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«AND NEW PHILOSOPHY CALLS ALL IN DOUBT» PAOLO ROSSI AND THE HISTORY OF EARLY MODERN SCIENCE

Introduction: The History of Early Modern Science in Perspective

First of all, I would like to thank the Accademia Nazionale dei Lincei for inviting me to this conference in memory of Paolo Rossi. The Fondazione Internazionale Balzan is honoured to have this illustrious scholar as a laureate, awarding him one of the two annual Balzan Prizes for the humanities, specifically for the history of science in 2009.[1]

I am also glad to be again in the Palazzo Corsini, which many times has been the venue of the Balzan awards ceremony, and which is home to the Accademia Nazionale dei Lincei, co-founded by my compatriot Johannes van Heeck (1579-c. 1620; Johannes Heckius, or Ecchio as he is called in Italian). Many years ago, when I was writing my doctoral dissertation, I came upon Johannes Heckius, not as might be imagined in Rome, but in Prague during the years 1604-1605, where Emperor Rudolf II, «essendo Sua Maestà inclitissimo alle cose Lynceae», as Heckius hopefully informed his co-Lincei back in Rome, would perhaps employ him at the imperial court. As is well known, Heckius did not succeed in this, although he met in Prague with important scholars such as Johannes Kepler. Eventually he went back to his friends and protectors in Rome.[2]

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* Former Vice-Chair of General Prize Committee; memorial conference «In ricordo di Paolo Rossi»; Roma, Accademia Nazionale dei Lincei, 17 April 2013. First published in Accademia Nazionale dei Lincei, *Rendiconti*, serie IX, volume XXVIII, fascicolo 3-4, Rome: Bardi Edizioni, 2018, pp. 445-457.

[1] *Premi Balzan 2009*, Milan: Fondazione Internazionale Balzan, 2009, pp. 51-66; *Balzan Prizewinners, Interdisciplinary Forum 2009*, Milan: Fondazione Internazionale Balzan, 2009, pp. 57-59. Also on https://www.balzan.org/en/prizewinners/paolo-rossi-monti and https://www.balzan.org/en/prizewinners/paolo-rossi-monti/berne--20-11-2009-italian-rossi.

[2] Van Kessel, E.M.R. "Joannes van Heeck (1579-?), co-founder of the Accademia dei Lin-

With the versatile scholar Johannes Heckius (Ecchio) – medical doctor, botanist, astrologer and even poet – we have already entered the discipline in which Paolo Rossi excelled: the history of early modern science.

As a distinct field of scholarship, the history of science emerged only in the course of the twentieth century. It soon blossomed and produced a whole library of books, articles and text editions. Historians of science came to it from different fields: not only from the modern sciences and technologies themselves, but also from philosophy, the history of ideas and cultural history. The early modern period, roughly from the Renaissance to the Enlightenment, came in for special attention as it is the era of exciting new discoveries and innovations. The New World, with unfamiliar inhabitants, animals and plants, was studied; the heavens were observed with new instruments; the invention of the printing press proved itself invaluable for the distribution of knowledge; gunpowder, the compass, the mechanical clock and other devices changed science and technology. The study of nature was transformed and knowledge of nature took on a new cultural meaning. The validity of knowledge claims, or epistemology, saw itself confronted with, for instance, questions about the status of hypotheses in astronomy or the value of mathematics and mathematical physics in the real world.

The study of science in those early modern times comprises the examination of both intellectual-philosophical and empirical-technological developments. Moreover, whoever wants to venture into this field must know that he will have to deal with different and sometimes quite disparate and puzzling pursuits, practiced by people from different professions, in different places and institutions. He is going to meet the university scholar, the court humanist, the medical man, the alchemist, the artisan, the engineer, or the gentleman of leisure – and the odd learned woman as well. Nowadays historians of science make a number of very diverse themes their subject of learned scrutiny. At the same time they pose quite general questions, asking themselves what these persons in early modern times studied, how they studied it, where and why.[3]

Most historians of science are considering, albeit with varying degrees of enthusiasm, the early modern period as the era of a scientific revolution

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cei in Rome. A bio-bibliographical sketch." *Mededelingen van het Nederlands Instituut in Rome* 38, 1976, pp. 109-134, quotation p. 123; Van Kessel, E.S. "Sapienza, sesso, pietas: i primi Lincei e il matrimonio." *Mededelingen van het Nederlands Instituut in Rome* 46, 1985, pp. 121-144. Cfr. also Id. *Geest en vlees in godsdienst en wetenschap*. The Hague: Staatsuitgeverij, 1980, pp. 117-181, 215-227.

