Political epistemology:
The problem of ideology in science studies

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Introduction: Science, Ideology, Praxis

This book explores the *discourses* on science as revealing of the connection between science and ideology. I address this entanglement through a cultural-political critique of academic discourses on science in the domains of the history, historiography, sociology and philosophy of science. I see this as a contribution to epistemology that reminds us that *political praxis* is the foundation of all meta-discourses on science. Ethical-political praxis (which, as I will argue, is distinct from *productive* practice) presupposes reflection but cannot be reduced to it, since it looks at the present from the future. A future to be chosen.

The main contention of this book is that the investigation and critique of the politics of science should begin with an assessment of the cultural conditions for science as they are established through discourses on scientific knowledge at various levels. There is no pure empiricism nor abstract logic of science. In fact, it is only through cultural forms of intellectual mediation that the advancement of science can be reflected and implemented. Even the economic force of science and technology requires that it is recognized at an abstract intellectual level and that it is consciously acknowledged, otherwise it cannot lead to any forms of institutionalization and development. Historians, sociologists and philosophers of knowledge investigate science, its genesis, justification and consequences but they too often leave implicit and underdeveloped the question about the collective agendas that underlay and direct science, in one word, its ideology. Political epistemology is concerned with science as a collective instrument of action and, more in general, with knowledge seen as a process that depends on collective strife, negotiation and decision, that is, on the constitution and enforcement of hegemonic projects.

A full-fledged political epistemology should bring together considerations of the material and ideological dimensions of science. It should address the entwinement of the *cultural politics of science* with the *political economy of knowledge* as a bridge between the structural analysis and the political comprehension of science. In this book I leaves aside the specific discussion on the first of these two poles—that is, science as a productive force coopted in the production of the material basis of society and its reproduction—but I deem an analysis of ideology equally relevant for a correct understanding of the phenomenon science. In fact, it is at the level of science ideology that meaning and directionality are imparted onto

knowledge and hierarchies and demarcations are introduced. I should stress at the very outset of this endeavor that I do not mean 'ideology' in a pejorative sense. Rather, this concept invites us to consider the ties of culture with politics, raises the question of the material embedment of science and the various agendas that direct it.

All of the debates on science here considered convey specific images of the science upon which they reflect, criticize, and forge. But these 'images of science' are no snapshots of the moment which mirror the processes and results of scientific advance with perfect adequacy. Rather, all images are prescriptive. They set the epistemic goals and programs. They are integral part of science, as they determine its societal-cultural meaning, define what problems science can legitimately address, posit the relevant questions, establish methodologies, argumentative strategies and rhetoric (Elkana 1981: 14-19). Science ideologies are collective epistemological programs. Usefulness, even economic import, is not sufficient by itself to determine the evolution of science. Interests must be reflected and credited at a discursive level in order to be articulated as practices and to set concrete targets. It is through ideology that people reflect their condition and set their aims.

Thus, science studies are the main road to science ideology and, as such, they are more powerful than it might be superficially assumed if one reductively considered them as parasitic relative to the sciences about which they talk. Struggles for scientific hegemony are accompanied by struggles for meaning. Therefore, ideological leadership in discourses on science not only determines the concrete possibilities for the advancement of science but also those of society at large. Struggles for the lead in science studies are in fact clashes over conflicting views on society. HPS and related academic fields criticize or foster epistemic practices and politics. By these means, they shape science itself. When Francis Bacon dedicated his treatise on the advancement of learning to James VI and I, he did not mean to offer the king of Scotland and England an abstract description of how science develops and according to what logic. Lord chancellor Bacon aimed to *achieve the institutionalization of a specific form of knowledge* which he considered to be functional to the empowerment of the nation. He conceived of such an empowerment as an imperial program of dominion over nature and rule over other people. He presented his role as an advisor of the British king by analogy with Aristotle who had once taught Alexander the Great and set the intellectual foundations of his conquest of the world (Bacon 2000: 10, B4*v*).

Science studies have taught us that no comprehension of science is neutral, objective, or disinterested. This book articulates this idea in a political direction. It claims that any intellectual engagement with the history and validity of science can be seen as political in its

core. By saying so, I do not mean to reduce science to disembodied ideology following recent post-truth radicalizations of social constructivism and post-modern relativism. The power of science in our scientific-technological world does not rest in its discursive force alone, but in its material transformatory power. As I claim, it would be misconceived to regard ideological struggles for meaning in the fields of meta-science as irrelevant to scientific progress. Different visions on science are not just alternative forms of reflection, depending on an indefinite plurality of equally valuable angles. Rather, they correspond to different visions of the future that are tightly connected with collective praxis.

Ideology has been variously understood in the past. I should leave aside the crude separation of science from ideology, which is itself a powerful ideological weapon but a week instrument for critique. Two are the conceptions that deserve particular attention here. One likens ideology to collective unconscious, wherefore science relates to ideology just like, in Freudian theory, consciousness relates to the unconscious. Karl Mannheim had very much this conception in mind when he set the foundations of the sociology of knowledge as a novel field of inquiry back in the 1930s. He wrote, with some caution, that

> the concept of 'ideology' reflects the one discovery which emerged from political conflict, namely, that ruling groups can in their thinking become so intensively interest-bound to a situation that they are simply no longer able to see certain facts which would undermine their sense of domination. There is implicit in the word 'ideology' the insight that in certain situations the collective unconscious of certain groups obscures the real conditions of society both to itself and to others and thereby stabilizes it. (Mannheim 1949: 36)

Luis Althusser, in his considerations on *Ideology and Ideological State Apparatuses* (1970) also relied on Freudian psychology as the cognitive basis of a relational distinction between ideology and science (Althusser 2014: 254-255)—thus abandoning the *aut-aut* mutual exclusion of earlier treatments of his. Although the two spheres of the conscious and the unconscious are structurally independent and the enlightenment of the conscious cannot possibly wipe out all obscurity, the separation line is movable. The fundamental difference between the two realms remains but the epistemological break becomes a never-ending task, a permanent revolution (or strive towards revolution). Science appears as an infinite effort of enlightenment:

> Now it is this knowledge that we have to reach, if you will, while speaking in ideology, and from within ideology we have to outline a discourse which tries to break with ideology, in order to dare to be the beginning of a scientific (i.e. subject-less) discourse on ideology. (Althusser 2014: 263)

George Canguilhelm later made this intuition of Althusser's productive for historical epistemology: "A scientific ideology is at once an obstacle and the condition of possibility […] for the constitution of science"—as he wrote (Canguilhelm 2009: 46).[1] Following in the footsteps of his Freudian-structuralist predecessor, he limited the influence of ideology on science to that which is the confused magma that anticipates the fully developed theory. Once a scientific realm is "epistemologized" it accomplishes an extra-ideological leap forward. His definition of a scientific ideology here follows:

> a. Scientific ideologies are explanatory systems the object of which is hyperbolic […]
> b. There is always a scientific ideology before a science in the field where the science will get installed
> c. The scientific ideology ought not to be confused with false sciences, nor with magic, nor with religion […] but rather it is a belief which looks at an already accomplished science, the prestige of which it recognizes and the style of which it tries to emulate. (Canguilhelm 2009: 53-54)[2]

Although Canguilhelm is open to a specific treatment of ideology as relevant to the history of science he regards ideology as mere 'history', that is to say, as the past of science. Once science is achieved, it is universal. The *rupture épistémologique* subtracts knowledge from historical becoming and ideological impurities.

The historicist and humanist Marxist, Antonio Gramsci had a different view. He did not posit the science-ideology break. His words are quite clear on this point: "Actually, even science is a superstructure, an ideology. One can say, however, that in the study of superstructures, science occupies a special place, for its relation to the structure has a particular character, wider in extension and closer as far as the continuity of its development is concerned" (Gramsci 2007: 1457).

For Gramsci ideology is at once the obscure realm of common sense and the transparent sphere of individual and collective consciousness. To make consciousness

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[1] "L'idéologie scientifique serait à la fois obstacle et condition de possibilité […] pour la constitution de la science."

[2] "a. Les idéologies scientifiques sont des systèmes explicatifs don l'objet est hyperbolique […]
b. Il y a toujours une idéologie scientifique avant une science dans le champ où la science viendra s'instituer
c. L'idéologie scientifique ne doit pas être confondue avec les fausses sciences, ni avec la magie, ni avec la religion […] mais elle est une croyance qui louche du côté d'une science déjà institué, dont elle reconnaît le prestige et dont elle cherche à imiter le style."

transparent is a task, a historical and practical one. Ideology is obscure and unreflected, if reality is looked at with the passivity of commonsense, or with the fatalism of subalternity without resistance or revolt. But ideology can also become self-transparent through struggles, political positioning and the setting of collectively subjective goals. Science, just like culture in general, becomes a sphere of political praxis and ceases to be a transcendent logic dominating consciousness, human relations and action.

In this book I embrace the Gramscian perspective of hegemony—or of science as cultural praxis. This acknowledges that science always and inevitably carries the hallmark of the collectivities it is merged in and contributes to direct. Drawing on this basic claim, specific studies should be dedicated to the comparative inquiry of the *esprit*—in Montesquieu's political sense—that the ethos of a community imparts on knowledge and vice versa. Comprehension of the political intentionality of science is not just an object-oriented inquiry but also presupposes self-clarification, reflexivity and ethical-political action. The issue at stake for the political epistemologist is not to *interpret* but to *transform* the reality of science, culture and the society. Intellectuals' outlook—as has been highlighted from perspectives as varied as the philosophy of praxis, subaltern studies, feminist and other situated epistemologies in contexts of resistance, denunciation and emancipation—is characterized by a positioning, more precisely, by the tension between the two poles of position and identity. Epistemic values are the distillate, in the form of principles, of an *irremediably impure* epistemology, emerging from societal and cultural distinctions, hierarchizations, prioritizations, struggles.

This books aims to go beyond the existing scholarship in and on science studies offering a reflection on the ideological, that is political, dimension of the methodological premises of the field. If science studies can be labeled as meta-science, this book 'goes meta-meta.' Its specific political treatment of the disciplinary discourses on science must be the foundation for further inquiries into the ways in which struggles for hegemony have constantly informed scientific advance. This book is meant as a first step toward a fully elaborated political epistemology. It begins with a critical exploration of its theoretical categories in order to launch new perspectives and pave the way for new socio-historical and epistemological studies.

An analysis of the most significant ideological struggles in science studies will serve to clarify my approach. In my treatment I do not limit the scope of science studies to the critical

inquiry of present day science studies but rather I expand its range to virtually encompass all of the debates reflecting on science, above all the methodological, philosophical, sociological and historiographical ones. As far as history is concerned, this preliminary exploration will bring into focus the political import of writing history against the ostensible 'neutral objectivity' of the historian. I will specifically employ the Gramscian theory of hegemony as a perspective capable of unifying the material and ideal poles of epistemological history. As I will argue, such a perspective sees beyond the two blind alleys of present-day historical epistemology: one marked by the structuralist 'crisis' of the subject, and the other by the post-modern crisis of the object. In particular, a humanistic focus on subjectivity and action should inform ethical-political responsibility against the groundlessness of the individualistic and relativistic tendencies typical of post-modern narrativity (mirroring those of neoliberal societies). This discussion of the political facets of epistemology will be complemented with a critical assessment of the state of the debates in the field.

The first chapter enters the research arena of political epistemology by integrating existing perspectives in historical epistemology and bringing together knowledge theory and political philosophy. I introduce the problematic through reflections originating from the most relevant political theses on science and politics advanced in the three areas of sociology, critical philosophy and historiography. This discussion should familiarize the reader with the problems and the leading questions of political epistemology as far as ideology in science studies is concerned.[3]

Chapters 2 to 5 rework and expand on inquiries in political epistemology which I have accomplished in recent years. Chapter 2 deals with problems in the philosophy of science. The link between conceptions of modernity and of scientific advance is assessed beginning with a discussion of the views of the post-Marxist thinker, Ágnes Heller. This chapter is a revision of an essay of the same title, "The Logic of Science and Technology as a Developmental Tendency of Modernity," *Thesis Eleven* 125/1 (2014): 32–48.

In order to highlight the critical potential of political epistemology, I then move back, in Chapter 3, to Cold War meta-science. I argue that the opposition of Anglo-Saxon approaches to Marxist history and philosophy of science produced a dichotomy between the latter's 'externalist' sociological and economic approaches versus the 'internal' technical or purely

[3] The problematic of the subject and the object in historical epistemology ideas of this chapter has been preliminary explored in the essay "Soggettività, strutture, egemonie: Questioni politico-culturali in epistemologia storica," in *Studi Culturali* (2018, in press).

intellectual visions of science. I deal with particularly influential Soviet perspectives on science fostered through Nikolai Bukharin's cultural program. I particularly discuss its *scientist* foundations, which led to a particular conception of historical materialism. Marxist thinkers such as Gramsci and Lukács strongly criticized 'vulgar' materialism and scientism while proposing epistemological and political alternatives, which are here briefly considered.

I then contrast these political and philosophical debates, which took place at the threshold of the Cold War, against the liberal politics of Thomas Kuhn's post-Koyréan conception of scientific revolutions. Kuhn's political presuppositions should be considered in relation to the manner in which they immediately affected his philosophy and, indirectly, his version of the history of science. This chapter merges two complementary, partly overlapping, publications of mine and unifies them by focusing on their original inspiration: "After Nikolai Bukharin: History of Science and Cultural Hegemony at the Threshold of the Cold War Era," in *Social and Human Sciences on Both Sides of the Iron Curtain*, edited by Ivan Boldyrev and Olessia Kirtchik, special issue of *History of Human Sciences* 29/4–5 (2016), 13–34 and "Copernicus as Kuhn's Paradigm of Paradigms: The Epistemological Dimension of *The Copernican Revolution,*" in *Shifting Paradigms: Thomas S. Kuhn and the History of Science*, ed. Alexander Blum, Kostas Gavroglu, Christian Joas and Jürgen Renn (Berlin: Edition Open Access, 2016), 61–86.

In the ensuing section, Chapter 4, I address historical methodology and the challenge of a political treatment of the history of science that follows neither the economicist line nor constructivist anti-structural analysis. This chapter is an expanded version of an essay which I wrote for a comprehensive volume on the history of pre-classical mechanics edited by Berlin and Tel-Aviv colleagues.[4] A revised version appeared in Italian as the afterword to a new translation of Hessen's classic in the history of science *The Socio-Economic Roots of Newton's Mechanics*.[5] In this essay I argue that the Marxist roots of social histories of science should be complemented with a political outlook resting on the perspective of hegemony. Such an approach permits an investigation of structures and identities as complementary elements of intellectual historical comprehension.

[4] Pietro Daniel Omodeo, *Emergence and Expansion of Pre-Classical Mechanics*, Boston Studies in the Philosophy and History of Science, ed. by Rivka Feldhay, Jürgen Renn, Mattias Schemmel, and Matteo Valleriani (Cham: Springer, 2018), 55-78.

