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Enlightening "Science and Philosophy"

Il testo riproduce l'intervento di Hilary Putnam al Convegno
"Quale futuro per la filosofia? Discutendo con Hilary Putnam"
(Università di Roma Tre, 6 novembre 2007)

Here is a brief outline of what I am going to talk about:

1. *Why and how the very need for philosophy became a question*
2. *Logical Positivism as a failed response*
3. *Postmodernism as another failed response*
4. *The importance and value of philosophy as I see it.*
5. *Another look at the history*

1. *Why and how the very need for philosophy became a question*

A reason often given is that philosophy for so long—from the Middle Ages until the end of the nineteenth century, in fact—was so heavily invested in two "ontotheological" (i.e., metaphysical *cum* theological) ideas, namely (1) the idea of God (although the "God of the philosophers" was always very different from the God of the celebrated "man—or woman—on the street"[1]), and (2) the idea of the immateriality of the soul.[2] Although most nineteenth century scientists were still church-goers, the posture of twentieth century (and now twenty-first century) science has been decidedly secular, and analytic philosophy, for the most part, has the same posture. I don't mean that there aren't scientists who are religious and analytic philosophers who are religious. But the idea of God as an entity we need to postulate in order to account for the existence of the natural world or to postulate as a foundation for morality is no longer widely accepted. Indeed, although I am a practicing Jew, I myself don't believe in either "ontotheology" or in the idea that ethics requires a religious "foundation". In fact, in my forthcoming book, *Jewish Philosophy as a Guide to Life; Rosenzweig, Buber, Lévinas, Wittgenstein*, I describe my current religious standpoint as "somewhere between Jonh Dewey in *A Common Faith* and Martin Buber." And I explain that I understand Dewey to be saying that the kind of reality God has is the reality of an ideal, and that that is the way I too conceive of God. But that is not the subject of this lecture.

It is not the subject of this lecture, but I mention it because for the large number of people, including many religious people, who have lost the belief in the God of ontotheology, the metaphysical First Cause and *ens necessarium*, and now find themselves unable to believe in the God of the unreflective believer or in life after death, it can seem that the whole of philosophy between, say, Plato and Hegel, was vast mistake. That is what Heidegger's proclamation of the end of "ontotheology" seemed to amount to, and Wittgenstein's description of the new task of philosophy

as "showing the fly the way out of the fly-bottle" has often been read as pronouncing a similar verdict on traditional philosophy. Moreover, not only has belief in God, as God was traditionally conceived, ceased to be something that educated people take for granted in the West, but the successes of evolutionary biology, genetics, computer science and brain science have demolished the idea that the "seat" of our mental faculties must be an immaterial soul. In addition, many natural scientists are hostile to philosophy, and are glad to dismiss it as obsolete. (Nor are they particularly friendly to analytic philosophy, which they often regard as scientifically uninformed hair-splitting.) In sum, even if the enormous prestige and the enormous success of science have not jeopardized the position of the humanities as a whole as important disciplines they can appear to have called into question the *raison d'êtr*e of philosophy. Is philosophy really just a relic from past ages that we need either to discard or to replace with something else?—even if we disguise the fact that the latter is what we are doing by retaining the word "philosophy"? That is what I want to address today.

2. *Logical positivism as a failed response to the question of philosophy's function*

Logical Positivism was a product of the combined influence of the great physicist Ernst Mach's version of empiricism and of Bertrand Russell's belief that, in the new logic that he and Whitehead did so much to perfect, a tool had been discovered that would either solve or dissolve the traditional problems of philosophy once and for all. It was thus decidedly a 20th century movement. In fact, Carnap's first great book, *The Logical Construction of the World*, was not published until 1928. In that book, there is still an interest in epistemology, and Husserl is even cited as a forerunner.[3] But in 1934, Carnap wrote the following words:[4]

> "All statements belonging to Metaphysics, regulative Ethics, and (metaphysical) Epistemology have this defect, are in fact unverifiable and, therefore, unscientific. In the Viennese Circle, we are accustomed to describe such statements as nonsense."

In these words we have the essence of Logical Positivism. In fact, they express in an extremely condensed way the two chief principles of the movement: (1) The meaningful statements in our language are exactly the statements that can be tested and "verified" (established to be true or false by the methods of science?[5]). All other statements are *nonsense*—totally

devoid of discussable content. (2) Every one of the fields into which traditional philosophy was divided: metaphysics, ethics, and even epistemology (referred to in this passage as "(metaphysical) epistemology") must be abandoned, because they consist entirely of such "nonsense".

