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Who is Dr. Frankenstein?
Or, what Professor Hayek and his friends have done to science

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Abstract

This commentary suggests that the ongoing malaise of biomedical research results from adopting a doctrine that is incompatible with the principles of creative scientific discovery and thus should be treated as a mental rather than somatic disorder. I overview the progression of the malaise, outline the doctrine and the history of its marriage to science, formulate the diagnosis, justify it by reviewing the symptoms of the malaise, and suggest how to begin to cure the disease.

Keywords: biomedical research; sociology of science; science policy; creativity; education; drug development

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> "It may well be that a nation may destroy itself by following the teaching of what it regards as its best men, perhaps saintly figures unquestionably guided by the most unselfish ideals."
>
> Friedrich von Hayek
> *The Constitution of Liberty*

The malaise

Four years ago, a group of prominent scientists and science administrators published a plan for rescuing US biomedical research from what the authors described as a widespread malaise (Alberts, Kirschner, Tilghman, & Varmus, 2014). That a rescue was needed was signaled by many sources: by Dr. Marcia Angell, a former Editor in Chief of the *New England Journal of Medicine*, who concluded that "it is simply no longer possible to believe much of the clinical research that is published," (Angell, 2009) by the pharmaceutical industry, which was unable to reproduce 50% - 90% of published pre-clinical studies (Begley & Ellis, 2012; Prinz, Schlange, & Asadullah, 2011), by the estimate that a half of research funding is wasted on irreproducible research (Freedman, Cockburn, & Simcoe, 2015), by the concerns about the outdated funding system along with its "perverse incentives" (Nicholson & Ioannidis, 2012; Stephan, 2012), by the fact that the proliferation of administrators was outpacing that of faculty sixteen fold (American Association of University Professors, 2014), by the report that a majority of graduate students felt overwhelmed, exhausted, hopeless, sad, or depressed nearly all the time and one in ten contemplated suicide (Arnold, 2014), by the "doused passion" of researchers (Kern, 2010), by the decreasing stream of new drugs (Scannell, Blanckley, Boldon, & Warrington, 2012), and by the reports that institutional corruption in the pharmaceutical industry and government is endangering the lives of patients (Light, Lexchin, & Darrow, 2013).

Four years later, these problems persist.

The irreproducibility of scientific studies, a prominent and wasteful symptom of the malaise, is now familiar not only to scientists, but also to the Chairman of the US House Science Committee (Schulson, 2018) who recently gave a keynote at the release of *The Irreproducibility Crisis of Modern Science* (Randall & Welser, 2018), a report by an advocacy group that calls for passing "a Reproducible Science Reform Act" (Wood, 2018). The questions about the motivation of the report notwithstanding (Schulson, 2018), its conclusion that "[s]cience cannot speak with proper authority until it cleans house" is difficult to dispute.

The growing number of lectures, workshops, conferences, and publications discuss solutions to the crisis (Fanelli, 2018), including the calls from the pages of *Nature* "to publish the houses of bricks rather than mansions of straw" (Kaelin, 2017), to videotape scientists at work (Clark, 2017), and to ration the number of papers a scientist can publish in their lifetime (Martinson, 2017). Recently, in the span of a week, Yale University hosted three lectures and a conference on irreproducibility, which has become a research field in itself. At one of the lectures, half of the audience raised their hands when the speaker asked them to do so if they thought the irreproducibility crisis has worsened, and a majority did so when asked if the crisis is severe, a result consistent with a formal survey of two years ago (Baker, 2016).

The crisis of veracity is but one of the persisting symptoms. "Perverse incentives" and the outdated funding system are still in place (Carroll, 2018; Huang, 2016; Siddhartha & Edwards, 2017), including the incentives to produce ineffective drugs (Prasad, McCabe, & Mailankody, 2018), as is the problem of proliferating administrators (McElroy, 2017). A research article released this month concludes that "mental health is a growing concern within graduate education" and suggests that the results "should prompt academia and policy makers to consider intervention strategies" (Evans, Bira, Gastelum, Weiss, & Vanderford, 2018). Because graduate students apparently feel that "academia and policy makers" are not listening, they have been forming trade unions, the effort that some universities fight tooth and nail (Coatsworth, 2018). That graduate students resort to strikes or even a hunger strike not at a struggling factory, but at universities proud of their multi-billion dollar endowments is hardly a sign of an environment conducive to healthy mentorship (Cui, 2018; Douglas-Gabriel, 2018). That faculty is now also forming unions and staging walkouts means that the mentorship is fraying at both ends (Jaschik, 2018).

Overall, while the diagnosis of *Rigor Mortis* – the title of a recent book on the state of biomedical research (Richard Harris, 2017) – may be excessively provocative and, hopefully, premature, the persisting symptoms of the malaise indicate that the rescue plan has yet to work.

As I previously argued (Lazebnik, 2015), this plan was bound to fail because its authors misdiagnosed the root cause of the disease.

According to the plan, "the root cause of the widespread malaise is a longstanding assumption that the biomedical research system in the United States will expand indefinitely at a substantial rate. We are now faced with a stark realization that this is not the case […] the current system is in perpetual disequilibrium, because it will inevitably generate an ever-increasing supply of scientists vying for finite set of research resources and employment opportunities" (Alberts et al., 2014). The consequent hypercompetition for funds, the authors suggested, was responsible for unreliable research, depressed scientists, neglected basic research, and other symptoms of the malaise. Hence, more funds and fewer scientists should solve the problem.

I felt that this diagnosis, which I called the money imbalance, was inaccurate because it could not explain why the malaise coincided with the largest increase in research funding in recent history, why the disease was not as prevalent in the past despite periods of tight funding, why it is not limited to biomedical research or to the United States, and, finally, why the heads of scientific institutions and funding agencies had been assuming that "the biomedical research system […] will expand indefinitely at a substantial rate," an assumption that belongs to the field of cosmology, not to managing human activities.

An alternative diagnosis was prompted by my observation that scientists were increasingly often called a workforce, a word that had been used by the Communist Party leadership to describe other citizens in the Soviet Union, where I grew up. The leaders there considered people cogs in a machine at their disposal, a workforce. Thinking why this word became so pervasive in the United States made me wonder if the malaise of biomedical research was related to the systemic flaws that felled the Soviet Union - the leadership-workforce system with its top-down chain of command. This question led me to a diagnosis made by others: the malaise is caused by the attempt to run academic institutions as businesses (Donoghue, 2008; Lazebnik, 2015; Pagano, 2017; Washburn, 2005).

This diagnosis, which I called businessification (Lazebnik, 2015), explained some symptoms of the malaise, but not all, making me wonder if I had to dig deeper.

For example, I could not understand *why* the heads of academic institutions decided to run them as businesses. Andrew Carnegie and other celebrated businessmen of the past could have demanded, if they had so wished, that the research institutions they generously funded be run as businesses. However, they did not. Instead, AT&T, the telephone company, let its research branch Bell Laboratories function for decades by the rules of the academic institution, ones that favor creativity, with remarkable success for both science and the AT&T bottom line.

As a historian of the Labs noted "[t]he teams at Bell Labs …were not seeking profits. They were seeking understanding. Yet in the process they created not only new products but entirely new – and lucrative – industries" (Josh Gertner, 2012). They invented the transistor, which enabled modern electronics and computing, the sensors that made digital photography possible, the solar cell of the solar panels, they discovered cosmic rays, developed super resolution microscopy, the first communication satellite, the first cellular phone system, and the mathematical theory of communication, which revolutionized communication by making it digital, to name some of the achievements. They also earned eight Nobel Prizes and three Turing awards (the "Nobel Prize of computing") in the process (Jon Gertner, 2013).

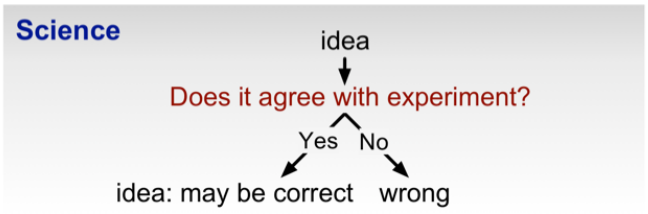
Why, then, has such a successful role model been replaced by its opposite, the model that forces even academic researchers to seek monetary profit by following the rules of business?

Equally puzzling was the low veracity of scientific reports. The thought that a properly run business – if we accept that academic research became a business – would produce something that works only half of the time on a lucky day did not make sense. This thought led me to realize that a current academic institution is not a business, but a hybrid between business and academia (Lazebnik, 2015). The properties of this hybrid reminded me the story of Dr. Frankenstein, who attempted to make a superior being by stitching together the best parts of deceased people. The result was a monster. This analogy helped me to understand why the hybrid has been sick – emergent and thus unexpected properties are a common outcome of combining distinct systems (Koulakov & Lazebnik, 2012) – but raised another question: Who is responsible for the emergence of this hybrid, or, in other words: Who is "Dr. Frankenstein" and why did he do this to science?

A doctrine?

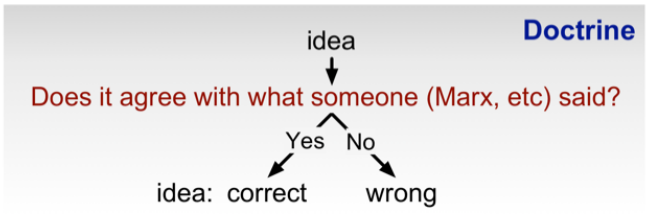
In principle, I thought, if we consider science as a social system, the malaise could be a result of two non-mutually exclusive processes.

First, the system could be developing by some intrinsic laws that trump the effort of scientists and administrators to keep it healthy, whatever is their position and however hard they try. For example, historians point out that empires have followed remarkably similar paths to their graves irrespective of who populated them, what their culture was like, where they were located, or when they existed (Glubb, 1976). This potential diagnosis, which we may call system aging, was depressing, as it implied that the only way to safety would be to jump off the Titanic to a younger vessel without any lifeboats in sight.



"In general we look for a new law by the following process. First we guess it. Then we compute the consequences of the guess to see what would be implied if this law that we guessed is right. Then we compare the result of the computation to nature, with experiment or experience, compare it directly with the observation, to see if it works. **If it disagrees with the experiment, it is wrong. In that simple statement is the key to science. It does not make any difference how smart you are, who made the guess, or what his name is** – if it disagrees with experiment it is wrong. That is all there is to it. "

Richard Feynman in: *Character of Physical Law,* The MIT Press, 1985



"Let me explain. If you are truly convinced that there is some solution to all human problems, that one can conceive an ideal society which men can reach if only they do what is necessary to attain it, then you and your followers must believe that no price can be too high to pay in order to open the gates of such a paradise. **Only the stupid and malevolent will resist once certain simple truths are put to them. Those who resist must be persuaded;** if they cannot be persuaded, laws must be passed to restrain them; if that does not work, then coercion, if need be violence, will inevitably have to be used—if necessary, terror, slaughter."

Isaiah Berlin describing ideologues in: *A Message to the 21st Century*

Figure 1. Two ways of evaluating ideas. Scientists evaluate an idea by comparing its predictions to what is observed in nature, while the followers of a doctrine compare an idea to what the founder of the doctrine or its interpreters said, irrespective of whether this opinion agrees with experiment or experience. Note that a scientific approach can test the validity of a political doctrine, but the ideological approach (this is true because someone said so) is unacceptable as a proof in science. A *Message to the 21st Century* can be found here: https://www.nybooks.com/articles/2014/10/23/message-21st-century/

Second, a social system could be deviated by a doctrine, as happened to societies taken over by the followers of Marx. Imposing his doctrine in order to introduce new rules destroyed millions of lives, as if they were the weeds that prevented grains from growing. The rules were new indeed. For example, because Marx said that "the theory of the Communists may be summed up in the single sentence: Abolition of private property" (Marx & Engels, 1848), having or organizing private enterprise was now punished as severely as premeditated murder, to disastrous economic effect.

Not all doctrines make their adepts behave so ruthlessly, but they tend to suppress logical thinking and common sense even in analytical minds, much like psychotropic agents, but with more lasting effect. They have this effect because the followers of a doctrine view it as the absolute truth, something that does not require testing (Fig. 1). As a result, scientists are not safe from joining a cult or thinking that something tangible on this planet can expand indefinitely at a substantial rate.

The possibility that the malaise is a result of indoctrination was intriguing because it could explain its sudden onset, which has been traced to the beginning of the 1980s (Lazebnik, 2015; Mirowski, 2011), and would suggest a cure, as taking the patient off the psychotropic agent could return him to his normal self, at least in theory (Fig. 2). The problem was that I did not see a prevalent doctrine that could explain either the malaise or the timing of its onset. Hence, for a while it seemed that the malaise was nothing doctrinal, just business, which was as annoying as an elusive answer can be.

A key to this puzzle came from my colleague Carlos Sonnenschein as an article on the sociology of the scientific field (Bourdieu, 1975). The article fascinated me by its insight, prompting me to learn more about the author, the French sociologist Pierre Bourdieu, thus leading me to a documentary about his incredible life (Pierre Bourdieu, 2001). In one of the episodes, Bourdieu mentioned the word neoliberalism. He also explained that neoliberal policies are made quietly, and that their effects become known twenty years later, when it may be difficult to track down the authors and too late to change the outcome. This sounded intriguing, both because he clearly did not like this ism and because I had no clue what neoliberalism was.

I quickly found from the emotional language of the first texts on neoliberalism that I read (Giroux, 2014; Harvey, 2007) that this topic is both contentious and confusing. This was unsurprising, as it involves politics and economics, the areas in which one term can have opposite meanings, several terms can mean the same thing, and the debates can affect the lives and livelihood of millions. However, the old but not forgotten experience of studying the works of Marx and Lenin, which was mandatory during my time in college, and the desire to understand the malaise kept me reading.

