

Preface

This volume is a tribute to Evandro Agazzi and his work by Italian and international scholars, former direct or indirect pupils, friends, colleagues or associates who esteem him and are grateful to him for long years of discussions, advice and fruitful philosophical exchanges. These essays were first presented at the international congress “Science Between Truth and Ethical Responsibility. Evandro Agazzi in the Contemporary Philosophical and Scientific Debate”, held in Cesena and Urbino (Italy) from 22 to 24 April 2014. That congress, like this volume, intended to celebrate his 50 years of academic activity, by offering a systematic study and critical discussion of his many and often pioneering contributions to a wide spectrum of philosophical issues.

Agazzi constitutes an extraordinary example of rigorous and original thought, successful professional leadership and organizing capacities at the international level. His teaching spans widely on scientific knowledge, its nature, limits and requirements, as well as on the connected questions of ethical responsibility, on its anthropological presuppositions and metaphysical backgrounds. The exemplar clarity of his explanations and lectures helped us and many others to see their own way into these difficult problems and to progress along directions he has indicated or suggested.

The papers collected here express, each in its own way, admiration and gratitude for his work, in the conviction that paying homage to a great philosopher means analysing, interpreting and disseminating his ideas, but even more importantly critically discussing them and taking advantage of their fecundity as a starting point for further advancements in the field.

Evandro Agazzi graduated from the Catholic University of Sacred Heart in Milan, under the supervision of Gustavo Bontadini. He then studied physics at the State University of Milan, philosophy of science in Oxford and mathematical logic in Münster. After becoming “libero docente” in philosophy of science and in mathematical logic, he taught various disciplines, both scientific and philosophical, in a number of universities (sometimes even simultaneously): those where he lectured for longer periods are the Catholic University in Milan, the University of Genoa, the Superior Normal School in Pisa, the Università Vita Salute San

Raffaele in Milan, the University of Fribourg (Switzerland), the Universidad Autónoma Metropolitana in Mexico City and the Panamerican University in Mexico City. In these and other universities he gave courses in philosophy of science, theoretical philosophy, philosophical anthropology and philosophy of nature, as well as mathematical logic, advanced geometry and complementary mathematics.

The development of Agazzi's philosophy is clearly explained and related to its historical context by Fabio Minazzi's article "Evandro Agazzi Philosopher. An overview". But at the same time Agazzi was also very active as an editor, organizer and cultural leader: in Italy, in 1978, he founded the journal *Epistemologia. An Italian Journal for the Philosophy of Science*; soon thereafter, for the publisher Franco Angeli in Milan, he started the collection "Epistemologia"; he then chaired the Centre of Studies on Contemporary Philosophy of the Italian National Council of Research; he became president of the Italian Philosophical Society and of the Italian Society of Logic and Philosophy of the Sciences. Furthermore, he chaired the most important international philosophical societies and academies: the International Academy of Philosophy of Sciences (from 1978 to now); the International Federation of Philosophical Societies (as president from 1988 to 1993, then as honorary president); and the International Institute of Philosophy (as president from 1993 to 1998, then as honorary president).

Agazzi's earliest researches concerned the foundations of mathematics and logic, on which he wrote *Introduzione ai problemi dell'assiomatica* (Agazzi 1961) and *La logica simbolica* (Agazzi 1964). He rejected a purely formal viewpoint, holding that what human thought can discover or "see" in these areas exceeds what can be proved (Agazzi 1961, p. 199). An "eidetic meaning" is needed not just for interpreting a formal system, but also for laying down the composition and transformation rules, since we must understand what they prescribe. This already sets clear limits to the possibilities of artificial intelligence, as he argued in later works (Agazzi 1967, 1981a). These ideas have been further developed and systematically argued for in his recent book *Ragioni e limiti del formalismo. Saggi di filosofia della logica e della matematica* (Agazzi 2012).

