

**REALISM AND  
ANTIREALISM**  
**IN METAPHYSICS,  
SCIENCE AND LANGUAGE**

*Festschrift for Mario Alai*

*Edited by*

**Adriano Angelucci, Vincenzo Fano,  
Gabriele Ferretti, Giovanni Galli,  
Pierluigi Graziani, Gino Tarozzi**

**E**

*Epistemologia*

**FrancoAngeli**

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## **Epistemologia**

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La collana intende andare incontro a quell'esigenza, ormai generalizzata, di conoscenza epistemologica che si riscontra a livello di cultura medio-alta e che corrisponde, in senso lato, alla diffusa aspirazione a prender coscienza critica della complessa varietà della nostra civiltà scientifico-tecnologica. Aspirazione che si accompagna, altresì, al desiderio di venire in chiaro circa lo statuto epistemologico di molte discipline che solo di recente hanno rivendicato l'impegnativa qualificazione di «scienza», pur riguardando ambiti di ricerca non inclusi nell'alveo delle discipline scientifiche tradizionali.

Rispetto ad analoghe collane già esistenti, questa si propone anche di allargare l'ambito delle scuole e tradizioni epistemologiche finora più correntemente conosciute in Italia, e che si ispirano in prevalenza al filone analitico anglosassone, portando l'attenzione su opere e autori afferenti ad altre aree culturali, come ad esempio quelle di lingua francese, tedesca, polacca.

Verranno quindi pubblicati, sia in traduzione che in opere originali, alcuni testi base di carattere istituzionale relativi all'epistemologia generale e alle diverse branche della filosofia della scienza. Per altro verso, verrà dato uno spazio più cospicuo del solito all'epistemologia delle scienze «umane», alla filosofia della logica, alle tematiche etiche che di recente si sono aperte nei riguardi della scienza. Pur senza rinunciare ad opere di carattere tecnico, l'accento generale verrà posto piuttosto su quei tipi di trattazione epistemologica nei quali è più presente un taglio specificamente filosofico.

La collana si propone di essere utilizzabile anche per corsi universitari: a tale scopo, oltre alle opere di carattere istituzionale cui si è fatto cenno, annovererà anche alcuni «readings» antologici, sia a carattere miscelaneo che monografico.

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## *Introduction*

Adriano Angelucci, Vincenzo Fano, Gabriele Ferretti,  
Giovanni Galli, Pierluigi Graziani, Gino Tarozzi

Great scholars in philosophy possess a keen analytical mind, excel in logical reasoning, and exhibit meticulous attention to detail. They rigorously define terms, avoiding ambiguities and errors. Originality and the willingness to challenge conventions are their hallmarks. They make significant contributions across various philosophical fields. They transparently address the exact aim of their research, and what it is not. Finally, they anticipate the impact of their theories on the current literature, and how such an impact should blossom across the future generations. In this respect, great philosophers address open problems and propose big questions for the foreseeable research efforts of those who will follow.

Mario Alai embodies the qualities of a great scholar in philosophy, and the various essays in this volume are an evidence to that. It is challenging to condense a lifetime of research in one book. However, the Editors of the present volume's aim was to face this challenge, to make a collection dedicated to Mario Alai's work not only *possible* but, as metaphysicians would say, *actual*. The book attempts to bring together the reflections of three different generations of scholars - i.e., mentors, colleagues, and students - on Alai's thought.

Viewed from this perspective, the extensive and valuable contributions that follow, crafted in honor of Mario Alai and his scholarly endeavors, come as no surprise. All the chapters focus on a theme that was very dear to the philosophical curiosity of Mario Alai. Moreover, in engaging with these different topics, the plethora of contributions gives us a sense of the work by Alai.

To make sense of the different contributions as a unified enterprise, this volume is organized into three sections, which seek to gather writings that revolve around Mario's most substantial contributions, while elucidating their contemporary significance in the global discourse. Moreover, it endeavors to offer precious insights into the origins and development of these

contributions, as observed through Mario's writings and responses. This represents a sort of *closure of the theoretical circle*, clearly showing how the work by Mario Alai has been appreciated through different generations, originating from his relation to his mentors, on the one hand, while also shedding new light on his students' research interests, on the other.

Editing such a wealth of material was, again, no small feat. Still, the taxonomy we have chosen for this book will assist readers in navigating the profound depths of Alai's philosophical research. Consequently, the book is structured into the following three parts:

1. *Realism in History of Philosophy, History of Science, and Metaphysics.*
2. *Scientific Realism.*
3. *Realism in Philosophy of Language, Epistemology, and Experimental Philosophy.*

Each contribution actively participates in a substantial conversation with Alai's body of work, as a deep theoretical dialogue between the author and Mario. Consequently, it appeared fitting to let Alai conclude this conversation, with direct responses to these philosophy-provoking pieces in his honor. We shall refrain from further commentary on the works within this book and allow them to express their significance independently to appreciate the river of ideas flowing through Mario's work<sup>1</sup>. Beyond their philosophical substance, they are a vivid testament to Alai's enduring dedication and ongoing contributions, in different moments of his research life.

<sup>1</sup> Most of the papers published in this volume were presented at the Conference "*Realism vs. Antirealism in Metaphysics, Science, and Language*", held at the University of Urbino on April 11-13, 2023. The Conference was supported by the Italian Ministry of Education, University and Research through the PRIN 2017 program "The Manifest Image and the Scientific Image", Prot. 2017ZNNW7F\_004.