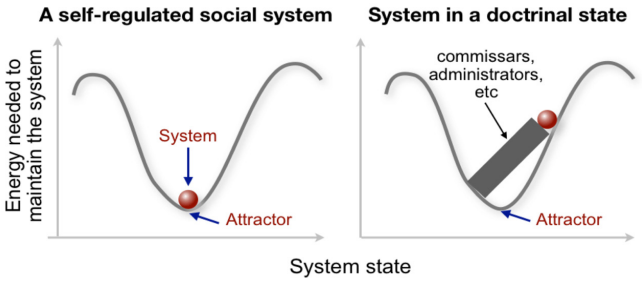


Figure 2. A social system diverted from its self-regulated state by a doctrine is unstable. A system can be compared to a ball that rolls on a hilly landscape (a fragment is shown by the curvy line), whose lowest points are called attractors. Without external constraints, the system sits in one of its attractors with little or no effort required to maintain it (left). Removing a system from an attractor requires effort (a revolution, indoctrination, etc.). A system would spontaneously return to the attractor unless prevented by force (commissars, administrators, etc.).

The few studies I could find on how neoliberalism has affected science (J. A. Fisher, 2007; Mirowski, 2011; Moore, Kleinman, Hess, & Frickel, 2011), of which the tellingly titled *Science-Mart: Privatizing American Science* by the historian and philosopher Philip Mirowski was the most expansive and informative, made me feel that I was on the right track: the authors argued that science has indeed been forcefully married to neoliberalism and that this marriage has been unhappy.

Sharing my revelation with a few colleagues made me realize that I was not the only scientist who was unaware of neoliberalism or its marriage. Some reacted to the suggestion that a doctrine, rather than scarce funding, could cause the malaise with disbelief, as if I were spreading a speculation from the darkest corners of the Internet. Others, however, advised that I should report what I have found, along with my thoughts and observations, because my commentary might reach interested readers who could bypass expert studies by philosophers and economists with their professional terminology and focus. I am following this advice.

Since a doctrine is a set of rules that prescribes how people should think and behave, to understand neoliberalism and whether it caused the malaise I decided to learn who created this doctrine and why, what its prescriptions are, why scientists and administrators would follow them, and how to neutralize it if needed.

A child of good intentions

Neoliberalism as an organized movement was born and baptized in the summer of 1938 in Paris, where Walter Lippmann, an influential American journalist, came for a honeymoon with the love of his life (Steel, 1980). A year earlier, Lippmann had published *The Good Society*, a book conceived by his concern that "[t]hroughout the world, in the name of progress, men who call themselves communists, socialists, fascists, nationalists, progressives, and even liberals, are unanimous in holding that government with its instruments of coercion must, by commanding the people how they shall live, direct the course of civilization and fix the shape of things to come." (Lippmann, 1937a).

He felt that this worldview, known as collectivism, forced people to make "intolerable choices," some of which are not unfamiliar today: "Men are asked to choose between security and liberty. To improve their fortunes they are told that they must renounce their rights. [...] To obtain greater equality they must have less freedom. […] To realize the promise of science they must destroy free inquiry. To promote the truth they must not let it be examined."

At the time, collectivism was already the law of the land in fascist Italy, Nazi Germany, and the communist Soviet Union. However, Lippmann was particularly concerned with "the gradual collectivism of democratic states," which he thought was promoted by groups like the Fabian Society (https://fabians.org.uk/) in Britain and by the proponents of the New Deal in the United States. To Lippmann, all types of collectivism were no more different, as he put it, than are tigers and lions from the point of view of a lamb. They would all lead to a totalitarian regime, war, and ruin.

Lippmann thought that collectivism had become popular because people, and intellectuals in particular, were dissatisfied with liberalism, a doctrine proclaiming that protecting the liberty of the individual is the primary goal of politics, and that having a free market and competition is the shortest way to prosperity (Minogue, Dagger, Ball, & Girvetz, 2017). He called for a revival of liberalism by modifying the doctrine and outlined an agenda for how to proceed.

The central point of the agenda was to reject the basic economic principle of liberalism, which was articulated in the 17th century at a meeting between the French minister of finance Jean-Baptiste Colbert and a delegation of merchants. When the minister asked how he could help commerce, the "most reasonable and the least flattering" of the merchants replied: *Laissez-nous faire*, that is "let us do (our job)", or, simply, "leave us alone". Whether this exchange ever happened is unknown, but once it was reported (Anonymous, 1751), *laissez-faire* became a term to describe the policy that the government should do just that, leave the market alone.

This policy has been credited with enabling the industrial revolution of the 19th century but also blamed for the concentration of wealth and thus political power in the hands of a few. At the time of Lippmann, such inequality led to widespread poverty, limited competition in the market, periodic depressions, including the Great Depression of 1929, wars, and social discontent (Minogue et al., 2017). Lippmann proposed that to prevent these problems in the future, new liberalism should reject laissez-faire as a fallacy "that sterilized the mind" of classic liberalism. Instead of leaving the market alone, government should develop policies that would support the market *and* resolve social problems. *The Good Society* was widely read and debated (Best, 2009).

One of the readers was Louis Rougier, a French philosopher who came to similar conclusions. Rougier used Lippmann's stay in Paris and the timely French edition of *The Good Society* to introduce the journalist to a group of twenty-five industrialists, bankers, civil servants, philosophers, and economists. Among them were two Austrian economists whose work influenced Lippmann when he was writing his book: Ludwig von Mises, who explained in his *Socialism* (von Mises, 1951) why economic prosperity under this doctrine is impossible, and his student Friedrich von Hayek. This meeting, which became known as Colloque Walter Lippmann, lasted five days and focused on discussing what liberalism was, why it declined, and how to renew it (Reinhoudt & Audier, 2018).

On the last day, August 30, 1938, Lippmann presented his *Good Society* agenda, which was approved as a new doctrine, *neo*-liberalism (Mirowski & Plehwe, 2015; Reinhoudt & Audier, 2018).

The *neo* in neoliberalism meant abandoning the laissez-faire of old liberalism to construct *the good society* by a concerted effort, in which government would become the market's bodyguard and enforcer (Mirowski & Plehwe, 2015). To find what exactly should be done and enforced, the group created a Center for Renovating Liberalism, with sections in France, Switzerland, and the United States, and planned to meet in a year to discuss how to help the newborn neoliberalism grow. These plans, however, were cut short by WWII, which started when baby neoliberalism was only one year and one day old.

The marvelous rules

Friedrich von Hayek, who worked during the war at the London School of Economics, adopted the baby by extending his previous work and the ideas discussed at the Colloque into *The Road to Serfdom*, a book, as Hayek wrote Lippmann, "on somewhat similar lines" to *the Good Society* (Best, 2009). However, Hayek's book, unexpectedly to both the author and the publisher, had a much larger and more lasting impact than its predecessor.

After *The Road to Serfdom* was released in Britain in 1944, the demand was such that the publisher could not keep up due to the wartime paper quotas (Ebenstein, 2001). Within a year, the book was translated into several languages, the University of Chicago Press printed it several times in the United States, and a condensed version was published by *Reader's Digest*, a magazine whose circulation at the time was nine million, with an additional 600,000 copies sold as reprints (Caldwell, 2007; Roehner, 2007). The book was condensed even further into eighteen graphic and memorable cartoons (Hayek, 2015), which look like they were designed in the anticipation of smartphones and their busy owners. The book is still in print, with the latest edition released in 2007 as an "unimpeachable classic work in political philosophy, intellectual and cultural history, and economics" and "one of the most important and influential books of the century" (Hayek, 2007).

The central idea of the book, as I understood it, is that humans are too prone to usurp power and are too easily corrupted by it to let them plan the economy. Doing so will inevitably result in a totalitarian regime, however well intentioned the planners are, with the worst of them rising to the top. Hence, the control of the economy and society in general should be left to the most powerful impersonal force in human society – the market.

What Hayek meant by the market, however, was not merely a market of material goods and services, as I would think. To him, the market was "a mechanism for communicating information," a "marvel" that solves "the problem of the utilization of knowledge not given to anyone in its totality" (Hayek, 1945). This mechanism not only makes the knowledge that is distributed among individuals available to all, but also assigns each piece of this knowledge a numerical value, its price. "If [the pricing system] were the result of deliberate human design, and if the people guided by the price changes understood that their decisions have significance far beyond their immediate aim, this mechanism would have been acclaimed as one of the greatest triumphs of the human mind."

In the words of the Nobel Committee, which summarized Hayek's ideas three decades later, "only by far-reaching decentralization in a market system with competition and free price-fixing is it possible to make full use of knowledge and information" (The Royal Swedish Academy of Sciences, 1974).

This conclusion implied that for humanity's own good, it should be disciplined as an unruly teenager.

First, anything and anyone should become a commodity, something which can be traded. In science, this would include scientists and whatever they find, write, report, or conceive, resulting in what is now called the market of ideas. Second, competition on the market should be increased, ideally to the limit, because the higher the competition, the more efficient the pricing. This limit would be reached when each individual on this planet competes with everyone else, the state now known as globalization. For scientists, this would mean increasing the competition for funding, positions, and other rewards. Third, since the market is the universal arbiter, to avoid the word deity, people should understand that the main goal in life is to respond to the market's signals, that your success is determined by how well you do that, and that true freedom means the freedom to trade. In science, this would mean that scientists should do what the market demands.

The role of neoliberal government would be to ensure that these requirements are met by providing what the market needs and by eliminating anything that interferers with it. This would include uncooperative foreign governments, opposing governmental and institutional policies, trade unions, guild fraternities, professional societies, historical bonds, national borders, long-term contracts and obligations, and any non-market ways of conducting human activities, including those in science and education.

Pierre Bourdieu, whose remark prompted my inquiry, summarized these changes in the subtitle of his article *The essence of neoliberalism*: "What is neoliberalism? A program of destroying collective structures that can be an obstacle to the logic of the free market" (Bourdieu, 1998). Since collective structures are the foundation of a traditional society and its morals, destroying these structures implied the need for new morals.

Indeed, as Hayek argued, "[f]or the small hunting and gathering band, consisting of twenty five to fifty

people, there were two overruling moral conceptions which today we describe with the terms "solidarity" and "altruism." Solidarity means common purposes pursued together with our fellows […] obedience to this instinct would have prevented any expansion of the society" (Hayek, 1979). Likewise, "[a]ltruism, in the sense that we must serve the needs of our known neighbor before we pursue the profit from dealing with strangers, would have made impossible the extension of society beyond the small group"

Hence, Hayek concluded that "we must, in our professional activities, no longer prefer the known good effects to the profits to be made, but must accept the profits as the signal which tells us how we can best help keep the masses of the population of the world alive. There is, ultimately, a moral justification for selfishness, if you care to call it that, for just obeying the commands of the market system. […] we must leave these inborn morals behind, and except for our relations with our immediate circle-what is now called the "nuclear family"– observe what I have called the "commercial morals."" In essence, whatever helps you to make a profit it is good. To avoid confusing the term "commercial morals" with professional standards of merchants and craftsmen, I will refer to them as new, or *neo*-morals.

It struck me that the neo-morals were quite different from Martin Luther King's sermon that "every man must decide whether he will walk in the light of creative altruism or the darkness of destructive selfishness. This is the judgment. Life's most persistent and urgent question is, 'What are you doing for others?'" (King, 1963).

Box 1. This is water

There are these two young fish swimming along and they happen to meet an older fish swimming the other way, who nods at them and says "Morning, boys. How's the water?" And the two young fish swim on for a bit, and then eventually one of them looks over at the other and goes "What the hell is water?"

David Foster Wallace: *This is Water*[1]

The contrast between the two morals made me realize the meaning of the second sentence of *The Road*: "This is a political book." Hayek was not proposing to tweak some obscure economic rules. He proposed a new worldview, a new faith, in which the marvel of the market, not of the human, was the most valuable part. The human was just a resource, along with oil, electricity, and other natural resources needed to make the market function. This role is now captured by the signs *Human Resources* on the doors of the offices that used to be called *Personnel*, from the word *person*, an individual, which is a bit different from *resource*.

Today, Hayek's worldview may seem normal, as is the sign *Human Resources*, because we live in a society built as he envisioned (Box 1), but at the time his vision was that of an outcast. He knew that his book "is certain to offend many people with whom I wish to live on friendly terms" (Hayek, 2007). At the same time, he regarded "the writing of this book as a duty which I must not evade," as the prophet of a new faith that will save the world by making everyone a merchant and a commodity at the same time, and by explaining humans that all their relationships are market transactions.

Difficult times

As he anticipated, Hayek's views made him famous in some circles and infamous in others. Winston Churchill polarized opinions further by saying in an election speech that "No socialist system can be established without a political police. […] They would have to fall back on some form of Gestapo, no doubt very humanely directed in the first instance" (Toye, 2010). His opponent, the socialist Clement Attlee, replied that Churchill's views were the "second-hand version of the academic views of an Austrian professor, Friedrich August von Hayek" (Toye, 2010). Blaming an Austrian (even though Hayek had become a British citizen in 1938) (Ebenstein, 2001) with the German name at the end of the war with a Germany led by an Austrian had its effect on the campaign, for Attlee won by a historic landslide. It also had its effect on Hayek.

As Hayek's colleague recalled, "That little episode caused the depth of hatred that was focused on Hayek. Hayek went through a period in the '50s and '60s [when] he was hated, execrated. Academics on the left, who were by no means unpleasant individuals, would not meet him. I had occasions when a professor of philosophy at Oxford didn't want to meet that man, absolutely emphatic -- not even for a free lunch, not with this man. It was a deep hatred." (Ralph Harris, 2000).

At the same time, *The Road to Serfdom* received positive and sometimes laudatory reviews by leading periodicals on both sides of the Atlantic (Ebenstein, 2001) and Hayek was invited to a book promoting tour in the United States. Because the condensed version of *The*

[1] https://fs.blog/2012/04/david-foster-wallace-this-is-water/

Road was so widely distributed, Hayek found himself addressing not only academics but also mass audiences. At one of these events he was approached by Harold Luhnow, a businessman who wanted to use the Volker Fund, a charity he had inherited from his uncle William Volker, to counter collectivism. This was how seven-year-old neoliberalism met his rich and generous uncle.

