Science popularization, hegemonic ideology and commercialized science

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Abstract

This paper attempts to discuss the relations between science popularization and hegemonic ideology. The latter is continuously in need to rearticulate itself, and science popularization appears to be one of the means for such a rearticulation. Nevertheless, it also appears that hegemonic ideology and scientific popularization are strongly linked with the construction of utopias, such as those of a world of almost free energy of the 1950s and of a world free of diseases of post-1980s.

Keywords: ideology, popularization, utopia, reductionism, European science.

There has already been extensive and interesting work concerning the popularization of science and, by now, the diffusionist model of popularization as a process of transferring knowledge from a source by those who 'know' to an audience comprised of those who 'do not know' is shown to have reached its explanatory limits. In 1994, almost 20 years ago, a seminal paper by two historians of science, Roger Cooter and Stephen Pumphrey[1] redefined the topography of the issues related to science popularization. Their work and the interventions made later on by Jim Secord[2], forced us to shift the emphasis from a diffusionist model to the view that historians should study the circulation of knowledge and the multifarious ways that such circulation brings about a sense and consciousness of what is science, what is scientific and what is scientificity. Thus, popularization has been freed from being considered a well-defined, specific and restricted form of scientific genre and its characteristics are now considered as being perpetually present in almost every form of scientific activity.

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[1] Roger Cooter, Stephen Pumphrey, "Separate Spheres and Public Places: Reflections on the History of Science Popularisation and Science in Popular Culture", *History of Science*, 1994, 32: 237-67.

[2] Jim Secord, "Knowledge in Transit", *Isis* 2004, 95: 654-672.

Through such works, popularization perceived as a process by which difficult things are made easy, appears to be abandoned. Nevertheless, an amazingly large number of people involved in newspapers, book writing and the media do exactly this, that is, they attempt to make complicated things easy. But instead of concentrating on the cognitive aspects of what is being transmitted or on the particularities of the language through which complicated scientific knowledge is transmitted, many historians of science have been looking at the question about the ways by which society at large or a number of social groups get in touch with science. And when we refer to science, we do not mean only the content of science, but the overall culture of science, the overall mentality of what it means to be scientific.

Here, then, is an interesting challenge for historians of science. It would be intriguing to investigate the ways the culture of science is being communicated and how this culture is being appropriated by various social groups. It does not matter whether we talk of expository science, knowledge in transit, circulation of knowledge or science popularization, it does not even matter whether we talk about the culture of science, scientific culture, science *in* culture, or science *as* culture, as long as we remember that when we discuss issues in the popularization of science we are referring to a set of social relations linking different communities with allies, audiences, publics and consumers. And it is, also, important to emphasize that such an approach to the popularization of science, is something where members of the relatively newly emerging communities of historians of science, like the historians of science and technology in Brazil, Portugal, Spain, and Greece, can bring in amazingly interesting elaborations on these themes, since the issues related to local conditions and the problems associated with the particularities of the localities play such a dominant role in examining the issues around science popularization.

Is this all? Does the admittedly complicated function of science popularization exhaust itself in our trying to understand the social relations linking different scientific communities with their allies or the construction of their audiences and publics? Though this is not such a mean job at all, what I would like to do in this paper is to raise a number of questions the nucleus of which centers on a rather neglected aspect of popularization. I am referring to ideology. How can one study the "presence" of ideology in popular scientific knowledge? How is the ideology of those who circulate knowledge imprinted upon the knowledge they circulate? How does ideology affect the means of circulation, the materiality through which such a circulation is being achieved? How does this materiality interact with ideology? Are

there any indications that the communication of the culture of science and its appropriation becomes part of the process of communicating and strengthening the hegemonic ideology? And, if yes, how do the various forms of knowledge in circulation fuse into (re)defining the dominant or hegemonic ideology?

I shall not discuss what ideology is since the point is not to sanitize the notion of ideology through an analytical discussion; on the contrary, it may be more useful to adopt an operational notion of the dominant ideology as the sum total of a particular worldview and value system shared by most in a society. Of course, when one is talking about ideology one does not look for something that is homogeneous and shared by all in a society in all its details. What is, however, characteristic of the dominant ideology is the fact that despite the various differentiations found among groups of people, there is a hard core of values, perceptions, beliefs, explanations and mores that are shared by many.