[3] Cfr. for example Park, K. – Daston, L. (eds.), *The Cambridge History of Science*, vol. III, *Early Modern Science*. Cambridge etc.: Cambridge University Press, 2006.

heralding the origins of modern science. Sometimes there has been a rather regrettable tendency to look back with the benefit of hindsight exclusively to developments that are known to be important for the present. Judging the past in terms of our present understanding of what science is, or should be, was given priority in scholarship. Hence the emphasis was on great men and great discoveries – men such as Galileo Galilei, Johannes Kepler and Isaac Newton, their life and works. Nowadays, historians of science focus more and more on the general question as to how and why science has become such an overwhelmingly important feature in Western culture. Certainly, they are still looking into the life and works of great figures like Galileo Galilei, Johannes Kepler and Isaac Newton *cum suis*. The history of science, however, is no longer depicted as a triumphant procession of great men and great discoveries, moving from one secure point to the next while climbing the mountain of knowledge, and propelled forward, as it were, by the superiority of European culture.[4]

During the early modern period changes in the study of nature coincided with the immense political, social, economical, cultural and religious transformations of the age. Historians of science must take these into account. Wars demanded improved military technology; humanists contributed editions and translations of ancient texts which were, more often than not, hotly debated; the Reformation and Counter-Reformation profoundly influenced the curriculum of schools and universities. And what to think of those aspects of the early modern study of nature which might strike us as rather strange or even beside the point to what we tend to view as true science: alchemy, astrology, magic? In the past, those elements of early modern science that did not make it into our modern world were often pushed aside, or even forgotten.[5]

To do justice to the vanquished and the forgotten parties is among the most difficult tasks of the historian. Paolo Rossi was not at all daunted by this task. His profound interest in the complexity of the intellectual processes on which early modern science was based led him to write his works on a great variety of subjects, breaking new ground in all of them. He expressed the view that the history of science can never be described as «a linear process of progressive growth», but must of necessity «emphasise, on the contrary, the tortuous, non-linear and by no means inevitable nature»

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[4] Cohen, H.F. *The Scientific Revolution. A Historiographical Inquiry*. Chicago: University of Chicago Press, 1994.

[5] Cfr. for example the classic account of the Scientific Revolution concentrating on the physical and mathematical sciences: Dijksterhuis, E.J. *The Mechanization of the World Picture*. Oxford: Oxford University Press, 1961.

of the historical evolution of science.[6] He became the valiant champion of a subtle and detailed approach to the history of early modern science, gaining international recognition on the way. A marked characteristic of this approach was the care he took to place the history of science firmly in the context of general European history. What is gained over the ages, however, can also be lost again, so Paolo Rossi reminds us:

> The history of science can serve to make us aware of the fact that rationality, logical rigour, verifiable statements, the publicising of results and methods, the very structure of scientific knowledge as something that can be built on are neither eternal categories of the spirit nor enduring facts in the history of mankind but historical achievements which, like all achievements, can by definition be lost or reversed.[7]

Francis Bacon and His Idea of Science: *Francesco Bacone. Dalla magia alla scienza* (1957)

Paolo Rossi's first book on a topic related to the history of science illuminated the roots and the development of Francis Bacon's thought. He gave the book an intriguing, even audacious subtitle: *Dalla magia alla scienza*.[8] This was the year 1957, when establishing any relation – positive or negative – between magic and science was unusual to say the least. Paolo Rossi, however, had worked at the Warburg Institute in London, where such links were favourably considered. Reviewing the English translation of the book, Frances Yates, one of the great scholars attached to the Warburg Institute, wrote: «I would like to put on record here my own debt to Rossi's work, which makes everything else on Bacon look pale and insipid, and how glad I am that it is now available in a good English translation».[9] Significantly, Paolo Rossi vehemently disagreed with Frances Yates's opinion that Bacon's thought somehow belonged to the hermetic tradition. There are, he conceded, superficial similarities. For instance, Bacon's definition of

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[6] Rossi, P. "Hermeticism, Rationality, and the Scientific Revolution." In Righini Bonelli, M.L. – Shea, W.R. (eds.), *Reason, Experiment, and Mysticism in the Scientific Revolution*. New York: Science History Publications, 1975, pp. 247-273, quotation p. 268.