[5] Pietro Daniel Omodeo, "L'eredità di Boris Hessen: Per un approccio socio-politico alla scienza in età moderna," in *Le radici sociali ed economiche della meccanica di Newton*, ed. Gerardo Ienna and trans. Giulia Rispoli (Roma: Castelvecchi, 2017), 119–150

The final chapter of this book deals with epistemology and historiography, this time seen in the light of hegemony theory.[6] It pieces together the convoluted history of the appropriation of Gramsci's political philosophy in the history of science and the new perspectives opened up in the field through recent reappraisals of his thought. It is the story of a missed opportunity to make Gramsci's legacy fruitful for science studies. Also, I would like to stress its importance for a renewed enquiry on present-day scientific world bringing together epistemology, historiography and politics. As I argue, the perspective of hegemony is crucial for such a program—the program of political epistemology. It is important to know where it comes from in order to redirect our field.

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Political epistemology constitutes the methodological and theoretical foundation of the ongoing project "Institutions and Metaphysics of Cosmology in the Epistemic Networks of Seventeenth-Century Europe," funded by the European Research Council as a consolidator grant (2017-2022) (Horizon 2020 Research and Innovation Programme, GA n. 725883 *EarlyModernCosmology*). This generous funding has made the completion of this book project possible. The research project can be seen as a large case study in political epistemology: it is a comparative inquiry of early-modern Protestant and Catholic cosmologies in their institutional, political and ideological settings. Science is seen as a contested field of

[6] It is based on the essay that appeared in Italian as "Egemonia e scienza: Temi gramsciani in epistemologia e storia della scienza," in *Gramsciana: Rivista internazionale di studi su Antonio Gramsci* 2 (2016): 57–84.

confessional struggles for cultural hegemony, shaped and transformed through its circulation within international scholarly and academic networks. In this context I could already organize a first methodological workshop on political epistemology (Venice, 13-14 November 2017). I would like to thank the friends and colleagues who helped me first in Berlin and then in Venice to critically assess the political economy of knowledge and the cultural politics of science, in particular Senthil Babu, Massimiliano Badino, Sonja Brentjes, Sascha Freyberg, Giulia Rispoli and Matthias Schemmel.

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Chapter four, “Toward a Socio-Political History of Science: From Structures to Hegemonies” benefited from thorough discussions of the cultural and political framework of early modern science, especially with Jürgen Renn and Rivka Feldhay. Chapter five, “Hegemony and Science: Epistemological and Historiographical Perspectives” was first presented and discussed in Italian at the conference “Egemonia dopo Gramsci: una riconsiderazione,” held at the University of Urbino, Italy, on 6-8 October 2015. Exchanges with the organizer, Fabio Frosini, as well as with Oreste Trabucco, Giuseppe Cospito and other Grasmci scholars has been very valuable. I presented and discussed an early version of chapter three, “On Both Sides of the Iron Curtain: The Marxist Struggle for Cultural Hegemony and HPS for a ‘Free Society’,” in Moscow, at the conference “Social and Human Sciences on Both Sides of the ‘Iron Curtain’” held at the *Poletayev Institute for Theoretical and Historical Studies in the Humanities – National Research University “Higher School of Economics”* (17-19 October 2013). I am grateful to Ivan Boldyrev and Olessia Kirtchik for the invitation, the subsequent discussions and the inclusion of my paper in a journal special issue stemming from the conference.

I am very thankful to Lindsay Parkhowell, not only for his valuable linguistic assistance but especially for the in-depth discussions on the themes, motivations and concerns looming large over my engagement with political epistemology, the inspiring discussions on the ethical impasses and challenges of our techno-scientific society, and the poem that opens this volume, which, in my view, well captures the spirit of this book.

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1. Towards a Political Epistemology: Positioning Science Studies

"Scientia et potentia humana in idem coincidunt." (Francis Bacon)

The Baconian *dictum*—concisely summarized as "knowledge is power"—is more often repeated than thoroughly reflected upon.[7] It still raises burning questions after about four hundred years, which are all the more urgent as our societies have ostensibly become the product of a global *knowledge economy*. Is the inner connection between science and power only a matter of human control over nature or is such control automatically transferred to men's lordship over other men? Should we conceive of it as an unavoidable logic of science, a *dialectic of the enlightenment* perpetually turning emancipation into its opposite, that is, oppression? And, to follow this line of thought further, are science and politics in their multifaceted intertwining only a matter of domination and manipulation? Can the reduction of politics to command capture the complex articulations of politics, the interconnection of science with societal organization, technology and production, and the epistemological richness of modern science?

A discussion of the political dimensions of science in line with the scholarly program of historical epistemology is long overdue. In this introductory section, I introduce the problematic, reveal its fundamental questions and demonstrate a suitable methodology. My treatment of this theoretical complex of issues, which is programmatic rather than systematic, will touch upon three entangled lines of inquiry: socio-historical, historiographical and epistemological. As a result a new area of research should be opened up: I will refer to it as *political epistemology*.

The expression 'political epistemology' as a line of inquiry guides the expectations of a scholar trained in Western thought and familiar with its categories in a precise direction. It unmistakably points to a discourse connecting knowledge theory with political philosophy. Has not the reflection on politics and knowledge been entangled since forever? Did this entanglement not precede the invention of the composite name for φιλο-σοφία in that

[7] "Science and human power coincide in one […]." Cf. Bacon (1963), 157.

tumultuous age of public confrontation, oratory strife in the agora and rhetorical competition of the Sophists in the classical age of the Greek city-states? My treatment of political epistemology cannot be separated from a preliminary discussion of the concepts and terms employed and of the angle of my particular outlook. Any positioning—this should be made clear from the outset—is historical and cultural. With no exceptions. For me 'political epistemology' is a convenient abbreviation for 'political *historical* epistemology.' After many years of research and intense exchange with friends and colleagues at the Max Planck Institute for the History of Science I am inclined to see the present endeavor as an integration and extension of the approach of the Berlin School of Historical Epistemology.[8] However, before I recount the historical-epistemological positions that have emerged from debates arising out of this context, I deem it expedient to introduce the problematic by commenting on the most relevant politically loaded theses that have been brought forward in the sociology of knowledge, philosophical knowledge theory and historiography. They will help familiarize the reader with the problems and the leading questions of political epistemology and help me to furnish the stage for my subsequent discussion.

1.1

> "Solutions to the problem of knowledge are solutions to the problem of social order." (Steven Shapin and Simon Schaffer)

This is the thesis of Steven Shapin and Simon Schaffer's classic, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (1985). The two authors invited social historians to see the history of science and the history of politics as the same terrain (Shapin and Schaffer 2011: 332).

Their case study specifically concerned philosophical controversies taking place in post-revolutionary England. They showed that the fierce contrast between Thomas Hobbes, on the one side, and Robert Boyle and the experimentalists of the Royal Society, on the other, was as much scientific and epistemological as political. In a time of monarchical restoration, the two antagonistic parties proposed different visions of science and society aimed at avoiding social disintegration and civil war. The experimental consociates presented their

[8] I allow myself the use of this expression to capture the unity in the variety of epistemologically-driven historical debates on science that have characterized the intellectual activity at the Max Planck Institute for the History of Science since its inception. Cf. Sturm and Feest (2011).

scientific polity as *the* model of an ideal community in which pluralistic exchange could be deployed harmoniously without degenerating into strife. Hobbes took the opposite stance on authority's relationship to the divergences in science and politics. More precisely, he cautioned the rulers against allowing divergent individual opinions in science just as in religion, because he thought that pluralism is the most serious menace to civil authority. As one of Hobbes' supporters stated, "Controversye is a Civill Warr with the Pen which pulls out the sorde soon afterwards" (Shapin and Schaffer 2011: 290). The dispute between the champions of the opposing parties, Hobbes and Boyle, concerned scientific method and its legitimacy (both epistemological and political). The two models facing off against each other were controlled freedom of opinion against centralized authority—or proto-liberalism versus absolutism. Hobbes rejected the factual knowledge of the experimenters, who grounded their science on sensible experience and regulated controversy, in preference for a rational scientific truth, which is philosophically demonstrated and not discursively constructed, that is, a truth sanctioned from above. His claim had an explicit political bearing as an argument in favor of centralized hierarchical power opposed to civil disorder. Shapin and Schaffer did not hesitate to qualify it "Leviathan's Political Epistemology" (Shapin and Schaffer 2011: 99–107).

Their socio-historical approach proved to be a successful attempt at a *new* sociology of science. Their work has been celebrated as a turning point in science studies.[9] With hindsight, it has been judged "the most influential text in our field since Thomas Kuhn's *Structure of Scientific Revolutions* (1962)" (Secord 2004: 657). As a matter of fact, it questioned the 'internalist' historiography of science without embracing Marxist 'externalism,' that is to say, it was programmatically aimed at overcoming the methodological dichotomy that loomed large over the Cold War history and philosophy of science. The socio-political, the authors argued, is *not* external to science. Their study dismissed earlier contextual approaches in which the roots of science were sought in the economic drives and social functions of science.[10] The focus had to be shifted from structural determinants to interactions between people. According to their proposal, the social historian should deal with free agents who assess their situations and develop strategies. One would better capture their approach by resorting to the theatrical metaphor, 'the historical actors play their roles.' As a matter of fact, the sociology underlying *Leviathan and the Air-Pump* did not rest on a philosophy of praxis, a

[9] By 'science studies' I mean the meta-discourse on science that ideally encompasses the history, sociology and philosophy of science, as well as the meta-discourse on the social entanglements of science, technology and medicine.

[10] The foundational work of Marxist externalism is Hessen (1931). I will discuss the historiographical and epistemological problems of Cold War Science studies in detail.

theory of action considering both subjects and structures, but fragmented the socio-historical picture into a plurality of individuals' atomic actions, intentions and strategies.[11] To be more precise, Shapin and Schaffer's way of looking at social reality was marked by constructivist biases which, in Pierre Bourdieu's definition, reduce "the social world to the representations that agents have of it, the task of social science consisting then in producing an 'account of the accounts' produced by social subjects" (Bourdieu 1989: 15a). Their approach is not *allant de soi* but an intellectual choice that requires a methodological justification. Therefore, any "science of science" ultimately requires some form of "reflexivity," not only methodological but also political.

The *sociology* of the *sociologist of science* is no neutral tool. It can be seen as a *Denkstil* in Ludwik Fleck's terms, though only by explicitly ascribing to this concept a politically loaded prescriptive meaning that remains implicit in the latter's major work (Fleck 2012). Any scientific approach is shaped by scholars' values, epistemological assumptions, methodological choices and, in the end, by a political vision of society. To ignore this multidimensionality would mean to naively applaud the *social (*or *cultural) turn* Shapin and Schaffer induced as a shift from *ideological* historiography to post-ideological social constructivism. This, in turn, would mean neglecting the profound political meaning of any change in the overall approach to a discipline. Thus, Shapin and Schaffer's sociology is not less problematic than the economic accounts they refused and *Leviathan and the Air-Pump* specifically raises two questions: Does the historical investigation of the articulation of science and power imply embracing social constructivism at the expense of economic analysis? Does the study of individuality and subjects' interaction necessarily replace an inquiry of knowledge production and political processes taking into account collective action? It has been pointed out that the emergence of British *sociology of scientific knowledge*, with its strong relativistic bias, had a leftist democratic connotation, as it focused on the social construction of truth in opposition to the well-established American paradigm, that is to say a Mertonian *sociology of science* concerned with problems of efficiency of the academic mechanisms of scientific production and validation.[12] However, the interactionist approach they used in their critical renewal of the field, neglected "structures" and "agendas", thus

[11] Here I mean praxis both in a Bourdieusian sense as well as in a Gramscian sense which I will specify in more detail later. It is a praxis-oriented treatment of economic and social structures as the non-determinist but constraining conditions of action. In a paper which appeared in German, Bourdieu outlines an "allgemeine Wissenschaft von der Ökonomie der Praxis" (in other terms, an "allgemeine ökonomische Praxiswissenschaft"), referring to a praxis-oriented extension of economic analyses (Bourdieu 1983: 185). I do not refer here to Latourian "praxeology", a topic which I will return to. For an overview of the problematic, cf. Renn (2016).

[12] See Harry Collins's critical remarks (1983: 266-268).

allowing for a limited political understanding of the sociology of science and their own endeavor.[13]

Beginning with this introductory chapter, and then proceeding in more detail in the following ones, I will discuss and propose alternative ways of addressing the interplay of knowledge and social order. Generally speaking my emphasis on the relevance of theory for history should be seen as a defense of historical epistemology: the investigation of society, present and past, is one more example of a scientific field in which no naive, intuitive or commonsensical comprehension is possible.

Concerning the sociological approaches to science, it should be remarked that social constructivism—the understanding of social reality as founded on subjective perspectives—does not directly involve a comprehension of natural science, and *a fortiori* of nature itself, as socially constructed. In other words, the subjective construction of social reality does not imply the social construction of nature and of truth. The categorical gap notwithstanding, a constructivist understanding of science has accomplished the μετάβασις είς ἄλλο γένος, from the subjective construction of the social world to that of science and nature.[14] It was launched in the 1970s and became widely established from the mid-1980s. The 'strong programme' initiated by David Bloor and Barry Barnes at the University of Edinburgh has shaped the discipline at large. Arguably, it directed many debates on science after the turn of the eighties. Jan Golinski, in a favorable assessment of this trend, aptly summarized it as follows: "By 'constructivist' outlook, I mean that which regards scientific knowledge primarily as a human product, made with locally situated cultural and material resources, rather than as simply the revelation of a pre-given order of nature" (Golinski 1998: ix). This approach means a "break with the project of epistemological validation of scientific knowledge" (Golinski 1998: x). The referent does not count for the validation of knowledge; rather, what counts is the causal explanation of shared beliefs and their success among specialists or, more broadly, within a

[13] Cf. Bourdieu (2004: 20-21): "But the limits of his [Collins's] work result from the fact that he remains enclosed within an interactionist vision which seeks the principle of agents' actions in the interactions between them and ignores the structures (or objective relationships) and the dispositions (generally correlated with the position occupied within these structures) that are the real principle of actions and, among other things, of the interactions themselves (which may be the mediation between structures and actions)." The direction of inquiry Bourdieu points to is *conceptually* consonant with the present project of a political epistemology considers the interplay of structures and praxes, although the stress on collective agency is here remarked by the employment of the theory of hegemony,

[14] Actually, as Ian Hacking has remarked, social constructivism found countless applications, which he discusses at length. He invited the reader "to sort out various 'whats' that may be said to be socially constructed." Cf. Hacking (1999: 17).

certain society or culture.[15] Cultural-anthropological inquiries in 'empirical epistemology' offer strong arguments against abstract philosophical considerations on the *logic* of scientific discovery by looking at practices and scientific processes as embedded in scientific communities.[16] They become problematic when, after the *pars destruens*, engage with the *construction* of alternative theories. Within the constructivist perspective, Thomas S. Kuhn's considerations relative to the crisis produced in *normal* science through anomalies escaping a given *paradigm* should be rephrased in a more appropriate sociological fashion: "Who was claiming there were anomalies, and why were they successful in getting others to agree?" (Golinski 1998: 25).[17] Actually, the Edinburgh sociologists of science lamented the *idealistic* tendency prevailing in their field and tried to develop a middle way in that they favored a conception of knowledge as a form of causal interaction between knower and reality while studying "realism" as an argumentative strategy deployed by scientists.[18]