# *How I Developed My Views on Realism*

Mario Alai

First, I wish to thank very much all the organizers and the participants in the beautiful conference whose proceedings are collected here<sup>1</sup>. Ending my academic career in such a rewarding way surpassed all my dreams. Whatever right or good one does or achieves in one's life, it is never to be credited just to one's own personal effort, but in large portion also to those with whom one has lived and worked. So much more in philosophy and teaching. Most of the participants and all the contributors to this book are people to whom I acknowledge such credit and whom I wish to thank very much for this.

Retirement is like academic death, so at this point I wish to confess my sins: I have been an antirealist! In fact, in retrospective, the development of my ideas may appear as one from antirealism to realism. At a closer look, however, things are more nuanced. Certain doctrines by Quine, Kuhn, and Putnam are valuable because they offer a more concrete and problematic picture of knowledge, science or language. Originally, I subscribed to them because I didn't think they were as antirealist as they actually were. In the long run, however, I criticized them, because I thought there was no need to be as antirealist as they actually were. Perhaps this explains my particularly moderate version of realism.

## **1. The beginnings: Bologna and Urbino**

As an undergraduate in Bologna, I studied philosophy of science with Alberto Pasquinelli, a student of Carnap, who taught logical positivism as the orthodox view in the field. Soon, however, I began to look at some alternative conceptions, like Popper's, Kuhn's and Quine's. In 1975 I discussed my *Laurea* dissertation *Linguaggio e conoscenza in W.V.O. Quine*

<sup>1</sup>“*Realism vs. Antirealism in Metaphysics, Science, and Language*”, University of Urbino, April 11-13, 2023.

with Alberto Pasquinelli and Marco Santambrogio. In Quine's philosophy I liked the conjunction of strict empiricism with holism, the rejection of epistemological foundationalism and of intensions, the criticism of the distinctions between analytic and synthetic and between factual and linguistic questions, the naturalization of epistemology, and the role of certain *a priori* elements, however local and transient, in knowledge (p. 296).

Thus, I defended his extensionalism against Carnap (pp. 297-305) and Hintikka (pp. 305-311), arguing that the notion of meaning, i.e., intension, has a precise sense only when its identity conditions coincide with terms, and that when comparing two theories, meaning variance can be overcome only pragmatically, by approximation (pp. 312-315), and as long as theories are not radically different.

However, I felt somewhat uneasy about the loss of propositional attitudes, communication at home, kinds, causes and modalities in science. Therefore, I suggested that, as a possible alternative, one could assume as primitive intensions rather than extensions (pp. 317-319). Besides, building on suggestions by Dummett, Kripke and Davidson<sup>2</sup>, I proposed to base intensions on intentions: the indeterminacy of reference at home is avoided by the *intention* of the speakers (exercised in their social linguistic practice) to talk about the same object; thus, meaning and reference are not identified and communicated ostensively, but emerge from that intention (pp. 325-328). Initially, our knowledge of meaning is purely intralinguistic and translation is impossible (pp. 329-330). However, whenever people intend and try to communicate, even across dialects or languages, in the long run this very intention establishes common meanings (pp. 331-333).

In 1975-77 I taught Religion in high school and enrolled in a master program at the University of Urbino. My final dissertation concerned the comparability of theories and the rationality of science in Kuhn, Lakatos and Feyerabend<sup>3</sup>. I agreed with Kuhn that experience is theory-laden, that all empirical controls presuppose some at least contextually *a priori* assumptions, that there are no transcendent rationality criteria, and that the choices about verification, falsification, etc., which are made in accordance with different paradigms may be equally rational.

<sup>2</sup> Dummett 1974, pp. 516, 526; Kripke 1974, p. 516. According to Kripke we have a correct first-person intuition of the intensions, hence, if I am bilingual, I know that 'rabbit' and 'lapin' mean exactly the same (1974, pp. 480-481). Davidson (1974) argues that one cannot build a theory of meaning from non-semantic bases, and analyticity and meaning exist only relative to one theory or another. I discuss these suggestions at the pp. 339-352.

<sup>3</sup> *Il problema della confrontabilità delle teorie. Note sul carattere razionale della scienza*, 1977, directed by Icilio Vecchiotti.

However, I maintained that all this did not justify Feyerabend's irrationalism, because the concept of rationality we always employed, the only possible one, is a relative and immanent concept (pp. 99-104). Moreover, I argued that this view was a coherent development of the Kantian subjectivist tradition in Western thought (including, for certain aspects, Popper and Lakatos themselves). Kuhn's picture, however, was better, because it acknowledged that there is a plurality of *a priori* frameworks, and they can change over time (pp. 108-110).

Yet, I noticed that Kuhn's perspective raised the problem of the genesis and justification of paradigms, and answering that they are conventional would be forfeiting realism, as Popper points out (p. 99). That was probably my first ever explicit remark about realism.

In the "new philosophies of science" of Kuhn, Feyerabend and others (also influenced by the later Wittgenstein, Quine, and others) one can distinguish two main themes, with three potential antirealist consequences, with which I came to deal in my subsequent development: the first theme included the doctrines of incommensurability, of the internal nature of empirical controls and rationality, and of the theory-ladenness of observation. They entailed that (1) science was non-empirical and non-rational, and that (2) knowledge is phenomenal and relative. This is to say, they entailed epistemic relativism and metaphysical and/or gnoseological antirealism (i.e., idealism or constructivism of some sort). These consequences included science, but they concerned knowledge in general.

