

## Review Essays

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### Science and Culture

RAPHAEL SASSOWER

*University of Colorado, Colorado Springs*

Joseph Agassi's themes in this piece relate to the importance of science and technology in the modern world, the interaction between science and technology, the interrelation between science and culture, the political dimension of science in a democracy, the improvement on the Popperian project in the methodology of science (shifting gears to pluralistic critical rationalism), and the philosophical elements that inform science as well as being informed by science.

**Keywords:** *science; scientism; methodology of science; Popper; Agassi; methodological pluralism; critical rationality; science and democracy*

Joseph Agassi, *Science and Culture*. Dordrecht, the Netherlands: Kluwer Academic, 2003. Pp. xxxii + 416. \$156.00. ISBN 1402011563.

This is the third volume of collected essays by Agassi in the renowned Boston Studies in the Philosophy of Science series, the first appearing as *Science in Flux* in 1975 and the second as *Science and Society* in 1981. Agassi's themes are familiar by now: the importance of science and technology in the modern world, the interaction between science and technology, the interrelation between science and culture, the political dimension of science in a democracy, the improvement on the Popperian project in the methodology of science (shifting gears to pluralistic critical rationalism), and the philosophical elements that inform science as well as being informed by science. (As expected, most of the essays have been previously published, most have been rewritten, and few are new.)

As he says in the Preface, "My main concern here is with social and political affairs with an accent on individual autonomy, liberalism, pluralism, and democracy. Science is in no need for defense." By focusing on these aspects of contemporary life within the general framework of a scientific culture (of rationality, universal appeal, uniform methods of inquiry, repeatability of experiments, and a whole other range of ideas and practices handed down to us from the age of the scientific revolutions of the 16th and 17th centuries), Agassi provides at once an implicit critique of how insulated the scientific community continues to be (what some would call an imminent critique) and a challenge to students and advocates of the scientific ethos (of truth and honor, or the more elaborate Mertonian version) to broaden their scholarly horizons to include social, political, religious, and ethical elements and variables in their discussions. All of this, of course, is undertaken in the name of philosophy or, more specifically, in the name of the Popperian version of philosophy (at once concerned with scientific methodology and with an open society and its putative and real enemies).

Whether one agrees with Agassi's method of classification or the actual categories presented here, one must acknowledge that a simplified summary is at once informative and heuristic (however much one disagrees with it), open to criticism and revision. Philosophically, Agassi seems to invite criticisms by disclosing and exposing the fundamental beliefs and perceptions he holds dear. Science, then, is classically portrayed, according to Agassi, in four different ways: the oldest (intellectualism) claims it rests on rational foundations; the dominant (empiricism and inductivism) claims it rests on experience and is devoted to "error avoidance"; their consequent view (instrumentalism) suggests that science is "but a mathematical tool-kit" without informative content (also known as conventionalism); and finally, the only "serious alternative," which in Popper's view (critical rationality) offers "error elimination" in an endless process. When Agassi explains why the fourth alternative view of science is more appealing than the others, it is in terms of failure and deceit, with ample examples from the history and sociology of science.

In the First Introduction, Agassi offers the book's thesis: "Science is an integral part of modern culture." Having said that, he immediately acknowledges that this thesis is "trite" but that "some corollaries from it are not." Viewing science, what he calls scientism, in isolation

is dangerous, as far as he is concerned, because it distorts the reality of how science is an integral part of our culture and thereby could lead to a view of science as if it itself were "unproblematic." If one follows this line of thinking (and doing), one endorses a version of "quietism," namely, a view of science that endorses the culture to be quiet about the conditions under which individual science students labor to become scientists or fulfill the promises of the scientific leadership. "Scientism is also a false prophecy," continues Agassi, because it encourages social conformity in the name of isolation from the cultural fray of the day: it is thus dangerous. It also provides a fragmented image of humanity by refusing to integrate all the complex aspects of its history and diversity. The exclusive focus on science as a privileged and insulated activity (with a privileged and insulated scientific community) is detrimental to the kind of integration Agassi advocates. Not only is scientism the traditional view of science in society, it is also methodologically an "internalist view" that allows exclusion and demands internal coherence (and obedience). It can thereby project an authority beyond its own confines and prevent any potential critique or dissent. Can anyone seriously claim to be against science?