The movement

To save humanity from collectivism, Friedrich Hayek organized a society of like-minded people who would develop and adapt neoliberalism, devised a plan for spreading it, and continued to inspire wealthy followers to fund the effort. In one word, he created a movement.

Hayek convened the first meeting of his society on April 1, 1947, at a hotel near the Swiss village of Mont Pèlerin. It brought together thirty-six intellectuals, including four who attended the Colloque Walter Lippmann and one from the Volker Fund, a sponsor of the meeting ("Société du Mont-Pèlerin," 2018). The group chose the name of the Mont Pelerin Society and issued a Statement of Aims (www.montpelerin.org/statement-of-aims/).

The Statement lists six topics of interest, ending with "[t]he problem of the creation of an international order conducive to the safeguarding of peace and liberty and permitting the establishment of harmonious international economic relations" and notes that the "group does not aspire to conduct propaganda. It seeks to establish no meticulous and hampering orthodoxy. It aligns itself with no particular party. Its object is solely, by facilitating the exchange of views among minds inspired by certain ideals and broad conceptions held in common, to contribute to the preservation and improvement of the free society."

Hayek remained President of the Society for 14 years and personally vetted every new applicant for membership, apparently to ensure that the "certain ideals and broad conceptions" of the candidates are not too different from his own. To avoid unwanted influences and ensure freedom of discussion, Hayek insisted that all conversations at the Society meetings should be off the record and that it "must remain a closed society, not open to all and sundry", a tradition that exists to this day (Mirowski & Plehwe, 2015). The Statement of Aims has been the only document that the Society has released for its 70 years of existence.

The potential of the Society for "the establishment of harmonious international economic relations" can be gleaned from the achievements and occupations of its members. Eight of the members, including Friedrich Hayek, received the Nobel Prize in economics (montpelerin.org/notable-members) and one, Erik Lundberg, was involved in creating and awarding the Prize itself. As the full name of the Prize – The Sveriges Riksbank [Sweden's Central Bank] Prize in Economic Sciences in Memory of Alfred Nobel – indicates, the Prize was established by the Bank, rather than by Alfred Nobel, and was awarded for the first time in 1969, 73 years after Nobel passed away. Lundberg was one of the three Bank officials credited for creating the Prize (Lebaron, 2006; Lindbeck, 1985) and then served as one of the six Prize Committee members for ten years, including four years as chairman (Lindbeck, 1985).

Other members of the Mont Pelerin Society have contributed to the cause as presidents of countries, senior government ministers and officials, professors of economics and law, prominent journalists, such as William Buckley and Henry Hazlitt, the heads and members of think tanks, philosophers, including Hayek's friend Karl Popper (S. Jacobs & Mullins, 2016), and other influential individuals, such as Charles Koch of the Koch brothers, the second wealthiest family in the United States (Butler, 2014; Forbes, 2016; Mirowski & Plehwe, 2015).

The second center of neoliberal influence in economics and politics grew from the Free Market Study Project at the University of Chicago, a program conceived by Friedrich Hayek, funded by the Volker Fund, and directed by Aaron Director, Hayek's follower, friend, and a founding member of the Mont Pelerin Society (Rob van Horn & Mirowski, 2015; Robert van Horn, 2013). Director became a celebrated leader of the Chicago school of economics, an informal group whose members emphasize free-market solutions and have received a third of all Nobel Prizes in this discipline. Seven of the eight "leading and best-known" school representatives, according to Encyclopædia Britannica, are members of the Mont Pelerin Society (Hess, 2017).

Milton Friedman, a member of the Chicago school, a founding member of the Mont Pelerin Society, a recipient of the Nobel Prize in economics, and a man described by *The Economist* as a kindred spirit of Hayek and "a giant among economists,"(The Economist, 2006) wrote *Capitalism and Freedom*, a book that has sold about a million copies since it was published in 1962, has been translated into 18 languages, and has never been out of print (Wkipedia, 2018). Friedman extended Hayek's view that human activities and relationships should be seen as market transactions, using children as an example: "…children are at one and the same time consumer goods and potentially responsible members of the society. The freedom of individuals to use their econom-

ic resources as they want includes the freedom to use them to have children – to buy, as it were, the services of children as a particular form of consumption. But once this choice was exercised, the children have a value in and of themselves…" (Friedman, 2002).

Thinking about my children, I wondered how could such views become a guide for generations. Friedrich Hayek had a plan (Figs. 3, 4).

"The secondhand dealers in ideas"

To spread his ideas, Friedrich Hayek suggested using the same people who had spread the ideas of socialism – intellectuals, whom he called secondhand dealers in ideas. "The class does not consist of only journalists, teachers, ministers, lecturers, publicists, radio commentators, writers of fiction, cartoonists, and artists all of whom may be masters of the technique of conveying ideas but are usually amateurs so far as the substance of what they convey is concerned. The class also includes many professional men and technicians, such as scientists and doctors, who through their habitual intercourse with the printed word become carriers of new ideas outside their own fields and who, because of their expert knowledge of their own subjects, are listened with respect on most others. There is little that the ordinary man of today learns about events or ideas except through the medium of this class; and outside our special fields of work we are in this respect almost all ordinary men" (Hayek, 1949). This includes politicians and legislators who decide how science is organized.

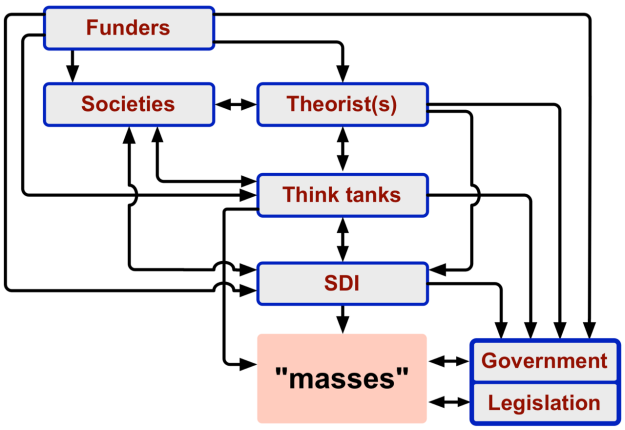


Figure 3. Hayek's framework for implementing ideas. SDI stands for secondhand dealers in ideas, which is how Friedrich Hayek called intellectuals. Figure 4 outlines how this framework was implemented.

The television, which an average American now watches five hours per day (Koblin, 2017), and the techniques of persuasion that this and other media, including those enabled by the Internet, have adopted, have made secondhand dealers in ideas even more influential. For example, *The Guardian* calls Oprah Winfrey, a popular TV personality and a billionaire, "one of the world's best neoliberal capitalist thinkers" because "her stories hide the role of political, economic and social structures in our lives" (Aschoff, 2015). The list of "the top Hayekian public intellectuals in America" compiled by a Hayek admirer includes other familiar names (Ransom, 2009).

Academia deserved special attention: "The point which is important for us, however, is that the scholar who becomes a university president, the scientist who takes charge of an institute or foundation, the scholar who becomes an editor or the active promoter of an organization serving a particular cause, all rapidly cease to be scholars or experts and become intellectuals, solely in the light of certain fashionable general ideas" (Hayek, 1949). I saw this process in action five decades after these words were published, as we will soon discuss.

To achieve the maximal effect with minimal means, Hayek advised that the movement should focus on those whom he called active intellectuals, or, in modern terms, opinion makers and influencers: "once the more active part of the intellectuals has been converted to a set of beliefs, the process by which these become generally accepted is almost automatic and irresistible" (Hayek, 1949). To attract these intellectuals, Hayek called for "a liberal Utopia, a program which seems neither a mere defense of things as they are nor a diluted kind of socialism, but a truly liberal radicalism which does not spare the susceptibilities of the mighty (including the trade unions), which is not too severely practical, and which does not confine itself to what appears today as politically possible."

In other words, the new faith had to be presented as exciting and simple enough to be adopted with enthusiasm. Who would refuse to save humanity, especially if doing so is not too complicated, at least in theory?

Articulating Hayek's radical Utopia and converting intellectuals into its fold required organizations of the type that became known as the think tank, a term that during WWII meant "a safe place where plans

and strategies could be discussed" (Ladi, 2014) and now applied to non-profit policy research organizations that participate in a different kind of war, the war for people's minds, the war of ideas (Blundell, 2007). Hayek's think tanks became the home base for neoliberalism, an example of how the vision of an outcast can be imposed throughout the world without much bloodshed, and a guide for those who want to change people's minds.

A tank from eggs

Hayek's first think tank, the Institute for Economic Affairs (IEA) was founded by Antony Fisher, an Etonian, a Cambridge graduate, and a WWII fighter pilot who had personal scores to settle with collectivism. His younger brother Basil, who was flying in the same squadron, was shot down by a Nazi fighter, bailed out, but fell to his death when his parachute caught fire. All Antony could do was to helplessly watch this tragedy from above (Frost, 2002).

After leaving the military, Fisher wanted to become a politician to oppose the spread of collectivism in Britain. The condensed version of *The Road to Serfdom* resonated with his views so much that he went to see the author. As Fisher recalled, "his counsel was that I should join with others in forming a scholarly research organisation to supply intellectuals in universities, schools, journalism and broadcasting with authoritative studies of the economic theory of markets and its application to practical affairs" (Frost, 2002). At that time, however, Fisher had few resources to educate intellectuals because the farm he had bought as a source of income was losing money.

The resources came as an unexpected outcome of visiting the Foundation for Economic Education (FEE) in the United States. FEE was funded by the Volker Fund and run by two members of the Mont Pelerin Society. One of them, Floyd "Baldy" Harper, had been a professor of economics at Cornell University until its trustees advised him against using the "more than contentious" book, *The Road to Serfdom*, in the class to avoid endangering government funding. Harper resigned instead to join FEE (Blundell, 2003).

The Cornell connection turned out to be fateful to neoliberalism, as Harper, perhaps upon hearing about Fisher's problems with farming, directed his visitor to the Cornell scientific farm, which had developed a technology to produce a fast-growing breed of meat chickens on industrial scale. Fisher realized the potential of this technology, but importing birds or eggs into Britain was prohibited. He solved the problem by disguising two dozen fertilized eggs as Easter eggs and brought them home in his hand luggage, a solution that would be hardly possible today because of intellectual property rights, material transfer agreements, and transportation safety regulations.

The chicks that hatched from these eggs transformed poultry farming in Britain, made chicken meat popular by making it cheap, and brought Antony Fisher a fortune, setting him free to finally follow Hayek's advice. Fisher established the Institute for Economic Affairs in 1955 and two years later hired economists Ralf Harris and Alfred Seldon to run it (Frost, 2002).

The nineteen-year-old neoliberalism now had a home.

Godmother

Over the next two decades, while being treated as "scorned, dismissed heretical minority", IEA published "some 3 million words in 250 papers and monographs" (Frost, 2002) presenting neoliberalism as the best solution for the Britain's economic problems, and introduced the maturing doctrine at hundreds of lunches and parties to journalists, economists, and politicians, converting some of them.

One of the converts was Margaret Thatcher, a rising star of the Conservative Party. When Thatcher became Leader of the Opposition in the British Parliament in 1975, her political mentor Sir Keith Joseph introduced her to IEA. She began to frequent IEA lunches, read IEA publications, and received a personal lecture from Friedrich Hayek himself, a meeting that both enjoyed very much (Frost, 2002; Ralph Harris, 2000).

Neoliberalism now had a dedicated godmother, who was about to become almost as powerful as a fairy and capable of turning ordinary people into knights.

This happened on May 4, 1979, when Margaret Thatcher became Prime Minister of the United Kingdom. As she wrote Harris two weeks later, "it was primarily your foundation work, which enabled us to rebuild the philosophy upon which our Party succeeded in the past. The debt we owe to you is immense and I am very grateful" (Thatcher, 1979). These were not just pleasantries, as two months later Ralf Harris became Baron Harris of High Cross of Tottenham, the place where he grew up as the son of a tramway inspector (Frost, 2002; Wolf, 2006). The Mont Pelerin Society ac-