Often we talk of a hegemonic ideology. The concept of hegemony was basically developed by Antonio Gramsci (1891-1937). In his view, in a particular historical context, social stability cannot be properly understood by considering that the exclusive reason for such stability is the social control through the various state institutions. This political stability has to be explained by other factors, of further coercion. Therefore, hegemony brought to the fore how the so-called *civil society*, with its institutions ranging from education, religion and family to the microstructures of practices of everyday life, contributes to the production of meaning and values, which direct and maintain the 'spontaneous' consent of the various strata of society. [3] Thus "hegemony is not simply the crude defence of the dominant opinions, nor the simple manipulation of things from above. It is much more than this: it embraces the whole of our reality, all our habits and hopes; it is our own perception of reality".[4] It appears that cultural hegemony, and its acceptance and consent by a wide range of the social groups, is what contributes greatly to social stability. But such hegemony cannot be sustained unless it is continuously being formulated and reformulated through its negotiations with antagonistic ideologies. Surely hegemonic ideologies are social constructs, they are manifestations of specific social groups which aim at maintaining their dominant position in a society. Hegemony is achieved through a continuous contestation of ideas and norms. Those who vie for hegemony are obliged to be

[3] Agustí Nieto-Galan "Antonio Gramsci revisited: Historians of science, intellectuals, and the struggle for hegemony," *History of Science* 2011, 49: 453-478.

[4] Renate Holub, *Antonio Gramsci. Beyond Marxism and Postmodernism* (Routledge: London, 1992), quote on p. 6.

continuously asserting and reasserting their ideology, and to continuously devise new ways to argue convincingly about the authority of their particular ideology. Interestingly, science popularization in its most general sense appears to be one of the fundamental means through which the dominant ideology is being (re)produced and assimilated.

Such a relationship between science popularization and the hegemonic ideology should also be assessed within the framework that takes into consideration the dramatic changes, which are being witnessed during the last 25 years, concerning the very character of scientific practice. The enterprise to convince people that the so-called knowledge economies are something new and novel and, in a way to project such a state of affairs as the result of neoliberal economic policies, depended to a large extent on science popularization.[5] Though knowledge economies are not something all that new, since from the beginning of the 19th century we have at least some kind of such economies, the establishment of the term as one of the neologisms in the days of globalization has been greatly eased through the popularization of all kinds of new innovations and new products. In addition, they were presented as the by-products of technoscience and the continuously strengthening ties between universities and industry. Symbolically, it was a decision by the US Supreme Court in 1980, which heralded the new period, the period many historians and sociologists of science termed as the period of 'commercialized' science: in the case of *Diamond v. Chakrabarty*, the Supreme Court ruled with a 5–4 vote that artificially created organisms could be patented under the US Patent Act; it was a decision that defined the framework for the patenting of genetically modified living creatures and the genetic material itself. In the same year the Bayh-Dole Act was passed by the US Senate and gave the right to universities as well as non-profit organizations to patent the results of publicly funded research. The latter act also contained certain confidentiality provisions for the protection of intellectual property prior to and during the patenting process. Nothing was the same after this watershed year and science—and more so its various forms of institutional expression—was to go through some lasting and rather dramatic metamorphoses.

Commercialization is not something new to science and the immediate or long-term uses of science were not a secondary consideration in the minds of many of

[5] In this paper when there is reference to science popularization, science refers to the physical as well as to the other social sciences, economics being such a science whose ways of popularizing, in our days, far exceeds those of the physical sciences.

those who were involved in scientific practices over the centuries. But what has been happening in the last three decades brings to the surface trends of a rather unique character. Experiments like those at CERN (but not only there) appear to have been undermining the centuries' long faith in the repetition and duplication of experiments as a characteristic almost synonymous with the very existence of post-17th century science. An increasing number of scientists cannot get raw data from authors who have published articles in standard journals and who are bound by the contracts their institutions have signed not to disclose more details than those they publish. Large pharmaceutical companies, after assessing through their own experts the projects they fund in various laboratories of prestigious universities, often decide to ask those who are responsible for the projects to stop them and start other experiments. One of the rather serious side-effects of such a practice is that there are cases of postdoctoral appointments in highly prestigious laboratories where young scientists cannot get a single publication even after a tenure of a couple of years. Mathematical (and computer) modeling is progressively becoming the most widely sought path to 'reaching truth' in almost all disciplines. Of particular interest are the attempts in economics where new products are being constructed and are legitimized through complex social and ideological processes. It, thus, appears that the relation to the sciences of the ways such products are being constructed and which subsequently acquire value is also something new and widens the spectrum of scientific practices.