Empirical sciences, however, represent the main subject of Agazzi's vast philosophical enquiries. Here he always held that science can aim at truth in the realist sense, avoiding both the Scylla of scepticism on the possibility of reaching the truth, and the Charybdis of the dogmatic illusion that truth has already been completely achieved. A key role is played in this respect by his distinctions between reality and objectivity, and between two senses of objectivity: as in-principle intersubjectivity and as reference to the object. On the one hand, he notices that the agreement among people about cognitive content does not hinge on their "private" data, but on the public actions they perform. On the other hand, operations constitute the specific "objects" of each particular discipline. Thus, the very conditions that define a science by structuring its proper objects also provide intersubjective knowledge of those objects (Agazzi 1969, Chap. 10, 2014, Chaps. 1 and 2).

More recently, at least since the volume *Il bene il male e la scienza* (Agazzi 1992 [2004]) and up to *Scientific Objectivity and Its Contexts* (Agazzi 2014),

Agazzi has studied scientific objectivity in its relations to the social reality, from a system theoretic viewpoint: the scientific-technological system is fully autonomous as to its cognitive value, but it is an “open adaptive social system”, interacting with other social systems; as such, it cannot just aim at maximizing its own internal goals, but must respect the constraints provided by different systems, such as the economic, political or energetic system. Among them, it must also respect the system of moral norms and values.

These central issues in Agazzi’s philosophy are discussed by many contributions to the present volume. The main features of his general philosophy of science are analysed by Craig Dilworth (“The Perspectivist Conception of Science”), Marco Buzzoni (“Science and Operationality”), Mario Alai (“The Issue of Scientific Realism”), Vincenzo Fano and Giovanni Macchia (“Scientific Progress and Verisimilitude”).

On the basis of this general theoretical framework, over the years Agazzi has carried out special researches on a number of particular issues. Some (though not possibly all) of them are accounted for by other papers of this volume. To begin with, he has offered important contributions to the foundations of the special sciences: contemporary physics, in particular quantum mechanics (discussed by Gino Tarozzi’s “Philosophy of Physics”); mathematics, (a subject explored by Marco Borga’s “Foundations and Philosophy of Mathematics”); artificial intelligence (analysed by Mariano Bianca’s “Artificial Intelligence”); sociology (the topic of Giuliano Di Bernardo’s “From Physics to Sociology”); and education (accounted for in detail by Giuseppe Bertagna in “Between Education and Pedagogy”).

According to Agazzi, the requirements of objectivity and rigour, characteristic of the natural sciences, can be satisfied also by the human sciences, since they are independent of quantitative methods. Besides, deductive rationality must be supplemented by argumentative and hermeneutic rationality (Agazzi 1979). Furthermore, when it comes to the psychological and pedagogical sciences, a key role is played by the principle of dignity of the human person. Agazzi devoted long reflections to this principle and to pedagogical theories, and he founded and directed for many years *Nuova Secondaria*, the main Italian journal for high-school teachers and administrators.

Of course, he developed his philosophy of science in connection with deep considerations on other closely related philosophical disciplines, which are the focus of a third group of contributions: Pierluigi Graziani’s “Philosophy of Mathematics and Logic”, Antonio Livi’s “The Issue of Alethic Logic”, Jure Zovko’s “Interpretation and Hermeneutical Judgement” and Carlo Penco’s “Philosophy of Language”.

But philosophy of science cannot be detached from an even wider theoretical horizon, including the anthropological, historical and more widely cultural dimensions of science, and Agazzi’s philosophical contributions span over all of them. Anthropology is dealt with in “Philosophical Anthropology”, by Matteo Negro; the historical and complex dimensions of science are discussed by Giuseppe Gembillo in “Science, Historicity and Complexity”; the strict relations between philosophy and history of science is the subject of Flavia Marcacci’s “Epistemology and History

of Science”; and the cultural and intercultural dimension of philosophy is the topic of the essay (“Contributions to Latin American Philosophy”) in which Lourdes Velázquez examines the impact of Agazzi’s thought in shaping the philosophical landscape of a whole continent.

A further decisive dimension of science is the ethical one, which is also presupposed by (and presupposes) anthropology, education and history. To ethics Agazzi has dedicated a great amount of work in recent years, variously dealing with the moral issues raised both by science and technology as human practices (ethics of science and technology), and by the ever more advanced forms of control and intervention on human and animal life that scientific and technological progresses make possible (bioethics). His contributions to the former area are examined by Boris Yudin in “Ethics of Science and Technology”, and Alfredo Marcos in “The Autonomy of Science in a System Theoretic Approach”.