Socio-anthropologists of the sciences such as Bruno Latour and Michel Callon distinctly saw this danger and objected to the pretense of *exclusively* accounting for science in social terms, as well (Callon and Latour 1992). However, the alternative they have brought forward in order to overcome the divide between nature and culture raises more problems than the solutions it proposes. Their actor-network theory places scientists and other social actors, scientific instruments and the natural entities dealt with by researchers all on the same level as inter-*acting* within a network of human and non-human *actants*. The cost of this 'neorealist move' is to downplay the difference between human agency and the referent of the natural discourse. The *political* cost is to depersonalize and reify action while paradoxically subjectivising nature. The cultural anthropology of science is caught within the dilemma of either reifying action by obliterating subjectivity or resuscitating anthropomorphism. The 'second' Latour, the most recent philosopher of the Anthropocene and Gaia, has shifted to the latter position. He has recently celebrated the Earth, or Gaia, as an *agent of geostory*, thereby going counter to the shared view that the natural and material counterparts of human action

[15] Berger and Luckmann (1966), 3: "The sociology of knowledge must concern itself with whatever passes for 'knowledge' in a society, regardless of the ultimate validity or invalidity (by whatever criteria) of such knowledge."
[16] For a brilliant study in empirical epistemology enframed in cultural anthropology, see Knorr-Cetina (1981).
[17] Based on Bloor (1978 and 1983).
[18] Barnes et al. (1966), esp. Chap. 4. Also, cf. 201: "More recent developments in the sociology of scientific knowledge have almost all been idealist rather than materialist in their orientation. Why this has been so it is difficult to say. Perhaps it has been helpful to the narrowing of vision which academic specialities always seem to engage in as they develop: an idealist approach, which denies that speech has referential functions and that there is anything (other than itself) which knowledge is *about*, usefully equates all that there is in the world with what that sociology of knowledge studies, with no problematic residue or reminder, nothing lying beyond the sociological gaze."

lack *subjectivity*, that is to say, they are not endowed with human-like intentions, rational choice, and sentiments.[19]

As a consequence of the controversial 'material turn' Latourian attempts to rehabilitate politics are undermined by the bizarre attribution of power to an agent matter, which is supposed to interact with human *actants* at the same level. The elevating of matter to political agency and the reduction of human agency to material-like effectiveness is untenable, and forces scholars into sophisticated—too sophisticated—intellectual detours (Bennet and Joyce 2010). They can only hide an unredeemable difficulty in their premises with appeals to complexity.

Notwithstanding the difficulty of conceiving of a *political* interaction between humanity and nature, Latour has called for a new *jus gentium*, a social contract between Gaia and ourselves aimed at avoiding the most catastrophic consequences of the anthropic transformation of our globe. But how should this "redistribution of agency" be understood? Latour calls for such redistribution as the basis of a "cosmopolitics" protecting us from the *revenge* of Gaia. The question arises: What does it specifically mean in *political terms*? The evocation of Gaia as goddess seems to resuscitate a sort of ancestral religion which Latour calls a "counter-Copernican revolution." Such an approach does not seem to imply any viable political action. In fact, political *praxis* – even in the polytheist context of the Greek polis – excludes the interaction with that which transcends humans. No politics is possible with the gods: They have to be worshipped. By contrast, counter-revolutionary moves always displayed a tendency to rediscover the value of transcendent religion which, generally, excludes the possibility of (or forcefully bans) revolutionary efforts aimed at an human and inter-human transformation of the world. In spite of Latour's rhetorical *caveat* and calls for an extra-human politics, the worship of Gaia necessarily leads to new forms of religious appeasement, or in a word 'alienation.' In an age of destiny—"the point of living in the Anthropocene is that all agents share the same shape-changing destiny"[20]—humanity is convicted to passivity while the transcendent powers of nature take back the initiative:

[19] Latour (2014), 3: "I don't need to review those new *emotions* with which the Earth is now agitated in addition to its usual *motions*. Not only does it turn around the Sun (that much we know), but it is agitated through the highly complex working of many enmeshed living organisms, the whole of which is either called 'Earth system science', or more radically Gaia. Gaia, a very ticklish sort of goddess. [...] We all [?] agree that, far from being a Galilean body stripped of any other movements than those of billiard balls, the Earth has now taken back all the characteristics of a full-fledged *actor*."

[20] Latour (2014: 15). I discuss these issues in Omodeo (2017b).

> Through a complete reversal of Western philosophy's most cherished trope, human societies have resigned themselves to playing the role of the dumb object, while nature has unexpectedly taken on that of the active subject![21]

In summary, such post-structuralist anthropomorphism reduces political initiative to nil and the worship of transcendence reemerges in a new shape. As Philip Mirowski has recently argued in a corrosive criticism: "The upshot of this Latourist project is that what exists in the way of science organization and scientific research is just fine the way it is" (Mirowski 2017: 447)

As for the ban on epistemology due to the undesirability of the realist remnant implied by any inquiry into the relation between theory (or discourse) and referent shifts the problem without solving it. Indeed, the epistemological issue reemerges all of the time. How are we going to assess modern experimentalism without taking into account the intended reference to natural phenomena and the broad materialist trust in an accessible worldly reality apart from discourses and bare authority? If validity and reference are only matters of rhetoric or misperception, the categorical specificity of science relative to other cultural realms – say, literature – gets confused, if not lost. How should we assess Copernicus' and Galileo's claims about the reality of the heliocentric planetary system? If their claims and those of their theological opponents were only a matter of discourse and power the difference between religion and science loses meaning, just like the difference between belief and argumentation or between divine revelation and observation. Are we really willing to take this line of enquiry to its end? And if so, what are the political consequences relative to our understanding of and positioning in today's scientific and technological society?

A preliminary response is that the exclusion of the reflection on the discourse-object relation from science studies in the wake of the social turn – and even more so after the post-modern turn – calls for a return to knowledge theory. Historical epistemology involves critical reflection upon the inquiring subject as much as the investigated objects of science and their interplay. Political epistemology should particularly raise the question of the political import of approaches to science. It could even go as far as to raise the question: *What is the political relevance of reality*? A question that is indeed asked by many in a time in which the consecration of 'post-truth' as the word of the year in 2016 is paralleled by the emergence of new populisms.[22]

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[21] Latour (2014: 11-12).

[22] This problematic was at the center of the conference I recently attended "Post-Truth and Politics Departing from the Thought of Hannah Arendt" (Berlin, Institute for Cultural Inquiry Berlin, Hannah Arendt Center at Bard College NY and Bard College Berlin, 29 April 2017).

Furthermore, a social treatment of science focusing on interactions within enclosed settings, such as the early-modern scientific society or contemporary laboratories, should not neglect the *political* in the name of the *social*. Action is not only about finding solutions and strategies within a given framework: it is also about forging, challenging and overturning the framework. Why can't people challenge and reverse the *status quo*? The collective character of transformative action is eminently political. A sociology addressing individuals and their interactions in local settings and neglecting larger communitarian efforts to shape and change society forgets the specifically political dimension of action. It is, so to say, a sociology without society. If it is left implicit society becomes hypostasized; it escapes the horizon of human beings seen as trapped in historical processes the dynamics of which transcend them. An apolitical sociology is only apolitical in appearance. Its solution to the problem of knowledge is a solution to the problem of social order, and indeed, a conservative one. It negates the possibility of transformative political praxis as organized collective action.

The problems opened by the sociology of science can be summarized thus: epistemology is at stake in any discussion of science, be it sociological, historical or other.[23] The object of inquiry is not independent from the inquirers' perspective. Hence, a sociological approach is not sufficient to achieve a full assessment of the entanglement of politics and knowledge, as sociology itself is part of the entanglement. If the categories applied in the investigation are not explicitly addressed or they are left implicit, common sense or *bon sense* occupy central stage as the pale surrogates of philosophy. Are not scattered, everyday conceptions historically and sociologically informed? Indeed, the more commonsensical they become—the less they are reflected and consciously embraced—the more their character is ideological and thus *brutally* political. The epistemological problem is not solved by those who ban theory from the history and sociology of science, it is only diluted; ideology is not avoided, but rather reinforced; it becomes the unquestionable outlook which is as taken for granted as the air we breathe.

Now it is an appropriate time to make the step forward from the sociology of knowledge to epistemology, and to look closer at the politics of this level of the meta-discourse on science.

[23] Berger and Luckmann (1966), 13: "To include epistemological questions concerning the validity of sociological knowledge in the sociology of knowledge is somewhat like trying to push a bus in which one is riding. [...] All we would contend here is that these questions are not themselves part of the empirical discipline of sociology. They properly belong to the methodology of the social sciences, an enterprise that belongs to philosophy."

1.2

Radikale Erkenntniskritik ist nur als Gesellschaftstheorie möglich. (Jürgen Habermas)

This statement, taken from an early piece of writing by Jürgen Habermas, looks at the philosophical analogon of the sociological thesis discussed so far. However, this is not a mere disciplinary transposition but rather a deepening, a 'radicalization' of the problematic. The shift to knowledge theory concerns the epistemological premises of sociology and those of any science. More fundamentally, it concerns those of philosophy itself, and thus reflexivity takes central stage. Habermas' commitment to radicalism is inherently prescriptive. A self-reflecting knowledge theory is a social self-reflection and coincides with political engagement. However, according to Hegel, reflexivity is not just a mirror duplication of a given reality. Rather, it unifies at a higher level of mediation than immediacy, according to the principle that *truth* is not the mirror-like *identitas mentis et rei* but instead the process achieving the reflexive connection: "The True is the whole. But the whole is nothing other than the essence realizing itself through its development" [24] (Hegel 1977: 11). Against the background of this logic, Habermas' remarks on the social rootedness of knowledge theory mean to reestablish a mediated unity between theory and society at a higher theoretical and social level. Such mediation has a political, transformative meaning, as it is more than merely a matter of speculative observation. The Marxist connotation stresses that *any* epistemology *must also* be criticized in view of society theory. This is an eminently political task.

The quoted statement stems from the preface to *Erkenntnis und Interesse* [*Knowledge and Human Interests*], a work from 1968 written when Habermas was a young exponent of the *Frankfurter Schule*. It formed a pair with *Technik und Wissenschaft als 'Ideologie'* [Technology and Science as "Ideology"] (1968). The context was that of a criticism of positivism and technocracy—a polemical context that I will single out as it can prove a useful introduction to the wider issue of the entanglement of epistemology and politics. According to Habermas' *caveat*, which was actually a critique of scientist ideology, *the positivist reduction of knowledge theory to philosophy of science is ideological, as it serves the technocratic defense of the Capitalist order against democratic struggles for social change.* Habermas' point was that technocratic developments in contemporary societies consolidate the *status quo* by employing scientific rationality as an ideological means of legitimation. They hinder emancipatory drives, which resort to a different rationality than instrumentalism. Instrumental thought—the

[24] Cf. Hegel (1980), 19: "Das Wahre ist das Ganze. Das Ganze aber ist nur das durch seine Entwicklung sich vollendende Wesen."

essence of *science as ideology* or *scientism*—reduces rationality to problem solving, politics to administration and social change to efficiency:

> For the philosophy of science that has emerged since the mid-nineteenth century as the heir of the theory of knowledge is methodology pursued with a scientistic self-understanding of the sciences. "Scientism" means science's belief in itself: that is, the conviction that we can no longer understand science as one form of possible knowledge, but rather must identify knowledge with science.[25] (Habermas 1971: 4)

Scientism finds its ideological employment in Weberian bureaucratic capitalism, the reign of *Zweckrationalität* in which critical and emancipatory uses of rationality are marginalized. If scientific and technological modernization are portrayed as the motor of social progress, it follows that experts instead of citizens are the depositaries of the knowledge that is deemed to be necessary and sufficient for collective decision making.

Habermas not only picked up Herbert Marcuse's *Grundthese*, the fundamental thesis that technology and science have assumed the function of legitimizing domination; he went a step further than his teacher in order to investigate the philosophical articulation of scientism. Scientism is based on the assumption that the method of the natural sciences is the model of *any* possible knowledge. Such a reduction of *Erkenntnistheorie* to *Wissenschaftsphilosophie* essentially coincides with Auguste Comte's vision. Science as ideology is positivism. In Habermas' perspective, 'positivism' *is* the negation of reflexivity and critical thought. Moreover, he assumed that scientism and ideology are strictly correlated, as *ideology* only emerges as a parasitic byproduct of scientific culture.

> It is in this way that ideologies in the restricted sense first came into being. They replace traditional legitimations of power by appearing in the mantle of modern science and by deriving their justification from the critique of ideology.[26] (Habermas 1970: 99)

On this point, a richer understanding of ideology is needed in order to address the politics of epistemology. The assumption that science and ideology emerged as two distinct branches of the same *modern* discourse on science does not allow us to properly address intellectual political struggles, which affect science itself as a contested cultural field. Furthermore, I

[25] Cf. Habermas (1968a), 13: "Denn die Wissenschaftstheorie, die seit der Mitte des 19. Jahrhunderts das Erbe der Erkenntnistheorie antritt, ist eine im szientistischen Selbstverständnis der Wissenschaften betriebene Methodologie. 'Szientismus' meint den Glauben der Wissenschaft an sich selbst, nämlich die Überzeugung, daß wir Wissenschaft nicht länger als *eine* Form möglicher Erkenntnis verstehen können, sondern Erkenntnis mit Wissenschaft identifizieren müssen" [emphasis in the original].

[26] Cf. Habermas (1968b), 72: "Erst dadurch entstehen *Ideologien* im engeren Sinn: Sie ersetzen die traditionellen Herrschaftslegitimationen, indem sie mit dem Anspruch der modernen Wissenschaft auftreten und sich aus Ideologiekritik rechtfertigen" [emphasis in the original].

would like to point out two intrinsic limits of Habermas' considerations on the philosophy of science: one *in objecto*—he deals with philosophy instead of science; and the other *in subject*—he limits himself to a criticism of positivism instead of the wide spectrum of scientific epistemologies. Habermas confuses science with the discourse on science, whereas a distinction between scientific activity and the philosophical discourses upon it is necessary from a methodological viewpoint. His criticism of the political uses and abuses of science neglects *science in action*—scientific methods, theories and practices—and treats only one *specific* if significant philosophy of science. He takes for granted *positivism* as the ultimate view on science, notwithstanding his broad definition of positivism as a science-based knowledge theory. Today we cannot restrict ourselves to a simplistic treatment of epistemological theories if we want to address crucial questions in the realm of political epistemology, such as: Is philosophy of science *as such* flawed as ideological? If not, what are alternative approaches that avoid the politics of positivism? How should epistemology, as the theory of scientific knowledge, relate to knowledge theory more generally?