So what is left for philosophers to do? How could the logical positivists continue to teach in philosophy departments, train graduate students, publish in philosophy journals and even create new philosophy journals? The answer Carnap went on to give, especially in his 1935 *The Logical Syntax of Language*, was that they weren't really doing what had traditionally been called "philosophy" at all, they were engaged in studying the "logic of science".

This might lead one to expect that Carnap must then proceeded to prove a number of results in a scientific field called by that name. But one would be wrong. In all the books and papers that Carnap wrote—books and papers which are rightly prized as brilliant contributions to important philosophical debates— there is, to be blunt, not one contribution to anything that anyone today recognizes as logic of science. There are attempts to "reduce" non-observational terms in science (terms such as "atom", "gene", "gravitational field tensor") to observation terms (an attempt that was a total failure, as Carnap came to recognize). There was an attempt, in *The Logical Syntax of Language* itself, to provide a syntactic characterization of "analytic" sentences (which category was supposed to include all the sentences of mathematics)—another failure. There were, as mentioned, brilliant contributions to philosophical—particularly debates in the philosophy of language and the philosophy of mathematics. And finally there was an attempt to formalize inductive logic, with results universally regarded as disappointing. In sum, to the extent that Carnap achieved anything important and impressive it was in philosophy and not in logic of science, and to the extent that he tried to obtain impressive and important results in logic of science, he met with complete failure. Carnap and his followers did not succeed in folding philosophy into science, as they hoped to do.

3. *Postmodernism as another failed response*

If Logical Positivism sought to counter the perceived danger to philosophy from science, the danger that science had rendered philosophy obsolete, Postmodernism sought to restore the prestige of philosophy by retorting that science itself, and, indeed, everything we think of as a description of "facts", is just a form of fiction—useful fiction, to be sure, but in the end just more of the many webs of ideology Western culture keeps spinning. It is not, I hasten to add, that the postmodernists thought there

is some other kind of discourse that is free of deceit. Rather, at least in the hands of Jacques Derrida and his followers (but to a greater or lesser extent in the hands of the other gurus of the movement as well), discourse itself is seen as *inherently* deceptive, if only because it tempts us to believe that here is such a thing as a truthful representation of reality, and there is not and cannot be any such thing. Or so postmodernists claim.

One might think that such a revolutionary claim would be backed by strong arguments. In fact, even Richard Rorty, the most intelligent analytically trained philosopher to be won over to the movement, described Derrida's argument as feeble.[6] (When he defended postmodernist views, Rorty did so by adapting arguments from analytic philosophers (not one of whom subscribed to Rorty's use of their arguments, however!), namely Sellars, Quine, Davidson and myself. But, rather than discuss this "can of worms" today, let me simply say that "representationalism"—the view that we can and often do succeed in representing parts and aspects of reality in language—is just what used to be called "realism", and realism does not become a terrible fallacy to be looked down upon with scorn just because a number of professors have given it the new name "representationalism" and *declared* it to be such.

4. *The importance and value of philosophy as I see it*

If neither the positivist response (fold philosophy into science), or the "postmodernist" response (declare science to be fiction) is tenable, what remains? The only way I know to answer this question is to tell you what makes philosophy so important and so fascinating in my own eyes. To the extent that this admittedly personal way of approaching this large question needs justification, my justification is that, as an octogenarian who received his Ph.D. at age 24, I have been doing philosophy for a long time, and I have been involved with most parts of the subject and with many of the central questions, both traditional and contemporary. Looking back over my 56 years of "doing philosophy", I find that in retrospect two definitions of philosophy appeal to me the most, and also that each definition requires to be supplemented by the other.

The first definition comes from Stanley Cavell's famous book *The Claim of Reason*, and I should like to quote from the passage in which it occurs at some length:[7]

> But if the child, little or big, asks me: "Why do we eat animals? or Why are some people poor and others rich? or What is God? or Why do I have to go to school? or Do you love black people as much as white

> people? or Who owns the land? or Why is there anything at all? or How did God get here? I may feel my answers thin, I may feel run out of reasons without being willing to say, 'This is what I do' …and honor that.
>
> Then I may feel that my foregone conclusions were never conclusions I had arrived at, but were merely imbibed by me, merely conventional. I may blunt that realization through hypocrisy or cynicism or bullying. But I may take the occasion to throw myself back on my culture, and ask why we do what we do, judge as we judge, how we have arrived at these crossroads…In philosophizing I have to bring my own language and life into imagination. What I require is a convening of my culture's criteria, in order to confront them with my words and life as I pursue them and as I may imagine them; and at the same time to confront my words and life with the life my culture's words may imagine for me: to confront the culture with itself along the lines in which it meets in me.
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> This seems to me a task that warrants the name of philosophy… In this light, philosophy becomes the education of grownups.