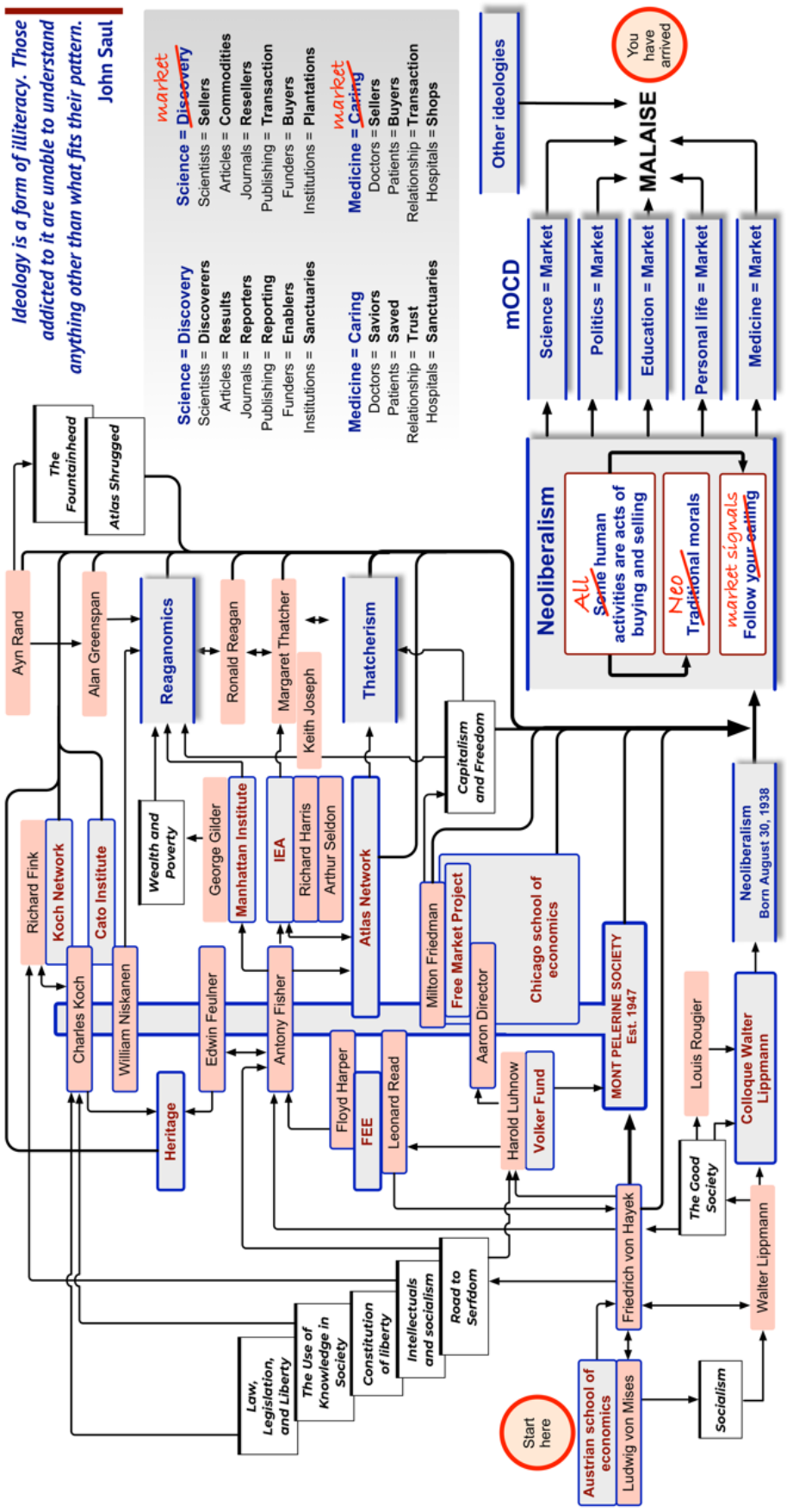


Figure 4. Mighty oaks from little acorns grow. An outline of the connections between people, doctrines, texts, and organizations mentioned in the text. Only some connections are shown to keep the graph readable. The names of the Mont Pelerin Society members are rimmed in blue. The names of doctrines are sandwiched between blue lines; texts are indicated by the titles within white rectangles. mOCD stands for market-obsessive compulsive disorder (see text), which is manifested as the malaise of science, education, industry, politics, and some other activities. Note that the depicted individuals can identify themselves with diverse political movements and philosophies, but share the belief that the best way to organize society is by considering all human activities as economic market transaction, and by assuming that the market as the highest authority on what is good and what is not. For example, Ayn Rand, who was born in the city where I grew up, was not fond of Hayek's ideas but both agreed on the superiority of a free market and the need for what I call neo-morals (see text).

knowledged Lord Harris by making him its President.

The reforms introduced over the next decade became known as the Thatcher revolution, or Thatcherism.

"When Mrs. Thatcher came to office in 1979 a principal objective of the new Conservative administration was to reduce the high prevailing levels of public spending, to create more incentives for private initiative", - recalls professor Ron Amann, who was at the time a lecturer of Political Economy at University of Birmingham, – "The high levels of public spending were conceived to be the result of a widespread `dependency culture' which was becoming progressively unrestrained […]. More central to our argument, however, was the assumption that many professional people in the public sector enjoyed cushioned lifestyles and pursued their own agendas which were disconnected from the real needs of ordinary people. This professional self-interest was quite slippery and typically clothed itself in eloquent expressions of high-mindedness. The new Thatcher government, however, refused to be charmed or deflected from the principle that producers of any good must not determine what should be produced; customers should […] Mrs. Thatcher's answer to professional and institutional self-interest was […] radical introduction of quasi-markets into the public sector, with a clear division between purchasers and providers" (Amann, 2003).

What once was a vision of an outcast economist, a "not too severely practical" Utopia, became the guide for millions of people. All without a single shot fired.

As Amann found, "a cultural revolution was inevitable. It came as a rude shock." Although no scientists were paraded on the streets in shackles, as happened during the Cultural Revolution in China, the shackles of the new rules were there, invisible, but, nonetheless, all too real.

Scientists learned that they were no longer discoverers and thinkers, but – by a decree of the new ruler inspired by her new faith – the producers and sellers of commodities (previously known as data, discoveries, observations, ideas, and insights) to journals, funders, and other willing or assigned buyers. They also learned that they should produce what the market demands, rather then pursue "their own agendas," that is their interests and intuition. How the market could demand what is yet to be discovered and thus still unknown and unanticipated, a conundrum that I call the Koff paradox because my friend Andy Koff pointed it out to me (Box 2), was none of the scientists' business. The marching orders were already issued. Administrators learned that their role was no longer to help scientists, but to ensure that scientists follow the rules of this newly invented marketplace, the market of ideas, and produce what they were told. Making a cut on the transactions, thus effectively cutting research funding, paid for administrator salaries, offices, and assistants.

Box 2. The Koff paradox

How can a market exist for that which is yet to be discovered? How can a market signal a need for something that is unknown to exist and impossible to foresee? It cannot. That is the very problem with the majority of science today…it lacks creativity, but rather fills in details that have market value.

Andy Koff

It was businessification indeed, businessification by decree.

The economic success of the revolution made it an example to follow, helping to spread rapidly to present and former British dominions and beyond. This spread was enabled by a network of think tanks, set up or guided by Antony Fisher with some help from his fellow members of the Mont Pelerin Society.

Godfather

In 1977, Antony Fisher co-founded the Manhattan Institute in New York City, which still awards its annual Hayek Book Prize and invites the winner to give a Hayek Lecture. In 1981, the year Ronald Reagan, an admirer and close friend of Margaret Thatcher, was elected President of the United States, the research director of the Institute George Gilder published *Wealth and Poverty*, a book that has been called the "Bible of the Reagan administration" (www.manhattan-institute.org/history).

Reagan's policies, which stopped stagflation but also caused increasing economic inequality by favoring the rich and deregulating financial markets, were named Reaganomics by one of its architects, the economist William Niskanen (Niskanen, 1993). Niskanen was a Mont Pelerin Society member, as were twenty of seventy-four economists employed in Reagan's task forces (Ebenstein, 2001). Apparently, Ronald Reagan not only knew whose ideas were behind his policies and met the

author at the White House, but considered Hayek one of his favorite thinkers (Hanke, 2007). "More than forty years ago", – he wrote Hayek in 1986, – "you warned the Western world against "The Road to Serfdom." We are all indebted to you for this advice and I think it is clear that your wise counsel is being heeded" (Reagan, 1986). It was indeed.

Oliver Letwin, a still serving member of British parliament, commented in 1994: "Without Fisher, no IEA; without the IEA and its clones, no Thatcher and quite possibly no Reagan; without Reagan, no Star Wars; without Star Wars, no economic collapse of the Soviet Union. Quite a chain of consequences for a chicken farmer!" (Blundell, 2003). I thought that the chain of events should start with Hayek. I also realized that those chicks from Cornell changed my life as well, and perhaps in more ways than I appreciate. Who could have known?

If the influence of Hayek and his movement had stopped with Thatcher and Reagan, the movement he created and inspired would have to be credited for the changes that have transformed the societies on both sides of the Atlantic and beyond. But the influence of Hayek's ideas continued to grow, getting stronger with the help of his powerful followers.

Powerful friends

As the IEA-like think tanks proliferated, and requests to help organize more of them kept coming, Antony Fisher founded Atlas Network, a mothership organization which funds, guides, coordinates, and helps to establish neoliberal and likeminded think tanks. Fisher's daughter, Linda Whetstone, is currently the Atlas Chairman, overseeing a network that connects 475 organizations in 90 countries, including 182 in the United States (atlasnetwork.org). The partner institutions are usually established and run with the help of at least one member of the Mont Pelerin Society (Plehwe & Walpen, 2006; Salles-Djelic, 2017).

A prominent example is the Heritage Foundation, which was co-founded by Edwin Feulner, a former IEA intern, and a president of the Mont Pelerin Society (Frost, 2002). During thirty-six years as president of Heritage, Feulner transformed it «from a small policy shop into America's powerhouse of conservative ideas and what the *New York Times* calls "the Parthenon of the conservative metropolis"» (www.heritage.org/staff/edwin-feulner). According to Heritage, "[i]n just its first year, the Trump administration embraced nearly two-thirds of the policy recommendations from Heritage's five "Mandate for Leadership" publications".

Hayek's vision also guided Richard Fink, known as Charles Koch's brain (Schulman, 2014), for he is the architect of the network funded by Charles and David Koch (D. Fisher, 2012), the brothers who have invested hundreds of millions into US elections (Seipel, 2018). The Framework for a Free Society (the name is trademarked, apparently to ensure it is not used too freely) at the Charles Koch Institute "enables individuals to better evaluate whether a proposed public policy or other action is in harmony with the principles of free societies, and therefore best improves well-being" (www.frameworkforafreesociety.org). The first two of the texts that "influenced the development of the Framework" and thus, I presume, serve as the touchstones for evaluating policies, are Hayek's *Law, Legislation, and Liberty* and *The Use of Knowledge in Society*. *The Declaration of Independence* by Thomas Jefferson, one of the American Founding Fathers, comes in only third place.

The best leader is barely known

A problem with following the development and influence of neoliberalism is that you would not find this term on the masthead of think tanks or in the recent articles by the followers of the doctrine, as they have not used the term since the 1950s, which reminded me the wisdom of Lao Tzu that "[t]he best leader is one whose existence is barely known" (Tzu, 1996). If in 1951 Milton Friedman presciently noted in his *Neo-Liberalism and its Prospects* that neoliberalism is "in many ways ideally suited to fill the vacuum that seems to me to be developing in the beliefs of intellectual classes the world over" (Friedman, 1951), he then stopped using the word, apparently without changing his opinion.

That this doctrine still prevails is apparent from the remarkable title of a recent report in *Foreign Policy* magazine - *The IMF [International Monetary Fund] Confronts Its N-Word [neoliberalism]* (Rowden, 2016). This title is remarkable because in just five words it makes three points: that neoliberalism has been a guide for major economic and political institutions, such as the IMF, that some followers begin to question this doctrine, and that mentioning neoliberalism is as unacceptable among civilized people as the other N-word.

I noticed, however, that the allegiance of an institution to the N-doctrine can be detected by looking into the history of the organization, its expressed respect to Friedrich Hayek, and by a combination of certain key words in the mission statements: free market (all areas of society should function as an economic market

controlled by people who profit from it most), freedom (to participate in the market), and personal responsibility (you are on your own). For example, the mission of the Pacific Research Institute (PRI), a think tank founded by Antony Fisher, is "to champion freedom, opportunity, and personal responsibility for all individuals by advancing free-market policy solutions".

Donating $2500 to the PRI would make you a member of the Friedrich Hayek Circle (pacificresearch.org/sir-antony-fisher-freedom-society). Because PRI is involved in shaping health care policies, you will help with your donation to convince others that your doctor should consider his expertise, himself, and you as a commodity, your relationship with him as a market transaction, and every attempt to relieve you from as much of your money as possible as obeying the market signals, which should be the main purpose of your and his lives. Because PRI is also involved in shaping educational policies, you will also help to make sure that education is a monetary transaction between the educational institution and its students, and that profiting from it is the mission of the institution, whatever its public mission statement states.

What have I learned?

My overview of neoliberalism, however incomplete, taught me how someone can impose his vision on nearly the whole world through a determined, inspired, and capable movement, that this revolution (and changing fundamental beliefs and ways of life is a revolution) could be quiet, and that human spirit or the lack of it detemines much of what we do and how we do it.

I learned that neoliberalism was created in response to the spread of collectivism, a multifaceted doctrine behind the National Socialism of fascist Germany, the communism of the Soviet Union, and the various shades of socialism in other countries, including the United States. I learned that for Dr. Hayek the economic market was the supreme governor, arbiter, and the purpose of *all* human activities, and thus, to benefit humanity, should be applied to all areas of society, including science, education, and medicine. To enable this change, traditional morals should be replaced with commercial morals, which are understood as the primacy of obeying the signals of the market over all others, either inner or external. Everyone is for himself and by himself, so we can live together happily, trading whatever we can, including ourselves.

It was finally time to return to the questions left unanswered by my diagnosis of businessification. Can I answer them now?

A mental case

Before my foray into the history of neoliberalism, I could not understand why the heads of scientific institutions had decided en masse to run them as businesses. What I have learned (Figs. 3 and 4) provided an explanation. The first cohort of science administrators was forced or enticed by the Thatcher-Reagan cultural revolution. The second cohort, as Hayek predicted, followed the new scheme once it became the fashion of the powerful and influential, and the next generation grew up absorbing the businessification of science as something natural. People adapt, especially if adapting is financially rewarding.

I witnessed the second phase, the spread of the fashion, in an institution in which its director, a scientist, began to behave as a corporate official. The change was sudden, as if he had a revelation, and came with organizational flow charts, the corporate vocabulary, a touch of superiority characteristic to those in the know, with what I would call the passion of the converted, and with excitement about the new ways science was run in other renowned institutions. What followed (generalized in Box 3) was a quiet, quick, and effective micro-version of the Thatcher-Reagan revolution, which resulted in the top-down chain of command, distraught faculty, eager and well-paid administrators with a corporate background, a well-funded, some would say excessive, public relations department, and graduate students covering all of this with gallows humor on an anonymous Twitter account.

As a sign that something was indeed not quite right, the institution started to lose its brightest and began having difficulties with attracting top talent, which would have been inconceivable a few years earlier. I realized only later that I had been observing in a microcosm the malaise that had been spreading on both sides of the Atlantic.

Because the malaise I observed was caused by a change in the mentality of those in charge, rather than by a deficiency of funding or of other tangible assets – in fact, the assets kept growing – I thought that the malaise was a manifestation of a mental rather than a somatic disorder. Because this disorder was caused

by the doctrine that all human activities are the acts of selling and buying – a psychotropic drug prescribed by Dr. Hayek off-label and inoculated by politicians – I diagnosed the malaise as an iatrogenic (caused by doctor) psychiatric disorder (Lwanga, 2014).