As a matter of fact, the sky of the philosophy of science is much richer than positivism—*there are more things in heaven and earth, Horatio, than are dreamt of in your philosophy*. Historical epistemology, in particular, has offered interpretations of science within historical and cultural coordinates that avoid positivistic presuppositions. According to Hans-Jörg Rheinberger, anti-positivism is the common thread running through historical epistemology, an intellectual endeavor which he regards as the twofold *Historisierung der Wissenschaftsphilosophie* as much as the *Epistemologisierung der Wissenschaftsgeschichte* (Rheinberger 2007: 13). Not even the 'forerunners' of historical epistemology, such as Ernst Mach (Mach 2012) or Fleck (Fleck 2012), can be said to have embraced reductionist visions of scientific knowledge in their social accounts of scientific advance. Further, the late Edmund Husserl's bitter remark about the crisis of Western civilization and its scientific culture can be read as a political stance against positivism: "Merely fact-minded sciences make merely fact-minded people"[27] (Husserl 1970: 6). In his late writing *Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie* [*The Crisis of European Sciences and Transcendental Phenomenology*] (1936), Husserl faced the crisis following the Great War and the epochal disaster foreseeable by the rise of the Nazi regime. Why was the European scientific culture unable to oppose these developments and promote higher ideals of civilization? (Time and again the Rousseauvian distrust in the possibility of coupling scientific

[27] Cf. Husserl (1996), 4: "Bloße Tatsachenwissenschaften machen bloße Tatsachenmenschen."

advance and moral progress reemerges.) Husserl blamed recent scientific culture for this failure. Such *Versagen der neuen Wissenschaft*, as he called it, descends from the loss of meaning inherent to a knowledge that is limited to mere facts.[28] Based on such premises, scientists have become mutilated intellectuals. They are not able to address the great problems of humankind such as ethics and the most fundamental philosophical questions. This narrowing down of thought (*Einschränkung der Wissenschaftsidee*) culminated in positivism, a cultural trend that beheaded science of its highest rationale: "Positivism, in a manner of speaking, decapitates philosophy"[29] (Husserl 1970: 9). Husserl contrasted the science of his time to that of the Renaissance, a universal culture in which the link between natural knowledge and life was intimate:

> The specifically human questions were not always banned from the realm of science; their intrinsic relationship to all the sciences—even to those of which man is not the subject matter such as the natural sciences—was not left unconsidered. As long as this had not yet happened, science could claim significance—indeed, as we know, the major role—in the completely new shaping of European humanity which began with the Renaissance.[30] (Husserl 1970: 7)

The relation between the history of science and the history of knowledge is far from being marginal in the debates in the field. Rather, it has become one of, if not *the*, crucial problem, as extensively discussed in the most recent synthesis on historical epistemology. Jürgen Renn has indicated that the post-modern relativization of science as equivalent to any other cultural phenomenon is one of the most pressing challenges for historians of knowledge.[31] In a sense, today we confront the extreme opposite to positivism. The object of the history of science has become blurred to the point where it is almost a matter of individual opinion. Even the crudest attempts to restore the materiality of the history of science by entitling monographs with specific artifacts, biological species or natural elements seem to be affected by the same confusion about the discipline's subject: *science*. Epistemology, once again, proves to be essential for the historical endeavor—and it is imperative to address it explicitly rather than leaving it implicit.

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[28] Better to say, he criticized the assumption that 'facts' are just given, independently of the socio-cultural contexts and histories mediating between the enquiring subject and the object to be known.

[29] Cf. Husserl (1996), 8: "Der Positivismus enthauptet sozusagen die Philosophie."

[30] Cf. Husserl (1996), 6: "Nicht immer waren die spezifischen Menschheitsfragen aus dem Reiche der Wissenschaft verbannt und ihre innere Beziehung zu allen Wissenschaften, selbst zu denen, in welchen nicht der Mensch das Thema ist (wie in den Naturwissenschaften), außer Betracht gestellt. Solange es sich noch anders verhielt, konnte die Wissenschaft für das sich seit der Renaissance völlig neu gestaltende Menschentum eine Bedeutung beanspruchen, ja, wie wir wissen, für diese Neugestaltung die führende Bedeutung."

[31] I am thankful to Jürgen Renn for letting me read an extensive manuscript work of his on historical epistemology that should be published next year.

That said, one cannot assume that anti-positivism is *per se* politically correct. Rather, the critical assessment of the political bearing of *any* epistemology is a task worth pursuing. What we need is, in a certain sense, to generalize what Habermas only offered as a caution in order to include theories of knowledge beyond positivism. The idea that an in-depth knowledge theory, *eine radikale Erkenntnistheorie*, coincides with a *Gesellschaftstheorie* can and should guide the critical (ultimately political) evaluation of any epistemology.[32]

In the late sixties Habermas envisaged a Marxist theory of society according to which knowledge emerges from a reflection on human activity (*gesellschaftliche Praxis*), both technical (*instrumentelles Handeln*) and political (*kommunikatives Handeln*). However, since reflection is part of Habermas's philosophical-political vocabulary but intentionality and struggle are not, later I shall look at the theory of hegemony for an adequate treatment of the dimensions of ethical and political praxis.

Before dealing with the perspectives of hegemony, which are rooted in a humanistic understanding of the subject and agency, I must address the most visible cultural trend of the day, post-modernism and its specific political bent. Post-modernism, as a perspective that does away with grand narratives about historical progress and causal explanations of intellectual advance, has affirmed itself from the eighties onwards. It has been regarded as "the cultural logic of late Capitalism" from the socio-historical perspective which post-modernism precisely rejects (Jameson 1991). In fact, it has enacted a shift with respect to the Marxist categories and technological utopias that dominated the Cold War era.

Jean-François Lyotard's *La condition postmoderne: Rapport sur le savoir* [The Postmodern Condition: A Report on Knowledge] (1979) is possibly the manifesto that launched this cultural movement. As Lyotard put it, "[p]ostmodern science […] is theorizing its own evolution as discontinuous, catastrophic, nonrectifiable, and paradoxical. It is changing the meaning of the word *knowledge*, while expressing how such a change can take

[32] For a colorfull gesture towards a political comprehension of epistemologies, cf. Fuller (1988), 6: "Popper's self-styled 'open society' vision of the scientific community marks him as a classical liberal, while Feyerabend's emphasis on the 'open' and Lakatos's on the 'society' aspects of the Popperian vision marks them as, respectively, an anarchist (or libertarian) and a social democrat. And Kuhn with his talk of normal science being dominated by a single paradigm which can be replaced only by 'revolution' is, by all accounts, a totalitarian. […] The philosophy of science […] is nothing other than the application of political philosophy to a segment of society, the class of scientists [...]." In spite of the accent of normativity, Fuller's *sociological* social epistemology did not expand on the larger political community of scientific production beyond the "formal sites of knowledge production", those of the scientific elites, as pointed out by Dieleman et al. (2016).

place. It is producing not the known, but the unknown"[33] (Lyotard 1991: 60). In this case, the reason for assuming scientific evolution without validation rests on the Wittgensteinian equation of science to any other linguistic game: "Here, the effect of dividing reason into cognitive or theoretical reason on the one hand, and practical reason on the other, is to attack the legitimacy of the discourse of science. Not directly, but indirectly by revealing that it is a language game with its own rules […] and that it has no special calling to supervise the game of praxis […]"[34] (Lyotard 1991: 40).

Recent developments are evidence of diversifications in historical epistemology, among which are two divergent tendencies deserving of our attention: One is the subjective radicalization and the other the poststructuralist marginalization of the subject. On the one hand, epistemic values and virtues have come to the fore. Objectivity is cast into doubt as an imperialist category, a *virtue* emerging from modern scientific discursivity and dominating it. In this respect, Lorraine Daston and Peter Galison's *Objectivity* (2007) can be regarded as the work marking the subjective post-modern turn in science studies in terms of an epistemological radicalization of the social constructivism of science.[35] In this book the two science scholars subjectivized objectivity, ascribing a quasi-ethical status to it: "Once objectivity is thought of as one of several epistemic virtues, distinct in its origins and its implications, it becomes easier to imagine that it might have a genuine history, one that forms only part of the history of epistemology as a whole" (Daston and Galison 2007: 33–34). The *crisis of the referent* could not be stated more clearly.

The other tendency goes in the opposite direction of a dismissal of subjectivity in the name of an evolution of knowledge without the subject. It continues a structuralist (and post-structuralist) strand launched by Louis Althusser and Étienne Balibar in their anti-humanistic interpretation of Marxism opposing historicist Marxism and the Gramscian philosophy of praxis.[36] In the field of historical epistemology the post-structuralist marginalization of the subject is found in Rheinberger's *Toward a History of Epistemic Things* (1997), a study on the emergence of molecular biology in the twentieth-century. The structures it deals with are

[33] Cf. Lyotard (1979), 97: "[…] la science postmoderne fait la théorie de sa propre évolution comme discontinue, catastrophique, non rectifiable, paradoxale. Elle change le sens du mot savoir, et elle dit comment ce changement peut avoir lieu. Elle produit non pas du connu, mais de l'inconnu."

[34] Cf. Lyotard (1979: 66): "Le résultat de cette division de la raison en cognitive ou théorétique d'une part et pratique de l'autre a pour effet d'attaquer la légitimité du discours de science, non pas directement, mais indirectement en révélant qu'il est un jeu de langage doté de ses règles propres [...], mais sans aucune vocation à réglementer le jeu pratique."

[35] Hacking lists the collaboration between Daston and Galison (1992), that was preparatory for the book on objectivity, as an instance of constructivism. Cfr. Hacking (1999: 23).

[36] Cf. Althusser and Balibar (1970: vol. 1, 150). For an assessment, see Thomas (2009: Chap. 1).

experimental systems characteristic of today's laboratories and the dynamics it reflects on coincide with the developmental logic of research. According to Rheinberger, research is a generator of *epistemic things*. These constitute the not-yet clearly defined objects of inquiry, and their investigation is made possible within sharply defined technical apparatuses. The *technical things*—or technical conditions—are paired with the *epistemic things* as the two structural elements that fuel the experimental dynamics of modern empirical science (in this case, biology). The relation between the two components is fluid. Once they are sharply defined and 'routinized', epistemic things attain the status of technical things and, vice versa, technical things can be problematized and thus become objects of inquiry as epistemic things. Rheinberger functionally differentiates technical things as answer-giving machines from epistemic things as questions-rising machines. The scientist is intentionally kept at the margins of the argument as a remnant of passé narratives dealing with scientists and delving into their intentions and goals. Instead, a Latourian history of science accomplishes the passage from the history of science to the *history of things*. Reinberger significantly refers to *things* as *structures,* indicating the filiation of his line of thought. As to subjectivity, he depicts its 'externalization' by quoting Jacques Lacan: "[T]he subject is, as it were, internally excluded from its object" (Rheinberger 1997: 24). The theoretical meaning is stated as follows:

> Experimental systems […] are the genuine working units of contemporary research in which the scientific objects and the technical conditions of their production are inextricably interconnected. They are, inseparably and at one and the same time, local, individual, social, institutional, technical, instrumental, and, above all, epistemic units. Experimental systems are thus impure, hybrid settings. It is in these 'dynamic bodies' that experimenters shape and reshape their epistemic things. (Rheinberger 1997: 2–3)

Scientists appear as 'functions of the functions' of the apparatus and its asking-and-answering *machines*. To be sure, human beings do not occupy the central place in a history of (*epistemic*) things.

Now, what is the *politicum* of the twofold crisis of the object and the subject in postmodernism and poststructuralism as evidenced by the reference works in historical epistemology mentioned above? I deem no author to be more suitable to address this issue than Michel Foucault for his particular synthesis of both tendencies. Did he not develop an epistemology without genesis (the subject) and referent? For this unification of structuralist and constructivist bias, I regard his early work as useful to bring into focus crucial impasses of current trends in epistemology at large. Here I shall restrict myself to the methodology of

cultural history presented in *L'archéologie du savoir* [*The Archeology of Knowledge*] (1969) and to comment on its political implications.

Foucault, somewhat misleadingly, calls his method "archéologie" and pits it against history as "memoire," the latter being a path to the *reality* behind the historical document (deemed to be inaccessible, thus mythological). In its place he proposes an approach that considers documents as "monuments"' They should be dealt with on their own terms; their interconnections should be established without any expectation as to the possibility of tracing anything beyond them. His perspective is that of a cultural history without subject and referent. It programmatically deals with "discursivity," its formation, regularities and dynamics. "[M]y aim is to define a method of historical analysis freed from the anthropological theme […]"[37] (Foucault 1972: 16). The declared aim is to dethrone the subject alongside humanism and anthropocentrism. Accordingly, Foucault turns cultural history into a "*pure description of discursive events* as the horizon for the research for the unities that form within it"[38] (Foucault 1972: 27). A particular conception of ἐπιστήμε supports his perspective:

> By *episteme*, we mean, in fact, the total set of relations that unite, at a given period, the discursive practices that give rise to epistemological figures, sciences, and possibly formalized systems […] .[39] (Foucault 1972 : 250 [emphasis in the original])

The discourse analyst travels across an indefinite field of infinitely mobile relations. Foucauldian "epistemology" excludes the subject of cognition and any principle of validation transcending the discourse. In fact, the *discours-objet* does not require an investigation of its origin or its referent. The discipline dealing with it, the knowledge archaeology, is an *analyse de formations discursives*.

But, once both subject and referent disappear, what secures the validity of knowledge? Foucault introduces a post-Kantian historicized a priori, which defines the ensemble of the rules of discursive practices. However, the assumption of such an a priori does not really answer the above question concerning validity, but only shifts it. What instance secures the a priori in the light of a discourse-immanent comprehension of scientific evolution without subject and object? Foucault's answer is well known: power! Nietzsche's *Wille zur Macht*

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[37] Cf. Foucault (1969: 26): "Il s'agit de définir une méthode d'analyse historique qui soit affranchie du thème anthropologique."
[38] Cf. Foucault (1969: 38–39): "[…] une description des événements discursifs comme horizon pour la recherche des unités qui s'y forment."
[39] Cf. Foucault (1969: 250): "Par *épistémè*, on entend, en fait, l'ensemble des relations pouvant unir, à une époque donnée, les pratiques discursives qui donnent lieu à des figures épistémologiques, à des sciences, éventuellement à des systèmes formalisés."

looms large behind this philosophy. If neither the origin nor the referent count, only authority remains as the ultimate source of legitimation. This is precisely the *politicum* of the epistemological crisis of the subject and the object. Foucault's reflection on disciplinary discourses and on discursive procedures of control and exclusion—for example as summarized in *L'ordre du discours* [The Order of Discourse]—is perfectly coherent with the premises of his archaeology of knowledge.[40]

The cognitive theorist Jean Piaget was quick to detect the epistemological risks already implied by Foucault's early outline of his idea of archeology in *Les mots et les choses: Une archéologie des sciences humaines* [usually translated as *The Order of Things: An Archaeology of the Human Sciences*] (1966). As early as 1968 Piaget accused him of receiving the negative aspects of "static structuralism" without the rigor of structuralist analysis. He saw Foucault's concept of episteme as extremely vague, and his attacks against the subject and genesis as misled.[41] Piaget's own integration of structuralism was meant to introduce: first, a specific analysis of the individual "equilibration" between linguistic signs and their experiential referents, and second, a study of the "developmental laws" of the cognitive-linguistic system. In this manner he proposed a polar alternative to the Foucaultian project, in which subject, the genesis of epistemic structures and their development were all taken into due account. In Piaget's conception of structuralism as the study of dynamic and self-regulatory totalities, the referent is crucial for the "synchronic" understanding of the interplay between signs and meanings whereas history proves essential for the "diachronic" assessment (Piaget 1970: 63–68).