The second definition comes from Wilfrid Sellars' essay *Philosophy and the Scientific Image of Man*.[8] "The aim of philosophy," he wrote, "is to understand how things in the broadest possible sense of the term hang togetherin the broadest possible sense of the term".

Cavell's definition, "the education of grownups", and the examples he gives of the "child's" questions which may show the "grownup" that he or she needs education, point to what I will call the moral face of philosophy; the face which interrogates our lives and our cultures as they have been up to now, and which challenges us to reform both. Sellars' definition points to what I will call the theoretical face of philosophy, the face that asks us to clarify what we think we know and to work out how it all "hangs together". Logical positivism, in a limited way, sought to preserve the theoretical face of philosophy (albeit dismissing many important theoretical issues as "metaphysical"), while banishing the moral face entirely, while Postmodernism wants to preserve the moral face of philosophy (albeit often reducing it to what Richard Rorty once described as "the hallucinatory effects of Marxism, and of the post-Marxist combination of De Man and Foucault currently being smoked by the American Cultural Left"). My own view is that philosophy at its best, has always, in every period, included some philosophers who brilliantly represent the moral face of the subject and some philosophers who brilliantly represent the theoretical face, as well some geniuses whose insights span and unite both sides of the subject. To renounce either the moral ambitions of philosophy or its theoretical ambitions is not just to kill the subject of philosophy; it is to commit intellectual and spiritual suicide.

To flash this out in the personal terms I promised, I will now describe some of the principal philosophical issues that have captivated my interest and inspired my work in the last half century.

Here is a short list:

1) Are physical theories just economical ways of describing the behavior of "observables", as Carnap and his followers believed? Or do they describe a reality much of which is unobservable by humans? Much of my work in the 1960s was devoted to defending the latter view, the "scientific realist" view, which positivism had rejected as "metaphysics", and postmodernism rejects as "representationalism".

2) What does Quantum Mechanics say about physical reality? In traditional language, what is the metaphysical significance of this strange and radically different physical theory?

3) Is mathematics about immaterial objects? About mental objects? Or about what structures are possible and what structures are impossible, in a special sense of "possible" and "impossible"? (From the publication of Mathematics Without Foundations in 1967 on I have defended the third alternative, sometimes called "structuralism".)

4) Is mathematical truth exhausted by what human beings can prove? Or does it transcend that? (Much of my work in philosophy of mathematics, ranging from What is Mathematical Truth in 1975 to the present day, has defended the latter, "realist", view.)

5) Does science really proceed by an algorithmic method ("inductive logic")? Or by a plurality of diverse methods. (I defend the latter, "pragmatist", view.)

6) Is ordinary language philosophically irrelevant? Can it turn out to be fundamentally wrong in one or another are, say by scientific discoveries? Against many American analytic philosophers, I have argued that ordinary language is deeply philosophically relevant—in many areas it is the only conceptual tool we have – but against certain ordinary language philosophers, I have argued that science can and sometimes does indeed correct our ordinary concepts.

7) Are the traditional assumptions concerning the concepts of denotation and connotation right? From the Meaning of 'Meaning' (which I wrote in 1972) on, I have argued that "meanings aren't in the head", and that the contrary view about meaning fail to explain how language and reality actually relate to each other. (My view, which is now widely held, is called "externalism", and the opposite view is called "internalism". Externalism holds that what goes on in the brain and what goes on in the environment jointly determine meaning.)

8) Are computer models of the mind in principle right? I used to think they are, but have become an opponent of that view.

9) Are our concepts really "factorable" into a "descriptive component" and a "value component"? Or are factual judgments and value judgments "entangled". (I defend the latter view.)

10) Is "naïve realism"—that is, the view that our perceptional experiences are of real external things and properties, and not simply events in our brains—really untenable in the light of scientific facts, as most philoosphers and neural scientists have claimed? (In company with John McDowell, I have argued that "naïve realism" is not only tenable but *right*.)

11) Is ethics exhausted by rules, as Kantians and Habermasians think? Or is much of it situational and pragmatic, as Dewey thought? (I am with Dewey here.