The new situation forces us not only to reconsider issues related with 'intellectual property rights' but more importantly to reconceptualize the Mertonian norms of science and ask whether universalism, communalism, disinterestedness and organized skepticism are still pertinent to describing the characteristics of science. And, in fact, many philosophers, historians and sociologists of science have been persistently asking the question of whether these norms have come to their historical end together with the kind of science they describe.[6]

The hypothesis I would like to explore is whether scientific popularization and the various forms of knowledge in circulation are involved in the processes of continuous rearticulations of the dominant or hegemonic ideology. Let me give an

[6] G. Irzik, "Commercialization of Science in a Neoliberal World" in Ayse Bugra, Kaan Agartan, eds., *Reading Karl Polanyi for the Twenty-First Century: Market Economy as a Political Project (*Palgrave, London 2007); H. Radder "Mertonian values, scientific norms and the commodification of academic research" in H. Radder, ed., *The commodification of academic research: analyses, assessments, alternatives* (University of Pittsburgh Press, Pittsburgh 2010); C. McSherry, *Who owns academic work?* (Harvard University Press, Cambridge 2001); D.B. Resnik, *The price of truth: How Money Affects the Norms of Science* (Oxford University Press, 2007); S. Shapin, *The Scientific Life: a moral history of a late modern vocation* (Chicago University Press, 2008).

example of what I mean in the case of science popularization. One of the commonest aims of science popularization is to consider it as a process for narrowing the cultural gap between the 'elite' and other social groups. By transferring knowledge across cultural and class lines, the expressed rationale of most of science popularization is to bridge gaps, to achieve egalitarianism, to convey in simple words the power of science and the many possibilities it can offer for the edification and the benefit of the masses. But this very process does not *only* transfer 'objective' and 'useful' knowledge. The very belief that one can bring egalitarianism through popularization is, in itself, an ideological undertaking. Such an undertaking is also an attempt to imbue and instill audiences with a particular ideology, very often an ideology of neutral science, which can provide answers to all kinds of problems or, worse still that the character of the solution to many problems, including social problems, is exclusively of a technical nature. Regarding the lack of scientific knowledge of particular social groups as being an expression of a cultural gap or a cultural lag with respect to that of the elites, presupposes a particular social and political agenda: that both groups, both the elites and the rest, *should* share the same fundamental scientific culture, in fact, they should share the culture of the elites. Such an attitude, shared by the large majority of scientists and science communicators is a presupposition heavy with all kinds of political connotations. In attempting to bridge gaps among different social groups, science popularization turns out to be a process of legitimizing new power relations between the elites and other social groups, and popularization turns out to be a process of political elaboration and social appropriation of the authority of science. Hence, an implicit agenda of much of popularization is that the elites and the rest will share the same knowledge *and* they will, also, share the same values about the significance of this knowledge. And such an agenda constitutes another aspect of the hegemonic ideology. Something along similar lines was convincingly argued in 1977 by Steven Shapin and Barry Barnes in their article on one form of popular institute; they showed that the curricula of the Mechanics' institutes in 19th century Britain were a way for social control of those being educated. Though workers were taught technical skills, the aim of the educators was to make them "more docile, less troublesome, and more accepting of the structure of the emerging industrial society."[7] In other words, the people attending the Mechanics' institutes courses, were taught not only technical skills, but by being taught those, the workers were imbued with all

[7] Steven Shapin, Barry Barnes, "Science, Nature and Controls: Interpreting Mechanics' Institutes", *Social Studies of Science* 1977, 7: 31-74, on p. 32.

kinds of values – values the net effect of which would be to make the working class in harmony with the dominant ideology.