Piaget's early criticism anticipates a political-epistemological criticism of the two major shortcomings of Foucauldian discourse analysis—one is ethical, the other is overtly political and both are epistemological at their core. The first is the ethical relevance of memory. Its preservation, especially the memory of suffering and atrocity, is an ethical imperative notwithstanding all possible factors threatening to remove or rationalize an inconvenient and terrible past. Hannah Arendt stressed the political relevance of *historical*

[40] The programmatic work is Foucault's lecture delivered to the Collège de France in 1970. See Foucault (1971).
[41] Piaget (1970: 114–115): "Il n'est donc pas exagéré de qualifier le structuralisme de Foucault de structuralisme sans structures. Il retient du structuralisme statique tous ses aspects négatifs : la dévalorisation de l'histoire et de la genèse, le mépris des fonctions et, à un degré inégalé jusqu'ici, la négation du sujet lui-même puisque l'homme va bientôt disparaître. Quant aux aspects positifs, ses structures ne sont que des schémas figuratifs et non pas des systèmes de transformations se conservant nécessairement par leur autoréglage. Le seul point fixe, dans ces irrationalisme final de Foucault, est le recours au langage, conçu comme dominant l'homme parce qu'extérieur aux individus : mais même 'l'être du langage' demeure volontairement pour lui une sorte de mystère dont il se plaît seulement à souligner l'"l'insistance énigmatique'."

truths, those truths that cannot be changed at will and are *witnessed* by records, documents and monuments (just the opposite of Foucault's idea of archaeology) (Arendt 1967: 303).[42]

Carlo Ginzburg, the historian of institutionalized mechanisms of control and persecutions in early modernity, faced the ethical shortcoming of post-modern narrativisation. He brought them back to skeptical relativism and cautioned against "the skeptical theses based on the reduction of historiography to its narrative or rhetorical dimension," as the problem of relativism is "at once cognitive, political, and moral" (Ginzburg 1999: I and 20). In *History, Rhetoric, and Proof* (1999) he insisted that while interpretations might diverge a principle of reality will always limit the horizon of possible legitimate interpretations:

> [Historical] sources are neither open windows, as the positivists believe, nor fences obstructing vision, as the skeptics hold: if anything, we could compare them to distorting mirrors. The analysis of the specific distortion of construction, as I attempt to demonstrate [...], is not incompatible with the refutations inflicted by the principle of reality. Knowledge (even historical knowledge) is possible. (Ginzburg 1999: 25)

In other words, awareness of the difficulties of history writing should not lead one to renounce a quasi-Freudian 'principle of reality' guiding the investigation, nor imply historical skepticism. One can add, as a corollary, that *historical epistemology*, while pointing to the historicity of scientific concepts, explanations and practices, does not necessarily imply that *anything goes*.

As to the political limit of a discourse-immanent episteme, the absence of any discourse-external criteria to assess whether a "truth regime" is better or worse renders power the ultimate goal of politics, a τέλος in itself. Even resistance to power, which is often seen as Foucault's most relevant political instance, loses meaning as there is no yardstick to assess the relative value of incommensurable power systems (Schulzke 2015: 60). Hence, the political relevance of the possibility of empirical validation imposes itself upon our attention. Materialism appears as the democratic opposite of authoritarianism as it can undo the 'truth' imposed by authority in science or that imposed by those in power in the name of a politics from below. As Ernst Bloch suggested, materiality and socialism belong so tightly together that one could even emphasize the political significance of ancient materialist views, for

[42] Actually, Arendt speaks of *factual truths* but she refers to historical events rather than to scientific facts which are a highly controversial category in the philosophy of science – a field she does not enter in her paper on the conflict of truth and political propaganda. In Chap. 5, I expand on this issue with reference to Primo Levi and his late work, *I sommersi e i salvati* (1986).

instance by referring to the line of Islamicate Scholasticism that posited the autonomy of matter as *aristotelische Linke* (Bloch 1963).

Of course, recognition of the political meaning of materiality does not automatically rehabilitate matter in ontology and validation in epistemology. However, it enables the deconstruction of the post-modern discourse about power as it shows that the ban of materiality itself has political significance. The question about the possible integration of matter and society in historical epistemology has to be reassessed.

The pioneer of historical epistemology Fleck is an important reference in view of a knowledge theory that into account the cultural dimension of science without denying its connection with reality. In fact, his socio-cultural understanding of science, as presented in his epistemological masterwork, *Entstehung und Entwicklung einer wissenschaftlichen Tatsache* (*Genesis and Development of a Scientific Fact*) (1935), stressed the relevance of the cultural genesis and the process of knowledge formation but did not loose from sight the question of the referent—say, of the *object*.

In his work he attacked the trust that logical empiricism had in the objective solidity of facts and the logic rationality deployed to ascertain scientific truths. The diaspora of the Vienna Circle and the tragedy of WWII, his deportation in the concentration lagers and the setting of the culture and circles of *Mitteleuropa* caused a temporary oblivion of his work, which belonged to that cultural world. Fleck reflected on the mediated character of scientific facts before and better than Kuhn. He did not avoid the issue of the relation between the cognizing subject and the object to be known. According to him, that epistemological relation needs to be understood as an interaction which is always mediated by a collective body of knowledge. In order to express such mediation he coined the term of *Denkstil*, or style of thought.

Denkstil is referred to shared mentalities. It is an element that is at once social-psychological, cultural and rhetorical. It helped Fleck to bring the historicity of knowledge to the forefront against the logical abstractions of the neo-positivists. He comprehended the social mechanisms that are at the origin of the style of the scientists' thought collective and secure its endurance through daring (for his time) parallels drawn from francophone ethnology. In particular he introduced the idea of *Denkstil* with reference to social and ethnological studies on the *mentalité* such as those by Émile Durkheim and Lucien Lévy-Bruhl author of *Les fonctions mentales dans les sociétés inférieures* (*The Mental Functions in Inferior*

Societies) (1910) and *La mentalité primitive* (Primitive Mentalities) (1922) (Fleck 1979: 46-51).

Besides the ethnological comprehension of the scientific tribe, it is important here to stress that the "active" cultural mediation between subject and object does not capture the entirety of the scientific enterprise. The "active" elements of culture are always counterbalanced by "passive" elements. These are material constraints. Scientific advance is not arbitrary. Rather, it is guided by a simple principle: "maximum thought constraint with minimum thought caprice" (Fleck 1979, 95).[43] This motto synthesizes both epistemological instances, the subjective and the objective once, dealt with in their reciprocal interpenetration. The scientific fact is generated within an epistemological triangulation in which the individual psyche interacts with the collective and the real. Fleck regards the three vertices of this dynamic triangle as the moments of 1. the resistance that reality opposes (*Widerstandsaviso* or "signal of resistence") to the broad and initially chaotic exploration of a field, 2. the cultural constraints that depend on well-established collective styles of thought (*Denkzwang* or "thought constraint") and 3. unreflected gestaltic perception (*unmittelbar wahrzunehmende Gestalt*, i.e., "a form to be directly perceived"), which is referred to the cognitive moment in the constitution of a scientific fact (Fleck 2012: 124 and 1979: 95).

It is not necessary to expand on the details of Fleck's thought to appreciate the relevance of his proposal of a culturalist historical epistemology that does not run the risk of post-truth relativism (Zittel 2010). Within a program of political epistemology, his theory of though collectives should be reread against the background of the theory of hegemony and that of thought style should be inserted into a reflection on ideology. Facing the rise of Fascisms and new forms of politically-driven cynical relativism, Fleck himself called for a sort of non-relativistic ideology-critique: "That is why the study of the dependence of science on environment and epoch is particularly important today" (Löwy 1990: 251 from Fleck 1939: 151). The synthesis here proposed cannot be considered a mere problem of historical-philosophical exegesis. Rather, it is a theoretical task directed towards the achievement of a historical-epistemological reappraisal of culturalist epistemology without embracing radical constructivism nor post-modern narrativism.[44]

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[43] Cf. Fleck (2012: 124): "größer Denkzwang bei kleinster Denkwillkürlichkeit."

[44] Fleck's concepts are particularly apt to be appropriated by political epistemology, more than more recent studies of forms of "scientific reasoning" that looked at it with a methodological eye than a historical-cultural one. Ian Hacking for one recognizes Fleck's legacy of his own terminological choices but feels closer to the project of Alistair Cameron Crombie's *Styles of Scientific Thinking in the European Tradition* (1994) (Hacking 1992, which discusses the Crombie's book before its publication). Hacking's styles of scientific reasoning are

Having expanded upon the political relevance of the referent, it is now beholden upon me to deal with what is excluded from the anti-humanistic discursive immanence, namely the political relevance of subjectivity.

1.3

> Se il politico è uno storico (non solo nel senso che fa la storia, ma nel senso che operando nel presente interpreta il passato), lo storico è un politico e in questo senso... la storia è sempre storia contemporanea, cioè politica. (Antonio Gramsci)

In this quote Gramsci pointed out the essentially political character of writing history (Gramsci 2007: Notebook 10, 1242).[45] The historian is always part of a collectivity and her/his intellectual activity is located in the agonistic field of struggles over political and cultural hegemony.

Gramsci's emphasis on culture, in particular on the political dimension of historiography, constituted a deepening and an extension of pre-existing Marxist debates, most significantly epistemological ones. Karl Marx's criticism of bourgeois economic theories was a model of how one should reflect on the interests covered by scientific discourses in spite of their pretended universalism.[46] *Das Kapital* demonstrated that *another science is possible – even necessary*. Friedrich Engels's writings on natural science and, in particular, his *Herrn Eugen Dührings Umwälzung der Wissenschaft*, the so-called *Anti-Dühring* (1877/1878), and *Dialektik der Natur* [*Dialectic of Nature*] (1873–1882) expanded on political epistemology at large. In the "old introduction" to *Anti-Dühring*, Engels criticized the ideological hypostatization of present-day science while emphasizing the historicity of all knowledge:

> In every epoch, and therefore also in ours, theoretical thought is a historical product, which at different times assumes very different forms and, therewith, very different contents. *The science of thought is therefore, like every other, a historical science*, the science of the historical development of human thought. […] In the first place, the theory of the laws of thought is by no

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located at a level of universality that obliterates their genesis. Accordingly, he is biased towards a "history of the present" and not a historical epistemology which would a "history of the future" in the optic of collective praxis.

[45] "The politician is a historian not only in the sense that he makes history but also that he interprets the past by acting in the present; the historian is a politician and, in this sense […], history is always contemporary history, that is, politics." (my translation).

[46] The question is still intriguing epistemologists. See for instance the leading question of Bourdieu (2004, 1) which constitutes the symmetric reversal of the question here posed: "Hos is it possible for a historical activity, such as scientific activity, to produce trans-historical truths, independent of history, detached from all bonds with both place and time and therefore eternally and universally valid?"

> means an "eternal truth" established once and for all [...].[47] (Engels 1987b: 338–339 [emphasis added])

Engels considered historical consciousness as the catalyst for the passage *from metaphysics to dialectics*, that is, from a static ontology to a dynamic comprehension of reality. Thus, he allotted epistemological import to history, since a reflection on science should take into account its development and, *vice versa,* scientific advance reveals science's historical rootedness. Moreover, Engels stressed the ideological connection between the metaphysical premises of classical science and political conservatism. For him, emancipation is not just a matter for theory and criticism is a practical instrument of emancipation. Therefore, he saw his denunciation of the ideological limits of the *old*, *static*, *metaphysical* science as a contribution both to the political struggle of the working class and to the advancement of science.

> Copernicus at the beginning of the period [of the Scientific Revolution] shows theology the door; Newton closes the period with the postulate of a divine first impulse. The highest general idea to which this natural science attained was that of the purposiveness of the arrangements of nature, the shallow theology of [Christian] Wolff, according to which cats are created to eat mice, mice to be eaten by cats, and the whole of nature to testify to the wisdom of the creator.[48] (Engels 1987a: 322–323)

These words, from the introduction to *Dialektik der Natur*, are directed against the class-determined content of pre-Laplacean and pre-Darwinian (and pre-Marxist) science. Age-old ideas of nature's harmony and of its eternal, divine order match the conservative view that mice exist to be eaten by cats – just as slaves are created to serve their lords and the wage-earners are meant to be exploited by the owners of the means of production.

Engels did not delve into the political dimension of historiography in spite of his engagement with political epistemology. Nevertheless, he offered wonderful examples of militant historiography; his most relevant contribution is probably the work on the *Bauernkrieg,* which created a sort of Sorelian myth of the German revolutionary tradition continued by the proletariat of his day.

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[47] Cf. Engels (1988), 121: "Das theoretische Denken einer jeden Epoche, also auch das der unsrigen, ist ein historisches Produkt, das zu verschiednen Zeiten sehr verschiedne Form und damit sehr verschiednen Inhalt annimmt. Die Wissenschaft vom Denken ist also, wie jede andre, eine historische Wissenschaft, die Wissenschaft von der geschichtlichen Entwicklung des menschlichen Denkens. [...] Denn erstens ist die Theorie der Denkgesetze keineswegs eine ein für alle mal ausgemachte 'ewige Wahrheit'."

[48] Cf. Engels (1985), 303–304: "Kopernikus, im Anfang der Periode, schreibt der Theologie den Absagebrief; Newton schließt sie mit dem Postulat des göttlichen ersten Anstoßes. Der höchste allgemeine Gedanke zu dem diese Naturwissenschaft sich aufschwang, war der der Zweckmäßigkeit der Natureinrichtungen, die flache Wolfsche Teleologie, wonach die Katzen geschaffen wurden um die Mäuse zu fressen, die Mäuse, um von den Katzen gefressen zu werden, und die ganze Natur um die Weisheit des Schöpfers darzuthun."

The lack of an articulated reflection on what I would call 'political historiography' by the founding fathers of Marxist philosophy was a lacuna that caught the attention of later generations. The extension of the criticism of epistemological ideology to that of historiography occurred in the Marxist camp in the 1930s. More precisely, the watershed for the history of science was the year 1931, when a group of Soviet delegates led by the Bolshevik leader Nikolai Bukharin articulated a Marxist approach to the history of science at the International Congress of the History of Science and Technology held in London. They promoted a socio-economic causal explanation of scientific advance which shifted the focus from theory and individual genius to society and its functions. The step toward this new paradigm for the history of science was a cultural and political move. Bukharin saw it as a communist contribution to an ongoing "struggle of ideologies" that reflected the geopolitical polarized context in which, in his own words, "the whole of humanity [...] has fallen apart into two [...] cultural-historic systems" (Bukharin 1931: 32). The militant intention of the Soviet delegates in London is also shown by the fervent rapidity with which they published their essays in that manifesto of Marxist historiography of science entitled *Science at the Cross Roads*.[49]

Bukharin did not view history and epistemology as disconnected; quite the contrary. According to him, a correct approach to past natural knowledge very much depends on a correct analysis of the social *function* of scientific activity. In modern societies, the social embedment of such activity tends to escape the consciousness of scientists themselves, due to the division of labor which makes production more effective and the comprehension of the complex functioning of society more difficult. As the philosopher of science Michael Polanyi recounted: "At Easter 1935 I visited N.I. Bukharin in Moscow. Though he was heading for his fall and execution three years later, he was still a leading theoretician of the communist party. He explained to me that the distinction between pure and applied science, made in capitalist countries, was due to the inner conflict of this type of society which deprived scientists of the consciousness of their social functions, thus creating in them the illusion of pure science" (Polanyi 1946: 8). However, in spite of this sensitivity to the connection between historiography and epistemology and in spite of the insertion of both in the political arena of cultural conflicts, Bukharin did not develop a theory of politically led historiography—it was Gramsci who provided that specific contribution with the theory of hegemony.