[7] Rossi, P. *The Birth of Modern Science*. Oxford: Blackwell, 2001, p. 229.

[8] Rossi, P. *Francesco Bacone. Dalla magia alla scienza*. Bari: Laterza, 1957.

[9] Yates, F.A. *Ideas and Ideals in the North European Renaissance. Collected Essays*, vol. III, London, etc.: Routledge & Kegan Paul, 1984, p. 66. Yates's review was first published in *The New York Review of Books*, 29 February 1968. Rossi's book in translation was published as *Francis Bacon: From Magic to Science*. London: Routledge & Kegan Paul, 1968.

man as the servant and interpreter of nature tallies with expressions found in early modern magic and alchemical texts. But Yates's final judgement of Rossi's book still stands: the book is as profound as it is original. Its profundity is based on a careful and unbiased reading of Bacon's philosophical texts in the context of the intellectual currents of his age. Its originality lies in the convincing interpretation, offered by Paolo Rossi, of these often very complicated sources. He elucidates, for instance, the wider significance of Bacon's opposition to the «fanciful compositions» of magicians and naturalists.[10] He also makes clear Bacon's motives for refuting traditional philosophy and putting a new idea of science in its place, and the importance of Bacon's new logic and its relation to the tradition of Renaissance rhetoric. The book had an enduring impact on international scholarship.

In Rossi's contribution entitled «Bacon's idea of science», the first chapter in *The Cambridge Companion to Bacon*,[11] he again emphasized Bacon's new image of science and the scientist or natural philosopher. Moreover, he succinctly illuminated in these few pages the Baconian idea of the advancement of science as different from modern, post Enlightenment views of progress in the following words:

> Science is an exploration of unknown lands and is like a hunt. The quarry is in the future. The light of nature lay ahead. Behind there is the darkness of the past. Scholars' interests should be turned toward the future, not to the past. What remains to be done is more important than what had been done.[12]

Rossi's book of 1957 and later related publications can also be read as a defence of Bacon's idea of science against its modern detractors, mainly philosophers but also historians who, according to Paolo Rossi, had thoroughly misunderstood this most mysterious philosopher of science. He pointed out the reasons for their delusions in no uncertain terms: inability to read texts in the original, particularly in Latin, simplification of complex questions, reduction of philosophic concepts to «seemingly brilliant slogans»,[13] and as a consequence of these scholarly weaknesses, construction of a spurious image of past ideas. Set against these well-deserved upbraidings, the magnitude of Rossi's own achievements is striking.

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[10] Rossi, P. *Francis Bacon: From Magic to Science*. London: Routledge & Kegan Paul, 1968, p. 42.

[11] Rossi, P. "Bacon's Idea of Science." In Peltonen, M. (ed.), *The Cambridge Companion to Bacon*. Cambridge: Cambridge University Press, 1996, pp. 25-46.

[12] *Ibid.*, pp. 42-43.

[13] *Ibid.*, p. 45.

The book *I filosofi e le macchine 1400-1700* (1962) stands at the junction of the history of three distinct fields: philosophy, science and technology.[14] Here, the author researches the interdependence of philosophy of science and scientific practices on the one hand and mechanical experiments and technical developments on the other. As with his work on Francis Bacon, Paolo Rossi broke new ground here, or perhaps I should say he built a new bridge. Usually, the history of technical inventions and of technology in general had been represented as largely divorced from the history of ideas and from social history. Rossi's book admirably and elegantly bridged the gap between those disciplines. In a way, this particular book grew organically out of Rossi's work on Francis Bacon and his intellectual world, describing the emergence, in early modern times, of the natural philosopher and the engineer, both devoted to the mechanical arts. It is also a clear testimony to the author's profound interest in the links between the history of science and social history.[15]

The Art of Memory: *Clavis universalis. Arti della memoria e logica combinatoria da Lullo a Leibniz* (1960; 1983)

The book *Clavis universalis. Arti della memoria e logica combinatoria da Lullo a Leibniz* (first edition 1960; revised edition 1983) was a pioneering work, preceding Frances Yates's well known volume on the art of memory by six years.[16] Paolo Rossi dedicated the English translation of the revised edition to the memory of Frances Yates.[17] Rossi's work, however, was conceived along quite different lines, as he was predominantly interested in a different starting point: the study of ways to build up and perfect memory in relation to late medieval and early modern combinatory logic, hence his mentioning, in the subtitle of the book, of the late-medieval Catalan philosopher Ramón Lull, author of many works dealing with memory and logic and an important foundation for Rossi's arguments. The seventeenth-century German philosopher Gottfried Wilhelm Leibniz, who had been

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14 Rossi, P. *I filosofi e le macchine 1400-1700*. Milan: Feltrinelli, 1962.

