discussion groups as a strategy for uniting and solidifying ties among radical scientists at "America's most militarized university," centering issues related to the science of sex and gender, transgender rights, climate change, and expertise and democracy. The chapter report describes how reading groups provided a foundation upon which the group-built connections with other activist

groups, including socialists, environmentalists, and anti-prison activists (Chapter Reports 2019).

Reading groups and discussion groups have been a prominent mechanism for SftP chapters to deepen members' understandings of, and commitments to, radical science. While some of these discussion groups focus on broader concepts and principles that work toward enriching the political consciousness of scientists, others have been framed more specifically around local issues. For example, in response to the Atlanta city council's 2017 resolution to shift to clean energy, the Atlanta SftP chapter organized monthly reading group sessions to construct a theoretical foundation from which they could be better positioned to advocate for equitable transitions. One outcome of the reading group was the facilitation of a "Green New Deal" town hall in Gwinnett County, Georgia, which integrated a discussion of immigrant rights into a broader conversation about energy efficiency and renewables. In collaboration with the Metro Atlanta Democratic Socialists of America's Ecosocialism Working Group, the Atlanta chapter of SftP also developed an organizing guide to share lessons and experiences that could help other chapters or groups organize similar town halls on local issues related to climate and energy justice (Chapter Reports 2019).

While discussion groups, reading groups, and seminars are the strategies for radicalizing scientists that come up most frequently in the chapter reports published in the magazine, there are also some examples of more confrontational approaches that hint at some of the antagonistic and disruptive tactics that the original SftP was known for. For instance, the Santa Cruz chapter discussed efforts and strategies for "counter-recruiting" efforts at the University of California Santa Cruz (UCSC) job fairs (Chapter Reports 2020a). Recognizing that UCSC has close entanglements with Silicon Valley firms and military defense contractors, counter-recruiting efforts produce agitprop material which detail the links between the Big Tech companies, the Pentagon, and the Department of Homeland Security.

In Ann Arbor, SftP chapter members were involved with "researching and exposing the University of Michigan's complicity in the climate crisis and advocating for the implementation of an ambitious and just climate policy," publicizing the university's $1.5 billion worth of investments in fossil fuel companies and raising awareness about how some of these investments have provided funding for far-right groups (Chapter Reports 2020b; Chapter Reports 2019). The research findings were shared with local activists who have been agitating for fossil fuel divestment; for more equitable distribution of university funds and resources; for mechanisms to incorporate community input into the university investment process; and for greater accountability related

to the university's emissions inventory. SftP chapter members and other campus activists' groups successfully "pressure[d] the university to incorporate methane leakage into its emissions inventory," and into "acknowledging the science that shows that official emission factors for methane are grossly underestimated." Ann Arbor SftP members also worked on pressuring the University of Michigan to incorporate a course in the core curriculum of their School for Environment and Sustainability program that would focus on issues related to environmental justice, environmental ethics, and a critical analysis of conventional sustainability studies.

While radicalizing scientists and science students has been a primary focus of the revitalized SftP, local chapters also describe public outreach and education efforts. One of the principles of unity highlights an imperative to "fight the corruption of science by systems of power and build democratic forms to expand access to scientific tools and knowledge." Chapters have endeavored to build relationships with communities and groups outside of academic or scientific institutions and have organized or participated in protests and public campaigns related to local issues. Tactics related to public understanding of science have included public-facing events such as teach-ins, seminars, open panel discussions, book launches, and community engagement events. The Boston chapter facilitated webinars, panel discussions, and presentations related to energy democracy, the transformation of energy grids, as well as a town hall on the proposed creation of an electric substation which would significantly increase electricity use by industry in a residential neighborhood (Chapter Reports 2020b).

The East Tennessee chapter's work to support SftP's "People's Green New Deal" campaign involved organizing community discussions attended by roughly forty community members which sought local input about how a Green New Deal might help respond to their priorities and how a pathway to a decarbonized economy could map onto the specific issues facing Appalachian communities. In partnership with regional organizations like Appalachian Voices and Statewide Organizing for Community Empowerment (SOCM), the East Tennessee Chapter worked on a campaign to rewrite the Tennessee Valley Authority Act to center energy democracy and environmental justice, incorporating local input from a tour of "communities and cities that would be most impacted by a just transition away from fossil fuels to hear out their concerns" (Chapter Reports 2019).

Also in 2019, the Twin Cities (Minnesota) chapter of SftP worked on drafting material to inform legislation regarding a Green New Deal, working with youth networks and organizing a public workshop series "centered on storytelling as a transformative way of engaging science and scientists with social justice and multiple ways of knowing" (Chapter Reports 2019). The Western

Massachusetts chapter also initiated projects which were oriented toward educating youth about issues related to radical science. The chapter held a workshop for K-12 teachers called "Science and Social Justice," which provided teachers with materials on a range of topics including environmental justice, community engagement, the integration of social science concepts into science education, and trauma-informed practices, as well as guidance on development curriculum plans (Chapter Reports 2019).

Another principle of unity is centered around SftP's opposition to "the use of science for exploitation, oppression, capitalism, imperialism, war, and environmental destruction" and the need to advocate "for system change to address the root causes of social, economic, and ecological problems." Local chapters have worked with other groups to co-organize strikes, rallies, demonstrations, and protests, particularly on issues related to environmental justice. In 2019, members of the Atlanta chapter showed up at a Senator's office to confront his staff about the party's opposition to the Green New Deal. The chapter also participated in public rallies and protests against Georgia's Public Service Commission and Georgia Power, activism which they credit with possibly contributing towards the closure of five coal-fired power plants (Chapter Reports 2020b). In Boston, the chapter worked with a local community group in their fight against the construction of a natural gas compressor station, protesting at the construction site, submitting comments to regulatory agencies, and working alongside East Boston residents and local environmental justice groups in their clashes with the utility company Eversource over efforts to construct an electric substation in a flood zone (Chapter Reports 2020a). In response to the UCSC's work on a planned Thirty Metre Telescope on top of Mauna Kea in Hawaii, members of the SftP chapter helped organize an event to pressure the university to withdraw their support for its construction, working with Native Hawaiian elders to speak of the site's significance and for the importance of respect for sacred places (Chapter Reports 2020a).

One attribute that distinguishes SftP from other advocacy groups is that in addition to producing critiques of the production of scientific knowledge under capitalism, members of the organization also actively seek to apply their professional training and expertise to produce counter-hegemonic science, or to help address community-identified questions and concerns. This is reflected in POU statements which affirm that SftP "recognizes, supports, and encourages the role of scientific knowledge and scientific investigation in building equitable futures, increasing understandings of our world, and guiding public policy," and "promotes positive instances of the use of scientific and technical expertise, providing scientists with knowledge and opportunities to use their specific training in accordance with SftP principles."

In 2018, the East Tennessee chapter was approached by a local energy justice group regarding a hazardous waste permit application for a chemical plant located in a neighborhood in Knoxville Tennessee which is predominantly inhabited by working class people and people of color. The chapter requested that the Tennessee Department of Environment and Conservation (TDEC) host a public hearing regarding the permit, a request which they were legally required to fulfill. In preparation for the public hearing, SftP chapter members hosted a "research party" where they gathered information about the application permit, state and federal law, and the history of the chemical company (Chapter Reports 2019). The chapter then produced a "community briefing document" which they distributed to community members, so that they would be informed in advance about the issues discussed at the hearing and could ask questions and make comments. The chapter report states that the public hearing provided SftP members with an opportunity to leverage their professional training as well as their reputation as scientists to navigate the regulatory system and put additional pressure on the chemical company:

> The research party was undoubtedly one of the most enjoyable and meaningful activities we have done together, as it allowed all of our members to put their scientific knowledge into service. At the public hearing, we brought the science in a strong and righteous way that demonstrated our prowess as scientists and commitment to serving the people. Each of us comes from different disciplinary backgrounds, including public health and environmental engineering, and our comments showed that our concerns were to be taken seriously. The local press coverage of the hearing reflected this, as they reprinted much of the strong commentary we brought forward. Many of the environmental regulators present expressed in private that they were impressed with our comments afterwards. (Chapter Reports 2019)

As part of their work opposing the construction of the Line 3 pipeline, the Twin Cities chapter also formed a working group which focused on reviewing project permits related to the pipeline, submitting written comments to regulators, and preparing public talking points. The SftP chapter was one group in a larger grassroots coalition of individuals and organizations, and their efforts "sought to leverage our scientific training to engage with systems of power that repeatedly fail in their missions to protect the public good." Through their connection with the University of Minnesota, the SftP chapter also obtained three university grants which were transferred to Indigenous organizers (Chapter Reports 2019).

In another example of bringing the training, tools, and reputations of scientists out of academia and into communities, the Western Massachusetts chapter has been involved in a longstanding campaign to bring public attention to the health problems related to mold in housing. The chapter worked closely with Tatiana Cheeks, a local mother who became a community expert

on mold after her son developed respiratory issues which led to clashes with her landlord over the issue. The chapter has worked with community organizers to bring attention to the issue of mold contamination while situating the problem within a broader social and political context, while also working toward public education, community outreach, and instigating change.

Centrality of Labor, 2022

From 2017–2019, the organizing energy was largely sustained by the lingering excitement of revitalization, culminating in the 2018 Ann Arbor convention attended by hundreds of activist-scientists across the United States as well as a retreat in summer 2019. However, today, chapters that contributed significantly to the early years (Atlanta, East Tennessee, Santa Cruz, Twin Cities) no longer exist, and other chapters with a large member presence (Ann Arbor, Boston, New York City) have not been meeting or organizing. A pattern in the first phase of revitalization was consistently a process from political self-education to agitation and advocacy. Decades of reactionary politics within the belly of the US empire had made scientists and technologists individualistic and docile, inculcating them with the belief that science is neutral or apolitical. Scientists were finding collectivity in an unfamiliar space, and much effort had been devoted to reconnecting with the organization's past and reeducating each other about radical politics. Theories are often reflected in action—the aforementioned organizing activities straddle institutional reforms, grassroots community engagement—and the reliance on chapter's own initiatives was replicated from the previous generation.

Where have all the radical scientists in these chapters gone? The COVID-19 pandemic was certainly a systemic shock. At a first level, the dwindling of organizing energy could be interpreted as the result of the changing social, economic, and political conditions engendered by the virus. This is too simplistic and cannot fully explain the rather gradual drop-off in activism. In the first year of the pandemic, SftP across chapters worked together remotely to provide resources for pandemic response. The COVID-19 Working Group and Mutual Aid Working Group were formed to promote public health education and address the material conditions of members' communities, respectively. The Boston chapter, for example, continued to organize remote teach-ins related to their earlier project on People's Green New Deal. In 2021, the magazine resumed from a temporary pause in print publishing and, somewhat counterintuitively, increased circulation numbers.

It is possible that similar factors which contributed to the end of the first iteration of SftP in 1989 are replicating and hindering the revitalization pro-

ject at an accelerated pace. The early years (1970–75) of high-impact agitation, riding on the backdrop of the New Left movement, gained a critical number of supporters that sustained activity for the next decade. Today, the anti-Trump sentiment, without large anti-systemic political movement to ride on, seems insufficient to sustain SftP's activity for more than a few years. Compared to the previous generation, when many organizers stayed on for at least five years to even more than a decade within SftP, the turnover rate for organizers today is exceedingly high; the same organizers' names are not even recognized by the members who join the next year.

But there may also be a silver lining that points to new opportunities for organizing and radicalizing scientists as workers. The obstacles to organizing—limited labor-power, high turnover, local chapter dormancy—all point to the political economic structure of scientific labor in the era of late imperialism. In contrast to the 1970–80s, scientists today no longer occupy a privileged social stratum. With increasing neoliberalization of higher education and research, the majority of scientists are "trainees" (i.e., student workers), who receive close to minimum wage with little or no benefits. Any veneer of career prospect or security is peeled away by the easily identifiable organizational form of academia: rugged individualism, faux meritocracy, entrenched hierarchy, and hypercompetition. Capital circulating across governments, universities, and the private sectors polarizes student workers (the actual producers of scientific knowledge) and solidifies their class position as well as consciousness. Whereas the New Left generation of SftP was unable to articulate fully the proletarian causes for science and scientists, our generation is undergoing more of an explicit and recognizable process of proletarianization.

One concept that is central to the POU but less visible in early chapter reports is the importance of integrating labor struggles into the work that SftP is involved with. Many in SftP are also rank-and-file members of graduate student or postdoctoral worker unions who organize labor in the scientific workforce. In December 2022, the publication team released *Organize the Lab: Theory and Practice*, a collection of essays on organizing scientists in academia (Science for the People 2022). The book became the most well-received publication since revitalization and generated widespread interest. Four separate book events in the subsequent months coincided with waves of academic labor action, including the University of California strike. One of the events was in collaboration with and fundraising for striking student workers at Temple University. The campaign around the issues of scientific labor increased SftP membership and generated significant organizing energy to create new local chapters.

It is worth noting that such a lack of job security for today's scientists, students, and science workers would be expected to shape the tactics, strategies,

and perceived horizons of the revitalized SftP. While today we participate in protests, sit-ins, and counter-recruiting, the activities discussed in the SftP Chapter Reports appear tame in comparison to the disruptive and confrontational actions that characterized the original run of the organization. The job security enjoyed by academic scientists of the 1970s may have been key to that generation to engage in actions that would be perceived as much riskier by today's precariat.

And so, we find ourselves once again in unfamiliar terrains untrod by the previous generation or even during the early years of revitalization. The organizing energy tied directly to workers' material conditions will hopefully be more sustainable than uncoordinated campaigns; but also looming are dangers of economism and trade union conservatism that plague the Northern labor movements. The unionized scientists are poised to become class conscious through their own exploitation; but exploited workers may not have the organizing bandwidths to engage in political action beyond union spaces. Labor is at the forefront of class struggle, but it alone is not sufficient to create new social relations nor presents immediate or obvious solutions to the crises in science we face today: climate change, neo-colonialism, and the perpetuation of discriminatory ideologies. How will SftP connect labor struggles with the radical science movement? How can scientists be radicalized and direct their sciences to serve the people? How will SftP, as an organization, create a vision, a philosophy, and concrete strategies that radicalized scientists can act collectively? It is clear that SftP's revitalization is in need of a new path that can answer these questions.

Conclusion

One achievement of SftP has been to articulate and exemplify a radical science-based social movement schooled in the Marxist tradition. The theories, as they often are, corresponded to the ethos of the time; the actions, likewise, were sometimes incongruent and inconsequential. However, where SftP succeeded, and many others failed was through the consistent attempt to unite theory and action.

In this article, beyond laying out the aims and achievements of the revitalized SftP, we took a critical approach to identify some weaknesses within the movement. Even with twenty years of publication from 1969–1989, with living members from the older generation in the midst, and with increased efforts to develop cogency and clarity about our views and aims, radical science is still in its infancy in the year 2023. Making a mature science for the people requires vigilance against complacency over SftP's legacy, against an ahistorical replica of past ideology or organizational structure, against repeating some

of the mistakes of the past, and against acquiescing to obstacles, setback, and (ultimately) inaction. As the organization begins this second, post-pandemic phase of revitalization, as new chapters, working groups, and campaigns are being formed, the issues raised here will invariably shape our movement's evolution.

REFERENCES

Altendorf, Mary, David Aronow, John Dove, Minna Goldfarb, Ginger Goldner, Judy Greenberg, Marvin Kalkstein, Frank Mirer, Geri Steiner, and Vinton Thompson. 1974. *China: Science Walks on Two Legs; a Report from Science for the People.* Edited by Dan Connell and Dan Gover. Avon.

Arrighi, Giovanni. 1994. *The Long Twentieth Century: Money, Power, and the Origins of Our Times*. Verso.

Berkeley SESPA. 1972. *Science Against the People: The Story of Jason*. Scientists and Engineers for Social and Political Action.

Bernal, John Desmond. 1952. *Marx and Science*. New York: International Publishers.

Chapter Reports. 2019. *Science for the People* 22(1). https://magazine.scienceforthepeople.org/vol22-1/chapter-reports-spring-2019/.

———. 2020a. *Science for the People* 23(1). https://magazine.scienceforthepeople.org/vol23-1/reports-spring-2020/.

———. 2020b. *Science for the People* 23(2). https://magazine.scienceforthepeople.org/chapter-reports/climate-change-summer-2020/.

———. 2021. *Science for the People* 24(2). https://magazine.scienceforthepeople.org/chapter-reports/autumn-2021-organizing-reports/.

Contreas, Jane, Britta Fischer, David Jhirad, Colleen Meier, Jim Moore, Jim Newsreel, Claus Offe, John Walsh, and Alphabet. 1970. "Reading." *Science for the People* 2(4): 38.

Crowley, Michael F. 1972. "Employment of Scientists and Engineers in 1970." *Monthly Labor Review / U.S. Department of Labor, Bureau of Labor Statistics* 95(4): 43–45.

Federal Bureau of Investigation. 1972. "Scientists and Engineers for Social and Political Action (SESPA) Revolutionary Activities." http://science-for-the-people.org/resources/fbi/fbi_luggage-contents-science-for-vietnam_1972-jun-13.pdf.

Foster, John Bellamy. 2020. *The Return of Nature: Socialism and Ecology.* New York: Monthly Review Press.

Gillette, R. 1973. "AAAS Meeting: Policy Change on Activists Brings Police." *Science* 179(4069): 162–64.

Goldhaber, Michael, M. Perl, M. Ross, and C. Schwartz. 1968. "Announcing the Formation of a New Organization of SCIENTISTS Dedicated to SOCIAL and POLITICAL ACTION." February. Author's files. Photocopied flyer.

Greeley, Kathy, and Sue Tafler. 1979. "Science for the People—A Ten Year Retrospective." *Science for the People* 11(1): 18–25.

Ienna, Gerardo. 2022. "The Double Legacy of Bernalism in Science Diplomacy." *Berichte zur Wissenschaftsgeschichte* 45: 202–624.

Lyons, Richard D. 1971. "The Talk of the A.A.A.S." *The New York Times*, December 29, 1971. https://www.nytimes.com/1971/12/29/archives/critical-scientists-less-rowdy-protesters-uneasy-with-indulgence-at.html.

Meertens, Ad, and Onno Nieman. 1979. "The Amsterdam Science Shop: Doing Science for the People." *Science for the People* 11(5): 15–17; 36–37.

Moore, Kelly. 2008. *Disrupting Science: Social Movements, American Scientists, and the Politics of the Military, 1945-1975*. New Jersey: Princeton University Press.

Rowberg, Richard. 1998. "CRS Report for Congress." 1998. https://www.everycrsreport.com/files/19980814_95-1209_5099a81054a63d58f79d6d18b4572fe7270f5a2e.pdf.

Schevitz, Jeff, Mike Hales, Joe Neal, Stonybrook Sespa, Britta Fischer, Mary Lesser, Al Weinrub, and Andre Gorz. 1973. "Which Side Are We On—A Forum on the Class Position of Technologists." *Science for the People* 5(3): 4–29.

Schmalzer, Sigrid, Daniel S. Chard, and Alyssa Botelho. 2018. *Science for the People: Documents from America's Movement of Radical Scientists.* Boston: University of Massachusetts Press.

Science for the People. 2022. *Organize the Lab: Theory and Practice*. Knoxville, TN: People's Science Network.

SftP Steering Committee. 2018. "Principles of Unity." 2018. https://scienceforthepeople.org/mission/.

Sheehan, Helena. 2022. "Marxism, Science, and Science Studies: From Marx and Engels to COVID-19 and COP26." *Science for the People*, May. https://magazine.scienceforthepeople.org/online/marxism-science-and-science-studies/.

Sneed, Annie. 2017. "The March for Science Is Just the First Step." *Scientific American*, April 21, 2017. https://www.scientificamerican.com/article/the-march-for-science-is-just-the-first-step/.

United States Census Bureau. 1975. "Household Money Income in 1974 and Selected Social and Economic Characteristics of Households." *Department of Commerce, Bureau of the Census*. https://www.census.gov/library/publications/1975/demo/p60-100.html.

summer 2023 volume 2 | issue 2 | 111–119

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02207 ESSAY

Socialism in the 21st Century (Soc21): Some Programmatic Remarks on Its Relation to Science and Technology

Joost Kircz

SOCIALISM IN THE 21ST CENTURY (SOC21.nl) is a Dutch initiative to create a platform for researchers (especially in the Netherlands), who feel connected to or are directly involved in social movements. It is envisioned as a place where questions, results and conclusions can be shared, linked and tested against each other. It is based on the premise that thorough in-depth research and activism in social movements can go hand in hand. The aim of Soc21 is to contribute to knowledge development for and alongside social movements based on international solidarity, feminism and eco-socialism. It is to this end that SOC21 is also collaborating with *Marxism & Sciences*.

SOC21 was established by seasoned activists in the Dutch socialist movement. As stated on the website:

> In order to develop an alternative for the current social order, it is necessary but not sufficient to build social movements. It is also necessary to develop a broad vision on social questions, link them together without imposing a hierarchy between more and less important positions, and to formulate solutions that can have practical significance while also contributing to an economic, social and ecological transition to a different society.

As one of those researcher-activists I will in the following draw on some questions and topics which I am working on in that context. Along the way I will make some programmatic remarks on the central questions of socialist development in theory and practice. As a trained physicist (and trained unionist) who worked as a science journals and books publisher for a long time, it may come as no surprise that I am particularly interested in the role of science, technology and science communication.

Kircz, Joost. 2023. "Socialism in the 21st Century (Soc21): Some Programmatic Remarks on Its Relation to Science and Technology." *Marxism & Sciences* 2(2): 111–119. https://doi.org/10.56063/MS.2310.02207

• *Correspondence:* Joost Kircz, www.kra.nl, Amsterdam.
• e-mail: Kircz@kra.nl
• DOI: 10.56063/MS.2310.02207
• *Received:* 31.05.2023; *Revised:* 25.07.2023; *Accepted:* 27.07.2023
• *Available online*: 04.11.2023

In very general terms, the goal of replacing the capitalist mode of production with a socialist society is shared by all socialists. The more decisive discussion is about the best strategy to achieve this goal. As goal and methods are intertwined, the ever-changing direct social environment demands a system of more or less understandable slogans and concrete political proposals, in tune with the latest analyses of society. Standard notions such as the need for building collectives and "commons," equal pay for equal work, recall of elected representatives by their constituents, stewardship of biological life on the planet, etc., have to be formulated or rather translated into programs that reflect the best knowledge we have. In that sense, after all historical forms of socialism collapsed (from social democracy to Stalinism, etc.), it is imperative to build a new socialist tradition, a tradition that stands on the shoulders of the best works of our socialist predecessors, provides a critical examination of those works, and integrates new knowledge and experiences accrued in the last decades.

A most important aspect is the turbulent role of science, technology, and medicine (STM) in today's world. These three strands of human activity are fully integrated in the capitalist mode of production and as such are fully commodified. This means that we as socialist activists are confronted with two related issues: a) what is the role of STM in society as well as for us as individuals and citizens? What are the driving forces and what are the aims of its development (directions are taken on the basis of what?), b) what are the intrinsic notions and directions of the various STM theories and practices? and to what extent do they co-define our political consciousness. Given, that humans, in their struggle for survival and future, to a large extent, are engineering; exploiting given models and theories (see Marx's distinction between the bee and the architect), in some parts of the world engineering, which is applied technology, is seen as an independent craft, it is fitting that the acronym includes engineering (so STEM). The point is that people are culturally used to the existing tools and try to extend and bend, or 'engineer', them for their own goals. So far so good, but many models, including linguistic expressions, are expressions of the driving forces of the capitalist mode of production. The efficiency of the Taylor system in the assembly line is not neutral, as it deskills workers and induces a dictatorial way of living, where the clock is ruling. Hence, there was a good reason in the early USSR for a heated debate on how to organize production (Bailes 1977). The driving force now is simple profit maximization and subsequently the private appropriation of the profit in a market economy. This induces working methods *and* a related language. Think about common expressions such as: "time is money," "I don't buy this argument," "what is in it for me?" or "I buy you a coffee." In this paper I touch on the issue to what extent efficient theories and methods can be transposed to

post-capitalist modes of production, lock, stock, and barrel. A famous Marxist economist once asked me the serious question if nuclear energy under workers control would be safer. The answer is not that simple, because we have to take an integral production chain as starting point and not only the present-day disastrous practice of mining and nuclear waste.

In view of this predicament an important project of SOC21 is called Marxism and Science & Technology (https://soc21.nl/alle-activiteiten/marxism-and-science-technology/). In part, it reads:

> We live in a highly technology driven world. Since the industrial revolution the relationship between the urbanised working class and the soil has been lost. Entering a Dutch supermarket we know that the square object on a blue plastic dish is Fish, on a yellow one it is Chicken and on a Green one it is called biological meat. If the shapes are round, they are called Burgers, of which we now also have Vega types, which anyway are biological, contrary to experiments with synthetic meat. If we travel from place A to B we look at our GPS and 'know' how to drive and how long the journey will take. Every idea of distance, location, and environment is gone. Any sense of direction is lost. Map reading becomes an old fashioned craft. The abstraction from the real world on which we live, from a representation onto a physical map, to an abstract map based on Global Positioning Satellites circling the earth. We know where we are, provided we define this as a geometrical place.

And further:

> In this project, we use the historical materialist outlook as a starting point, but want to dig deeper. Following critically Marx and Engels and their hope for a scientific socialism, we want to better understand the intricacies of models and theories and their applicability and capacity for forecasting. A central feature is a critical analysis of the highly abstract and mathematical theories of the natural sciences, their contingencies and successes. This analysis must become input for a critical evaluation of the often uncritical borrowing of the methods of the natural sciences in other contexts, such as sociology, the humanities, and economy. After all the sciences of non-living matter, even if their mathematical representations look prohibitively abstract, are in principle much easier than the complicated environment of living and thinking matter. For all practical purposes, the formal models of the natural sciences can be extremely useful in tackling social problems, and nothing should be worse than not appreciating that. The quest is: to what extent is this possible and to what extent are such applications safe, in terms of keeping the human social factor alive against technocratic implementations and forecasts. Even stronger, are we able to develop models and theories based on human culture and society that reciprocally might induce progress in the natural sciences? A prime, and unfortunately single, example is the development of elementary statistics that

> proved its value in the cholera 1854 outbreak in London and became an essential research field in itself.[1]

It is a well-known theme in socialist politics to address the submission of scientific investigations to the needs of hegemonic forces. A research project or the application of a theory, method, or technique is limited to formal measures of perceived usefulness within a limited timeframe. Long-term planning is not in the capitalist vocabulary. In itself, this might sound obvious. In a socialist society, the directions (and related financial and administrative support) of science would have different centres of gravity than in non-socialist societies. Are the choices based on short-term returns on investments or on long-term understanding of life on earth and its inhabitants? In order to expand this trivial opposition into a programmatic policy for socialists, there is a need for a clearer delineation of the various aspects of science in its broadest sense. A most important aspect is that even if the hegemonic culture fences off ideas and activities contrary to this hegemonic culture, humans can "jump out of their box" and invent novel theories, models and goals, in contrast to the poor bees and their single-minded labour. The emancipation of humanity, their labour, sexuality, and social structures transcend what is at some point in time accepted as "normal." Then actual rules are not bended but broken.

In this respect, we have to think about categories as possible ingredients for an actual ST(E)M politics for and by the people at large. Unfortunately:

> Since Marxism in the western world after the establishment of a dictatorial bureaucracy in the USSR, developed mainly as a discipline of historians, economists and sociologists, very little has been written on the role of science by (not about) people who are really involved in one of the natural sciences. It is typical that many authors dealing with science and materialism exhibit a total ignorance of the fundamental problems in modern physics or chemistry. (Kircz 1994)

Marxism & Sciences, in this special issue, focusses attention on social movements that try to do two things: A) address the exploitation of mental labour for the benefit of capital and the organization of workers in the ST(E)M industry (including research and educational institutions), B) address initiatives to redirect knowledge for the benefit of the populace. The second task includes the demystification of knowledge in order to advance self-organization of communities for purposes such as reducing pollution and the active usage in all knowledge actively in initiatives for other directions of research.

Before we start, we have to be clear what we mean by a science, next to a craft or common knowledge. A simple answer to the question 'what is science'

---

1. See also the paper "Socialist strategies and the role science" which elaborate further in line with the above.
https://soc21.nl/wp-content/uploads/2020/04/Intro1-v5a-What-is-this-work-about-kort.pdf

is to stipulate that a science must be seen as the human process of systematically accruing knowledge (experiences, facts, regularities, etc.) which will be confronted with interpretations (theories), experiments, and subsequently will have the capacity to predict. Otherwise we establish only an understanding of why something happened without insight into how a process will continue, stutter, or even stop. In other words, is our interpretation of the world fit for change? As all sciences are human endeavours contingent to the socio-economic history of the present, they are human-made products.

This means an understanding of how to change the directions of science away from the goal (*telos*) of final profit and certainty for the benefit of the owners (and their managers) of the means of production—and/or their implicit military goals—into the general well-being of humanity as part of nature. In other words: the well-being of the totality of nature and humanity as the measure of success of a theory or method.

Obviously, this is not a simple call for nationalization of research-intensive companies (such as the pharma industry), but rather digs deeper in the choices made in research. A standard example is the case of malaria research, which is not a priority for big pharma but is for humankind. A related discussion on which I will not expand in this contribution is the criminal, ever-increasing labyrinth of patent laws, the ultimate commodification and private appropriation of the social results of mental labour. This means that the so-called scientific method is framed in pragmatic terms of modern capitalism.

Ever since the Ancient Greeks, and in particular the Aristotelian tradition, there is a strong tendency to reduce complicated issues to palatable chunks fitted for formal logical handling. In the modern era, analysis and reduction became the primary method of the sciences in all fields. This is seen in the successful and versatile mathematical methods that serve us in our society. Indeed, breaking down complicated objects into simple parts enables us often to rebuild the complicated object, using a reductionist causal chain. However, the road back from gen to butterfly, or quark to telephone, is still in *terra incognita*. Simple sciences like physics allow mathematical models based on formal logic. As soon as more complicated issues arise such as the dialectics of the place of humans in nature, or the very function of the human body as a whole, we have to depart from reductionist reasoning. Hence, in powerful statistical methods based on computations using the largest possible number of past performances or characteristics, the staple of data grinding and so-called artificial intelligence, we only emphasize and enhance existing knowledge and its social consequences, instead of advancing knowledge.

It is also a social problem that due to lack of long-term planning of novel research we are confronted with capitalist solutions to capitalist problems. Think about the massive investment in concrete and steel (and their nitrogen

oxides footprint) in offshore windmills. However, the most serious challenge is that researchers of complicated social issues try to mimic the simple, straightforward methods of the natural sciences. Because these methods work with great success in the simple world of applied mathematics, such as engineering as we know it, there is no reason to try and mould vast interacting and interpenetrating systems like society, the human body, or ecology into elementary "particles." It may help in well-defined contingent situations, but it remains a poor man's solution nibbling on the enormous unknown we are confronted with. For a novel approach, not only do we have to rethink the modern fashion of casting everything in formal systems, but we also have to try and develop novel methods on other levels so as to transcend the mechanical methods of the day (Kircz 2015).

To understand this issue, it is crucial to re-direct science into a more pluralistic fashion, based on the activity of humans in various social contexts. Obviously, this can be achieved by knowing and using lessons learned so far. Claims made in the so-called science-wars in the 1990s—despite often providing correct critique of today's scientific practice—never materialized as a successful counterculture.[2] This discussion poses the question again: do we merely deal with a re-direction and re-organisation of state of the art models, or do we strive for a more democratic society based on a multitude of human activities that will give birth to novel theories, methods, and practices. For an anti-reductionist approach in Marxian sense, further discussions are needed in a better understanding of the dialectics of quantity-quality transitions (Kircz and van der Linden 2021).

Everything mentioned above is of course in need of worked-out programs tailor made for particular situations. Here we face the problem of 'specialization' and 'application'. The contradiction involved is an aspect crucial in mobilizing citizens in taking control of their local environment: neighbourhood and workplace. On this level, 'citizen's science' is a democratic weapon for making people aware of their capabilities to learn and use all kinds of measuring techniques to monitor safety and pollution. Buying useful apps on your phone is merely the first step. Knowing what a reading means—other than something shown in green, yellow, or red—is crucial. It is again the commodification of simplified knowledge that suppresses people's understanding of

2. Already in 1983, long before the post-modern fashion, the British socialist scientist Brian Easlea (Easlea 1983) analyzed the remarkable relation between masculinity and analytical procedures of smashing object into pieces in order to find ever more "elementary" units from which more complicated structures can emerge. In line with this anti-reductionism the systems-biologist Dennis Noble (Nobel 2006) makes the case that both causal ways, from down to top down versus bottom-up, must be taken as equal valid approaches, in his attack on reductionist genetics.

what it is all about in order to go beyond complaining about data readings and move toward self-organisation to address its causes.

Another important aspect is that every technology generates its pollution, and every scientific discovery can be used for human destruction. So, on the mundane level of applications of methods and technologies, we have to widen the perspective from 'useful now' to long-term 'possible consequences'; the talk about 'efficiency' and 'sustainability'. Hyper modern 'milk factories' in The Netherlands with hundreds of cows are very efficient in waste management, outflanking small farms with a few cows. In the present-day ecology discussion, the phenomena of efficiency on the macro side and (e.g.) animal rights on the other side are important aspects to review in relationship to the early socialist politics of collective farms. In the fight against big money, it is important to address the need of a fully-global understanding in discussions of (e.g.) degrowth.

The marvels of technology, from the use of fire for cooking food to the present-day permanent social control between lovers, parents and children, taxpayers and bureaucrats, etc., is an enormous source for literature, films, and social programming of all stripes. Here we enter the issue of communication, education, and the driving role of media as McLuhan already emphasized sixty years ago (McLuhan 2003 [1944]). And there is, contrary to what is often suggested in terms of 'popularisation' a growing interest in knowledge.

A clear example is the fascination with 'the stars' and how that fascination is used. Indeed, many a human is fascinated by looking up to the night sky and wonder the stars. This wondering before the stars is universally used in religions as the region of where every deity is seated, and consequently as a source of commodification and oppression. It is crystal clear that artificial satellites are mainly used for military aggression (sorry, defense against aggression), and it is well known that scientific satellites are often only part of the 'payload' of rockets that bring various commercial and military satellites in outer space. But 'selling' this to the populace is completely morphed into the 'ever human desire' to understand the heavens. Even if this is the case, the massive costs incurred (mostly hidden in 'defense' budgets) must be compared to the little money spent in research and technology to attack climate change or respond to common diseases such as malaria, schistosomiasis, and others. It is important to note here that technological utopianism was also a feature of self-declared "socialist states." This was not just part of a scientistic or progressivist ideology but has to be understood in its particular historical context (see Fig.1), from which it nevertheless did or could not emancipate, initiating a path-dependency leading to ideological petrification.[3]

3. For the massive propagandistic use of aviation and the cosmos in the USSR, see Palmer, 2000, 2006. For a review of technological utopianism in the USSR see Josephson, 2010.

Figure 1. Peasants disembark an Agitprop airplane after they have taken above clouds to show that there is no God. (Russian State Film and Photo Archive, Krsnogorsk/russiainphoto.ru)[4]

The discussions about war and peace, armament and disarmament, medicine and eugenics, hunger and bio-industry, welfare and urbanisation, potable water and soil pollution, etc. all have, in addition to the inter-human relationship, a common basic kernel: the relation between humanity and its biological substrate as part of its natural environment. The relationship between people and nature is the basis of all discussions regarding the blessings and dangers of science and technology and therewith the whole issue of ecology (Kircz 1994). The more we learn, the greater is the amount of the yet unknown (Kircz 2023; Firestein 2012; deGrasse Tyson 2005). This means that we cannot anymore maintain a belief in stopgaps; as socialists, we need a clear understanding toward the goal of a conscious world-wide planned economy in one way or the other.

Conclusion

Our lives are now fully immersed in scientific theories, methods, and practice. Children use now-ubiquitous computers in their cradles in the same way that our great grandparents might have used a walking stick. We can use such devices for various applications (such as typing this essay on a PC), but the eman-

4. https://www.rbth.com/history/332301-how-aviation-became-effective-propaganda

cipatory value of STEM is not only in applications but in a deeper understanding of the dynamics of methods and the dangerous consequences of the myth that this is the only way to achieve progress. Conscious socialist politics starts with the fight for a broad education against the present trend to reduce curricula to hands-on tricks and teaching to the test. Science of and for the people means guaranteeing that the people understand the background of theories, methods, and applications in order to understand the intertwining of goal and method on all levels of social activity. Such an aspiration is a key factor in building SOC21 and *Marxism & Sciences*.

Acknowledgement

I thank Jarek Ervin, Sascha Freyberg, and Herman Pieterson for their critical discussions.

REFERENCES

Bailes, Kendall E. 1977. "Alexei Gastev and the Soviet Controversy over Taylorism." *Soviet Studies* 29 (3): 373–394.

deGrasse Tyson, Neil. 2005. "The Perimeter of Ignorance." *Natural History Magazine*, November.

Easlea, Brian. 1983. *Fathering the Unthinkable: Masculinity, Scientists, and the Nuclear Arms Race, The Politics of Science and Technology*. London: Pluto Press.

Firestein, Stuart. 2012. *Ignorance: How It Drives Science*. New York: Oxford University Press.

Josephson, Paul R. 2010. *Would Trotsky Wear a Bluetooth?: Technological Utopianism under Socialism, 1917–1989*. Baltimore: John Hopkins University Press.

Kircz, J. G., 1994. "Materialism and the "Makability" of the World." *IIRE Working Paper 32*, IIRE Amsterdam, 21 pages. https://fileserver.iire.org/working_papers/IIRE%20Working%20Paper%2032.pdf

———. 2015. "Reality, knowledge and forecasting." Essay based on my presentation at the conference *Le Troisième Âge Du Capitalisme, Sa Physionomie Socio-Politique À L'orée Du Xxie Siècle. En Mémoire d'Ernest Mandel (1923-1995)*, May 20-22, 2015, Lausanne, Switzerland. http://fileserver.iire.org/working_papers/WP41.pdf

———. 2023, "Talk @ Max Planck Institute for the History of Science (MPIWG)." *Historical Materialism & Science or The Finiteness of Our Scientific Models/Theories*, April 17, 2023.

Kircz, Joost and Marcel van der Linden. 2021. "Complicating the Quantity-Quality Transition." *Critique: Journal of Socialist Theory* 49(3–4): 177–190

McLuhan, Marshall. 2003 [1944]. *Understanding Media: The Extensions of Man*. Critical Edition, edited by W. Terrence Gordon. CA: Gingko Press.

Noble, Denis. 2008. *The Music of Life: Biology Beyond Genes*. Oxford: Oxford University Press.

Palmer, Scott W. 2000. "Peasants into Pilots: Soviet Air-Mindedness as an Ideology of Dominance." *Technology and Culture* 41 (1): 1–26.

———. 2006. *Dictatorship of the Air: Aviation Culture and the Fate of Modern Russia. Cambridge Centennial of Flight*. New York: Cambridge University Press.

summer 2023 volume 2 | issue 2 | 121–127

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02208 COMMUNICATION

But Why Call an Academic Journal Zilsel? News from Edgar Zilsel

Jérôme Lamy and Arnaud Saint-Martin

Introduction

At the dawn of the 2010s, Science and Technology Studies (STS) was a well–established area of research. The conceptual and empirical ferment of the early days was long gone. The time for controversy and taking sides was also long gone. Journals dedicated to the social studies of science (such as Social Studies of Science or Science, Technology & Human Value) had become somewhat routine. In France, the Revue d'Anthropologie des Connaissances, founded in 2007, acclimatised STS themes by focusing mainly on sociological approaches.

It was in this contrasting landscape that we founded the journal Zilsel. But why on earth name it after a sociologist and historian of science from the first half of the 20th century, now all but forgotten? It seemed to us that, if we were to play a part in revitalising the STS, it was important to revive a more open conception of science studies. Edgar Zilsel worked in the fields of the history, philosophy and sociology of science. He questioned the social divisions of scientific work and included the question of techniques in his problematics. In short, the aim was to take an inclusive approach to scientific practices.

In this brief history of the Zilsel academic journal, we first look at Edgar Zilsel's career and his singularity. Next, we look at the various stages that led to the creation of the journal. Finally, we look at Zilsel's intellectual and political legacy—and in particular his discreet but resolute Marxist roots.

Lamy, Jérôme and Arnaud Saint-Martin. 2023. "But Why Call an Academic Journal Zilsel? News from Edgar Zilsel." *Marxism & Sciences* 2(2): 121–127. https://doi.org/10.56063/MS.2310.02208

• *Correspondence:* Jérôme Lamy, CESSP (UMR 8209), EHESS, Paris.
• e-mail: jerome.lamy[at]laposte.net
• ORCID: 0000-0003-3820-284X
• DOI: 10.56063/MS.2310.02208
• *Received:* 24.04.2023; *Revised:* 19.06.2023; *Accepted:* 21.09.2023
• *Available online*: 05.11.2023

Spectrum of Zilsel

Edgar Zilsel's posterity is one of contrasts, in perfect harmony with his scientific career. Born in Austria in 1891, Zilsel studied at the University of Vienna. He wrote his philosophy thesis on large numbers (Zilsel 1916) before writing his habilitation on the history of the notion of genius in history (Zilsel 1991). A member of the Vienna Circle, he was a representative of its left wing. Zilsel was a Marxist, but his political and theoretical convictions were never directly apparent in his academic writings. As a Jew, Zilsel was directly threatened by the rise of Nazism in the 1930s. He therefore went into exile in the United States from 1939. With no permanent position, he managed to obtain a few research contracts and teach at several university colleges. Desperate and with no professional prospects, Zilsel committed suicide in California in 1944. His academic work consisted mainly of articles in sociology and philosophy journals. And it was in his texts published in English that he formulated a theory of the evolution of modern science based on the study of class dynamics.

Three texts stand out, published in the early 1940s, in which Zilsel empirically constructed an innovative conceptual framework. Although Zilsel did not mention Marx in these articles, his reference to the author of *Capital* was obvious. In his first text (Zilsel 1940), devoted to Copernicus, Zilsel showed that the canon of Frombork, nourished by an abstract academic culture, was part of the long tradition of a Pythagorean astronomy that ignored mechanics. Zilsel's second text (Zilsel 1941) focused on the magnetic work of William Harvey. According to Zilsel, the British context of iron domination (mines, mastery of manufacturing) explained Harvey's practical mastery of magnetism. But this sociological context also explains why Harvey neglected the question of measurements: mathematics was not a necessary skill for the iron industry. It was in his third text, "The Sociological Roots of Science" (Zilsel 1942), that Zilsel proposed a solution to the emergence of experimental science. He showed that between the class of academics (who mastered mathematics and abstraction) and the class of craftsmen (who mastered the processing of matter), an engineering class was emerging (of which Galileo was the most famous representative) capable of articulating the two skills. Zilsel has thus patiently constructed a sociological and historical theory of the social classes of science.