The second theme in the "new philosophies of science" was the "pessimistic meta-induction" (PMI), suggesting that all the theories advanced in science in the long run will be rejected along with the entities they postulate, like the theories of phlogiston, caloric, ether, spontaneous generation, chrySTALLINE spheres, etc. This entailed that (3) there is no theoretical truth or progress in science, i.e., scientific antirealism (which, unlike (2), concerns just theoretical science).

## **2. Helsinki**

From 1977 to 1979 I held a scholarship at the Philosophy Department of Helsinki University, where I met von Wright, Hintikka, Stenius, Saarinen, Tuomela, Rantala, and Ilkka Niiniluoto. In that environment I continued to reflect about intensions, and eventually, over the years, I developed a full-fledged defence of intensions, synonymy, analyticity: initially I argued that, in spite of being relative to language (hence to time), they are real and play important roles in language and thought. Subsequently, however, I

distinguished between intensions, propositions, synonymity and analyticity, which are abstract, hence eternal, and the *expression* of certain intensions or propositions by certain words or sentences, which is local and transient<sup>4</sup>.

In philosophy of science, instead, I worked with Tuomela, Rantala, and Ilkka Niiniluoto. Through Wolfgang Stegmüller's *The Structure and Dynamics of Theories*, I discovered the so called "structuralist" or "semantic", or "non-statement" view of scientific theories, developed by Suppes, Sneed, van Fraassen and Fred Suppe.

Stegmüller argued that Kuhn's meta-scientific concepts and claims could be rephrased in the structuralist perspective, and when so rephrased they allowed to compare theories and find reduction relations among them. The incommensurability problem derived only from the neopositivists' conception of theories as linguistic entities. Thus, I began to see that perhaps a broader view of science, taking into account scientific dynamics, supra-theoretical entities, theory-ladenness and local *a priori* structures, could be compatible with the empirical and rational character of science. Niiniluoto's work on verisimilitude and the comparison among theories was also quite helpful in this respect. Thus, in 1979 I wrote a *Laudaur* essay on these topics under his guidance.

Eventually, I became convinced that the problem is not whether theories really *are* sets of statements or of models, because statements identify models and models are describable by statements. What matters, however, is that questions in philosophy, in particular in philosophy of science, are not *just* linguistic questions, as the logical positivists believed.

### 3. Maryland

I made further progress in this direction in 1980, when I got a Fulbright Scholarship and enrolled in the Ph.D. program at the University of Maryland, with the intention to study the structuralist view with Fred Suppe. I see from my semester papers of 1980 and 1981 that I still believed that incommensurability was at least possible in principle, even if not necessary and in practice.

In the semester paper *Kuhn's Paradigms: From Reality to Possibility* (October 10, 1980), I wrote that although incommensurability is possible in principle, it is not possible in practice. But even if it were, progress would be possible in four different senses, and paradigms concerned with different

<sup>4</sup> Alai (1981); (1994, pp. 165-176); (2021, §§ 8.2).

problems need not be incompatible. In another semester paper, *The "Stegmüller Approach" to the Structure of Theories* (Fall 1981), I gave a thorough account of the Sneed-Stegmüller's approach, of its consequences and of the related literature, discussing various criticisms (among which some by Tuomela) and replies<sup>5</sup>. I then concluded that Stegmüller had effectively reacted to all objections – either by answering them, or by softening his position: the non-statement structure of theories and the existence of an intertheoretical reduction relation, in the end, were proposed by him as a concrete possibility, not as a general exceptionless rule. Two of his claims remained unchallenged, however:

that the Ramsey sentence must express the empirical claims of a theory containing theoretical terms; and that (while the structuralist approach accounts for and supports various of the Kuhnian features of science), paradigm shifts do not logically imply incommensurability.

However, from Suppe's masterpiece book *The Structure of Scientific Theories*, I learned more details about both the evolution of logical positivism and the "new philosophies of science". Above all, I learned that current philosophical research had by then moved beyond both those phases: not just Lakatos, but people like Putnam, Achinstein, Harold Brown, Nickles, Laudan, Darden, Shapere, were offering a more balanced, concrete and realistic analysis of scientific practice.

According to them science was empirical not *in spite of*, but *thanks to* the local *a priori* constraints: moreover, science was *rational*, although *what* decisions are rational at each time depends on the conceptual and evidential background at that time. Dudley Shapere himself taught at Maryland University, and following his course was extremely important for me. Other helpful readings were Marcello Pera's *Apologia del metodo*, Aronson's *A Realist Philosophy of Science*, and Kosso's *Reading the book of Nature*.

Again, I learned from Putnam's writings that incommensurability was a consequence of the descriptivist (i.e., in effect, verificationist) conception of meaning and reference, which paradoxically Kuhn and Feyerabend shared with their logical positivist opponents. Thus, I definitely realized that the antirealist consequence (1) of Kuhn's philosophy (that science is not empirical or rational) could be overcome<sup>6</sup>.

<sup>5</sup> I published an improved final version of this paper as (Alai 1985).