Let us consider technocracy, where science and its multifarious applications are considered to be the key to progress, to the alleviation of all social ills and to the solution of all social problems. Interestingly, until about the late 1960s many Marxists and non-Marxists alike shared the same outlook about science. They both believed that science itself was a neutral enterprise but differed in the practical applications and uses of science. The neutrality of science and the belief that its ideological and political aspects are materialized only when science is applied has been the fundamental tenet of technocracy. Such an attitude helped underline the view that the solutions of social problems were of an exclusively technical character, promoted by technocrats who are supposed to be thinking objectively and have the necessary knowledge. This view was, for many decades, shared by people who had differing views on a host of other aspects of social and political life. Thus technocracy, for many decades, has been an unchallenged hegemonic world view and science popularization was one of the main mechanisms which guaranteed the perpetuation of such hegemony.

But by the early 1970s there were serious changes in the world. The environmental crisis and then the energy crisis started to challenge technocracy. The pillar of technocracy that more science and more technology will bring more progress for all, did not anymore sound as convincing as it sounded a decade earlier. And the Vietnam War which ended in 1975 with the defeat of the USA, among many other things, underlined two things: first the case that perhaps for the first time in the history of humanity a military power is defeated without being able to use the ultimate weapon it possesses[8]; and, secondly, in the United States and generally in the West, scientists started to criticize strongly other scientists for their involvement in the war. Scientists ceased to be what after World War II appeared to be a homogeneous whole. Of course, the question of nuclear armaments had created serious disagreements among the scientists as soon as World War II ended. But these disagreements did not lead to serious doubts of the ways science was produced and applied. The Vietnam War in the context of all the other problems where scientists had played a prominent role seems to have been catalytic in bringing about a widespread current of criticism on the ways science was produced and applied.

[8] The Korean War of 1950 and 1953 "does not count" since the result was a stalemate and formally it was a war between North and South Korea.

Especially in the USA, the universities and research institutes, the funding bodies, the various committees whose existence was known but their deliberations were kept secret, a number of Federal Agencies came under severe attack and their role was questioned. Interestingly, the most vocal agents of this criticism were scientists. Eventually there were deep divides within the scientific communities – divides which, if anything, have been accentuated over the years. New power relations were formed, academic politics took a new turn, and US Defense funding was no longer available to almost everyone, independent of what kinds of problems they were investigating.[9]

So the environmental and energy crises, and the defeat of the USA in South Vietnam, brought to the public sphere new groups of scientists, many of them rather critical of the way science was being practiced. The 1970s saw the formulation of new models of economic development, the discussion of alternative ways for progress, there was a redefinition of the moral responsibilities of the scientists, and slowly a different view towards science and its possibilities was being articulated. For example, the notion of sustainable development and the notion that there are limits to growth, all have their beginnings in the 1970s.[10] It appeared that not all scientists shared the same values, and that many scientists criticized other scientists as to their moral stand *vis a vis* the use of the science they practiced. There was no more consensus that science and technology were a solution to all the problems, and many people started voicing their concern that science and technology as they were practiced, were no more part of the solution to many problems but part of what created those problems. Scientists became deeply divided, since within the new framework conditioned by these new social realities, the science they were producing and practicing entered a period of a deep crisis. Its authority was shaken and its credibility doubted. And, thus, technocracy as it was historically formulated, ceased to be the unchallenged hegemonic ideology. It continues, of course, to be dominant, but its position as a hegemonic ideology is becoming progressively more and more precarious.

The extensive science popularization undertaken in the post-World War II era had another important aim: the formulation and legitimization of a utopia. In the fifties and sixties it was the utopia of a world of cheap and limitless energy for all. And

[9] Kelly Moore, *Disrupting Science: Social Movements, American Scientists, and the Politics of the Military, 1945-1975,* (Princeton University Press, 2008)

[10] Donella Meadows, Dennis L. Meadows, Jorgen Randers, Eillima W. Behrens III, *The Limits to Growth* (Universe Book, 1972). The studies appearing in the book were funded by the Volkswagen Foundation and the work was commissioned by the Club of Rome. For a different perspective see, also, Steven Rose and Hilary Rose, *Science and Society* (Penguin, 1970) and Barry Commoner *The Closing Circle*: *Nature, Man, and Technology* (Knopf, 1971).