Because people affected by this disorder obsessively demand that all human activities should be considered as economic market transactions and do so with disregard to others, I classified it as the market-obsessive compulsive disorder (mOCD) with sociopathic tendencies, a subcategory of doctrine-obsessive disorders (dOCDs), which include communism, neoliberalism, socialism, libertarianism, neoconservatism, objectivism, anarchism, and many other isms.

I noted that mOCD preferentially affects people in power, such as the heads of institutions, perhaps because they are less exposed to the consequences of what they do than the people they govern, but this disorder can affect everyone and spreads easily, as I had learned from experience. I remember enthusiastically explaining to Joe Rodriguez, a graduate student who just joined my laboratory, how we should package and sell our findings, the philosophy I learned an hour earlier from a colleague who had absorbed it at a top university. Fortunately, Joe sobered me with his ironic smile by asking: Yuri, can we talk science? This recollection implied that mOCD is contagious but is reversible by psychotherapy, which was encouraging.

Because mOCD can affect anyone, this diagnosis could explain why the malaise was not restricted to biomedical research or even to science. For example, from a conversation with a musician of a world-renowned symphony orchestra I learned that the orchestra was also suffering from the malaise and that the symptoms were similar to those observed in academia. The telling symptom of mOCD was that the new generation of orchestra administrators was as indifferent to music as some science administrators were to science, as all viewed their organizations as vehicles to make money and the people who work there as cogs, workforce, needed to make these vehicles perform. The consequences were also similar – the difficulty in recruiting talent and a concomitant fall in the rankings.

To find if mOCD could explain other puzzles unresolved by the diagnosis of businessification, I decided to start with reading again the rescue plan (Alberts et al., 2014).

Box 3. How to Improve Science: A Memo to a New CEO

- Remember that the purpose of a research institution and university is to make money; science is just one way to do it. Never say or admit this in public.
- As in any revolutionary transition, there will be difficulties and resistance. Change the structure of the institution to prevent scientists from resisting or making any other decisions that control their professional lives. Tell them often that the changes are for their benefit and will improve science.
- Use administrators liberally to enforce new rules until the new system is accepted as natural. Secure their loyalty by being generous.
- Consider scientists as economic entrepreneurial units. Promote entrepreneurial approaches to science as superior to traditional ones.
- Whatever scientists discover or develop is a commodity. Favor scientists whose commodities can be sold for money. Introduce metrics to price others out.
- Maximize competition to let the market select the fittest. To help evolution, make all research and teaching appointments temporary. This will also make them think twice before piping up. Supply and demand!
- View publishing as a market transaction between the scientist and the journal; use the impact factor as the price multiplier. Remember, the market is the final arbiter of truth. Sold!
- Reduce or eliminate benefits to leave scientists to fend for themselves. Call this freedom.
- Provide all services to scientists for a fee. Market rules.
- Keep collateral damage under control. Let those in the trenches eat cake once in a while to relieve tension. Get the best lawyers your endowment can buy if the problems spill over.

Revisiting the rescue plan

Revisiting the rescue plan with the benefit of overviewing Dr. Hayek's teachings and a new diagnosis made me realize that the plan is based on a combination of mutually exclusive views.

The authors share the neoliberal worldview because they consider science as a market that is regulated by supply and demand, because they view scientists as uniform economic units that need to be processed through

a workforce pipeline to be ready for the market, and because they tell others how they should behave without considering why people would do otherwise.

At the same time, the authors use the notions based on traditional morals and the ways of organizing science: they are concerned about perverse incentives, hypercompetition, the wellbeing of young scientists, and the prevalence of applied research over fundamental discovery. The problem is that these notions make little sense in the worldview in which the market is the universal model for all human activities.

For example, there is no such thing as perverse incentives as long as the sellers and buyers reach an agreement voluntarily and within the law. If a scientist can sell a paper to a journal – and they are a seller and a buyer according to the doctrine – then there is nobody to blame, as both sides make some profit: the scientist in funding, salary increases, and other rewards, the publisher by charging other scientists for reading the article. If a company profits by selling a drug it knows to be ineffective (Prasad et al., 2018), or raises the price of a life-saving drug fifty fold just because it can (Petersen, 2016), it is obligated to do so. As Milton Friedman reminded us: "Few trends could so thoroughly undermine the very foundation on our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible. This is a fundamentally subversive doctrine" (Friedman, 2002). If government refuses to support breast-feeding babies to please manufacturers of breast milk substitutes (A. Jacobs, 2018), then politics is just another market. If universities and research institutions use taxpayers' money to fund the administrative glut instead of research programs, the market will sort everything out, for it works in mysterious ways. If an adjunct faculty member commits suicide because of work overload (Pells, 2018), or a professor takes his life because he was unable to "fulfill the metrics" (Grove, 2015), then this is what the market does well – selects the fittest. If a coach who brings substantial profit to a university abuses children, then should we blame the administrators for obeying the signals of the market to look the other way instead of following outdated morals? (Doom, 2018; Giroux, 2014) What is perverse here, really?

Likewise, there is no such thing as hypercompetition. The higher is the competition, the more efficient and effective is the market in separating the wheat from the chaff and in pricing each appropriately. And, the more efficient and effective is the market, the better it is for everyone, eventually that is, because this information processor can resolve what is incomprehensible to any human being. The real problem would be *hypo*-competition, but it is no longer a concern thanks to the implemented economic market model of science. Be first, my friend, right or wrong, the market will sort everything out!

The complaint about the prevalence of translational research is also out of place because if the market is the marvel whose signals must be obeyed to save humanity, then it is only logical to accept that what sells must be favored over what does not. And it is equally obvious that the results of applied research sell better than far-out ideas of the likes of Einstein or Mendel. Isn't it logical?

The hybrid conceptual framework of the plan could not but remind me the Frankenstein nature of the current scientific institutions, which combine traditional and businessified approaches to managing science (Lazebnik, 2015). Perhaps, I thought, the Frankenstein managing model reflects the confusion in the minds of its creators, which would explain the attempt to cure the malaise by applying the psychotropic drug that caused it, as the authors of the rescue plan suggest. This possibility would be consistent with my diagnosis of the malaise as a mental affliction, although the ability to handle two mutually exclusive ideas at the same time and remain sane is considered a sign of a first-rate intelligence (Fitzgerald, 2017).

I felt that studying the neoliberal worldview and language was beginning to look helpful and thus decided to ask again another puzzling question: Why would analytical minds be shocked by the fact that something tangible on this planet cannot expand indefinitely at a substantial rate? A tip came from my son Egor, who suggested that I read about the global financial crisis of 2008.

We were shocked!

The crisis, the worst since the Great Depression of 1929, shrunk the endowments of the United States and British universities by roughly a third and disrupted research in many other ways (Wolinsky, 2009). To find why this crisis had happened and why those who were supposed to prevent or at least predict it had failed to do so, the United States House of Representatives called a hearing.

The star expert was Alan Greenspan, the former Chairman of the Federal Reserve and a prominent Reaganomist (Weisman, 1982), who had been adulated during prosperous times so much that he said he had felt

embarrassed (Tett, 2013). Greenspan was also known as "somebody who had trained as an ultraorthodox, free-market economist and was close to Ayn Rand, the radical libertarian novelist. He was (in)famous for his belief that the best way to run an economy was to rely on rational actors competing in open markets. As Fed chair, he seemed to worship mathematical models and disdain "soft" issues such as human culture" (Tett, 2013).

Congressman Henry Waxman, who chaired the hearing, began with a statement in line with my own inquiry: "Over and over again, ideology trumped governance. Our regulators became enablers rather than enforcers. Their trust in the wisdom of the markets was infinite." (Waxman et al., 2008). He then questioned Alan Greenspan.

HW: "The question I had for you is you had an ideology. [Cites AG:] *''I do have an ideology. My judgment is that free, competitive markets are by far the unrivaled way to organize economies."* […] That was your quote. You have the authority to prevent irresponsible lending practices that led to the subprime mortgage crisis. You were advised to do so by many others. Now, our whole economy is paying its price. You feel that your ideology pushed you to make decisions that you wish you had not made? ''

AG: "[ideology] is a conceptual framework with the way people deal with reality. Everyone has one. You have to. To exist, you need an ideology. The question is, whether it exists is accurate or not [sic]. What I am saying to you is, yes, […] I found a flaw in the model that I perceived is the critical functioning structure that defines how the world works, so to speak."

HW: "In other words, you found that your view of the world, your ideology, was not right, it was not working."

AG: "Precisely. That's precisely the reason I was shocked, because I had been going for 40 years or more with very considerable evidence that it was working exceptionally well. "

This answer, and the word *shocked* in particular, reminded me the "stark realization" that the rescue plan authors had when they found that "a longstanding assumption that the biomedical research system in the United States will expand indefinitely at a substantial rate" was wrong. I thought that both shocks were related in two ways.

They were both a result of what Thomas Huxley described as "the great tragedy of Science – the slaying of a beautiful hypothesis by an ugly fact," (Huxley, 1870) which, as I know from experience, is a shock. In both cases, the hypothesis was that organizing any human activity as an economic market would solve all problems, irrespective of human culture, human nature, and humans in general. A difference between these cases was that Alan Greenspan admitted that the doctrine was wrong, while the authors of the rescue plan were either unaware that they were following a doctrine, or not forthcoming enough to admit it. Overall, the shock expressed in the rescue plan was consistent with my new diagnosis because the reaction implied equating a hypothesis – a fiction – with a fact, which was not a sign of a clear mind.

Being encouraged by finding an explanation for an annoying puzzle, I proceeded to examine the symptom that my previous diagnosis also failed to explain fully: the irreproducibility crisis. Since reporting results before verifying them, cutting corners, and other behaviors that underlie low veracity are related to professional standards and thus morals, I asked whether commercial morals, whose necessity Hayek advocated, were to blame.

Beware of being caught

As we discussed, Friedrich Hayek mentioned in one of his lectures that "we must leave these inborn morals [altruism and solidarity] behind, and except for our relations with our immediate circle-what is now called the "nuclear family"– observe what I have called the "commercial morals."" (Hayek, 1979).

The lecture was followed by questions and answers:

"Q: Assuming we universalized this ethic of self-interest, why should the individual be led to pursue productive goals instead of, for example, becoming a thief?

Now, you say there are certain prohibitions that should be hedged around, but if I am indifferent to the ends of society and to the others whom I don't know, why shouldn't I, for example, mug strangers? Why wouldn't this be rational?

Professor Hayek: Because society would punish you for it. It is part of the abstract rules that if you do what is prohibited, you are punished.

Q: But isn't that simply an argument that I should be very careful when I mug someone rather than an ethical argument against this action?

Professor Hayek: Well, I don't know."

To test if this discussion is related to the problem of

veracity, I took the liberty of modifying the questions and imagined that I had a chance to ask them. My text is in italics.

Me: If I am indifferent to the ends of society and to the others whom I don't know, why shouldn't I, for example, *sell a manuscript to the editor by overlooking inconvenient evidence*? Why wouldn't this be rational *to get a publication in a prominent journal and the ensuing benefits*?

A: "Because society would punish you for it. It is part of the abstract rules that if you do what is prohibited, you are punished."

Me: But isn't that simply an argument that I should be very careful when I *write and sell the manuscript* rather than an ethical argument against this action?

What would Hayek answer? What would you?

A sign that Hayek's commercial morals now rule academic life is that many scientists no longer cringe when they hear the advice to sell their manuscript or idea, rather than to prove their conclusions, that they call their results a product, and that the advice to sell yourself well is no longer considered as a suggestion to prostitute profitably. Another sign that Hayek's morals are taken for granted is that proposed solutions to the veracity problem often focus on punishment rather than on finding why professional standards that worked for centuries suddenly lost their power. The calls from the pages of *Nature* to videotape scientists as potential shoplifters, or to restrict the number of publications one can publish over lifetime are some of the more vivid. That scientists propose to videotape themselves, rather then to restore professional standards, implies that they consider commercial morals – to sell by whatever means without breaking the law – as given.

The institutional morals have also changed accordingly. In 1947, when Friedrich Hayek considered a job at Princeton but was dissatisfied with the salary, Harold Luhnow of the Volker Fund contacted the university on Hayek's behalf. Princeton replied that "In the past, the Institute has not accepted, and in the future it probably cannot properly accept, funds as specifically allocated by the donors as would be implied by your offer." When Hayek complained to Jacob Viner, an early member of the Chicago school of economics, he responded, "I think you are going to run into the same situation at any of the respectable institutions" (Mirowski & Plehwe, 2015). The current state of affairs is summarized in the titles of articles on the topic, such as *To Charles Koch, Professors are Lobbyists* (Gibson, 2016), *The Koch brothers' influence on college campus is spreading* (Strauss, 2014), and *What Charles Koch and Other Donors to George Mason University Got for Their Money* (Green & Saul, 2018) What these articles tell is that Charles Koch does not have to insist on requiring that the recipients of his funds comply with his worldview (Barakat, 2018), perhaps because this worldview – that on the market of ideas you get what you paid for – has become a norm.

Overall, I felt that mOCD could at least contribute to the veracity problem and thus continued to look for other potential causes. This time, a tip came from my experience at a study section and an article sent by a colleague.

This is just a game

A study section is a group of about twenty experts who are assembled by the National Institutes of Health (NIH) to discuss and score grant applications on a particular subject. The applications are then funded according to the assigned score. This is why I was a bit surprised when an NIH program director, who was exceptionally effective at guiding us through the process, prohibited us from using the F-word. She meant "funding," as in "I think this proposal should (not) be funded". Not being able to state the obvious seemed peculiar, but except for an occasional Freudian slip we went along with the game.

I realized that this game relates to the veracity problem when Francesca Grassia, who is familiar with how scientific policies are made and implemented, sent me *A Sovietological View of Modern Britain*, an article by the former British Sovietologist Professor Ron Amann, who told us earlier about the consequences of the Thatcher revolution (Amann, 2003).