There is a bidirectional relation between science and technology on the one side and ethics and anthropology on the other. On the one hand, in fact, as noticed above, science and technology are an “open adaptive social system”, which must harmonize with other social systems, including the system of moral norms and values (Agazzi 1992 [2004], Chap. 14). On the other hand, however, both the natural and the human sciences are involved in the justification of moral norms and values.

Unlike the natural world, mankind and its activities are characterized by the ought-to-be. Values are projections of the ought-to-be, i.e., “the ideal models which work as regulative parameters for human operations, performances and actions” (Agazzi 1992 [2004], p. 127). In turn, values are justified through an “image of the human nature”: this image is based on biology, psychology, sociology, psychoanalysis, etc., and it should offer a plausible model for human behaviour and actions. This is not falling into the naturalistic fallacy of deducing “ought” from “is”, but acknowledging that “it is rational to demand that man behave in accordance with his own constitutive conditions, and accepting the contrary, even if it could be done, would not be rational” (Agazzi 1981b, p. 18).

According to Agazzi, a ground for ethical norms shared by different cultures, religions or philosophies can be provided by the already mentioned principle of human dignity. Consciousness is the *proprium* for human persons, which people can and ordinarily do have; but since it is not a substantial feature, it can be acquired or lost, but persons do not cease to be human when it attenuates or vanishes. Hence, the deprivation of this property cannot become a reason for discrimination (see Agazzi 1992, pp. 28–39, 1992 [2004], Chap. 10). These and other issues concerning the relationships between ethics and the biological sciences are discussed in Gonzalo Miranda’s essay “Bioethics”.

Finally, any philosophical discussion of science must be set on the background of the most general and encompassing attempts to understand reality, i.e. metaphysics and religion. These are the subject of Paolo Musso’s “Metaphysics and Ontology” and Juan José Sanguinetti’s “Religious Faith, Natural Science, and Metaphysics”. In particular, for Agazzi, although metaphysics is a “brief” discourse, it is a necessary presupposition of scientific knowledge. Besides, science

cannot substitute nor limit the autonomy of religious faith, for the latter answers questions which science, by its own nature, cannot address.

As mentioned at the beginning, the best homage we can pay to an authentic master of thought, besides knowing and interpreting his or her ideas, is establishing a critical dialogue with them. This too is something we learned from Agazzi, from his attitude towards his own teachers, Gustavo Bontadini in the first place: for he was able to learn from them, with humility, deep respect and gratitude, and at the same time to become an original and intellectually independent thinker.

True dialogue may become easier, *as a matter of fact*, when some basic philosophical assumptions are shared; but *in principle*, it requires above all keenness in the quest for truth and disposition to critical (and self-critical) thinking. The two must always go together, but can be declined in the most different ways, depending on one's personality, background and attitudes. They can elicit objections on particular claims or doubts on basic assumptions; suggest alternative but complementary perspectives; allow to develop cues in the master's ideas, or draw from his or her teaching original and autonomous research strategies. In all of these senses, each of the contributors to this volume can be considered a pupil of Evandro Agazzi and indebted to his research in philosophy.

While this work originates from the desire to acknowledge these debts, and to honour so many years of academic activity and philosophical *paideia* by Evandro Agazzi, it could not have been thought of and published without the patronage and financial help offered by various institutions: thus, we gratefully thank the University of Urbino "Carlo Bo" (*Centro Interuniversitario di Ricerca in Filosofia e Fondamenti della Fisica*—CIRFIS), the Department of Basic Sciences and Foundations of the University of Urbino—*DiSBeF*; the University of Insubria, Varese (*Centro Insubrico "Carlo Cattaneo" e "Giulio Preti"*); the University of Macerata (*Dipartimento di Studi Umanistici*); the University of Messina (*Centro Studi di Filosofia della Complessità "Edgar Morin"*); the National Academy of Sciences, Literature and Arts of Modena; the City of Cesena; and the International Academy of Philosophy of Sciences.

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