<sup>6</sup> I took this stand in the semester papers *Supra-theoretical Entities and the Semantic Conception*, Phil 808 (prof. Suppe, Fall 1981), and *A "Bootstrap" Conception of Philosophy of Science*, Phil 808 (prof. Shapere, Spring 1982).



Putnam's causal theory of reference also meant that not any theoretical change implies a change of reference, so we don't need to believe that all the objects postulated by superseded theories just don't exist. This was a first step to tackle also the antirealist consequence (3), the PMI. However, as recognized by Putnam, this was not decisive, because it doesn't apply to extreme cases like caloric, phlogiston, or the chrySTALLINE spheres. This problem remained thus open until I began to study scientific realism (SR), and selective realism in particular.

#### **4. From Metaphysical Anti-realism to “Sophisticated” Metaphysical Realism**

Still during my years in Helsinki, I had become interested also in Rorty's attack to the “mirroring” conception of knowledge and in Putnam's rejection of his earlier metaphysical realism (MR), which took place around 1975 and 1976. Putnam had been wondering how to keep SR in face of the PMI, and he was troubled by Goodman's problem of incompatible but equivalent descriptions in science, i.e., by the problem of conceptual relativity. Moreover, having given up his previous causal theory of reference, he was at loss to understand how language could refer to subject-independent reality. Thus, after some wavering, he found a way out in Dummett's verificationism, more sophisticated and radical than neopositivist verificationism. So, he concluded that reference, truth, and SR itself, could be reconstructed verificationistically as epistemic notions, *internal* to one framework or another.

Initially he thought that such a strategy couldn't possibly work, since verificationism could not accommodate scientific truths like «Venus might not have carbon dioxide in its atmosphere even though it follows from our theory that Venus has carbon dioxide in its atmosphere» (1978, pp. 35-37, 108-109). Shortly after that, however, he recognized that this anti-verificationist argument was fallacious (Alai 1988; Alai 1989, § 5), so embracing Dummettian verificationism and rejecting MR.

I instinctively liked his new approach, because it somehow included Quine's holism, Kuhn's epistemic pluralism, and Kant's role of the *a priori* elements in science. However, it wasn't completely clear to me what radically idealistic and relativistic consequences all this could have (i.e., in practice, the antirealist consequences (2) of Kuhn's philosophy). Indeed, I hadn't realized to which extent these authors (beginning with Kant himself) embraced those consequences.

One day, however, I told Hintikka about my “Kantian” leanings, and he suggested me to read C.I. Lewis’ *Mind and the World Order*, from which I got the idea that the objectivity of knowledge is compatible with the fact that the mind, in a sense, “organizes” the world. Therefore, I started to defend Putnam’s “internal realism”, arguing that

(\*) conceptual pluralism, holism and the *a priori* need not entail subjectivism and relativism.

Little by little, however, as I understood Putnam’s new position better, I realized that actually it was a subtle form of metaphysical antirealism, so I went on pressing (\*), this time, however, as a criticism of Putnam.

I was roughly half-way on this realization when I arrived at Maryland, and in certain semester papers of 1981 and 1982 I began to develop a sort of “sophisticated” MR: although there are alternative conceptual schemes, each one can reveal certain objective aspects of reality. Once a conceptual scheme is fixed, the claims made within it are objectively (absolutely) true or false. I also subscribed to truth as correspondence, to the mirroring metaphor of knowledge, and to SR.

Thus, my Ph.D. dissertation was *A Critique of Putnam’s Antirealism*, tutored by Allen Stairs (Alai 1989): I maintained that although knowledge has subjective, conventional, and *a priori* features, its content is the subject-independent reality. I also argued that since Putnam’s “internal” realism had a verificationist basis, not only it forfeited the objectivity of knowledge (like Kant and Kuhn), but it preserved SR only nominally.

Therefore, in order to criticize his antirealism, I needed to (a) reject radical verificationism, by answering Dummett’s acquisition and manifestation challenges; (b) solve Putnam’s problem of how reference get fixed; (c) oppose Goodman’s constructivism; (d) reconcile the relativity of knowledge with objectivity. I tried to carry out these tasks in that dissertation, but I completed (c) and (d) only subsequently, with my 1992 doctoral dissertation in Florence.

Surprisingly, I found the tool for (a) in Dummett himself: bivalence is the mark of realism. Therefore, the use of bivalence shows that we attribute realist meanings to sentences. Besides, negation, comparatives and mathematics are devices which take meanings beyond actual and possible observation: for instance, meaning may assigned to the word ‘electrons’ by explaining that they are non-observed objects, smaller than such and such size, etc.

I dealt with (b) by criticising Putnam’s model-theoretic paradox, arguing that it’s not truth-conditions that fix meanings, but the other way round, and that meanings are basically fixed by ostension and intentions, after all, *pace*

Wittgenstein (Alai 1994, pp. 165-176; 2021, § 8.3). I pointed out that Putnam's indeterminacy of reference, like Quine's, has basically the same root as Goodman's «new riddle» of induction and of Kripke's sceptical interpretation of Wittgenstein's discussion of rule-following, viz., their nominalism. In fact, their respective paradoxes are actually reductions to the absurd of nominalism: one cannot explain why computation, induction, *and* language work, unless (i) there exist abstract entities, i.e., universals, or at least objective similarities vs. differences, and (ii) the human mind can distinguish and grasp them. Once this is granted, everything falls easily into place, and we can explain how reference is fixed (Alai 1991; 1995; 2021, pp. 348-350).