15 The book was translated in a number of languages and was published in English as Rossi, P. *Philosophy Technology, and the Arts in the Early Modern Era*. New York: Harper & Row, 1970.

16 Rossi, P. *Clavis universalis. Arti della memoria e logica combinatoria da Lullo a Leibniz*. Milan and Naples: Ricciardi, 1960. The revised edition was published under the same title by il Mulino: Bologna, 1983. Yates, F. *The Art of Memory*. London: Routledge & Kegan Paul, 1966.

17 Rossi, P. *Logic and the Art of Memory. The Quest for a Universal Language*. London: Athlone Press, 2000.

studying symbolic logic in relation to the development of a universal language, was chosen by the author as the end point of his research.

The search for general methods underlying the philosophy as well as the practice of science can be said to have been a strong preoccupation of a number of late medieval and early modern scholars. The combinatorial method can be found, for instance, in some of Lull's works, featuring techniques for calculating all possible combinations from lists of material or immaterial objects. Encyclopaedism, methods of classification, quests for a universal language – all play a part. Finally scholars hoped that these types of research would lead to the key unlocking the secrets of the order of nature or the essential structure of reality – the true *clavis universalis* of Rossi's main title. It is true that such ideas captivated the minds of many a scholar, especially in the sixteenth and seventeenth centuries. It is salutary to remember, though, that these ideas were and are easily misunderstood, and consequently easily misrepresented by scholars of our own time who are not sufficiently *au courant* with the contemporary intellectual context. Even Frances Yates, on reading her first treatise by Ramón Lull, confessed that it had seemed «perfectly unintelligible» to her and that trying to understand the Catalan philosopher involved «a severe ordeal of battling» with his thoughts.[18] The problem of understanding and interpreting such sources should thus not be underestimated.

Nevertheless, Paolo Rossi valiantly entered an intellectual world which had truly been lost in the course of the ages. It was a past world peopled by many scholars, some of them bearing famous names, and others quite unfamiliar. The scholarly tradition Paolo Rossi set out to describe was as complex as it was diverse. Its favoured methods not only included mnemotechnics and combinatory logic, but were also linked to other manifestations of symbolic communication, such as emblematics and cryptology. Moreover, Paolo Rossi was keenly aware of the classical and medieval antecedents of this tradition, and briefly described them in his first chapter, but not without including the voices of those early modern scholars who objected to mnemotechnics, such as Erasmus and Montaigne. Of course, memory had always been considered an essential part of classical rhetoric. Not everybody, however, even in early modern times, was convinced of the helpfulness of the mnemotechnic method, which involved the employment of memory places and images for the increase of true knowledge.

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[18] Yates, F. *Lull & Bruno. Collected Essays*, vol. I, London: Routledge & Kegan Paul, 1982, pp. 3-4.

Nevertheless, Paolo Rossi forcefully made his case for the importance of this tradition of logic intertwined with the art of memory.

How did the author achieve this goal? A purely descriptive approach to the history of this tradition was not what interested him most. In his book, Paolo Rossi first and foremost wanted to show the dynamics of this tradition. Therefore, he studied sixteenth-century encyclopaedism in depth, including ideas about universal theatres and Giordano Bruno's philosophical considerations on links between images and logic. As Paolo Rossi saw it, the overall aim of all these scholarly efforts was a knowledge of the world which was both all-encompassing and profound, that is to say, a general science cracking the codes of reality. Even if representatives of the new scientific methods like Francis Bacon and René Descartes voiced their doubts about the usefulness of what Rossi engagingly calls «intellectual fossils» [19] for their own philosophy, the tradition still lived on. Rossi goes on to disclose intimate and complex connections between encyclopaedic or pansophic movements on the one hand and the search for various types of artificial or universal language on the other.

Hopes of finding a solution to these intricate problems remained high during the entire early modern period. As late as 1678 Gottfried Wilhelm Leibniz wrote in a letter to his benefactress Elisabeth of Brunswick-Wolfenbüttel:

> The universal character will represent our thoughts truly and distinctly and when a thought is composed of other thoughts, its character will also be composite [...] Simple thoughts are the basic elements of the universal character, and simple forms are the original sources of all things.

