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Science and Liberation

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erature, philosophy, relationships, and even, in its proper place, religion. In the fight for a just and sustainable world, there can be no substitute for organized political struggle – a fact scientists themselves increasingly recognize.

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ments. Business leaders meet with environmentalists regularly. If parts of the planet become uninhabitable and there are a series of climate-related catastrophes, that would be bad for business, the argument goes. So even captains of industry will come along with the right arguments and proposals.

In 2014, as oil and gas production continues at a breakneck pace in Canada and the U.S., we have more than enough evidence to know that such an apolitical approach of lobbying and persuasion has failed disastrously. The basic nature of the system we live in isn't democratic. It's a system that takes the elements of life – nature, land, water, energy,

cultures, and peoples – and converts them into commodities for profit and control. The system has its own logic. If you are a player in it, you have to follow that logic. You have to take what you can grab – for most people it's their own lives – and turn it into money. If you're excluded from the system, you're excluded from the very means of survival. If you're excluded and you try to get the means of survival for yourself or your loved ones outside the system, you will be met with violence. Profit, accumulation, and economic growth are more than dominant ideas: they define capitalism as a system of relations.

Thus, for a stabilized atmosphere, we are going to have to defeat some very powerful people and institutions in the process of liberating ourselves – and science – from the dictates of profit. Success in this struggle will require all the tools of social change: organization, communication, demonstration, and experimentation with different actions.

The intelligence that drives scientific inquiry is a profound human capacity, but science alone can never tell us how to act. It cannot provide principles, even though it can help us to act within them once we have them. For this reason, science will never be enough to do political battle with conservative movements or powerful corporations. For that, people have to find moral guidance from other human capacities and other cultural resources: art, lit-

thority) and Science B (business), many scientifically minded people assume that to be scientific means to be neutral, to reserve judgment, to refuse a stance even on the most critical issues of the day. In fact, science says no such thing. Scientific objectivity means being conscious of biases within a given framework and acting to minimize them while testing claims against evidence. It does not mean having no opinion and no point of view (or, for that matter, accepting a given framework without question). In fact, in the book *Descartes' Error*, the neurologist António Damásio calls on studies that show rational decision-making is impossible without emotions.

In the case of climate change, we have an overwhelming and nearly unprecedented scientific consensus, with all the authority Science A can bring combined with all of the knowledge that Science C has been able to generate. But without major political change, elites are able to continue on a path of greater fossil fuel use and escalating climatic rupture. As with other issues, vested interests direct policy by proactively controlling the direction of science (Science B), using media and government agencies to attack the credibility of scientists, their reputation, and their morale, and hiding or confusing the information available to the public. Facing this kind of resolute political opposition, an approach, a strategy, and a set of political principles must be chosen. Science itself cannot provide these things.

This becomes clear when we consider two different approaches to combatting catastrophic climate change. For many mainstream environmentalists, the path has always seemed clear. We live in a democracy, after all. So, first, we convince enough people that the climate problem is serious. We demonstrate that the technology is available to solve it without sacrificing most comforts and conveniences. Then we convince our leaders to make the necessary technological and policy changes, and if they don't, then we elect leaders who do. Many of those who make economic decisions aren't elected, it's true. But they, too, can be convinced by rational argu-

A colleague of mine in environmental science recently told me that he is about to run out of funding since his Natural Sciences and Engineering Research Council (NSERC) discovery grant has not been renewed, twice in a row. Scientists like him, focused as they are on their work, are encouraged to think their funding has not been renewed because there is something wrong with them or their research. In fact, there are broader social forces at play.

It turns out that the feminist slogan the personal is political is relevant to science as well. For decades, the membership card in the club of Canadian scientists was the NSERC discovery grant. The purpose of the grant was to give every working scientist basic funding to do their research. In recent years, two changes have been made to this paradigm. First, as detailed in a new book by Chris Turner, the federal government has declared an outright war on science, cutting funding for basic research and redirecting it to business-friendly projects. Second, NSERC has moved to a model of rewarding "excellence," which in fact has nothing to do with excellence but means concentrating funding with smaller numbers of researchers while leaving many researchers with nothing.

Last September, a group of scientists took the unique step of organizing themselves into a movement called Evidence for Democracy. Mounting a series of rallies and media events, they announced a platform targeting the federal government with three demands: to fund research from basic through to applied science; to base decisions on the best available science and evidence; and to make scientific findings open to the public.