These various proposals have had mixed fortunes. Rejected by advocates of an internalist history such as Koyré, they disappeared from histori-

ographical debates at the dawn of the 1950s. The intellectual ferment surrounding Science and Technology Studies—some of whose leaders came from the Marxist critique of science (Lamy and Saint-Martin 2014; 2015)—did not allow Zilsel's work to be reread. It was finally Steven Shapin who, in the early 1980s, gave Zilsel's proposals the status of genuine 'theses' (Shapin 1981). Little by little, Zilsel was reinstated in an intellectual genealogy which placed him as a precursor (or at least as a legitimate ancestor) of the STS (Zilsel 2000; Krohn and Raven 2000; Lynch 2001). But what do we really retain from Zilsel's theses? Not much: his historicism, his use of class defence and his analysis in terms of social power relations were no longer in vogue. Since the 1970s, STS has been dominated by highly variable forms of constructivism: from the strong programme of the Edinburgh School (encouraging us to examine validated products of knowledge in the same way as those that have not been validated), to the relativist programme of Harry Collins, through to Michel Callon and Bruno Latour's actor–network theory (which sought to dissolve all the usual categories of analysis of the social world), there was hardly any room for a historical sociology of science and technology that took account of modes of domination, power relations or the inertia of structures.

It seemed to us, however, that the creation of an academic journal entitled Zilsel could recharge the Zilselian project and give it new perspectives.

From Blog to Journal

In 2013, we both founded a research blog, on the French platform Hypothèses (https://zilsel.hypotheses.org/). We had to come up with a name for the blog. Our own research practices placed us rather on the fringes of mainstream STS movements. We had both worked on the history of astronomy, integrating (for JL) Foucauldian conceptions of heterotopias to conceive of astronomical observatories as specific scholarly spaces (Lamy 2007) and (for ASM) developing the regimes of science proposed by Terry Shinn, to characterise a bureaucratic form of observatory administration in the Belle Epoque (Saint-Martin 2008). We had begun a series of discussions on the relationship between history and sociology (Lamy and Saint-Martin 2007; 2010). This fairly broad opening up to the historical sociology of science and the philosophy of concepts meant that we were quite far removed from the central debates in STS concerning the politicisation of science (Callon et al. 2001), the ethical boundaries of scholarly work (Mamo and Fishmann 2013) or the ontological turn in STS (Woolgar and

Lezaun 2013). It therefore seemed to us that taking inspiration from a historian and sociologist of science such as Edgar Zilsel, attentive to social regularities, forms of hierarchy as well as the historicity of concepts, was a good thing.

The science criticism movement that began during the Cold War was another important reference for the Zilsel blog, and later for the journal. From the 1960s onwards, a number of scientists, concerned about the military or ecocidal uses of science, began to question scientific practices that did not take their consequences into account: nuclear power and the chemistry of pesticides were challenged. In the United States, the magazine Science for the People has given rise to a critical reflection on science. The aim was not only to question the effects of science (combined with increasingly massive technologies), but also, more generally, to question the unthinkable aspects of rationality, in particular the exclusion of women from the scientific field, the effects of the power of science and the relations of domination within the learned professions. In France in the 1970s, physicist Jean-Marc Lévy-Leblond led a veritable "self–criticism of science" (Lévy-Leblond and Jaubert 1975; Quet 2013; Debailly 2015). These movements were an inspiration for the blog (and then for the academic journal) because they allowed us to think about scientific activity in all its dimensions (social, ecological, economic, etc.). We conducted a long interview with Jean-Marc Lévy Leblond in 2018 (Fages et al. 2018), and *Zilsel* continues to pay close attention to the history of this critique of science (Debailly 2015; Quet 2013).

The blog's activity from 2013 to 2017 was based on dissatisfaction. Critical activity was increasingly reduced or neutralised in academic journals. In contrast to the harsher, more cheerful tone of the 1970s, criticism now took on the emollient allure of harmless scholasticism. A few conceptual details were discussed, and the method was glossed over, but it was rare (since the end of the Science Wars) for any kind of structured criticism to question the very principles of STS as it was being developed.

The blog was therefore an opportunity to defend critical verve. And pastiche was a well–suited means of doing this. So, to denounce the inanity of Michel Maffesoli's evasive, approximate and impressionistic sociology, we produced and succeeded in publishing in *Société* a headless text on self-service electric cars in Paris. With no fieldwork and no real object of investigation, we wrote an absurd text replicating the codes of Michel Maffesoli's sociology (Tremblay 2014). Once the article had been duly published, we denounced the hoax on the blog (https://zilsel.hypotheses.org/1713).

We weren't content just to publish hoaxes: research articles, critical notes, conference proceedings—we pulled out all the stops.

The blog has found its audience. It therefore seemed appropriate to continue the adventure in the form of an academic journal that extends the plural approach to science and technology. In 2017, we published the first issue of *Zilsel*. The journal includes in–depth surveys ("Confrontations") thematic dossiers ("Frictions"), full–length interviews ("Libre échange"), exploratory articles ("Friches"), "Classiques" as well as "Critiques." The move to an academic format has enabled us to set up an editorial board and formalise open evaluation practices. In order to avoid falling into the dreaded routinisation of research, we are still trying to maintain Edgar Zilsel's epistemological and critical orientation.

Zilsel's Legacy

Naming an academic journal after a historian and sociologist of science like Zilsel is no mean feat. At the very least, it signifies respect for an epistemological ambition and a willingness to play a critical role. At the same time, however, the history and sociology of science have evolved considerably since Edgar Zilsel's death. The debates in which he took part are no longer the same today.

Zilsel's Marxist perspective—which was relatively discreet—has, in fact, only been extended very discontinuously in the field of STS. In the 1980s and 1990s, several emblematic authors in the field continued to claim a Marxist anchorage (Shaffer 1984; Restivo 1994), but these were weak signals. Overall, the social sciences are turning away from the Marxist corpus, both out of heuristic exhaustion (in France, the Althuserian exegeses had transformed the reading of *Capital* into an obscure hermeneutic) and out of political demonetisation (the fall of the Wall having sounded the death knell of the Soviet experiment). If Marxism has been reintegrated into analyses (particularly in history and the sociology of science) since the 2000s, it is in a form that would have seemed unrecognisable to Zilsel: it is mainly environmental sociology that has revived the scattered elements of a Marxism that is now attentive to the "metabolic rupture" that capitalism imposes between the extraction of resources and the possibilities of regeneration (Foster 1999).

It seems to us, however, that there is much more to Zilsel's legacy than the patrimonialisation of Marxist analyses. It seems to us that Zilsel's approach was much more than the academic application of theoretical schemes to historical cases.

Firstly, Zilsel based his work on a reflexivity of the categories used to designate agents or groups of agents. In his work on genius (Zilsel 1991), he gave the notion of genius a historical dimension by studying its different meanings in Antiquity and during the Renaissance. This work has yet to be done again. And the academic journal *Zilsel*, which advocates the cross–

fertilisation of disciplines around the subjects of scientific research, encourages us to maintain this focus on the historicity of concepts. From this point of view, Dominique Raynaud's work on the Anthropocene is symptomatic of the approach taken by Zilsel (Raynaud 2018).

Secondly, Zilsel developed a social analysis of the groups who were active during the Renaissance and early modern period. This is the thrust of his thesis on the distribution of skills among the three social classes involved in the emergence of experimental science: academics steeped in theoretical knowledge; craftsmen involved in the use of practical knowledge; and engineers capable of acting as intermediaries. It's a reflection that brings into play social practices, power relations and issues of socio–epistemic legitimacy. These are recurring themes in *Zilsel*: very recently we published a dossier devoted to practical knowledge (Fages and Lamy 2021).

Finally, there is one theme common to Zilsel and Marxist analysis, which continues to inform the social studies of science as envisaged by the journal: critical operations. The idea that the place of science and technology in society is (among other things) determined by relations that are never given as such is not unique to Zilsel. From Adorno and Horkheimer to Bourdieu, it encompasses a vast array of epistemological positions. It is this approach to science—reflexive and critical—that constitutes Zilsel's guiding principle.

REFERENCES

Callon, Michel, Pierre Lascoumes and Yannick Barthe. 2001. *Agir dans un monde incertain. Essai sur la démocratie technique*. Paris: Le Seuil.

Debailly, Renaud. 2015. *La critique de la science depuis 1968. Critique des science et études des sciences en France après Mai 68*. Paris: Hermann.

Fages, Volny, Jérôme Lamy, Arnaud Saint-Martin et Jean-Marc Lévy-Leblond. 2018. "Objecteur de science. Entretien avec Jean-Marc Lévy-Leblond." *Zilsel* 3: 227–257.

Fages, Volny and Jérôme Lamy. 2021. "Savoirs pratiques: par-delà la science instituée." *Zilsel* 9: 191–216.

Foster, John Bellamy. 1999. "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology." *American Journal of Sociology* 105(2): 366–405.

Krohn, Wolfgang and Diederick Raven. 2000. "The 'Zilsel Thesis' in the Context of Edgar Zilsel's Research Programme." *Social Studies of Science* 30(6): 925–933.

Lamy, Jérôme. 2007. *L'observatoire de Toulouse aux 18e et 19e siècles. Archéologie d'un espace savant*. Rennes: Presses Universitaires de Rennes.

Lamy, Jérôme and Arnaud Saint-Martin. 2007. "Un dilemme pratique: sociologie et histoire au prisme des STS. " *Carnets de bord* 14: 52–64.

———. 2010. "La frontière comme enjeu. Les Annales et la sociologie." *Revue de synthèse* 131(1): 199–127.

———. 2014. "Marx, un spectre qui ne hante plus les Science Studies? Première partie: Marx, des campus aux machines." *Cahiers d'histoire. Revue d'histoire critique* 124: 161–182.

———. 2015. "Marx, un spectre qui ne hante plus les Science Studies? Deuxième partie: Marx, de l'oubli au retour du refoulé." *Cahiers d'histoire. Revue d'histoire critique* 126: 173–187.

Lévy-Leblond, Jean-Marc and Alain Jaubert. 1975. *(Auto)critique de la science*. Paris: Seuil.

Lynch, Michael. 2001. "Vers une généalogie constructiviste du constructivisme." *Revue du MAUSS* 17: 224–246.
Mamo, Maura and Jeniffer R. Fishman. 2013. "Why Justice? Introduction to the Special Issue on Entanglements of Science, Ethics, and Justice." *Science, Technology and Human Values* 48(2): 159–175.
Quet, Mathieu. 2013. *Politiques du savoir. Sciences, technologies et participation en France dans les années 68*. Paris: Éditions des Archives Contemporaines.
Raynaud, Dominique. 2018. "Anthropocène. Technique. Deux points de contact entre science et pensée partisane." *Zilsel* 3: 261–277.
Restivo, Sal. 1994. *Science, Society, and Values. Toward a Sociology of Objectivity*. Bethlehem: Lehigh University Press.
Saint-Martin, Arnaud. 2008. *L'office et le télescope. Une sociologie historique de l'astronomie française, 1900–1940*. PhD., Université Paris IV.
Shapin, Steven. 1981. "Zilsel thesis." In *Dictionnary of the History of Science*, edited by W.F. Bynum, E.J. Browne, Roy Porter. 451. London: The Macmillan Press Ltd.
Tremblay, Jean-Pierre. 2014. "Automobilités postmodernes. Quand l'Autolib' fait sensation à Paris." *Sociétés* 126: 115–124.
Woolgar, Steve and Javie Lezaun. 2013. "The Wrong Bin Bag: A Turn to Ontology in Science and Technology Studies." *Social Studies of Science* 43(3): 321–340.
Zilsel, Edgar. 1916. *Das anwendungsproblem: Ein philosophischer versuch über das gesetz der grossen zahlen und die ınduktion*. Leipzig: Johann Ambrosius Barth:
———. 1940. "Copernicus and Mechanics." *Journal of the History of Ideas* 1(1): 113–118.
———. 1941. "The Origins of William Gilbert's Scientific Method." *Journal of the History of Ideas* 2(1): 1–32.
———. 1942. "The Socilogical Roots of Science." *American Journal of Sociology* 47(4): 544–562.
———. 1991. *Le Génie. Histoire d'une notion de l'Antiquité à la Renaissance*. Paris, Minuit.
———. 2000. "The Sociological Roots of Science." *Social Studies of Science* 30(6): 935–949.

summer 2023 volume 2 | issue 2 | 129–134

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02209 COMMUNICATION

The Politically Mathematics Manifesto: An Introduction

Senthil Babu D, On behalf of the Politcally Mathematics Collective

THE MANIFESTO

Section 1:

> "Who would deny logic? Every simple person uses logic without the guidance of a logician, but logic that attempts to prove the soul, the god, or the supernatural cannot be considered valid. The common person would believe any of this without some obscurantist logician creating confusion." –Carvaka

In every age the old gods fall to new. Today the gods are data and programs. They see us. They govern our fate, and they will guide us to our destiny.

The rules of power are always obscure. Rules, fates, actions, and consequences are obscured so people do not resist or enact change, even when they can. Unlike before, communication is now instantaneous. Memory is becoming indefinite, and vision infinite. We can be watched, remembered, and tracked in ways we never could be before. Digital technologies guide what we want, what we know, and how we respond, while instilling an illusion of free choice. The ruling forces of today are capital, weapons and information gathering. We might say that the Gods have a new trinity of Gs, Greed, Guns and of course Google.

When production and governance become part of automated systems, people reduce to data streams whose actions become functions that are operated on again and again. These functions are abstract in nature, but they can make the difference between life and death. Insurance, for example, is getting granted based on scores and indices that trace the history and the risk of a person and assigns a number to them. A person might be denied a loan for

Babu, Senthil D. 2023. "The Politically Mathematics Manifesto: An Introduction." *Marxism & Sciences* 2(2): 129–134. https://doi.org/10.56063/MS.2310.02209

• *Correspondence:* Senthil Babu D, Politically Mathematics Collective.
• e-mail: sbabu@tuta.io
• ORCID: 0000-0003-3970-0648
• DOI: 10.56063/MS. 2310.02209
• *Received:* 20.07.2023; *Revised:* 27.07.2023; *Accepted:* 28.07.2023
• *Available online*: 05.11.2023

their education because their family has a score of 600, and the bank wants a score of 800.

This may seem to portend some sort of a doomsday scenario, where we all become slaves to programs and their writers, but at the heart of any system of data analysis is mathematics. Data processing is ultimately a mathematical activity, and it is there that lies the hope. Mathematics is a human activity after all. Like any other human activity, it carries the possibilities of both emancipation and oppression.

We live in the age of digital data, and in that age, mathematics has become the parliament of politics. The social law has become interwoven with models, theorems and algorithms. With digital data, mathematics has become the dominant means in which human beings coordinate with technology.

We hope that the practice of mathematics takes up the challenges of the time, strives to bring accountability to the needs of the people. If action is not taken at this time, our digital technologies will be the new jails.

Section 2:

> "Machines were... the weapon employed by capitalists to quell the revolt of specialized labour." –Karl Marx

> "The successful construction of all machinery depends on the perfection of the tools employed; and whoever is a master in the arts of toolmaking possesses the key to the construction of all machines." –Charles Babbage

Three centuries ago, the Newtonian revolution in physics made mathematics a firm part of any technological project. Two centuries ago, began the age of specialization of mathematics, where mathematicians ceased to be natural philosophers or even mathematicians, but became geometers, logicians, computers, analysts, etc.

One century ago, the age of the universalist mathematician finally closed with the death of Henri Poincare in 1912. This era marked a crisis point in the history of mathematics, often associated with the search of Universal Foundations.

Almost half a century ago, human beings began to lose their monopoly of producing mathematical knowledge to technology with the publication of the first computer assisted proof in 1976. Since then, there has been an interplay between mathematical thought and technology that has been growing.

Each year, mathematics shapes politics in new ways, through technologies of surveillance, medicine, transport, communication, media, information, identification, and governance.

Mathematics, by its nature, is contradictorily both universally accessible and accessible only in parts—this is a time to start engaging with mathematics politically.

Over the last many decades, concerns about the relationship between science and society have informed public discourse at multiple levels—both internationally and within the Indian context. Although voices have been raised by different sections from within and outside the academy, and with varied political motivation, the efforts made to understand and transform this relationship have contributed both to theory and practice—influencing the different points at which science and society interact. In India, the Peoples Science Movements (PSMs)—which themselves have been guided by varied motivation—have sought to promote scientific temper, popularize science, to aid State building and national progress by promoting science and science education among the masses, to critique the relationship between Science and Technology and industry and also to use science as a means for social transformation. More recently, studies in the Sociology of Science have also sought to understand the relationship between science and society, to critique the practice of science and the structure of scientific research, and to question the role of scientific activities in accelerating inequality.

In current times, there have been sufficient efforts to reveal that the relationship between science and society is far from benign. In some ways, this relationship manifests itself in very apparent ways—the relationship between progress in science and technology and economic progress for example—and thus makes way for it to be better understood, and also challenged more often. In contrast however, the relationship between mathematics and society, across the various levels of education and access to technology, is much less understood. However, it is precisely because of this that it enjoys a special status—one that perhaps needs to be probed further.

Mathematics is often seen as a tool to be able to learn and do science. It is what formats and determines vocabulary, and that is where it's role ends. On the one hand, this attitude lends a sort of impunity to the mathematics community within the academy (Pure mathematicians are not bothered by what their science is used for, the applications it finds is not their concern—they study mathematics for its own sake). On the other hand, mathematics assumes a crucial and dominant role within educational curricula precisely because it is what is needed in order to engage with scientific, technological and economic processes and activities. It is guaranteed a place at the university and compulsory at school. It therefore also serves as a sort of gatekeeper, helping to shape a notion of merit. It determines, in many ways, who takes part in the development of the Nation and industry and to what extent.

To address this issue, we should look at the nexus of the producers of mathematical knowledge and mathematically skilled professionals. In light of the recent debates regarding the restructuring of the University Grants Commission, the relationship of centres of research and industry, debates regarding the updating of the the tertiarylevel mathematics syllabus, and the composition of mathematics education up until that point.

Mathematics is also different from science as a knowledge form in that it is associated not only with skills of reasoning or logical thinking, but also with a

deep capacity for abstraction. In a casteridden society like India, where the mind is valued over the hand, asking questions of mathematics as to how it renders itself into caste inequalities and reproduces social inequality becomes all the more necessary.

Section 3:

> "I worried about the separation between technical models and real people, and the moral repercussions of that separation."–Cathy O'Neil

Guided by the larger concerns of how knowledge gets valued in todays changed economy, what processes contribute to creating this value, how forms of knowledge and their arenas of practice serve to uplift an economic system, accelerate economic inequality or support industry and contribute to state building, we feel the need to focus on mathematics as an area of knowledge in particular. And even more specifically, to examine the relationship between mathematics and society in the Indian context.

We feel it is important to understand how mathematics serves and has served as a basis for contributing to industry and State building and in turn how the State, industry, and other forms of organisation make demands—overt and subvert—of mathematics.

This is not the first time such questions are being asked of course. Unlike in the case of science, such concerns rarely emanate from the mathematical community within the academy, and in public. They do, however, find a voice within the community of mathematics education. But as it is, such concerns have been little explored in the context of India. Across the international community of mathematics education as well, discourse surrounding such concerns is increasingly directed towards the politics of curriculum making which asks important questions but has little to do with practice. So, what we are left with then is very little in way of data and empirical studies, which will help us be more concrete and pointed even in the questions we are trying to raise.

Formulating these questions to us is only an attempt at perhaps initiating such studies in the context of India. It is an invitation to those who might share these concerns to begin a dialogue.

We are putting up this initial note in the hope that those who are interested could add their own questions, ideas and of course anything that they think is pertinent to this initiative.

The questions and suggestions for study, we thought would help us situate and guide us to work through the concerns. We are looking for people to work together on questions which is of particular interest to them concerning mathematics in India. We do believe that not merely sharing concerns but even working together is still very much possible in our increasingly fragmented professional and social worlds.

INTRODUCTION TO THE POLITICALLY MATHEMATICS COLLECTIVE

In December 2016, a group of practitioners of mathematics came together for a conference in Pondicherry to share their political concerns regarding the use of mathematics today. The group consisted of Historians, Academics, Teachers, Activists, People from Science/literacy movements, Programmers, Social Scientists, and Educationists.

Different members expressed different concerns. Some asked the question of who mathematics serves in the modern context. Mathematics, as part of the educational system, should provide people with tools for emancipation, and at the same time, mathematics has acted as a gatekeeping mechanism to prevent people from the poorest sections of society from securing their basic needs and rights. With new systems of finance, credit and insurance, mathematics actually seems to become a tool in denying them their most basic needs.

Just one month prior, the Indian government pursued a disastrous policy of demonetization, where the majority of the country's currency was derecognized, leading to a financial crisis for the majority of the people. This was done in the name of controlling undeclared income, and wrought havoc in the country. The group began discussing how policies regarding the use of money, and then finance have become growing problems for people. Mathematical experts have been commissioned to serve aggressive neo-liberal policies and pursue programs used for surveillance, land grab, and large-scale dispossession. The Indian state has been explicit in stating that it wants to fund mathematics for industry-friendly areas such as mineral exploration, GIS, Big Data projects, etc. Many academics reported that they have seen projects, educational degrees, and departments that have facilitated these programs. People working on education have pointed out that there has been a shift in emphasis towards algorithms and computer programming. This illustrated how the school system, university, industry and state are consolidating the interests of capital.

This led to a discussion on what is missing in our collective understanding of mathematics. Even students who pursue mathematics to the higher levels find mathematics to be alienating. It is a paradox that those who have mastered this knowledge also are exploited by it. We realized that the education systems develop an extensive labour force of students trained in the use of mathematics. We wondered if this trend could be turned around by thinking of mathematics differently.

Since then, we have taken up specific themes of study where the practitioners of mathematics and the working people would come together to interrogate mathematical practice.

One initiative started in response to the continuously rising indebtedness and the burden on the working women for basic survival in the rural areas of the Coromandel coast and the Kaveri delta in south India. This brought us to examine the apparatus of calculations used in the flow of credit into the households and in relation to the flows of water and crops in these regions.

Another initiative that came out was to look at the history of mathematical practices in the working lives of people. This is to question the division between the activities of the mind and the hand, especially in a caste society like India, where manual work is denigrated in favor of abstraction, as the privilege of the few. We have looked at the histories of school mathematics, research mathematics, mathematics used by artisans, mathematics used by accountants and mathematics used by merchants, taking care to not valorize one over the other, but show their relationship in social histories.

During the COVID pandemic, we initiated critiques of the use of mathematical models to further the exploitation of the working poor in India. This includes the flimsy use of models to justify policies that hurt the working class, particularly the migrant workers who had been stranded and exploited during the pandemic, as well as exploitative credit allocation schemes that were given in lieu of proper welfare schemes needed at the time. We also launched criticisms on the state's callous policy on education, where provisioning aspects were neglected, and the children, especially girl children and children from remote locations, were deserted.

Page 134, line 24:-26: remove and replace with this: Friends of our collective have studied the labour of teachers in schools in the central Indian state of Chattisgarh. They have shown how teachers are exploited on account o their gender, caste and class locations.

There are many initiatives along the way. We intend to bring focus on algorithms, automation, data, and surveillance. Our work in credit needs to be linked to the larger world of finance and accumulation. Our work is taking us to deeper questions on measurement, regarding how life, dignity, work, and social reproduction are measured or not measured. We are creating an archive of mathematical practices. We are also looking at the shifting priorities of state and industry in developing mathematics.

We invite interested people to join us in further exploring these concerns and to develop ways to pursue studies along with the working people, to generate pedagogic resources that will facilitate ongoing efforts of the working-class movements.[1]

1. For more information and contact, please visit www.politicallymath.in.

summer 2023 volume 2 | issue 2 | 135–147

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02210 INTERVIEW

A Radical Trajectory in Science Studies: Interview with Gary Werskey

Gerardo Ienna

Introduction

Gary Werskey has been one of the main animators of the debates around science and Marxism in the United Kingdom. He especially played the role of mediator between two generation of Marxist scientists: the old generation active during the 1930s, 1940s and 1950s and the new one close to the new left who animated the debates between the 1960s, 1970s and 1980s (see Werskey 1978; 2007).

Born in Salinas, California, on August 5, 1943, Gary Werskey studied at Northwestern University and later entered Harvard as a graduate student in history in 1965, completing his doctorate in 1973 under the joint supervision of Stuart Hughes and Everett Mendelsohn. At the time, Mendelsohn was one of the few historians of science who took seriously the Marxist tradition known by the derogatory term "externalism" (Ienna and Rispoli 2019; Ienna 2022a). Actually, Werskey discovered this tradition in his second year of doctoral studies and decided to write for his dissertation a collective biography of a group of five British Marxist scientists: John Desmond Bernal, Joseph Needham, Hyman Levy, John Burdon Sanderson Haldane, and Lancelot Hogben. In 1968, he travelled to the United Kingdom to conduct his research, becoming particularly close to the Needham family. During this period, he came into contact with various currents of the New Left and with developments inBritish sociology and history of science. This research project would become the basis for his now well-known monograph *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930's* (Werskey 1978).

In 1970 he joined the Science Studies Unit in Edinburgh where the *strong program* in the Sociology of Scientific Knowledge was being developed by

Ienna, Gerardo. 2023. "A Radical Trajectory in Science Studies: Interview with Gary Werskey." *Marxism & Sciences* 2(2): 135–147. https://doi.org/10.56063/MS.2310.02210

• *Correspondence:* Gerardo Ienna, University of Verona and University of Maryland.
• e-mail: gerardo.ienna[at]gmail.com
• ORCID: 0000-0001-5278-8838
• DOI: 10.56063/MS.2310.02210
• *Received:* 04.07.2023; *Accepted:* 06.07.2023
• *Available online*: 05.11.2023

David Bloor and Barry Barnes. At the same time Werskey joined the British Society for Social Responsibility (BSSRS), which was established in 1969, before becoming in 1972 one of the founding members of the *Radical Science Journal* (RSJ).

In 1971, largely thanks to him and his colleague Roy MacLeod, renewed attention was given to the famous contributions presented by the Soviet delegates, led by Nikolai Bukharin, to the second International Congress of the the History of Science and Technology held in London in 1931. The resulting volume of papers, hurriedly translated into English and published under the title of *Science at the Cross Roads*, is still considered a classic of both the history of science and Marxist literature (Ienna and Rispoli 2021; Ienna 2022b). The republication of this text, as well as Werskey's important 1978 monograph, provided a cardinal resource connecting two generations of Marxist scientists.

The emergence of the Radical Science Movements in the U.K.[1] also has to do with the international circulation of ideas. Indeed, Werskey was among those researchers—such as MacLeod, Robert M. Young, Jerry Ravetz, and Les Levidow, for example—who migrated from the United States to the U.K. This migration encouraged an intellectual vibrancy and new forms of cultural hybridization (Turchetti 2016).

In 1969 the BSSRS took shape, initially without any particular political direction (although early supporters included the old generation Marxist scientists such as: Bernal, Needham and Levy). The goal was to bring together a wide range of scientists by creating a platform to expose the abuses and ideological uses of science.

As soon as radical activists Werskey, Ravetz, Young and Levidow arrived in the U.K., they immediately took part in the association. The BSSRS quickly became a more politically engaged organization (see Rosenhead 1972; Ravetz 1977). Composed initially of both radical and more liberal wings, internal rifts gradually grew within the group (Rose and Rose 1976, 18–24). On the one hand, two of the founding members of the BSSRS, Hilary Rose and Steven Rose, argued that the association was not sufficiently socialist. On the other hand, more establishment scientists like Michael Swann and John Ziman believed that its new direction was too radical and so broke away in 1973 to create the Council for Science and Society (Ravetz 1977).

The BSSRS contained within itself a heterogeneous mix of different political tendencies (Rose and Rose 1976, 19). The peculiarity of the BSSRS was that it adopted a critique of science in 'late capitalism' based on the concept of class instead of the idea of morality (Moore 2006, 256–257). The clear majority of members of the radical science movement were from an academic milieu, and

1. For more on the declinations of the Radical Science Movements in the UK, see Bharucha 2018.

some of these were directly concerned with issues related to the STS field. Activities were largely based in London and other cities such as Cambridge, Edinburgh, Leeds, and Manchester.

The BSSRS was composed internally of various groups dedicated to specific topics such as the *Hazards Group, the Woman in Science Group, the Politics of Health Group, and the Radical Statistics Group*. The newsletters Undercurrent (devoted mainly to alternative technologies) and *Science for People* were instruments through which the association publicized its reports and the various activities of the radical science movement in general (Werskey 2007, 432).

Alongside these, there arose at the initiative of Young, assisted by Werskey, David Dickson, Miuke Hales and Jonathan Rosenhead, the *Radical Science Journal* (now known as *Science as Culture*), which was an important channel for the development of STS in the UK. This journal consisted mainly of philosophers, historians, and sociologists of science who collaborated with each other on a common theoretical and practical issues. As can be deduced from the journal's first editorial, this project was constituted in a manner antithetical to the trend toward political neutrality that was coming to dominate the practice and direction of STS inside academia (see Radical Science Journal 1974). Within this broad and diverse radical science movement, there were numerous contributions that could be considered relevant to the STS field and its internal theoreticaldevelopment. Although communication the radical and academic practitioners of 'science studies' was not always smooth, the latter recognized the contributions of the political militants as fundamental. Foremost among these are certainly the works of Werskey, Young, Ravetz and the Roses, which have been widely regarded as landmarks in the emergence of STS.

Until 1987 Werskey continued to teach in the UK, moving between Leicester, Bath and finally at the University of London. During this period Werskey gradually distanced himself from the institutionalized social studies of science, instead, concentrating instead on the development of a marxist critique of capitalist science.

This interview aims to explore Werskey's role in the development of Marxist debates on science during the 1970s and 1980s by highlighting the intricate relationships between Radical Science Movements, STS, Cultural Studies, and the British New Left in general.

GERARDO IENNA: *Why did you come to the Science Studies Unit in Edinburgh?*

GARY WERSKEY: I took up the lectureship there in January 1970. For the previous 18 months I had been doing research in the UK for my Harvard PhD on the British left-wing scientists of the 1930s. This period coincided with some momentous changes in both my political outlook and personal circumstances. Politically, my interviews with these old Marxists, as well as the events of May

'68 and increasing opposition to the Vietnam war, induced a leftward shift in my politics and world-view. This transformation coincided with meeting my future wife, who was herself an activist in the early days of second-wave feminism. It was against this backdrop that I decided to seek an academic appointment in Britain, which I was now finding more politically and intellectually congenial than the US. I think I was seen as a good fit at Edinburgh, given my Harvard connections with Everett Mendelsohn and other young progressive historians of science and my study of J.D. Bernal et al who were in a sense the ideological godfathers of the SSU, especially the Edinburgh geneticist C.H. Waddington.

GI: *And what was your relationship to Marxism at that time?*

GW: During my undergraduate years at Northwestern I was introduced to Marx in a variety of historical and philosophical courses as an important figure in the history and development of European modernist thought. This neutral/apolitical presentation legitimated the beginning of my interest in Marxism, at the same time as my disenchantment with American capitalism was growing via my involvement in the civil rights movement—following my participation in the March on Montgomery in 1965—and my early opposition to the American war in Vietnam. Everett Mendelsohn's lecture on the British Marxist scientists encouraged a closer engagement with orthodox Marxism and its application to the history of science (above all, Boris Hessen). This trajectory was strengthened between 1968 and 1970 while working in the UK, where I engaged with both young and old Marxists not just about the past but also contemporary politics and numerous challenges to 'diamat' versions of Marxism.

GI: *Why did you decide to leave SSU at a certain point?*

GW: I had a genuinely high regard for Barry Barnes, David Bloor and SSU's Director David Edge. Barry in particular took an interest in my work (which he saw as grist for his largely theoretical work) and helped to deepen my understanding of the sociology of knowledge as a discipline. Both David Edge and he also offered me outlets for some of my early publications. And Edge, by virtue of his former position as Science Editor at BBC Radio, enabled me to gain a commission from Radio 3 to do a documentary on the radical scientists of the 1930s.

However, while I hugely enjoyed the intellectual stimulation and camaraderie of the SSU between 1970 and 1972, my now increasingly radicalised *praxis* was encouraging me to read further afield from the emerging interests of what we would now call STS specialists. But it was only when I signed on to

the *Radical Science Journal* that I got really caught up with a variety of contemporary Marxisms that were more engaged with the challenges posed by feminism, anti-racism and anti-colonial struggles. The one tendency I toyed with but ultimately rejected was the writings of Althusser and his acolytes. However, the greatest lacunae in my education as a would-be Marxist was (and continues to be) my ignorance and understanding of *Capital*, beyond many attempts to dip into vol. 1. Although I've read most everything else of his and Engels, that gap—and my withdrawal from revolutionary politics beginning in the 1980s—means that I still regard myself as an aspiring rather than a genuine Marxist.

GI: *You mentioned the fascination with and rejection of the Althusserian perspective. Was this already occurring during your period of affiliation with the RSJ? This issue also allows me to go into depth on another question. The rejection of some aspects of the Althusserian perspective seems to me a rather common feature of the British debates of those years (I am thinking especially of E.P. Thompson's The Poverty of Theory). So, I wonder if, more generally, there were any points of contact (even if only theoretical or mutual intellectual influence) between the nascent projects of the SSU, RSJ, BSSRS and what in those years were beginning to be called the "Cultural Studies" (I am thinking especially of the Birmingham CCCS).*

GW: The greatest British supporters of Althusser in the 1970s were the editors of *New Left Review* (who also took almost no interest in questions about the political economy of science and the social/ideological construction of scientific ideas. So, it's not surprising that most British Marxist/Left historians were uncomfortable with the fairly mechanistic outlook and abstract categories that the French structuralists employed in their work. Otherwise, I think we at RSJ were open to quite a diverse range of radical/Marxist perspectives, especially if they managed to embrace feminist and anti-colonial writers. European Marxists, including the Frankfurt School, Gramsci, Lukacs, Benjamin, etc., were congenial, as were American Marxists associated with the Monthly Review, including Harry Braverman's labour process writings. In Britain we definitely had a lot of time for historians like Thompson and Raphael Samuel but also those gathered around Stuart Hall at the Centre for Cultural Studies in Birmingham—one of Stuart Hall's students, Maureen McNeil was on the RSJ collective. We were also closely aligned with the Marxist economists associated with the Conference of Socialist Economists and its journal *Capital & Class*, as well as the non-sectarian scholars associated with *Radical Philosophy* (including the historian of science Simon Schaffer).

GI: *What tensions did you see between the SSK program and the problems faced by the Radical Science Journal and the BSSRS?*

GW: Put simply, I think our conception of science and its enmeshment with the globalising social relations of contemporary capitalism was so different from the preoccupations of the SSK crowd that there wasn't sufficient common ground for any tensions to arise. The two camps simply went their separate ways, with of course the institutionalisation of STS and the ascendancy of SSK achieving the academic hegemony that they continue to enjoy. Where the real tensions arose was between RSJ and BSSRS—but such is the way when theorists and activists of the left fail to understand each other's intent and practice.

GI: *If they took different paths, is it possible to say that STS and Radical Science movements had common roots (e.g., the famous debate on the two cultures, the pressing need to address the relationship between science and society, Waddington's role in promoting the creation of SSU, Bernalism etc.)?*

GW: 'Science' in the broadest sense was front and centre in the post-war political and policy debates in both the USA and the UK. Above all the bomb and the American-Soviet arms race fuelled the militarisation of science and the growth of the military-scientific-industrial complex (and the peace movements of the 1950s). There were moral and technocratic panics about whether enough scientists and engineers were being trained and educated to sustain the 'white-hot technological revolutions' required to sustain the West's military and economic superiority. By the mid-Sixties and America's escalation of the Vietnam war, a radical political critique of Big Science had begun to emerge.

The academic and intellectual ramifications of these developments led to the development of the institutions and 'schools' that would provide the foundations for both STS and 'radical science'. This could be seen in the UK with the rise of SSU-type departments being developed at Edinburgh, Sussex, Leeds and Manchester Universities. One of the intellectual influences spurring this development was 'Bernalism', which had been assimilated as a world-view by the Wilson government in the 1960s. Sociological studies of science associated with the likes of Robert Merton and Joseph Ben-David were also available, as was the 'Two Cultures' debate inspired by C.P. Snow. But probably the most intellectually subversive figure was Thomas Kuhn, whose *Structure of Scientific Revolutions* loosened a lot of assumptions about science's neutrality and objectivity.

These were the 'common roots' of the ferment around the growth of both STS and the radical science movements. The difference is that the latter formation was also drawing on a variety of contemporary Marxisms, as well as the increasingly influential feminist and post-colonial critiques.

GI*: In your article "Marxist Critique" you report that all these tensions were resolved by the transformation of the BSSRS into a more radical and militant society, through the exit of the older and more conservative scientists (Werskey 2007). In one passage you say that also participating in the BSSRS were "younger STS teachers and scholars, who of course were licensed to get science and engineering students thinking about both the social dimensions of their work and their professional responsibilities." Who were these STS scholars? What role did they have in the BSSRS?*

GW: The most active of these STS teacher-scholars in BSSRS (and *Science for People)* was Dorothy (Dot) Griffiths, who was then based at Imperial College (where I later joined her). Dot was also on the RSJ collective but drifted away as she gravitated toward the newly founded *Feminist Review*. Donald Mackenzie, a former student of mine at Edinburgh who worked in both BSSRS and the SSU (I think), was also very active. In the Manchester Liberal Studies in Science department, I'd nominate Ken Green as a key figure, although I'm not sure whether BSSRS had much of a local presence in Manchester. Another important STS teacher was Brian Easlea. Based at SPRU (the Science Policy Research Unit at Sussex) and an RSJ member, Brian's *Liberation and the Aims of Science* was certainly the most influential STS textbook in the 1970s. Another younger activist at Sussex was Mike Hales, a founding member of the RSJ collective. Finally, a somewhat older and less radical figure but an influential STS scholar in his own right was Jerry Ravetz at Leeds whose monograph *Scientific Knowledge and Its Social Problems* enjoyed quite a following.

GI: *Both the radical science movements and SSK in a way aspire to show the "non-neutrality of scientific knowledge." The radical science movements accomplish this through Marxist theoretical tools, social critique and the analysis of the relationship between science and ideology. The SSKs, on the other hand, aim to construct a theoretical model that has the claim to be neutral itself… How were the principles of symmetry and impartiality read by the radical science movements? Is this the key to understanding the mutual loosening? Did the RSJ question itself on this issue?*

GW: Others would probably be better able to answer this epistemological question. The best source would undoubtedly be Bob Young's writings in the 1970s, especially his RSJ articles. What's surprising, in retrospect, is how Young's argument that "Science Is Social Relations" was perfectly compatible with a conventionally 'realist' view that the findings of science were "true". For more on this, including a useful contribution from Maureen McNeil, I'd direct

you to the Bob Young festschrift (edited by Kurt Jacobsen & David Morgan), *Free Associations: Psychoanalysis, Science & Power* (Routledge 2022/2023).

GI: *Related to what you said before, you mention in your article "Marxist Critique" that some radicals (e.g. Young) came into tension with the BSSRS and that others (i.e. Hilary Rose and Steven Rose) even left the society. Is this related to the tension you mention between the RSJ and the BSSRS? Didn't the RSJ originate within the BSSRS (as well as other journals such as Undercurrents and Science for People)?*

GW: We all emerged out of the common intellectual and political context of the late Sixties. Some of the divergence from BSSRS in its early years arose from personal/sectarian differences (e.g., the Roses' early departure). Others simply reflected where the skills and ideologies of different actors led them to focus more on BSSRS than, say, RSJ. Sometimes, however, these differences could inspire personal animosities, with grassroot activists occasionally questioning the value of the more academic/theoretical work of, e.g., Bob Young. The RSJ collective itself felt it represented a broad non-sectarian spectrum of interests, included the alternative technology people gathered around Pete Harper (an early RSJ member) and *Undercurrents* and others active in the Conference of Socialist Economists. Remember, too, that some of us (including me) were wishing to engage with other struggles through broader Left groups such as the British Communist Party, Socialist Workers Party, International Socialists, Big Flame, etc.

GI: *I would ask you for some more details about how the RSJ collective was formed. Who had the first idea? how did the collective gradually expand? who took part in it?*

GW: Bob Young almost certainly was the moving force in getting RSJ started. I'm a bit hazy about the start date, but I'm guessing it kicked off sometime in 1972. Bob hooked me in on the strength of an incendiary seminar he gave in Edinburgh in 1971. I moved down to Leicester in 1972 and so was able to participate in the RSJ collective's early meetings in London. But you'll notice that the first issue of RSJ didn't come out until January 1974. It had sold out (2200 copies) by the time the next issue (2/3) appeared in 1975. The names of collective members were published at the head of each issue. (One of its most significant contributors, Les Levidow, didn't join the collective until c. 1976.) The collective members were drawn eclectically from science activists working through the British Society for Social Responsibility in Science and the alternative technology *Undercurrents* network to those with an interest in science and technology working out of feminist and Left groups. Certainly a significant minority were Bob's former and past students and colleagues. We generally met at Bob's house at Freegrove Road and later Cardozo Road, not far from the Caledonian Road tube station in Kentish Town.

GI: *Did you also organize seminars? How did the process of theoretical comparison among the members take place? What were the main intellectual resources used? with what forms of hybridization?*

GW: Ideologically we were quite a broad church, which was both invigorating and debilitating. Apart from our critiques and concerns about how capitalism was transforming science ideologically and technologically into a powerful set of forces for the oppression of workers, women and the Global South, what we had in common was our disdain for Eurocommunism on the one hand and the structural Marxists of the *New Left Review* on the other. Our eclecticism to some extent mirrored Bob Young's omnivorous intellect and interests, as well as our willingness to collaborate with a wide range of other radical intellectuals, including those working in *Radical Philosophy* and the Conference of Socialist Economists. We also hybridised our readings of British and European Marxism with American New Left and Marxist writers like Harry Braverman, Barbara and John Ehrenreich, Donna Haraway and those associated with the Monthly Review Press. However, we rarely organised or participated in public forums. An exception was our intervention in a conference on the history of biology organised by *Past & Present* and the British Society for the History of Science.

GI: *Could you tell me more about this intervention for P&P and BSHS that you mentioned?*

GW: I don't recall either the title or the exact date, but it would have been sometime in the late 1970s. I was a commentator on one of the papers on eugenics, possibly given by William McGucken. I gave a passionate but frankly ill-prepared reply which didn't sit well with me (or some in the audience), even though Bob Young & Co loved it.

This reminds me of a similar uncomfortable presentation I gave around the same time to a session organised by the 'Communist University' at University College London. Though I was publicly apologetic about my contribution, it did at least go down well with one audience member, Geoff Roberts, who went on to become a distinguished historian of the Stalin era and is today an important critic of 'Western' government and media commentary about the war in Ukraine.

GI: *How was the internal work of the RSJ organized? How were contributions selected? Were there meetings to determine the editorial line?*

GW: In line with our credo as libertarian Marxists, the collective was strongly committed to being as open and participatory in our conversations, decision-making and editorial processes as possible. This meant at times excruciatingly long meetings, endless editorial reviews and rewrites and a very low rate of

journal production. Bob Young was both a force that brought many of us together and equally someone whose dominating presence and combative style could paralyse proceedings and lead to the exodus of some very valuable comrades.