As he writes, the collapse of the Soviet Union made most of his professional skills redundant, but after becoming pro-vice-chancellor at a university and then CEO of a major UK funding agency, he found to his surprise that "[t]he growing managerial pressures in the public sector in Britain, which caused dismay and incomprehension to many colleagues, were instantaneously recognisable to an old Soviet hand. Moreover, in their historical aspect my former studies had taught me that broken eggs do not necessarily an omelette make [sic]; that during a period of revolutionary change the means can come to dominate and distort the ends. These were sobering thoughts. In short, I had seen the future – but […] I had some pretty serious doubts about whether it would work."

Why did Ammon think that the future would not work? He points to Thatcher's reforms and his expertise:

"Mrs. Thatcher's answer to professional and institutional self-interest was […] radical introduction of quasi-markets into the public sector, with a clear division between purchasers and providers. The critical point here is that these were not real markets with real customers buying services with real money."

Pretending to be buyers and sellers in an imaginary market and exchanging imaginary money ("points" to exchange for salaries and funding) had consequences. First, this meant that the participants played a game. Second, because of the sheer number of people and activities involved, this game became similar to that described by Hermann Hesse in *The Glass Bead Game* in its complexity, arbitrary rules, the impossibility of any one of the players to understand it fully, and the lack of purpose other than playing it. The last, and perhaps decisive consequence is that by living in an imaginary world, where you have seven lives and absolute weapons, it may come as a surprise when the real world crashes around you, as it did for the leadership of the Soviet Union and for Alan Greenspan.

In fact, Professor Amman doubted that playing the game could be productive because he was an expert in the game played in another imaginary economic market – the Soviet economy – where the production of nearly all goods for a country of nearly 300 million was planned and regulated by a central authority. The apparatchiks had to plan, approve, and monitor the design, production, pricing, and delivery of everything, from the curvature of tablespoons (I am not exaggerating) to tanks and missiles. The impossibility of this goal and the fear of losing their jobs or even lives led the players to engage in the game of pretense.

Amann points to similarities between the games played in the Soviet Union and Britain, even though one was played to build socialism while the other to prevent it. A common feature was a lowered threshold of succumbing to temptations: to cut corners, to lie about results, to omit inconvenient findings. It was easier to do because the transgressions were made by the personalities who people played, not by themselves. A grant applicant playing into sellers and buyers with the NIH, or the author playing the same game with an editor could be used as examples. Having your colleagues playing the same game lowers this threshold further, while seeing the insanity of the forcefully imposed counterintuitive framework and the need to feed the family helps to lower it even more. The habit of playing the game can further blur the line between the imaginary and the physical world, helping to find strong cards, desirably announced with a press release, even if they do not exist. Soon, gaming the system becomes a natural response to its unnatural and yet very real dominance.

Life is just a game, after all. Doesn't everyone play?

This notion made me see another Frankenstein wandering in the modern world of science – a combination of real suffering from still incurable diseases and artificial games played by people who are supposed to cure them. This image could not but make me think about the diagnosis of a mental disorder. But, why do scientists continue playing the game instead of throwing away the beads? A search for an answer brought me to the next symptom of malaise – groupthink.

Groupthink or the feast of science

Groupthink is a collective state of mind occurring "when a group with a particular agenda makes irrational or problematic decisions because its members value harmony and coherence over accurate analysis and critical evaluation." (Psychology Today, 2018) Some point to its increasing influence in biomedical research and medicine, where irrational decisions are bound to cause suffering and lost lives (Brody & Kern, 2004), and in other areas of society (Cain, 2012).

Groupthink is an aspect of a phenomenon, described a century ago by Gustave Le Bon in his classic *The Crowd* (Le Bon, 1895), that under certain circumstances a group can think and behave as a single organism, a social system. This system has emergent properties in that its character, intent, behavior, and the way of thinking can differ from those of each of the individuals. As a result, a group can make decisions that unintentionally hurt or even kill each of its members. To become a crowd, people may not need to gather in one place, say at a conference room or a stadium, but can merely consider themselves as a group: a political movement, a nation, the fans of a football team, or a scientific field.

Le Bon noted that the intellect of any crowd member is "of slight importance" for how the crowd would behave or think, as "a gathering of scientific men or of artists, owing to the mere fact that they form an assemblage, will not deliver judgments on general subjects sensibly different from those rendered by a gathering of masons or grocers." Observing what happens at some scientific meetings and in scientific fields makes me wonder if scientific judgments are always reached differently. Overall, in the words of a

contemporary expert on group behavior, "it does not take stupid people to make stupid decisions" (Nemeth, 2018).

As psychologists have learned, the best cure for groupthink, short of avoiding working in groups, is to have dissenters. Besides preventing groupthink, dissenters help to solve problems by increasing the creativity of others and widening the range of ideas they consider. What I did not know was that dissenters are helpful even if they are wrong, which means that having dissenting opinions is beneficial in itself (Nemeth, 2018).

Psychologists also find, unsurprisingly, that people do not like to hear that they are wrong, and scientists and science administrators are no exception, and thus treat the troublemakers roughly. Hence, the key question is whether the culture of the environment – of a meeting, conference, laboratory, a research institution, or the NIH – helps to compensate for this human weakness.

Before the malaise took over, I was fortunate to work where dissent was a given, leaving me memories of what a healthy scientific environment should be.

When I was invited to give my first lecture in the United States, I asked my labmates at the Johns Hopkins School of Medicine to listen to my practice talk. The tradition was that the speaker would buy beer and the audience reciprocates with honest opinions. The first opinion I heard was "Yuri, it sucks". This was from Ilya Goldberg. Ann Pluta followed with more gentle "Well, Yuri, let's say you can do better", but I could see what she meant. I was shocked because I respected both and because the talk was only two days away. This shock, however, radically changed how I have presented my results and ideas ever since, benefiting my audiences and myself. My first lecture was well received.

This atmosphere reflected the environment at Hopkins, highlighted in my memory by Long Rifles meetings, which were organized by the late Don Coffey, an unconventional visionary and an incredible person I was fortunate to meet (Kelly, 2017; Pienta, 2017). The first meeting I attended was held in Don's backyard and started with piles of Maryland crabs and plenty of beer, a combination known to facilitate discussion. Then, the speaker, who gave his invited formal talk earlier that day, began presenting it again. Within seconds, someone raised a hand: "I have been thinking about your talk all afternoon. What you do makes no sense to me whatsoever." "Well, let me explain it better for you," – the speaker replied. A rigorous, no-holds-barred discussion continued for several hours. It was clear that everyone enjoyed this feast of science, including the speaker, because the goal was to find truth, however grand this may sound. This is how science should be done, I thought.

Reading fifteen years later about the "doused passion" of scientists at the JHU School of Medicine (Kern, 2010) and seeing this change setting in elsewhere reminded me how deeply the malaise had spread. By that time, I had an episode that became for me a symbol of how the culture had changed.

I invited a colleague to give his famous talk on how to recognize false and unreliable results in publications and how to avoid the embarrassment of having such results in your articles. To make the talk even more interesting, he included examples from the articles published by people in the audience. The transgressions were all minor, but mentioning them in the presence of their authors raised the audience's attention, caused roaring cleansing laughter, and brought many thanks afterwards. It was fun.

Not everyone was amused, however, as I had to rescue the speaker from an upset faculty member and was asked the next day to write a letter to my guest's institution requesting a formal reprimand. I refused, only to find later that I no longer taught the course on ethics and exposition, which sponsored the talk. This is how I learned that the ethics had changed and that long rifles have been banned along with the silver bullets only they could shoot.

How did it happen that a culture of rigorous dissent, competitive but enjoyable camaraderie, and the notion that truth in science is more valuable than anyone's ego changed so rapidly into a culture in which people "value harmony and coherence over accurate analysis and critical evaluation", a mindset that promotes compliance, nepotism, self-pollination, prevailing mediocrity and other features uncharacteristic to environments conducive to discovery?

As I see it now, the change came from two sources.

One was following the fashion that scientific institutions should imitate businesses. In the case that I observed, a particular attraction appeared to be in applying the top-down chain of command. Gone were public and stimulating disagreements between director and his deputy, in were dutifully compliant executors of the will. To bypass the opinions of faculty, who unforgivingly slowed the progress of science by opposing effective decisions and thoughtful policies with their propensity to discuss and dissent, professors were summarily neutralized by relegating the faculty council, which had previously cleared major decisions,

to an advisory role. The faculty who did not like the change either left, or, like myself, kept mum, short of occasional grumblings at the bar.

When I asked the person in charge how the institution could remain unique, as ours indeed had been, by imitating others, my question was not greeted as a welcome sign of healthy dissent. The very person who had used to invite his toughest critics to his presentations no longer wanted to be contradicted. Perhaps because he had found true faith.

The second source of changed attitude towards dissent was suggested by the origin of the term groupthink. As Irving Janis, the Yale psychologist who introduced it, explained, '[t]he term "groupthink" is of the same order of words as the words in the "newspeak" vocabulary that George Orwell uses in 1984 – a vocabulary with terms such as "doublethink" and "crimethink". By putting "groupthink" with those Orwellian words, I realize that it takes on an invidious connotation. This is intentional: groupthink refers to a deterioration of mental efficiency, reality testing and moral judgment that results from in-group thinking." (Janis, 1973)

Commonly cited examples of doublethink from *1984* are – War Is Peace; Freedom Is Slavery; Ignorance Is Strength – but my favorite comes from Orwell's *Animal Farm*: "All animals are equal but some animals are more equal than others". Doublethink, as groupthink, entered English and is defined by the Oxford dictionary as "[t]he acceptance of contrary opinions or beliefs at the same time, especially as a result of political indoctrination"(www.oxforddictionaries.com/definition/doublethink).

This definition reminded me that political doctrines come with the need to suppress dissent because no doctrine favors everyone (some benefit only a minority), because people do not like imposed rules, and because a single boy can bring down the king by saying aloud what others keep to themselves. As Le Bon put it, "[t]he precise moment at which a great belief is doomed is easily recognisable; it is the moment when its value begins to be called in question. Every general belief being little else than a fiction, it can only survive on the condition that it be not subjected to examination" (Le Bon, 1895). Hence, as Churchill put it about socialism, the followers of doctrines "would have to fall back on some form of Gestapo" of various severity to make sure that the boy who might point the finger is isolated, silenced, or, better yet, raised by the secondhand dealers of ideas to not even think that what he sees is different from what he is told.

As Hayek warned, "[it] is part of the abstract rules that if you do what is prohibited, you are punished" (Hayek, 1979). While scientists are now not sent to gulag or executed, if one does not count suicides caused by current academic environment (Grove, 2015; Pells, 2018), the possibility of losing your reputation, promotion, position, or job for saying something that one is not supposed to say is real and everyone knows that. Dr. Amann learned that "[r]aising critical questions about audit, public accountability and the new apparatus of equal opportunities is rather like expressing doubt in earlier times about the existence of God or the ultimate triumph of the working class. This is sacred territory. One should tread warily and be of sober countenance" (Amann, 2003).

Forbidden opinions are not limited to social topics. For example, Philip Mirowski, the author of *Science-Mart*, found from experience that "poking around in order to inquire whether the modern privatization regime has influenced the "quality" of knowledge being produced, is a quest fated to loose friends and influence" (Mirowski, 2011). In general, the offence is not saying something in particular, but daring to say what you are not supposed to, for one crack can break a dam.

Adding to the anxiety is that the prohibited terms and topics keep multiplying, recently reaching even the names of restrooms, with no official list to consult or headquarters to inquire if in doubt. It is difficult to blame people in this situation to become less accommodating with inconvenient truth, bending it to avoid confrontation, resorting to little white lies, and telling tales, sometimes long ones, and spinning these into what are popularly termed "narratives". One can also understand why it is safer to stay quiet rather than ask tough questions in public, including the conference rooms of science or medicine.

After all, these people are put between the rock of unnatural rules and the hard place of the need to feed the family, warned by the fate of dissenters, and get the lay of the land rather early in their careers. In such an environment people are more likely to become "cheerful robots," to use the term coined by the Columbia sociologist C. Wright Mills (Mills, 2000), or "excellent sheep," if you prefer Yale professor William Deresiewicz nomenclature (Deresiewicz, 2015). Would either species dare to point the finger at the naked king?

Because the question of how one should name restrooms does not transpire easily from Hayek's teachings even after a glass of vodka, I suspect that the topics that can get you fired come from more than one doctrine. If so, then there is another Frankenstein wandering

around, stomping dissenters out in research and educational institutions and in society in general. If this is not insane, I do not know what is, but I might be biased by my diagnosis of the malaise as a mental disorder.

To finish this section on a lighter note without diluting the subject, let me quote the late Don Coffey: "I can say, I am not fat, but I'm fat, and everyone knows I am fat… everyone knows what the real issues are, but they just don't say it" (Pienta, 2017). I thought that if you and I would say what the real issues are when we have a discussion, give a talk, write a paper, submit a grant application, give our opinion, or, to start, when we talk to ourselves in solitude, the malaise, including the veracity problem, will be gone in due course and not only in science. Remember that boy from the fairy tale about the emperor's new clothes?

Collateral damage

A symptom of the malaise that was difficult to explain by businessification was the epidemic of mental problems among young scientists (Evans et al., 2018). The diagnosis made sense only if the business owners would mistreat their most valuable workers into madness – a management approach that is hardly rational in a business whose prosperity depends on the properly functioning minds of its workers. Wondering whether my new diagnosis of mOCD can explain this problem better led me to ask why scientists want to find cures for cancer, Alzheimer's, Parkinson's, or other diseases.

Of course, curiosity, lifting the ego by solving a difficult problem, and the prospects of glory and wealth are involved, but, in my experience, more often than not the chief motivation is to help people, other people. In fact, this is why many became biomedical researchers in the first place and this is why we have antibiotics, know how to save diabetics from certain death, and can easily cure peptic ulcer. The praise from administrators for getting grants, the cheers and envy from your colleagues for publishing papers and making discoveries cannot compare with respect received by those who find a cure. It is beyond envy in its fascination with what scientists can do. This is why the book about ten scientists whose discoveries saved 1.6 billion lives is called *Scientists greater than Einstein* (Woodward, Shurkin, & Gordon, 2009). They are.