utopias are heavily ideological entities. A hegemonic ideology implies some kind of utopia, and a utopia is closely identified with a hegemonic ideology. Science popularization appears to be absolutely pivotal in accelerating this process and creating a peculiarly reciprocal relationship. Historically at least, science popularization has been articulating the characteristics of utopias which, in turn, are used to further legitimize ideological trends, and as these trends become entrenched in society, utopias become even more dominant and need further help from science popularization, etc. Hence, science popularization, utopias, hegemonic ideologies seem to be intractably intertwined. The ideology of technocracy so closely associated with the post-WWII hegemonic ideology and the utopia of a world with endless supplies of cheap energy, needed to be continuously revamped, needed to be continuously legitimized through a host of specific success stories. But by the early 1970s there were fewer and fewer success stories to come by. The various crises of the 1970s brought about the need for another dominant paradigm in science. In cultural terms physics and the atom could no longer command the necessary credibility in order to continue to have the authority which was so necessary for the dominant ideology. What was so systematically constructed since the end of WWII was in urgent need of change. Slowly, biology and the gene replaced physics and the atom.

Let me mention a word of caution before I continue: when one is dealing with these issues one has to be doubly careful; there is no conspiracy theory. Nor are the people who popularize science part of a big plot to lead us all to a hideous world. The phenomenon we are discussing is the complex issue of vying for hegemony, of legitimizing ideologies, and the role of science in all this. And what I am trying to point out, is that both science itself as well as its popularizations are being practiced in societies where the struggle for hegemonic ideology is continuously on the political agenda of different social groups, and that both science and its popularizations cannot be considered to be isolated from such contentions for hegemony.

The new paradigm, the movement away from physics and the atom into biology and the gene, was accompanied by attempts to associate with it a new utopia: a world without diseases; a world with plenty of food for everyone. Let us attempt to probe into some characteristics of what many popularizes call the 'miracles' of molecular biology. Almost every day in almost every media we come across small or big successes of molecular biology. Whether it is a new cure for cancer, or the discovery of the gene for obesity or for jealousy, we are continuously reminded that most of our problems will be understood and solved through the triumphs of

molecular biology. But what has been the net effect of popularization or the circulation of knowledge about molecular biology? It appears that the popular 'understanding' of the issues involved in biological research has been the conviction of a reductionist view that everything is in the genes. What has been successfully communicated is not the complicated microscopic processes, but the overall attitude that whatever is going to happen to us has somehow been codified in our genes. Or that if it is not the case, then it is conceivable that genes can be properly manipulated to give the wished-for result. Never mind that biologists and other scientists have been telling us at every opportunity that biological research has, in fact, undermined such reductionism and a number of molecular biologists have been insisting that every finding about a particular gene has to be assessed in the context of all the other genes.[11] But the *public perception* of biological research is heavily anchored in reductionism. And such reductionism has been the net outcome of popularization attempts. Reductionism far from being a methodological or even a philosophical topic, has, over the years, become part of an ideology, which emphasizes that the problems one is facing have been in the genes all along. One is jealous, one is obese, one is antisocial, one will have all kinds of diseases because everything is in the genes, and thus, reductionism is no longer a technical issue, something which shows a sloppy methodology or naive philosophy. If over the years, reductionism has become an ideological category, then the processes of popularization that places emphasis on the significance of reductionism, have themselves acquired a rather intense ideological character.

There is, of course, a kind of methodological counterargument. If most writers could write better, if there was a concerted effort to educate people on these matters, if people's education had been such that these relatively complicated matters could form the proper background for popular texts etc., things would be dramatically better and reductionism would not be so dominant in the public perception of molecular biology. However, this is not a valid counterargument, since it relegates all to a hypothetical situation and we are interested in understanding the present and the present has the characteristics I have tried to describe. The point is not to understand what would have happened under different conditions, but to understand what is actually happening. It is indeed the case that there are many bad writers who have an incomplete understanding of what they are writing about, and in

[11] Many of the arguments can be found in Evelyn Fox Keller *The Century of the Gene* (Harvard University Press, 2000).

many newspaper articles and television programmes, the bottom line is that they want to impress with the pictures they show rather than to convey information, which could then be further processed. The question of the relationship of ideology to science popularization cannot be relegated to the technical insufficiencies of writers or editors, but to the very processes of science popularization, which comprise part of the complex processes of rearticulating the hegemonic ideology.