In a long footnote to this quotation, Paolo Rossi expressed his particular hope that his chapter on the sources of Leibniz's universal character, the last chapter of the book, had demonstrated not only the survival of ideas from earlier periods of history, but also their serious impact on Leibniz's thought.[20]

It is this persistent inquiry into the branching out of different approaches to philosophical and scientific problems over more than two centuries that gives Rossi's book its unique character. Moreover, the reader's appetite is whetted by the source material he provides in the appendices. No wonder that this particular work became an important stimulus for further research.

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[19] Rossi, P. *Logic and the Art of Memory. The Quest for a Universal Language*. London: Athlone Press, 2000, p. xxi.

[20] *Ibid.*, p. 193, footnote 55, pp. 317-318.

The Fate of Biblical History: *I segni del tempo. Storia della Terra e storia delle nazioni da Hooke a Vico* (1979)

Paolo Rossi made a further major contribution to the history of early modern science and scientific thought with the book *I segni del tempo. Storia della Terra e storia delle nazioni da Hooke a Vico*.[21] The gradual discovery of deep time since the seventeenth century fascinated him, and it is easy to see why. Scholarly attempts to come to terms with the idea of a remote past touched on many strands in intellectual history. As in the book *Clavis universalis*, Rossi was determined to draw these different strands of intellectual history together. He was now entering a territory where not only science and philosophy, but also religious issues played an important part. The concept of time here turns out to be a tricky one, as it means two quite different things: the age of creation as well as the age of civilisations. In a balanced scholarly approach, Paolo Rossi set out to explore what could be called the history of time placed into a much wider scientific and philosophical context.

Real fossils – not the imaginary intellectual fossils of *Clavis universalis* – and their importance for the scholarly understanding of the history of the earth play a role from the first pages of the book onwards. Rossi mainly focuses on a period of roughly a century, from the middle of the seventeenth to the middle of the eighteenth century. It is perhaps no coincidence that this historical period was also partly covered by Paul Hazard in his celebrated book *La crise de la conscience européenne (1680-1715)* (1935), although Hazard struck a totally different note. Like Paul Hazard, Paolo Rossi was also interested in an intellectual crisis – albeit a slowly developing one – caused by the transformation of man's understanding of the natural world.

Rossi endeavours to reconstitute beliefs and theories that were once held and are now discarded. These beliefs and theories touched on problems relevant to the origins of the earth as well as to the beginnings of mankind, in relation to culture's moving away from barbarism. It is therefore logical that in the first part of the book the author starts to review the problems that new findings in geology pose to a creational understanding of the chronology and history of the earth based on Scripture. Geology as a science with evidence provided by fossils is studied here next to the ideas of scholars wanting to come to terms with new scientific discoveries and theories. More often than not scholars were shown to be rather reluctant

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[21] Rossi, P. *I segni del tempo. Storia della Terra e storia delle Nazioni da Hooke a Vico*. Milan: Feltrinelli, 1979.

to leave received wisdom behind them. In this way, Paolo Rossi linked the growing importance of empirical observation of the natural world to speculative philosophizing about the natural world, marrying, as it were, the history of science to the history of ideas. Successive evolutions of ideas in the works of such great scholars as Robert Boyle, Isaac Newton and René Descartes are elucidated here.

Perhaps even more perplexing to seventeenth- and eighteenth-century scholars were the issues arising out of a new understanding of the consecutive ages of human history and the development of nations. How to react to the age of ancient civilisations of, for instance, the Egyptians or the Chinese, in comparison to the more restricted biblical chronology of the Jews? How to respond to the notion that there might have been human life before Adam? In the second part of his book, Rossi charts the puzzlement and the subsequent, allegedly unavoidable, scholarly quarrels about these issues. He shows that prevailing opinions about time and the place of history in time were attacked by a few rationalist scholars and defended by those who clung no less rationally to the idea of a definite beginning of the world's creation, which had taken place somewhere on a familiar and hallowed timescale. The slow surrender of scriptural history, however, as analysed by Paolo Rossi, inexorably led to new lines of thought about the role of Scripture, shedding fresh light on this dark abyss of time.