GI: *What contacts and interactions did you have with other militant journals? I guess especially exchanges, on the one hand, with other British journals such as Science for People, Undercurrents, or Radical Philosophy? Were you in any way coordinated?*

GW: I think I've answered this above. All of the publications you mentioned were important to us, as well as the CSE's *Capital & Class* and the American journals *Science for the People*, *Monthly Review*, etc. However, there was little coordination and even at times antagonism with BSSRS, some of whose activists disparaged our preoccupations with theoretical as opposed to their agitational practices.

GI: *Did you also have contacts with journals based in other cultural contexts? I'm thinking especially of Science for the People (US), Sapere (Italy), Testi e contesti (Italy), Medicina Democratica (Italy), Suivre et vivre (France), Labo-Contestation (France), Le Cri des Labo (France), Impascience (France)? or more generally, did the RSJ have transnational contacts? There are several articles published by non-British scholars in the journal….*

GW: Sadly, we were far more oriented to the Anglosphere than we were to our European counterparts. You are right that on occasion we would publish the odd continental writer but more through our academic networks than any more specifically political connections.

GI: *About your academic networks. How were these constructed? It is true that maybe they did not travel on the same channels as political militancy but, I imagine, however, that you built a network of transnational academic exchanges based with other scholars interested in Marxist studies on science. Can you tell me more about that?*

GW: My academic networks were neither large nor extensive, based largely on close contacts with past mentors and open-minded colleagues. There was a Harvard network back to my PhD supervisor Edward Mendelsohn which included Loren Graham at MIT and Roy MacLeod at Sussex Uni. My Edinburgh colleagues Barry Barnes, David Bloor, and David Edge were important influences, as were some of my students, notably Donald Mackenzie. At Bath University I was connected to Harry Collins and Trevor Pinch, while at Imperial College my only close contact was Dorothy Griffiths. I also had occasional but useful encounters with Steve Shapin (who succeeded me at Edinburgh), Simon

Schaffer (through Radical Philosophy), Jerry Ravetz at Leeds (an older American kindred spirit), and several members at the Manchester Liberal Studies in Science group, including Ken Green and Jon Harwood.

A propos of networks, it was David Edge who introduced me to Michael Totten, a producer at BBC Radio 3 who enabled me in 1972 to do both an hour-long documentary about the Red Scientists of the 1930s and a talk comparing and contrasting that generation's views about science and socialism and my own. That talk greatly angered the Head of Radio 3 who was appalled that his network was propagating my Marxist 'propaganda.' I've actually got the audio of both programs. They are massive files but I could send those to you via WeTransfer if you were interested.

GI: *How did the transformation of the RSJ into Science as Culture come about? Does this transformation process have to do with a process of academization of the RSJ's original project? To date, I would say that Science as Culture is considered as one of the journals in the STS field… I also wonder if this transformation has not generated some internal controversy within the board.*

GW: This transition occurred after I left the RSJ collective. Les Levidow (still with *SaC*) would be the right person to talk about this. I think it partly arose because of the Left's depression following the election of Margaret Thatcher in 1979 and the consequent exhaustion of carrying on in the same fashion as we had in the Seventies. We were all pretty burnt out by this stage, and I think Bob Young in particular needed a more stable context for supporting his and others' radical scholarship. So, *SaC* provided some continuity with our tradition but could also act as a bridge to the more critical end of STS.

GI: *Another question related to transnational networks: I had a chance to view the archives of the PAREX project (the project between the Maison des Sciences de l'Homme and the University of Sussex). I noticed that you, you participated in some of the activities of this group while you were at SSU. Can you tell me more about this experience?*

GW: This was an initiative of Roy MacLeod at Sussex, working with Chris Freeman at the Science Policy Research Unit (SPRU) there, to establish this link with the Ecole des Hautes Etudes en Sciences Sociales in Paris. I only attended one of their seminars in Paris, where I gave a paper about my work on the Left scientists (around 1971). It was an interesting initiative, but I have no knowledge what impact it had practically or intellectually. Roy MacLeod has the archive of this endeavour and is, I think looking for a home for it either at Sussex or Paris.

GI: *Let's come to contemporary aspects: Do you think a rapprochement between Marxist-oriented studies of science and technology with the academic field of STS is possible (or desirable) today? If yes, what do you think might be the mutual benefits of opening up potential dialogue? Or are you convinced that these fields are destined to remain incompatible with each other?*

GW: I've been too long absent from both the political and academic interventions around science and technology to say anything meaningful about the important questions you pose. The far greater integration of research and development into the fabric of twentyfirst century capitalism must have tilted the concerns of all those still engaged either politically or academically with these developments. I imagine the problem with most STS academic units is that they must now be as much assimilated into the requirements of the capitalist state as their colleagues in the faculties of science and engineering. So, while always open to learning from anyone with a good mind and a good heart, I would guess that I would still be focussing most of my efforts into supporting those wanting to change as well as understand our societies.

GI: *Any final thoughts?*

GW: I'd like to close with a few reflections concerning pessimistic thoughts about the future when things don't seem to be going well either professionally or politically.

When *The Visible College* finally appeared in late 1978—after a decade of bringing it to fruition while prioritising politics—I became quite depressed about the book's lack of impact generally and particularly in conversations on the Left (Werskey 1988). Though I had good reviews in prestigious outlets like the *Economist* and the *New York Times Book Review*, my publisher judged that interest in radical publications had peaked and therefore put no effort into promoting it. Of course, Thatcher's election soon afterwards vindicated that judgment and by 1980 I was convinced that I had wasted a decade of my life trying to engage the world in new conversations about science and socialism.

Fast forward 25 years to the International Congress of the History of Science & Technology in Beijing which I attended as *Minerva's* book review editor. To my amazement there was a session on the Red scientists of the 1930s led by a new generation of scholars quite unknown to me. Many of them actually assumed from my long silence that I had died! The knock-on effect is that I was then invited the following year by two young historians of science at Princeton to deliver the keynote address to their annual conference which focussed on the legacy of *Science at the Crossroads*. That was the text that then found its way into my 2007 *Science as Culture* article. Fifteen years later via Academia.edu I'm receiving periodic news of continuing citations of my work, thanks partly to

younger scholars like yourself and my onetime PhD student at Imperial College, David Edgerton, who's now an influential professor at King's College London.

But of far greater importance—and little owing to me and my work—a new generation of radical science activists are working on numerous fronts employing their own frameworks to make sense of contemporary capitalism and combat its worst manifestations. In other words, one benefit of living 50 years after all those earlier disappointments is not to prejudge the long-term effect of one's work and struggles, thanks to the cunning of history. Venceremos!

ACKNOWLEDGEMENTS

Sections written by Gerardo Ienna of this project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101026146.

REFERENCES

Bharucha, Zac. 2018. *The Radical Science Movement in the U.K. 1968-1978; Struggles Against the Impact of Capitalist Ideology on Science, Technology and Social Relations of Science*. Poland: Amazon Fulfillment.

Ienna, Gerardo and Giulia Rıspoli. 2019. "Borıs Hessen at the Crossroads of Scıence and Ideology: From Internatıonal Cırculatıon to the Sovıet Context." *Society & Politics/Societate şi Politică* 13(1): 37–63.

———. 2021. "The 1931 London Congress: The Rise of British Marxism and the Interdependencies of Society, Nature and Technology." *HoST-Journal of History of Science and Technology* 15(1): 107–130.

Ienna, Gerardo. 2022a. "The Double Legacy of Bernalism in Science Diplomacy." *Berichte zur Wissenschaftsgeschichte* 45(4): 602–624.

———. 2022b. "The International and Interdisciplinary Circulation of Boris Hessen's Theses" In *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook,* 75–130, edited by Omodeo, Pietro D., Sean Winkler and Hessen Boris. Venice: Verum Factum.

Moore, Kelly. 2008. *Disrupting Science. Social Movements, American Scientists, and the Politics of the Military 1945–1975.* Princeton: Princeton University Press.

Radical Science Journal. 1974. "Editorial." In *Radical Science Journal* 1(1): 2–3.

Ravetz, Jerry. 1977. "The British Council for Science & Society." In *Newsletter on Science, Technology, & Human Values* 19: 15–19.

Rose, Hilary and Steven Rose. 1976. *The Radicalisation of Science. Ideology of/in the Natural Sciences*. London-Basingstoke: The Macmillan Press Ltd.

Rosenhead, Jonathan 1972. "The BSSRS: Three Years On." In *New Scientist* 134–136.

Turchetti, Simone. 2016. "Looking for the Bad Teachers: The Radical Science Movement and Its Transnational History." In *Science Studies during the Cold War and Beyond*, edited by Turchetti, Simone and Elena Aronova. New York: Palgrave MacMillan.

Werskey, Gary. 1978. *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*. London: Allen Lane, 1978; second edition: London: Free Association Books, 1988.

———. 2007. "The Marxist Critique of Capitalist Science: a movement in three acts?" *Science as Culture* (42): 397–461.

———. 2021. *Picturing A Nation: The Art & Life of A.H.* Fullwood, Montgomery: NewSouth Books.

Werskey, Gary and Natalie Wilson. 2023. "The Artists of the Atlas: Their Role in Creating Settler-Colonial Australia's Visual Culture." *Journal of Australian Studies* 47: 322–343 https://doi.org/10.1080/14443058.2023.2167852

summer 2023 volume 2 | issue 2 | 149–153

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02211 CULTURAL WORK

ESSAY

The Atlas Project: Updating Arntz and Neurath

Alice Creischer and Andreas Siekmann

The *ATLAS GESELLSCHAFT UND WRTSCHAFT* (Atlas of Society and Economy) was part of the Vienna Method of Pictorial Statistics that was developed at the *Gesellschafts- und Wirtschaftsmuseum* (Social and Economic Museum of Vienna) from 1925 onward by Otto Neurath and his team, which consisted of Gerd Arntz, Marie Reidemeister and others. In this method, graphical elements provide information on political and economic interrelations; they are presented on panels that can be set up to form entire public spaces. The diagrammatic idiom was also specifically conceived for persons who were illiterate, or barely literate. Workers' education was to take place independently of school education. In 1934—after Neurath and his staff had to flee from Vienna—the method was renamed Isotype, an acronym for International system of typographic picture education.

Since 2004 we have been working on updating this atlas method. What particularly fascinated us with the graphical work of Gerd Arntz, was its 'anti-subjective' representation of social power relations. 'Being a subject' is deliberately schematized as an effect of the system or the revolutionary class. Through the same means, the pictorial argumentation becomes a demand to reverse the conditions. At the time, this was a dedication to revolutions of soviets and their factory and barracks occupations. This schematization is continued in the atlas. Gerd Arntz explains:

> . . . tables and curves that are difficult to interpret are replaced by rows of equally large, colored symbols on panels, magnetic boards and in films ... groups of persons are actually represented by groups of persons, and production

Creischer, Alice and Andreas Siekmann. 2023. "The Atlas Project: Updating Arntz and Neurath." *Marxism & Sciences* 2(2): 149–153. https://doi.org/10.56063/MS.2310.02211

• *Correspondence:* Alice Creischer, Berlin.
• e-mail: alicecreischer@aol.com
• DOI: 10.56063/MS.2310.02211
• *Received:* 20.07.2023; *Revised:* 27.07.2023; *Accepted:* 29.07.2023
• *Available online*: 33.08.2022

> volumes by the relative number of their pictures ... this consistent system of showing figures or fluctuations in volume by simplified signs designed to be presented in rows ... is the beginning of a type of representation that ... can provide all sciences with a basis for making their interrelations comprehensible in pictures. ... what is yet to be examined is the impact of the quantity and volume of an object on the direction of its movement and its force in society at large. Then there is the problem of the extent to which the quantity within the representation can be considered an explanation of facts. furthermore, the extent to which ... the representation of social struggles, in particular, would have a transformative effect on the method itself.[1]

The first ten sheets were updated as part of the *ExArgentina*[2] project with students of the University of Lüneburg. After that, many updates were made and often initially part of other projects. They followed very different needs and agendas, so that over the years the *Atlas project* became for us rather a kind of continuous medium of political contemporaneity – and it still is.

It seems to us that—depending on the political situation, institutional framework and our own sensibility—we also have to cover a historical distance to the particular sheets in different ways, which then expresses itself in the dimensionality, the intensity and often even in the repetition of the answers, sometimes as a poster, as a whole brochure or as a single sheet.

'Updating' is not, after all, a process ever completed. For it is already outdated when it is formulated. This lack of being present makes it clear that it is more about the relentlessness of wanting to know at that moment than about 'numbers and figures.'

We experience again and again how the complexity of political and economic facts is inflated to such an extent that they no longer seem to be representable. We would therefore have to accept them and submit to them. Keeping these facts representable therefore still remains a political demand, "to analyze our present life, to make demands and to give the recognized a pressure for realization."[3]

The two updates published here are the brochure *Nature meets itself* (Fig. 1), created in 2013 for the Bergen Assembly (see Appendix), and *The big four*, one sheet on land grabbing in Ukraine (Fig. 2), which were created for the Kiev Biennial, 2015. They answer the atlas sheet 35 *Produktive*

1. Gerd Arntz: Bewegung in Kunst und Statistik, in: a bis z, Zeitschrift der Gruppe "Kölner Progressive Künstler," Cologne 1931.
2. ExArgentina, Museum Ludwig, Köln 2004, Palais de Glace, Buenos Aires, 2006.
3. Gerd Arntz, ibid. See also gerdarntz.org

Flächen der Erde ('Productive areas of the Earth') (Fig. 3) from the *Atlas* of 1931.

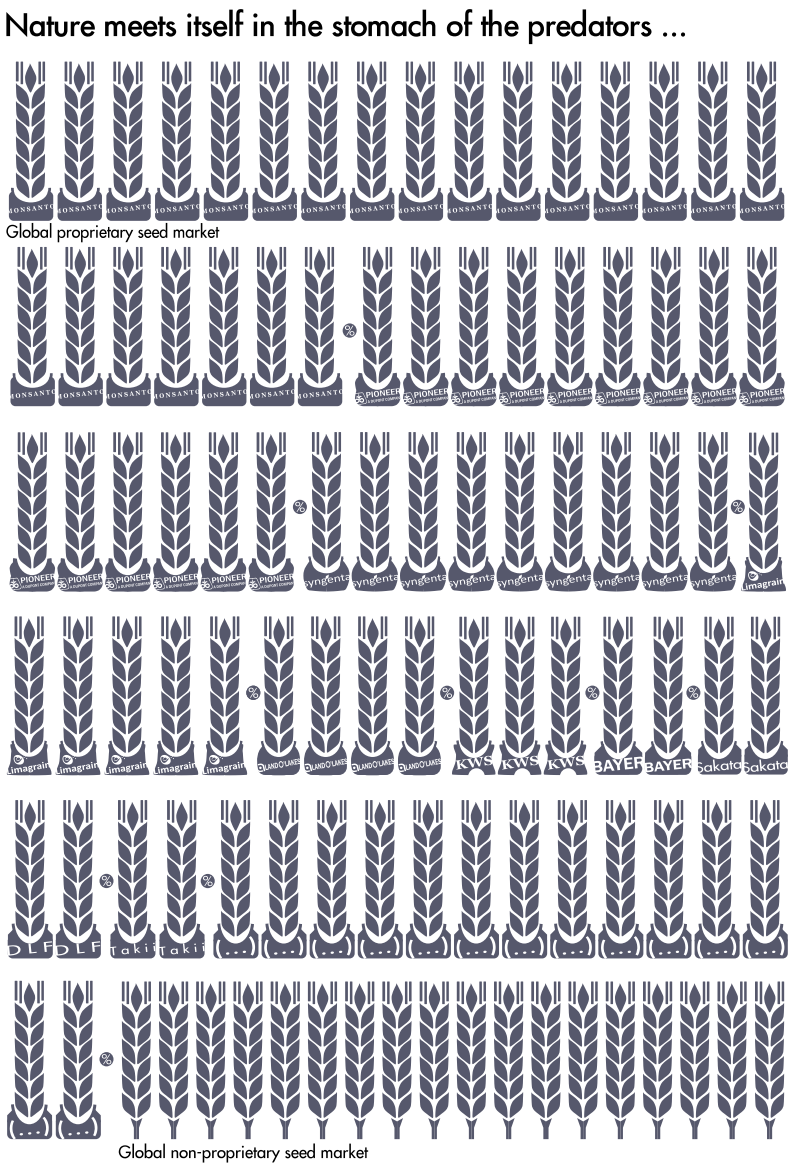


Figure 1. Nature Meets Itself (2013).

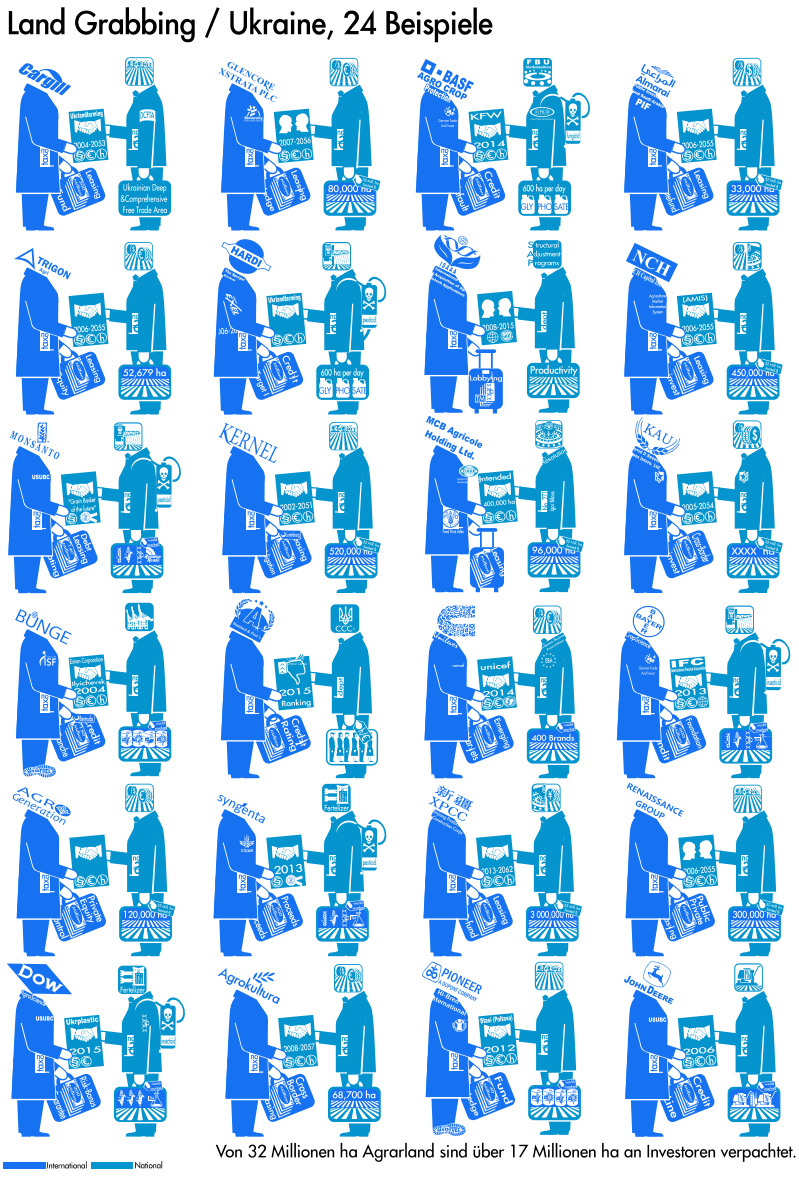


Figure 2. Land Grabbing in Ukraine (2015).

Figure 3. Produktive Flächen der Erde (Productive areas of the Earth) (1931)

REFERENCES

Atlas Gesellschaft und Wirtschaft, ed. by Otto Neurath, art director Gerd Arntz. Leipzig 1930. https://files.libcom.org/files/Gesellschaft_und_Wirtschaft_1931.pdf

summer 2023 volume 2 | issue 2 | 155–207

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02290 APPENDIX

WORK

Nature Meets Itself in the Stomach of the Predators[1]

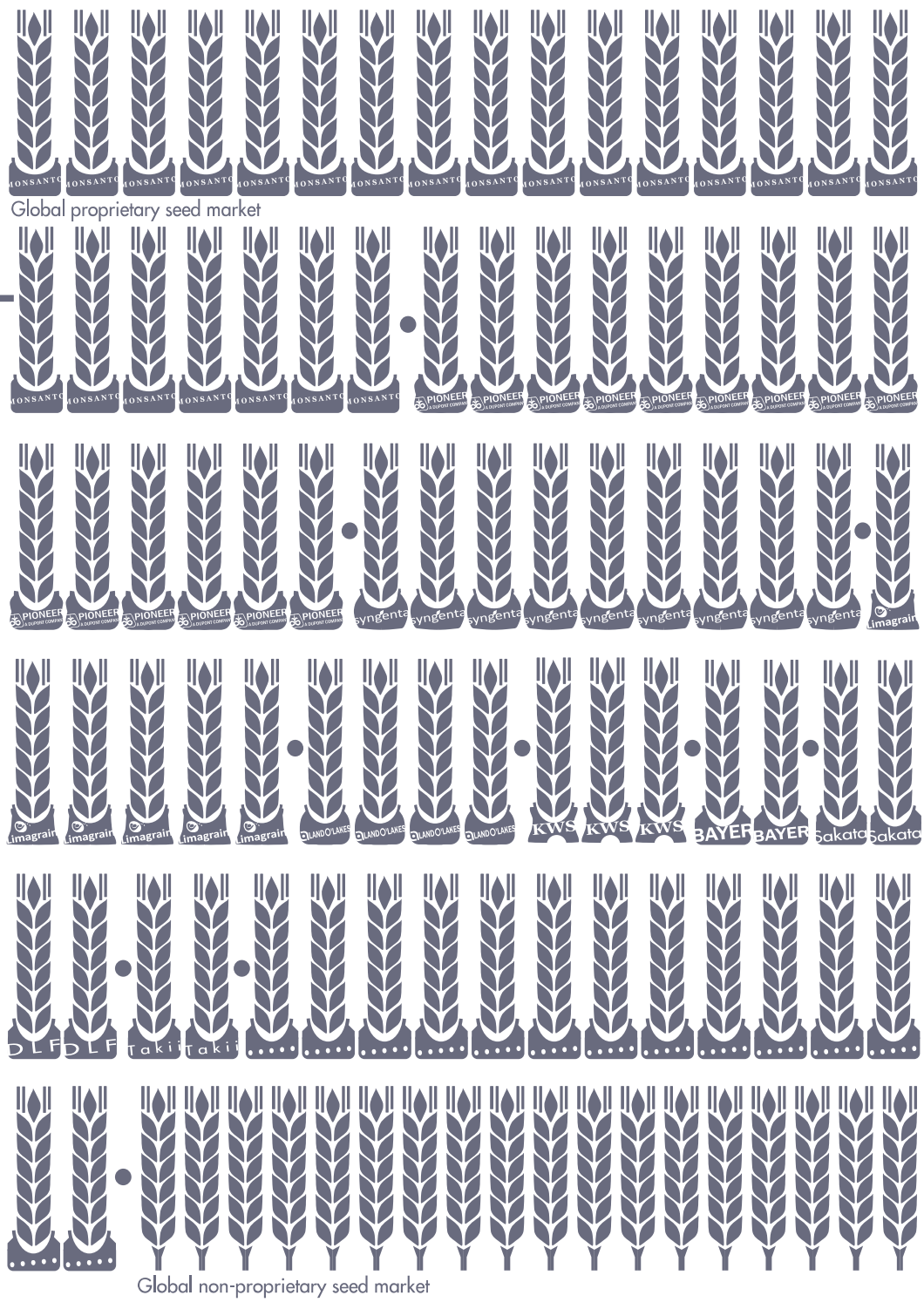
By Alice Creischer and Andreas Siekmann, 2014

1. The graphics are from the brochure, *in the stomach of the predators*, printed at Kunstraum lakeside, Klagenfurt, 2014. They have been developed for the work with the same title for Bergen triennial, 2013. The original work is available at the link, below: Nature Meets Itself in the Stomach of the Predators

Creischer, Alice and Andreas Siekmann. 2023. "Nature Meets Itself in the Stomach of the Predators." [Graphic Design] *Marxism & Sciences* 2(2): 155–207. https://doi.org/10.56063/MS.2310.02290

• *Correspondence:* Alice Creischer, Berlin.
• e-mail: alicecreischer@aol.com
• DOI: 10.56063/MS.2310.02290
• *Received:* 20.07.2023
• *Available online*: 05.11.2023

Nature meets itself in the stomach of the predators ...



Global proprietary seed market

Global non-proprietary seed market

Gerd Arntz, Otto Neurath: Gesellschaft und Wirtschaft/Bildstatistisches Elementarwerk, Blatt 58, 1929

Nature meets itself in the stomach of the predators

Alice Creischer
Andreas Siekmann

kunstraum lakeside
Klagenfurt, 2014

Nature meets itself in the stomach of the predators.
In the stomach it creates disasters & produces demands.
It creates disasters & produces demands.
It makes people superfluous.
In the stomach it creates disasters & produces demands.
It makes nature superfluous.

Die vorliegende Publikation ist bereits die zweite in zehn Jahren, die der kunstraum lakeside mit Alice Creischer und Andreas Siekmann herausgibt. Gleich zu Beginn unserer kuratorischen Arbeit für den Lakeside Park haben wir die beiden KünstlerInnen eingeladen, eines der ersten Projekte im Rahmen eines Kunstprogramms zu entwickeln, das seinen inhaltlichen Schwerpunkt auf kritische Ansichten der Ökonomie legen sollte. Alice Creischer und Andreas Siekmann zählen in dieser Hinsicht gewiss zu den interessantesten KünstlerInnen ihrer Generation, weil sie eine hohe kritische Aufmerksamkeit gegenüber ökonomisch-politischen Problemen der Gegenwart mit sorgfältiger Recherchearbeit und einer großen Varianz ästhetischer und medialer Verfahren in der künstlerischen Umsetzung verbinden. Das Ergebnis der Zusammenarbeit im Jahr 2005 war eine außergewöhnliche Wandarbeit für den Vortragsraum des Lakeside Parks – großformatige Emailletafeln mit Bildstatistiken zu monopolartigen Produktionen in den Bereichen von Copyright, Patenten und geistigem Eigentum – und eine Begleitpublikation mit ausführlichem Datenmaterial und begleitenden Texten.
Wie die Arbeit von 2005 stellt auch diese Publikation, die im Rahmen der Ausstellung „In the Stomach of the Predators" entstand, die Aktualisierung einer Seite aus dem berühmten statistischen Bildatlas „Gesellschaft und Wirtschaft" von Gerd Arntz und Otto Neurath aus dem Jahr 1930 dar. War das Kapitel Saatgut in der Wandarbeit vor zehn Jahren nur eines unter mehreren zum Problem der Monopolbildungen, so ist die aktuelle Publikation ausschließlich diesem Thema gewidmet und trägt damit der in wenigen Jahren weiter erhöhten Brisanz des Problems Rechnung. Heute kontrollieren drei Firmen mehr als die Hälfte des Markts für Saatgut. Doch der aggressive Zugriff einiger Konzerne auf natürliche Grundlagen der Landwirtschaft und ihre exklusive Vermarktung ist nicht erst ein Phänomen der Gegenwart, sondern lässt sich – wie Creischer/Siekmann zeigen – bis in die 1930er-Jahre zurückverfolgen und mit einer Reihe von „Natur"-Katastrophen in Verbindung bringen. In dieser historischen Perspektive auf eine aktuelle globale Bedrohung korrespondiert diese Arbeit mit dem historischen Bewusstsein der KünstlerInnen für erkenntnisfördernde Visualisierungsmodelle komplexer Sachverhalte, wie sie Arntz und Neurath zur Zeit der Wirtschaftskrise der Zwischenkriegszeit ausgearbeitet hatten. Während das Glossar dieses Bands umfangreiches Zahlen- und Datenmaterial anbietet, visualisieren die Bildtafeln zum Teil überraschende Verbindungen zwischen Konzernen, politischen Entscheidungsträgern und großen „gemeinnützigen" Stiftungen, so dass Begriffe wie „Desaster-Kapitalismus" und „philanthropischer Kapitalismus" an Anschaulichkeit gewinnen.

Christian Kravagna, Hedwig Saxenhuber

1929 begannen Gerd Arntz und Otto Neurath im Wiener Institut für Bildstatistik die Arbeit am Atlas „Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk". Der Atlas umfasst hundert Blätter, die über die Verhältnisse der damaligen Wirtschaft informieren. Ihre Darstellungsmethode basiert auf serialisierten Mengenbildern. Man sieht keine Zahlen und Kurven, die vorgeben, sofort erfassbar zu sein. Vielmehr ist man gezwungen, im Lesen anzuhalten und eine gewisse Zeit mit Zählen zu verbringen. Was uns besonders an der grafischen Arbeit von Gerd Arntz faszinierte, war die inhärente Aufforderung, die Verhältnisse, die beschrieben wurden, argumentierbar zu halten und damit umkehrbar zu machen.
Das war ein Motiv, mit der Aktualisierung der einzelnen Blätter zu beginnen, was seit 2002 in verschiedenen Workshops stattfindet. 2005 haben wir mit Studierenden der Alpen-Adria-Universität Klagenfurt die Blätter 58 und 59 des Atlasses mit dem Titel „Monopolartige Produktionen europäischer und außereuropäischer Länder" ausgesucht und sie auf Monopolbildungen an geistigem Eigentum, Patenten, Copyrights aktualisiert.
Nun, 2014, möchten wir diese Aktualisierung ergänzen mit einer Recherche, die wir vor zwei Jahren zu Saatgutmonopolisierung begonnen haben. Die Recherche führt von den Anfängen der Agroindustrie in der Dustbowl Katastrophe der 1930er-Jahre in den USA bis zu den aktuellen Auswirkungen von Saatgutmonopolen auf die globale Agrarwirtschaft. Es ist eine Geschichte von Desastern/Katastrophen, wobei die VerursacherInnen die Dynamik der Katastrophen zu neuen Demands/Produktivitätsregimen nutzen. Ausgangspunkt der Recherche war die Eröffnung des Globalen Saatgutspeichers in Spitzbergen 2008, der vorgibt, die Saatgutdiversität der Welt zu bewahren, jedoch finanziert wird von den weltgrößten Saatgutmonopolisten Syngenta, Monsanto und Pioneer.

Die Recherche wurde in zwölf grafischen Tafeln umgesetzt, die nun hier mit einem Glossar abgedruckt sind. Das Glossar erklärt alle Begriffe, die in den Tafeln auftauchen, und macht deren Zusammenhänge klar.

Diese Publikation ist eine Fortsetzung der ersten Publikation des Workshops von 2005. Sie behandelt das gleiche Thema und macht zugleich die dramatische Zuspitzung der Monopolisierungsfrage in den letzten zehn Jahren deutlich.

Alice Creischer, Andreas Siekmann

Permanent People's Tribunal

on Agrochemical Transnational Corporations

Bangalore

3. - 6.12. 2011

26.02.2008

Opening Conference

Global Seed Vault Svalbard

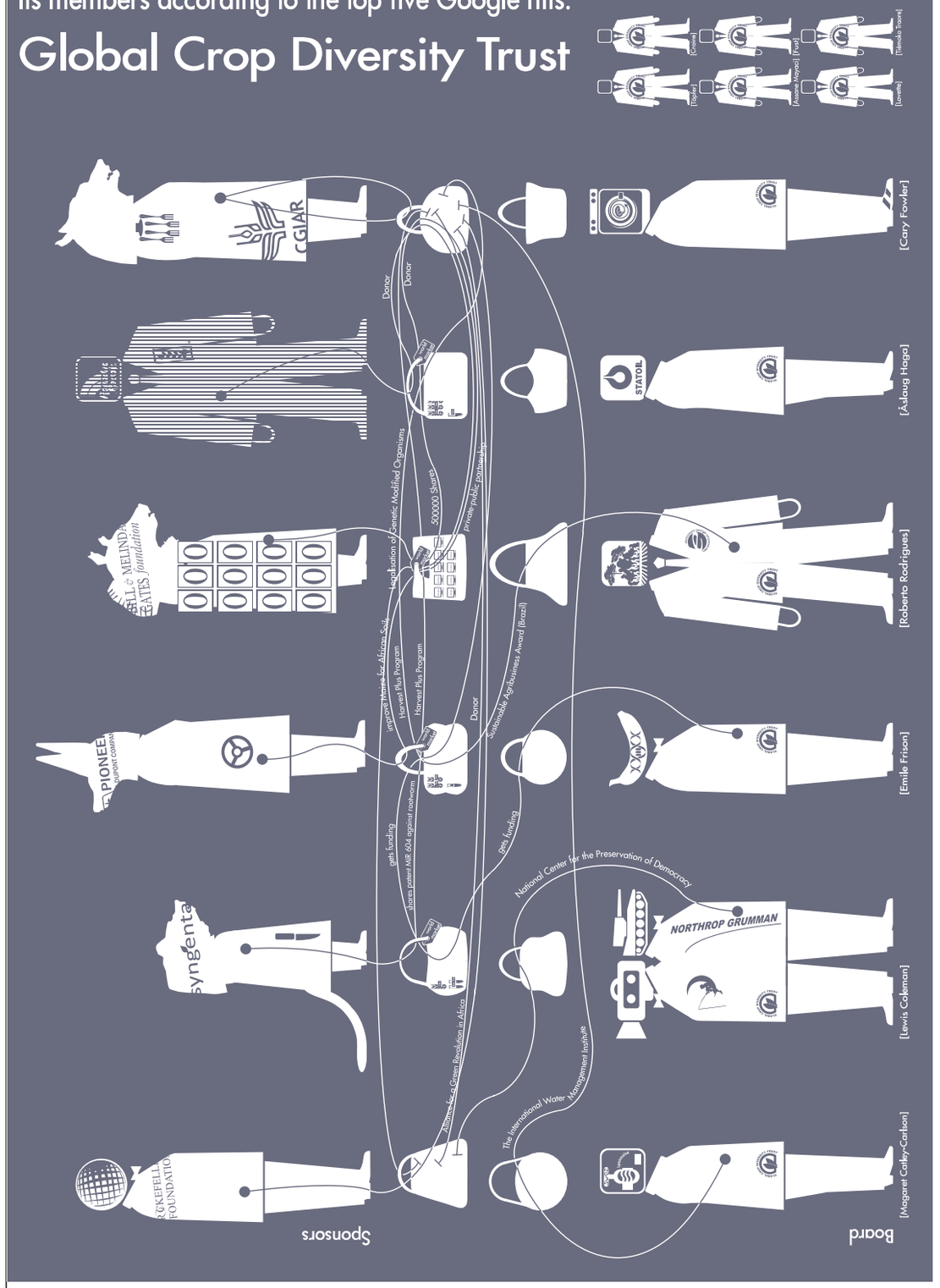
25.02.2008

Tafel/Plate 1

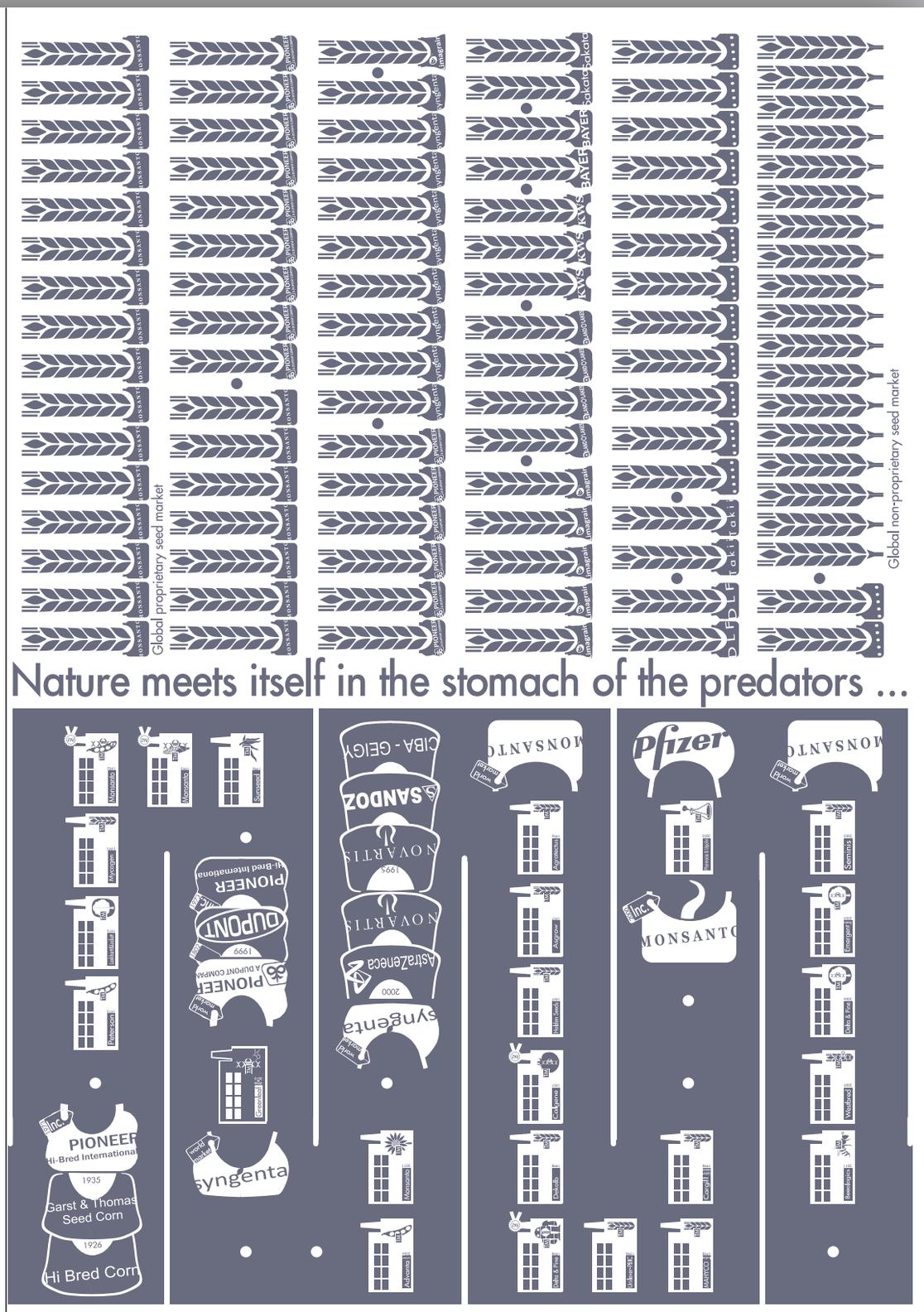
Tafel/Plate 2

Its members according to the top five Google hits.

Global Crop Diversity Trust

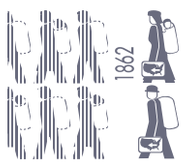


Tafel/Plate 3



Tafel/Plate 4

In the stomach it creates disasters & produces demands.

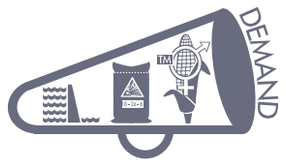


Homestead Act

Dust Bowl

Each figure = 50.000 migrants

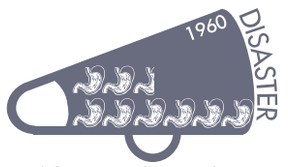
California



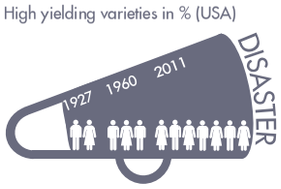
Nitrogen Fertilizer

Each figure = 5 million tons

High yielding varieties in % (USA)

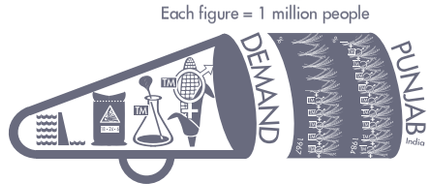


Each figure = 1 million people



Each figure = 1 billion people

UN Fund for Population Activities



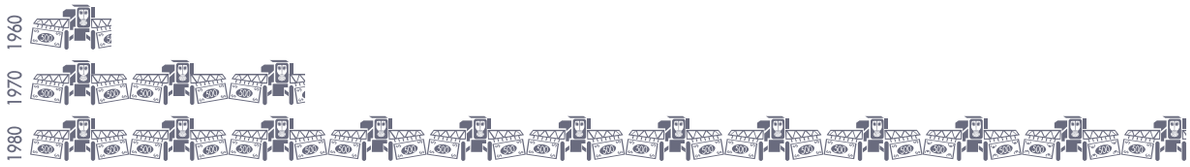
Green Revolution

Areas under IR8 Rice

Consultative Group on International Agricultural Research (CGIAR)

Packages / Impacts, each figure = 5 million tons

Glyphosate

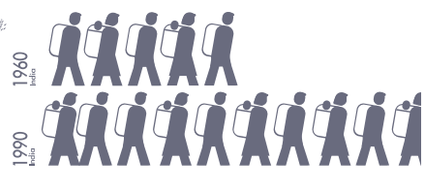


Each figure = 1 billion USD pesticide consumption

Each figure = 100 billion USD credits

Tafel/Plate 5

Each figure = 10 workdays per hectare (rice)

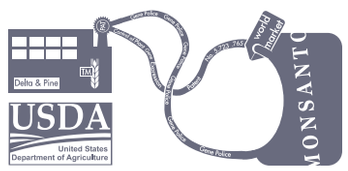


Rural urban migration - each figure = 25 million people

Each figure = 1 million people

It creates disasters & produces demands; it makes people superfluous.