Once I sent to Putnam a copy of my dissertation, but I never got any feedback. Later, however, he largely recanted his antirealism, shifting to a position much closer to mine, although I suppose this was the fruit of his own ongoing development, rather than a reaction to my criticisms (Putnam 1994, 2012, chs. 3, 4).

## 5. Florence

In 1987-1991 I was awarded a new doctoral scholarship by the University of Florence, which I used more or less as a post-doc. In 1992 I discussed the final dissertation, entitled *Conceptualizations and the Knowability of the World: a Defence of Metaphysical Realism*, co-directed by Antonio Santucci, Eva Picardi and Claudio Pizzi. In it I generalized my defence of sophisticated MR against various other arguments, such as those from the “veil of perception” and from the “veil of conceptualization” (e.g., some by Rescher, Rorty, and others).

Moreover, I countered Goodman's and Putnam's argument from “equivalent descriptions” by arguing that such descriptions are alternative but not contradictory, therefore they may well represent the same objective reality, although in different terms or under different respects. Granted, the world is not self-sorted (as assumed by “naïve” MR), since it is *we* that sort it by “description schemes”, whose choice is pragmatic and conventional. Yet, which sentences are true or false within each description scheme is an objective question. (Carnap too considered internal questions objective, but meaning that they are empirical, i.e., non-metaphysical (1950), while for me both empirical and theoretical sentences can be metaphysically true or false, once a particular scheme has been specified).

Goodman and Putnam had already considered this “sophisticated” position, but they objected that there are *so many* different description

schemes, that one and the same sentence may turn out to be true in one description and false in a different equivalent description, while *no* sentence is true within *all* possible schemes or equivalent descriptions. Therefore, they concluded that we cannot describe the world “in itself”, which is «a world well lost». We know only a *phenomenal* world of our own making (Goodman 1978).

For instance, since position and motion are relative concepts, the sentence ‘The Sun orbits the Earth’ is false within our ordinary scheme (1), but it is true within a scheme (2) which takes the Earth as the origin of its spatial coordinates. The same happens for all the alternative ways of subdividing and grouping entities, ontological categorizations (e.g., as objects or as properties), projection schemes (e.g., geographic projections), measuring units, etc.

My reply was that when the same *sentence* has different truth-values within different schemes, this is because in each scheme it expresses a different *proposition*. Hence, what it says in one scheme is compatible with what it says in the other, and the truth of propositions is not relative. For instance, when the sentence ‘The Sun orbits the Earth’ is used within in scheme (1), it actually expresses the proposition ‘The Sun orbits the Earth *from the viewpoint of scheme (1)*’, but when it is used within scheme (2), it expresses the proposition ‘the Sun orbits the Earth *from the viewpoint of scheme (2)*’.

It has also been objected (for instance by Rorty) that, however, we cannot say how the world is *in itself*, because we can tell this only in our own terms, by describing it through one scheme or the other, therefore we can only tell how the world is *for us*. I replied that this is a non-sequitur: of course, we must describe it in *our own terms* (not from a God’s eye point of view), still in this way we can know how it is in itself, because knowledge is a function of two arguments, the world and our scheme of description. Therefore, as long as our representations co-vary with the world, they are objectively, metaphysically true: the objectivity of relative knowledge is warranted by this correspondence relation. In other words, knowledge is in an important sense structural, as stressed by Poincaré, Schlick, Carnap, and many others.

In order to press these points, I also defended the distinction between factual and linguistic questions rejected by Quine, and the distinction between scheme and content attacked by Davidson. Thus, in 1992 I was finally settling my old accounts both with Quine and with the antirealist consequences (2) of Kuhn’s philosophy (subjectivism and relativism).

## 6. Scientific Realism

At that point, however, I realized that in my writings I had just countered two powerful arguments against metaphysical and gnoseological realism: (a) radical verificationism (based on the acquisition and manifestation problems), and (b) conceptual relativism (the problem of incompatible equivalent descriptions). That is, I had shown (to my satisfaction at least) that it was *not impossible* for us to know how the world is in itself. But do we actually know it? I had not offered any *positive* argument to this effect, yet.

For instance, the sceptical challenge was quite open: how can we prove that our representations are actually true of the world in itself, i.e., that an independent world exists at all, and that our representations of it are not completely distorted by a brain-in-vat-like mechanism, or simply by a radical inadequacy of our cognitive systems? Indeed, I had kept that challenge in place myself, by rejecting verificationism, whose ultimate aim is reducing scepticism to senselessness (as Putnam had tried to do by his *brain-in-vat* argument).

Moreover, I was aware that to offer such positive arguments I had to proceed on the dangerous and insidious ground of metaphysics, and I didn't know how to support synthetic claims in metaphysics. Thus, I decided to explore how *scientific* realists argued for their claims and see whether anything similar could be done for *metaphysical* realism. Somehow, semi-consciously, I was assuming that the methods and standards in philosophy of science might be, if not scientific<sup>7</sup>, at least *science-like*, or at any rate safer than those in metaphysics. This is how, around the turn of the century, I started to work on SR. My first paper on this subject was Alai 2003.