In our day, perhaps one of the most intriguing challenges is the inherent impossibility to identify unambiguously what constitutes popular scientific writing. I would like to consider further the relationship of ideology to science popularization in a particular category of writings. These are texts which appear in professional journals, but they are not necessarily addressed to only members of one particular community compared to the more specialized articles in these journals. In many journals (such as the *Bulletin of Atomic Scientists*, *Nature*, *Science* and *Scientific American)*, in addition to such specialized articles, there are also specific kinds of article that have a long history of addressing themselves to a larger, more heterogeneous scientific audience: editorials, policy notes, review articles, obituaries, and news. Surely these are not popular writings in the traditional sense but nevertheless they do play a role similar to that of science popularization: they present the state of affairs of particular disciplines; they express worries and criticisms of excesses attempting to veer things back to 'where they should be'; and, mostly, by narrating successes, they reiterate that, despite problems, 'things are basically OK'.

Let me give an example from the publications of one scientist and his collaborators. James Fowler, who is well known for his theory of (social) networks, is currently Professor of Medical Genetics in the School of Medicine and Professor of Political Science in the Division of Social Sciences at the University of California at San Diego, USA. Together with his collaborator Nicholas Christakis, they were in the list of top 100 global thinkers of the magazine *Foreign Policy*.[12]

In an article in the *American Political Science Review* entitled "Genetic Variation in Political Participation", Fowler et al. consider the problem of how one decides who to vote for. They claim that their study shows that "a significant proportion of the variation in voting turnout can be accounted for by genes", claiming that these findings suggest for the first time that "humans exhibit genetic variation in their tendency to participate in political activities." They mention that it appears

[12] *Foreign Policy*, December 2010, http://www.foreignpolicy.com/issues/183/contents (accessed on January 25, 2013).

unlikely that there may be a 'voting gene', nevertheless they emphasize that, in combination with environmental factors, there may be a "set of genes whose expression regulates political participation."[13] In another article in the *Journal of Politics* with the title "Two Genes Predict Voter Turnout" Fowler and Dawes claim to have shown that "individuals with a polymorphism of the MAOA gene are significantly more likely to have voted in the 2004 presidential election."[14] Significantly in an essay in *Science,* appearing in the column called *Perspectives* and titled "Biology, Politics, and the Emerging Science of Human Nature," Fowler and Schreiber attempt to synthesize what appeared to be the disparate aims of brain research and political science. The authors claim that "these separate fields of inquiry are subject to inherent limitations that may only be resolved through collaboration across disciplines. We describe recent advances and argue that biologists and political scientists must work together to advance a new science of human nature."[15]

In the cases I presented, and a host of others which spring from articles in learned or professional journals, the writers have an undoubted expertise about what they are writing about. They write clearly and they write well. The aims of these articles are similar to the aims of science popularization: to communicate new developments and to present new agendas. The 'end result' of such articles is, also, rather similar to what a host of articles of science popularization achieve: to forge allegiances, to create audiences, to push research agendas, to intervene in academic politics. In other words, such articles are part of the means for the contention for ideological dominance as to the character of social problems and the kind of science that will provide answers. Whereas many scholars stress the absolutely crucial role of environment in its most general sense in our everyday lives, a reductionist approach, which explains not only diseases and psychological traits but also social and political behavior, becomes a particularly strong counterargument to those who insist on the role of the environment. And this counterargument draws its strength from the authority of molecular biology. Of course, many of these scientists who try to legitimize such an approach are quick to point out the non-negligible role of the environment. The public perception, though, of what is being communicated makes

[13] James Fowler, Laura Baker, Christopher Dawes, "Genetic Variation in Political Participation", *American Political Science Review*, May 2008, 102: 233-248, quotes from p.233.

[14] James H. Fowler, Christopher T. Dawes, "Two Genes Predict Voter Turnout," *Journal of Politics*, July 2008, 70: 579-594, quote on p.579.

[15] James H. Fowler, Darren Schreiber, "Biology, Politics, and the Emerging Science of Human Nature," *Science*, 7 November 2008, 322: 912-914, quotes from p.912.

such a reference to environment rather opaque – and when one is talking about the kinds of articles I attempt to analyze, it is this net effect which is the decisive factor in the public perception of what is at stake.

The argument about the relationship of science popularization and hegemonic ideology is not only confined to such cases as above. One can trace such a relationship in more politically explicit aspects as well.

In much the same manner as the cases I discuss above, there is a recent analogous case to be noted in Europe. The issue is the much contested notion of European science. Europe is presently in the throes of its most dramatic transformations since the end of the Second World War – there are new political realignments and a strong contention for political and ideological hegemony. Interestingly, the notion of European science is playing a rather prominent role in all this.