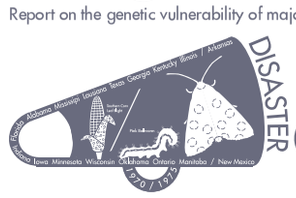
Report on the genetic vulnerability of major crops, 1972

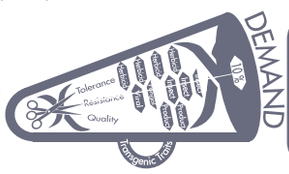


Joint venture, 1983 Patent acquisition, 1998

Worldwide protests 1999

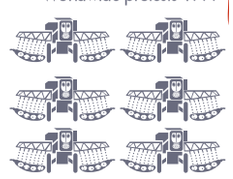
Tafel/Plate 6



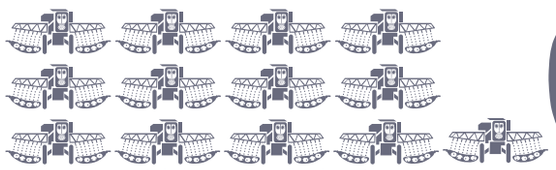


Most frequently commercialized

MON 832, 1996 MON 1445, 1997 MON 63413, 2012 MON 89788, 1996



Argentina 2010, each figure =



Roundup soybeans / glyphosate /10 million liters / hectares

MON 87701, 1997 MON 810, 1995 MON 531, 1996

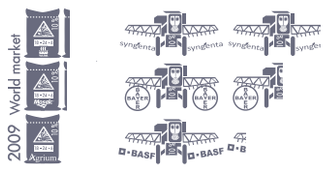
South Africa

Australia

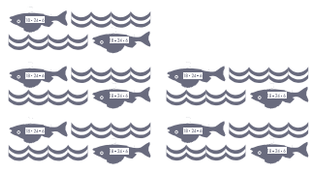
India

USA

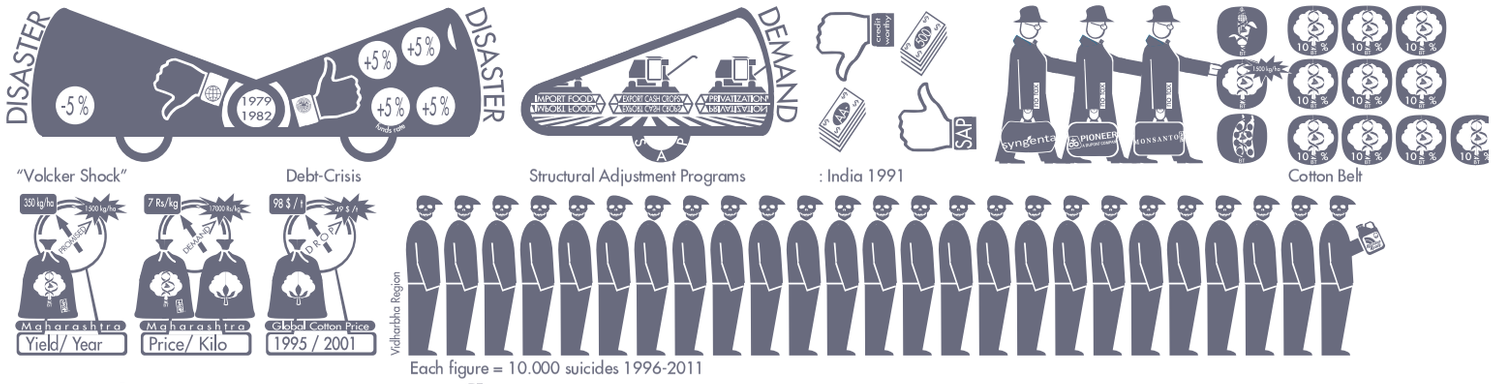
CGIAR



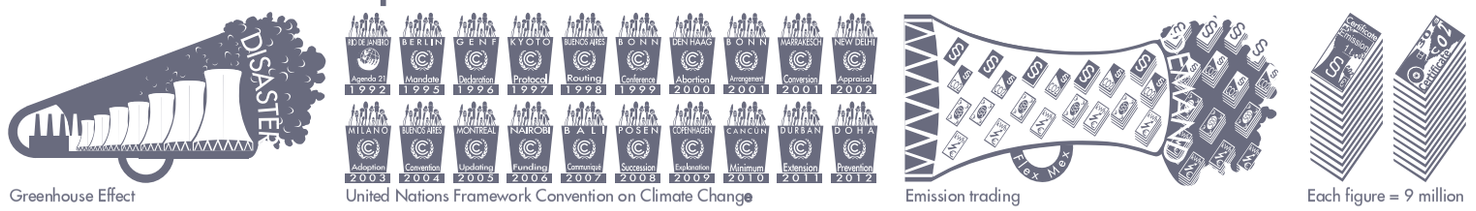
Top 3 fertilizer / pesticide companies

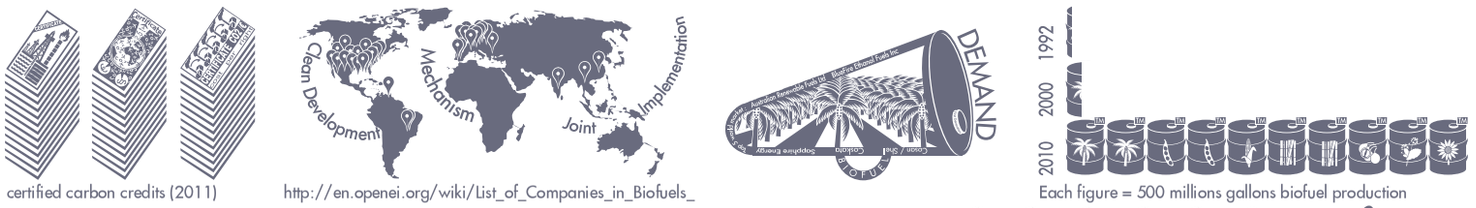


Each figure = 50.000 km² dead coast zones



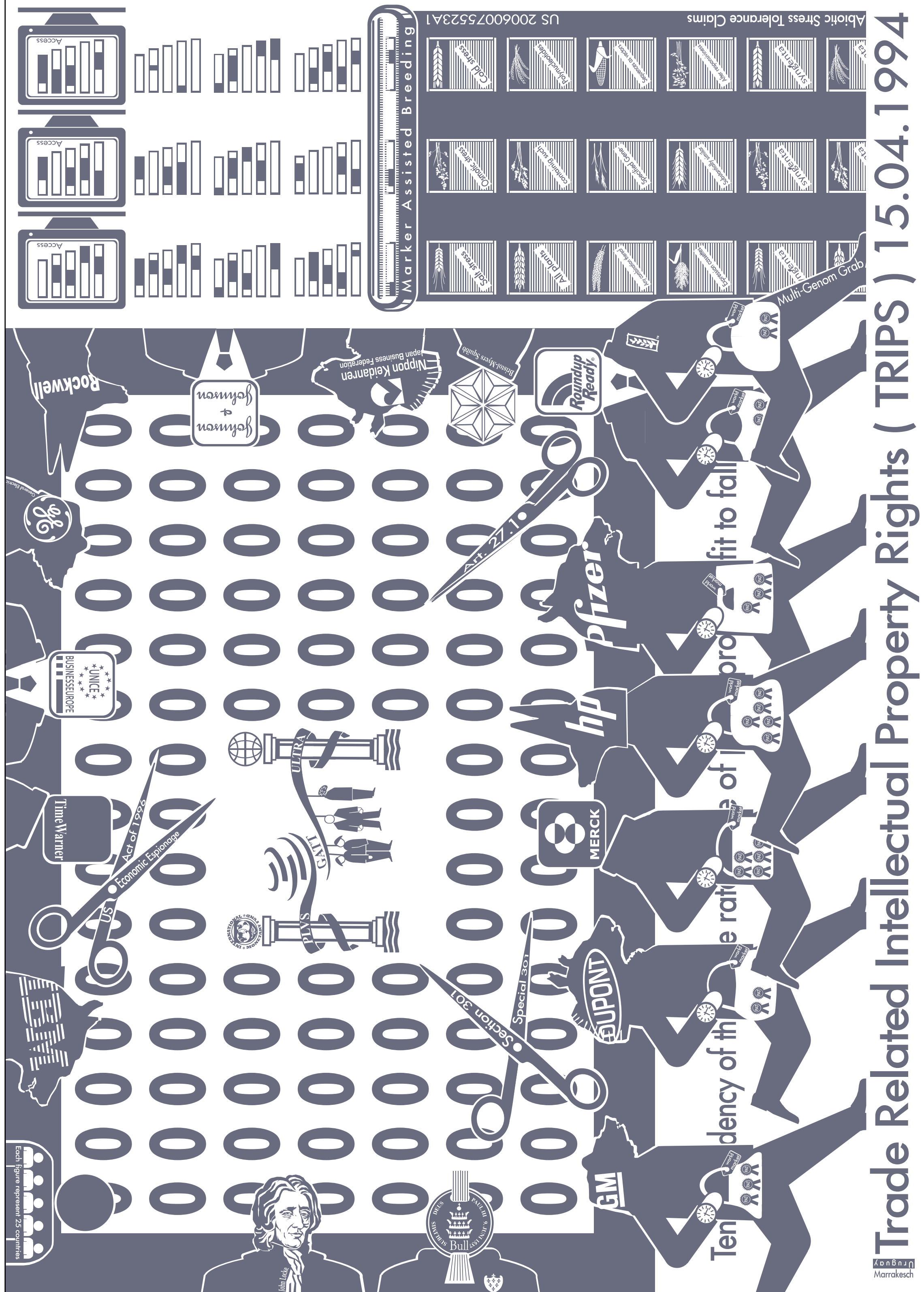
it makes nature superfluous.





Tafel/ Plate 7

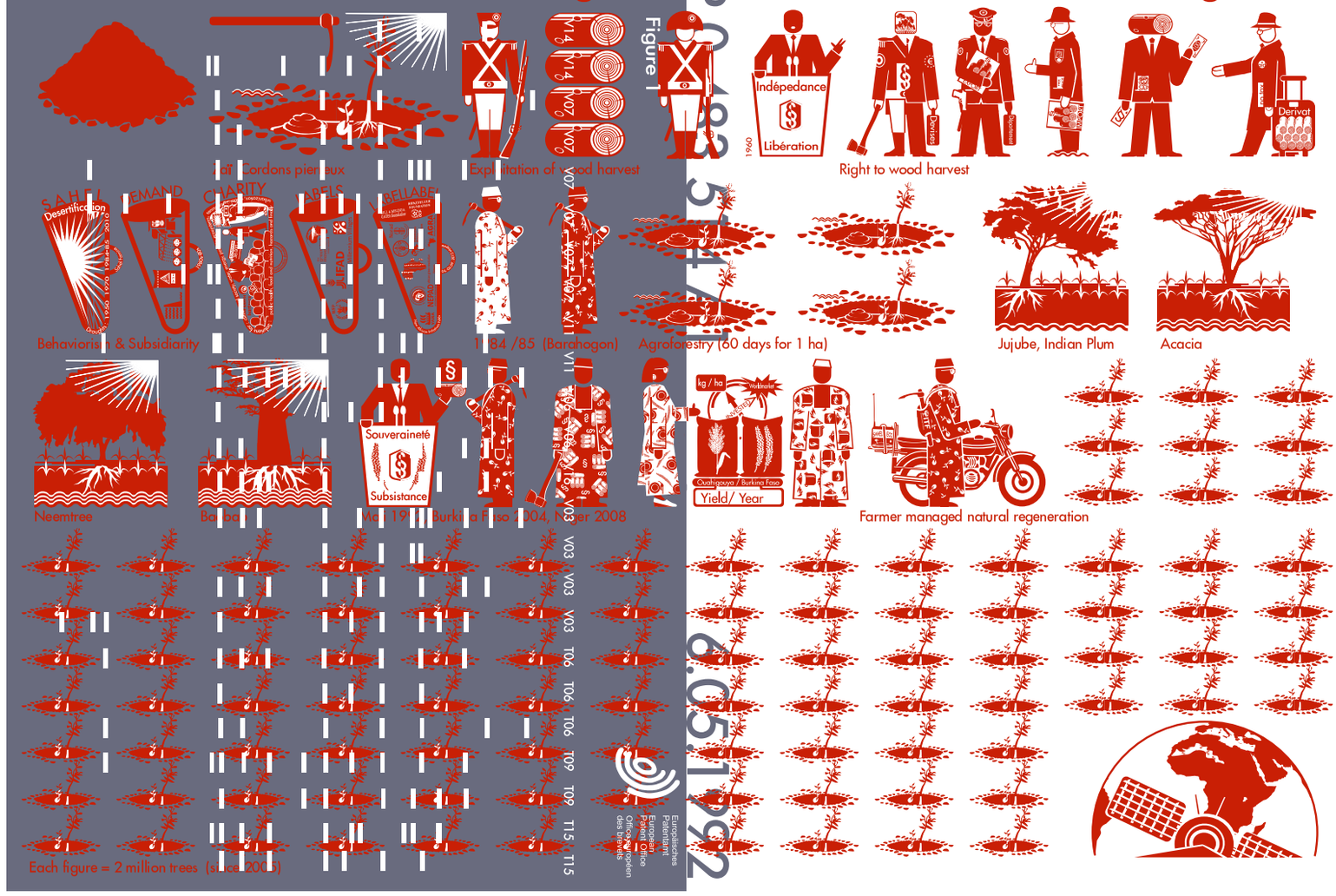
Tafel/ Plate 8



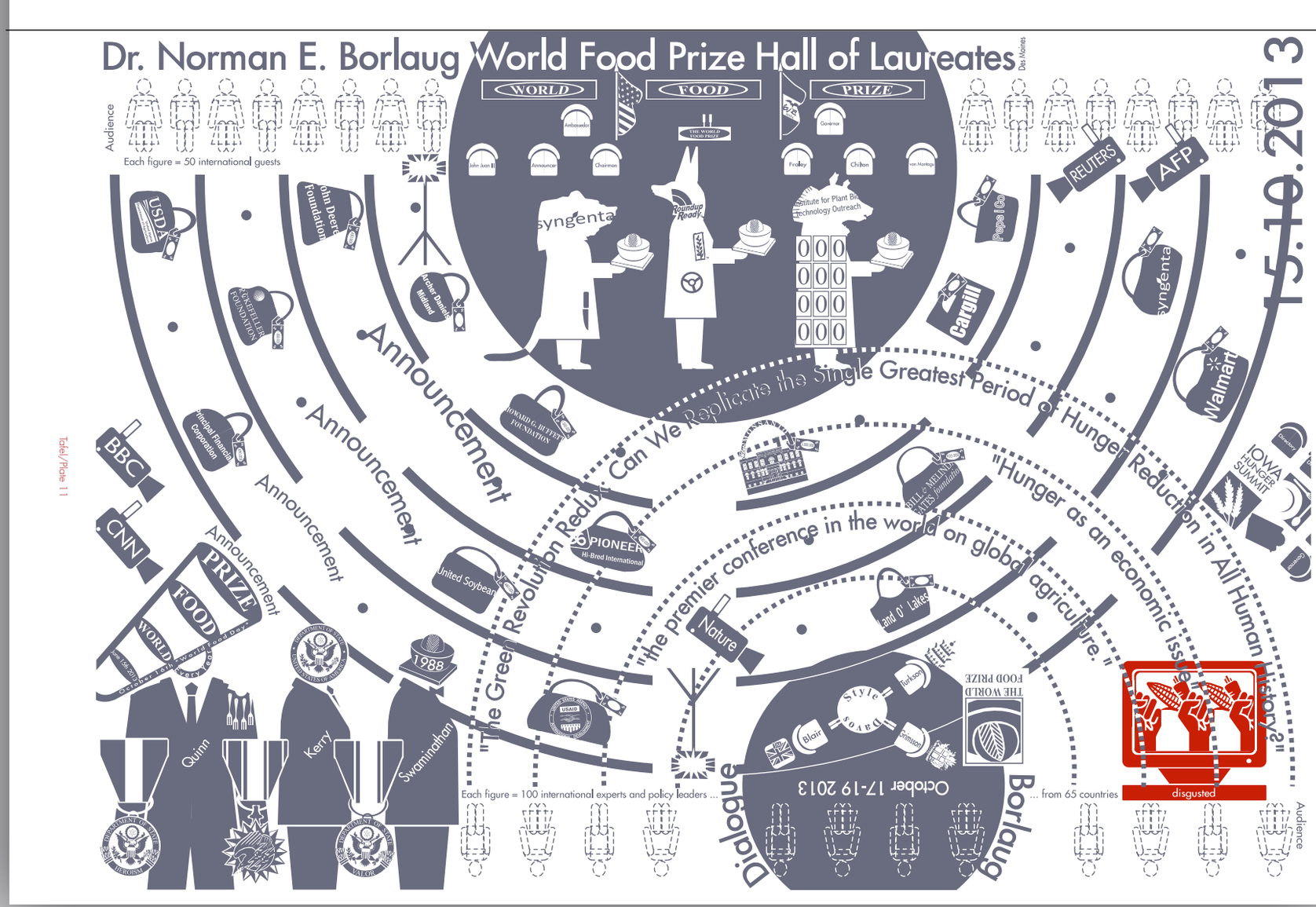
Tafel/Plate 9

EP 0 483 514 A1

Monsieur Mathieu Ouédraogo et Monsieur Yacouba Sawadogo



Tafel/Plate 10


Dr. Norman E. Borlaug World Food Prize Hall of Laureates
Des Moines
15.10.2013
Audience
Each figure = 50 international guests
WORLD
FOOD
PRIZE
Ambassador
Governor
John Juen II
Announcer
Chairman
Fraley
Chilton
von Maltzan
THE WORLD FOOD PRIZE
syngenta
Roundup Ready
Institute for Plant Biotechnology Outreach
USDA
John Deere Foundation
Archer Daniels Midland
ROCKEFELLER FOUNDATION
Principal Financial Corporation
HOWARD G. BUFFETT FOUNDATION
Announcement
Announcement
Announcement
Announcement
Announcement
"The Green Revolution Redux: Can We Replicate the Single Greatest Period of Hunger Reduction in All Human History?"
"the premier conference in the world on global agriculture."
"Hunger as an economic issue"
BBC
CNN
WORLD FOOD PRIZE
PIONEER Hi-Bred International
United Soybean
USAID
Nature
Land O' Lakes
BILL & MELINDA GATES foundation
Cargill
Pepsi Co
REUTERS
AFP
Walmart
IOWA HUNGER SUMMIT
1988
Quinn
Kerry
Swaminathan
Each figure = 100 international experts and policy leaders ...
October 17-19 2013
Style
Davos
Blair
Clinton
Burkson
THE WORLD FOOD PRIZE
Dialogue
Borlaug
... from 65 countries
disgusted
Audience

LEGEND
In the stomach of the predators

0 • • • Pl. 9

Åslaug Haga • • • Pl. 2
Arable Land • • • Pl. 8
Article 27.1 • • • Pl. 9

Behaviorism & Subsidiarity • • • Pl. 10
Biofuel Companies • • • Pl. 8
BOP Marketing • • • Pl. 3
Borlaug Dialog • • • Pl. 11

Cary Fowler • • • Pl. 3
Claims: EP0483514 (A1) 1992-05-06 • • • Pl. 10
CGIAR • • • Pl. 3 / 5 / 7
Cordons pierreux • • • Pl. 10
Credit Flood • • • Pl. 5

De Sublimis Dei • • • Pl. 9
Demand: Biofuels • • • Pl. 7
Demand: Climate Ready Crops • • • Pl. 7
Demand: Emissions Trading • • • Pl. 7
Demand for Land • • • Pl. 8
Demand: Genetic Security • • • Pl. 6
Demand: Genetic Use Restriction Technology • • • Pl. 6
Demand: Green Revolution • • • Pl. 5
Demand: Invasive species • • • Pl. 6
Demand: Irrigation, Fertilizer, Hybrid-Seed • • • Pl. 5
Demand: Population Control • • • Pl. 5
Demand Structural Adjustments • • • Pl. 7
Demand: Undo Land Reforms • • • Pl. 5
Disaster Capitalism • • • Pl. 2
Disaster Captalism: John Kerry • • • Pl. 11
Disaster: Climate Change • • • Pl. 7
Disaster: Communism • • • Pl. 5
Disaster: Dust Bowl • • • Pl. 5
Disaster: Genetic Erosion • • • Pl. 6
Disaster: Greenhouse Effect • • • Pl. 7
Disaster: Hunger in the 3rd World • • • Pl. 5
Disaster: Population Bomb • • • Pl. 5
Disaster: Volcker Shock / Debt Crisis • • • Pl. 7

Disaster: Vulnerability of Monocrops • • • Pl. 6
Displacement • • • Pl. 8 / 5
Dr. M.S. Swaminathan • • • Pl. 11

Economic Espionage Act, 1996 • • • Pl. 9
Emile Frison • • • Pl. 3
EU Biofuel Directive • • • Pl. 8
Everybody's Business • • • Pl. 8
Example Norfund • • • Pl. 8
Exploitation of Wood Harvest / Right to Wood Harvest Pl. 10

Farmer-managed natural regeneration • • • Pl. 10
Farmer Suicides • • • Pl. 7
Flex Mex • • • Pl. 7
Garrett Hardin • • • Pl. 5
Gates Foundation • • • Pl. 3
Global Crop Diversity Trust • • • Pl. 3
Glyphosate • • • Pl. 5 / 6

Homestead Act, 1862 / Displacement • • • Pl. 5 / 8

In the stomach it creates disasters & produces demands • • • Pl. 5 / 6
Iowa Hunger Summit • • • Pl. 11
IPC • • • Pl. 9
It creates disasters & produces demands; it makes people superfluous • • • Pl. 6
It makes nature superfluous • • • Pl. 7

John Locke • • • Pl. 9

Kenneth Quinn • • • Pl. 11

Lewis Coleman • • • Pl. 3

Margaret Catley-Carlson • • • Pl. 3
Marker Assisted Breeding • • • Pl. 9
Monsanto • • • Pl. 3 / 4
Monsanto Sizing • • • Pl. 9
Monsieur Mathieu Ouédraogo et Monsieur Yacouba Sawadogo • • • Pl. 10
Motorcycle • • • Pl. 10
Multi-Genome Patent Grab • • • Pl. 9

Nature meets itself in the stomach of the predators • • • Pl. 4
New Deal on Global Food Policy • • • Pl. 8
Nitrogen – Fertilizer • • • Pl. 5

Occupy World Food Prize • • • Pl. 11

Packages / Impacts • • • Pl. 5 / 6
Permanent Peoples' Tribunal Session on Agrochemical Transnational Corporations • • • Pl. 1
Philanthrocapitalism • • • Pl. 3
The Pink Bollworm Eradication Program • • • Pl. 6
Pioneer • • • Pl. 3
Pioneer Hi Bred / DuPont • • • Pl. 4
Punjab • • • Pl. 5

Roberto Rodrigues • • • Pl. 3
Rockefeller Foundation • • • Pl. 3
Roundup Ready / BT • • • Pl. 6

Sahel drought • • • Pl. 10
Sample Alliances • • • Pl. 7 / 8
Satellite • • • Pl. 10
Scanfuel • • • Pl. 8
Section 301 / Special 301 • • • Pl. 9
Svalbard Global Seed Vault • • • Pl. 1
Svalbard Agreement • • • Pl. 1
Sunday, 24 February 2008 4:00 PM • • • Pl. 1
Surplus Population/ Example India / Philippines • • • Pl. 6
Syngenta / Syngenta – Foundation • • • Pl. 3 / 4

Terminator Seeds • • • Pl. 6
The tendency of the rate of profit to fall • • • Pl. 9
Trade Related Intellectual Property Rights • • • Pl. 9
Tuesday, 26 February 2008 • • • Pl. 1

Undo Land Reform • • • Pl. 8
United Nations Framework Convention on Climate Change • • • Pl. 7

World Food Prize • • • Pl. 11
World Food Prize Donors • • • Pl. 11
World Food Prize Laureates • • • Pl. 11
World's Top 10 Seed Companies, 2009 • • • Pl. 4

Zaï • • • Pl. 10

0 A

0
> Tafel/Plate 8

"*Res nullius* … is a Latin term derived from Roman law whereby *res* … is not yet the object of rights of any specific subject. Such items are considered ownerless property and are usually free to be owned." The term is related to *Occupatio*. "Examples of *res nullius* in the socio-economic sphere are wild animals or abandoned property. … Wild animals are regarded as *res nullius* and as not being the subject of private property until reduced into possession by being killed or captured. … *Res nullius* also has an application in public international law, more specifically called *terra nullius*, whereby a nation may assert control of an unclaimed territory and gain control when one of its citizens (often an exploratory and/or military expedition) enters the territory. This *terra nullius* principle has justified the colonisation of much of the world, as exemplified in the competition for influence within Africa by the European powers." It is based on the idea that, even though there may be indigenous peoples residing on "newly discovered" land, it is the right of the "more civilized" to take the land and put it to "good use."

http://en.wikipedia.org/wiki/Res_nullius (October 16, 2014)

Biomass advocates refer to "marginal," unproductive, idle, degraded, abandoned wastelands. As many as 500 million hectares of abandoned and marginal land are available worldwide for growing biomass crops.
Gaia Foundation et al. Agrofuels and the myth of marginal lands, 2008

www.watchindonesia.org/Agrofuels&MarginalMyth.pdf

0
> Tafel/Plate 9

Trevor Williams, the former Executive Secretary of IBPGR (International Board for Plant Genetic Resources) has argued that "it is not the original material which produces cash returns," and a 1983 forum on plant breeding stated that "raw germplasm only becomes valuable after considerable investment of time and money." According to this calculation, peasants' time is considered valueless and available for free.

Vandana Shiva: Biotechnology and the Colonisation of Regeneration, Bangalore, 1991
Bangalore seminar on Women, Ecology and Health

Arable Land
> Tafel/Plate 8

Arable land per person / world
1950: 5,100 sqm
1975: 3,400 sqm
2000: 2,700 sqm
2050: 2,000 sqm
Rural population 2010: 3,411,352,000 / 49% of the world population

"Arable land is a category of agricultural land, which, according to the Food and Agriculture Organization's (FAO) definition, additionally includes land under permanent or perennial crops, such as fruit plantations, as well as permanent pastures for the grazing of livestock. In 2008 the world's total arable land amounted to 1,387 Mha, and 4,908 Mha was classified as 'agricultural land.'"

www.Fao.org../fileadmin/templates/ess/ess_test_folder/Publications/Yearbook_2010

Article 27.1, 1996
> Tafel/Plate 9

Article 27.1 of the TRIPS Agreement (Trade-Related Aspects of Intellectual Property Rights) states that: "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application." That excludes all applications outside the industrial sector.

Vandana Shiva, Biopiraterie, Münster 2002, p. 23 (transl. A.C.)

B

Behaviorism & Subsidiarity
>Tafel/Plate 10

"The Sahel zone has for decades been a region of worldwide aid projects with various political backgrounds. Examples include the Millennium Villages initiated by Jeffrey Sachs, the Green Belt Movement in Kenya and the Green Wall. The Millennium Villages Project is a project of the Earth Institute at Columbia University, the United Nations Development Programme and Millennium Promise. It is an approach to ending extreme poverty and meeting the Millennium Development Goals. Millennium Villages claims to ensure that communities … have a real, sustainable opportunity to lift themselves out of the poverty trap. … the Millennium Villages obtain only similar achievements at far greater expense. This is a result of the Millennium Villages' use of artificial fertilizers and hybrids [*sic*] seeds (often of plants such as corn, which are not indigenous to the area). … According to Rachel Bezner Kerr, use of fertilizers and genetically modified seeds leads to dependence of the farmers on expensive products being marketed by large industrial companies."

http://en.wikipedia.org/wiki/Millennium_Villages_Project (October 16, 2014)

"Millennium Villages provides villages, free of charge, with what are considered the building blocks of development: modern seeds and fertilizer, boreholes for clean water, clinics. … Millennium Villages require a heavy investment per village, as well as a flow of external support for some years, and that is not a sustainable solution. It's hard to believe the outside world will provide the billions of dollars necessary to create tens of thousands of Millennium Villages in Africa. Indeed, foreign aid flows collapsed after the financial crash of 2008."

Mark Hertsgaard, Regreening Africa: The Nation, November 19, 2009, http://markhertsgaard.com/regreening-africa/

"The Great Green Wall …was first proposed by Nigerian president Olesegun Obasanjo in 2005. … he urged planting a 15km-wide strip of trees across Africa to prevent the Sahara desert from expanding southward as climate change intensified. … African heads of state endorsed Obasanjo's vision, and the idea gained international traction with the establishment of the Africa-European Union Partnership on Climate Change, which in 2007 adopted the plan … What amounts to a vast tree plantation across thousands of miles of African drylands is bound to fail, the critics warn. Young trees need care to survive: watering, pruning, protection from animals. That means giving local people the incentive to provide such care, and irrigation facilities where there often is no water supply. … The Great Green Wall is too good an idea to be allowed to fail. … Beyond the fear that Obasanjo's literal vision … is likely to enrich African forestry departments more than local communities, it also turns out to rest on a basic scientific mistake. High-resolution satellite images captured by the US Geological Survey (USGS) show that the Sahara is not, in fact, advancing southward. … [Professor Abdoulaye] Dia, a geologist, understands the scientific arguments against the literal vision of the Great Green Wall. But to embrace such arguments would alienate his patron … and other heads of state."

http://mondediplo.com/2011/12/11africatrees

"What makes FMNR so empowering, and sustainable, is that Africans themselves own the technology. … this knowledge is free. It's hard to overstate how important that is to poor farmers—and nations. It means they can use the technology now, without waiting or relying on capital infusions from foreign governments or humanitarian organizations."

Mark Hertsgaard: http://afrique-europe-interact.net/index.php?article_id=223&clang=1

Biofuel Companies
>Tafel/Plate 8

http://www.e2.org/ext/doc/E2AdvancedBiofuelMarketReport2012.pdf

BOP Marketing
> Tafel/Plate 3

"Monsanto has shifted its business strategy in poor countries, particularly in Sub-Saharan Africa, towards marketing to the 'bottom of the pyramid' (BOP)—targeting the poorest, albeit diffused, segment of the market which could bring trillions of dollars in sales. … The company's main product is called the 'Combi-Pack', labelled as *Xoshindlala* in Zulu which means 'chase away hunger', which has been commercially released in South Africa since the late1990s. The 'Combi-Pack' is a package of hybrid maize seeds, fertilizers and herbicides intended for use in small landholdings … and comes with pictogram instructions for illiterate users. The product is regarded as a good example of BOP marketing … The package comes with the 'no-till' technology that Monsanto has been promoting across developing countries, which is dependent on the use of herbicides instead of plowing to reduce soil erosion and touted as an environmentally sustainable practice. … Monsanto … currently controls 40 percent of South Africa's market in maize seeds, through gradual acquisition of local seed companies and the continuous upgrading of its research facilities and capabilities in the country over the past few years."

Elenita C. Dano, Unmasking the New Green Revolution in Africa, African Centre for Biosafety, Third World Network, 2009

Borlaug Dialogue
> Tafel/Plate 11

"The Award Ceremony coincides with the Norman E. Borlaug International Symposium, known as the Borlaug Dialogue, which addresses an issue related to hunger and food security each year. Past symposia have focused on the promises and challenges presented by biofuels for global development, the dual challenges of malnutrition and obesity, water insecurity and its impact on development and stability in the Middle East, and 'The Green Revolution Redux: Can We Replicate the Single Greatest Period of Hunger Reduction in All Human History?' In 2008, the World Food Prize Foundation accepted a $5 million contribution from Monsanto to ensure the continuation of the …Symposium. The funds support a renewed fundraising campaign to transform the historic Des Moines Public Library building into a public museum, the Hall of Laureates, to honor Norman Borlaug and the work of the World Food Prize Laureates. The 2013 Borlaug Dialogue was held 16–19 October 2013."

http://en.wikipedia.org/wiki/World_Food_Prize (October 16, 2014)

"The three-day conference brings together international experts, policy leaders, business executives and farmers to address cutting-edge issues in food security and nutrition. In 2012, the event attracted over 1,000 participants from more than 65 countries, and it has been called 'the premier conference in the world on global agriculture.'"

http://www.worldfoodprize.org/index.cfm?nodeID=71721&audienceID=1

"Once again, we will have a distinguished and diverse array of speakers including H.E. Olafur Ragnar Grimsson, the President of Iceland, and H.E. Cardinal Peter Turkson of Ghana, who is the President of the Pontifical Council for Justice and Peace at the Vatican. I have a very special announcement to make: We are greatly honored that Tony Blair, Prime Minister of Great Britain and Northern Ireland from 1997–2007 and now Patron of the Africa Governance Initiative, will be part of a special panel titled 40 Chances, moderated by Howard G. Buffett and focused on redefining the fight against hunger, poverty and suffering. We are so very pleased to have Howard's son Howard W. and his wife Lili with us today."

Ambassador Kenneth M. Quinn, president of the World Food Prize Foundation, Remarks from the World Food Prize Laureate Announcement, June 19, 2013 http://www.worldfoodprize.org/index.cfm/24667/24412/amb_kenneth_m_quinns_remarks_from_the_world_food_prize_laureate_announcement

C

CGIAR
> Tafel/Plate 5

"Starting in 1943, the Rockefeller Foundation and the Mexican government laid the seeds for the Green Revolution when they established the Office of Special Studies, which became the International Maize and Wheat Improvement Center (CIMMYT) in 1963. CIMMYT and the International Rice Research Institute (IRRI, Philippines), established in 1960 with support from the Rockefeller Foundation and Ford Foundation, developed high-yielding, disease-resistant varieties that dramatically increased production of these staple cereals … In 1970, the Rockefeller Foundation proposed a worldwide network of agricultural research centers under a permanent secretariat. This was further supported and developed by the World Bank, FAO and UNDP, and the CGIAR [Consortium of International Agricultural Research Centers] was established on May 19, 1971, to coordinate international agricultural research efforts aimed at reducing poverty and achieving food security in developing countries. … By 1983 there were 13 research centers around the world under its umbrella."
These were the following: IRRI – International Rice Research Institute, Los Baños, Philippines, 1960; CIMMYT – International Maize and Wheat Improvement Center, Mexico, 1966; IITA – International Institute of Tropical Agriculture, Ibadan, Nigeria, 1967; CIAT – Centro Internacional de Agricultura Tropical, Calo, Colombia, 1968; CIP – Centro Internacional de la Papa, Lima, Peru, 1971; WARDA – West Africa Rice Development Association, Cotonou, Benin, 1971; ICARDA – International Center for Agricultural Research in the Dry Areas, Beirut, Lebanon, 1978; ICRISAT – International Crops Research Institute for the Semi-Arid Tropics, Hyderabad, India, 1972; ILRAD – International Laboratory for Research on Animal Diseases, Nairobi, Kenia, 1973; IPGRI – International Plant Genetic Resources Institute, 1974, Rome Italy; ILCA – International Livestock Center for Africa, Addis Ababa, Ethiopia, 1974; IFPRI – International Food Policy Research Institute, Washington DC, USA, 1975; WFC – World Fish Center , Penang, Malaysia, 1977; WAC – World Agroforestry Centre, Nairobi Kenia, 1978.

http://en.wikipedia.org/wiki/CGIAR (October 16, 2014)

CGIAR / New Centers
> Tafel/Plate 6

"CGIAR has responded, at least in part, to criticisms of Green Revolution methodologies. This began in the 1980s, and mainly was a result of pressure from donor organizations. Methods like Agroecosystem Analysis and Farming System Research have been adopted to gain a more holistic view of agriculture."

http://en.wikipedia.org/wiki/Green_Revolution (October 16, 2014)

At the same time, the CGIAR institutes began to understand themselves more and more as public-private partnerships. New centers since 1980: ISNAR – International Service for National Agricultural Research (supervising and implantation of PPP models), The Hague, Netherlands, 2004; IWMI – International Water Management Institute, Battaramulla, Sri Lanka, 1985 (donor: Unilever Sri Lanka); CIFOR–Center for International Forestry Research, Bogor, Indonesia, 1993; Bioversity International, Rome, Italy (donors: Gates Foundation and also corporations such as Mars Inc. and Pioneer Hi-Bred International Inc.); ILRI – International Livestock Research Institute, Nairobi, Kenya, 1995 (donors: Gates / AGRA – Alliance for a Green Revolution in Africa).

http://en.wikipedia.org/wiki/CGIAR (October 16, 2014)

Claims:
Patent EP0483514 (A1) 1992-05-06
> Tafel/Plate 10

"Use of molecular markers in tree breeding
1. A method of tree breeding wherein Restriction Fragment Length Polymorphism (RFLP) technology is applied to samples of tree material from a plurality of trees; the information derived from said RFLP technology is presented in a genetic relatedness hierarchy, a level in said hierarchy comprising groups, each of which groups relates two of said trees as being more genetically related to each other than either of the two trees is genetically related to any other tree in any other of said groups; two of said trees of appropriate relative genetic diversity are selected; and a further tree or trees is/are derived from the two selected trees.
2. A method according to Claim 1, wherein a further tree is derived by crossing the two selected trees.
3. A method according to Claim 1, wherein further trees are derived by cloning each of the two trees.
4. A method according to Claim 1, 2 or 3, wherein said trees are of a commercial species.
5. A method according to Claim 4, wherein said species is a Eucalyptus species.
6. A method according to any preceding claim, wherein said samples are leaf samples.
7. A method according to any one of Claims 1 to 5, wherein said samples are shoot samples.
8. A method for use in tree breeding, wherein RFLP technology is applied to material from a progeny tree, to material from the mother tree of said progeny tree, and to material from a plurality of trees which are possible paternal trees in respect of said progeny tree, and data therefrom is subjected to analysis thereby to determine the tree of said possible paternal trees which is the most likely paternal tree in respect of said progeny tree.
9. A method according to Claim 8, as applied in respect of a multiplicity of mother trees in a stand of trees.
10. A method for use in tree breeding, wherein RFLP technology is applied to seed of a body of seed and data therefrom is used to provide a criterion of assessment of said body of seed.
11. A method according to Claim 10, wherein the criterion of assessment is the degree of selfing of individual trees.
12. A method according to Claim 10, wherein the criterion of assessment is the proportion of pollen parents represented in said body of seed.
13. A method according to Claim 10, wherein the criterion of assessment of said body of seed is compared to the same criterion established in respect of a second body of seed.
14. A method according to any one of the preceding claims, wherein the probes used in the RFLP technology comprise one or more of GLPP011; GLPP029; GLPP063; GLPP093; P002 AND P022.
15. An RFLP probe comprising GLPP011.
16. An RFLP probe comprising GLPP029.
17. An RFLP probe comprising GLPP063.
18. An RFLP probe comprising GLPP093.
19. An RFLP probe comprising P002.
20. An RFLP probe comprising P022."

Claims: EP0483514 (A1), 1992-05-06

Cordons pierreux
> Tafel/Plate 10

"Cordons pierreux are thin lines of fist-sized stones laid across fields. Their purpose is to form a catchment. When rain falls, it pushes silt across the surface of the field, which then fetches up against the cordon. Slowing down the flow of water gives it more time to soak into the earth. The accumulated silt also provides a comparatively fertile spot for seeds of local plants to sprout. The plants slow the water even further in turn, and their roots break up the compacted soil, thereby making it easier for more water to soak in."

http://en.wikipedia.org/wiki/Yacouba_Sawadogo (October 16, 2014)

Credit Flood
> Tafel/Plate 5

1961 – ca. 20 billion USD
1971 – ca. 70 billion USD
1980 – ca. 560 billion USD
(Third World credits / billion USD)

"At the beginning of the 1970s, a downright credit flood ensued, with an increase in granting credits of more than 200% a year and

sufficient risk checks hardly being made by the lending countries. While the foreign debts of the Third World amounted to ca. 20 billion dollars in 1961, they already amounted to ca. 70 billion in 1971 and ca. 560 billion in 1980. The massive rise in oil prices in 1973 additionally accelerated the aggressiveness in lending on the side of the countries of the North and the necessity to borrow money on the side of the countries of the South … So while the North was intent on investing the excess money resulting from the hike in oil prices in credits, these credits were in higher demand by the countries of the South due to their drastically higher oil bills.
"In the wake of the economic recession in 1974/75, lending attained a further function: namely, to again stimulate economic growth in the capitalist centers. The granting of bilateral credits by the countries of the North to the countries of the South was on the one hand linked to a trade agreement according to which the debtors committed to acquiring industrial goods and arms from the respective lending country using the money they received. On the other hand, the debtor countries were granted conditions enabling them to increasingly bring natural resources and basic industrial goods to the free market. The countries of the South soon stood in direct competition with each other in regard to their export efforts, which led to the desired decline in prices for natural resources and thus to sinking import costs for the countries of the North. Due to the therefore lacking—but originally planned—additional income through the quantitative increase in exports, it became impossible for the countries of the South to ever be able to pay back their debts."

http://www.schoener-leben-goettingen.de/Materialien/Publikationen/HTM/slg_1_sept00_T2.htm (transl. Karl Hoffmann)

D

De Sublimus Dei
> Tafel/Plate 9

Pope Paul III, May 29, 1537: "We, who, though unworthy, exercise on earth the power of our Lord and seek with all our might to bring those sheep of His flock who are outside into the fold committed to our charge, consider, however, that the Indians are truly men and that they are not only capable of understanding the Catholic Faith but, according to our information, they desire exceedingly to receive it. Desiring to provide ample remedy for these evils We define and declare by these Our letters, or by any translation thereof signed by any notary public and sealed with the seal of any ecclesiastical dignitary, to which the same credit shall be given as to the originals, that, notwithstanding whatever may have been or may be said to the contrary, the said Indians and all other people who may later be discovered by Christians, are by no means to be deprived of their liberty or the possession of their property, even though they be outside the faith of Jesus Christ … By virtue of Our apostolic authority We define and declare by these present letters … which shall thus command the same obedience as the originals, that the said Indians and other peoples should be converted to the faith of Jesus Christ by preaching the word of God and by the example of good and holy living."

http://www.papalencyclicals.net/Paul03/p3subli.htm

Demand: Biofuels
> Tafel/Plate 7

"A biofuel is a fuel that contains energy from geologically recent carbon fixation. These fuels are produced from living organisms. Examples of this carbon fixation occur in plants and microalgae. These fuels are made by a biomass conversion (biomass refers to recently living organisms, most often referring to plants or plant-derived materials). This biomass can be converted to convenient energy-containing substances in three different ways: thermal conversion, chemical conversion, and biochemical conversion. This biomass conversion can result in fuel in solid, liquid, or gas form. This new biomass can be used for biofuels. …
"Bioethanol is an alcohol made by fermentation, mostly from carbohydrates produced in sugar or starch crops such as corn, sugarcane, or sweet sorghum. Cellulosic biomass, derived from non-food sources, such as trees and grasses, is also being developed as a feedstock for ethanol production. Ethanol can be used as a fuel for vehicles in its pure form, but it is usually used as a gasoline additive to increase octane and improve vehicle emissions. …
"Biodiesel can be used as a fuel for vehicles in its pure form, but it is usually used as a diesel additive to reduce levels of particulates, carbon monoxide, and hydrocarbons from diesel-powered vehicles. Biodiesel is produced from oils or fats using transesterification and is the most common biofuel in Europe. In 2010, worldwide biofuel production reached 105 billion liters (28 billion gallons US), up 17% from 2009, and biofuels provided 2.7% of the world's fuels for road transport, a contribution largely made up of ethanol and biodiesel. Global ethanol fuel production reached 86 billion liters (23 billion gallons US) in 2010, with the United States and Brazil as the world's top producers, accounting together for 90% of global production. The world's largest biodiesel producer is the European Union, accounting for 53% of all biodiesel production in 2010. As of 2011, mandates for blending biofuels exist in 31 countries at the national level and in 29 states or provinces. The International Energy Agency has a goal for biofuels to meet more than a quarter of world demand for transportation fuels by 2050 to reduce dependence on petroleum and coal."

https://en.wikipedia.org/wiki/Biofuel#First-generation_biofuels (October 16, 2014)
http://www.earth-policy.org/datacenter/pdf/book_wote_energy_biofuels.pdf

Demand: Climate-Ready Crops
> Tafel/Plate 7

"The patent grab on so-called climate-ready traits is sucking up money and resources that could be spent on affordable, farmer-based strategies for climate change survival and adaptation. … The gene giants are now focusing on the identification and patenting of 'climate-proof' genetic traits associated with resistance to abiotic stresses. (Abiotic stresses are environmental stresses encountered by plants, such as drought, saline soils, low nitrogen, heat, cold, chilling, freezing, high light intensity, ozone and anaerobic stresses)."