In the over 20 years during which I have been working on SR my ideas have gradually grown and developed, without however undergoing radical changes like those on scientific rationality and MR. Therefore, I don't need to present them here, since they are spelled out in my publications and a clear account of them is given in this book by Dieks, Fano, Marcacci, Niiniluoto, Buzzoni, Galli, and in great detail by Morganti and Cordero.

<sup>7</sup> As I argued in Alai 2012, SR is not itself a scientific doctrine, but a philosophical one.

## 7. Back to Metaphysical Realism (and Scepticism)

The so called “no miracle argument” (NMA) is a powerful (perhaps the most powerful) argument for SR. It hinges on the practical impossibility of “miraculous” (i.e., extremely unlikely) coincidences, and I began to think that perhaps some variants of it could also supply the positive support for MR I was looking for.

For instance, looking at the world, our perceptual contents are (1) regular (i.e., either (1.1) uniform, or (1.2) changing in a regular and continuous way) and (2) independent of our will or imagination (as stressed, for instance, by Umberto Eco (2012), Maurizio Ferraris (2012), etc.). Now, MR explains this by assuming that our perceptions constitute the way in which an objective and regular external world appears to us. In other words, they are the values of a function which takes as arguments the world and our cognitive system. Therefore, we *know* the subject-independent world, and we know it in the correspondence sense of knowing.

According to metaphysical antirealism, instead, those perceptual contents have nothing to do with the subject-independent world (if it exists at all), they are just subjective phenomena. If so, however, why are they so regular? There are four possible explanations:

(1) Each singular sensation or *erlebniss* is ontologically independent of all the others, and their regular coordination is a pure coincidence. However, a simple calculation shows that such a coincidence would be so improbable that statistically it shouldn't happen even once in the life of the universe.

(2) Singular sensations or *erlebnisse* are coordinated by our own mind. Still, this seems impossible since they are independent of our will or imagination.

(3) They are coordinated by God (as assumed by Berkeley) or by an Evil Demon (as assumed by Descartes's sceptic). Yet, this would be a miracle, but miracles don't exist (or at least, it is rational to avoid miraculous explanations).

(4) Sensations are produced and coordinated by the computer of a mad scientist who keeps our brain in her vat. However, this explanation is more complex than the explanation provided by SR: in order to exactly mimic the perception of an external world, the computer should run a program at least as complex as the external world, and the computer and the scientist themselves would add further complexity. Therefore, explanation (4) is implausible because it violates Occam's razor.

I have used some variants of this argument (Alai 2005; 2009; 2017; 2023). Besides, while the regularity of perceptions shows that they are not radically distorted, the success of science, in particular of its stunning novel

predictions, shows that even theorization does not radically distort reality. A very clear account of my views on metaphysical realism, including both my negative and positive arguments for it, is offered in this volume by Ilkka Niiniluoto.

Obviously, the just sketched argument from the regularity of sensations is both an argument for metaphysical realism, and against scepticism on the external world. In fact, my anti-sceptic strategy is not arguing that the sceptical scenarios are impossible, and/or scepticism is meaningless or contradictory, like certain idealists do, and Putnam did with his brain-in-vat argument. Their arguments, in fact, involve idealism or some sort of verificationism, hence the rejection of MR: as Putnam remarks, the price of holding MR is acknowledging the possibility of sceptical scenarios, i.e., the *meaningfulness* of scepticism.

Unlike them, however, I believe that we should be happy to pay that price. Still (as Allen Stairs first pointed out to me), that scepticism is meaningful does not entail that it is true. That sceptical scenarios are possible does not mean that they are real: my argument is that they are possible but astronomically improbable, or if you will, logically possible but practically impossible.

I have also argued that certain other contemporary anti-sceptic strategies (like contextualism, or the relevant alternatives strategies) are unsatisfactory because they don't counter scepticism head-on, they only block it when ordinary knowledge is concerned, confining it to the philosophical sphere. The latter, however, is precisely where it has its most proper ground.

I have applied arguments of this kind to scepticism on different subjects, like induction, other minds, and the past. Besides, I have argued that contemporary conspiracy theories (like those about the Moon landing, the Twin Towers attack, chemical trails, vaccination, or more recently the Covid-19 pandemic) use the same argumentative strategies of philosophical scepticism and can be debunked in similar ways (Alai 2019).

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***Realism in History of Philosophy,  
History of Science, and Metaphysics***



# *The Long History of Realism in Western Philosophy*

Evandro Agazzi

In 2009, Mario Alai edited a volume *Il realismo scientifico di Evandro Agazzi*, containing the proceedings of a conference organized by the Department of Philosophy of the University of Urbino in 2006. My participation in this *Festschrift* in honour of Alai reciprocates that homage paid to me by my Urbino friends, but my personal and intellectual ties with Mario are much deeper and significant. In fact, I had the opportunity to discuss with him, during the gestation of my book *Scientific Objectivity and its Contexts*, the fundamental theses of my conception on the subject of scientific realism and realism in general. The importance of that confrontation is attested by the fact that Mario Alai's name appears (alongside those of prestigious international epistemologists) among those scholars whom I have felt the duty to thank, in addition to the fact that I have also mentioned him in that work published by Springer in 2014. For these reasons my contribution to the present volume will not deal with the technical issues of the realism debate, but offer an historical overlook of the evolution of the concept of realism, and it concludes with a summary of the more specific way of my defence of realism as a logical consequence of considering science and human knowledge in general as an effort of establishing true propositions that necessarily entail the existence of their intended referents.