—And there are many more questions and issues that I have pondered and that continue to fascinate me.

But what is the justification for worrying about such questions?

4.1 *The significance of these issues*

By way of an answer to *that* question, I shall now say something about the significance of each of those issues.

1) and 2) The positivist idea that all science does is predict the observable results of experiments is still popular with some scientists, but it always leads to the *evasion* of important foundational questions. For example, the recognition that there is a problem of understanding quantum mechanics, that is, a problem of figuring out just how physical reality must be in order for our most fundamental physical theory to work as successfully as it does, is becoming more widespread, but that recognition was *delayed* for decades by the claim that something called *The Copenhagen Interpretation* of Niels Bohn had solved all the problems. Yet the "Copenhagen interpretation", in Bohr's version, amounted only to the vague philosophical thesis that the human mind couldn't possible understand how the quantum universe was in itself and should just confine itself to telling us how to use quantum mechanics to make predictions *stateable in the language of classical, that is to say, non-quantum-mechanical, physics!* (In my lifetime, I first realized that the "mood" had changed when I heard Murray Gell-Man say in a public lecture sometime around 1975 "There is no *Copenhagen Interpretation* of quantum mechanics. Bohr brainwashed a generation of physicists!") Only after physicists stopped being content to regard quantum mechanics as a mere machine for making predictions and started taking seriously the question: but what does this theory actually *mean*, could real progress be made. Today many new paths for research have opened as a re-

sult:[9] string theory, various theories of quantum gravity, "spontaneous collapse" theory, are only the beginning of quite a long list. And Bell's famous theorem, which has transformed our understanding of the "measurement problem" would never have been proved if Bell had not had a deep but at the time highly unpopular interest in the meaning of quantum mechanics.[10]

In cosmology, however, there has unfortunately been somewhat of a revival of the positivist contempt for the question of the meaning of general relativity in recent years, but, owing to the influence of Einstein, who always recognized that physical theories are not mere formal systems, the great majority of astrophysics continue to try to *understand* the nature of cosmic space-time and of the forces that shape the destinies of astronomical objects (including black holes), and not simply to say, as Steven Weinberg now appears to urge, that sometimes it is more convenient to use one theory, and sometimes it is more convenient to use another, and there is no reason to ask which is really true.[11] It is precisely at the level of fundamental physic science, in fact, that it becomes clear that the sharp separation that the positivists thought they saw, and that our culture often takes for granted, between metaphysics and physics is most untenable. Both physics and metaphysics flourish most when they interact and interpenetrate, that is, when they push Sellars' question, "how things in the broadest possible sense of the term hang together in the broadest possible sense of the term".

3) and 4) [The issues about the nature of mathematics I listed] Although empiricists from Hume down to John Stuart Mill thought that mathematical knowledge was just ordinary empirical knowledge, no mathematician, to my knowledge has ever agreed. Nor have many non-mathematicians: the idea of an *experiment* to test if 3+5 are really 8, or if the Intermediate Value Theorem is really true, or if Fermat's Last Theorem (which should now be called "Wiles' Theorem) is really true, doesn't correspond to anything we are able to actually do or even conceive. But why doesn't it?

A variety of interesting answers have been proposed: that mathematics is about "mental constructions", that mathematical truths are really "grammatical" truths, that mathematics is simply logic in disguise, are among them. And some philosophers, including myself, have argued that the first two views (mathematics as about mental constructions and mathematics as "grammar") simply makes no sense of the success of applied mathematics, of what the physicist Eugene Wigner famously called "the unreasonable effectiveness" of mathematics, and that the third (mathematics is "logic in disguise") doesn't help even if it is right.

The intuitive interest of these questions about mathemathics is immediate. The positivists themselves couldn't resist opting for a combination

of the "logicist" view and the "grammatical" view, in spite of their having officially "banished" such metaphysical questions from their sanitized realm of the "cognitively meaningful"! Human beings are simply not going to give up asking "how things in the broadest possible sense of the term hang together in the broadest possible sense of the term".