"The International Rice Institute (IRRI) in 2008 launched a new initiative, funded by the Bill & Melinda Gates Foundation, to switch the photosynthesis mechanism in rice. In November 2009, CIMMYT (International Wheat and Maize Improvement Center) launched their Wheat Yield Potential Consortium to do the same for wheat."
Earth Grab: Geopiracy, the New Biomassters and Capturing Climate Genes, www.etcgroup.org

"ETC Group uncovered 1,600 patents / 55 patent families (corresponding to a single 'invention' submitted for intellectual property protection in more than one country), resulting in 532 separate patent documents. BASF … holds 21 of the 55 patent families. Together, Monsanto and BASF hold 27 of the 55 patent filings (49%). This is significant because Monsanto and BASF announced in March 2007 that they would enter a $1.5 billion partnership to develop crops that are more tolerant to adverse environmental conditions. Although Ceres, Inc. and Mendel Biotechnology are independent companies, both companies conduct joint research with Monsanto (and Monsanto holds an equity stake in Mendel). Monsanto … and BASF… have forged a colossal $1.5 billion partnership to engineer stress tolerance in plants."

Patenting the "Climate Genes" and Capturing the Climate Agenda, Communiqué, May/June 2008, www.etcgroup.org

Demand: Emissions Trading
> Tafel/Plate 7

Certified Carbon Credits, 2011, 45 million USD
318 projects in India
101 projects in China
94 projects in Brazil
Earth Grab: Geopiracy, the New Biomassters and Capturing Climate Genes, www.etcgroup.org

"Emissions trading or cap and trade is a market-based approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. A central authority (usually a governmental body) sets a limit or *cap* on the amount of a pollutant that may be emitted. The limit or cap is allocated or sold to firms in the form of emissions permits which represent the right to emit or discharge a specific volume of the specified pollutant. Firms are required to hold a number of permits (or allowances or *carbon credits*) equivalent to their emissions. The total number of permits cannot exceed the cap, limiting total emissions to that level. Firms that need to increase their volume of emissions must buy permits from those who require fewer permits.
"The transfer of permits is referred to as a trade. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions. Thus, in theory, those who can reduce emissions most cheaply will do so, achieving the pollution reduction at the lowest cost to society. … one emissions permit or allowance is considered equivalent to one metric ton of carbon dioxide (CO_2) emissions. … These permits or units can be sold privately or in the international market at the prevailing market price. … Trading exchanges have been established to provide a spot market in permits, as well as futures and options market to help discover a market price and maintain liquidity. Carbon prices are normally quoted in euros per tonne of carbon dioxide or its equivalent (CO_2e). Other greenhouse gases can also be traded, but are quoted as standard multiples of carbon dioxide with respect to their global warming potential. …
"Currently there are six exchanges trading in UNFCCC related carbon credits: the Chicago Climate Exchange (until 2010), European Climate Exchange, NASDAQ OMX Commodities Europe, PowerNext, Commodity Exchange Bratislava and the European Energy Exchange. NASDAQ OMX Commodities Europe listed a contract to trade offsets generated by a CDM carbon project called Certified Emission Reductions. Many companies now engage in emissions abatement, offsetting, and sequestration programs to generate credits that can be sold on one of the exchanges. At least one private electronic market has been established in 2008: CantorCO2e. Carbon credits at Commodity Exchange Bratislava are traded at a special platform – Carbon place.
"Trading in emission permits is one of the fastest-growing segments in financial services in the City of London with a market estimated to be worth about €30 billion in 2007. Louis Redshaw, head of environmental markets at Barclays Capital, predicts that 'Carbon will be the world's biggest commodity market, and it could become the world's biggest market overall.'"

http://en.wikipedia.org/wiki/Emissions_trading (October 16, 2014)

Demand for Land
> Tafel/Plate 8

Estimations of land grabbing: "Large-scale land deals have risen 20 million hectares between 2005 and 2009 according to the International Food Policy Research Institute/ IFPRI (2009);
45 million hectares since 2007–2008 according to the World Bank (2010); and 227 million hectares since 2000 according to Oxfam (2011). Ultimately though it is virtually impossible to know how much land grabbing is taking place. One problem is that many land deals are simply not reported; they take place in secret and are not covered by the media. But even if each and every land deal was reported, it would still be impossible to pin down the numbers for a variety of reasons. First, the projects involved in reported large-scale land acquisitions can be at widely different stages of planning and operationalisation—some just initial, others more advanced. Second, the financing behind the projects is fluid and can change abruptly. … Third, there is the problem of unreliable and corrupt recording of measurable data about land and land use, a problem which goes back further than the current wave of land grabbing and has to do with both technical and political factors. In the end, measuring land grabbing is like trying to pin a wave to the sand."

http://www.tni.org/primer/global-land-grab#onwhatscale

2030: Biofuel feedstocks expected to range between18 and 47 million ha

World Bank, Rising global interest in farmland, Washington DC, September 2010

99 million ha / Europe

Fian Deutschland e.V.: German Investment funds involved in land grabbing, Draft 25 October 2010

Demand: Genetic Security
> Tafel/Plate 6

Most frequent commercialized transgenic traits:

Herbicide tolerance	40%
Insect resistance	24%
Viral resistance	10%
Fungal resistance	4%
Product quality	21%

Brian D. Wright: International Crop Breeding in a World of Proprietary Technology, 2000 The World Bank Research Observer; doi: 10.1093/wbro/lkr016

Demand: Genetic Use-Restriction Technology
> Tafel/Plate 6

"The need was there to come up with a system that allowed you to self-police your technology, other than trying to put on laws and legal barriers to farmers saving seed …" Melvin Oliver, USDA, 1985. The USDA considered this a built-in "gene police."

Vandana Shiva: Stolen Harvest: The Hijacking of the Global Food Supply, 2000, p. 82

"In 1983, Delta & Pine Land (D&PL) joined with the US Department of Agriculture in a project to develop Terminator seeds. It was one of the earliest experiments with GMO. It was a long-term project. … In March 1998 the US Patent Office granted Patent No. 5,723,765 to Delta & Pine Land for a patent titled *Control of Plant Gene_Expression*. The patent is owned jointly … by D&PL and the United States of America, as represented by the Secretary of Agriculture. … In a June 1998 interview, USDA spokesman Willard Phelps … explained that USDA wanted the technology to be 'widely licensed and made expeditiously available to many seed companies.' … They wanted to get Terminator seeds into the developing world where the Rockefeller Foundation had made eventual proliferation of genetically engineered crops the heart of its GMO strategy from the beginnings of its rice genome project in 1984. USDA's Phelps stated that the US Government's goal in fostering the widest possible development of Terminator technology was 'to increase the value of proprietary seed owned by US seed companies and to open up new markets in Second and Third World countries.'"

http://www.Globalresearch.ca/monsanto-buys-terminator-seeds-company/3082

Demand: Green Revolution
> Tafel/Plate 5

"The term 'Green Revolution' was first used in 1968 by former United States Agency for International Development (USAID) director William Gaud, who noted the spread of the new technologies: 'These and other developments in the field of agriculture contain the makings of a new revolution. It is not a violent Red Revolution like that of the Soviets, nor is it a White Revolution like that of the Shah of Iran. I call it the Green Revolution.'"

http://en.wikipedia.org/wiki/Green_Revolution (October 16, 2014)

"By the 1970s, the term 'revolution' was well deserved, for the new seeds—accompanied by chemical fertilizers, pesticides, and, for the most part, irrigation—had replaced the traditional farming practices of millions of Third World farmers. By the 1990s, almost 75 percent of Asian rice areas were sown with these new varieties. The same was true for almost half of the wheat planted in Africa and more than half of that in Latin America and Asia, and about 70 percent of the world's corn as well. Overall, it was estimated that 40 percent of all farmers in the Third World were using Green Revolution seeds, with the greatest use found in Asia, followed by Latin America."

http://www.iatp.org/files/Lessons_from_the_Green_Revolution_Do_We_Need_N.htm

"The Green Revolution was a brilliant Rockefeller family scheme to develop a globalized agribusiness which they then could monopolize just as they had done in the world oil industry beginning a half century before. As Henry Kissinger declared in the 1970s, 'If you control the oil you control the country; if you control food, you control the population.' Agribusiness and the Rockefeller Green Revolution went hand-in-hand. They were part of a grand strategy which included Rockefeller Foundation financing of research for the development of genetic engineering of plants and animals a few years later."

http://www.globalresearch.ca/doomsday-seed-vault-in-the-arctic-2/23503

Demand: Irrigation, Fertilizer, Hybrid Seed
> Tafel/Plate 5

Nitrogen fertilizer use
1940 – 14.6 million tons
1950 – 22 million tons
1960 – 34 million tons

Hybrid seed use – Pioneer Hi-Bred – % per acre in the USA
1936 – 0.1%
1940 – 90%
1960 – 96.3%

One farm feeds ...
1940 – 11 people
1950 – 15 people
1960 – 26 people

Agrium: Sustaining a Growing World, 80 Years of Evolution in North American Fertilizer and Agriculture, http://mawrc.org/downloads/AgriumAnniv2012-Dowbenko.pdf

The primary lesson of the Dust Bowl was the need for fertilizers, hybrid seeds and irrigation programs.
"As part of New Deal programs, Congress passed the Soil Conservation and Domestic Allotment Act in 1936 … The administration also began to educate farmers on soil conservation and anti-erosion techniques, including crop rotation, strip farming, contour plowing, terracing, and other improved farming practices."

http://en.wikipedia.org/wiki/Dust_Bowl (October 16, 2014)

"The severe drought … revealed an advantage of hybrid corn not previously recognized—its drought tolerance. This revealed ecological resilience motivated some farmers to adopt hybrids despite their commercial unattractiveness in normal years. That response to climate change had a tipping effect. The increase in sales of hybrid seed in 1937 and 1938 financed research at private seed companies that led to new varieties with significantly improved yields in normal years. … Widespread commercial adoption began in 1932. … The US Department of Agriculture began tracking the adoption of the new varieties in the following year, 1933. At that time, only about 0.1 percent of the nation's corn acreage was planted to the new seed. In 1936, the USDA proclaimed significant increases in yield per acre could be achieved by adopting hybrid corn …Yet it took another decade before 70 percent of the corn acreage had been planted with hybrid seed. By 1960, 96.3 percent of acreage was planted to hybrid varieties … One of the hybrid traits introduced improved the plant's ability to absorb nitrogen fertilizers, and, indeed, the use of fertilizer was required to reach the potential of the hybrids."

Richard Sutch: The Impact of the 1936 Corn-Belt Drought on American Farmers' Adoption of Hybrid Corn, University of California, Riverside, Draft of January 6, 2010

Demand: Population Control
> Tafel/Plate 5

"The United Nations Population Fund (UNFPA) … is a UN organization. The work of the UNFPA involves promotion of the right of every woman, man and child to enjoy a life of health and equal opportunity. This is done through major national and demographic surveys and with population censuses. … Their work involves the improvement of reproductive health … UNFPA began operations in 1969 as the United Nations Fund for Population Activities … under the administration of the United Nations Development Fund. In 1971 it was placed under the authority of the United Nations General Assembly. … UNFPA has been accused by different groups of providing support for government programs which have promoted forced-abortions and coercive sterilizations … [for example] UNFPA provided aid to Peru's population control program in the mid-to-late '90s. When it was discovered the Peruvian program had been engaged in carrying out coercive sterilizations … UNFPA supported Chinese government programs which include forced abortions and coercive sterilizations …"

http://en.wikipedia.org/wiki/United_Nations_Population_Fund (October 16, 2014)
http://www.infowars.com/depopulating-the-third-world-un-sterilization-campaigns-in-developing-countries-accelerating/

Demand: Structural Adjustments
> Tafel/Plate 7

"Structural adjustment programs (SAPs) consist of loans provided by the International Monetary Fund (IMF) and the World Bank to countries that experienced economic crises. The two Bretton Woods Institutions require borrowing countries to implement certain policies in order to obtain new loans (or lower interest rates on existing ones). … SAPs are supposed to allow the economies of the developing countries to become more market oriented. This then forces them to concentrate more on trade and production so it can boost their economy. … Through conditions, SAPs generally implement 'free market' programs and policy. These programs include internal changes (notably privatization and deregulation) as well as external ones, especially the reduction of trade barriers."

https://en.wikipedia.org/wiki/Structural_adjustment (October 16, 2014)

"In 1998, the World Bank's structural adjustment policies forced India to open up its seed sector to global corporations like Cargill, Monsanto and Syngenta. The global corporations changed the input economy overnight. Farm saved seeds were replaced by corporate seeds, which need fertilizers and pesticides and cannot be saved. …
"Monocultures and uniformity increase the risk of crop failure …When Monsanto first introduced Bt Cotton in 2002, the farmers lost 1 billion rupees due to crop failure. Instead of 1,500 kilos per acre as promised by the company, the harvest was as low as 200 kilos per acre. Instead of incomes of 10,000 rupees an acre, farmers ran into losses of 6,400 rupees an acre. In the state of Bihar, when farm-saved corn seed was displaced by Monsanto's hybrid corn, the entire crop failed, creating 4 billion rupees in losses and increased poverty for desperately poor farmers. …
"The second pressure Indian farmers are facing is the dramatic fall in prices of farm produce as a result of the WTO's free trade policies. The WTO rules for trade in agriculture are, in essence, rules for dumping. … Global wheat prices have dropped from $216 a ton in 1995 to $133 a ton in 2001; cotton prices from $98.2 a ton in 1995 to $49.1 a ton in 2001; Soya [sic] bean prices from $273 a ton in 1995 to $178 a ton. This reduction is due not to a change in productivity, but to an increase in subsidies and an increase in market monopolies controlled by a handful of agribusiness corporations."

Vandana Shiva, From Seeds of Suicide to Seeds of Hope: Why Are Indian Farmers Committing Suicide and How Can We Stop This Tragedy?
http://www.huffingtonpost.com/vandana-shiva/from-seeds-of-suicide-to_b_192419.html

Demand: Undo Land Reforms
> Tafeln/Plates 5/8

"There is significant evidence that the Green Revolution weakened socialist movements in many nations. In countries such as India, Mexico, and the Philippines, technological solutions were sought as an alternative to expanding agrarian reform initiatives, the latter of which were often linked to socialist politics."

http://en.wikipedia.org/wiki/Green_Revolution (October 16, 2014)

"Propriety redistribution took place in: Bolivia 1952, Chile 1960, Colombia 1966, Cuba 1959, Guatemala until 1954, Peru 1950, Vietnam 1953–1956, South Korea 1950, Philippines 1960s. … In 1949, shortly after the Chinese communists came to power, the highest levels of the US government began to commend land reform as the least unacceptable option. … In the early 1960s, the USA … placed its efforts primarily on developing a military response to 'communist insurgency' and economic and technical aid … The Malthusian fears which propelled the Green Revolution put land reform on hold, and even reversed it in many parts of the world."

Kilusang Magbubukid ng Pilipinas: "Historical and Political Perspectives on IRRI, and Its Impact on Asian Agriculture," in: The Great Rice Robbery, A handbook on the impact of IRRI in Asia; Pesticide Action Network Asia and the Pacific, 2007

Disaster Capitalism: Sunday, February 24, 2008, 4:00 PM /
Svalbard Global Seed Vault Opening Conference
> Tafel/Plate 2

"If global catastrophes like *asteroid impacts* or *disease pandemics* were to strike, seeds stored in this first ever 'doomsday' vault would ensure that humans could regrow the crops needed for survival. The vault, designed to withstand all natural and human disaster, will house samples of all known food crops."
Terje Riis-Johansen, Minister of Agriculture and Food, Norway

"There are seven billion of us on the planet today. By 2020, there will be more than nine billion. … Obtaining enough food in the years to come will be even more of a challenge. Climate change is making it more difficult and more expensive to produce food. This is the context in which the seeds being stored in Svalbard Global Seed Vault will play a vital role in the future. We believe the design of the facility will ensure that the seeds will stay well-preserved even if such forces as *global warming* raise temperatures outside the facility."
Magnus Bredeli Tveiten, project manager

"Genebanks have been subject to natural disasters, war and civil strife. Many genebanks are situated in developing countries …The seed vault is the perfect place for keeping seeds safe for … up to 10,000 years. … Our mission is to ensure the conservation and availability of crop diversity for food security worldwide. An increasingly unpredictable and changing climate, and a world population expected to reach 9 billion by 2050 will place unprecedented demands on agriculture. Conserving the vast diversity of crop varieties is the only way to guarantee that farmers and plant breeders will have the raw materials needed to improve and adapt their crops to meet these challenges and provide food for us into the future."
Cary Fowler, Executive Director, Global Crop Diversity Trust

http://www.regjeringen.no/en/dep/lmd/campain/svalbard-global-seed-vault/news/summary-of-the-svalbard-conference.htm

Disaster Capitalism: John Kerry
> Tafel/Plate 11

"The challenge today to all of us in a world that is facing the threat of climate change, which is more real than unfortunately some people want to acknowledge, and what that may do to hunger and refugees and devastation and to food supplies—these are really challenging times and this is a significant moment … Because despite all the world's technological advances, today nearly 870 million people, one-eighth of the world's population, suffer from chronic hunger—chronic hunger.
"And it is obviously a trap that prevents people from realizing their God-given potential, but more than that, places people in extremis, places communities in extremis. It can actually feed into terrorism. It feeds into failed states. It feeds into all of the challenges that we face in terms of building order and creating stability on this planet. And the struggle for food is, in the end, a struggle for life itself.
"So the stakes are really high and the challenge is beyond what we face today in terms of all of the statistics and what they tell us. The challenge is that by 2050, the world's population is going to grow to 9 billion people. That is going to demand at least a 60 percent increase over our current agricultural production. …
"Last year, President Obama, along with African leaders, announced the formation of the New Alliance for Food Security and Nutrition. And that is a way to seek to engage the private sector, and it has a goal of lifting 50 million people out of poverty in the next 10 years. And in just the first year of its existence, it has already secured 4 billion in investment commitments. And just—you can already see what this is doing in Ethiopia, where I was just a few weeks ago for the African Union 50th anniversary. There, they are distributing better seeds to about 15,000 maize farmers, and that will potentially increase their productivity by 50 percent."

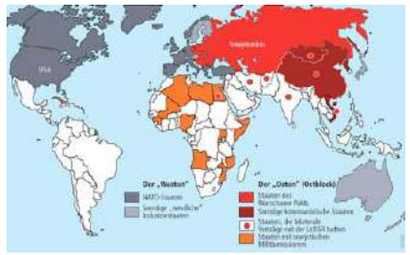
World Food Prize;
Source: US State Department, http://www.state.gov/secretary/remarks/2013/06/210896.htm

Disaster: Climate Change
> Tafel/Plate 7

"Climate model projections were summarized in the 2013 Fifth Assessment Report (AR5) by the Intergovernmental Panel on Climate Change (IPCC). They indicated that during the 21st century the global surface temperature is likely to rise a further 0.3 to 1.7 °C (0.5 to 3.1 °F) for their lowest emissions scenario using stringent mitigation and 2.6 to 4.8 °C (4.7 to 8.6 °F) for their highest. …
"Future climate change and associated impacts will vary from region to region around the globe. The effects of an increase in global temperature include a rise in sea levels … as well as a probable expansion of subtropical deserts. … Other likely effects of the warming include more frequent extreme weather events including heat waves, droughts and heavy rainfall, ocean acidification, and species extinctions due to shifting temperature regimes. Effects significant to humans include the threat to food security from decreasing crop yields and the loss of habitat from inundation."

http://en.wikipedia.org/wiki/Global_warming (October 16, 2014)

Disaster: Communism
>Tafel/Plate 5



http://www.omnia-verlag.de/upload_files/welt_machtbloecke.pdf

Disaster: Dust Bowl, 1931–1939
> Tafel/Plate 5

"The Dust Bowl … was a period of severe dust storms that greatly damaged the ecology and agriculture of the US and Canadian prairies during the 1930s; severe drought and a failure to apply dryland farming methods to prevent wind erosion … caused the phenomenon. … The rapid mechanization of farm equipment … contributed to farmers' decisions to convert arid grassland … to cultivated cropland. The drought and erosion of the Dust Bowl affected 100,000,000 acres (400,000 km2), that centered on the panhandles of Texas and Oklahoma … The Dust Bowl exodus was the largest migration in American history within a short period of time. Between 1930 and 1940, approximately 3.5 million people moved out of the Plains states … In just over a year, over 86,000 people migrated to California."

http://en.wikipedia.org/wiki/Dust_Bowl (October 16, 2014)

The migrating farmers went mostly to Los Angeles, California, where they found work in the huge orchards and the Californian defense industries. By the end of the war, the LA area had accounted for 17% of all of America's wartime production.

http://faculty.washington.edu/gregoryj/dust%20bowl%20migration.htm

Disaster: Genetic Erosion
> Tafel/Plate 6

China:	1940: 10,000 wheat varieties	/ 1970: 1,000
Philippines:	1940: 6,000 rice varieties	/ 1980: 1
Mexico:	1940: 10,000 maize varieties	/ 1998: 2,000

http://www.fao.org/docrep/007/y5609e/y5609e02.htm

Report on the Genetic Vulnerability of Major Crops, 1972, by the Agricultural Board, the Division of Biology and Agriculture, and the National Research Council. The report discussed the vulnerability of 11 important crops: "The key lesson … is that genetic uniformity is the basis of vulnerability to epidemics … this uniformity derives from powerful economic and legislative forces."

Robin Pistorius: Scientists, Plants and Politics. A History of the Plant Genetic Resources Movement, IPGRI, 1993

Disaster: Greenhouse Effect
> Tafel/Plate 7

"Global warming is the observed century-scale rise in the average temperature of Earth's climate system. In its fourth assessment (AR4 2007) of the relevant scientific literature, the Intergovernmental Panel on Climate Change (IPCC) reported that scientists were more than 90% certain that most of global warming was being caused by increasing concentrations of greenhouse gases produced by human activities. … Proposed policy responses to global warming include mitigation by emissions reduction, adaptation to its effects, building systems resilient to its effects, and possible future climate engineering. Most countries are parties to the United Nations Framework Convention on Climate Change (UNFCCC), whose ultimate objective is to prevent dangerous anthropogenic … climate change. Parties to the UNFCCC have adopted a range of policies designed to reduce greenhouse gas emissions and to assist in adaptation to global warming. Parties to the UNFCCC have agreed that deep cuts in emissions are required, and that future global warming should be limited to below 2.0 °C (3.6 °F) relative to the pre-industrial level. Reports published in 2011 by the United Nations Environment Programme and the International Energy Agency suggest that efforts as of the early 21st century to reduce emissions may be inadequate to meet the UNFCCC's 2 °C target."

http://en.wikipedia.org/wiki/Global_warming (October 16, 2014)

Disaster: Hunger in the Third World
> Tafel/Plate 5

"In 1976, a book published by two World Bank economists surpassed the F.A.O. with an estimate that more than half the population of the developing countries, or 840 million people, were seriously malnourished in the mid-1960's. Professor Poleman, who has done an analysis of the difficulties in quantifying the nutrition situation in developing countries for the Agricultural Department, agrees that … food production in developing countries tends to be understated because taxation is often based on production, and because so much backyard production is locally consumed and never counted."

http://www.nytimes.com/1981/10/05/business/food-and-hunger-statistics-questioned.html?pagewanted=all

Disaster: Population Bomb
> Tafel/Plate 5

THE POPULATION BOMB – BY THE BILLIONS
1804: 1 billion
1960: 3 billion
1987: 5 billion
2011: 7 billion

Voice Of The People (Canada): THE POPULATION BOMB – BY THE BILLIONS, votp.blogspot.com, October 6, 2010

"*The Population Bomb* is a best-selling book written by Stanford University Professor Paul R. Ehrlich and his wife, Anne Ehrlich (who was uncredited), in 1968. It warned of the mass starvation of humans in the 1970s and 1980s due to overpopulation, as well as other major societal upheavals, and advocated immediate action to limit population growth. … The title *Population Bomb* was taken (with permission) from General William H. Draper, founder of the Population Crisis Committee … Ehrlich … believed that the United States should take a leading role in population control …. In order to avoid charges of hypocrisy or racism it would have to take the lead in population reduction efforts. Ehrlich floats the idea of adding 'temporary sterilants' to the water supply or staple foods. … Countries with sufficient programmes in place to limit population growth, and the ability to become self-sufficient in the future would continue to receive food aid. …He mentions his support for government mandated sterilization of Indian males with three or more children."

http://en.wikipedia.org/wiki/The_Population_Bomb (October 16, 2014)

Disaster: Volcker Shock / Debt Crisis
> Tafeln/Plates 6/7

"As we pick up our story of former Federal Reserve Chairman Paul Volcker, it's the fall of 1979 and Volcker has recently been named chairman, putting his mark on Fed policy by raising the discount rate a full percentage point … While the 3-month Treasury Bill was climbing from 8% in September of '79 to 12.5% by year end, the Fed wasn't counting on long-term rates rising as well, from the 9.2% level in September to 10.1% by December 31st. … Into early 1980 interest rates … continued to rise … By the end of the first quarter, the long bond was yielding 12.3%. Reagan won the election that November and, as soon as the votes were tabulated, Volcker began to tighten interest rates more. The federal funds rate, which had averaged 11.2% in 1979, peaked at 20% in June 1981. The prime rate rose to 21.5% in '81 as well."
Debt—dollar debt—was to be the vehicle for a new role played by the New York banks, led by David Rockefeller's Chase Manhattan and Walter Wriston's Citibank.

http://www.buyandhold.com/bh/en/education/history/2000/paul_volker2.html

"Their idea was to extend hundreds of billions of dollars in newly acquired OPEC and other petrodollars, which they 'persuaded' Saudi and other OPEC governments to bank their new oil surpluses in London or New York banks. … This second phase, the post-gold era …. Kissinger's 'petro-dollar recycling,' rolled along … until early 1979 when the dollar faced a major foreign sell-off during the end of the Jimmy Carter Presidency. … In August 1979, to restore world 'confidence' in the dollar, President Jimmy Carter … was forced …to accept Paul Volcker, a protégé of Rockefeller's from Chase Manhattan Bank, as new Chairman of the Federal Reserve with an open mandate to do what was necessary to save the dollar as reserve currency. … Volcker's shock therapy, begun in October 1979, lasted until August 1982. Interest rates shot through the roof to double digits. … Within a year, the prime rate had shot up to the unheard-of level of 21.5% … "The Latin American debt crisis, an ominous foretaste of today's USA sub-prime crisis, erupted as a direct result of the Volcker shock. In August 1982 Mexico announced it could no longer pay in dollars the interest rate service on its staggering debt. It, as most of the Third World from Argentina to Brazil, from Nigeria to Congo, from Poland to Yugoslavia, had fallen for the New York banks' debt trap."

http://www.globalresearch.ca/the-financial-tsunami-the-financial-foundations-of-the-american-century/7813

Disaster: Vulnerability of Monocrops
> Tafel/Plate 6

Invasive species:
a) Southern corn leaf blight
The Southern corn leaf blight is a fungal disease of maize. It was in Florida, Alabama, Mississippi, Louisiana, Texas, Georgia, Alabama, Kentucky, Illinois, Indiana, Iowa, Minnesota and Wisconsin (it later entered Canada) and Oklahoma from May to September 1970.
b) Bollworm
The pink bollworm (*Pectinophora gossypiella*) is an insect known for being a pest in cotton farming. It broke out in 1975 in Arkansas and New Mexico.

Robin Pistorius: Scientists, Plants and Politics. A History of the Plant Genetic Resources, IPGRI, 1993

Displacement
> Tafel/Plate 8

Peasants, farmers, indigenous people, pastoralists, fisherfolk, forest dwellers, nomads:
"Not only does land grabbing mean that farmers will lose their land, but these lands will be transformed from smallholdings or communal lands into large industrial estates connected to far off markets. The Chairperson of the United Nations Permanent Forum on Indigenous Issues estimates that the land rights of some 60 million indigenous people worldwide may be at risk as a result of large-scale agro-fuel expansion."

http://www.oaklandinstitute.org/greaHand-grab-rush-world%E2%80%99s-farmland-threatens-food-security-poor

Dr. M.S. Swaminathan
> Tafel/Plate 11

"In a written statement, Dr. M.S. Swaminathan, the renowned Indian scientist and Chairman of the World Food Prize Laureate Selection Committee, said … '2013 marks the 60th anniversary of the discovery of the … DNA Molecule … During the last 60 years, the science of molecular genetics … has opened up uncommon opportunities for shaping the future of agriculture, industry, medicine and environment protection …' Van Montagu, Chilton, and Fraley each conducted groundbreaking molecular research on how a plant bacterium could be adapted as a tool to insert genes from another organism into plant cells, which could produce new genetic lines with highly favorable traits."

http://www.worldfoodprize.org/index.cfm/24667/24410/three_biotechnology_scientists_awarded_2013_world_food_prize

"Mankombu Sambasivan Swaminathan (born 7 August 1925) is an Indian geneticist and international administrator, renowned for his leading role in India's 'Green Revolution,' … He is the founder and chairman of the MS Swaminathan Research Foundation. … From 1972 to 1979 he was director general of the Indian Council of Agricultural Research. He was Principal Secretary, Ministry of Agriculture from 1979 to 1980. He served as Director General of the International Rice Research Institute (1982–88) and became president of the International Union for the Conservation of Nature and Natural Resources in 1988."

http://en.wikipedia.org/wiki/M._S._Swaminathan#Honours.2C_awards_and_international_recognition (October 16, 2014)

Economic Espionage Act, 1996
> Tafel/Plate 9

"The act makes the theft or misappropriation of a trade secret a federal crime. … Penalties for violation are fines of up to US$500,000 per offense and imprisonment of up to 15 years for individuals, and fines of up to US$10 million for organizations. … The International Trade Commission has used the EEA's definition of misappropriation to support its enforcement of US trade laws that prohibit 'unfair methods of competition and unfair acts in the importation of articles … in the United States.' … The EEA was developed on the basis of a national philosophy that emphasizes a 'level playing field' for all business competitors that arose in no small part due to the size and diversity of the American private sector. Many other nations not only lack such legislation, but actively support industrial espionage using both their national intelligence services as well as less formal mechanisms including bribery and corruption. The United States Office of the National Counterintelligence Executive publishes an annual report on Foreign Economic Collection and Industrial Espionage mandated by the U.S. Congress which outlines these espionage activities of many foreign nations."

http://en.wikipedia.org/wiki/Economic_Espionage_Act_of_1996 (October 16, 2014)

EU Biofuel Directive
> Tafel/Plate 8

"The Directive on the Promotion of the use of biofuels and other renewable fuels for transport, officially 2003/30/EC and popularly better known as the biofuels directive, is a European Union directive for promoting the use of biofuels for EU transport. The directive entered into force in May 2003, and stipulates that national measures must be taken by countries across the EU aiming at replacing 5.75% of all transport fossil fuels (petrol and diesel) with biofuels by 2010. The directive also called for an intermediate target of 2% by 31 December 2005. The target of 5.75% is to be met by 31 December 2010. The percentages are calculated on the basis of energy content of the fuel and apply to petrol and diesel fuel for transport purposes placed on the markets of member states. Member states are encouraged to take on national 'indicative' targets in conformity with the overall target."

https://en.wikipedia.org/wiki/Directive_on_the_Promotion_of_the_use_of_biofuels_and_other_renewable_fuels_for_transport (October 16, 2014)

Everybody's Business
> Tafel/Plate 8

Land grabbing / investors:
Private equity funds: US$2.4 trillion
Hedge funds: US$1.9 trillion
Pension funds: US$30 trillion +23% since 2010
Sovereign wealth funds: US$ 4.7 trillion +14% since 2010
"Today, the pension fund industry is three times larger than the other three put together."
Investment banks, university endowments, wealthy individuals, insurance companies, state funds, food processing industry

http://www.viacampesina.org/downloads/pdf/en/landgrabGRAIN-dec2011.pdf

"These farmland funds generated a rate of return from 1991 to 2010 that was roughly double that from investing in gold or the S&P 500 stock index and seven times that from investing in housing …" 400% return on investment within 10 years.

http://www.earth-policy.org/books/fpep/fpepch10
http://farmlandgrab.org/post/view/19638

Example Norfund:
"Matanuska is a Mozambique-based company owned by UK-based Saxion Estates subsidiary Rift Valley Holdings, one of the largest African farmland owners, and Matanuska Mauritius, which appears to be a shell company. Norfund has invested US$3.7 million in the company, giving it a 33.3% share, and provided it with US$4 million in loans. In a first phase of the company's operations, Matanuska established a 3,000-ha banana plantation and secured a 12-year supply agreement with Chiquita. According to a report by Mozambique's national farmers organisation UNAC, the company has made repeated labour-law violations."

www.grain.org/…/4479-grain-releases-data-set-with-over-400-global-land-grabs%20(1).pdf

Exploitation of / Right to Wood Harvest
> Tafel/Plate 10

"In Mali, tree management had been part of traditional agriculture. Salif Guindo… a farmer from the village of Endé, explains how they revived an ancient voluntary association of farmers, called Barahogon, that had encouraged tree stewardship for generations. But using trees was abandoned when cutting wood became a crime. First the French colonial government declared all trees to be state property, enabling government officials to sell timber rights to woodcutters. Similar arrangements continued after independence. Meanwhile, farmers caught pruning or cutting trees were punished. As a result they would uproot seedlings to avoid later hassles. Needless to say, several generations of this left the land denuded and increasingly desiccated.
"In the early 1990s, a new Mali government—perhaps mindful that farmers furious about mistreatment had killed Forestry Agency officials in some villages—passed a law giving farmers ownership of trees on their land. Farmers did not hear about the law until Sahel Eco mounted a campaign to inform them via radio and word of mouth. Since then, FMNR [farmer-managed natural regeneration] has spread rapidly, including across borders. Salif recalls a recent visit from twenty mayors and provincial directors of agricultural and environmental agencies from Burkina Faso. 'They seemed astonished to hear our story and see the evidence,' Salif says. 'They asked, Is this really possible?'

"In Niger, too, FMNR had a hard time gaining traction, in part because it involves some counterintuitive elements: namely, to grow trees farmers must be allowed to cut them down as well. … only after Niger government officials suspended enforcement of regulations against cutting trees did tree-growing gather momentum. … The pattern has been the same throughout the western Sahel: FMNR has spread largely by itself, from farmer to farmer and village to village, as people see the results with their own eyes and move to adopt the practice."

Mark Hertsgaard, Regreening Africa, The Nation, November 19, 2009, http://markhertsgaard.com/regreening-africa/

F

Farmer-managed natural regeneration (FMNR) > Tafel/Plate 10

"… involves the systematic regeneration and management of trees and shrubs from tree stumps, roots and seeds. FMNR is especially applicable, but not restricted to, the dryland tropics. As well as returning degraded croplands and grazing lands to productivity, it can be used to restore degraded forests, thereby reversing biodiversity loss and reducing vulnerability to climate change. FMNR can also play an important role in maintaining not-yet-degraded landscapes in a productive state, especially when combined with other sustainable land management practices such as conservation agriculture on cropland and holistic management on rangelands.
"FMNR adapts centuries-old methods of woodland management, called coppicing and pollarding, to produce continuous tree-growth for fuel, building materials, food and fodder without the need for frequent and costly replanting. On farmland, selected trees are trimmed and pruned to maximise growth while promoting optimal growing conditions for annual crops (such as access to water and sunlight). When FMNR trees are integrated into crops and grazing pastures there is an increase in crop yields, soil fertility and organic matter, soil moisture and leaf fodder. There is also a decrease in wind and heat damage, and soil erosion."

http://en.wikipedia.org/wiki/Farmer-managed_natural_regeneration (October 16, 2014)

Farmer Suicides > Tafel/Plate 7

"In addition to causing harm to public health and ecosystems, GE seeds and crops provide a pathway for corporations to 'own' seeds through patents and intellectual property rights (IPRs). Patents provide royalties for the patent holder and corporate monopolies. This translates into super profits for Monsanto. For the farmers this means debt. For example, more than 250,000 Indian farmers have been pushed to suicide in the last decade and a half. Most of the suicides are in the cotton belt where Monsanto has established a seed monopoly through Bt cotton."

The GMO Emperor Has No Clothes – A Global Citizens Report on the State of GMOs, ed. Vandana Shiva, Navdanya International, 2011

"The region in India with the highest level of farmers suicides is the Vidharbha region in Maharashtra—4000 suicides per year, 10 per day. This is also the region with the highest acreage of Monsanto's GMO Bt cotton. Monsanto's GM seeds create a suicide economy by transforming seed from a renewable resource to a non-renewable input which must be bought every year at high prices. Cotton seed used to cost Rs 7/kg. Bt-cotton seeds were sold at Rs 17,000/kg. Indigenous cotton varieties can be intercropped with food crops. Bt-cotton can only be grown as a monoculture. Indigenous cotton is rain fed. Bt-cotton needs irrigation. Indigenous varieties are pest resistant. Bt-cotton, even though promoted as resistant to the boll worm, has created new pests, and to control these new pests, farmers are using 13 times more pesticides then they were using prior to introduction of Bt-cotton. And finally, Monsanto sells its GMO seeds on fraudulent claims of yields of 1500/kg/year when farmers harvest 300–400 kg/year on an average. High costs and unreliable output make for a debt trap, and a suicide economy."

Vandana Shiva, From Seeds of Suicide to Seeds of Hope: Why Are Indian Farmers Committing Suicide and How Can We Stop This Tragedy? http://www.huffingtonpost.com/vandana-shiva/from-seeds-of-suicide-to_b_192419.html

Flex Mex > Tafel/Plate 7

"The [Kyoto] Protocol defines three 'flexibility mechanisms' that can be used by Annex I Parties in meeting their emission limitation commitments. The flexibility mechanisms are International Emissions Trading (IET), the Clean Development Mechanism (CDM), and Joint Implementation (JI). … The CDM and JI are called 'project-based mechanisms,' in that they generate emission reductions from projects. The difference between IET and the project-based mechanisms is that IET is based on the setting of a quantitative restriction of emissions, while the CDM and JI are based on the idea of 'production' of emission reductions. The CDM is designed to encourage production of emission reductions in non-Annex I Parties, while JI encourages production of emission reductions in Annex I Parties."

https://en.wikipedia.org/wiki/Kyoto_Protocol (October 16, 2014)

Kyoto Protocol: The Clean Development Mechanism / Joint Implementation Program "encourages investments by Northern companies and states in sequestration of climatic mitigation projects located in the global South. … From 2009, projects that produced biodiesel on so-called degraded lands also became eligible for CDM credits."

Earth Grab: Geopiracy, the New Biomassters and Capturing Climate Genes, www.etcgroup.org

G

Garrett Hardin: The Tragedy of the Commons, 1968 > Tafel/Plate 5

"Hardin focused on human population growth, the use of the Earth's natural resources, and the welfare state. … Parents breeding excessively would leave fewer descendants because they would be unable to provide for each child adequately. Such negative feedback is found in the animal kingdom. … Hardin blamed the welfare state for allowing the tragedy of the commons; where the state provides for children and supports overbreeding as a fundamental human right."

http://en.wikipedia.org/wiki/Tragedy_of_the_commons (October 16, 2014)

The Global Crop Diversity Trust > Tafel/Plate 3

According to the Norwegian Ministry of Agriculture and Food: "The Global Crop Diversity Trust provides scientifical guidance and assistance in organizing shipments of seeds. The Trust will also finance a large part of the management and operation of the Seed Vault."

Mission: The Global Crop Diversity Trust states that: "Yet at the moment much of the world's crop diversity is neither safely conserved, nor readily available to scientists and farmers who rely on it to safeguard agricultural productivity. … The Global Crop Diversity Trust is the only worldwide response to this funding crisis. … it is important to note how the Trust differs from other organizations competing for donations. … It is rare that the world faces a major problem which has highly disturbing implications but an identifiable and achievable solution. This is precisely what the Crop Trust offers; a costed, measurable plan, relying on existing institutions and simple proven technologies. It is the only solution. Crop diversity is disappearing, and the Trust is the sole dedicated worldwide funding organization for its conservation. … The Crop Trust offers a unique opportunity to put in place a rational and cost-effective system for the conservation of the resources which underpin all agriculture and the world's future food supplies. … "An increasingly unpredictable and changing climate, and a world population expected to reach 9 billion by 2050, will place unprecedented demands on agriculture. Conserving the vast diversity of crop varieties is the only way to guarantee that farmers and plant breeders will have the raw materials needed to improve and adapt their crops to meet these challenges—and provide food for us into the future. … And there is only one organization working worldwide to solve this problem—the Global Crop Diversity Trust. The Crop Trust's response is to raise an endowment, the interest from which is enough to guarantee the effective conservation—and crucially, the ready availability to those who wish to use it—of the biological basis of all agriculture. The endowment will ensure that the conservation of this most vital and natural resource is placed forever on a firm foundation."

http://www.croptrust.org/content/who-we-are

Members of the Global Crop Diversity Trust according to the top 5 Google hits (philanthrocapitalism)

Margaret Catley-Carlson (Canada):
"Chair of the Global Water Partnership and the International Advisory Committee for Group Suez Lyonnaise des Eaux … member of the UN Secretary General's Advisory Board, the Rosenberg Forum, and of the Council of Advisors of the World Food Prize. She serves on the Boards of … IWMI (the International Center for Water Resource Management); the IFDC (Fertilizer Management) and IIED (the International Institute for Environment and Development). She has been chair of the ICARDA and CABI Boards and the Water Supply and Sanitation Collaborative Council, Vice Chair of the IDRC Board of Water for the 21st Century … President of the Canadian International Development Agency 1983–89; Deputy Executive Director of UNICEF in New York 1981–1983; President of the Population Council in New York 1993–98; and Deputy Minister of the Department of Health and Welfare of Canada 1989–92."

http://www.croptrust.org/content/the-board

Group Suez Lyonnaise des Eaux is one of the world's largest private water companies.

Catley-Carlson / CGIAR: IWMI (the International Center for Water Resource Management) is a part of the CGIAR.

CGIAR / Consultative Group of International Research:
"… is a strategic alliance that unites organizations involved in agricultural research … donors include governments … foundations and international and regional organizations. The work they support is carried out by the 15 members of the CGIAR Consortium of International Agricultural Research Centers, in close collaboration with hundreds of partner organizations … The CGIAR now has 64 governmental and nongovernmental members and supports 14 research centers and one intergovernmental research center (AfricaRice)."

http://www.hodinkhai.com/cgiar-organization.html

Lewis Coleman (USA):
"… President of DreamWorks Animation … employed by Bank of America Securities …where he was a Senior Managing Director from 1995 to 1998 and Chairman from 1998 to 2000. … ten years at the Bank of America …Head of Capital Markets, Head of the World Banking Group, and Vice Chairman of the Board and Chief Financial Officer. He spent the previous thirteen years at Wells Fargo Bank … Head of International Banking, Chief Personnel Officer and Chairman of the Credit Policy Committee. … one of the pioneers of debt-for-nature swaps, which involves agreements between developing nations in debt and one or more of their creditors who agree to forgive debt in return for environmental protection."

http://www.croptrust.org/content/the-board

"Coleman is also the lead Board Director of Northrup Grumman Corporation, one of America's largest military industry Pentagon contractors." Among Northrup Grumman's best-known arms products are the heavy strategic stealth bomber B-2 Spirit, the F-14, the unmanned reconnaissance drone RQ-4A Global Hawk and the nuclear-powered aircraft carriers of the Nimitz class.

http://www.globalresearch.ca/doomsday-seed-vault-in-the-arctic-2/23503

Coleman / Rockefeller Foundation: Northrup Grumman and the Rockefeller Foundation are members of the National Center for the Preservation of Democracy.