## **1. The ontological sense of the question of realism**

In the history of Western thought, for a long period of time the question of realism has been strictly *ontological* in nature, according to two distinct ways of understanding this adjective: first, as an attempt to determine which are the entities that “really exist”; second, as an effort to specify what “kind of reality” belongs to certain entities. Historically, the problem of realism

arose, in the Middle Ages (especially in the Scholastics of the XII century), when the above ontological questions were debated with regard to those well determinate entities that were called *universals*, that is, in essence, genera and species. In the midst of that debate, some positions emerged that were denoted as *realist* (though according to different shades of meaning), to which others were opposed that we could call anti-realist (also not univocally). In fact, the two extremes are constituted, on the one hand, by the so-called *extreme realism* (according to which genera and species “really exist” in themselves in the guise of immaterial substances) and, on the other hand, by *nominalism* (according to which universals have no existence, but simply a linguistic function, being reduced to pure “names” that serve to group individual representations having a certain similarity). This last position can be called *anti-realist* in a strong sense (but always taking into account that it concerns the reality of “certain entities”, i.e. of the universals). Within this dichotomous polarity of extreme realism/nominalism there have been many intermediate solutions, more or less sophisticated, which attest the richness and charm of the metaphysical positions of the medieval debate, and which are usually summarized under the names of *conceptualism* and *moderate realism*. They are characterized by the fact that they do not answer with a peremptory yes or no to the question of whether universals exist, but rather determine what “kind of existence” can pertain to them. Thus, while the “extreme” realists attributed to universals a *substantial* reality in a world analogous to the Platonic world of Ideas, the conceptualists argued that universals do have an existence, but only in our minds (i.e. as concepts). However, with this, they kept their distance from the positions of the nominalists, according to whom universals do not exist even as *entia rationis* because they are only “names”. We could say that they were recognized a simple existence of *linguistic* type. To these positions was added the one called *moderate realism*, according to which universals do not exist in themselves, but exist in certain respects *in re* (i.e. *in things*, insofar as they are certain properties which individuals of a given species or genus *really have in common* and which distinguishes them from individuals of other species or genera). Moreover, again according to moderate realists, universals also exist *in our intellect*, as representations of those general characteristics that they embody in things.

Why have I summarized this rich medieval debate? In order to clarify that at those times never the following question occurred: “when we know the world, do we actually know *reality* or not”? This is the question that characterizes *epistemological realism*, quite different from the *ontological* questions that animated the debate on universals. On the contrary, we can say that all the theoretical positions that emerged in that debate shared an

undoubted *epistemological realism*. In short, it was taken for granted that, when we know, we know *the real*. The reasons that led to assume this realist position can be summarized in the following question: if we do not know the real, what do we know? The real was still conceived somewhat radically as whatever is present to the mind. Good or bad, one cannot know without knowing *something* that is, evidently, actually *real*, as the mind merely “opens” to reality.

## 2. The epistemological (i.e. gnoseological) sense of the question of realism

Who can assure me that what I know is actually the real rather than something else? This question represents a kind of watershed between “classical” and “modern” philosophy, precisely because it expresses a problem that classical philosophy had not explicitly posed, and that instead to moderns (and still to us), seems very clear and fundamental: how can we know that the “external world”, beyond our representations, is identical to the world I *represent* to myself? With modernity, however, the tacit assumption holds that we know our *representations or ideas* and not the real. This is the non-figurative sense of the “exteriority” mentioned above: it expresses that “presupposed epistemological dualism” that has imposed on modern philosophy an impossible task, that of *knowing* how the real is “outside knowledge”.

These are clearly formulated (with their respective attempts at solution) in Descartes, and were taken up by various modern philosophers up to and including Kant: between thought and reality there is a gap that is difficult to bridge, if we start from the assumption that the act of thought and the real world are two completely heterogeneous and clearly separate realities.

Faced with such issues, we could ask: on the basis of what evidence or arguments can we say that what we know is, for example, the representation of the bottle and not the bottle itself? There is no justification for such a statement, which, moreover, is based on another presupposition: that the “external” world exists. In fact, how can we affirm that the world exists, if we do not know it? In fact, we assume, first, that the world exists; then, second, we strive (indirectly) to know it even though we know directly only (its?) representations.

These are the contours of the issue of realism in modern thought, which now has an almost exclusively epistemological sense. Accepting that we know our representations (ideas) and not the real objects, are qualified as *realists* those who believe that, albeit through indirect guarantees, we come to know *reality* as it is, while are qualified as *idealists* those who believe that

our knowledge cannot go beyond the *ideas* and does not attain reality. In this way, the concept of *realism* is determined by opposition to *idealism*, initially on an epistemological level, but it soon expanded to the ontological level when, with Berkely, the *esse* was reduced to *percipi*, that is, when the existence of things depended on their being known by some subject. At first, this position was considered extravagant and, for example, in the *Critique of Pure Reason* Kant devoted a paragraph to the «Rebuttal of idealism» and specified his position qualifying it, at the same time, as a «transcendental idealism» and an «empirical realism», believing that the thought could be attributed the ability and the function of constructing the objects of knowledge, but not that of constructing reality. However, the later German transcendental idealism, denying the otherness of being and thought supported the thesis of the *ontological identity* of both and made reality a product of thought.