5) [The issue about "induction"] The idea that there is anything like an "algorithm" for doing science is not one that any scientist I know believes in. A few years ago, speaking to an audience which contained at least 50 Nobel Prize winners I said, the following:

> I have argued that even when the judgments of reasonableness are left tacit, such judgments are presupposed by scientific inquiry. (Indeed, judgments of *coherence* are essential even at the observational level: we have to decide *which* observations to trust, which scientists to trust (sometimes even which of our *memories* to trust). I have argued that judgments of reasonableness can be objective. And I have argued that they have all of the typical properties of 'value-judgments'. In short, I have argued that my pragmatist teachers were right: 'knowledge of facts presupposes knowledge of values.' But the history of the philosophy of science in the last half century has largely been a history of attempts—some of which would be amusing, if the suspicion of the very idea of justifying a value judgment which underlies them were not so serious in its implications —to evade this issue. Apparently any fantasy—the fantasy of doing science using only deductive logic (Popper), the fantasy of vindicating induction deductively (Reichenbach), the fantasy of reducing given a mysteriously available set of 'true observation conditionals', or, alternatively, 'settling for psychology' (both are Quine's)—is regarded as preferable to rethinking the whole dogma—the last dogma of empiricism?—that facts are objective and values are subjective and never the twain shall meet.

—and not one of those scientists disagreed with me!

Nevertheless, if what we might call "the myth of Inductive Logic" is not one to which scientists themselves subscribe, it has had a powerful influence on the way lay-persons think about science—an influence which, I would argue, it is one of the functions of philosophy at its best to combat. In fact, the idea that beliefs about "facts" must be fundamentally different from "attitudes" towards values was supported by the most influential defender of the idea that values are "non-cognitive", the father of "emotivism",[12] Charles Stevenson, precisely by employing the claim that value judgments can't be verified by "induction and deduction" (while

"beliefs about facts" supposedly could be). Thus what began as a technical issue in epistemology, the issue about "induction", came to play a crucial role in discussions of the possibility of the rational discussion of value issues—an issue of immense importance to our culture.

6) [The significance of ordinary language] If "ordinary language" is just something to be sneered at, then is the whole vocabulary we have for describing the word of human agents to be either despised or else replaced by the "Newspeak" of some social science? To me it seems clear that the descriptions of human life we find in the novels of Tolstoy or George Elliot are not mere *entertainment*; they teach us to perceive what goes on in social and individual life. And such descriptions require the many subtle distinctions that ordinary language has made available to us. The question of the relevance or irrelevance of "how we speak" is not just a question for philosophers, although it is that too. It is a question for philosophers, because once ordinary language is laughed out of the room, philosophical theories are no longer held responsible at all to the ways we actually speak and actually live; but it is a question for more than just philosophers, because, at bottom, contempt for ordinary language is contempt for all the humanities.

7) [The issue about denotation and connotation] Here it is perhaps unnecessary to say that debates about "externalism" and "internalism" in the philosophy of mind and philosophy of language are not just debates for philosophers. This is one present-day scientific field in which philosophers and scientists (linguists and cognitive scientists) actually talk to each other and recognize the profit in doing so!

8) Nor is any "propaganda" is needed for the case that the question whether our minds/brains are best thought of as computers is important and exciting. Here too, philosophers and scientists do talk to each other and recognize the profit in doing so.

9) The case for the idea that facts and values are deeply entangled[13] draws on some of the best philosophical work of the last hundred years: on Quine's attack on the positivists' analytic/synthetic distinction, on the work done by some Wittgenstein's best followers (notably Iris Murdoch, Philippa Foot and John McDowell) on the way "thick" ethical concepts such as "cruel" resist "factorization" into a "purely descriptive" component and an "expressive" or "emotive" component, and on my own observations (some of which I quoted above) on the way in which the epistemic values which inform science are, after all, value concepts too. For

an number of years, in fact, I have argued that in science, and particularly in the social sciences, we are unavoidably dealing with an entanglement of facts, theories and values. It is like a three legged stool—all three legs are needed, or it falls over. The all-too popular idea that if something is a "value judgment" then it must be wholly "subjective" rests, not just upon shaky foundations, but on foundations that have completely collapsed. In my opinion, understanding this is vital if we are to regain faith the possibility and the importance of *rational debate about values*.

10) [The issue about "naïve realism"] This is an issue that is difficult to describe briefly, if only because we have been taught for so long that "naïve realism" was refuted by the discovery of the role of the brain in perception. But today a number of philosophers and some psychologists are begin to reexamine the issue. Again, it seems to be in the sciences of the mind that the idea of an opposition between science and philosophy is eroding.

Looking over this list, it is clear (to me, at least), that each of these issues is intellectually fascinating, and that failure to pay serious attention to them would be deleterious to science itself and to philosophy both in Cavell's sense, education for grownups, and in Sellars'; indeed, Cavell's comprehends Sellars', since a grownup who does not care if his view of things hangs together hardly counts as "educated".