Cary Fowler:
"Prior to joining the Trust as its Executive Director, Dr. Cary Fowler was Professor and Director of Research in the Department for International Environment & Development Studies at the Norwegian University of Life Sciences. He was also a Senior Advisor to the Director General of Bioversity International. In this latter role, he represented the Future Harvest Centres of the Consultative Group on International Agricultural Research in negotiations on the International Treaty on Plant Genetic Resources. Cary's career in the conservation and use of crop diversity spans 30 years. … He is a past-member of the National Plant Genetic Resources Board of the U.S. and the Board of Trustees of the International Maize and Wheat Improvement Center in Mexico. Cary is the author of several books on the subject of plant genetic resources and more than 75 articles on the topic in agriculture, law, and development journals."

http://www.croptrust.org/content/the-board

Emile Frison:
Dr. Emile Frison is the Director General of Bioversity International. … Director of Bioversity's regional office for Europe … was Director of the organization's International Network for the Improvement of Banana and Plantain in Montpellier, France … recently led the organization … in the formulation of a new strategic vision for Bioversity, in which nutrition and agricultural biodiversity will play an important role in the overall goal of reducing hunger and poverty in a sustainable manner."

http://www.croptrust.org/content/the-board

Frison / Bananas: "'Only GM can save the banana' is the underlying message of a story that first surfaced in 2001… and has done the rounds in the media ever since. The story claims that because bananas are sterile, they can't be bred to avoid virulent banana diseases and so could be extinct within a decade. … Each time this headline-grabbing story (re)emerges, it gets expertly debunked … until the next time comes around. And almost every time, the same scientist is quoted, Dr. Emile Frison. … But the … FAO has directly contradicted Dr. Frison's claims …saying that while there are problems of vulnerability to disease, this is aggravated by the widescale commercial use of the Cavendish banana, and can be countered by promoting greater genetic diversity."

http://www.gmwatch.org/index.php/only-gm-can-save-the-banana

Frison / Syngenta / Pioneer: donors
Frison / CGIAR: Bioversity International

Åslaug Haga (Norway):
"Ms. Haga is the Director of Renewable Energy of the Federation of Norwegian Industries. She is also the Head of the governing board of the Norwegian Institute for Nature Research (NINA). … She was elected Chairman of the Centre Party in 2003. Ms. Haga held three Ministerial positions: Minister of Cultural Affairs from 1999–2000, Minister of Local Government and Regional Development from 2005–2007, and Minister of Petroleum and Energy from 2007–2008."

http://www.croptrust.org/content/the-board

Gates Foundation

Gates Foundation / Microsoft:
Microsoft had 90 percent of the world share for user software in 2011.

http://de.statista.com/statistik/daten/studie/157902/umfrage/marktanteil-der-genutzten-betriebssysteme-weltweit-seit-2009/

"The Global Crop Diversity Trust (GCDT), which supports the operational costs of Svalbard, has received almost $30 million dollars in support from the Bill and Melinda Gates Foundation. (Global Diversity Trust, 'Funding Status 1-1-2011'). This is by far the largest support of any non-governmental entity."

http://www.centerforfoodsafety.org/issues/303/seeds/seed-banks#

Gates Foundation / Monsanto:
"As is well known, the Gates Foundation has very close working ties to Monsanto. The Gates Foundation invested $23 million in Monsanto in 2010 to help the company through some financial woes, and has been a determined supporter of spreading Monsanto's genetically engineered crops throughout the developing world."

http://www.centerforfoodsafety.org/issues/303/seeds/seed-banks#.

Gates Foundation / Monsanto / CGIAR:
"Dr. Robert Horsch [was] hired by the Gates Foundation as Senior Program Officer of the Global Development Program [which is the supervisor of the AGRA Project]. Horsch had been Vice-President of Product and Technology Cooperation, and later Vice-President for International Development Partnerships, of Monsanto Corporation … Horsch worked with Monsanto for 25 years before he joined the Gates Foundation … He was also a member of the Advisory Committee of the Partnership to Cut Hunger and Poverty in Africa (PCHPA), the Private Sector Committee of the CGIAR and the United Nations Millennium Project Task Force on Hunger."

Elenita C. Dano,Unmasking the New Green Revolution in Africa, African Centre for Biosafety, Third World Network, 2009

Gates Foundation / Rockefeller Foundation:
"The Rockefeller Foundation … forged an alliance with the Bill and Melinda Gates Foundation, publicly announced on 12 September 2006. The marriage of two of the world's largest philanthropic foundations gave birth to the Alliance for a Green Revolution in Africa (AGRA), with the Gates Foundation committing an initial amount of US$100 million and another $50 million from the Rockefeller Foundation. … The alliance is considered a breakthrough for the Gates Foundation, which has hitherto been focusing most of its philanthropy on global health and medical projects … AGRA's primary goal is to increase the productivity and profitability of small-scale farming using technological, policy and institutional innovations that are environmentally and economically sustainable. … The conceptual framework of the Gates-Rockefeller partnership … is outlined in a 'White Paper' entitled '*Africa's Turn: The New Green Revolution for the 21st Century*' … The paper mainly summarizes … that Africa has to benefit from the promises of the Green Revolution … through the combined use of applications of modern ecology and modern biotechnology."

Elenita C. Dano, Unmasking the New Green Revolution in Africa, African Centre for Biosafety, Third World Network, 2009

Monsanto:
Monsanto controls 23% of the proprietary seed market and 9% of the agrochemicals market. (2009)

Who Will Control the Green Economy?, 2011, www.etcgroup.org

"Monsanto is cited as one of the major sponsors behind the Svalbard Global Seed Vault in many web sites but not in the home page of the Svalbard Global Seed Vault. Monsanto does share technology and patents with the following companies mentioned in the referred document: The Australia-based Grains Research & Development Corporation (GRDC) and the Swiss-based company Syngenta AG."

http://monsantoboycott.com/sponsorships /link no longer works

Monsanto / CGIAR:
"… the gene giants are also teaming up with philanthro-capitalists to develop climate-tolerant traits for the developing world. Monsanto and BASF, for instance, are working with the International Maize and Wheat Improvement Center (CIMMYT) and national agricultural research programs of Kenya, Uganda, Tanzania and South Africa to develop drought-tolerant maize. The program is supported by a $47 million grant from the Bill & Melinda Gates Foundation. Monsanto and BASF have agreed to donate royalty-free drought-tolerant transgenes to the African researchers."

Earth Grab: Geopiracy, the New Biomassters and Capturing Climate Genes, ETC Group, 2011

Pioneer:
Pioneer/ DuPont controls 15% of the proprietary seed market and 6% of the agrochemicals market. (2009)

Who Will Control the Green Economy?, 2011, www.etcgroup.org

Pioneer / Gates Foundation / CGIAR:
"Launched in February 2010, the Improved Maize for African Soils Project (IMAS) will develop maize varieties that are better at capturing the small amount of fertilizer that African farmers can afford, and that use the nitrogen they take up more efficiently to produce grain. Project participants will use cutting-edge biotechnology tools such as molecular markers—DNA 'signposts' for traits of interest—and transgenic approaches to develop varieties that ultimately yield 30–50% more than currently available varieties, with the same amount of nitrogen fertilizer applied or when grown on poorer soils. The varieties developed will be made available royalty-free to seed companies that sell to the region's smallholder farmers, meaning that the seed will become available to farmers at the same cost as other types of improved maize seed. … Improved varieties developed using DNA marker techniques are expected to be introduced within seven to nine years, and those containing transgenic traits are expected to be available in approximately 10 years, pending product performance and regulatory approvals by national regulatory and scientific authorities, according to the established laws and regulatory procedures in each country. IMAS is being led by CIMMYT and funded with USD 19.5 million in grants from the Bill & Melinda Gates Foundation and USAID. The project's other partners—the DuPont Business, Pioneer Hi-Bred; the Kenya Agricultural Research Institute (KARI); and the South African Agricultural Research Council (ARC)—are also providing significant in-kind contributions including staff, infrastructure, seed, traits, technology, training, and know-how."

http://www.cimmyt.org/en/improved-maize-for-african-soils

Roberto Rodrigues:
"Roberto Rodrigues has served as Brazilian Minister of Agriculture (2003–2006), Co-chairman of the Interamerican Ethanol Commission (IEC), Coordinator of the Getulio Vargas Foundation Agrobusiness Center (GV Agro) as well as President of the Superior Agriculture Council of São Paulo's Federation of Industries (FIESP). … served as President of the prestigious Brazilian Rural Society and the Brazilian Agribusiness Association. … represented the Brazilian agribusiness sector in several advisory committees … such as the National Agricultural Policy Council, the National Monetary Council, and the National Foreign Trade Council. He also chaired the National Agribusiness Forum."

http://www.croptrust.org/content/the-board

Rodrigues / Monsanto:
July 2003: "Brazil … could soon legalise the use of controversial gene-modified soybeans [Monsanto's Bt/ Roundup] after a five year ban … Brazil is the last major agricultural exporter to ban the use of GMO technology, which is estimated to be used in around 56 per cent of the world's production. But Brazilian agriculture minister Roberto Rodrigues is positive: 'There is still a great possibility that the Senate will legalise GMOs before late September …'"

http://www.foodnavigator.com/Legislation/An-end-to-Brazilian-GMO-ban

Rodrigues / Pioneer:
"DuPont recently received awards in the Ag Chemicals and Seeds categories at the National Agribusiness Forum in Campinas, Brazil. The award recognizes companies and institutions that are committed to the sustainable development of agribusiness in Brazil."

http://www2.dupont.com/media/en-us/news-events/october/recognized-for-commitment.html

Rodrigues / Syngenta:
Harvest Plus Program, Biofortification, Brazil

Rockefeller Foundation:
Founded by John D. Rockefeller in 1913. "Its overall philanthropic activity has been divided into five main subject areas: Medical, health, and population sciences; Agricultural and natural sciences; Arts and humanities; Social sciences; International relations. … Agriculture was introduced to the Natural Sciences division of the foundation in the major reorganization of 1928. In 1941, the foundation gave a small grant to Mexico for maize research [CIMMYT] … the primary intention being to stabilise the Mexican Government and derail any possible communist infiltration, in order to protect the Rockefeller family's investments. By 1943 this program … had proved such a success with the science of corn propagation and general principles of agronomy that it was exported to other Latin American countries; in 1956 the program was then taken to India; again with the geopolitical imperative of providing an antidote to communism. It wasn't until 1959 that senior foundation officials succeeded in getting the Ford Foundation (and later USAID, and later still, the World Bank) to sign on to the major philanthropic project, known now to the world as the Green Revolution …"

http://en.wikipedia.org/wiki/Rockefeller_Foundation (October 16, 2014)

Rockefeller Foundation / CGIAR: The Consultative Group on International Agricultural Research (CGIAR) has evolved since the 1960s from a number of institutes that were founded around the world by the Rockefeller Foundation as crop research centers.
"CGIAR was shaped at a series of private conferences held at the Rockefeller Foundation's conference center in Bellagio, Italy. … To ensure maximum impact, CGIAR drew in the United Nations' Food and Agriculture Organization, the UN Development Programme and the World Bank. … Financed by generous Rockefeller and Ford Foundation study grants, CGIAR saw to it that leading Third World agriculture scientists and agronomists were brought to the US to 'master' the concepts of modern agribusiness production, in order to carry it back to their homeland. In the process they created an invaluable network of influence for US agribusiness promotion in those countries, most especially promotion of the GMO 'Gene Revolution' in developing countries, all in the name of science and efficient, free market agriculture."

http://www.globalresearch.ca/doomsday-seed-vault-in-the-arctic-2/23503

Rockefeller / Green Revolution:
"Costing around $600 million, over 50 years, the revolution brought new farming technology, increased productivity, expanded crop yields and mass fertilization to many countries throughout the world. Later it funded over $100 million of plant biotechnology research and trained over four hundred scientists from Asia, Africa and Latin America."

http://en.wikipedia.org/wiki/Rockefeller_Foundation (October 16, 2014)

Syngenta:
"Syngenta AG is a global Swiss agribusiness that markets seeds and agrochemicals. Syngenta is involved in biotechnology and genomic research. … Syngenta's field crops include both hybrid seeds and genetically engineered seeds, some of which enter the food chain and become part of genetically modified food."
Syngenta and its predecessor companies have been involved in numerous legal actions and controversies over the years. "A series of fatalities due to accidental consumption of the company's herbicide Gramoxone (Paraquat) occurred in the 1960s. … Atrazine has been banned in several Wisconsin counties in the United States and in the European Union. … Syngenta's contributions to US federal candidates, parties, and outside groups totaled $267,902 during 2012, ranking it 10th on the list of companies in its sector. …The company was recognized by the 2011 Dow Jones Sustainability Index (DJSI) as one of the best performing chemical companies worldwide."

http://en.wikipedia.org/wiki/Syngenta (October 16, 2014)

Syngenta / Paraquat: Syngenta is additionally accused of hazarding cases of poisoning and deaths of agricultural laborers through the sale of the herbicide Paraquat. Paraquat is banned in the EU and Switzerland, in part due to its high human toxicity. In 2012, the corporation was therefore nominated for the Public Eye Award.

Syngenta controls 9% of the proprietary seed market and 18% of the argochemicals market. (2009)

Who Will Control the Green Economy?, 2011, www.etcgroup.org

Syngenta Foundation:
"… created its flagship program, the Farmer Support Team (FST). The FST is a nationwide program in the Philippine archipelago. It works with farmers in all the major rice, fruit, and vegetable production provinces of the country. It began by helping Filipino farmers gain greater understanding and achieve higher productivity through trainings in Integrated Pest Management (IPM), Integrated Crop Management (ICM) and Total Crop Management (TCM). … The Syngenta Foundation addressed the World Food Day Symposium in 2005 as an output of the Millennium Ecosystem Report."

http://en.wikipedia.org/wiki/Syngenta (October 16, 2014)

Syngenta / Gates Foundation / CGIAR:
Harvest Plus Program: "The Syngenta Foundation supports the HarvestPlus Challenge Program to improve global nutrition. … HarvestPlus, an initiative of the … CGIAR, is an interdisciplinary global alliance of research institutions and implementing agencies. … HarvestPlus focuses on improving the nutritional value of staple foods that poor people already eat. This 'biofortification' uses conventional breeding to develop crops richer in appropriate minerals and vitamins. … In 2009… the Syngenta Foundation joined the program's international supporters. These include the Gates Foundation, the US Agency for International Development, the World Bank and the UK's Department for International Development. HarvestPlus planned its development phase to run until 2013."

http://www.syngentafoundation.org/index.cfm?pageID=525

Syngenta / Pioneer:
Common patent with DuPont Pioneer Hi-Bred for pesticide against the corn rootworm trait MIR604 (Agrisure®), January 1, 2011

http://www.syngenta.com/global/corporate/en/news-center/news-releases/Pages/en-101214.aspx

The Global Crop Diversity Trust/ other GCDT board members

Dr. Mangala Rai, Secretary of India's Department of Agricultural Research and Education (DARE)
John Lovett (Australia), Chairperson of the Cooperative Research Centre for National Plant Biosecurity, Syngenta grain-gene board
Klaus Töpfer (Germany), Former Executive Director of the UN Environment Programme (UNEP); Under Secretary General of the UN Food Programme
Modibo Tiémoko Traoré (Mali), former Minister for Rural Development, Mali, FAO Assistant Director General charged with the Agriculture and Consumer Protection Department
Sir Peter Crane (UK), former director of The Royal Botanic Gardens, Kew
Ibrahim Assane Mayaci, Prime/Foreign Minister of Senegal, member of Rural Hub, Dakar
Walter Fust (Switzerland), Swiss Ambassador with a long career in the diplomatic field

http://www.croptrust.org/content/who-we-are

Glyphosate
Tafeln/Plates 5/6

Use of glyphosate worldwide: ca. 1 million tons, 2010
Ca. 40,000 fatal poisonings in the Third World
25% of banned pesticides are exported …

http://www.epa.gov/oppfead1/international/trade/

Monsanto patented glyphosate in 1974 as the phytotoxin Roundup. "There are four pesticides currently in use on farms that derive from World-War-II-era nerve gas: methidathion, oxydemeton-methyl, methamidophos, and ethoprop."

http://www.worldfuturefund.org/Projects/greenrevolution7.html

Environmental groups and farmworker advocates have sued the Environmental Protection Agency, arguing that four pesticides derived from WWII-era nerve gas agents should be banned. The four pesticides are methidathion, oxydemeton-methyl, methamidophos, and ethoprop. "They are acutely toxic and cause systemic illnesses to humans and wildlife by inhibiting the ability to produce cholinesterase, an enzyme necessary for the proper transmission of nerve impulses. Symptoms of cholinesterase inhibition include muscle spasms, confusion, dizziness, loss of consciousness, seizures, abdominal cramps, vomiting, diarrhea, cessation of breathing, paralysis, and death. Acute poisonings can also cause chronic (long-term) effects, such as permanent nerve damage, loss of intellectual functions, and neurobehavioral effects."

Time to Stop Using Nerve Gas on Farms? – The Daily Green http://www.ecochem.com/1_news.html

"A recent study identifies approximately 400 coastal 'dead zones' around the globe, covering an area of 245,000 km2. These are marine waters that are so oxygen depleted they can no longer sustain life. The main culprit: chemical fertilizer runoff."

Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life, November 2008, www.etcgroup.org

Glossary

The patent on glyphosate has meanwhile expired in most countries. Herbicides containing glyphosate are now also being produced by other corporations, e.g., Touchdown by Syngenta or Durango by Dow AgroSciences.

http://www.keine-gentechnik.de/dossiers/roundup-und-gentechnik-pflanzen/fakten-zu-roundup-und-glyphosat.html

H

Homestead Act, 1862
> Tafel/Plate 5

"The Homestead Acts were several United States federal laws that gave an applicant ownership of land … this originally consisted of grants totaling 160 acres … of unappropriated federal land … the United States Homestead Acts were initially proposed as an expression of the 'Free Soil' policy of Northerners who wanted individual farmers to own and operate their own farms …The first of the acts, the Homestead Act of 1862 … Anyone who had never taken up arms against the U.S. government … could file an application to claim a federal land grant. … An amendment to the Homestead Act of 1862, the Enlarged Homestead Act, was passed in 1909 and doubled the allotted acreage to 320. Another amended act, the national Stock-Raising Homestead Act, was passed in 1916 and again increased the land involved, this time to 640 acres. …
"Between 1862 and 1934, the federal government granted 1.6 million homesteads and distributed 270,000,000 acres (420,000 sq mi) of federal land for private ownership. …
"The homestead acts were much abused. … people manipulated the provisions of the act to gain control of resources, especially water. … That method was also used by large businesses and speculators to gain ownership of timber and oil-producing land."

http://en.wikipedia.org/wiki/Homestead_Acts (October 16, 2014)

"Since around the beginning of the 1930s, research has been conducted on the extent to which this could at least have amounted to illegitimate appropriation—land-grabbing."

A. M. Sakolski, (1932) The Great American Land Bubble: The Amazing Story of Land-Grabbing, Speculation and Boom from Colonial Times to the Present Time, New York: Harper & Bros., 1932

The Homestead Act caused a huge displacement of the Indians. We were unable to find any evaluation of the forced migration of Indian persons due to the Homestead Act.

I

Iowa Hunger Summit
> Tafel/Plate 11

"The World Food Prize Foundation established the Iowa Hunger Summit as a means to celebrate Iowa's great successes in fighting hunger and poverty and to unite in further action against both." It is held each year during the World Food Prize's week of events in October at the Des Moines Marriott Downtown. "The Iowa Hunger Summit gathers [several hundred] leaders from across Iowa representing community organizations, business and industry, state and local government, social agencies, churches and religious communities, schools and universities, and other groups that lead or participate in projects to confront hunger."

https://www.worldfoodprize.org/en/events/iowa_hunger_summit/

IPC
> Tafel/Plate 9

"The Intellectual Property Committee was a coalition of thirteen US corporations 'dedicated to the negotiation of a comprehensive agreement on intellectual property in the current GATT round of multilateral trade negotiations'. The coalition was formed in March 1986 by Bristol-Myers, DuPont, FMC Corporation, General Electric, General Motors, Hewlett-Packard, IBM, Johnson & Johnson, Merck, Monsanto, Pfizer, Rockwell International and Warner Communications. Members changed throughout 1986 to 1996. By 1994, CBS, DuPont and General Motors quit, and others like Digital Equipment Corporation, Procter & Gamble, and Time Warner had joined."

https://en.wikipedia.org/wiki/Intellectual_Property_Committee_(US_private_coalition) (October 16, 2014)

"Once created, the first task of the IPC was to repeat the missionary work we did in the U.S. in the early days, this time with the industrial associations of Europe and Japan, to convince them that a code was possible. … It was not an easy task but our Trilateral Group was able to distill from the laws of the more advanced countries the fundamental principles for protecting all forms of intellectual property. Besides selling our concepts at home, we went to Geneva where [we] presented [our] document to the staff of the GATT Secretariat. We also took the opportunity to present it to the Geneva-based representatives of a large number of countries. What I have described to you is absolutely unprecedented in GATT. Industry has defined a major problem for international trade. It crafted a solution, reduced it to a concrete proposal, and sold it to our own and other governments. The industries and traders of world commerce have played simultaneously the role of patients, the diagnosticians, and the prescribing physicians."

James Enyart (Monsanto), A GATT Intellectual Property Code, Les Nouvelles, June 1990

J

John Locke
> Tafel/Plate 9

"Labor creates property, but it also does contain limits to its accumulation: man's capacity to produce and man's capacity to consume. According to Locke, unused property is waste and an offense against nature. However, with the introduction of 'durable' goods, men could exchange their excessive perishable goods for goods that would last longer and thus not offend the natural law. The introduction of money marks the culmination of this process. Money makes possible the unlimited accumulation of property without causing waste through spoilage. … The introduction of money eliminates the limits of accumulation. … Locke is aware of a problem posed by unlimited accumulation but does not consider it his task. He just implies that government would function to moderate the conflict between the unlimited accumulation of property and a more nearly equal distribution of wealth and does not say which principles that government should apply to solve this problem. … Moreover, Locke anchors property in labor but in the end upholds the unlimited accumulation of wealth."

http://en.wikipedia.org/wiki/John_Locke#Theory_of_value_and_property (October 16, 2014)

K

Kenneth Quinn
> Tafel/Plate 11

John Kerry about Kenneth Quinn in his keynote at the announcement of the World Food Prize: "I'm particularly grateful to be introduced by Ken Quinn. I was sitting there thinking, listening to Ken, General MacArthur said old soldiers never die, they just fade away. Well, old Foreign Service officers never die either, but they don't fade away, obviously. (Laughter.) They just go on to take on new, terrible tasks. And this is a man who knows how to do it. (Applause.) … what an amazing journey we have shared together … And back in 1968, when I was in Vietnam, I got up to this tiny little hamlet on the Mekong River—beautiful, beautiful little place, rice paddies all around it. … And Ken was informing me that he spent a whole year there or so, I guess, as a Foreign Service officer and actually going out on missions with some of our boats and so forth. So we've been intersecting for a long time, and it's an honor to be here with him. Ken is the only Foreign Service officer to receive both the Army Air Medal and the State Department's Medal for Heroism and Valor. And that tells you a lot, folks. (Applause.) … And I think the words 'impossible' and 'intractable' sort of go with his DNA somehow, and he knows how to work through them."

US State Department, http://www.state.gov/secretary/remarks/2013/06/210896.htm

M

Marker Assisted Breeding
> Tafel/Plate 9

"MAS … works like a genetic barcode scanner, analyzing the unique sequence of components in a plant's DNA to identify the desired genes. The process begins by identifying several thousand short, unique stretches of DNA called 'markers' that are distributed throughout the plant's genome. Some of these markers are associated with genes that contribute to the desired traits. During breeding, if a marker is consistently associated with the desired gene—because they are both present or both absent in offspring plants—the marker can be used to track the gene. Thus, once a plant's genetic barcode has been scanned and specific markers identified, it becomes possible to screen thousands of seedling plants for the presence of the desired gene(s). … Seeds are now like our cell phones and laptops—containers that deliver proprietary technologies. … The gene giants are stocking hundreds of monopoly patents on genes in plants that the companies will market as crops genetically engineered to withstand environmental stresses such as drought, heat, cold, floods, saline soils and more. Beyond the U.S. and Europe, patent offices in major food-producing countries such as Argentina, Australia, Brazil, Canada, China, Mexico and South Africa are also swamped with patent filings."

Earthgrab, Geopiracy, the New Biomassters and Capturing Climate Genes, etc group, Oxford, 2011, Page 141

Monsanto
> Tafel/Plate 4

"Through a series of transactions, the Monsanto that existed from 1901 to 2000 and the current Monsanto are legally two distinct corporations. Although they share the same name and corporate headquarters, many of the same executives and other employees, and responsibility for liabilities arising out of activities in the industrial chemical business, the agricultural chemicals business is the only segment carried forward from the pre-1997 Monsanto Company to the current Monsanto Company. This was accomplished beginning in the 1980s:
- 1985: Monsanto purchased G. D. Searle & Company for $2.7 billion in cash. In this merger, Searle's aspartame business became a separate Monsanto subsidiary, the NutraSweet Company. CEO of NutraSweet, Robert B. Shapiro, became CEO of Monsanto from 1995 to 2000.
- 1996: Acquired Agracetus, a majority interest in Calgene, creators

of the Flavr Savr tomato, and 40% of DeKalb Genetics Corporation. It purchased the remainder of DeKalb in 1998. [Purchased parts of India's biggest seed company, MAHYCO. Purchased Cargill international seed corporations in Latin and Central America.]
- 1997: Monsanto spun off its industrial chemical and fiber divisions into Solutia Inc. This transferred the financial liability related to the production and contamination with PCBs at the Illinois and Alabama plants. In January, Monsanto announced the purchase of Holden's Foundations Seeds, a privately held seed business. By acquiring Holden's, Monsanto became the biggest American producer of foundation corn, the parent seed from which hybrids are made. The combined purchase price was $925 million. Also, in April, Monsanto purchased the remaining shares of Calgene.
- 1999: Monsanto sold off NutraSweet Co. and two other companies. In December, Monsanto merged with Pharmacia & Upjohn, and the agricultural division became a wholly owned subsidiary of the 'new' Pharmacia; the medical research divisions of Monsanto, which included products such as Celebrex, were rolled into Pharmacia.
- 2000 (October): Pharmacia spun off its Monsanto subsidiary into a new company, the 'new Monsanto.' As part of the deal, Monsanto agreed to indemnify Pharmacia against any liabilities that might be incurred from judgments against Solutia. As a result, the new Monsanto continues to be a party to numerous lawsuits that relate to operations of the old Monsanto. (Pharmacia was bought by Pfizer in a deal announced in 2002 and completed in 2003.)
- 2005: Monsanto acquired Emergent Genetics and its Stoneville and NexGen cotton brands. Emergent was the third largest U.S. cotton seed company, with about 12 percent of the U.S. market. Monsanto's goal was to obtain 'a strategic cotton germplasm and traits platform.' [February 2005: Emergent Genetics Inc.]
- 2007: In June, Monsanto completed its purchase of Delta and Pine Land Company, a major cotton seed breeder, for $1.5 billion. As a condition for approval of the purchase from the Department of Justice, Monsanto was obligated to divest its Stoneville cotton business, which it sold to Bayer, and to divest its NexGen cotton business, which it sold to Americot. Monsanto also exited the pig breeding business by selling Monsanto Choice Genetics to Newsham Genetics LC in November, divesting itself of 'any and all swine-related patents, patent applications, and all other intellectual property.'
- 2008: Monsanto purchased the Dutch seed company De Ruiter Seeds for €546 million, and sold its POSILAC bovine somatotropin brand and related business to Elanco Animal Health, a division of Eli Lilly in August for $300 million plus 'additional contingent consideration.' [July 2009: WestBred: genetically modified wheat]

http://en.wikipedia.org/wiki/Monsanto (October 16, 2014)

Monsanto Sizing
> Tafel/Plate 9

"The US company Monsanto recently filed patent application WO2008021413, which … makes 175 claims to misappropriate various gene sequences and genetic variations … Monsanto … explicitly claims all relevant maize and soy plants inheriting those genetic elements and its uses in food, feed and biomass. In a further patent application, WO2009011847, Monsanto makes broad claims covering methods for cattle breeding, for the animals themselves as well as 'milk, cheese, butter and meat.'"

https://www.testbiotech.org/en/node/352

Monsieur Yacouba Sawadogo and Monsieur Mathieu Ouédraogo
> Tafel/Plate 10

"Yacouba Sawadogo is a farmer from the west African nation of Burkina Faso who has been successfully using traditional farming techniques from the region to restore soils damaged by desertification and drought. … Together with Mathieu Ouédraogo, another local farm innovator, [he] began experimenting with techniques for rehabilitating damaged soil in about 1980. He relies on simple approaches traditional to the region: cordons pierreux and zaï holes. Both Sawadogo and Ouédraogo have engaged in extension and outreach efforts to spread their techniques throughout the region."

http://en.wikipedia.org/wiki/Yacouba_Sawadogo (October 16, 2014)

"Sawadogo's experiments worked: by concentrating water and fertility in pits, he increased crop yields. But the most significant result was one he hadn't anticipated: tiny trees began to sprout amid his rows of millet and sorghum, thanks to seeds contained in the manure. As one growing season followed another, it became apparent that the trees—now a few feet high—were further increasing crop yields while also restoring soil fertility. …
"Sawadogo's struggle may seem small, but it is part of the most important test humanity now faces. No matter what happens at Copenhagen or beyond, the world is locked in to decades of temperature rise and the associated climate impacts: deeper droughts, fiercer floods, more pests. … The tree-based farming that Sawadogo and hundreds of thousands of other poor farmers in the Sahel have adopted could help millions of their counterparts around the world cope with climate change. Already these practices have spread across vast portions of Burkina Faso and neighboring Niger and Mali, turning millions of acres of what had become semi-desert in the 1980s into more productive land. The transformation is so pervasive that the new greenery is visible from outer space via satellite pictures. With climate change, much more of the planet's land will be hot and arid like the Sahel. It only makes sense, then, to learn from the quiet green miracle unfolding there."

Mark Hertsgaard, Regreening Africa, The Nation, November 19, 2009, http://markhertsgaard.com/regreening-africa/

Motorcycle
> Tafel/Plate 10

"'I think trees are at least a partial answer to climate change, and I've tried to share this information with others,' Sawadogo adds. 'I've used my motorbike to visit about a hundred villages, and others have come to visit me and learn. I must say, I'm very proud these ideas are spreading.' To be clear, these farmers are not planting trees, as Nobel Prize-winning activist Wangari Maathai has promoted in Kenya with her Greenbelt Movement. They are simply growing and nurturing the ones that sprout naturally. Planting trees is much too expensive and risky for really poor farmers. Studies in the western Sahel have found that about 80 percent of planted trees die within a year or two. By contrast, trees that sprout naturally are native species and thus more resilient. And of course they cost nothing."

Mark Hertsgaard, Regreening Africa, The Nation, November 19, 2009, http://markhertsgaard.com/regreening-africa/

Multi-Genome Patent Grab
> Tafel/Plate 9

"The genomics approach is especially attractive to Gene Giants because it gives them an opportunity to make sweeping patent claims that extend far beyond a single crop… Many of the patents claim isolated DNA sequences that are associated with abiotic stress tolerant traits. Because of the similarity in DNA sequences between individuals of the same species or among different species … the patent claims extend not just to abiotic stress tolerance in a single engineered plant species, but also to a substantially similar genetic sequence in virtually all transformed plants. The claims typically include any gene or protein with 'substantial identity' that is associated with abiotic stress tolerance in transgenic plants, as well as methods for using the isolated gene sequences to engineer the plant to respond to abiotic stress. For example, DuPont's (Pioneer Hi-Bred) November 2007 patent for 'transcriptional activators involved in abiotic stress tolerance' claims a method for expressing the genetic sequences in a plant that improves its cold and/or drought tolerance … The claims are not limited to drought/cold tolerance in a single crop, but to use of the technology in transgenic monocots (maize, barley, wheat, oat, sorghum or rice) and dicots (soybean, alfalfa, safflower, tobacco, sunflower, cotton or canola). Monocots and dicots are the primary classes of flowering plants. Nearly all of the world's food supply comes from flowering plants. …"
A Syngenta patent application also seeks extremely broad claims. It claims gene sequences that confer abiotic stress tolerance—including "cold stress, salt stress, osmotic stress or any combination thereof."
The claims extend to a "substantially similar" gene sequence from a monocot or a dicot plant, from a cereal (including maize, rice, wheat, barley, oat, rye, millet, milo, triticale, orchardgrass, guinea grass, sorghum and turfgrass). Also claimed are methods for using the specified gene sequences as vectors, expression cassettes, as well as plants containing such polynucleotides to alter the responsiveness of a plant to abiotic stress.

Earth Grab: Geopiracy, the New Biomassters and Capturing Climate Genes, www.etcgroup.org

NO

Nature meets itself in the stomach of the predators
> Tafel/Plate 4

"In the stomach of the predators, nature has provided the battlefield of union, the crucible of closest fusion, the organ connecting the various animal species," writes Marx as a summary in his first article on the regularization of forest use, which he presented to the Rheinische Landtag in 1842. Old feudal rights of use such as wood and berry collection were being adapted to the new property rights of the rural aristocracy, that is to say leveled. The summary was intended for the representatives of the aristocracy, who, despite being united in greed, were suspiciously monitoring who would be able to gain maximum advantage from the legislation.

Karl Marx: Debates on the Law on Thefts of Wood, 1842 http://www.marxists.org/archive/marx/works/download/Marx_Rheinishe_Zeitung.pdf

New Deal on Global Food Policy
> Tafel/Plate 8

"A principal actor among these institutions is the International Financial Corporation (IFC), the private sector of the World Bank Group, which finances private investments in the developing world by advising governments … and encouraging 'business enabling environments' in developing countries. … Working alongside the IFC is the Foreign Investment Advisory Board (FIAS), which promotes private investment by improving the 'investment climate' of developing countries. … During the height of the 2008 food price crisis, the World Bank called for a New Deal on Global Food Policy, which pushed for a vast increase in agricultural production. … IFC investments capitalize on the fact that high food prices have triggered a 'financial revolution' in agriculture after years of underinvestment in the sector. Driven by the belief that high food prices offer unique opportunities for emerging markets … Moreover, in February 2009, the IFC formed an alliance with Altima Partners to invest in farming operations and agricultural land in 'emerging market countries.' The new $625 million Altima One World Agricultural Development Fund is IFC's largest equity investment in its expanding agribusiness portfolio."

http://www.oaklandinstitute.org/great-land-grab-rush-world%E2%80%99s-farmland-threatens-food-security-poor

Nitrogen Fertilizer
> Tafel/Plate 5

By the end of World War II, the US had built 10 large-scale nitrate factories to make bombs. With Europe's and Japan's production facilities in ruins, the US entered the postwar period as the undisputed global champion of nitrogen production. The industry quickly shifted from munitions to fertilizer and domestic consumption began to skyrocket, driven, writes Vaclav Smil, by the rise of new hybrid strains of corn, "the first kind of high-yielding grain cultivar dependent on higher fertilizer applications."

Vaclav Smil, Enriching the Earth, Cambridge: MIT Press, 2004 http://foodpolicyforthought.wordpress.com/2013/04/27/10-things-i-didnt-know-about-nitrogen-fertilizer/

Occupy World Food Prize
> Tafel/Plate 11

"The World Food Prize (WFP) organizers say the speakers they invited to participate in the WFP ceremonies in Des Moines on October 16–20, 2012, represent a broad spectrum of the international food and agriculture industry, including persons involved in sustainable farming. A brief glance at the information below reveals not diversity but a smothering blanket of corporate uniformity. Although WFP speakers and their charities work to alleviate world hunger, their efforts are inevitably affected by the policies of their principal donors, such as the Gates Foundation and Monsanto. Donors like these do not support policies and programs that significantly deviate from their own agendas. Food policies that spurn GM seeds and pesticides in favor of organic and small sustainable farming usually lose out to agribusiness. Agribusiness and chemical corporations exist ultimately for profit, not the public welfare. Occupy the World Food Prize believes the WFP committee has not delivered a fair and balanced program of speakers. Representatives of organic and sustainable agriculture have been ignored and thus denied the same opportunities as their corporate counterparts to be heard at the ceremonies."

http://occupytheworldfoodprize.com/about,(link no longer works)

P

Packages / Impacts
> Tafeln/Plates 5/6

"In the 1960s at the beginning of the first Green Revolution, the Rockefeller and Ford Foundations promoted industrial-style agriculture in the Global South through technology 'packages' that included modern varieties (MVs), fertilizer, pesticides, and irrigation. … seminal studies revealed that the Green Revolution's expensive 'packages' favored a minority of economically privileged farmers, put the majority smallholders at a disadvantage, and led to the concentration of land and resources."

*http://www.academia.edu/2891404/Food_First_Policy_Brief_No._12_Ten_Reasons_Why_the_Rockefeller_and_the_Bill_and_Melinda_Gates_Foundations_Alliance_*

for_Another_Green_Revolution_Will_Not_Solve_the_Problems_of_Poverty_and_Hunger_in_Sub-Saharan_Africa

World's Top 3 Fertilizer Corporations, 2009
Yara, Norway – 12%
Mosaic, USA – 11%
Agrium, Canada – 10%
Globally, consumption of industrial fertilizers increased 31% from 1996 to 2008 due to increases in livestock production and agro-fuel crop plantings.

World's Top 4 Pesticide Corporations, 2009
Syngenta – 19%
Bayer – 19%
BASF – 11%
DOW – 10%
"In 2007 the four largest pesticide companies reported double-digit sales jumps. Pesticide revenues are up in nearly all regions, but Latin America (particularly Brazil, Argentina and Mexico) and Eastern Europe were the key growth markets."

Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life, November 2008, www.etc.group.org

"A recent study identifies approximately 400 coastal 'dead zones' around the globe, covering an area of 245,000 km2. These are marine waters that are so oxygen-depleted they can no longer sustain life. The main culprit: chemical fertilizer runoff."

Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life, November 2008, www.etcgroup.org

Use of glyphosate worldwide: ca. 1 million tons, 2010
Ca. 40,000 fatal poisonings in the Third World
25% of banned pesticides are exported …

http://www.epa.gov/oppfead1/international/trade/

The patent on glyphosate has meanwhile expired in most countries. Herbicides containing glyphosate are now also being produced by other corporations, e.g., Touchdown by Syngenta or Durango by Dow AgroSciences.

http://www.keine-gentechnik.de/dossiers/roundup-und-gentechnik-pflanzen/fakten-zu-roundup-und-glyphosat.html

Packages / Impacts: Global Pesticide Consumption
> Tafel/Plate 5

1960	1970	1980
850 mil. USD	2,7 mil. USD	11,6 mil. USD

Global pesticide consumption and pollution: with China as a focus, WenJun Zhang et al., 2011, http://www.iaees.org/publications/journals/piaees/articles/2011-1(2)/Global-pesticide-consumption-pollution.pdf

Packages / Impacts: World Trends in Fertilizer Use
> Tafel/Plate 5

World total:	1959/60	1989/90	2020
	27.4	143.6	208.0
Nitrogen	9.5	79.2	115.3
Phosphate	9.5	37.5	56.0
Potash	9.7	20.6	56.0

http://www.ifpri.org/sites/default/files/publications/vb38.pdf

PERMANENT PEOPLES' TRIBUNAL
> Tafel/Plate 1

SESSION ON AGROCHEMICAL TRANSNATIONAL CORPORATIONS, Bangalore, December 3–6, 2011

"This session of the Permanent Peoples' Tribunal (PPT) completes a long process of investigation started in July 2008, when representatives of Pesticides Action Network (PAN) presented a request of intervention in order to investigate how and in which terms the activities of the transnational agrochemical corporations cause 'massive death, terrible harm to health, plunder of the environment and destruction of ecological balance and biodiversity' (letter of request). Due to the impossibility for the victims and survivors to have effective recourse to legal avenues for justice … the PPT decided to hold the session in Bangalore, from 3rd to 6th December 2011, after two years of intense work gathering and documenting cases.

"In accordance with the program … witnesses, technical witnesses and survivors made oral presentation of specific cases and submitted supporting documents. As established in its Statute, the Tribunal notified the legal representatives of the transnational corporations headquartered in Germany (Bayer and BASF), Switzerland (Syngenta) and the United States (Monsanto, DuPont, Dow Chemical Company). The situation presented to the Tribunal in terms of human rights violations by and through agrochemical transnational corporations (TNCs) can be summarized as follows. Bayer, BASF, Dow, DuPont, Monsanto and Syngenta are major agrochemical TNCs, involved in the production of both agrochemicals and proprietary seeds (including hybrid seed and genetically modified seed). Combined, those six companies have a 72% share of the global pesticide market … Linked to the power and influence of these corporations is a recurring picture of abuse of this power ranging from bribery (direct and indirect), threats, and harassment to weakening regulations, producing misleading, erroneous or even false information and data and untruthful and aggressive marketing and promotion of hazardous pesticides and of genetically modified (GM) seed. … As a consequence, highly toxic pesticides are produced, marketed and used, resulting in great suffering and in violations of rights, which largely affect small farmers, farm laborers, the poor and powerless. Violations of rights and suffering also occurred through the introduction and use of genetically modified crops on their own terms and in combination with the use of hazardous agrochemicals. The problem of hazardous agrochemicals in this context is worsened by the failure of glyphosate to control weeds, which enhances the use of pesticides such as 2,4-D and dicamba, and the genetic modification of crops so that they can tolerate such harmful herbicides.
"The Tribunal makes the following declaration of responsibility for the six indicted TNCs and three Governments in particular and further also declares the responsibilities of all States, international organizations, UN Specialist Agencies, all other institutions of global governance.

"CONCERNING THE INDICTED SIX CORPORATIONS (BASF, BAYER, DOW CHEMICAL, DUPONT, MONSANTO)
The Tribunal finds on all evidence presented before it the six TNCs prima facie responsible for gross, widespread and systematic violations of the right to health and life, economic, social and cultural rights, as well as of civil and political rights, and women and children's rights. The Tribunal further finds that their systematic acts of corporate governance have caused avoidable catastrophic risks, increasing the prospects of extinction of biodiversity, including species whose continued existence is necessary for reproduction of human life.

"CONCERNING THE THREE SPECIFICALLY INDICTED STATES
The United States of America (USA), the Swiss Confederation (Switzerland) and the Federal Republic of Germany (Germany) have demonstrably failed to comply with their internationally accepted responsibility to promote and protect human rights, especially of vulnerable populations and their specific customary and treaty obligations in the sphere of environment protection in the following ways:
The three States, where six corporations are registered and headquartered, have failed to adequately regulate, monitor and discipline these entities by national laws and policy; the concerned States have not as fully respected the human rights of freedom of speech, expression, and association of citizens and persons within their own jurisdictions protesting against the move toward a second Green Revolution, not having learned the lesson of the first."