Reminding yourself that your research has a chance to save those kids who will be coming to the cancer center can keep you sane when your experiments fail late at night, when the answers become more and more elusive, when you start doubting whether even the questions you have been asking for so long are meaningful. Telling yourself that you are here because you follow your calling can help no matter what research you do. When you hear the judgment call "What are you doing for others?" you have an answer, and you have one when your children ask you what you do at work, which is where you are most of the time.

Box 4. The Frankensteins I have met

- Research organizations that are neither businesses nor academic institutions.
- Educational institutions that teach students the values their operational model rejects as outdated.
- Medical associations that make doctors take the oath that they "will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm" and then force them to behave according to a doctrine for which helping others is an atavism to be abandoned.
- Doctors who are torn between the oath, their conscience, and the need to make a living by abandoning the first two.
- A society (from the Latin word *socius* – companion) governed by a doctrine that derides mutual help.
- People who use mutually exclusive traditional and neo-morals at the same time.
- Environments that call scientists to openly and freely exchange their findings and ideas while encouraging to compete with each other.
- A system in which those who are expected to find cures play games.
- Mentoring talent by considering it a workforce.
- Frankenthesis (Smith, 2018)

How would you feel once you are asked, explicitly or tacitly, to leave your "inborn morals" behind and look at your struggles from the "profits to be made" perspective, as Hayek and his followers have prescribed? Would these struggles make sense? Could you get depressed by asking yourself why you are here, in the laboratory, when your peers are making several times more outside the lab? Would you ask yourself what is your purpose in life, which you wanted to devote to science and finding a cure for as long as you remember? Would you feel some void inside? Should you be surprised if you would feel lost and frustrated rather than motivated? How would you work if you were not motivated?

If solidarity is an atavism to be abandoned as a stone age tool to fit Hayek's vision for a better tomorrow, would you start wondering: Are we all in it together, finding the cure, that is? Or, am I just a disposable part of the workforce meant to make profit for my institution and secure grants to pay a salary to my supervisor? Can I rely on my colleagues in the laboratory, or are they just other instances of economic selfish units? Am I a mentor driven by my love of science, seeing how my enthusiasm lifts the people I advise, or am I just a part of workforce assigned to do a job, which I need to feed my family and the multiplying administrators at my institution? I pretend that everything is fine and I am in control, but people in my laboratory see through the veil. Can I trust them?

These are some of the inner conflicts that rip the minds of scientists these days. I can only imagine what happens in the minds of doctors who swear while taking the Hippocratic oath "I will remember that I remain a member of society, with special obligations to all my fellow human beings, those sound of mind and body as well as the infirm" (www.aapsonline.org/ethics/oaths.htm). How would this sound after abandoning traditional morals, as medicine is also converted into an economic market? These conflicts are worsened further by not understanding why science and medicine should be done in such an unnatural way.

In psychology, "the inner conflicts and anxieties that accompany important human issues of purpose, responsibilities, independence, freedom, and commitment. […] the pervasive and persistent feeling that one's life is meaningless – that there is a void that can never be filled in a meaningful way" are known as symptoms of the existential crisis (James & Gilliland, 2012), a term that sounds as grave as is the state of mind it describes.

Given this knowledge, I would expect that professionals who want to help depressed researchers would consider that younger scientists may be more vulnerable to this crisis not because they are paid less or work more, as these conditions are not new, but because they realize that the science they read about in books – truthful books, I should add – is different from the science they meet once they come to the laboratory, the science disfigured by the malaise? Could this realization, repeated every day, cause an existential crisis?

A recent report in *Nature Biotechnology* on mental health crisis among young scientists (Evans et al., 2018) and a *Nature* editorial on the same topic (Nature Editorial, 2018) reminded me that I am not a psychologist.

The authors of the report begin by acknowledging "a dire need to resolve our understanding of the mental health issues in the trainee population". The report then introduces "gender, mentorship relationships and perceived work–life balance" as key variables that define "susceptibility to mental health struggles" and conclude that being a "transgender and/or gender-nonconforming" individual increases the chance of depression or severe anxiety, as does poor "work-life balance," and unsatisfactory relationships with the mentor. I did cringe at describing graduate students as impersonal "trainee population" and wondered what work-life balance means for people for whom doing science *is* life, but assumed that this is just professional terminology and was eager to learn how the authors plan to help the students.

The discussion of "intervention strategies" begins by praising the NIH for "a keen focus on building the biomedical workforce of tomorrow" and proposes expansion of career development offices with mental health training programs as "a foundational step for institutions to ensure that students are prepared to become the biomedical workforce of tomorrow." This effort, the authors suggest, "will result in a competitive advantage for institutions and increase retention, thus strengthening the bioscience workforce pipeline." The pipeline language, the praise of the funder, and the focus on helping the institutions, rather than the people suffering from mental problems, brought back the vision of Soviet posters showing the brigades of uniformed comrades marching as a workforce towards the bright communist future and praising the Party for caring about them.

My emotions and background aside, it was difficult not to conclude that the authors see graduate students not as unique and gifted individuals who went to science to fulfill their calling, but as a "trainee population," economic units traveling through a workforce pipeline to the market, obeying market signals to become a commodity. What is most remarkable, I thought, that the authors hold this view not because they are uncaring people – everything I could find indicated otherwise – but, and here I am guessing, because they take this view as normal. If so, it is only natural to expect that they would think, or at least speak, the language of the doctrine that has shaped their worldview.

Besides the language, I noted the focus on treating mental problems rather than on finding their cause, which was puzzling. Indeed, advising graduate students suffering from depression to seek help rather than finding why they became depressed is indeed reasonable and practical, but only as much as advising

a woman abused by the man she loves badly to seek counsel. Limiting yourself to advising her to move out and move on, so she can fall in love with someone else, is reasonable if her tragedy is a rare incident in an otherwise happy society. If, however, a half of all women are abused, one has to ask: Why do so many men abuse women? And then attempt to change the culture in this society by making men more humane, not by making the sufferers of the abuse comfortable with reporting it, as both the article and the *Nature* editorial suggest.

Of course, by abusive men I mean not the mentors or administrators, even though some might qualify irrespective of their gender, but the current academic environment, and by women those who live in it. To put it in more biomedical terms, if patients in a clinical trial begin having mental problems en masse, the investigators would not merely advise the patients to seek professional help and create a website to facilitate finding it, they would stop the medicine and start looking for the mechanism of the side effect. Why would this possibility escape the authors of the report and the Editors of *Nature* who wrote the editorial?

My answer is that focusing on palliative care and on fixing the consequences, rather than looking for the root cause of a problem, is a feature of a doctrine-dominated society, in which even raising the possibility of questioning the foundational doctrine is beyond the pale. When I was in college, this principle was summarized by a joke: What are the four reasons that prevent Soviet agriculture from feeding the country? The answer was: winter, spring, summer, and fall. The point was that anything could be blamed but the real cause, the prevailing doctrine. The punchline was, however, one of wry humor in a system in which people who were unable to control their destinies and felt hopeless as a result became indifferent to their life and turned to vodka to fill the void. They were also advised by editorials, written by people who felt that they were above the "masses", to seek treatment and have healthier lives, but not to question the doctrine that determined how they lived. It did not end well.

Thinking how abusing the minds of scientists affects science led me to the next symptom of the malaise.

A drying pipeline

The steadily decreasing number of new drugs is a symptom that worries even people who may be indifferent to other manifestations of the malaise (Scannell et al., 2012; Stott, 2018). While many factors contribute to this decline (Bowen & Casadevall, 2015), I think the most critical, yet least discussed, is that the followers of the prevailing worldview disregard the nature of discoverers, the people who make much needed conceptual breakthroughs by "seeing what everybody has seen and thinking what nobody has thought" or discovering what nobody has ever seen or even imagined.

Reading the reports on how "NIH renovates its workforce" by "strengthening the bioscience workforce pipeline", which is how the mentoring of scientists is described in the language of mOCD, gives me an impression that the authors of these reports think that discoverers can be produced on assembly lines, like iPhones or robots, ready to follow market signals to discover whatever is needed at the moment.

I doubt this approach not only because so far its results have not been encouraging, or because I find it difficult to imagine how the market can signal someone to discover something unanticipated (Box 2), but also because those who directed successful research programs in the past, or were familiar first hand with what creativity is, had a different view of creative people and their needs.

Vannevar Bush, the visionary credited for enabling the progress of science in the United States before the malaise, thought that "no one can select from the bottom those who will be the leaders at the top because unmeasured and unknown factors enter into scientific, or any, leadership. There are brains and character, strength and health, happiness and spiritual vitality, interest and motivation, and no one knows what else, that must needs enter into this supra-mathematical calculus." (Bush, 1945).

Box 5. An old and tried recipe for making discoveries

1. Find creative people who are smarter than you are.
2. Add them to a supportive and exciting environment.
3. Be patient.
4. Collect discoveries as they come. Be sure not to miss them.
5. Enjoy steps 1- 4 with colleagues over beer or wine

Walter Lippmann, a brilliant journalist and analyst whom we met earlier, called this "no one knows what" the " energy [that] cannot be planned and managed and made purposeful, or weighed by the standards of utility or judged by its social consequences. It is wild and it is free.

But all the heroes, the saints and the seers, the explorers and the creators partake of it. They do not know what they discover. They do not know where their impulse is taking them. They can give no account in advance of where they are going or explain completely where they have been. They have been possessed for a time with an extraordinary passion which is unintelligible in ordinary terms" (Lippmann, 1937b).

Carl Jung, the founder of analytical psychology and a visionary, gave this energy another name: "I have had much trouble getting along with my ideas. There was a daimon in me, and in the end its presence proved decisive. It overpowered me, and if I was at times ruthless it was because I was in the grip of the daimon. I could not stop at anything once attained. I had to hasten on, to catch up with my vision. Since my contemporaries, understandably, could not perceive my vision, they saw only a fool rushing ahead." (Jung, 1989) Jung concludes, "[a] creative person has little power over his own life. He is not free. He is captive and driven by his daimon". Perhaps this is what Hayek meant by saying that he had "come to regard the writing of this book [*The Road to Serfdom*] as a duty which I must not evade".

I think this "no one knows what" – energy, spirits, the feeling of duty, or daimon – is of the same mysterious origin as love, as being in love with someone is similar to being in love with an idea. Both states can happen for no obvious reason, are irrational, can lead you to abandoning everything and everyone else, including yourself, to selflessly spend most of your time with your passion, however uninteresting it could be to others. Both can drive you mad by your inability to reach a resolution, and make you jealous of your competitors trying to put their hands on what you consider yours, although this feeling can be even stronger with ideas than with people.

How else you can explain the passion for finding why corn can be spotty, why worms roll right or left, why rabbits have warts, why the sky is blue, why a protein folds its tail in this absolutely fascinating way, or whether you can ride a sunbeam. It can be explained if we agree with Carl Jung that "[t]he creation of something new is not accomplished by the intellect but by the play instinct acting from inner necessity. The creative mind plays with the objects it loves" (Jung, 1976). And the nature and origin of love puzzled even Carl Jung.

Accepting this complex, undefined, irrational, and yet evident and necessary nature of creative people led celebrated science organizers of the past reach a simple yet effective solution for solving problems or finding problems to solve, whether in business or academia: find creative people, which requires nose for talent and colleagues eager to refer an extraordinary individual, and then give them what they need to function at their full potential. What they need besides material resources is time, interactions with likeminded people, and freedom (Box 5).

"Mr. Kelly [director of Bell Labs] believed that freedom was crucial, especially in research. Some of his scientists had so much autonomy that he was mostly unaware of their progress until years after he authorized their work…. In sum, he trusted people to create. And he trusted them to help one another create." (Josh Gertner, 2012) And what they created made a bundle for AT&T and changed our lives, but only because they were working in an environment compatible with their nature, not in a pipeline that equates people to what usually flows down the tubes only because someone, some decades ago, decided that to make humanity better people should submit their minds and destinies not to their will, understanding, and inner voice, but solely to the signals of the market. The Wizard of Oz would be proud.

As I was reading the book about the great minds of Bell Labs (Jon Gertner, 2013), I imagined what would happen to me if I were to suggest to Mr. Kelly that he should pass his creative, young, and so diligently selected recruits through the workforce pipeline to make them ready for the market. I suspect that he would first laugh, assuming that I was joking. Then, he would sternly ask me if I were a communist. I would deny, pointing that communists despise markets while I speak market language and offer a market solution. Mr. Kelly would then call an ambulance, if he were to decide that I was mentally ill (mOCD?), or the FBI if he would suspect that I was attempting to sabotage science at AT&T. In either case I would not see the light of day for a while.

Indeed, what happens when you put creative people into the "workforce pipeline"? The American saying about forcing a square peg into a round hole comes to mind. Indeed, creative people are often fragile, not very social, sometimes bordering on strangeness, to avoid the word weirdness, and are not known to hold their opinions back, especially if they are prevented from doing what their daimon pushes them to do. Hence, I would venture to guess that some may not come out on the other end of the pipeline, while others would come out distorted by the mental and moral contortions, ripped apart by the fight between their daimons

and the market signals that are loudly transmitted by their advisors. All of this while the pipeline administrators are preoccupied with planning and improving a "well-balanced workforce for the future".

The problem is that institutions, businesses, or nations that do not appreciate the nature of creative people may not have a future, as they would find people who can follow market signals by reproducing or improving what has been created, but would stall without fundamental discoveries, which are unanticipated by definition (Box 2), and without the electrifying magic that the discoverers create by being around.

This is why the fatal flaw of neoliberalism and other doctrines that defy human nature is not the bad economics, as some suggest (Rodrik, 2017), but the inherent contradiction between the economic market model of science and actual science: creative people follow their inner voice rather than market signals and cannot do otherwise without destroying themselves along with their potential. If following this voice happens to coincide with what the market demands, then all benefit. If not, then the talent and genius perish, stay away, or move elsewhere. This is why drug pipelines go dry when workforce pipelines are brought in.