To remedy this situation, Agassi pulls together a set of essays that allow for a deeper appreciation of the contexts within which science has evolved, technology has been exercised, and our culture has been studied. If science could afford its supremacy and be shielded from attacks, it was because of its insistence on providing knowledge that was certain. Once the certainty of knowledge claims was challenged, it became fashionable to argue that science has no knowledge at all (whether in the earlier versions of instrumentalism or later versions of postmodernism). The basic thought that guides this volume, continues Agassi, is that science "has value despite its fallibility" and that many scientific theories, however mistaken, are interesting and exciting and thereby inspire humanity to remain curious and inventive and to interact with humility and "siblinghood." His last salvo in this introduction is the catchy summary of the philosophical contribution of Popper, as someone who "suggested that knowledge of when science goes off the road is informative about the road." There is no finger pointing: this scientific theory or principle is false, rather than this is bad science, and therefore, let us move on and ask, what does this teach us? Knowing for sure that this is false is as important as not knowing for sure that this is true (even though the reverse view is commonly held).

In the Second Introduction, Agassi offers some autobiographical anecdotes to illustrate that the elitist view of science is always accompanied and contrasted by a popular, mundane, even precarious view of science. Being elitist comes naturally to philosophers and scientists alike, so this is an attempt to drive the ideas "home," so to speak, to make them accessible, with a twist about the political and military contexts in which technological innovations are played out. When he says, "We do not know what science is," I guess he means to bring together Russell's concerns with the limits of scientific knowledge (after the horrors of World War II that shook the complacency of European culture) and Lyotard's descriptions of the postmodern condition in the age of science (following the French Marxist tradition). So culture matters (to science) even more than we ever thought it would (having eschewed the insulation of scientism).

In the Third Introduction, Agassi explains his view of philosophy of science (as distinct from scientific knowledge). The theme that he traces historically is the fallibilist view of knowledge (and scientific inquiry) and the way in which it is expressed today. Instead of confirming knowledge claims either a priori or a posteriori (intellectualism and empiricism, respectively) to maintain science as authoritative and infallible, Agassi promotes the following fallibilist agenda. Just as in political and legal systems we prefer checks and balances so as not to be at the mercy of one institution or governing board (church doctrine or monarchy), allowing for changes and improvements, reforms and revolutions, we should endorse both methods of inquiry and "play them against each other." This would result in realizing the best each can offer as well as their limitations. They could complement each other so as to succeed where either of them alone would fail. When the scientific enterprise is understood in a more fluid manner, inviting the contributions of any and all, metaphysical and religious insights may aid rather than threaten it. In this light, then, any attempt by the guardians of science (Popper included) to demarcate science from all other human activities is a disservice to science and to humanity. For Agassi, then, since "science is in no risk from the alternatives," and since "criticism should be beneficial all around," science should focus its "combat" on irrationalism as such and return to its "traditional task."

Using my own terminology, this view of the scientific enterprise comes very close to my version of postmodern technoscience, for it puts all ideas and models on a leveled playing field, breaking down barriers to entry, and allowing for no prefigured privilege of one

view over another. Some call this posture or view relativism or, even worse, (Feyerabend's version of) intellectual anarchism. But what distinguishes Agassi's (and my own different but parallel) view of the role of science in culture and the philosophical attitude we should promote in relation to its various activities (from research and pedagogy to funding and implementation) is the insistence on critical rationality as a method (of testing and arbitration) and an ethos (of human integrity and interaction). Irrationalism (whether romantic, religious, or fascist) is dangerous because it relies solely on self-justification and therefore refuses to submit its claims and authority to dissenters and outsiders. There is nothing wrong about being a scientist in the natural philosophy sense of the term as long as one remembers to remain philosophically minded about one's explorations of nature.

All of these themes are repeated throughout the essays with a richness of examples from the history of science and ideas, from Aristotle and Descartes to Boyle and Newton. The index of names is varied and large, informative in the ways in which it juxtaposes ideas that otherwise would have been studied by scholars in isolation. As the introductions all illustrate, Agassi's main contribution to the philosophy of science is in the broad intellectual and scholarly net he casts on the history of ideas, going as far back as needed and bringing to life debates and concerns that may seem irrelevant to contemporary scholars who are consumed with details of potentially silly ideas. Agassi's second contribution is in his accessible discussions that are at times conversational in tone and style. His are invitations to a dialogue, no less solicitous and provocative than Socrates', yet much more open to debate and changing of views than Socrates' leading questions with predictable answers. Perhaps because of this second attribute, Agassi remains at times utterly baffling and elusive, making outlandish claims without any quoted substantiations (references or quotes are rare). This charge has been leveled against him repeatedly by those who wish to avoid his ideas and criticism. But even here, I would suggest, there is method to his madness (be it true or alleged): he makes the most extreme claims to open them to refutation or criticism, whether by others or himself; moreover, perhaps deliberately refraining from quoting authorities is a way to lessen the intimidation factor that accompanies criticisms and rebuttals, a way of saying, listen to what is said and pay no attention to who is saying it.