In a 1995 European Commission White Paper on the question of unemployment and on the ways young people can gain as many skills as they need before finishing high school, the European Union proposed that history of science and technology be included in the school curricula. It was no doubt a good recommendation but for the wrong reasons.[16] The White Paper suggested that by learning the history of science, and especially the history of technology, young people will acquire knowledge of a variety of skills and techniques and will become aware of the boundlessness, as it were, of human inventiveness. The recommendation of the report, however, is embedded in one of those interesting mental somersaults that the bureaucrats in Brussels are so fond of performing. It was noted that science had been a European phenomenon, that modern science was born in Europe and that it should be taken as our common European heritage and, hence, all schoolchildren should become aware of the history of European Science.

Here is one of those instances where there is such a dramatic dichotomy between bureaucratic goals and the aims of an academic pursuit. Never mind that historians of science have been trying to articulate local differentiations and trying to bring to the surface the deviations from the viewpoint that holds scientific enterprise to be an all-inclusive homogeneous practice. European integration as planned in Brussels needs 'European' notions and the construct of European science will continuously be seeking legitimization. There is such a construction of European

[16] White Paper published by the European Commission entitled *Teaching and Learning: Towards the Learning Society* (Luxembourg, 1995). See sections II.B and C.

science in the kinds of articles I have been looking at, in the introductory passages in the Framework Programs, which are the research programs of the European Union, and in many science policy papers. Recently an article published in *Science* was entitled "From 'Science in Europe' to 'European Science'." It cannot be more explicit in its aim, which is to argue for such a transition.[17]

The point I want to make is that political agendas are being formulated in terms of scientific entities or concepts that appear neutral in order to lend legitimacy to the politics involved. The highly problematic notion of European science appears sufficiently innocent yet it codifies specific power relations, and, thus, it becomes a rather effective means of reconfiguring the hegemonic ideology.

It is one thing to consider the word 'European' to denote a geographical reference but it is a dramatically different choice to give to the same word a cultural reference. In fact, the legitimization of the concept of 'European Science' has been one of the aims of all those who have been formulating the hugely funded European research projects. Long gone are the days when the concept of science in Europe was considered to be sufficiently self-explanatory. The attempts at political unification of Europe have blatantly failed, and what was envisaged as political unity has degenerated into turning Europe into a mere (but fractionated) economic entity. And since political unity cannot be achieved within the context of such strong nationalistic discourses as those in Europe today, what is being sought is new ways to give further legitimacy to a failed political strategy. Since political union is virtually impossible, the emphasis now is to propagandize at all levels of society the one thing that most social groups will accept as unproblematic and will not react against: that there is a European Science. The notion of European Science looms large and it is being continuously reconstructed and rearticulated. Now European Science is no longer science in Europe, it is no longer science situated geographically in Europe, but it is the science *of* Europe. And, thus, the notion of European Science being under continuous negotiation and reconfiguration, is vying for dominance, is part of the struggle for becoming the means for the contention of a hegemonic ideology. Of course, such a notion was nurtured for many decades by many historians of science in order to unfold the success story of science, and to construct a narrative of how this European Science migrated to other places like China and Latin America. But the

[17] Maria Nedeval, Michael Stamfer, "From 'Science in Europe' to 'European Science'," *Science*, 25 May 2012: vol. 336, n. 6084: 982-983.

emphasis on it as a quasi-political category overshadows the serious inhomogeneities present in the development of the sciences in Europe since the 17th century.

There are, in a way, two kinds of ideologies involved in the process of popularization: one is the ideology expressed by the very act of popularization, by the enterprise to popularize itself; the second is the ideology imbedded in what is being popularized, in the kind of science that is being popularized, in the appropriate discourse used for the popularization of science. And I want to emphasize that although the first kind, that which is expressed by the act of popularization, is rather clearly manifested and easily discernible, the second one, which has to do with the content of what is being popularized, is usually opaque and almost always neglected. Of course, the hegemonic ideology does not involve a static and unchanging set of values. It needs continuous revamping since a particular ideology needs to be reinforced in order to be lasting. Popularization, or rather the ideology of popularization, is one such means. And, thus, the popularization of ideology affects in turn the ideology of popularization.

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