Why are they still doing it?

If the malaise indeed can be a result of imposing the economic market model on science, as my inquiry and more comprehensive previous studies (Mirowski, 2011) suggest, why then do people in charge of science policies and the heads of scientific institutions keep discussing the malaise as if this explanation did not exist?

One answer is that they are not aware of being indoctrinated (Box 1) and I have no evidence to argue otherwise. Another possibility is inertia, which is to be expected from mature individuals with established worldviews, the reality of large institutions, and the financial and other incentives of avoiding rocking the boat. Finally, people in charge may be aware of the doctrine and its consequences, but consider the malaise a transient hiccup in the inevitable progress of science into a prosperous economic market.

This attitude would reflect the difference between running a business and following a doctrine. The goal of running a business is to make money. If money is not coming, the business model is revised, and if this does not help the business is closed, very much like an idea can be killed by an experiment in science (Fig. 1). The goal of implementing a doctrine, however, is to save humanity by changing human relations and activities according to someone's vision, be it Karl Marx with Friedrich Engels, or Friedrich Hayek with Milton Friedman. When the future of humanity is at stake, even substantial problems look like minor hiccups and perished millions as statistics or necessity. In this grand scheme of things, the current problems of scientists, doctors, educators, and artists are too negligible to consider in earnest. Let nature take its course to let future generations live happily ever after.

I lived through the hiccups of one of these political experiments – and imposing any doctrine is an experiment – and never thought that investigating the malaise of science would make me wonder if I live in another. This could not but make me worry, as I learned from experiencing the protracted demise of the Soviet Union, that political visionaries are only humans and humans can err, however inclined they are to make the world better.

The fact is, there is no need in political experiments to marry science to market, as these two have enjoyed mutually satisfying and enriching, but distant, relationship for centuries. I learned more about the chemistry of this relationship and why *a good society* should look at science rather than at the economic market from an unexpected source – the website of the Charles Koch Foundation.

The Republic of Science

The website featured a quote: "[Michael] Polanyi's 'The Republic of Science: Its Political and Economic Theory,' published in 1962, is the text that best illustrates what Koch is trying to do with his massive personal fortune — and the contradictions and controversies that come with it. That paper argues that science should function like an economic market [emphasis mine], with research dollars flowing to the very best scholars and ideas, as determined by scientific consensus. It has guided Koch's effort to donate more than $200 million to colleges and universities, an effort that he plans to accelerate in the coming years and that will continue to shape academic research and student learning long after the effects of his political giving have faded" (Charles Koch Institute, 2018).

Learning that Charles Koch plans to continue shaping academic research and thinks that science should function like an economic market was not surprising

considering his respect for Friedrich Hayek and his ideas, and the ways he puts them in practice (Green & Saul, 2018). That Michael Polanyi would express this opinion was also not unexpected, I thought, as he was Hayek's friend for forty years (S. Jacobs & Mullins, 2016) and a part of the neoliberal movement from its inception. I was surprised when I began to read this inspiring article: «It appears, at first sight, that I have assimilated the pursuit of science to the market", Polanyi writes, "But the emphasis should be in the opposite direction. The self-coordination of independent scientists embodies a higher principle, a principle which is *reduced* [emphasis MP] to the mechanism of the market when applied to the production and distribution of material goods … the coordinating functions of the market are but a special case of coordination by mutual adjustment. In the case of science, adjustment takes place by taking note of the published results of other scientists; while in the case of the market, mutual adjustment is mediated by a system of prices broadcasting current exchange relations, which make supply meet demand» (Polanyi, 1962).

In other words, science and the economic market are siblings of the same principle who are alike in that both are self-regulating and self-correcting systems of interacting individuals. However, these systems differ, as siblings often do, in the nature of these interactions, in the currencies that mediate them, and in their purpose. Each does its job in its own way, according to its purpose.

The purpose of science is to find truth, whether this means to find why the sky is blue, why corn is spotty, what causes cancer, or how to kill millions of people in under 20 minutes. The purpose of the market is to enable trade. Scientists interact by evaluating their results, from imaginary observations to quantum mechanics and genetic code, while on the market people interact by selling and buying anything, from imaginary goods, to bread and butter, to their own dignity or freedom. While scientists add their findings to the body of knowledge, which is available to anyone, buyers and sellers distribute and accumulate wealth, or capital.

The value of anything at the market is determined by supply and demand, which makes it meaningless to ask why anyone would pay $100K for a piece of corn snack that happens to look like a gorilla (Juang, 2017), and is measured in arbitrary units, money. The value of findings in science is determined by professional standards, which, according to Polanyi, include three interrelated criteria: the plausibility of the result, its scientific value (composed of accuracy, systematic importance, and "the intrinsic interest of its subject-matter"), and its originality. The tension between the first two criteria and originality creates "dynamic orthodoxy," which is "essential in guiding and motivating scientific work." Applying these standards across the network of overlapping scientific fields results in an emergent property of the system – scientific opinion – an organizing principle of science. These principles, Polanyi argues, would benefit society if adopted by other areas of science, including politics. In other words, he thought that the Republic of Science would be happier and more productive than the Republic of Greed.

As Polanyi concludes, science that was self-governed by professional standards and scientific opinion was responsible for two centuries of scientific and industrial progress, a fact contradicting the claim that "academics haven't policed themselves well in the past, and they won't likely do a good job in the future" and thus require more administrators and lawyers to police them (Randall & Welser, 2018). In fact, I think the opposite is true: replacing the traditional professional standards with Hayek's morals to force incestuous marriage between two siblings – science and market – made the requirement for administrators inevitable, as it happens in a family once its starts breaking up.

When a family follows the rules that, as Leo Tolstoy noted, make all happy families alike, it functions as a self-sustained and self-regulating system despite the tensions and antagonisms common to human relations. Once these relationships deteriorate for some reason or are broken by an outsider, the interactions become dependent on administrators: judges who determine the visitations schedules and issue restraining orders, police to enforce them, family services officials to ensure that children are not abused, psychotherapists to keep everyone as sane as possible, and, of course, lawyers to divide the children and remaining possessions orderly, exacting a hefty price for the lesson.

The meaning of this lesson is in cherishing the relationships that let people live in productive harmony, however humanly imperfect they can be. Polanyi was convinced that "science itself can be pursued and transmitted to succeeding generations only within an elaborate system of traditional beliefs and values, just as traditional beliefs have proved indispensible throughout the life of society."

Michael Polanyi mentions at the beginning of his article, which was published in 1962, that "[m]uch of what I will have to say will be common knowledge

among scientists". I am afraid that what Polanyi said would be anything but trivial for scientists who grew up under the malaise. I am sure, however, that professional standards based on traditional morals, rather than a doctrine that puts humans second to the things they make, will be once again the foundation of science, medicine, education, and other human endeavors. The question in view of my diagnosis is how to take the patient off the drug and whether this is possible at all, which brings us to the last question in my inquiry.

What to do?

I hear two answers to this question from my colleagues. The first is that the disease is terminal, so we should wait until the patient collapses and then build something new on the remains. The second answer is that we can begin building that "something" now, which requires knowing who can do it, what should be done, and how. I share the second opinion, despite my occasional cynicism, perhaps because of my life experience.

I was six when I was standing in line to buy some butter in the little coal-mining town where my grandparents lived. The line was special not because it was a day long, but because the first time in many years the store had butter to sell. I heard from the conversations that they were selling butter because Khrushchev, the Soviet leader at the time, had been deposed. The authorities were thus signaling that not having butter in the stores was Khrushchev's fault and that from now on everything would be better. This was the beginning of my political education along with watching my grandfather reading newspapers, which I would fetch for him from a kiosk next to the ice cream stand.

A story about Khrushchev that I also knew from childhood is that he wanted to solve food shortages by planting corn, after seeing how plentiful it was in the United States. He ordered to plant corn everywhere in the Soviet Union, replacing traditional grains in any soil or climate. He was a doctrinaire, so he expected the corn would comply as eagerly as his subordinates. However, because corn couldn't care less what Marx, Lenin, or Khrushchev thought about how and where it should grow, the result was no corn and no grains, and thus no meat and no butter.

The forced planting of corn reminded me the forced planting of the economic market model in science, education, and medicine, and the audacity of people who want to change the laws of nature and human nature in particular. This story also reminded me that Russia is now the leading exporter of grain (Medetsky, 2018) because it produces it in excess, even though the seasons, the soil, the climate, and the people have remained the same. What has changed? The doctrine that commanded execution of people for organizing private enterprise no longer occupies human minds. Despite seven decades of purges and indoctrination the withdrawal off this psychotropic drug was rapid and relatively uneventful as far as revolutions go. A push was needed, however.

A push may be also needed to take society off the drug that causes the malaise in science and elsewhere. Several possibilities come to mind.

One is an event akin the launch of Sputnik (a Russian word for companion, fellow traveler) by the Soviet Union in 1957. This launch shocked the United States government into revamping the educational system with the National Defense Education Act (Powell, 2007), organizing schools and programs for gifted students (NAGC, 2018), paying more attention to science and scientists, and creating the Defense Advanced Research Projects Agency (DARPA) to be responsible for anticipating future technological threats and developing technologies bordering on science fiction, one of which evolved into the Internet (DARPA, 2018).

As my friend Andy Koff suggested, the next Sputnik event could be unrelated to war (the ability to launch Sputnik meant the ability to send nuclear warheads anywhere on the globe), but nevertheless shocking if it came from a country that uses a traditional model of science and would solve a problem of the magnitude like the war on cancer, fundamentally change our understanding of consciousness, or discover something life-changing that we cannot even anticipate.

The second possibility is a political change of the prevailing doctrine, the Thatcher revolution in reverse, so to speak. The neoliberal doctrine is already showing cracks in the wake of the 2008 financial crisis. Although the neoliberal movement has explained it away (Mirowski, 2014), giving more credence to the opinion that "an economist is an expert who will know tomorrow why the things he predicted yesterday didn't happen today," the fact that even Alan Greenspan lost his absolute belief in the market as a universal solution to all problems and began to study social anthropology to understand humans (Tett, 2013), suggests that many of his fellows and followers lost it as well. Calling neoliberalism the N-word on the pages of a mainstream

publication (Rowden, 2016) is another sign that brings to mind Le Bon's conclusion that "[t]he precise moment at which a great belief is doomed is easily recognisable; it is the moment when its value begins to be called into question" (Le Bon, 1895).

The question is which doctrine will govern next and how this transition will happen.

As I mentioned at the beginning of this commentary, Lippmann's concerns about collectivism are again in the news, perhaps because the same excesses of capitalism that revived socialism a century ago are at work again. I read, shaking my head, that "[s]ocialism is having a renaissance of late" as "a genuine alternative to our crisis-ridden system" but needs a "rebrand" (politics is a market after all!) (Towler, 2015). An activist of the Democratic Socialists of America, an organization that had promised to "defeat the Right and take on neoliberal Democratic Party establishment candidates" (DSA, 2018), has indeed defeated a ten-term Democrat congressman in New York (Krieg, 2018), while a graduate of West Point, the top United States Military Academy, considers himself a revolutionary socialist and poses with the slogan "Communism will win" written inside his graduation cap (Esch, 2018).

I have my concerns about capitalism, but I have also seen what happens when communism wins. I was fortunate not to see the worst of it, but what I heard from my family members, neighbors, and then read in the books has been enough. I am not sure the West Point graduate wants his grandchild to stay in line for butter or be shot for owning a business. The problem is that however absurd planting corn in tundra may be, literally and figuratively, "[t]he philosophic absurdity that often marks general beliefs has never been an obstacle to their triumph. Indeed the triumph of such beliefs would seem impossible unless on the condition that they offer some mysterious absurdity. In consequence, the evident weakness of the socialist beliefs of today will not prevent them triumphing among the masses" (Le Bon, 1895). Because these words had been written by Gustave Le Bon decades before socialism did triumph, I listen to his judgment and would not discount the possibility of a political Sputnik, this time locally made.

Whatever the future political change might be, it may be an opportunity to navigate science back to its normal self, or let it go from bad to worse if scientists choose to keep adapting to the malaise, as *Nature* advises "the US biomedical workforce" (McDowell & Heggeness, 2016), and keep releasing their steam by protesting on the streets without finding the root causes of their problems. I suggest that scientists would be better off if they decide to do what they do best – analysing complex systems and solving difficult problems – to develop a practical policy-by-policy plan for how science should be organized and how to get there.

To this end, I see my commentary as an invitation to learn from Friedrich von Hayek, which is why I thought it was worth overviewing what he did. Indeed, Hayek can be seen as a pedantic Dr. Frankenstein who imposed his cold logic on society, but also as an example of how to implement ideas. A movement to return science to normalcy, perhaps while doing the same for society at large, would be in a much better position than Hayek at the time when he was an outcast. I have not met a scientist – from graduate students to biotech CEOs – who is happy with the malaise, nor a non-scientist who would not be shocked or at least puzzled by hearing about what is happening in science, education, and medicine.

Perhaps it is time to heed Hayek's advice that "organized efforts have to be set in motion by a few individuals who possess the necessary resources themselves or who win the support of those that do; without such men, what are now the views of only a small minority may never have a chance of being adopted by the majority" (Hayek, 2011). This is a big country with plenty of wealthy people. Some of them may share the view that destroying talent in rusty pipelines in the name of a rusty doctrine is not the best way to look for cures or to educate their children and grandchildren. Some of them helped Hayek to save their countries and businesses from collectivism. It is time for others to help cleaning up what his ideas have wrought, do it for science and for traditional morals on which it is founded, lest the followers of another ism conduct yet another political experiment.

A starting point could be what Congresswoman Betty McCollum said at the hearing on the financial crisis of 2008: "If we need an ideology, if we need a philosophy to govern, as Mr. Greenspan suggested, I would suggest we give pragmatism a try, we give common sense a try" (Waxman et al., 2008). This is what an old and tried recipe for doing good science suggests (Box 5). The time has come to pull it out of the drawer and enjoy science while breathing fresh air freely in the Republic of Science.

Are you ready?

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