Unlike his hero Popper, Agassi has not fared as well in establishing a major place for himself in the cathedrals of the learned "establishment": he remains the enfant terrible whose unpredictable and unsolicited outbursts can liven up any professional meeting. He knows just enough in numerous areas to be a challenge, a gadfly, a thorn in someone's thigh; he knows just enough to make sweeping generalizations and connections that would never be made by scholars whose expertise has limited their vision outside of their chosen field of research. Perhaps this is Socrates' legacy; perhaps this is what he learned from the Judaic tradition of debate for the love of God (rather than for the sake of fame and fortune). And finally, I suppose that more people know of him and his work than are willing to admit to it in public. This becomes a sociopsychological phenomenon about which I hesitate to speculate too much here (but which can be fruitfully studied by the Edinburgh group of sociologists of science whose work Agassi systematically ignores). Suffice it here to say that what is implied by Agassi's views and his own execution of their implication in print is the incessant demand to be courageous in stating one's views as clearly and succinctly as possible with an open invitation to be criticized in public without shame or humiliation.

One of the "cardinal" sins in Judaism is embarrassing someone in public (more sinful than lying about sanctioned food to someone who keeps Kosher). Being openly critical while remaining rational and open to rebuttals can easily be misunderstood as trying to embarrass someone else in public. But Agassi does not mean it this way; it may come across this way because of academic assumptions about rational discourse in public. His refusal to abide by the authority of the day is Socratic and Jewish: there is always already an appeal to higher authority, and this appeal is seen as pretentious and elitist (even when it is not). Is it because he wants to practice what he preaches? Is it because he wants to grab the attention of others and point to any emperor who has no clothes? Is it because he has nothing to lose and therefore is free to make outrageous claims and air them in public? Regardless of the "right" answer, Agassi has maintained a level of intellectual engagement that is entertaining, frustrating, and provocative unlike any academic I have met over the years. He speaks casually about science and religion, for example, as if he were an expert on both. Likewise, he quotes from the standard texts of anthropology and sociology, women studies and literature, medicine

and psychology, as if anyone knows them all. That is too much to stomach for most of us.

Most analyses of ideas in science as well as in art focus on form and content, sometimes together, sometimes apart. I shall try to revisit Agassi's concerns together (not only as they are summarized in his introductions). For example, he writes, "The oldest view of science is intellectualism: science rests on purely rational foundations, with no need to appeal to experience." Moreover, "The dominant view of science is empiricism." Then, "Consequently, instrumentalism (of Pierre Duhem) suggests that science is but a mathematical tool-kit." And therefore, "The only serious alternative to these theories is the critical view (Karl Popper) that takes scientific theories at face value as true or false and research as the process of explanatory conjectures and their tests—their attempted refutations" (p. xiii). Now, without quibbling with this summary, we may want to ask, Who says so, you? And on what grounds, and with whose authority? What justifies your claims? How are they substantiated?

At times one can believe that Agassi merely reports old news, the common view, the standard assessment of the field under study, but what if he does not? Or even if he does, what if it is just a bit misleading or exaggerated? How would the reader know? Since he does not necessarily contrast his views with those of others, we remain in the dark. In the standard history of ideas textbooks, empiricism is contrasted with rationalism and not with intellectualism—so what is his point here, if there is one, of calling rationalism "intellectualism"? True, the term was suggested by Kant and adopted by Popper. But even for readers who know this, does this change the situation? And sweeping generalizations may be useful intellectual tools, but are they equally useful to the expert and the novice? I suppose that those who are insulted by Agassi's claims would point out in the briefly quoted passage above how neatly he declares that the only viable alternative is Popper's while neglecting many others who would like to be considered "serious alternatives" as well.

But then there are the gems one can find in Agassi's writings, such as, "Here is my thesis. Science is an integral part of the modern culture . . . the distorted image [of science in isolation] is then misleading. It leads to scientism, to the view that science is, or can be, the sole part of our culture that matters intellectually" (p. xvii). Now here we see how careful the argument proceeds so as to distinguish between the actual activities of scientists and the view or image of

their activities. It is different to claim that science makes demands of superiority and exclusivity in our culture than to claim that it may be perceived this way regardless of the "truth of the matter." Now this is a delicate attempt to deploy philosophical and logical tools of the trade to clarify something that may confuse observers and mislead participants and critics alike. This is Agassi at his best, emulating Popper's style: though Popper may have been mistaken, he was clearly stating his mistakes, rather than couching them in a language so obscure that the effort to actually understanding their meaning is overshadowed by the mere attempt to decipher them (an accusation Agassi makes repeatedly against Heidegger the Nazi). And because the mistakes are clearly stated, they can be corrected, even eliminated from the agenda so that other options are pursued. You have just become, dear reader, part of the "siblinghood of humanity," joined the critical rational club whose membership is open to anyone. Back to Scientism. "Scientism is dangerous because it projects an extremely poor image of humanity and it does so with authority" (p. xvii). The concern here is not necessarily with verifying this image of science but rather the potential (if not actual) consequences of this image. Moreover, Agassi is always on the alert to warn us against and try to undermine and debunk the authority of anything out there in our culture. This, too, he gleaned from Popper.