Equally profound and original is Rossi's approach to his third theme: the history of language and linguistics, as he takes great pains to explain to the reader why the discussion about the origin of language posed such gripping problems to scholars. He describes the slow realization – with many ups and downs – that it was unlikely that one language, i.e. Hebrew, was the source of all languages. Moreover, he analyses the equally halting acceptance of the idea that the origin of languages was not so much linked to the divine creation of the world, but perhaps more to the cultural history of mankind. Perhaps more than any other, this development spelled the definitive death of Adam. As Paolo Rossi remarks on the last page of his book:

> The death of Adam was a slow death. But in the history of ideas, as in the history of individuals, the resistance put forth and the defence mechanisms are no less important, and certainly no less interesting to analyze, than the achievements and the discoveries of the truth.[22]

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[22] Rossi, P. *The Dark Abyss of Time: the History of the Earth and the History of Nations from Hooke to Vico*. Chicago-London: University of Chicago Press, 1984, p. 270.

To me, these words sound like the true testimony to Rossi's modus operandi as a historian.

According to Rossi, the wish to accommodate the old with the new without giving up the primacy of biblical chronology and sacred history was particularly evident in Giambattista Vico's *La scienza nuova*. As was the case with the book on Francis Bacon, *I segni del tempo* can be read on the level of a scholarly and historiographical discussion – or even polemics. In his earlier book, Rossi had staunchly defended Bacon's idea of science against modern scholarly misunderstandings. As far as Giambattista Vico is concerned, long before the publication of *I segni del tempo*, Rossi had edited *La scienza nuova* and other works.[23] He had offered a new interpretation of Vico's philosophy in its historical context in the collection of essays *Le sterminate antichità. Studi vichiani* (1969). These essays, and the later augmented edition of the collection (1999), led to interesting and fruitful discussions in the world of learning, especially in Italy.[24] As Rossi expressed it in his contribution to the interdisciplinary forum of the laureates at the Swiss National Science Foundation in Bern, organised in connection with the Balzan Prize 2009:

> Vico was made to don the robes of eternal precursor (to Kant, to Hegel, to Marx). I have tried to show that Vico (who published his masterpieces in 1725, 1730 and 1744) did not study anything written after the 1680s, and I have upheld these theses of which the unpopularity do not negate their veracity, i.e. that Vico is often backward-looking in his positions and that Vico is the living demonstration that it is possible not to be "culturally up-to-date" and at the same time belong to the extremely small group of the great doyens of philosophy.[25]

The History of Modern Science in Context: *La nascita della scienza moderna in Europa* (1997)

For the series *The Making of Europe*, the editor Jacques Le Goff invited Paolo Rossi to write a general history of early modern science aimed at the wider public, and this became *La nascita della scienza moderna in Europa*

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[23] Cfr. for instance Rossi, P. (ed.), *Il pensiero di Giambattista Vico. Una antologia dagli scritti*. Torino: Loescher, 1959; Vico, G. *Opere*, ed. Rossi, P., Milan: Rizzoli, 1959; Id. *La scienza nuova*, ed. Rossi, P., Milan: Rizzoli, 1963.

[24] Rossi, P. *Le sterminate antichità. Studi vichiani*. Pisa: Nistri-Lischi, 1969; Id. *Le sterminate antichità e nuovi saggi vichiani*. Florence: La Nuova Italia, 1999.

[25] Rossi, P. "The Past is a Foreign Country." In *Balzan Prizewinners Interdisciplinary Forum 2009*, Milan: Fondazione Internazionale Balzan, 2010, pp. 59-66, and on https://www.balzan.org/en/prizewinners/paolo-rossi-monti/berne--19-11-2009-forum-monti.

(1997).[26] The book was the fruit of a lifetime's careful reading of sources and thinking about the essential features of early modern science and scientific thought. It has been criticised for not incorporating the most recent secondary literature at the time,[27] but to me, that is not the point of this particular work. There are other books in existence which aptly summarise the history of early modern science on the basis of fairly recent secondary literature. Many of such books, though, do not have the same intellectual force as Rossi's contribution to the field.

In his «Introduction», the author stresses two points: first, the importance of placing the history of science firmly in the context of political and social history; and second, the birth of modern science as an intellectual revolution. These starting points were rather different from the prevalent way of describing the origins and the development of the scientific revolution as an evolution of new epistemological methods followed by new theories and discoveries, usually formulated by great men. The methods that took pride of place in such books on the scientific revolution were considered to be based on, for instance, the mathematization of the world system and the victory of empiricism. Rossi's approach was different. He never forgot to refer *expressis verbis* to the world in which the scholars whose work he analysed lived. These references pointed to the often very harsh realities of early and not only modern human existence, including intolerance, persecution and war, but also to more positive aspects such as patronage and the role of learned societies. Nevertheless, he defended his view that the coming of modern science could never be reduced to a simple manifestation of contemporary social and political conditions.