### 3. Science and realism

Now we want to consider the problem of *scientific realism* and ask whether or not modern science has been realist (and up to what point). The answer is that yes, modern science has been realist from its Galilean origins until the end of the nineteenth century, and it has been so in both an ontological and an epistemological sense.

The “Galilean revolution” is implanted on a solidly realist ground in the ontological sense, that is, as a new methodological proposal for a better knowledge of the “natural substances” that exist in *rerum natura* and are what they are independently from our knowledge of them. Galileo, simply, was convinced that nature could be studied much better if, instead of striving to understand its mystery by grasping by “speculation” the *true and intrinsic essence* of physical bodies, we limited ourselves to investigate some *affections*, that is, to study certain well-defined *properties*, asking, so to speak, to nature itself some precise questions and forcing it to answer them through experiment.

Galileo did not use the word *phenomenon* in his writings, and we can see the reason for this in the fact that, for him, the “apprehensible” natural aspects coincided with the real aspects of the world. This term, however, occurs abundantly in the writings of Newton, but it is necessary to clarify what is the meaning of phenomenon for the great English physicist. It is certainly not the Kantian sense! For Newton phenomenon is only what is *shown*, that is, what is *manifest* (while for Kant phenomena are «pure appearances»). According to the old authors, the explanation of phenomena

had to consist in deducing them from the essential properties of things, as they were contained in their respective substantial forms. In line with Galileo, Newton rejects this methodology: when science tries to explain phenomena, it can postulate certain causes, provided that they are not abstract and occult realities, but characteristics inductively derived from the experience of what is manifest. In this he revealed his empiricist conceptual framework, which gave to induction the primary importance. It is a fact, however, that the rapid development of the new mechanical science, and its rigorous mathematical dress, led to the general belief that it offered a universal and necessary knowledge about the physical world.

It may therefore be surprising that the first explicit anti-realistic interpretation of science was offered by the philosopher who nurtured a great admiration for the new physics and, moreover, considered it as a knowledge endowed with universality and necessity. This is, of course, Kant; but this can be explained if we consider that he also crushes scientific knowledge within the “epistemological dualism” mentioned above.

#### **4. The crisis of realism in science**

Whereas Kant’s transcendentalism, while renouncing intellectual intuition, continued to attribute to the intellect the function of being the “constitutive” factor of the horizons of intelligibility of reality, the positivist approach instead rejects intellectual intuition and also the function of intelligibility of the intellect and declares its intention to limit itself to a description of phenomena and of the constant connections that they empirically exhibit. Very soon, moreover, difficulties of theoretical order arisen in physics begin to make people doubt of the effective capacity to make our theoretical constructions and our scientific theories correspond to reality (I deliberately leave aside the questions related to mathematical sciences because they would take us too far). For example, it was not possible to propose satisfactory mechanical models of the electromagnetic ether, or of thermodynamic phenomena, which would allow to consider mechanics as the basic science, within which the fundamental properties of physical reality were determined. At the end of the nineteenth century Mach interprets these difficulties as a sign that science has neither the task nor the right to set out in search of such fundamental representations of reality; proposing a form of radical empiricism, he systematically reduces knowledge to perceptions; he does not deny that the intellect has a role to play, but it is not properly cognitive, and, particularly with regard to science, he argues that theoretical concepts and scientific laws are merely convenient algorithms by which we



synthesize a certain multiplicity of our experiences, but they do not express a true cognitive content.

From what has been said, however, it does not appear clear why this denial of scientific realism has been produced almost suddenly, nor does it appear in what way this scientific anti-realism is characterized with respect to the forms of philosophical anti-realism already known. To clarify these two issues, I will say that anti-realism emerges when science begins to deal with the *unobservable*, because then the cognitive basis required by radical empiricism and its claim to be able to reduce theories to the empirical plane, without residue, is lost. Then one begins to argue that the theoretical concepts we use are more or less arbitrary, that is, they receive an unduly ontological interpretation, while they can have no other sense than a function of coordinating experience without true cognitive scope. In this way, the undeniable presence and variety of theories in science has been interpreted unilaterally (by certain philosophers) as the evidence that scientific knowledge is in itself *conventional* and, therefore, completely arbitrary if we think it should describe reality to us, while it can be accepted as a more or less useful form of practical guidance to operate in reality. This is one of the most widespread senses of scientific anti-realism, traceable from Mach to, for example, van Fraassen.

To this position we can object that the realization that it is not possible to eliminate the theoretical dimension from the empirical sciences should instead have led scientists and epistemologists to realize that the theory/experience nexus is much richer and more problematic than the limited and poor empiricist epistemologies could ever suspect.

## **5. Reasons in favor of scientific realism**

Observation, for modern science, is always an *instrumental* observation and therefore born from a complex interplay between «certain demonstrations» and «sensible experiences», as Galileo explicitly affirmed. Though today, with the “observation of the unobservable”, we do not find the same experiences as Galileo, we must however continue to affirm that ours are always *observations*. It is not true that we “do not observe” a certain galaxy or a certain elementary particle, just because we cannot discern them with the naked eye; on the contrary, we observe through instruments, as Galileo did, even if our observations are much more sophisticated and complex. But the scientific complication of observation does not mean impossibility of verification, nor does it make it less important on the methodological level. If anything, it can be argued that the sophistication of