What makes Popper of interest for Agassi is not only his methodological insights regarding the progress of the scientific enterprise and his disputations with the Vienna Circle or with latter-day probabilistic inductivists but, rather, the way in which his political and social philosophy (*The Open Society and Its Enemies*) relates to his philosophy and methodology of science (*Logik der Forschung*). For Agassi, there is always a political, social, psychological, and economic dimension to anything scientific (just read his ongoing output to see how wide an intellectual net he casts). It may be on the level of the rational behavior of a society (p. 43), the notion of autonomy (chap. 1.5), the potential for tolerance (chap. 2.1), or responsibility (chap. 5). In all of these cases, Agassi wants to remind us that there are rational (or not) consequences to a rational assent to a specific rational choice we make regarding the value of science and its methods. In some sense, then, Agassi is more of a Marxist than he admits, although perhaps not more than he would ever like to admit, for it was the Marxist critique of classical economics and of Hegelian metaphysics, for example, that clarified the manner in which science is power and as such has political agendas to express, fulfill, or derail.



Moreover, if implicit or explicit self-interest is a powerful motivating force in the adoption or rejection of a principle or theory, and if the choice is driven by the potential benefits or costs associated with their application (rather than their rationality or their logical soundness or their fit with observable phenomena), then it would make sense to insist on framing scientific ideas within their cultural domains.

As Agassi takes on one topic after another, we detect a methodological principle he repeatedly uses: set up the two extreme views on the matter, outline the spectrum of views in the middle, illustrate why the extreme views fail and what would be a reasonable alternative (see, for example, tradition, pp. 84ff.). The manner in which choices among alternatives work best for Agassi as a recommendation for anyone else, regardless if in scientific matters or others, is closely aligned with his view of scientific progress or contributions to the scientific ethos. Similarly, Agassi lists the major views on science and pluralism (classical rationalism, traditionalist relativism, monistic progressivism, and pluralist critical rationalism) and then dissects the problems associated with all of them, still preferring one view over the others, but only putatively so! There is always room for improvement; there is always another thing to be said; and his word is never final (see chap. 2.4).

For example, when discussing Poincaré, he offers “openness, honesty, and transparency” as important additions to the scientific attitude (p. 119) to remind the reader that correcting and adjusting views, claims, principles, and theories is an activity best undertaken with eager public scrutiny, rather than with cowardly demeanor of protecting one’s view from critical examination. In this context, then, let me quote an Agassi trademark: “(Parenthetically, it was easier to conceive of Poincaré’s philosophy of science as attitudinal than Popper’s, since Popper is a realist who has to explain how our attitudes matter to Mother Nature, whereas Poincaré was a conventionalist, and unlike truth by nature, truth by convention is a matter of attitude)” (p. 120). Brief, dense, clear, and sharply styled, Agassi pulls together thousands of pages of scholarly debates and presents them as if anybody should know this and appreciate the insight. As for recommended choice readings, I would leave it up to the reader. I think the richness of the offering would allow special interests to be satiated, ranging from broad parallels and intersections between science and religion to personal attitudes toward the scientific enterprise in psychological, sociological, and political terms.

Finally, Agassi will be remembered as a sectarian philosopher who wears his allegiance on his sleeve, without shame or pride. Gombrich the art historian and theorist of aesthetics and Gellner the anthropologist, for example, are considered Popperian at least in their attitudes and methods of inquiry and therefore are complimented. Kuhn, on the other hand, is lumped together with all irrationalist thinkers, muddled in their convictions, unable to explain their own intellectual commitments, and refusing to provide a road map for those following in their steps. Whether autonomy or personal responsibility ends up being paramount in Agassi's philosophy, one can appreciate his attempts to engage us all on an individual basis, ensure we admit our weaknesses and take responsibility for what we say and believe, rather than pretend our ideas are disembodied and in the "third world."

*Raphael Sassower is a professor and chair of philosophy at the University of Colorado, Colorado Springs. His two most recent published books are titled Confronting Disaster: An Existential Response to Technoscience (Lexington Books, 2004) and, with Louis Cicotello, Political Blind Spots: Reading the Ideology of Images (Lexington Books, 2005); and he has authored numerous articles and essays in professional journals. His interests range from pedagogy and aesthetics to the cultural critique of science and technology in sociological, political, economic, and moral terms.*