[49] See infra Chap. 3.

Hegemony, understood as intellectual, cultural and moral leadership in politics, has been variously received in intellectual history and cultural studies. The perceived strengths of Gramsci's humanistic *philosophy of praxis*—as he called his approach in line with Antonio Labriola—is to break down the rigid separation of economy and culture and the unilateral dependency of the latter on the former, as well as the dependence of politics on social structures, a fact often assumed by Marxist intellectuals (Williams 1973). Moreover, as has been remarked, "it was Gramsci who made the real breakthrough, by [...] transforming the idea of hegemony from a merely political to a moral and intellectual form of leadership, and understanding that the subject of a hegemony could not be any socio-economically pre-constituted class, but had to be a politically constructed collective will" (Anderson 2016: 79).

Gramsci's special conception of culture as a moment of politics explains his thoughtful notes on the intellectual challenges of history-writing, in particular the necessary connection of such an activity with philosophical outlooks, values and political motivations. Actually, his views on historiography and philosophy recast Benedetto Croce's thesis according to which "history is always contemporary history." Neo-idealist liberal philosopher Croce defended this thesis in *Teoria e storia della storiografia* [Theory and History of Historiography] (1917, first published in German as *Zur Theorie und Geschichte der Historiographie* in 1915). He saw historiography as a living intellectual activity, which revitalizes the past according to the historian's perspective, values and commitment. Moreover, he sharply distinguished historiography from mere chronicles registering facts and from "philology," which specifically deals with the documents and the restoration of past narrations. This distinction was functional to his attack against the positivist illusion that history could be inductively derived from a mere collection of facts, revealed by documents and past historical accounts with crystalline evidence:

> [...] to history pertains not to *judge*, but to *explain*, and that it should be not *subjective* but *objective*. [...] In consequence of this misunderstanding we hear historians being advised to purge themselves of theories, to refrain from the disputes arising from them, to restrict themselves to facts, collecting, arranging, and squeezing out the sap (even by statistical methods). It is impossible to follow such advice as this, [...], for such "abstention from thought" reveals itself as really abstention from "seriousness of thought", as a surreptitious attaching of value to the most vulgar and contradictory thoughts, transmitted by tradition, wandering about idly in the mind, or flashing out as the result of momentary caprice. The maxim is altogether false, understood or misunderstood in this way, and it must be taken by its opposite—namely, that history must always judge strictly, and that it must always be energetically subjective [...].[50] (Croce 1921: 86 [emphasis in the original])

[50] Cf. Croce (2001: 94–95): "[...] che alla storia spetti non giudicare ma spiegare, e che essa debba essere non soggettiva ma oggettiva [....]. In conseguenza di questo fraintendimento si ode raccomandare agli storici di purgarsi delle teorie, mettere a tacere le dispute in proposito e attenersi ai fatti, raccogliendoli e ordinandoli e

Gramsci agreed on this perspective but considered the subjectivity of a public intellectual such as a historian to be essentially political. Hence, he not only appropriated the aforesaid thesis that "history is always contemporary history" but added to it the clause: "that is, politics" (Gramsci 2007: Notebook 10, 1241–1242). It is not only individual biases that shape the historian's *spiritual* adherence to certain positions; rather, it is his or her social, cultural and historical belonging to a collectivity that marks his or her work. Similarly, the main idea of Croce's *Logica* (Croce 1909) that philosophy and history are inherently connected as the two poles of the same intellectual endeavor led Gramsci to an interconnected treatment of history, philosophy and politics (Gramsci 2007: Notebook 10, 1255).

The reason for viewing historiography and philosophy as united endeavors rests on the observation that the outlook of history implies a vision of reality. As Giambattista Vico distinctly perceived, historicity corresponds to a form of knowledge that is irreconcilable with a static metaphysics. In the *Scienza nuova* [The New Science] he attacked the abstract mechanism of his day as well as post-Cartesian and jusnaturalist conceptions of society as based on static views of reality opposed to his own developmental understanding of the facts of culture. As historicity is the realm of human activity it is also the perspective from which an adequate world vision is possible. As one reads in his historical-philosophical *Elements* the nature, or essence, of every being coincides in its origin and an appropriate understanding of a subject considers with its transformations starting from its birth.[51]

Today, the hypostatized competitor to history-writing is neither Cartesian mechanism nor Comtian scientism. As has been observed in recent writings in medical historiography, the anti-humanist dangers of the present juncture in time are linked to the rise of neurological scientism and its penetration into historiography at the expense of the discipline itself. This novel trend is mystifying insofar as it spreads the "belief that the new knowledge provides an innovative tool for digging deeper into the understanding of ourselves and our past" (Cooter 2013: 8). Consequently, one among the natural sciences is converted from the object of critical

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spremendone il succo (magari, col metodo statistico). Raccomandazioni che poi [...] non si è in grado di seguire; onde quel 'preservarsi dal pensiero' si concreta effettivamente in un preservamento dalla 'serietà del pensiero', in un far valere surrettiziamente tutti i più volgari e contraddittorii pensieri trasmessi dalla tradizione, vaganti nelle menti per ozio o balzanti da momentanei capricci. Intesa o fraintesa a quel modo, la massima è affatto falsa, e bisognerebbe sostituire l'opposta: che la storia deve sempre e rigorosamente giudicare, e deve essere sempre energicamente soggettiva […]."

[51] Vico (1984: 64, translation revised): "XIV. The nature of things is nothing but their coming into being (*nascimento*) at certain times and in certain guises. […] XV. The inseparable properties of things must be due to the modification or guise with which they are born […]"

assessment into a presupposition for philosophical and historical inquiry. In this manner, the history of science becomes the harmless corollary of a neuroscience that is lifted to the status of a *fundamental knowledge theory*. The history of science and medicine does not unfold its potentiality as a critical tool directed against epistemological naturalization, objectivation, and the fetishism of facts and of present-day explanations. As the historian of medicine Roger Cooter recently admonished, the *fatal* neuro-shift substitutes critical thought for a celebration of the present (political and cultural). According to him, the alliance between cognitive neurosciences and historiography involves the surrender of the latter discipline. Satisfaction with what is given takes the place of reflection and critique. Against *subaltern* interdisciplinarity—which subordinates history to neuroscience—he has reiterated the political relevance of *disciplinary* historicity. History-writing as a critical practice constitutes the way out from 'the new poverty of theory' (Cooter 2014).[52]

Confronted with neo-positivist and biologist tendencies, a historical comprehension of science is itself the *mise en cause* of hypostatized science. That is why the history of science cannot be neutral in an age in which science is not only functional to the reproduction of global capitalism (technology and consumption) but also to secure the survival of our global society and to determine the limits of its economic growth (Renn 2015). What is the usefulness of the history of science in such a society? Does it have the parasitic function of celebrating the techno-scientific triumphs and pointing out their ancient lineage? Or does it rather provide us with critical instruments necessary for orientation in contemporary culture, and disentangle political agendas that often transcend democratic debates in the name of expertise (Nieto-Galan 2016)?[53]

Historiographical criticism is a necessary component of political epistemology. This concerns, first, critical review of debates on the history of science and the evaluation of the implicit agendas to which historians adhere and, secondly, the meta-meta-exploration of the cultural and political drives behind clashing approaches to history. Politically speaking, history reactivates the past to open up the future. An ahistorical science is subservient to a conservative vision of reality and society. By contrast, historiography emerges as a form of intellectual engagement—culturally, it is the vehicle of the consciousness of time and change and, politically, the discipline that most radically opposes the hypostatization of the present. György Lukács addressed this political and epistemological dichotomy between historicity, as

[52] I comment on this in Omodeo (2015).
[53] See infra Chap. 5.3.

the perspective of the forces of change, and scientism, as an essentially reactionary expression, in *Geschichte und Klassenbewußtsein* [History and Class Consciousness] (1923):

> [...] the unexplained and inexplicable facticity of bourgeois existence as it is here and now acquires the patina of an eternal law of nature or a cultural value enduring for all time. [...] We see the unhistorical and antihistorical character of bourgeois thought most strikingly when we consider *the problem of the present as a historical problem*.[54] (Lukács 1971: 157 [emphasis in the original])

Thus, how does political epistemology look from the viewpoint of the present as a historical problem? To what extent can political epistemology *be* political? In order to offer a preliminary answer to these questions I will conclude this section with a discussion of the main categories of political epistemology.

4.

Terminological clarification is an exercise of self-reflection aimed at historical appropriation and re-direction. Our categories have geneses and vector tendencies. The concepts deployed in political epistemology are not neutral. What would a discourse on the πόλις and on ἐπιστήμε, and the entanglement of these two concepts, look like? How should we deal with the burden of history? Or with the ethnocentrism of implicit Hellenophilia? Let me follow the suggestion of the cultural anthropologist Ernesto De Martino of not ignoring our historical and cultural positioning but rather making the ethnocentric legacies explicit as a way of opening them up to critical 'commensurability.'

> An absolutely non-ethnocentric perspective is theoretically absurd and practically impossible, as it would mean stepping out of history in order to contemplate all of the cultures, including the western one. Thus, the only possibility I see is to employ western categories of interpretation in a non-dogmatic manner. This is a critical use, that is, it is controlled by the explicit awareness of the western historical genesis of those categories and the need to enlarge and recast their meaning through their comparison with other historical-cultural worlds.[55]

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[54] Cf. Lukács (1968: 340): "[...] die unerklärte und unerklärbare Faktizität des Daseins uns Soseins der bürgerlichen Gesellschaft erhält den Charakter eines ewigen Naturgesetzes oder eines zeitlos geltenden Kulturwertes. [...] Am krassesten tritt uns dieses ungeschichtliche, antigeschichtliche Wesen des bürgerlichen Denkens entgegen, wenn wir *das Problem der Gegenwart als geschichtliches Problem* betrachten."

[55] My translation. From De Martino (1977: 394–395): "Una prospettiva assolutamente non etnocentrica è un assurdo teorico e una impossibilità pratica, poiché equivarrebbe ad uscire dalla storia per contemplare tutte le culture, compresa la occidentale. L'unica possibilità è quindi l'impiego non dogmatico di categorie interpretative occidentali, il che significa un impiego critico, cioè controllato dalla consapevolezza esplicita della genesi storica occidentale di quelle categorie e dalla esigenza di allargarne e riplasmarne il significato mediante il confronto con altri mondi storico-culturali. Tale confronto si fonda sull'assunzione che le categorie interpretative dell'occidente e quelle degli altri *etne* non occidentali non siano 'incommensurabili' (in questo caso si

A recognition of the Eurocentric burden of political epistemology begins of necessity with standard classical references—first, to Plato, for his defense of the centrality of knowledge for the regulation of a well-functioning political body in his technocratic and hierarchical vision of the city-state. Modern utopias variously followed his Πολιτεία from Tommaso Campanella's *Città del sole* [*The City of the Sun*] to Thomas More's *Utopia* and Francis Bacon's vision of a scientific and technological *New Atlantis*. Rationalist concepts of knowledge changed, but not the intellectual support of the ideal of an enlightened leadership, although dystopias and skeptical attitudes toward philosophical dreams shadowed eu-topias. The tension between democracy and expertise, between collective decision-making and skillful administration animated ancient as well as modern debates on science and its public role. The anti-democratic bias of Plato's emphasis on truth-oriented government reemerges in a modern longing for technocracy, a political program led by scientists (the ideological meaning of which Habermas already pointed out). Yet, for the genesis of the categories of political epistemology Aristotle's Πολιτικά is perhaps even more relevant than Plato's Πολιτεία.[56] His empirical and systematic treatment of politics has been celebrated, as emphatically as anachronistically, as the passage from *political philosophy* to *political science*.

Aristotle (*Politics* I 1, 1252b 27–30) defines the πόλις as the perfect human community. It secures the maintenance and reproduction of human life (τὸ ζῆν) and sets its aims beyond mere existence: it aims at *good* life (τὸ εὖ ζῆν) as its ultimate goal (Aristotle 1990: 9). The πόλις is a distinctively self-sufficient entity, whose αὐταρχεία is akin to that of a living organism. Aristotle compares the body political to the body of a man, a horse, a house. The house is the location of the city-state's cellule, the family or οἶκος. Its patriarchal chief rules over his wife and children like a king and over his slaves like a δεσπότης. Aristotle's family is an economic unity, both in the pre-modern and modern sense. He calls the regulation of its metabolism οἰκονομία and distinguishes it from politics. Actually, the study of economy is the presupposition of a correct comprehension of politics, as it deals with the constitutive elements of the political community (*Politics* I 1, 1253b 1–4): "Seeing then that the state [πόλις] is made up of households [ἐξ οἰκιῶν], before speaking of the state we must speak of the management of the household [περὶ οἰκονομίας]. The parts of household management correspond to the persons who compose the household, and a complete household consists of

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decreterebbe la impossibilità di ogni discorso etnologico), ma che una comune umanità abbraccia le prime e le seconde, consentendo il passaggio dalle prime alle seconde."

[56] For a comparison see Ball (1972).

slaves and freemen." (Aristotle 1995, 1988)[57] The delineation of the interrelation of the political in relation to the economic is one of the most strikingly modern topics dealt with in the first book of the *Politics*.[58] While familiar authority is imposed on subjugated human beings (slavery is pivotal in Aristotle's conception and receives extensive legitimation), political authority is exercised among peers, the free male citizens of the city-state.

Chrematistic, which is the art of acquiring wealth, is relevant to both economy and politics but neither of these realms can be reduced to it. Aristotle asserts that the indefinite accumulation of richness, if set as the goal of economy, diverts family and state from their proper aim, namely the realization of a good life. In the name of enrichment, the benefit of a wise administration of goods is sacrificed for the accumulation of wealth as a goal in itself (*Politics* I 9, 1257b 38–1258a 1)—a sort of Weberian Capitalist spirit *ante litteram* (Aristotle 1990: 47).