Members of the jury: Upendra Baxi (India), Elmar Altvater (Germany), Ibrahima Ly (Senegal), Paolo Ramazzotti (Italy), Ricarda Steinbrecher (UK), Gianni Tognoni (Italy)

"Programme of the Session; Bangalore, December 4, 2011
9:15 AM – 9:40 AM: Witness 1: Roundup Ready (RR) Soy Case – Javier Souza, (RAPAL, Argentina)
9:40 AM – 10:05 AM: Witness 2: Poisoning of Silvino Talavera Case – Petrona Villasboa (Paraguay)
11:05 AM – 11.30am: Witness 4: Endosulfan Poisoning / Aerial Spraying Case – Jayakumar Chelaton, (Thanal, India)
11.30 AM – 11:55 AM: Witness 5: Endosulfan Poisoning Case – Dr. Y. S. Mohankumar (Kasargod, India)
11.55 AM – 12:20 PM: Witness 6: Endosulfan Poisoning Case – Dr. Mohammed Asheer (Kasargod, India)
1:30 PM –1:55 PM: Witness 7: US farmers vs. Monsanto – David Runyon (US)
1.55 PM – 2.20 PM: Witness 8: Presentation on the Poisoning of the Arctic Case – Kathryn Gilje (PAN North America)
2:20 AM – 2:45 PM: Witness 9: Death of Bees / Philipp Mimkes (CBG Network, Germany)
2:45 AM – 3:10 PM: Witness 10: Death of Bees / Graham White (Beekeeper, UK)
3:10 PM – 3:35 PM: Witness 11: Atrazine and Harassment Case – Dr. Tyrone Hayes (University of California, Berkeley, USA)
3:35 PM – 4:00 PM: Witness 12: Obsolete Pesticide Dumps Case – About Thiam (PAN Africa, Senegal)
4:30 PM – 4:55 PM: Witness 13: Child Labour Case (MV Foundation) – Mr Shankar (India)
4:55 PM – 5:20 PM: Witness 14: Child Labour Case (child) – Ashwini (India);
5:20 PM – 5:45 PM: Witness 15: Paraquat Poisoning – Nagama Raman (Pesticide Sprayer, Malaysia)

Email: tribunale@internazionalelelliobasso.it; fillb@iol.it
Web: http://www.internazionalelelliobasso.it
http://www.pan-uk.org/files/PPT%20Draft%20Finding%20and%20Recommendations.pdf

Philanthrocapitalism
> Tafel/Plate 3

See: Global Crop Diversity Trust
See: World Food Prize

The Pink Bollworm Eradication Program
> Tafel/Plate 6

"Objective: To eradicate the pink bollworm from all cotton-producing areas of the U.S. … The pink bollworm is costing U.S. cotton producers more than $32 million each year in control costs and yield losses. To eliminate this annual burden, in 2002, the industry began Phase I of a program to eradicate this key cotton pest."

http://www.cotton.org/tech/pest/bollworm/

Monsanto invented and sells agricultural seeds that are genetically modified to make a crystalline insecticidal protein from *Bacillus thuringiensis*, known as Bt Cotton Mon 531 / Bt Maize BR Soya. Adoption rate of Bt transgenic cotton varieties in 1996–2009, in 12 countries / per area under crops: Australia – 95%; Burkina Faso – 29%; China – 60%; India – 89%; South Africa – 98%; USA – 88%

https://en.wikipedia.org/wiki/Bt_cotton (October 16, 2014)

Pioneer Hi-Bred / DuPont Pioneer
> Tafel/Plate 4

- 1924 Henry Wallace begins selling 'Copper Cross', the first commercial hybrid seed corn.
- 1926 Hi-Bred Corn Company founded in Des Moines, Iowa, with $7,000 in capital.
- 1931 Roswell Garst agrees to produce/distribute seed. The following year Garst partners with Charles Thomas to form the 'Garst and Thomas Seed Corn Company'.
- 1935 'Pioneer' was added to the name of the company to distinguish it from other hybrid corn companies. The full name is 'Pioneer Hi-Bred Corn Company'.
- 1936 Pioneer founds Hy-Line Poultry Farms (later Hy-Line International) to produce hybrid egg-laying chickens. Henry B Wallace (son of Henry A Wallace) serves as president of Hy-Line until 1975. …
- 1970 The company name is changed to Pioneer Hi-Bred International, Inc. …
- 1973 Becomes a publicly traded company.
- 1973 Pioneer obtains a soybean product line through the purchase of Peterson Seed Company.
- 1975 Purchases Lankhartt and Lockett companies (cotton seed business).
- 1977 Pioneer acquires Microbial Products division to develop bacterial strains for inoculation into silage.
- 1978 Hy-Line International is spun off.
- 1981 Pioneer becomes the market-share leader in North America corn sales.
- 1982 Annual sales pass the US$10 million mark.
- 1991 Pioneer purchases 2 million shares and establishes a partnership with Mycogen Seeds to develop Bt insect resistance in corn, sorghum, soybean, canola, sunflower, and other seeds. Pioneer sold the shares in 1998. Pioneer becomes the number one brand of soybeans in North America.
- 1992 Pioneer paid $450,000 to Monsanto for rights to genetically modified soybean seeds that are resistant to Roundup herbicide.
- 1993 Pioneer paid $38 million to Monsanto for rights to Bt corn that is resistant to European corn borers.
- 1996 Pioneer acquires 20% stake in Sunseeds Co. (a hybrid vegetable seed producer)
- 1997 DuPont acquires a 20% stake in Pioneer and the companies form a joint venture called Optimum Quality Grains LLC.
- 1999 DuPont purchases the remaining 80% of Pioneer for $7.7 billion.
- 2006 DuPont and Syngenta announce Greenleaf Genetics, a joint venture to market seed genetics and biotech traits.
- 2010 DuPont and Syngenta end their joint venture, Greenleaf Genetics, with Syngenta retaining complete ownership.
- 2012 Pioneer announces update to business name to be DuPont Pioneer.
- 2012 Lawsuit regarding pesticides and dust by 200 residents of Waimea, Kauai against Pioneer Hi-Bred International, a DuPont company.

http://en.wikipedia.org/wiki/Pioneer_Hi-Bred (October 16, 2014)

Punjab
> Tafel/Plate 5

Area under IR8 rice:
1967 – 54% / 1984 – 95%
"Punjab was selected by the Indian government to be the first site to try the new crops because of its reliable water supply and a history of agricultural success. India began its own Green Revolution program of plant breeding, irrigation development, and financing of agrochemicals."

http://en.wikipedia.org/wiki/Green_Revolution (October 16, 2014)

"The occurrence of drought in 1966 caused a severe drop in food production in India, and an unprecedented increase in food grain supply from the US. … The US President, Lyndon Johnson … refused to commit food aid beyond one month in advance until an agreement to adopt the Green Revolution package was signed between the Indian agriculture minister … and the US Secretary of agriculture …"

Vandana Siva, The Violence of the Green Revolution, New Delhi, 2010

R

Roundup Ready
> Tafel/Plate 6

"Roundup Ready Crops (RR Crops) are genetically engineered crops that have had their DNA altered to allow them to withstand the herbicide glyphosate (the active ingredient of Monsanto's herbicide Roundup). They are also known as 'glyphosate tolerant crops.' RR crops deregulated in the U.S. include: corn, soybeans, canola, cotton, sugarbeets, and alfalfa."

"The patent on the first type of *Roundup Ready* crop that Monsanto produced (soybeans) expires in 2014. Monsanto has broadly licensed the patent to other seed companies … About 150 companies have licensed the technology."

http://www.sourcewatch.org/index.php/Roundup_Ready_Crops
http://en.wikipedia.org/wiki/Monsanto (October 16, 2014)

Glossary

The GM Roundup Ready ("RR") soybeans took only a few years to become established in Argentina. This crop swept onto the market as the financial crisis hit Argentina in 2001.
While soy cultivation represented only 3,700 hectares in 1971, it had risen to 8.3 million hectares in 2000, 9.3 million by 2001, 11.6 million by 2002 and by 2007 had reached 16 million hectares or 60% of the land in cultivation, giving rise to the phrase "soyization of the country." Argentina 2010: 98% of the cultivated soy is RR soy. Glyphosate use: 200 million liters, ca. 10 liters per hectare

http://www.combat-monsanto.co.uk/spip.php?article299 ,(link no longer works)

S

Sahel drought
> Tafel/Plate 10

"The Sahel drought was a series of historic droughts, beginning in at least the 17th century affecting the Sahel region, a climate zone sandwiched between the African savanna grasslands to the south and the Sahara desert to the north, across West and Central Africa. While the frequency of drought in the region is thought to have increased from the end of the 19th century, three long droughts have had dramatic environmental and societal effects upon the Sahel nations.
"Famine followed severe droughts in the 1910s, the 1940s, and the 1960s, 1970s and 1980s, although a partial recovery occurred from 1975–80. While at least one particularly severe drought has been confirmed each century since the 17th century, the frequency and severity of recent Sahelian droughts stands out. Famine and dislocation on a massive scale—from 1968 to 1974 and again in the early and mid-1980s—was blamed on two spikes in the severity of the 1960–1980s drought period. From the late 1960s to early 1980s famine killed 100,000 people, left 750,000 dependent on food aid, and affected most of the Sahel's 50 million people."

http://en.wikipedia.org/wiki/Sahel_drought (October 16, 2014)

Sample Alliances
> Tafeln/Plates 7/8

Joint ventures between biotech, oil and seed companies:
BP + Mendel Biotechnologies + DuPont Seeds
General Motors + Marathon Oil + Mascome (biotech)
Shell + Codexis
Chevron + Solazyme (biotech) + Weyerhäuser (forestry)

Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life, 2009, www.etcgroup.org

Satellite
> Tafel/Plate 10

"FMNR has spread largely by itself, from farmer to farmer and village to village, as people see the results with their own eyes and move to adopt the practice. Thanks to agro-forestry, satellite photos analyzed by the US Geological Survey can now discern the border between Niger and Nigeria. On the Niger side, where farmers are allowed to own trees and FMNR is commonplace, there is abundant tree cover; on the Nigeria side, where big tree-planting schemes have failed dramatically, the land is almost barren.
"When these images became available in 2008, even FMNR advocates like Reij and Rinaudo were shocked: they had no idea so many farmers had grown so many trees. Combining the satellite evidence with ground surveys and anecdotal evidence, Reij estimates that in Niger alone farmers have grown 200 million trees and rehabilitated 12.5 million acres of degraded land."

Mark Hertsgaard, Regreening Africa: The Nation, November 19, 2009, http://markhertsgaard.com/regreening-africa/

Scanfuel
> Tafel/Plate 8

"A Norwegian company, Scanfuel is operating what is currently noted to be the largest Jatropha plantation in Ghana. The company through its Ghana subsidiary, Scanfuel Ghana Ltd., has acquired 400,000 hectares of land in the Asante Akim North Municipality of the Ashanti Region to plant Jatropha for the production of biodiesel for export. But a visit by ghanabusinessnews.com and the International Correspondent of the European Energy Review to the farms and surrounding villages revealed an enterprise operating with impunity and disregard for local people, their way of life and local laws. According to the Chief of Efirise, one of the settler farmer communities within the operation area of Scanfuel, Amadu Zakari, the company acquired the land from the paramount chief of Agogo, Nana Akuoku Sarpong. He added that Scanfuel subsequently offered to pay GH¢1 per acre of land to the farmers whose land it was taking over.
"According to Zakari, most farmers rejected the offer because the amount was seen as paltry. Scanfuel, however is going ahead with its project, planting and harvesting the Jatropha seeds for processing and expanding by the day. Local people are worried but scared, as they believe there are powerful hands behind Scanfuel.
"Scanfuel uses heavy agric machinery to clear everything in its way including human settlements, crop farms and economic trees. A walk around the farm revealed Dawadawa and shea trees that have been cut down. The Dawadawa tree serves as an essential food and medicinal plant for the local people. The shea tree, apart from serving as food, also has huge economic potentials for local people."

http://emmanuelwrites.blogspot.de/2010_02_01_archive.html

Section 301 / Special 301
> Tafel/Plate 9

"Section 301 of the Trade Act of 1974 is the principal U.S. statute for identifying foreign trade barriers due to inadequate intellectual property protection. The 1988 Omnibus Trade and Competitiveness Act strengthened Section 301 by creating Special 301 provisions, which require the U.S. Trade Representative (USTR) to conduct an annual review of foreign countries' intellectual property policies and practices. By April 30th of each year, the USTR must identify countries that do not offer 'adequate and effective' protection of IPR or 'fair and equitable market access to United States persons that rely upon intellectual property rights.' According to an amendment to the Special 301 provisions by the Uruguay Round Agreements Act, the USTR can identify a country as denying sufficient intellectual property protection even if the country is complying with its TRIPS commitments. These findings are submitted in the USTR's annual Special 301 Report.
"USTR's Special 301 annual reports demonstrate that, from a U.S. perspective, intellectual property protection is weak in developed as well as developing countries and that the willingness of countries to address intellectual property issues varies greatly."

http://itlaw.wikia.com/wiki/Special_301 (October 16, 2014)

Sunday, February 24, 2008, 4:00 PM
> Tafel/Plate 2

Svalbard Global Seed Vault Opening Conference

> See Disaster Capitalism

Surplus Population
> Tafel/Plate 5

Rice Cultivation – Labor per Crop per Hectare per Year, in Days

Malaysia 1951	208
Karnataka, India 1955	309
K. Philippines 1972	102
Q. Philippines 1979	68
California 1977	3

Vandana Siva, The Violence of the Green Revolution, New Delhi, 2010

Rural to Urban Migration in India:
1960 – 21%
1970 – 25%
1990 – 40%

Vandana Siva, ibid.

Filipino Workers Overseas, 1994: 6.21 million
2.56 million contracted
1.8 million as permanent residents
1.8 million undocumented

Kilusang Magbubukid ng Pilipinas: "Historical and Political Perspectives on IRRI, and Its Impact on Asian Agriculture," in: The Great Rice Robbery, A handbook on the impact of IRRI in Asia; Pesticide Action Network Asia and the Pacific, 2007

Svalbard Global Seed Vault
> Tafel/Plate 1

"The Svalbard Global Seed Vault, which is established in the permafrost in the mountains of Svalbard, is designed to store duplicates of seeds from seed collections around the globe. Many of these collections are in developing countries. If seeds are lost, e.g. as a result of natural disasters, war or simply a lack of resources, the seed collections may be reestablished using seeds from Svalbard. The loss of biological diversity is currently one of the greatest challenges facing the environment and sustainable development. The diversity of food crops is under constant pressure. …
"The Seed Vault has the capacity to store 4.5 million different seed samples. Each sample will contain on average 500 seeds, so a maximum of 2.25 billion seeds may be stored in the Seed Vault. The Seed Vault will therefore have the capacity to hold all the unique seed samples that are conserved today by all the approximately 1400 genebanks that are found in more than 100 countries all over the world. In addition the Seed Vault will have capacity to also store many new seed samples that may be collected in the future. … Priority will be given to crops that are important for food production and sustainable agriculture. … The seeds will be stored in minus 18 degrees Celsius. … The low temperature and the limited access to oxygen will ensure low metabolic activity and cause a delay in the aging of the seeds. …
"Food security is a challenge in many developing countries. This is caused by a number of factors, e.g. lack of appropriate infrastructure for preservation of biodiversity. The security provided by Svalbard could consequently be of particular importance for many developing countries. Many developing countries are rich in biodiversity. The Svalbard vault will be an extra security for plant diversity.
"The Svalbard Global Seed Vault is financed by three Norwegian Ministries: The Norwegian Ministry of Foreign Affairs, The Norwegian Ministry of Environment and The Norwegian Ministry of Agriculture and Food. The Seed Vault is built and technically operated by The Directorate of Public Construction and Property. The Nordic Genetic Resource Centre is responsible for the management and operations of the Seed Vault. … The Governor of Svalbard is responsible for the overall security of the Seed Vault. FAO Commission on Genetic Resources for Food and Agriculture (CGRFA) and the Governing Body of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA) provide the Global Framework for the Seed Vault. The seed Vault will contribute to the FAO Global System for Plant Genetic Resources."

http://www.regjeringen.no/en/dep/lmd/campain/svalbard-global-seed-vault.html?id=462220

The website of the Norwegian government forgot to mention that the Seed Vault is co-financed by the Bill & Melinda Gates Foundation, the Rockefeller Foundation and the companies Syngenta, Monsanto and Pioneer/DuPont. Together, these firms dominate 50% of the global seed market. The Rockefeller Foundation was one of the initiators of the Green Revolution in the 1960s, a worldwide campaign to industrialize agriculture, which has to a great extent led to the loss of biodiversity and to soil erosion.

The Gates Foundation regards itself as their successor. It initiated the Alliance for a Green Revolution in Africa (AGRA), which propagates the second, genetically modified industrialization of agriculture on the continent.

Svalbard Agreement
> Tafel/Plate 1

"The Svalbard agreement does provide corporations seeking to patent plant genetics additional advantages in their efforts. … the Svalbard deposit agreement is extremely complicated, opaque, at times downright misleading and involves difficult questions and interpretations of international law. … Numerous seed banks only require a simple Memorandum of Understanding (MOU) with depositors. … By contrast, there is little chance that some seed banks and collections, especially those that are local, smaller scale and… have the legal expertise, or funding to hire attorneys to decipher the myriad complications of the Svalbard contract.
"Meanwhile the GCDT, and its supporting biotech companies and their surrogates, are advertising how they are spending millions of dollars trying to acquire local and smaller seed collections from developing countries for Svalbard. As noted, these local collectors have little chance to understand, much less give informed consent, to what can happen to their deposits."

http://www.seedsnatcher.com/2010/11/amy-goldman-kent-whealys-nemesis-joins.html

Global access to the genetic resources of agricultural crops is regulated by the "International Treaty on Plant Genetic Resources for Food and Agriculture." It came into effect in 2004 and has meanwhile been ratified by 120 states. The treaty that regulates the storage of seeds in Svalbard is also based on the "International Treaty." It guarantees the gene banks that they will remain the owners of the stored material. However, they must give some to anyone who, as a breeder or farmer, requests so. If a breeder would like to have plant seeds stored in Svalbard, however, … a look into the database of the Vault suffices. … To optimize access to the seeds of the gene bank: that's the whole meaning of the database of plants being collected at Spitsbergen. … To this end, at least regulated computer access and the knowledge of its use are preconditions. Something that certainly does not apply to hundreds of millions of farmers today. … The documents of the "International Treaty" show how great the interest in plant-genetic material is: 600 times a day, says Shakeel Bhatti, seed samples from the gene bank are requested via the treaty.
Cross-border requests are mostly made by large seed corporations from the industrialized North that request material from the national gene banks, mostly from the southern hemisphere.
Christoph Then: "It is about monopolizing as much as possible of the naturally existing biological agrobiodiversity via these patents. And the databases are used for this purpose, information on regional varieties are utilized, everything that can be exploited in these patent applications. There are signs in the patents clearly indicating that the centers of biological diversity or the corresponding gene databases have been systematically searched. I believe that the large corporations indeed grasp it as a service facility they can visit to collect the relevant data, based on which they can then consider how to formulate their patent applications."

http://www.heise.de/tp/artikel/30/30303/1.html

Syngenta
> Tafel/Plate 4

"Syngenta was formed in 2000 by the merger of Novartis Agribusiness and Zeneca Agrochemicals. … Novartis was formed of the 1995 merger of the three Swiss companies:
Geigy, which has roots back to 1758; Sandoz Laboratories which was founded in 1876; and Ciba, founded in 1884. Ciba and Geigy had merged in 1971 and had concentrated mainly on crop protection in its agro division, Sandoz more on seeds. Zeneca Agrochemicals was part of AstraZeneca, and formerly of Imperial Chemical Industries. ICI was formed in the UK in 1926. … In 2004, Syngenta Seeds purchased Garst, the North American corn and soybean business of Advanta, as well as Golden Harvest Seeds. … In 2005, Syngenta opposed a Swiss ban on genetically engineered organisms. … Syngenta finances the Syngenta Foundation for Sustainable Agriculture."

http://en.wikipedia.org/wiki/Syngenta (October 16, 2014)

T

Terminator Seeds
> Tafel/Plate 6

"The need was there to come up with a system that allowed you to self-police your technology, other than trying to put on laws and legal barriers to farmers saving seed …" Melvin Oliver, USDA, 1985. The USDA considered this a built-in "gene police."

Vandana Shiva: Stolen Harvest: The Hijacking of the Global Food Supply, 2000, p. 82

"In 1983, Delta & Pine Land (D&PL) joined with the US Department of Agriculture in a project to develop Terminator seeds. It was one of the earliest experiments with GMO. It was a long-term project. …
In March 1998 the US Patent Office granted Patent No. 5,723,765 to Delta & Pine Land for a patent titled, *Control of Plant Gene _Expression*. The patent is owned jointly … by D&PL and the United States of America, as represented by the Secretary of Agriculture. … In a June 1998 interview, USDA spokesman Willard Phelps … explained that USDA wanted the technology to be 'widely licensed and made expeditiously available to many seed companies.'
USDA's Phelps stated that the US Government's goal in fostering the widest possible development of Terminator technology was 'to increase the value of proprietary seed owned by US seed companies and to open up new markets in Second and Third World countries.'"

http://www. Globalresearch.ca/monsanto-buys-terminator-seeds-company/3082

Terminator Seeds
> Tafel/Plate 6

Monsanto acquired Delta and Pine in 1998. "As of 2006, they [terminator seeds] had not been commercialized anywhere in the world due to opposition from farmers, indigenous peoples, NGOs, and some governments. In 2000, the United Nations Convention on Biological Diversity recommended a *de facto* moratorium on field-testing and commercial sale of terminator seeds; the moratorium was re-affirmed … in 2006. … India and Brazil have passed national laws to prohibit the technology."

http://de.wikipedia.org/wiki/Genetic_Use_Restriction_Technology (October 16, 2014)

The Tendency of the Rate of Profit to Fall
> Tafel/Plate 9

"TRIPs caused a revolution in the products and processes available to biologists in general. Compared to the software industry, fixed costs are high and the variable costs of reproducing the new technology are negligible, so competition with price near marginal costs is infeasible. … there is some logic to the notion that Monsanto aims to be the Microsoft of the seed industry."

Brian D. Wright: International Crop Breeding in a World of Proprietary Technology,in: The World Bank Research Observer, 2000

Trade Related Intellectual Property Rights
> Tafel/Plate 9

"The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is an international agreement administered by the World Trade Organization (WTO)… It was negotiated at the end of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) in 1994. The TRIPS agreement introduced intellectual property law into the international trading system for the first time and remains the most comprehensive international agreement on intellectual property to date…
"TRIPS also specifies enforcement procedures, remedies, and dispute resolution procedures. … Its inclusion was the culmination of a program of intense lobbying by the United States, supported by the European Union, Japan and other developed nations. … the United States strategy of linking trade policy to intellectual property standards can be traced back to the entrepreneurship of senior management at Pfizer in the early 1980s, who mobilized corporations in the United States and made maximizing intellectual property privileges the number one priority of trade policy in the United States … After the Uruguay round, the GATT became the basis for the establishment of the World Trade Organization. Because ratification of TRIPS is a compulsory requirement of World Trade Organization membership, any country seeking to obtain easy access to the numerous international markets opened by the World Trade Organization must enact the strict intellectual property laws mandated by TRIPS. For this reason, TRIPS is the most important multilateral instrument for the globalization of intellectual property laws. … Furthermore, unlike other agreements on intellectual property, TRIPS has a powerful enforcement mechanism. States can be disciplined through the WTO's dispute settlement mechanism."

http://en.wikipedia.org/wiki/TRIPS_Agreement (October 16, 2014)

The framework for the TRIPS Agreement was conceived and shaped by three organisations—the Intellectual Property Committee (IPC), Keidanren and the Union of Industrial and Employers' Confederations of Europe (UNICE). IPC is a coalition of 12 large US corporations … Keidanren is the federation of economic organizations in Japan and UNICE is the official mouthpiece of the European industry and business world.

Vandana Shiva, Biopiraterie, Münster 2002, p. 23 (transl. Karl Hoffmann)

Tuesday, February 26, 2008
> Tafel/Plate 1

Opening Ceremony of Svalbard Global Seed Vault
During the whole day: Pre-Arranged Interviews
Attendees: President of the European Commission, Mr. José Manuel Barroso, and Prime Minister of Norway, Mr. Jens Stoltenberg; Location: Press Center, SAS Radisson Hotel
9:35 AM – 9:50 AM: Common Nordic Press Briefing; President of the European Commission, Mr. José Manuel Barroso and Prime Minister of Norway, Mr. Jens Stoltenberg; Location: On the doorstep – outside SAS Radisson Hotel
9:50 AM – Airport to Seed Vault: Black boxes containing seeds from the gene banks of the world's international agricultural research centers, CGIAR, arriving for the opening. 268,000 distinct samples of seeds, from Colombia, Mexico, Canada, the Philippines, Syria, Nigeria, Pakistan, and Kenya, comprising approximately 10 tons, filling 676 boxes.
10:30 AM – 11:15 AM: Official Opening Ceremony
Workers' choir sings *Sleep Little Seedling Young*.
A polar bear made of ice by the artist Olav Storø guards the entrance of the vault. Its heart is made of local seeds that hopefully will sprout as the bear melts during the short summer. Welcome from the stage / Jens Stoltenberg's speech: "With climate change and other forces threatening the diversity of life that sustains our planet, Norway is proud to be playing a central role in creating a facility capable of protecting what are not just seeds, but the fundamental building blocks of human civilization." José Manuel Barroso's speech: "This is a frozen Garden of Eden."; Fredrik Skavlan interviews Cary Fowler, Jessica Kathle, Jacques Diouf. Handover of the key by Øyvind Christoffersen of the Directorate of Public Construction and Property; Fredrik Skavlan interviews Wangari Maathai; Stoltenberg and Barroso and the other guests carry seed boxes into the mountain.
Exit. The guests leave. Polar gospel choir sings *Sov, du vesle spire ung* (Sleep Little Seedling Young).
11:20 AM – 12:00 AM: Media availability/Photo opportunities
12:00 AM: Mr. Barroso and Mr. Stoltenberg depart for Ny-Ålesund
12:30 AM: Press briefing / Media availability

Svalbard Global Seed Vault: Opening ceremony – regjeringen.no

U W

Undo Land Reform
> Tafel/Plate 8

"Commercial land deals are coming into direct conflict with land reform efforts in many developing countries. … In the Philippines, for instance, a series of high-profile deals have clashed with long-running demands for agrarian reform, including land redistribution. … Saudi executives representing big agricultural business have raised concerns about the Philippine agrarian reform … Furthermore, June 2009 media reports suggest that the E.U. is also pressuring the Filipino government to remove its ban on foreign ownership of land through World Trade Organisation (WTO) provisions."

http://www.oaklandinstitute.org/great-land-grab-rush-world%E2%80%99s-farmland-threatens-food-security-poor

United Nations Framework Convention on Climate Change
> Tafel/Plate 7

"The United Nations Climate Change Conferences are yearly conferences held within the framework of the United Nations Framework Convention on Climate Change (UNFCCC). They serve as the formal meeting of the UNFCC Parties (*Conferences of the Parties*) (COP) to assess progress in dealing with climate change, and beginning in the mid-1990s, to negotiate the Kyoto Protocol to establish legally binding obligations for developed countries to reduce their greenhouse gas emissions."
Conferences: 1992: Rio de Janeiro, Agenda 21; 1995: The Berlin Mandate; 1996: Geneva, Switzerland; 1997: The Kyoto Protocol on Climate Change; 1998: Buenos Aires, Argentina; 1999: Bonn, Germany; 2000: The Hague, Netherlands; 2001: Bonn, Germany; 2001: Marrakech, Morocco; 2002: New Delhi, India; 2003: Milan, Italy; 2004: Buenos Aires, Argentina; 2005: Montreal, Canada; 2006: Nairobi, Kenya; 2007: Bali, Indonesia; 2008: Poznan, Poland; 2009: Copenhagen, Denmark; 2010: Cancún, Mexico; 2011: Durban, South Africa; 2012: Doha, Qatar

https://en.wikipedia.org/wiki/United_Nations_Climate_Change_conference (October 16, 2014)

World Food Prize
> Tafel/Plate 11

"The World Food Prize is an international award recognizing the achievements of individuals who have advanced human development by improving the quality, quantity, or availability of food in the world. … In 1985, [Nobel Peace Prize Laureate Norman] Borlaug met with the chief executive of General Foods Corporation, James Fergusen. Norman Borlaug presented his long standing desire for the establishment of a major prize for agriculture. …"
In 1990, the businessman and philanthropist John Ruan assumed sponsorship of the Prize and established the World Food Prize Foundation, located in Des Moines, Iowa. The prize recognizes contributions in all fields involved in the world food supply—food and agriculture science and technology, manufacturing, marketing, nutrition, economics, poverty alleviation, political leadership and the social sciences. Laureates are honored and officially awarded their prize in Des Moines, Iowa, in a televised award ceremony.

http://en.wikipedia.org/wiki/World_Food_Prize (October 16, 2014)

World Food Prize Donors
> Tafel/Plate 11

"This is the 10th year that the State Department has hosted the World Food Prize's announcement ceremony … But while the US government's involvement might suggest that the prize is a neutral barometer of agricultural excellence, funders of the foundation which backs it have a vested interest in promoting industrialized farming around the world. … Out of 125 donors who contributed more than $500 between fiscal years 2009 and 2011 … 26 were either agribusiness or charities directly affiliated with agribusiness. Together, donations from these companies amounted to more than 28 percent of funds raised for that period … The combined support of ADM, Cargill, Monsanto, and General Mills alone for this period came to more than a half million dollars.
"Powerful, policy-driving charities are also among the prize's top backers. The Gates Foundation and the Rockefeller Foundation … made combined donations worth $1.93 million between 2009 and 2011 … In recent years, many World Food Prize recipients have been champions of exactly the kind of industrial-scale agriculture that is the livelihood of the award's corporate backers. … Jo Luck and Pedro Sanchez, who won the prize in 2010 and 2002, respectively, began serving on a policy advisory committee for DuPont. In 2011, the ex-Ghanaian president John Kufuor was awarded … Kufuor's leadership also saw consolidation of the agriculture industry and increased investment from US agribusiness."

http://www.motherjones.com/blue-marble/2013/06/why-did-john-kerry-announce-world-food-prize

World Food Prize Laureates
> Tafel/Plate 11

"Washington, D.C. (June 19, 2013) – Three distinguished scientists—Marc Van Montagu of Belgium, and Mary-Dell Chilton and Robert T. Fraley of the United States—were today named the winners of the 2013 World Food Prize during a ceremony at the U.S. State Department, where Secretary of State John Kerry delivered the keynote address. Mr. John Ruan III, Chairman of the World Food Prize, also participated in the ceremony. … Ambassador Kenneth M. Quinn, President of the World Food Prize, emphasized … 'These three sci-

entists are being recognized for their independent, individual breakthrough achievements in founding, developing, and applying modern agricultural biotechnology' … Marc Van Montagu, who is Founder … of the Institute of Plant Biotechnology Outreach at Ghent University in Belgium; Mary-Dell Chilton, who is Founder … of Syngenta Biotechnology; and Robert T. Fraley, the Executive Vice President … of Monsanto, will be formally awarded the World Food Prize at the 27th Annual Laureate Award Ceremony at the Iowa State Capitol on October 17, in conjunction with the Borlaug Dialogue international symposium in Des Moines, Iowa, focused this year on 'The Next Borlaug Century: Biotechnology, Sustainability and Climate Volatility.'"

http://www.worldfoodprize.org/index.cfm/24667/24410/three_biotechnology_scientists_awarded_2013_world_food_prize

World's Top 10 Seed Companies, 2009
> Tafel/Plate 4

Seed Sales /	US$ million	Market Share
Monsanto	7.297	27%
DuPont (Pioneer)	4.641	17%
Syngenta	2.564	9%
Limagrain	1.252	5%
Land O' Lakes	1.100	4%
KWS AG	997	4%

Just 3 companies control more than half (53%) of the global commercial seed market.

Who Will Control the Green Economy?, 2011, www.etc.group.org

Z

Zaï
> Tafel/Plate 10

"Zaï or Tassa are planting pits dug in the soil to catch water that were traditionally used in western Sahel (Burkina Faso, Niger, Mali) to restore degraded drylands and increase soil fertility. Zaï holes are being reintroduced since the 1980s by Yacouba Sawadogo, a farmer from Burkina Faso, who introduced the innovation of filling them with manure and other biodegradable waste to provide plant nutrients. The manure attracts termites, whose tunnels help further break up the soil. He also slightly increased the size of the holes over the traditional models. Zaï holes help improving the yields of trees, sorghum, and millet."
"… the zai and other water-harvesting techniques have helped recharge underground water tables. 'In the 1980s water tables were falling by an average of one meter a year,' [Chris] Reij says. 'Since FMNR and the water-harvesting techniques began to take hold, water tables have risen by five meters, despite a growing population.'
In some areas, the water table has risen by as much as seventeen meters. Some analysts have credited increased rainfall beginning in 1994. Reij says that can't explain it: 'The water tables began rising well before that. The effect is felt within one or two years' time.' Studies have documented the same replenishing effects in Niger."

http://en.wikipedia.org/wiki/Za%C3%AF (October 16, 2014)
Mark Hertsgaard, Regreening Africa, The Nation, November 19, 2009: http://markhertsgaard.com/regreening-africa/

Impressum

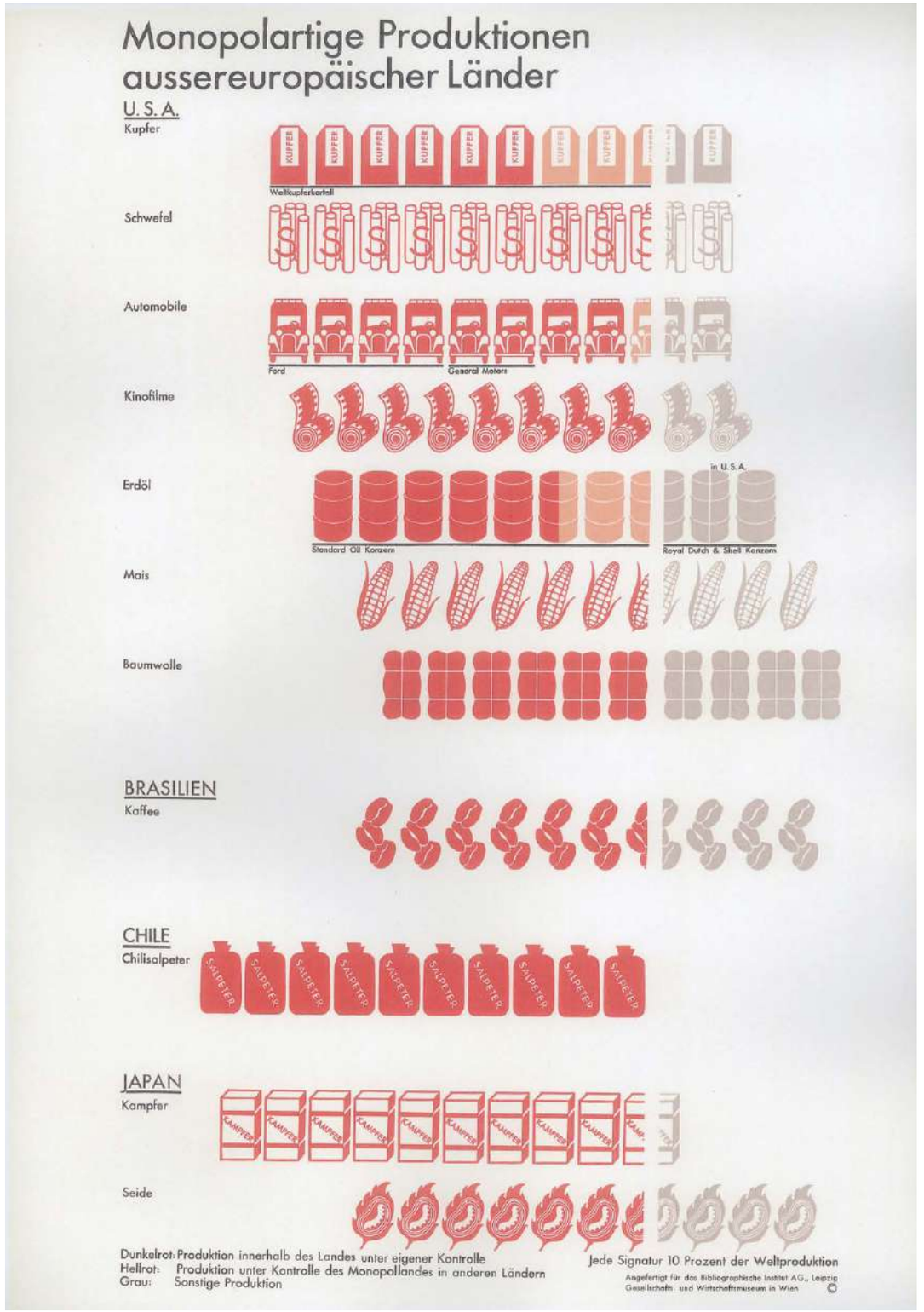
Alice Creischer/Andreas Siekmann
In the Stomach of the Predators
2014

Herausgeber:
kunstraum lakeside
Künstlerische Leitung 2005–2014: Christian Kravagna und Hedwig Saxenhuber
Künstlerische Leitung ab 2015: Hemma Schmutz

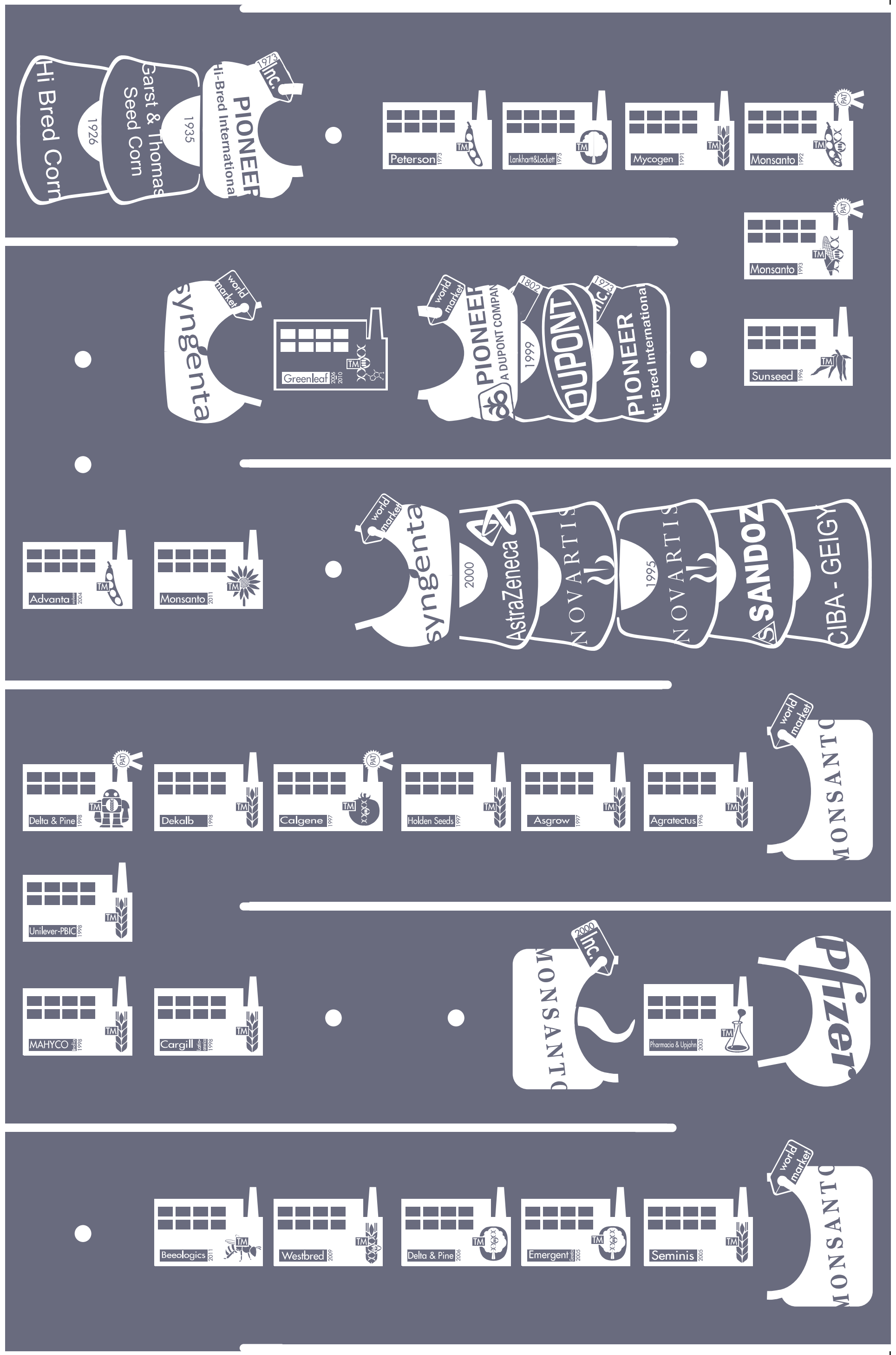
Koordination und Kunstvermittlung: Nora Leitgeb
Assistenz: Anneliese Trapic-Hartl
Technische Betreuung: Robert Schabus
Park Management: Maria Mack

Lektorat deutsch: Iris Weißenböck
Lektorat englisch: Jennifer Taylor
Grafische Gestaltung: Andreas Fogarasi
Druck: REMAprint, Wien

kunstraum lakeside
Lakeside Science & Technology Park
Lakeside B02
9020 Klagenfurt, Austria



Gerd Arntz, Otto Neurath: Gesellschaft und Wirtschaft/Bildstatistisches Elementarwerk, Blatt 59, 1929



Hi Bred Corn
1926
Garst & Thomas Seed Corn
1935
PIONEER
Hi-Bred International
Inc.
1973
Peterson
Mycogen
Monsanto
Sunseed
syngenta
world market
Greenleaf
PIONEER
A DUPONT COMPANY
1999
DUPONT
Advanta
AstraZeneca
2000
NOVARTIS
1995
SANDOZ
CIBA - GEIGY
Delta & Pine
Dekalb
Calgene
Holden Seeds
Asgrow
MONSANTO
Unilever-PBIC
MAHYCO
Cargill
Pharmacia & Upjohn
Pfizer
2000
Beeologics
Westbred
Emergent
Seminis

summer 2023 volume 2 | issue 2 | 209–215

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s*.2310.02212 BOOK REVIEW

Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook by Boris Hessen. Verum Factum, 2022

Damian Moosbrugger

LARGELY UNNOTICED, A TRUE GEM was given to all Marxists and philosophers and historians of science last year. September saw the publication of a long-lost textbook by the Soviet physicist and historian of science Boris Hessen. As the opening volume of the *Verum Factum* book series, Manuscripts and Documents on the *History of Physics: A Historical Materialist Textbook* launches a series that has set the spreading of insights and inquiries into the political dimension of scientific practices and knowledge production as its goal.[1] It brings together different contributions to political epistemology[2] in an open-access format.