Of course, the great men are still present in the book: Johannes Kepler, Galileo Galilei, Isaac Newton, René Descartes, Christiaan Huygens, to name only a few. Rossi's main argument, however, strikes a different note: there was no straight path to modern science. The intellectual revolution which formed its foundation is presented as a rather complicated affair. It is meandering like a long, slow river, with travellers calling at many different ports. Paolo Rossi deals with the debate about the mechanical arts and about hermetical knowledge, the discovery of the New World and the new astronomy, developments in philosophy and technology, the problem of deep time, the vogue for classification, and so forth. Chronologically, he

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[26] Rossi, P. *La nascita della scienza moderna in Europa*. Roma-Bari: Laterza, 1997. The book was also published in English, French, German and Spanish.

[27] Book reviews of Rossi, P. *The Birth of Modern Science*. Oxford: Blackwell, 2001, by Long, P.O. *Isis* 93, 2002, pp. 481-82, and by Dear, P. *American Historical Review* 108, 2003, pp. 245-46.

begins the book with the second half of the fifteenth century, more particularly with Leonardo da Vinci's studies on mechanics and optics, and he ends with Isaac Newton's book, *Opticks*, published at the beginning of the eighteenth century. So according to Paolo Rossi, it took quite some time before a radical break with the past was achieved in all its scientific aspects.

In this respect, the last sentence of the book throws an interesting light on Rossi's view of the intertwinement of intellectual, scientific and political forces at work in European history at large, for there he writes: «As for the seemingly tumultuous origins of many of the values connected to scientific knowledge which we today assume as positive and incontestable, can we not identify a similar process relative to the political values of liberty and tolerance?».[28]

I, for one, would prefer the question mark at the end of that sentence to be changed, as if by a magic hand, to a full stop. But maybe it still too early for that.

I would like to end on a personal note. To me, it is very meaningful that in 2009 Paolo Rossi gave his contribution to the laureates' interdisciplinary forum in Bern the title *The Past is a Foreign Country* – the famous first words, now almost proverbial, of L.P. Hartley's novel *The Go-Between*, a book published not long before Rossi went to work at the Warburg Institute in London. «The past is a foreign country, they do things differently there» is how the full quotation runs.[29] To me this refers to Rossi's boldly entering this foreign country of the past, and to his tireless endeavours to understand what is going on there. When we read, in John Donne's poem of 1611 «An Anatomy of the World», the line «And New Philosophy calls all in doubt», I can easily imagine Paolo Rossi to be at hand, helping us to consider and analyse the meaning of such words in the context of the poet's age.

Rossi's intellectual courage and scholarly dedication were the outstanding characteristics of his life and work. I am sure these virtues will always be remembered, shining, as they do, on every page of his writings. And of course I personally relished the reminiscences he shared with me on meeting him in connection with the Fondazione Internazionale Balzan. These reminiscences focused on Italian scholars who had been Rossi's teachers and colleagues, scholars whose works I, too, revered, such as Eugenio Garin and Delio Cantimori.

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[28] Rossi, P. *The Birth of Modern Science*. Oxford: Blackwell, 2001, p. 229.

[29] Hartley, L.P. *The Go-Between*. London: Hamish Hamilton, 1953, p. 9.

Abstract – In this paper given in 2013 during a conference in memory of Paolo Rossi, Nicolette Mout outlines Paolo Rossi's contribution to the history of science as a distinct interdisciplinary field of scholarship. In reflecting back upon the 2009 Balzan Prizewinner's research, Mout highlights his examination of both intellectual-philosophical and empirical-technological developments and his skill in placing the history of science firmly in the context of general European history. She discusses each of Rossi's most important works (from Francis Bacon and his idea of science, to the relationship between magic and experimental science, the art of memory and the fate of biblical history), ending with the book written for the general public, *The Birth of Modern Science in Europe*. She shows how his appreciation for the complexity of the intellectual processes on which early modern science was based led to his groundbreaking vision of the history of science not as «a linear process of progressive growth», but as characterised by an evolution that is «tortuous, non-linear and by no means inevitable».