Moreover, Aristotle's justification of political order *in accordance with nature* (διὰ φύσιν) lifts the philosopher, as the depositary of natural truth, to the role of the ideological guarantor of order. Aristotle distinguishes two separated spheres, the political and the theoretical: in *Nicomachean Ethics* I 5 he posits two corresponding *superior* ways of life, one devoted to politics and the other to θεωρεῖν, or contemplation. Theory coincides with the activity of the speculative philosopher, politics subsumes all practical sciences and guides them to the aim of collective good. As Aristotle states (*Nicomachean Ethics* I 2, 6–7):

> [The science of politics] ordains which of the sciences are to exist in the states [ἐν ταῖς πόλεσι], and what branches of knowledge the different classes of the citizens are to learn, and up to what point; and we observe that even the most highly esteemed of the faculties, such as strategy, domestic economy [οἰκονομίκὴν], oratory, are subordinated to the political science [ἡ πολιτική]. Inasmuch then as the rest of the [practical] sciences are employed by this one [...] the end of this science must include the ends of all the others. (Aristotle 1994: 5–7)

In contrast to the practical sciences, theory is independent of politics. In fact, according to Aristotle, theoretical life is autonomous relative to politics and the correspondent life of *praxis*. The division of the *ideological* function from the *political-practical* in society accompanied the developments of the western civilization as a *fil rouge*. The Latin medieval distinction between the *vita activa* and *vita contemplativa* was a Christian revision and

[57] Cf. Aristotle (1990: 12): "ἀναγκαῖον πρῶτον περὶ οἰκονομίας εἰπειν· πᾶσα γὰρ σύγκειται πόλις ἐξ οἰκιῶν. οἰκονομίας δὲ μέρη ἐξ ὧν πάλιν οἰκία συνέστηκεν· οἰκία δὲ τέλειος ἐκ δούλων καὶ ἐλευθέρων"

[58] On the Byzantine Christianized transformation of the concept of *oikonomia* paving the way for a modern distinction between the strict laws of the state and the pragmatic rules regulating the society at large, cf. Dagron (1990).

continuation of the Hellenistic social-existential split which, arguably, opened up a conceptual space for the modern ideals of the autonomy of science (Arendt 1998).

Significantly, Aristotle's distinction between the public realm of politics and the semi-private realm of economy constituted the basis for modern inquiries of bases and superstructures, society and culture. It looms large over Marx' most influential assessment of the dependency of the political from the economical, *Zur Kritik der politischen Ökonomie* [*A Contribution to the Critique of Political Economy*] (1859), a standard point of reference not only for social theory but also for Marxist epistemology going in various directions, from economic determinism to the philosophy of praxis:

> [...] the anatomy of [...] civil society [...], has to be sought in political economy. […] The general conclusion at which I arrived and which, once reached, became the guiding principle of my studies can be summarized as follows. In the social production of their existence, men inevitably enter into definite relations, which are independent of their will, namely relations of production appropriate to a given stage in the development of their material forces of production. The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness.[59] (Marx 1987: 262–263)

The Soviet historian Boris Hessen began his classic of Marxist history of science, *The Social and Economic Roots of Newton's* Principia [*Newton's Mechanics*, in the Russian version], with a reference to the aforementioned passage: "The mode of production of material life conditions the social, political and intellectual life process of society" (Hessen 2009: 42).[60] Accordingly, he treated science as the intellectual *superstructure* based on specific conditions of production, the exploration of which is the specific task of the historian. The nature of the economic conditioning of the social, political and intellectual realms became the crux of Marxist exegesis. It triggered heated controversies over the mediation and interrelation between them. Is consciousness the last link in a chain of dependencies connecting economy to politics and politics to individual cognition? Is it perhaps the opposite, as Max Weber

[59] Cf. Marx (1980: p.?): "[...] daß die Anatomie der bürgerlichen Gesellschaft in der politischen Oekonomie zu suchen sei. […] Das allgemeine Resultat, das sich mir ergab, und einmal gewonnen, meinen Studien zum leitfaden diente, kann kurz so fomulirt werden: In der gesellschaftlichen Produktion ihres Lebens gehen die Menschen bestimmte, nothwendige, von ihrem Willen unabhängige Verhältnisse ein, Produktionsverhältnisse, die einer bestimmten Entwicklungsstufe ihrer materiellen Produktion entsprechen. Die Gesammtheit dieser Produktionsverhältnisse bildet die ökonomische Struktur der Gesellschaft, die reale Basis, worauf sich ein juristischer und politischer Ueberbau erhebt, und welcher bestimmte gesellschaftliche Bewußtseinsformen entsprechen. Die Produktionsweise des materiellen Lebens bedingt den socialen, politischen und geistigen Lebensprocess überhaupt. Es ist nicht das Bewußtsein der Menschen, das ihr Sein, sondern umgekehrt ihr gesellschaftliches Sein, das ihr Bewußtsein bestimmt."

[60] For the broad context of this work, see Winkler (2013).

claimed by setting religious ethics at the center of his investigation of Capitalism (Weber 2008)? Or, finally, is the interplay between the various realms a sort of dialectical loop? While economic historians of science à la Hessen sought for the socio-economic roots of science and strived toward a causal explanation of the scientific epiphenomenon, Weberians such as Robert K. Merton argued for the centrality of religion in the making of modern scientific culture (Merton 1938). Gramscians instead selected the organic metaphor of economy as the skeleton of a living organism from the quoted introduction to the critique of political economy. According to them, the different organs accomplish different tasks without unidirectional dependencies (Gramsci 2007: Notebook X, 41). The latter view engendered a humanistic line of historical inquiry of science, gravitating around concepts such as *cultura scientifica* and *cultura filosofica* (Garin: 1994). Finally, the social rootedness of cognition has been dealt with in terms of *mental models* and *shared knowledge* by Berlin colleagues (Damerow 2007; Renn and Damerow 2007). Matthias Schemmel has recently described the "dialectical" process underlying the constitution of space epistemology as follows: "Experiential knowledge participates in the construction of cognitive structures, which in turn constitute the basis for further experience" (Schemmel 2016: 2). Such structures are not individual but largely socialized and historical. The Marxist triad of economy, politics and cognition, with its Hegelian roots, defines a relational space of historical inquiry that still awaits further investigation in historical epistemology or—if the accent is set on the second term of the triad – *political* epistemology.[61]

Thus far I have discussed the historical burden of the discourse centered on the πόλις in political theory. It is now time to turn to ἐπιστήμε which certainly constitutes the crucial problem of modern philosophy—if not of philosophy *tout court*. After Descartes introduced the separation of subject and object in terms of a fundamental dichotomy (Descartes 1983), the problem of the interrelation between the two poles of knowledge appeared to his followers as one of the most urgent problems in philosophy. It especially led to attempts to establish a scientific *method* securing the correspondence between theory and nature. As a matter of fact, Descartes' famous *Discours de la méthode* [*Discurse on the Method*] (1637) served as an introduction to tracts on optics, geometry and meteorology (Descartes 1982). The development of modern science as an empirical and theoretical endeavor suggests examining the relation between experience and theory as a recursive process, both from the viewpoint of history and that of cognition.

[61] Cf. infra Chap. 4.

However, this is not the place to reconstruct the vicissitudes of epistemology in modern science and philosophy; for the time being I will limit myself to remarking that the process of knowledge can be expediently expressed with the formula "knowledge is encoded experience." This captures the developmental logic of knowledge as well as its recursive character (the dynamism of reciprocal backlashes of theory and experience) (Renn, in press). However, we could also refer to science as "alienated experience" in order to stress the many ways in which epistemological layers and levels of abstraction reproduce, reinforce and enforce social hierarchies and power relations.[62]

Experience, together with theory, constitutes one pillar of modern epistemologies. In the perspective of political epistemology, experience, at once individual and collective, should be understood as action rather than contemplation. As Marx put it in his criticism of static contemplative materialism, in the first thesis on Feuerbach,

> The chief defect of all previous materialism [...] is that things [...], reality, sensuousness are conceived only in the form of the *object*, *or of contemplation*, but not as human *sensuous activity*, *practice*, not subjectively.[63] (Marx 1976: 3 [emphasis in the original])

Action should be seen in its twofold dimensions of *production* and *political praxis* according to the ancient distinction between ποίησις—linked to the concept of τέχνη and aimed at the production—and πρᾶξις, which is eminently political. The epistemological significance of the former has been acknowledged in the history of science beginning with Leonardo Olschki's studies on science in late-medieval corporate settings up to the most recent studies on the *structures of practical knowledge* (Olschki 1919–1927; Valleriani 2017).[64] As for political action and its connection with science, which is certainly less direct than the connection between science and technology, this theme still awaits a satisfactory treatment.

Finally, in this conceptual recognition of political epistemology, I ought to reintroduce *history* as the mean term between *politics* and *epistemology*. In this case it is not the Greek ἱστορίαι—those of Herodotus and Thucydides—that inform our conceptuality. It is rather the

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[62] For a delineation of the problem, see Babu Senthil (2015), who also suggests addressing the question of universalism in science from the viewpoint of alienation, an issue that is particularly urgent in a social context marked by caste distinctions and corresponding epistemic-epistemological hierarchies.

[63] Cf. Marx (1998), 19: "Der Hauptmangel alles bisherigen Materialismus [...] ist, daß der Gegenstand, die Wirklichkeit, Sinnlichkeit nur unter der Form des *Objekts od. der Anschauung* gefaßt wird; nicht aber als *sinnlich menschliche Thätigkeit, Praxis*, nicht subjektiv" [emphasis in the original].

[64] See infra Chap. 4.1.

Judeo-Christian sense of the unidirectional development from an ἀρχή to an ἔσχατον that underlies historical-epistemological Eurocentrism.

> Our coming was expected on earth. Like every generation that preceded us, we have been endowed with a *weak* Messianic power, a power to which the past has a claim. That claim cannot be settled cheaply. Historical materialists are aware of that.[65] (Benjamin 1968: 256 [emphasis in the original; translation slightly revised])

Walter Benjamin envisioned the messianic component of historicism, a post-theological remnant of views on redemption. He particularly saw Marxism as a materialist eschatology, thus as a secular translation of earlier religious and idealistic views on salvation. De Martino was like minded and saw this cultural background of contemporary history as an opportunity to establish a comparison between the *dramma dell'apocalissi marxiana* (the drama of Marxist Apocalypse) and apocalyptic visions emerging in various epochs and cultures on an ethnological basis. As he contended, the European heredity of Judeo-Christian eschatology bifurcated either in positivistic views of progress, idealistic philosophies of history and historical materialism, on the one hand, or in the desolated sense of relativistic fragmentation and decadence, on the other.

All cultures confronted with the fluidity of history are forced to reflect at once about their possible end, the "end of the world" in its materiality and values. This can engender despair and can find expression in mythology as well as in literature, religion and philosophy. Alternatively, it can induce a commitment for a new beginning. The millenary expectations emerging from the movements for decolonization as progressive discourses of emancipation stand in stark contrast relative to a widespread European sense of loss of centrality and meaning. Western visions of the scientific apocalypse—the chemical and atomic war just like today's fears of anthropogenic mass-extinction (Davies 2016, Renn 2017, Omodeo-Parkhowel 2018)—are purely negative unless they trigger collective efforts directed toward the creation of a new world and a new humanity, beyond the end of the present ones (De Martino 1977: 629–630). Franz Fanon, the Martinique psychoanalyst of the *Guerre d'Algérie,* commented on the decline of Europe in the early Sixties:

> Look at it now teetering between atomic destruction and spiritual disintegration.[66] (Fanon 2004: 235)

[65] Cf. Benjamin (1974: 694): "Dann sind wir auf der Erde erwartet worden. Dann ist uns wie jedem Geschlecht, das vor uns war, eine *schwache* messianische Kraft mitgegeben, an welche die Vergangenheit Anspruch hat. Billig ist dieser Anspruch nicht abzufertigen. Der historische Materialist weiß darum" [emphasis in the original].
[66] Cf. Fanon (1961: 239): "Regardez-la aujourd'hui basculer entre la désintégration atomique et la désintégration spirituelle."

And contrasted the European sunset to the rise of another world:

> The Third World is today facing Europe as one colossal mass whose project must be to try and solve the problems this Europe was incapable of finding the answers to.[67] (Fanon 2004: 238)

History is eminently political in the sense that it looks at the past, transforms and connects it to the present and projects it toward the future. The lesson to be drawn from ethnographic humanism and critical ethnocentrism is not relativism but the critical assumption of one's own position, given the impracticability of an abstract survey of cultures and histories (De Martino 1977: 396–397). No visions *sub specie aeternitatis* are accessible; rather, positioning and engagement are required.

5.

The first step of this exploration of political epistemology has been to consider sociological approaches because they address the political dimension of science and bring forward fundamental theses, such as the structural connection existing between the social solutions to the problem of knowledge and those of social and political order. As much as this thesis is true for the object under scrutiny (science and the community devoted to it), it also applies to the sociologist of science. As I have argued, sociology is not outside the political arena. Rather, as a discipline, it is part of the political struggle. Its assumptions about society and politics, and about agents and structures, are vehicles of ethical and political visions. Epistemology cannot be avoided, despite radical sociological programs pretending to *solve* the epistemological problem *by banning* it from any possible inquiry. The elimination of the epistemological concern about reference makes of validity a matter of pure authority, as I have argued reflecting on the political consequences (and premises) of discourse analysis. The vision of scientific dynamics as processes without a subject and an object—either in the form of knowledge archaeology or of actor-network theory—explicitly decenters human agency. The cost is the *theoretical* renunciation of ethics and politics, whereby the *practical* urgency of the ethical and political appropriation of memory and decision-making is made evident against the passivity implied by the reification of action or by the resignation to all-pervasive "truth regimes." Political epistemology appears to navigate difficult waters between the Scylla of

[67] Cf. Fanon (1961: 241): "Le tiers monde est aujourd'hui en face de l'Europe comme une masse colossale dont le projet doit être d'essayer de résoudre les problèmes auxquels cette Europe n'a pas su apporter de solutions."

post-modern discursivity without subject or referent, on the one side, and the Charybdis of positivist scientism, on the other. Both encourage political passivity, either by abolishing agency and truth, or by allotting collective decisions to expert elites. In the latter case, science and technology are posited as absolute instances from which technocratic circles can derive the means to improve society within an unquestionable framework, the unshakable presence of global Capitalism. Political *historical* epistemology should propose a way of avoiding both blind allies by reasserting the centrality of agency—individual and collective—and looking at science as a contested field of political action in which epistemology is not abandoned but set at the center. I propose that the referent, referred to the objective constraints of knowledge, matters as much as power within a perspective that I connect to the theory of hegemony. Subjectivity, anchored in a structure of material, social and intellectual settings, reflects and redirects the reality it is tethered onto. Historical self-reflection is needed, as a way of establishing our cultural positioning or the historical-historiographical boundedness of our perspectives, aimed at problematizing both and moving beyond the Hellenocentric humanism of our political epistemological categories toward the humanism of critical ethnocentrism.