While their demands are hardly radical, these scientists have been galvanized to step out of their labs and enter the public sphere because of a Canadian government that, like the North American conservative movement from which it sprang, dislikes science. We are at a point in Canada where Prime Minister Harper's government controls communications by government scientists from Environment Canada and the Department of Fisheries and Oceans. It has eliminated the position of national science adviser. It has

scrapped Statistics Canada's long-form census (vital to research on social inequality) and closed labs and environmental monitoring stations. And more than any other government in the world today, the Canadian government is dedicated to denying the results of climate change science and preventing civilization-saving action at international climate forums.

The conservative movement's attack on science has several prongs. Where they can attain government office, as in Canada, they use the highly effective tools of funding and de-funding, and regulation and de-regulation, to control government scientists and embolden private interests. The goal is to transfer power and resources from public services and public science to private institutions, while often appealing to moral and religious doctrines in the process.

The success of these attacks on science are partly due to vulnerabilities caused by the way science itself is done in our society, for the word science has multiple meanings.

Science and Curiosity

Albert Einstein said that science is the refinement of everyday thinking. In that sense, science is a fundamental human activity: it means paying attention to evidence, using logic, rendering explicit assumptions, and testing hypotheses formally in a way that is repeatable by others. It is this kind of science that is under attack from conservatives and other forms of authority. Let us call this kind of science Science C, where C stands for curiosity.

Today, hacker subculture exemplifies Science C better than academic science does. Hackers are dedicated to following their curiosity wherever it goes, and the open-source, free software movement that most hackers belong to is also dedicated to making information freely and universally accessible. No one exemplified Science C and hacker culture better than Aaron Swartz. Swartz de-

Leftists try to make change by convincing large numbers of people to take action in social movements. Insights from the social sciences could inform leftists in these efforts. For example, recent studies correlating a wide range of social problems with economic inequality suggest that people are highly sensitive to status and that social policy should be designed to minimize inequality with this in mind. Philosophers have long debated whether human nature has an instinct for freedom, and while scientific knowledge about human nature remains extremely limited, what little science has revealed suggests that humans do have instincts both for freedom and for equality.

Another set of studies, about moral licensing, suggests that voluntarist appeals have severe limitations. In one study, subjects who had made a green or eco-friendly consumer choice were afterwards less likely to donate to a good cause or help an individual in need. Here, too, we find social science research that suggests that relying on solidarity works better than relying on charity, as charity can be brittle.

A third area of research shows that political ideology affects consumer choices. An American study published in the Proceedings of the National Academy of Sciences found that "conservative individuals were less likely to purchase a more expensive energy-efficient light bulb when it was labelled with an environmental message than when it was unlabelled." Today's capitalist society means that many of these insights are coming from business-oriented research on marketing and organizational behaviour. Leftists shouldn't shy from studying these insights, discarding the useless ones, and adapting the helpful ones.

No Substitute for the Left

The scientifically minded do not automatically gravitate toward the political left. Partly because of the influence of Science A (au-

is what corporate bureaucracies are designed to do, in terms of fostering original research, the results have been catastrophic.

“Common sense suggests that if you want to maximize scientific creativity, you find some bright people, give them the resources they need to pursue whatever idea comes into their heads, and then leave them alone ... if you want to minimize the possibility of unexpected breakthroughs, tell those same people they will receive no resources at all unless they spend the bulk of their time competing against each other to convince you they know in advance what they are going to discover.”

Graeber gives us an important insight into how Science B has come to trump Science C. Leftists, meanwhile, are natural supporters of Science C, and left-wing scientists like the evolutionary biologist Richard C. Lewontin and the mathematical ecologist Richard Levins use the term “people’s science” to describe how science could be done in a better society. While most of us have a healthy anti-authority streak that can bring us into conflict with scientific authority (Science A), the best challenges to that authority, indeed any authority, are themselves made on the basis of logic, evidence, and inquiry. One of the tasks of the political left, then, is to liberate and encourage the rigorous curiosity of Science C.

Science and Social Movements

Marx and the early socialists viewed their work as scientific in nature, and even their errors can be understood as failures to act according to their own scientific principles. Generations later, socialists like Trotsky, Luxemburg, and others tried to popularize scientific discoveries and intellectual culture for the people. Today, even though leftists are few in number and not especially influential, the natural and social sciences are good places to look for them.

veloped Creative Commons, Reddit, and other innovative works before moving into activism explicitly.