Pietro Daniel Omodeo's and Sean Winkler's edition of Hessen's textbook offers not only a complete transcription of the Russian original, but also, and this is probably more decisive for most international scholars, an English translation of the most relevant parts. In addition, the material is introduced by four articles that contextualize and highlight the significance of Hessen's work, thus making the edition an accessible introduction into his views on the relations between science and society.

1. The volume is freely accessible on the website of Verum Factum: https://verumfactum.eu/volumes/manuscripts-and-documents-on-the-history-of-physics/.
2. As used in (Omodeo 2019).

Moosbrugger, Damian. 2023. "Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook by Boris Hessen. Verum Factum, 2022." *Marxism & Sciences* 2(2): 209–215. https://doi.org/10.56063/MS.2310.02212

• *Correspondence:* Damian Moosbrugger, Federal Institute of Technology Zurich.
• e-mail: damian.moosbrugger[at]gess.ethz.ch
• ORCID: 0009-0005-9504-4552
• DOI: 10.56063/MS.2310.02212
• *Received:* 20.07.2023; *Revised:* 05.08.2023; *Accepted:* 06.08.2023
• *Available online*: 05.11.2023

In the first article, Rose-Luise Winkler (2022) provides a sketch of the circumstances of Hessen's life and work within which he wrote the textbook. The reason the nearly 700-pages manuscript had to finally wait 86 years for its publication is that in 1936, when the proofs were ready for printing, he was arrested and sentenced to death—a victim of the Stalinist purges. The manuscript was only rediscovered in 2004.

Sean Winkler (2022) embeds Hessen's thought within the philosophical disputes between 'mechanists' and 'dialecticians' that occurred in the Soviet Union at that time in the second article. According to his characterization, Hessen's views in all his works are "emblematic of the Deborinite approach to dialectical materialism" (Winkler 2022, 45), thus locating him among the latter.[3] Hessen must thus be seen as following an "anti-reductionist natural philosophy" (ibid., 46). Moreover, the article includes a discussion of Hessen's arguments in favour of contemporary developments in physics, namely quantum mechanics and general relativity.

The way Hessen's ideas have been received and circulated internationally is presented by the detailed investigation in the article by Gerardo Ienna (2022). They were first taken up by leftist historians of science in Britain, from where they continually reached scholars all over the world. The overview ends by going through the relatively large number of new editions and translations of Hessen's work that appeared in recent decades. Hence, it becomes clear that his textbook arrives at a time where a renewed interest into his analyses can be experienced.

One possible reason for this is given by Pietro Daniel Omodeo (2022) in the last introductory article. While contemporary science studies has the advantage of conceptualizing science as a contingent cultural phenomenon, rather than approaching objective truth, it nonetheless fails to grasp the larger narrative of modern science. According to Omodeo, this is illustrated by the attacks against the concept of the Scientific Revolution. Instead of dismissing it, the "Scientific Revolution should be understood as the cultural expression of specific relations of power and a specific historical arrangement of society at a global level" (ibid., 176). Such a point of view has the potential to inaugurate and guide a reflection on the role and function of science even today. In this light, he argues, Hessen's analyses can be seen as an "antidote" (ibid.,175) against the problems faced in science studies nowadays.

3. After the Russian Revolution of 1917, Abram Deborin was the leading figure of the 'dialecticians,' who argued against the possibility of reducing nature to mechanical causal explanations and insisted that the laws of dialectics are inherent to nature.

To understand this appraisal, we must first of all turn to the claims Hessen made. Up to now, he has mostly been famous for his paper "The Social and Economic Roots of Newton's *Principia*"—originally a talk he delivered at the Second International Conferences for the History of Science in London in 1931. A new translation has been offered by Freudenthal and McLaughlin recently.[4] Following a materialist conception of history, Hessen (2009) argues that scientific progress cannot not be understood as the accumulated result of individual flashes of genius but must rather be grasped against the background of specific social relations in place. In consequence, he posits a close connection between science on the one hand, and technological and economic development on the other.

More specifically, his paper contains three theses that are based on the figure of Newton and his *Principia*. First, Hessen explains the emergence of classical mechanics as a response to the technological demands placed in the fields of trade and transport, as well as the military and mining industry by the advent of the epoch of merchant capitalism and manufacture. Secondly and somewhat conversely, he relates the absence of certain physical discoveries, specifically the law of conservation of energy, to a lack of technical application thereof—the steam engine in this case. Thirdly, he argues that ideological distortions in science, such as Newton's introduction of God into his world picture, can ultimately be traced back to the class positioning in political struggles of that time.

The theses about the development of early modern science that Hessen presented in this article differ significantly from his usual research focus. This has led some scholars to consider his analysis of Newton as rather ad hoc and superficial. His textbook proves otherwise, however. The topics it covers and the points it makes are similar, partly even identical to what he proposed in his article of 1931. Hessen's materialist history of early modern physics—the cornerstone of which he sees in the emergence of classical mechanics—can thus be seen as the result of larger project, which he probably already started in the late 1920's.

4. In their edition, Freudenthal and McLaughlin (2009) included several texts by Henryk Grossmann from around the same time, in which he makes a similar argument to Hessen, too. Thereby, they introduced the Hessen-Grossman Thesis: "Technology was developed *in order to* facilitate economic development and science developed *by means of* the study of the technology that was being applied or developed" (4, emphasis in the original). With the formulation, they stress the fact that science is not restricted to the immediate improving contribution to technology. Rather, they propose to regard technology as having provided science with its subject matter—machines.

Accordingly, the historical scope which Hessen covers in his textbook is also broadened. The three main parts deal with a number of scientists that were active during the epoch of the Scientific Revolution. Consequently, the context is no longer restricted to England, but expands to Western Europe in general. The basic argument of the first part, however, remains the same: "The remarkable flourishing of the natural sciences in the sixteenth and seventeenth centuries," according to Hessen (2022), "is due to the break-up of feudal ownership, and the development of merchant capital, international maritime transport and heavy industry (mining and metallurgy)" (4).

As in his earlier article, he summarizes the technical problems faced in economic fields that rose to importance with the unfolding of new social relations in early modern Europe and correlates them with mechanical problems of physics. Such a historical materialist approach to science, Hessen concludes, explains "why the great constellation of natural scientists, beginning with Galileo and ending with Newton, chose the problems of terrestrial and celestial mechanics as the main themes of their research" (Hessen 2022, 191).

Hence, with respect to his first thesis, Hessen's textbook does not offer us anything entirely new—some parts are literally the same. Nevertheless, the reader is provided with much more material for illustration. For instance, he brings up sources that discuss the conditions of road and river transport (Hessen 2022, 191–202), as well as quotes that testify to Galileo's interest in military affairs—including gunnery or fortification (ibid., 210–12)—or reports about the already existing complexity of mines (ibid., 214–19). The argument is also framed slightly different in the textbook. The limits of science are not addressed at all. At the same time, the third part includes a much more extensive treatment of the roles played by institutions, which had only been touched upon very slightly in the Newton paper.

There, Hessen asserted that the new scientific endeavours of the 16th and 17th centuries did not receive their original impulse from within the universities. On the contrary, they struggled against them. Instead of being integrated into the old institutions, therefore, these practices took place in specialized, professional schools or in scientific societies, situated outside the traditional university system. Hence, other than the Austrian Marxist and sociologist of science Edgar Zilsel (2003), who argued that modern science resulted from the merger of the methods of "university-scholars"

and "*humanistic literati*" with those of "superior *craftsmen*" (4), Hessen draws a rather one-sided picture of the institutional impact.

Hessen (2022) does not only repeat, but he also quotes more material and sources to illustrate his two-pronged observation in his textbook. The struggle of the universities against 'Cartesianism' in France (2022, 243), for instance, is used to corroborate the fact that the traditional universities—the "bulwarks of scientific reaction and scholasticism" (ibid., 237)—opposed the inclusion of the new sciences. The structure and aims of the new institutions that were formed as a result are discussed more closely in his book through the mentioning of famous examples such as the Florentine Academy del Cimento, the London Royal Society or the Paris Academy of Sciences (ibid., 254–63).

So far, Hessen's article on Newton's Principia appears as a distillate of the findings presented in his textbook. Even though the latter offers more material, it is merely more than an extension—while not a trivial, also not a completely unexpected one—of the thesis already presented there. The second part of the textbook, however, brings up something qualitatively different. Because it was aimed at students participating in history of physics courses, the mid-part represents an anthology, in which Hessen included a variety of primary sources to illustrate "the emergence and development of the main principles of dynamics" (Hessen 2022, 224).

By including a collection of key texts from the history of physics, including, among others, works by Lagrange, Galileo, Huygens, Descartes, Leibniz or Newton, Hessen aims to show that scientific theorization and concept formation do not simply follow a linear or already laid-out path. Rather, according to him, the "development of mechanics in the seventeenth century rested not only on the question of the perpetual refinement, systematization and design of its principal foundations, but also on the disputes between different schools of thought" (Hessen 2022, 225). In classical historiographies, however, Hessen mentions in the preface, "we barely find any portrayal of that intense struggle taking place between different schools of physics and the process which forged its basic principles and laws" (ibid., 188).

More than anything else, the inclusion of this part opposes receptions of Hessen in science studies that dismiss him as an economic reductionist. At the same time, the point of view that Hessen takes here might be inspiring for people beyond the field of the history and philosophy of science. Science teachers or scholars of science education might draw another

perspective from his didactic take on how to present concept formation in physics in a historical and social manner.

Unfortunately, except for the introduction, this part of the textbook has not been translated in the edition. One can of course appreciate Hessen's intention for situating the internal disputes in physics within its socio-economic and ideological context and read the primary sources that are listed in the original. Nevertheless, for scholars not well versed in Russian, it becomes difficult to judge or gain a lot from this exercise, since it remains unclear which excerpts of the texts Hessen chose and how he introduced them.

In conclusion, the edition of Hessen's textbook is first of all an invitation to reread his oeuvre. This can be done with its historical value for the field of science studies in mind—which of course it has—but there is more to it. The edition and availability of the new material offers the ideal moment to reconsider Hessen's Marxist approach to science and reassess it in the light of the current state of science studies.

For obvious reasons, Hessen's thesis about early modern sciences is outdated by our standards and can no longer count as a sufficient explanation for the mechanical nature of the newly emerging classical physics. It remains partly stuck in preconceived conceptions of history as progress characteristic of Soviet dialectical materialism with its corresponding view on scientific development as a continual rapprochement to objective truth. More fine-grained analyses into a variety of facets of the contingent nature of science as a cultural expression, along with a pluralism of the most progressive theoretical approaches of the day would need to be pursued to overcome this limitation.

Nevertheless, there are several convincing advantages inherent to Hessen's framework. For instance, we can fully agree with what the editorial collective states in the foreword, "Hessen's approach shows how historical and philosophical as well as scientific and socio-economic levels can be integrated into a complex picture of the formation of science in both ideal and material sense" (Freyberg and Omodeo 2022, 8).

Hessen provides us with a tool to connect, orient and bring together singular, but specialized in-depth case studies into a larger narrative. With its focus on the transformative potential inherent to collective human action in the form of class struggle, his approach opposes both scientism and relativism—the two false oppositional views characterizing our neoliberal world.

In this sense, the final publication of Hessen's textbook on the history of classical mechanics that this edition offers can warmly be welcomed. It is a valuable contribution to the struggle for a renewal of the socialist tradition in science studies—which has largely (and deliberately) been neglected and forgotten. Its task, to grasp what part science plays in the reproduction of capitalist relations in the present, would offer the possibility to politicize science and participate in the creation of radically different visions for the relations between science and society in the future.

References

Freudenthal, Gideon, and Peter McLaughlin. 2009. "Classical Marxist Historiography of Science: The Hessen-Grossmann-Thesis." In *The Social and Economic Roots of the Scientific Revolution: Texts by Boris Hessen and Henryk Grossmann*, edited by Gideon Freudenthal, and Peter McLaughlin, 1–40. Cham: Springer.

Freyberg, Sascha, and Omodeo, Pietro Daniel. 2022. "Foreword" In *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook*, edited by Pietro Daniel Omodeo, and Sean Winkler, 7f. Venice: Verum Factum.

Hessen, Boris. 2009. "The Social and Economic Roots of Newton's *Principia*." In *The Social and Economic Roots of the Scientific Revolution: Texts by Boris Hessen and Henryk Grossmann*, edited by Gideon Freudenthal, and Peter McLaughlin, 41–102. Cham: Springer.

Hessen, Boris. 2022. *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook*, edited by Pietro Daniel Omodeo, and Sean Winkler. Venice: Verum Factum.

Ienna, Gerardo. 2022. "The International and Interdisciplinary Circulation of Boris Hessen's Theses." In *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook*, edited by Pietro Daniel Omodeo, and Sean Winkler, 75–132. Venice: Verum Factum.

Omodeo, Pietro Daniel. 2019. *Political Epistemology. The Problem of Ideology in Science Studies*. Cham: Springer.

Omodeo, Pietro Daniel. 2022. "Boris Hessen's Philosophy of the Scientific Revolution" In *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook*, edited by Pietro Daniel Omodeo, and Sean Winkler, 133–82. Venice: Verum Factum.

Winkler, Rose-Luis. 2022. "An Unpublished Manuscript by Boris M. Hessen: Materials and-Documents on the History of Physics." In *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook*, edited by Pietro Daniel Omodeo, and Sean Winkler, 11–34. Venice: Verum Factum.

Winkler, Sean. 2022. ""A Pantheon of Great Ideas." Boris Hessen and the History & Philosophy of Science." In *Manuscripts and Documents on the History of Physics: A Historical Materialist Textbook*, edited by Pietro Daniel Omodeo, and Sean Winkler, 35–74. Venice: Verum Factum.

Zilsel, Edgar. 2003. *The Social Origins of Modern Science*, edited by Diederick Raven, Wolfgang Krohn, and Robert S. Cohen. Dordrecht: Springer.

summer 2023 volume 2 | issue 2 | 217–224

marxism & sciences

A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY

id#: *m&s.* 2310.02213 SYMPOSIUM REVIEW

M&S 2023: "Marxism in the Age of the Total Crisis"

Faik Onur Acar

Marxism & Sciences held its first symposium titled "Marxism in the Age of Total Crisis" from September 14 to 17 at the *Bilimler Köyü* (Village of Sciences), Foça İzmir.

The primary goal of this initiative, as outlined in the journal's aims and scope, is to rebuild "the Marxist concept of totality on the basis of a materialist conception of history and materialist dialectics" (as of 9 October 9, 2023, Journal's web page listed). Not only culture and society, but also nature was considered as elements of this totality. As a result, these fields were viewed as arenas of class struggle and thus subject to interference.

In this context, the first symposium was crucial to achieving its objective. It investigated the Marxist theory's totality and emphasized that comprehending capitalism's total crises is achievable only from this perspective, both in theory and in practice.

The symposium's call for contributions underscored the idea that the ongoing crises form a multifaceted totality. The crises humanity experiences are indicative of the crisis-ridden nature of capitalism. Capitalism was identified as a contributing factor in crises at multiple levels. "Capitalism appears to be a factor in crises at various levels" (as of 9 October 9, 2023, Symposium's web page listed). Therefore, the examination of both these levels and their interconnections was a crucial objective of the Symposium.

Acar, Faik Onur. 2023. "M&S 2023: Marxism in the Age of the Total Crisis." *Marxism & Sciences* 2(2): 217–224. https://doi.org/10.56063/MS.2310.02213

• *Correspondence:* Faik Onur Acar, Department of Systematic Philosophy and Logic, Ankara Uni.
• e-mail: onurfaikacar[at]gmail.com
• ORCID: 0000-0002-7002-4636
• DOI: 10.56063/MS. 2310.02213
• *Received:* 09.10.2023; *Revised:* 27.10.2023; *Accepted:* 28.10.2023
• *Available online*: 05.11.2023

As will be demonstrated in this review, the program's contents and schedule both encouraged participants to establish links between arguments and thesis from various fields, which, ideally, results in a broad understanding of capitalism's total crises and subsequent Marxist criticisms.

The organizers of the Symposium originally planned for all presentations to be delivered in person. However, due to unforeseen circumstances, some contributors participated online, while four others were not be able to present their contributions in either way. Therefore, the Symposium ultimately took a hybrid form. The audience for the event was relatively small, comprising only about ten individuals, but they were highly engaged. The presentations, which lasted approximately 45 minutes each and were followed by an additional 45 minutes for Q&A, were more intense and effective due to the nature of the situation. Instead of briefly summarizing their thesis, presenters provided lengthy and detailed inquiries. This process was followed by intense debates, resulting in a more comprehensive understanding of the thesis.

The opening speech of the symposium was given by Siyaves Azeri. According to Azeri, Marx's critique of religion as an expression of the immiserating effects of capitalist social relations can be broadened to include criticism of conspiracy theories, which appear to impact both social and political spheres of contemporary life. The underlying message and impact of these theories suggests that human beings lack agency and are therefore only seen as subject to capitalism rather than capable of dismantling it. This perspective reduces them to mere producers and consumers of commodities rather than autonomous individuals.

This approach to international politics has ties to right-wing populism, which appears to be on the rise globally. Like conspiracy theories, right-wing populism portrays human beings as subjects controlled by external forces. However, in this case, these forces are not hidden but instead attributed to immigrants and other groups—a process of pseudo-concretization of the "abstract" nature of capitalism.

The second presentation, delivered by Yoav Peled, focused precisely on this subject, drawing from the evaluation of the most recent elections conducted in Israel in 2022.

Peled presented right-wing populism not as an ideology but as "a rhetorical device for political mobilization in formally democratic societies that can adapt to different ideologies." Therefore, Peled examined how the rhetorical tools utilized by right-wing populism vary according to the social and political circumstances of each country, focusing on the case of Israel.

Peled argued that in Israel, unlike in the US and Europe, right-wing populism did not stem from the fear of the immigrants or economic deprivation. Rather, it was fueled by resentment towards the Labor Zionist Movement, the existential insecurity among the common people, which is a phenomenon prevalent in governments worldwide, and competition over resources with the Palestinians. Peled emphasized that right-wing populism is a political outcome, existing in addition to capitalism in general, although it arises from diverse socioeconomic conditions specific to each country.

On the second day of the Symposium, Dang Tuan Dung, and Pham Minh Duc delivered a presentation titled "Dehumanization and Techno-Fetishism: A Marxist Critique of Transhumanism." Dung and Duc first explored the growing trend of dehumanization in various industrial and economic sectors, leading to the emergence of transhumanism in the academic realm. They argued that transhumanism represents an ideology that motivates individuals to exceed human limitations, thereby implicitly promoting human enhancement. However, this mindset devalues humans as valuable entities in their own right. Dung and Duc argued that this approach to human beings is a manifestation of human alienation from their species in the Marxist sense of the term. This is a result and actuality of other alienation processes, as alienation from the labor process, other workers, and their products.

The subsequent presentation was delivered by Bruce Robinson. Robinson's research aimed to establish a connection between Turing Machines, regarded as the origins of artificial intelligence, and Marxism.

Robinson attempted to redefine and re-conceptualize computer science concepts from a Marxist perspective; he began by highlighting the limitations of formal logic which led to its inability to conceptualize Turing Machines. Based on this conclusion, he examined Turing machines on a theoretical level, exploring their connection to the labor process. An important focus at this stage was the mediation between these two elements. The author continued his line of reasoning by analyzing how Turing's ideas were used to explain the relationship between computing and capitalism, which raised the question of whether machines can produce value. This topic was also discussed in the presentation.

The next day began with Joos Kircz's presentation on "Function and Totality: The Methodological Confrontation of Historical Materialism and Holism" in which he explored the underlying intersecting theme of all the aforementioned presentations.

As implied by the title of his presentation, Kircs aimed to explore the concept of holistic materialism from a methodological perspective. He argued that while formal logic performs adequately for everyday purposes even in basic physics, accepting this logic imposes limitations. In other words, in a similar vein to Robinson, Kircz underlined the limitations of formal logic but from a different perspective.

Kirsc linked the dominant effect of formal logic in science with the power of the hegemonic culture for pure science, which conceptualizes the objects as an externality that is alien to us. This is followed by the underlying criticism of positivism and its logic. Hence, the question: "What is the object we aim to describe?" He further inquired, "Do we discuss structure or well-defined objects?" These questions lead to an immanent aspect. From this point of view, although the objects or the objectivity in itself is not specific yet, they are not evaluated as alien to subjects; moreover, the structure seems to be the same as the one we as subjects (of knowledge) form. Undoubtedly, this structure reflects the capitalist mode of production. Therefore, the definition and critique of capitalism were connected to the critique of science's well-established concept of objectivity, creating a compelling starting point for a new comprehension of holistic materialism.

The subsequent presentation of the day, titled "Reducing Uncertainty by Marxist Abstractions in a Time of Total Crisis," was delivered by Erzebet Pasztor, where she delved into a related subject in a more tangible manner.

Pasztor commenced her presentation with a discussion of climate change, which is widely regarded as one of the most pressing crises and threats to not only humanity but also the planet as a whole.

Pasztor examined this issue by using the Galapagos as an example. Her approach involved two essential elements. First and foremost, she brought attention to the concept of "resilience" which is gaining popularity in various research fields, including ecology.

According to Pasztor, this concept highlights the inclination to accept that "any change can be technically managed and assimilated while maintaining the ongoing survival of the system," which can lead to the destruction of certain components as well as the species (Chatzarakis, 2022). She asserted that this concept suggests the inefficacy of the methodology adopted to evaluate the current situation in ecology generally, and hence in the Galapagos. The determining concept of this method seems to function only to perpetuate the current crises. Building upon this determination and Ollman's Marxist dialectical methodology, the author defined a

suitable approach that not only comprehends but also can prevent the current devastating situation in the Galapagos Islands. According to her, adopting the Marxist dialectical perspective compels us to analyze the capital dynamics of Galapagos for achieving a comprehensive understanding of the area.

This approach to the environment views it as a part of the dynamic process of production and reproduction within the capitalist system, rather than a separate or foreign one. It is reasonable to argue that no method can be detached from its object and process. Therefore, an immanent approach is appropriate for theorizing the environment under capitalism. At this point, Pasztor once again recalled Ollman's analysis of Marxist dialectics, identifying three key aspects of abstraction that one must always reflect on: "extension, generality, and the standpoints of abstractions."

The final presentation of the day, titled "Symptoms of Asymptotic Knowledge: An Ecological Leninist Critique of the Mechanistic Worldview," was presented by Kenny Knowlton Jr. and Cameron Gamble. Knowlton and Gamble presented their initial argument by establishing a connection between "the historical realization of capitalist accumulation and the generation of time and space". They argued that the predominant conceptions of time and space in science and philosophy, largely established by the works of Kant and Newton, cannot be dissociated from the capitalist mode of production and should therefore not be examined in isolation. This is because they are "developed through the complex formation of a specific form and structure of knowledge, expressed in and through the worldview of capital's representative class." Drawing on Lenin's studies, this deduction was supported by the contradictions found in the mechanistic worldview. Knowlton and Gamble evaluated this as "asymptotic knowledge" and argued that it only results in reproducing the current status of both capitalism and epistemology. In other words, Knowlton and Gamble concluded that the crises in the mechanical worldview were a manifestation and symptom of the crises in capitalism. Concordantly, they proposed adopting an "Ecological-Leninist perspective" characterized by the concept of metabolism, which enables to place contradictions in their proper context - nature itself. Accordingly, this perspective could potentially offer the essential tools to firstly differentiate between the contradictions in nature and those in capitalist society, and secondly, facilitating the identification of the relation between these contradictions in a correct manner.

The Symposium's final day opened with a presentation by Ali C. Gedik entitled "Music in Crisis and the Crises in Ethnomusicology: Towards a Marxist Theoretical Framework for the Holistic Study of Music in the Age of Total Crises." Gedik initially explained the correlation between the crises in music and those in ethnomusicology. Then he assessed that ethnomusicology is the only branch of musicology that has a holistic approach. Apart from that, drawing from the studies of Blacking, he evaluates music as a "species-specific trait of man [sic.]." Hence, all the limitations of making or listening to music, including the division between talent and audience, are a result of historical division of labor and, as Gedik mentioned, significant obstacles for human actualization. In my view this deduction can be regarded as another definition of crisis.

Gedik suggested that the crises and the difficulties associated with defining or rejecting them in the field of musicology should be considered as a result of estrangement from a holistic approach. In this regard, postmodernism and globalization theories had taken over these fields. In contrast to these perspectives, Gedik proposed that "ethnomusicology should be the study of music in crisis to apprehend the crises in humanity." Finally, Gedik proposed that a thorough re-evaluation of the concept of culture, drawing from the ideas of Benjamin, Adorno, Williams, Ilyenkov, and Stuart Hall, is necessary to solve or even define these crises objectively.

The final presentation at the Symposium was on the topic of John Akomfra's multichannel installations, presented by Peter Lesnik. Lesnik opened his presentation by referring to climate change, one of the most significant modern crises, which had been discussed in former presentations of the symposium, as observed. Based on Ollman's research, he contended that the impact of the heating-related aspects of the climate crisis constrains our imagination, leading to political inaction. The solution, he porposes, is to liberate our imagination in a sustainable and efficacious way to ensure systemic political engagement.

Lesnik argued that in order to achieve this objective, we as agents must alter our thinking habits regarding the future, which is related to but not determined by the past and present. This linear thought process restricts us from perceiving the potential of the present and thus, the future. Conversely, Lesnik suggested that prioritizing the present by assessing both its positive and negative potentials can result in shaping the future. In other words, we must approach the present from an imagined future rather than a predetermined one. To systemically accomplish this objective, Lesnik proposes utilizing the Marxist dialectics, which Ollman elaborated. In this

context, he found an actualization of such dialectics and politics in the work of John Akomfra.

Akomfra employed three screens simultaneously in his work, each displaying a different moving image from a distinct time period. Despite all the visuals depicting the same ocean, they concentrated on different manifestations and periods; for instance using the ocean as an immigration route over the years, or ocean as a landscape. Lesnik examined Akomfra's work by connecting it with the Soviet director Sergey Eisenstein's concept of dialectics in cinema, which emphasized the relationship between images rather than the images themselves. Lesnik argued that by using different screens at the same time and voice-over narration during the screening, Akomfra forced the audience to see the potential of the ocean in the present. Subverting the linear understanding of time and space, as Eisenstein did, seemed to be the key element at this point. In this regard, Lesnik evaluated the installation not only as a call for a political action, but also as an act in itself.

As a whole, the Symposium, which began with the discussions of the concrete and methodological problems of Marxism, ended with analyzing and proposing an example of a political act.

To wrap it up, I would like to share my observations on the atmosphere at the Symposium. As I mentioned above, the conference took place at the Village of Sciences, which was established by Turkish academics. The founders of Village of Sciences aimed to create a conducive environment for academics, undergraduate, and graduate students to pursue teaching and learning in a more liberal and constructive manner. Two events, ranging from physics to sociology and philosophy, were held in a week such as "Reconstructing Gender: Digitality, Posthumanism, and the Feminist Perspective," and "Building Human Tissues: Tissue Engineering and Regenerative Medicine" (As of 9 October 9, 2023, The Village of Sciences web page listed). The objective of these adjustments was to challenge the hierarchical structure that could hinder individuals from understanding their relationship with others and reaching a holistic perspective, as proposed by Marxist theory. I propose that a wide social hierarchy presents an obstacle to reaching this goal too. Harmonically all needs for the organization were efficiently fulfilled by all the participants; professors and volunteers. Moreover, both the enjoyment and responsibilities were evenly distributed by the collective. The meals were prepared collaboratively and also the responsibility of washing dishes were shared. Undoubtedly, staying in tents together was an essential element of this communal spirit. The Village of

Sciences is also characterized by gatherings in the evenings after the lectures or workshops, with songs and sometimes even musical instruments, and by trips to the seashore on free days. The Symposium was the final event hosted this summer, and selecting The Village of Sciences as the venue for the Symposium is fitting, given the aims of the Journal and the Symposium.

During the evaluation meeting with all the participants, it became apparent that the Symposium did not fully convey Marxist theory's entirety, its potential to depict capitalism's crises and define total crises in capitalism. However, it would be erroneous to assume such objectives could be achieved quickly or easily. Nonetheless, a step forward has been made. I assert that the Journal and Symposium are progressing slowly but surely, similar to the Zapatistas.

REFERENCES

Chatzarakis, N., T. Persefoni, and L. Tsoulfidis. 2022. "A Model of Economic Growth and Long Cycles." *Review of Radical Political Economics* 54:351–382.
"Aimes and Scope." accessed October 9, 2023. https://marxismandsciences.org/aims-and-scope/
"Call for Contributions." accessed October 9, 2023. https://marxismandsciences.org/call-for-paper-of-symposium/
"Bilimler Köyü Events." accessed October 9, 2023. https://bilimler.org/etkinlikler/#events.

marxism & sciences
A JOURNAL OF NATURE, CULTURE, HUMAN AND SOCIETY
VOLUME 2 | ISSUE 2 | SUMMER 2023

NOTES ON CONTRIBUTORS

Gerardo Ienna is a Marie Skłodowska-Curie Global Fellow (MISHA, Horizon 2020; GA: 101026146) at the University of Verona and the University of Maryland. He completed his PhD in 2019 and was subsequently a postdoctoral fellow at the University of Verona, Ca' Foscari University of Venice, and collaborated with the Free University of Bolzano. he spent various periods of study and research abroad at Université Paris 1 Panthéon-Sorbonne, École des Hautes Études en Sciences Sociales in Paris, the University of Maryland at College Park (Washington, D.C.) and the University of Manchester. He published various articles and essays devoted to Marxist historiography of science, Science and Technology Studies, history of science diplomacy, radical science movements etc. He also recently published two monographs devoted to reconstructing debates in the field of historical epistemology. His present research project aims at reconstructing transnational collaborative networks within the Radical Science Movements between US, UK, Italy and France.

Sascha Freyberg is a visiting fellow at the Max Planck Institute for the History of Science in Berlin and member of the Max Planck Partner Group "The Water City: The Political Epistemology of Hydrogeological Praxis." He is also an editor of the book series "Verum Factum: Studies and Sources on Political Epistemology" and with "Marxism & Sciences".

Kulyash Zhumadilova was born and raised in Shymkent, Kazakhstan. Currently she is a doctoral candidate in science and technology studies (STS) at Virginia Tech, USA. Kulyash studies ideological influences on contemporary biology. Her interests in-clude history and philosophy of science, social theory, and disciplinary history of STS.

Nafis Hasan received his PhD in Cell, Molecular and Developmental Biology from Tufts University in 2019. After a brief postdoc, he currently works in the labor movement and is an Associate Faculty member at Brooklyn Institute for Social Research. His research interests range from cancer biology to climate politics and eco-Marxism; his writings have appeared in Jacobin, Science for the People, and more. He serves as an editor for Science for the People magazine and Jamhoor, a critical left media organization focused on South Asia, and organizes with the Democratic Socialists of America. He is currently writing a book on the political economy of cancer research and treatment.

Dhruv Raina is a retired Professor of History and Philosophy of Science and Education from Zakir Husain Centre for Educational Studies, Jawaharlal Nehru University, New Delhi, India. He has published widely on the history and philosophy of science, historiography of science in South Asia, culture and politics of science.

Omprasad is Assistant Professor at Indira Mahindra School of Education, Mahindra University, Hyderabad, India. His research interest lies in the history of movements of

science and scientists, politics of science and transnational political networks of scientists.

Antoine Lalande is a Ph.D student in Information and Communication Science at CELSA - Sorbonne University, and a member of GRIPIC laboratory (EA1498). His research focuses on the popularization of social science in leftwing activists's networks through a fieldwork investigation on a bar-restaurant in eastern Paris. Starting from the critical studies of popularization in the 1970s, he intends to situate his work within the critical epistemologies of modernity, in order to understand and describe the ways in which social science exists in places peripheral to academic institutions.

Joëlle Le Marec is Professor of Information and Communication Science at the Museum National d'Histoire Naturelle (PALOC, UMR 208). She previously directed the GRIPIC and taught at CELSA, Sorbonne University. She has carried out and directed numerous research projects and published works on visitor practices, the condition of the public in museums, and discourses about science in museums and the media - the most recent of which is *Essai sur la bibliothèque. Volonté de savoir et monde commun* published by ENSSIB in 2021. She is involved in a number of cooperation networks between libraries, museums and research, and also runs an international network on the knowledge of precariousness.

Sigrid Schmalzer is Professor of History at the University of Massachusetts Amherst. Her published works include Red Revolution, Green Revolution: Scientific Farming in Socialist China (University of Chicago Press, 2016), along with a children's picture book based on that research, Moth and Wasp, Soil and Ocean: Remembering Chinese Scientist Pu Zhelong's Work for Sustainable Farming (Tilbury House Publishers, 2018). She also co-edited Science for the People: Documents from America's Movement of Radical Scientists (University of Massachusetts Press, 2018). She is a founding member of the Critical China Scholars group and the revitalized Science for the People, and a vice-president in her faculty union.

Calvin Wu is a neurobiologist at the Massachusetts Institute of Technology. Previously the publisher of Science for the People magazine, he is now Secretary of SftP's Steering Committee.

Edward Millar is a postdoctoral researcher in Environmental Applied Science and Management at Toronto Metropolitan University, editor for Science for the People magazine, and chapter representative for SftP Canada.

Joost Kircz has a PhD in molecular physics and studied and worked at the Universities of Amsterdam and Utrecht in The Netherlands. After his academic carrier he started working for the international science publisher North-Holland /Elsevier. Among his roles were Publisher of the renowned physics list and researcher in digital publishing. Hereafter he started his own research company in digital knowledge transfer: Kircz Research Amsterdam. From 2006-2014 he was a part time research professor/ program leader on electronic publishing at the Amsterdam University of Applied Sciences. As from his early student years, as part of the national leadership of the student movement of 1968/9, he is involved in socialist politics and activism. He was a board member of the International Institute for Research and Education (1982-2019), founded by

the Marxists economist Ernest Mandel: www.iire.org. At present he is in the board of the Dutch Stichting Socialistisch Onderzoekscollectief / Socialist Research Collective Foundation: Socialism in the 21st century. www.soc21.nl. He was chairman of the parliamentary fraction of the local radical party Amsterdam Anders (Different Amsterdam), in the central Amsterdam borough 2004-2010. His present interests are mainly in the interplay of Marxism and Science, and the study into what extent the contemporary sciences can deepen the understanding and development of so-called scientific socialism, set out by Marx & Engels, now more than a century ago. His publications can be found on the website www.kra.nl

Jérôme Lamy is a historian and sociologist of science, research fellow at the CNRS. His research focuses on the historical sociology of astronomy and space activities, the historical anthropology of nature and the circulation of concepts.

Arnaud Saint-Martin is a sociologist and research fellow at the CNRS. His research alternates between the history of science and technology, particularly astronomical, and the study of transformations in astronautics, from the Cold War to the advent of "New Space."

Senthil Babu D., is a historian of mathematics based at the French Institute of Pondicherry, in south India, where he is involved in studies concerning Nature, Knowledge and Labour [https://ifpindia.org/research/social-sciences/knowledge]. He is coordinating a research programme in the Social History of Vernacular Mathematical Practices in Medieval South India in collaboration with Chair, History and Philosophy of Mathematics at ETH, Zurich. His book, Mathematics and Society: Numbers and Measures in early modern South India, will be published soon by Oxford Universtiy Press in 2022. He is a member of the editorial board of the series, Verum Factum: Studies in Political Epistemology [https://verumfactum.it/]. He is a member of the Politically Mathematics Collective in India [https://www.politicallymath.in/

Gary Werskey has lived in Australia since 1987. After founding new programs in science and engineering at the University of New South Wales and later working as a management consultant, he returned to his vocation as an historian and sometime activist engaged with settler-colonial Australia's visual culture and its political legacies (Werskey 2021; Werskey and Wilson 2023). He is a co-founder of the Blackheath History Forum, which promotes greater awareness of Australian history and its ideological representations; and an Hon. Associate of the University of Sydney's Department of History. He is currently actively supporting the campaign to recognise Aboriginal and Torres Strait Islander peoples in the Australian constitution through the establishment of a Voice to Parliament.

Alice Creischer and **Andreas Siekmann** are artist living in Berlin and Vienna. They curate together and are working on the actualisation of the atlas of arntz and Neurath since 2003. They have recently edited together, *Potosi Principle Archive*. Walther König, Cologne 2022.[1]

1. https://www.adkdw.org/en/article/3600_potosi_principle_archive_volume_1_4

Damian Moosbrugger often wonders what another science might look like. His curiosity is attracted by topics ranging from Marxism and animal liberation over the social history of mathematics and physics all the way to science fiction. Closest to academia is probably his interest in the development of a socialist critical theory of knowledge, in particular a Marxist approach to the natural sciences. He believes that such a framework can enable us to understand the role science plays in reproducing current social relations and grasp its potential to go beyond them. As for his scientific qualifications, he has earned a master's degree in both interdisciplinary sciences as well as history and philosophy of knowledge from the Federal Institute of Technology in Zurich. There, he is soon going to commence with his PhD. His project is committed to writing a history of the Scientific Revolution from below—just as Hessen was. It will be based on the analysis of the impacts, which German-speaking technical practitioners, such as clock- and instrument-makers, goldsmiths or architects, exerted on mathematics in Early Modernity. He lives in Zurich, where he is, among others, involved in organizing Capital-reading groups.

Faik Onur Acar, earned his bachelor's degree in Philosophy from Istanbul University in 2011, and subsequently completed two master's degrees in History of Philosophy under the supervision of Nilgün Toker Kılınç at Ege University, and in the Department of Cinema and Television under the guidance of Bülent Diken at Kadir Has University. He is currently a PhD candidate in the Department of Systematic Philosophy and Logic at Ankara University. His current research focuses on speculative materialism. Acar is also interested in political philosophy in relation to Marxist ontology. His works have been published in *Sinefilozofi*.

GUIDELINES FOR AUTHORS

The purpose of these guidelines is to ensure a clear, standard format for submissions. Please follow all guidelines as closely as possible.

Marxism & Sciences is an open access journal. Publication of articles/essays and access to accepted and published material is free. The journal does not charge any article/essay submission, processing or publication fees. We have no budget for proof-readers or typesetters. These tasks are therefore the responsibility of the authors.

The basic descriptions and principles about the content of submissions are formally presented here. However, the priority of the journal is to achieve its aims collectively in collaboration with editors, editorial and advisory boards, authors and readers.

Marxism & Sciences accepts submissions only on the condition of contributing to Marxist conception of totality, materialist conception of history and/or materialist dialectics. Submissions satisfying this condition could be on any topic from any branch of sciences. The journal especially promotes submissions which are written collaboratively by more than one author from different and/or remote disciplines, or cover more than one discipline if written by a single author.

Marxism & Sciences welcomes any contribution that falls within the domain of its aims and scope. However, the journal especially encourages submissions with following four qualifications:

- *Class struggles:* Studies covering class struggles in nature, culture, and/or society.
- *Geographical prevalence:* Studies from Africa, Asia, Latin America, Central, Eastern and Southeastern Europe as well as Western Europe and North America.
- *Gender equality:* Studies by non-male authors and/or from Marxist and socialist feminist perspective.
- *Marxist ecology:* Studies which considers human as part of nature, not superior to it.

Each issue of the journal is published based on a specific topic announced publicly at the web page through the Call for Papers (CFP). Submissions on other topics are also welcome.

Marxism & Sciences welcomes a wide spectrum of academic writing styles from articles at one end to essays at the other. *Marxism & Sciences* also welcomes cultural works in fields of arts or traditional and popular culture particularly those related to the specific topic of each issue.

Below are the types of submissions accepted by *Marxism & Sciences*:

- **Articles** (5000-10000 words): Articles are original scholarly manuscripts that contribute to any field of research.
- **Essays** (5000-1000 words): Essays are original contributions with more personal, intuitive and introspective style and do not necessarily have to build on a comprehensive literature review and/or extensive research, unlike scholarly articles. Essays are expected to include critical reflections or political interventions into the past or actual natural/cultural/social issues and/or old or ongoing scholarly and intellectual discussions.
- **Review articles** (6000-12000 words)**:** Critical review of the state-of-art of any topic or any discipline(s).
- **Cultural works** (max. 1200 words of texts or max. 1 GB of audio/visual material): Poem, play, story, music, short film, documentary, video, photographs, graphics design, painting, sculpture etc.
- **Communication** (1500-7000 words): Responses to previously published articles/essays or cultural works in the journal, or actual disciplinary discussions on Marxism, or brief political reviews from Marxist perspectives, or reports about planned or ongoing Marxist projects by scholars and/or activists. This category is intended to foster discussion, exchange, coordinate collaborations and international cooperation, Intention, standpoint, context, addressees and aims should become clear from the texts. Connections to knowledge, research and development are very welcome. Submissions under this category are not peer-reviewed but evaluated by the editors.
- **Translations** (6000-12000 words): Works either with an historical or actual significance written and published in languages other than English.
- **Interviews** (1500-3000 words)**:** Interviews with leading Marxist scholars in any discipline.
- **Book, film, music recording, exhibition and performance arts reviews** (1000-2000 words)
- **Conference and symposium reviews** (1000-2000 words)
- **Letters to editors** (500-1000 words): Short communication on any topic that attracts the attention of the readers.

Open Peer Commentary (OPC): *Marxism & Sciences* may choose an accepted manuscript for an OPC process. The process begins once the approval of the author(s) is acquired.

Academic quality: Please consider originality, theoretical and practical significance, and methodological rigor, referring to the usual standards within your specific discipline or subdiscipline.

Confidentiality, responsibility and ownership: All documents considered during the review procedure are confidential. Statements and opinions expressed in published submissions are those of the author(s).

Academic property issues: Submissions must be original and unique. They may not be already published in the same or similar form (in print or electronically, including on a web site), in any language, or accepted or under consideration for publication elsewhere. Papers published in *Marxism & Sciences* may not be published elsewhere in any language without the permission of *Marxism & Sciences*.

CALL FOR PAPERS

VOLUME 3 | ISSUE 2 | SUMMER 2024

CENTENNIAL OF EVALD ILYENKOV II

ISSUE EDITORS: CORRINA LOTZ AND KYRIL POTAPOV

Vol 3, issue 2 (Summer 2024) of the Marxism & Sciences, is devoted to Evald Ilyenkov's centennial.

The International Friends of Ilyenkov join **Marxism & Sciences** in commemorating independent Marxist philosopher Evald Ilyenkov's Centenary in 2024. Ilyenkov was born in Smolensk, Russia 18 February 1924. In recent years he is increasingly recognised as amongst the most significant philosophers of the Soviet period. We particularly welcome submissions which help take forward Ilyenkov's dialectical approach to understanding and finding answers to contemporary issues.

CALL FOR PAPERS

VOLUME 4 | ISSUE 1 | WINTER 2025

MARXISM IN THE AGE OF THE TOTAL CRISIS

ISSUE EDITOR: SIYAVEŞ AZERI

In volume 4, issue 1 (January 2025) a selected number of papers presented at the first **Marxism & Sciences** symposium, "Marxism in the age of the Total Crisis," will be published. Additional contributions related to the topic are also welcome.

NOTE

Your submission may be in the form of articles, essays, communications, cultural works and creative writing for our winter 2025 collaborative issue.
Detailed CFPs for both issues will be published and circulated in due time.