

Preface

The dominant view nowadays is that the philosophy of nature no longer exists. That branch of philosophy died out with the emergence of the modern empirical sciences. Its domain of inquiry was divided among the various particular sciences. Admittedly, there are still some philosophers who try to cultivate a philosophy of nature, but when one takes a closer look at their work it turns out that most of their effort is devoted to defining what exactly the philosophy of nature is supposed to study. The philosophy of nature as traditionally understood only prepared the ground for the future natural sciences and at their emergence lost its reason for being. Does that mean the elimination of philosophy from science? Not at all. In the first place, the very existence of science is a fact which requires philosophical reflection. That task was taken up by the philosophy of science. That branch of philosophy is flourishing and, just as happens with any respectable science, has many schools and specializations—from research into the kind of rationality represented by various sciences and the logic of the development of scientific theories, through analysis of the methods used by various sciences, to specialized analytic research into those aspects of scientific theories which the sciences themselves cannot handle.

Does that exhaust the tasks which philosophy must fulfill in relation to science? In answering that question, let us appeal to history. Above all, the statement that first there was the philosophy of nature and then the natural sciences arose and liquidated the place of philosophy in science is a crude oversimplification of the historical process. The natural sciences did not arise on the ruins of the philosophy of nature. They existed in parallel to it, though they were not always explicitly separated from it. It is sufficient to name the Greek sciences: astronomy, optics, acoustics, statics, not to mention geometry. One can only speak of a period of the domination of the philosophy of nature over the sciences until the beginning of the modern period, after which one must speak of the period of the domination of the sciences. The transition between those two periods was a continuous transition, although one rich in dramatic tensions. Notice how many typically philosophical problems were found in the spheres of interest of various scientific theories. The problems of time, space, and causality will serve as typical examples. Right down to our own day they are thought of as “great problems of philosophy” though at the same time all the fundamental theories of physics have much to say on these topics.

It is of course true that when some problem migrates from philosophy to the empirical sciences, it thereby changes its significance. We know that context is just as important as the “internal” connections between concepts. What is more, the problems and concepts transformed by the migration from philosophy to the sciences often come back for further philosophical deliberation, in that way thickening the connections between the two realms of knowledge.

The strengthening of that connection creates an interesting field of investigation. I have called it “philosophy in science,” no doubt a summary expression and one which includes only some aspects of the phenomena which interests us here, but I hope that the entire book will constitute a justification for it. As I have already noted, the history of science itself bears witness to the presence in science of philosophical threads and it is for that reason that I have to write this book from a philosophical point of view.

That does not mean that the study of philosophy in science has to limit itself to purely historical considerations; it means only that historical considerations seem to be an indispensable element of a strategy which would allow us to see the philosophical significance of the sciences. In my opinion, a thorough knowledge of at least the most important trends which have appeared in the history of philosophy and science is a necessary condition of a responsible research program in the area of contemporary philosophico-scientific problems, and at the same time is an indispensable minimum of knowledge for the researcher working in other areas of philosophy.

I borrowed the idea of developing a series of lectures around the most important figures and themes from the history of place of philosophy in science from Professor Jean Ladrière, who gave such a series of lectures at the Institut Supérieur de Philosophie of the University of Louvain in 1982–1983. The unpublished notes from those lectures, made available in typescript through the kindness of Professor Ladrière, were of invaluable assistance to me.¹ The many references to Professor Ladrière’s notes in the text of this book indicate my debt to him only partially. However, my own series of lectures is not a copy of the lectures given in Louvain. Professor Ladrière concentrated his attention principally on one problem, namely, on the relation of physics to metaphysics in the most important systems of the philosophy of nature. That is indeed one of the key problems, but I decided to go beyond that problem, and to undertake a more comprehensive discussion of the particular systems. As a result, the more focused formulation of Professor Ladrière has, in my book, become a more general series of lectures. That has manifested itself also in the method of the lectures.

Professor Ladrière limited himself to a discussion of the relation between physics and metaphysics in Aristotle, Descartes, Leibniz, Kant, and Whitehead. I have supplemented that account with a look at Plato, Newton, Popper and the so-called Romantic philosophy of nature. I also added a chapter on Aristotle’s treatise *On the Heavens* and a chapter discussing the philosophical themes in contemporary

¹J. Ladrière, *Physique et Métaphysique*, the text of lectures read at the Catholic University of Louvain in 1982–1983.

science. A short chapter on the Ionic philosophers of nature and a slightly longer chapter as a kind of summary discussion supplement the whole. The reasons for my additions are as follows:

Many problems later treated by nearly all the great systems of the philosophy of nature come from the Presocratics, so it necessary to begin with them. Since all of Western philosophy is only a footnote to Plato (Whitehead), it is not possible to leave him out of a course of lectures; all the more since contemporary theoretical physics seems in many cases—more or less consciously—to refer precisely to Plato. Textbooks in the history of philosophy do not usually devote very much space to the philosophical views of Newton. Even if it is true that that thinker does not belong among the brightest stars in philosophical firmament (which is a matter of debate), the classical mechanics which he created had such a great influence on entire generations of philosophers, that one must give him a prominent place in any discussion of philosophy in science. As for Popper, one can of course have greater doubts, but from the point of view of the twenty-first century, it is already clear that his views have become an important achievement of the most recent philosophy.

I made a choice of themes with a view to their importance for philosophy in science. The single exception is the Romantic philosophy of nature. It is included in this book as an example (unfortunately, one among many in history) of unfruitful lines of inquiry. Because the field of the philosophy of nature is a great temptation for overly impatient minds, I thought it would be appropriate, at least in one case, to show where intuitions lead when insufficiently controlled by the rigors of logic.

I also added a chapter dedicated to a discussion of the philosophical significance of theories of contemporary physics. Over the years, it has become even more obvious that the natural sciences are not only taking up many themes which traditionally belonged to the philosophy of nature, but are also posing entirely new problems which require philosophical analysis. What is more, the influence of the natural sciences on philosophical thinking about the world is currently much greater than the influence of any one thinker.

One should not, of course, think of the present book as a comprehensive account of the history of the philosophy in science; it is only *selected problems*, although selected with a rather keen partiality for those which I saw as more important. The approach which I take in this series of lectures (for thus can one characterize the literary genre of this work), does not limit itself to looking “from the inside” of any concrete philosophical system; it is an attempt—by means of a history of the most important philosophical views—to identify authentically philosophical themes in the questions raised by the contemporary natural sciences. The identification of those themes is not yet their philosophical elaboration. That is a task that still awaits its author.

One can see the idea of philosophy in science as a contemporary version of the old philosophy of nature. For that reason, I will sometimes use those terms interchangeably. One can interpret that as a bow to tradition. Science by its very nature is *avant-garde*, but one of its methods in the conquest of new terrain is respect for tradition.

The present translation is based on the second Polish edition of this book (under a different title; the title of the previous edition was *The Philosophy of the World*) has been significantly expanded. It became possible thanks to the collaboration of Małgorzata Szczerbińska-Polak, who wrote all the Appendices and biographies. For that, I offer my sincere thanks. I also wish to express my sincere thanks to my translators, Professor Kenneth W. Kemp and Mrs. Zuzanna Maślanka-Kieroń. If it is true that every translator is a betrayer (*traduttore—traditore*), then it applies to my translators in the most minimal possible sense.