Creative Commons is an organization and a licensing system that facilitates the sharing and use of creative work. Like the GNU Public License (GPL) for software developed by Richard Stallman, Creative Commons has an implicit philosophy that creative work is a collective endeavour and that human instincts to share knowledge and information should be celebrated and encouraged, not suppressed. This is the spirit of Science C.

Creative Commons and the GPL are legal tools to facilitate sharing, and in their domains they are analogous to peer review and publication in scientific journals for scientists. However, like the conflict between free and proprietary software, there is a conflict between open access and proprietary access to scientific publications, a conflict Aaron Swartz became aware of as an activist.

Swartz was so appalled by the privatization of scientific knowledge in expensive journals that he took direct action to make the journals public, breaking the copyright of the academic database known as JSTOR. As Swartz explained, without broad public access, “Everything up until now will have been lost.” Swartz believed the commodification of essential knowledge must be vigorously resisted: “Forcing academics to pay money to read the work of their colleagues? Scanning entire libraries but only allowing the folks at Google to read them? Providing scientific articles to those at elite universities in the First World but not to children in the Global South? It’s outrageous and unacceptable.”

Facing dire federal charges that could have landed him in jail for decades, Aaron Swartz committed suicide in January 2013.

Science and Authority

If Science C is about curiosity, and as such constitutes a potential threat to those with power, science can also mean authority.

Anyone making any claim wants to say that science backs them. In popular media, scientists from government and prestigious universities can make authoritative statements because they possess scientific authority. Let us call this aspect of science Science A, for authority. Ideally, the practice of Science C can lead to the authority of Science A. But in reality, the authority of Science A is abused and sold as a commodity.

In a famous case from the mid-'90s, University of Toronto medical researcher Nancy Olivieri discovered harmful effects of a blood disorder drug called Deferiprone. In the stir of controversy that followed, Olivieri was forced to defend herself, her research, and her job against a wide range of attacks from the drug manufacturer and senior staff at her hospital.

The most pressing attack on scientific authority today, however, centres on the consensus of climate scientists at the Intergovernmental Panel on Climate Change, which released its fifth and most dire report this past October. Before resigning from NASA as the world's leading climatologist, James Hansen once lamented "the politicization of reporting of global warming." Hansen stressed that with corporate consolidation of the media, the task of resisting the negative politicization of scientific inquiry, including attacks on the credibility of scientists, is "formidable."

Such direct attacks on scientific authority are relatively rare, but they reveal how powerful business interests seek to discredit scientific authority when scientific findings challenge their profits and social control. More insidiously, such business interests do not merely wait to attack scientific results they don't like. On the contrary, they have developed sophisticated ways of channelling and controlling scientific curiosity.

Science and Business

This is what I call Science B, the business of science. The sad truth is that most of what scientists do is not Science C, exploring the world through systematic investigation. Most of what scientists do is try to raise funds, generate publications in prestigious journals, find students to work on their projects, and keep up with other scientists according to these metrics. Science B operates like other sectors of capitalist society. It is competitive, comparative, and divided by status into superstars, has-beens, and also-rans.

The Canadian Association of University Teachers (CAUT) launched a campaign last summer called Get Science Right. Aiming to overhaul the federal science policy that oversees Science B, CAUT argued for more money for basic science, since funding in the natural sciences has fallen by 6.4 per cent since 2007. Meanwhile, the federal government has increased funding for research partnerships – partnerships between science and business - by 23 per cent since 2011.

The business of science makes science vulnerable to attack by authoritarian governments and conservative movements, streamlining opportunities for the wealthy and powerful to steer science to their own benefit. As a result, we can create tens of thousands of chemicals but haven't thought much about what to do with them after we've used them. Half a dozen countries have nuclear weapons that can destroy whole cities, but no country has a functioning renewable energy system. Human curiosity (Science C) could have solved our environmental problems long ago, but it cannot take flight because it is trapped within Science B.

Writing for the Baffler magazine, the well-known cultural anthropologist David Graeber assessed the problem. "The increasing interpenetration of government, university, and private firms has led everyone to adopt the language, sensibilities, and organizational forms that originated in the corporate world. Although this might have helped in creating marketable products, since that