5. *Another look at the history*

I began this lecture with particular account of the "crisis" of philosophy, a view made popular in Europe by Heidegger's *Sein und Zeit*. On that view, a natural one for an ex-seminarian like Heidegger, traditional philosophy was seen as "ontotheology". (Heidegger's solution to the crisis was that we should all become Heideggerians.) Another account of the "crisis", one I might have begun with instead of the one I gave, can be found in the writings of Bertrand Russell and also in the logical positivists. On that account, it was the realization that philosophy led to debates that are never settled, coupled with the supposed fact that "the new logic" could resolve the old unsettleable problems, that required that traditional philosophy be entirely replaced. But the list of problems I have just given does not presuppose that philosophy be a handmaiden to theology, and it suggests that "progress" need not consist in "settling" issues once and for all. Indeed, it does not consist of that in any serious area of human endeavor or inquiry that I know of. And those problems have quite old roots,

which suggests that philosophy was never just a handmaiden to theology, even if in the Middle Ages it was often urged to be that. To give a few examples: The issue about whether talk of unobservables in physical science is really "representational" (my *issue 1*), above) already appeared at the time of Berkeley and Hume, and is thus centuries old. (*Issue 2*), about quantum mechanics, is simply a contemporary spin-off, occasioned by the puzzling character of that theory). *Issues 3)* and *4)*, about the nature of mathematical truth, of course go back to Aristotle and Plato, but there have been a great many new and fascinating ideas about them in the last century and a quarter, both from mathematicians and from philosophers. *Issue 5)* about induction, goes back to the rise of the new science in the 17th century, and the idea of "induction" itself, of course, goes back to Aristotle, though he was not foolish enough to suppose it was an algorithm. *Issue 6)* is likewise centuries old, and the idea of externalism can even be found in scattered observations of both Leibniz and Kant. *Issue 7)* is new in one way and old in another; Aristotle's insistence that metaphysics must "save the appearances" can be viewed as a form of respect for ordinary language as against Platonic speculation. And *8)*, *9)* and *10)* likewise have ancient or early modern forerunners. In sum, philosophy was never just ontotheology, and even when philosophers were concerned with ontotheology, they were concerned with much more than that. That is a first reason that the idea of a fundamental "crisis" in philosophy, and "end of philosophy", is deeply mistaken. And if the questions of philosophy are indeed "unsettleable", in the sense that they will always be with us, that is a wonderful thing, not something to be regretted.

NOTES

[1] That the God of the philosopher is very different from the God of the ordinary believer is true, for example, whether the philosopher be Aquinas, or Spinoza, or Kant, or Hegel.

[2] Spinoza was an exception here, but Kant was not, although his immaterial soul existed only in the noumenal realm, as the "transcendental unity of apperception", and Hegel, characteristically wanted matter and soul to be in some sense identical-and-also-nonidentical.

[3] Husserl.

[4] RUDOLF CARNAP, *The Unity of Science* (London: Kegan Paul, Trench, Hubner & Co.; 1934), pp. 26-27.

[5] Later this was softened to the requirement that meaningful statements must be "confirmable or disconfirmable", and still later by still more complicated requirements. For a brief history see the first chapter of my *The Collapse of the Fact/Value Dichotomy*.

[6] Rorty on Derrida.

[7] STANLEY CAVELL, *The Claim of Reason*, Oxford, 1979, p. 125.

[8] WILFRID SELLARS, *Philosophy and the Scientific Image of Man*, in *Frontiers of Science and Philosophy*, ed. by Robert Colodny (University of Pittsburgh Press; Pittsburgh, PA; 1962);

reprinted in *Science, Perception and Reality* (Routledge & Kegan Paul Ltd; London, and The Humanities Press: New York; 1963) [Reissued in 1991 by Ridgeview Publishing Co., Atascadero, CA.], p. 37.

[9] For more details, see my *A Philosopher Looks at Quantum Mechanics (Again)*, British Journal for the Philosophy of Science, Volume 56, Number 4 (Dec. 2005), pp. 615-634.

[10] Bell's Theorem.

[11] For an excellent account of Weinberg's views, see YEMIMA BEN-MENAHEM, *Convention*, Cambridge, 2006, pp. XXXX.

[12] " [as the doctrine that value judgments are mere modes of emotional "persuasion" was called].

[13] Cf. *The Collapse of the Fact/Value Dichotomy*.