In conclusion, it is not the undifferentiated unity of power and science that we are looking for—not the *coincidentia* suggested by the famous Baconian *dictum*. Rather, what matters is the systematic, historically mediated and politically intended conjunction of two realms. Sociology of science, critical knowledge theory and historiography all variously look at science as informed not only by dominion but also by cultural leadership, the two dimensions of politics. To use the Machiavellian metaphor underlying Gramsci's concept of hegemony, the *prince* should not only be a *lion* but also a *fox* capable of creating a wide moral and intellectual consensus towards his societal project. Hence, the question "how does politics enter science studies?" cannot be reduced to power but must be seen within the far broader field of politics and culture. The question not only requires appropriate philosophical and historical tools in order to capture the politics involved in past and present science, but calls for a normative answer as well: To what extent should politics enter science studies? And how? One should first acknowledge that science studies cannot be confined to the ivory tower of the *vita contemplativa*. Science, philosophy and historiography are the entangled dimensions of a cultural activity that originates from and rebounds onto collective processes and actions. The two-sidedness of the science residing at the core of our global knowledge society is that it can at the same time lead to its dissolution or to its salvation at a higher level of civilization. There is a profound and compelling political meaning to science and any meta-discourse commenting upon it.

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Concluding remarks: Nostalgia and future

Science is located at the center of the metabolism of modern societies. For Antonio Gramsci, it occupies a special position among the ideologies because it establishes a vital connection between socio-economic structures and cultural-political praxis. Such connection is not self-evident, though, and it is the task of science studies (broadly understood as the ensemble of disciplines dealing with science at a meta-level) to reflect and help to redirect the dynamics of knowledge and society. The grand narrative of the advancement of humanity through scientific progress ended about one years ago after it had hegemonized the comprehension of the interrelation of science and politics of the late nineteenth century. Since then, the link between science, politics and ideology has become a matter of dispute, actually a field of struggles for meaning. The shock of WWI chemical warfare (Bretislav 2017), the entry of humankind in the atomic era with conflicting feelings of fascination and terror (Masco 2004, Omodeo and Parkhowell 2018) and the concerns linked to anthropogenic climate change (Davies 2016) mark three moments that enhanced our political-epistemological awareness of the self-destructive empowerment of humanity. Technological annihilation has emerged as a discourse of 'immanent transcendence,' the fright that the technological logic (doom?) of destruction could escape and dominate its creators (Omodeo 2017). Alternatively, techno-conservative dreams of experts' governance have offered to public imagination pale perspectives of solution to the major problems faced by our scientific civilizations, especially in the years of booming economic expansion, but in fact *technocracy* merely co-opts science into reformist agendas that ultimately secure the maintenance of the status quo and preclude the option of profound social changes in the name of the perfectibility of the system we live in.

As for eschatology, Western philosophy has been dwelling with apocalyptic thoughts at least since Augustin attempted to make sense of history in the moment of the cracking down of the Roman Empire. Thoughts about the end of the world (actually, of *our* world) have been two-sided from their inception as they either fostered a passive hermeneutics of the signs of a transcendent logic that guides nature and human events,

or served as a motivation for an active engagement for radical transformation (Cohn 1962). Such ambivalence, the tension between action and fatalism in the face of a projected catastrophic end, is typically rooted in the sentiment of the fundamental contingency of existence. We still experience it, but "in a secular manner" (Northcott 2015). The signs of the end have been articulated and exploited within various scientific and political paradigms, related to the growing sense of global threaten during the twentieth century. Technology has taken the ideological form of an alienated God *à la* Feuerbach. Such is the deepest sense of science as an institution of meaning today – or an "imaginary institution" in Ágnes Heller's expression. Modern societies thus create forms of adoration and fear of the secular hypostatization of human activity. Scientism and its cultural variations foster a *secular theology* of science that incenses *la science pour la science*, an idea (or rather the 'idol') correspondent to the theology of art, *l'art pour l'art*, in a different mode (Benjamin 2008: 24). A humanistic re-appropriation of the material and historical understanding of science is urgent, in order to invert the fatalism that the abstract essentialization of science and its dynamics induce. This redirectioning ought to start from a critique of ideology which reconstitutes the connection of the discourses on science with the materiality of science and reactivates its emancipatory potential. In this book I have set up an exploration of the *immanent interests* entailed in science ideologies, specifically, the cultural-political agendas of the reflection on science in the academic disciplines deputed to this task.

Avoiding the Scylla of scientism does not mean that the Charybdis of anti-science is a viable alternative. It would be illusory to expect that the dynamics of our society could be comprehended and redirected without taking into account the fact that the material basis of our civilization is completely dependent on science. It is surprising that the co-evolution of humankind and its environments and the necessary knowledge-mediation of the natural-historical world is a theme that has too long been eclipsed in history-writing and historiography (Chakrabarty 2009). In a time of natural cataclysms and total scientific dependency it is absurd to turn one's backs to science and embrace radical skepsis. It would be a populist move akin to the renounce to international diplomacy in the name of the border identities in a time of mass migrations. Political populism is often linked to forms of cynic relativism. According to it, all knowledge is treated at the same level so that, as a result, scientific truth and any other sort of claims appear as *democratically* equal, no matter what their source and foundation is.

Knowledge and belief get confused. Arguably, we live in a time in which *populist reason* affects both politics and science alike. But populism, to remain with mythological teratology, is a multi-headed hydra. We live in a time in which the president of the most powerful country in the world uses social media to disseminate doubts on the *reality* of global warming while people's sufferance becomes an occasion to be capitalized. The march of thousands Mesoamerican migrants walking across Mexico towards the North has thus been exploited as an electoral opportunity to be seized by the far right in the USA just as its European homologues can exploit the refugees crisis of the Mediterranean Sea. The same demagogic logic is deployed in the petty province of the Empire, Italy, where global problems of migration are addressed through simplistic formulas that resonate with xenophobe anxiety and racial anger. Zealous neo-fascists and neo-liberal administrators of EU politics are similar in reducing the tragedy of thousands of Africans drowning in the waters of the Mediterranean Sea to a matter of border security. Such inhumane simplifications are revealing of populist reason marching towards the occupation of our *historical a priori*. In politics, rhetoric is becoming the structuring factor of collective identities (cf. Laclau 2005). Similarly, persuasion through propaganda is taking the place of scientific reason and method. The equation of knowledge and belief makes scientists' assessments dubious; in this light, scientific analyses of the causes and consequences of human action in nature are dismissed as partial or, even worse, as a complot of (social-democratic) elites directed against the 'freedom' of a deregulated market economy. Knowledge is recast into a manipulative instrument of soft power that is more akin to Ioan Petru Culianu's idea of Renaissance magic, an epistemic means of action on fantasy and desire, than Michel Foucault's disciplinary biopolitics (Culianu 1987).

A discussion of the interests that shape science today is the basis for a reflection on how to accord science (and the discourses on science) to interests that escape those of the capital and consumerist consensus. A more general, more communitarian, more collective science is needed (Rose and Rose 1976). Such perspective should immunize us against opportunistic skepsis, which twists criticism into cynicism and, in fact, serves the powerful against the subjugated. In fact, the most acute symptom of such tendency is the emergence of a path to social epistemology that treats knowledge *as a power game* and accords *truth* to *the law of the stronger* (as proposed by Fuller 2018). It has been said that we live in a post-truth condition, "in which—as the Oxford English Dictionaries

definition of the word of the year 2016 goes—objective facts are less influential in shaping public opinion than appeals to emotion and personal belief" (Omodeo 2018). It closely resembles the blurring of the distinction between truth and lie, which justifies the propagandistic uses of lie, as Hannah Arendt prophetically discussed back in the 1960s (Arendt 1967).

The uncertainty of the present political and cultural moment awakens a painful nostalgia of a past in which comprehension and solutions appeared to be solid, coherent, and reachable. They were legitimized by the empirical gathering of *facts* and rational methods of *deduction* and *argumentation*. The engagement of humankind with truth was part of a grand narrative of emancipation. However, after the turn of the Eighties and the affirmation of a post-modern *Geist* substituting the rigidities of the Cold War era, no way back is left. Hence, the temptation arises to seek individual refuge in isolation or to resort to semi-private circles of survivors. We could "gather in a circle around the fire of our names" but the artificial creation of an inside without externality proves illusory; phantoms cannot warm up the chill of this winter but rather vampirize their carriers. Karl Marx criticized mythological dreams of the restauration of an idealized past as an objective hindrance to transforming action. As he observed in *The Eighteenth Brumaire of Louis Bonaparte*,

> revolution […] cannot draw its poetry from the past, but only from the future. It cannot begin with itself before it has stripped off all superstition in regard to the past. (Marx 1972, 13)

Lyrics evoke the ancestral home and construct fantastic bridges connecting the past to the future. What is missing is the *present*, the moment of evasion from the circularity of time, the *kairos* preventing the eternal return of the same within the enchanted circle of hegemonic ideologies.

Throughout the pages of this book, I have brought to expression the desire to fly outside the labyrinth of post-modernity. Knowledge, especially *scientific* knowledge, is an essential component of the problem and its solution. Episteme is not about grasping the *laws* of the nature in order to bent to a Stoic-like freedom of necessity. It is neither the study of the functioning of the brain nor that of the stars that will pave the way to

freedom, as the study of nature is only a precondition of *choosing*, with unrestrained minds, the path towards a renewed relation to the world.

There is one definition of scientific paradigm, in Kuhn's *Structure of scientific revolutions*, that offers an important future-oriented political insight of crucial relevance for historical epistemology:

> But paradigm debates are not really about relative problem-solving ability, though for good reasons they are usually couched in those terms. Instead, the issue is which paradigm should in the future guide research on problems many if which neither competitor can yet claim to resolve completely. A decision between alternative ways of practicing science is called for, and in the circumstances that decision must be based less on past achievement than on future promise. (Kuhn 1996: 157-158)

Kuhn posits *futurology*, a discourse *from* the future, at the basis of an epistemic history and an historical epistemology acting as *magistra vitae*. The scientist's decision to follow a path is not based on immediate results and the solutions it offers to the problems of the past. Choice is guided by expectations about the future and implies an engagement to make it become real. Galileo Galilei's legendary "eppur si muove," his defense of terrestrial motion against the censure of the Inquisition cannot be reduced to argument and proof. In fact, the contention concerned possible futures. In politics just as in epistemology, the solution of problems is guided by visions of (and a commitment to) the inexistent. It is a creative act, the acknowledgment of which is the starting point of political epistemology.

Futurology, for sure, entails many dangers. Once epistemology is thrown in the arena of competing visions of the future, it runs the risk of becoming the hostage of brute force. Neophytes of social Darwinism argue that, among competing visions, the stronger will prevail and impose to others what should count as *truth* – which is not the same as arguing that ideology is the truth of the hegemonic class, because this latter claim refers to positioned truth not to the equality of the positions. Abstract epistemologists could try to avoid the risks of unrestrained *political* constructivism, by appealing to hard facts, formal logic and detached objectivity. However, this extrema ratio is a blind alley as it denies at once the historical character of any knowledge and its categories, thus renouncing any *real* comprehension of science and its substitution for a

reassuring phantasy distilled from the philosophical mind. The commitment of the present book is to preserve the historicity of knowledge and the awareness of its political conditions of possibility, without reducing politics to the law of the stronger but rather in the hope to reactivate its emancipatory potential. The epistemologist, just like the scientist (!), is called to position himself or herself and reflect on the cultural politics of thought in science studies.

The necessary means for such reflection, its unavoidable starting point, is *Ideologiekritik*, the criticism of ideology, intended as a comprehension of the materiality of discourses, in particular their social and political efficacy. I specifically dedicated the pages of this book to ideology in science studies as an angle to critically assess the state of the art of historical epistemology. I evaluated hegemonic approaches to the history, historiography, and philosophy of science and assessed divergent paths to historical epistemology that lead to opposite vistas on science. On the one hand the impersonal bias of the structural analysis of scientific advance, on the other, the post-modern constructivist subjectivization of the categories of science can be seen as two tendencies that have engender inverse epistemological 'crises': one affects the status of the epistemological subject, banned in the name of a developmental logic without subject, and the other, the crisis of the referent's objectivity, erased by its incorporation into the knowing subject. The political impasse of these tendencies (objective depersonalization and subjective relativism) can be best evidenced from the Foucaultian project of an archeology of knowledge. This species of historical epistemology synthesizes the instances that are at the source of the twofold crisis of the subject and the object of knowledge. It is a poststructuralist episteme that obliterates the genesis as well as the referent of knowledge in the name of discourse immanence. Yet, as this intellectual project maintains the alleged impossibility of assessing epistemology through any criteria that are not self-referential, it eventually results in the acceptance of authority and power as the ultimate rationale of knowledge. Power enters epistemology not in terms of struggle but of dominion. From this perspective, no emancipation is conceivable anymore, but only a substitution of power through power, since all alternatives are ultimately equivalent. The impersonal negativity of subjugation leaving no hope for collective action (for politics!) fosters, instead of countering, authoritarianism. The negation of an objective anchoring of knowledge and the impracticability of collective praxis are the political-epistemological limits of this

philosophy. In the pages of this book, I invite to reconsider both, object and subject, structures and political collectivities, in order to overcome the moral and political limitations of today's agendas in historical epistemology.

The theory of hegemony stands out as an alternative to objectivist and idealist reductivisms. It opens up a humanistic and historical path to epistemology that values political subjectivity, initiative, and action, as well as the structural elements and the reciprocal relation of the collective agents and their reality. In other words, hegemony theory values the objectivity of concrete historical conditions and of the material references of knowledge (to be dealt with in terms of a political economy of knowledge), while it also emphasizes collective subjectivity as the driving force of political and epistemic transformations (cultural politics of science). This is an outlook on culture that enables the historical epistemologist to appreciate the political dimension of knowledge, seen as a form of historical mediation between society and nature, constantly and reciprocally reshaped by struggles for meaning. In order to articulate the theory of hegemony in the field of historical epistemology, I suggest to integrate it with existing cultural and sociological analyses developed in cultural studies on science, beginning with methodologies resting on Fleck's concept of *Denkkollektiv*. Marxist historiography, along the line connecting Boris Hessen to Edgar Zilsel and externalist history of science offer examples of how to think the contexts of science and its developments, although the study of structures and knowledge bearers proves dramatically insufficient if it is not redirected towards intellectual responsibility and praxis.

The perspective of hegemony is not only relevant to understand and redirect scholarship in history but also at the meta-levels of the sociology of science, historiography and the philosophy of science. My critical assessment of meta-science has been guided by Gramscian ideas on cultural hegemony and ideological struggle. Their reception in the history and philosophy of science has become appreciable only in recent years. In this book, I have particularly pointed out crucial moments of the history of HPS, especially linked to the political and ideological antagonisms of the Cold War. Certainly, my investigation could be expanded to include more historical cases and specific -discourses on science in different epochs, settings, and cultures. As a prospect of future research, the maturity of the political approach here assigned to science studies should be *measured* not only in terms of theory soundness but also by its

capacity to raise new questions to historians, and cast new light on allegedly well-established facts, epistemic genealogies and chains of events. Brief: the capacity to direct the historical research of the future. Political epistemology should guide a theoretically-informed empirical inquiry of our past and a critical understanding of our scientific present.

Finally, the burning question: how should a radically democratic science look like? The scientist and the historian of science are called to clarify their position as intellectuals and position themselves. The present conjuncture of post-modern relativism and populist anti-scientism does not leave room for nostalgic retreat from the world and hide. Rather, it forces to wake up and take position.

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