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1 Popper and His Philosophy: An Overview

0. INTRODUCTION

Karl Popper both provoked and attracted controversy. His work addressed key problems in the fields of epistemology, philosophy of science and social science, logic, political theory and politics, metaphysics and theories of mind. In each field he challenged dominant theories and sought to formulate new ones. Perhaps his most important achievement was to cast doubt upon induction as a criterion of demarcation between science and non-science, and to propose the alternative of falsifiability. Over the course of his life he extended this criterion into a broader philosophy of critical rationalism that would be applicable to many fields. At the heart of this philosophy is the practice of criticism. Popper rejected the idea that we should try to justify our arguments and proposed that we should replace it with the idea that our ideas need to be exposed to, and to survive, criticism. In tandem with attempts to refute opposing views, Popper encouraged scientists to propose bold conjectures and then attempt to refute them.

Popper provoked controversy in part because of his merciless criticism of those philosophies and theories he chose to attack. Logical positivism, Platonism, Marxism and Freudianism, for example, all had powerful proponents and followers who initiated spirited defences. The intellectual reception of his positive proposals was invariably mixed. This was not just due to the novel quality of his ideas. It was the consequence of a number of more mundane factors such as the timing of translations into English, brought about by the disruptions caused by the rise of national socialism, the onset of war, geographical isolation and poor health.

Although primarily known in Europe as a philosopher of science who in his seminal work, *Logik der Forschung* (1934), presumed to have overturned some of the key doctrines of the Vienna Circle, Popper became better known in English-speaking countries as a political philosopher who had written *The Open Society and Its Enemies*

(1945). *Logik der Forschung*, however, was not published in an English translation until 1959, as *The Logic of Scientific Discovery*, which included many new footnotes and appendices. The publication of Popper's *Postscript* to the *The Logic of Scientific Discovery*, which was a major effort to revise and extend his earlier philosophy, was interrupted by poor eyesight and did not appear until the 1980s (Popper 1982a, 1982b, 1983).

Similar difficulties beset his political views and arguments. The *Open Society* was the product of his years (1937–45) of relative isolation at Canterbury University College in Christchurch, New Zealand. Although this book came to prominence during the Cold War, and was generally represented as a liberal critique of communism, much of its policy content reflects a perspective drawn from Austrian social democracy. Whereas many commentators lump Popper and Friedrich Hayek together as classical liberals, their political views on markets and the role of the state in the economy are quite different (see Shearmur 1996; Caldwell 2006). The problem of interpretation is further compounded because during the 1950s and 1960s Popper took on a more liberal persona and propounded liberal doctrines and even aligned himself with some conservative causes. Nonetheless, the extent to which there are fundamental changes over time in Popper's political views is a matter of dispute. Over the course of his life, as would be expected, Popper had abandoned some arguments, revised others and proposed new ones. Neither the order of the publication of his writings nor their reception reflects the order of development of his ideas. For many readers, the Popper they embraced or rejected had moved on.

As Malachi Haim Hacohen (2000, introduction) has argued, in places, Popper's own reconstruction of his intellectual development, *Unended Quest*, hinders attempts to understand accurately the early development of his ideas. Indeed, it is only since the 1990s, when Popper's papers were catalogued and made available in the Hoover Archives, that it has become easier to trace the lines of his intellectual evolution. Based on his archival research, Hacohen (2000, p. 10) has revealed a further difficulty in that parts of Popper's account of his intellectual trajectory cannot be borne out by the documentary evidence. All this is further complicated by Popper's somewhat difficult and combative personal character. He evoked strong feelings among those who knew him. Sentiments of intense loyalty jostle uneasily alongside those of dislike and disapproval. Not surprisingly, such feelings can influence assessments of his contribution to philosophy. This chapter provides an overview of many key strands of Popper's philosophy and offers a brief assessment of its philosophical and political significance.

1. BACKGROUND – HISTORICAL AND INTELLECTUAL CONTEXT

Karl Popper was born in Vienna on 28 July 1902 into a Jewish family that had converted to Protestantism. As Hacohen has shown, the dominant values of the family and much of his social milieu were cosmopolitan and liberal. In the years before the First World War, Vienna was the capital of a sprawling, multi-ethnic Austro-Hungarian Empire. Vienna was also home to numerous 'progressive' movements in art, philosophy, psychology, education, economics and politics. Throughout many of these fields there was an optimism about science, its role in promoting social reform and above all the capacity of scientific rationalism to contribute in creating better societies.

With the collapse of the Hapsburg Empire after the war, and the creation of the Republic of Austria, new political forces were unleashed. Both the ideas and the political struggles of socialists and communists had a profound impact on Popper who, at one stage, considered himself to be a Marxist and communist. He was almost seventeen when he witnessed a bloody confrontation between police and communists, an event that helped to steer him towards democratic socialism, and eventually to what can be called social liberalism. Later experiences of the dogmas and violence of national socialism were also significant in formulating his political views.

Vienna was also home to Sigmund Freud, the founder of psychoanalysis, and Alfred Adler, who formulated an influential theory of individual psychology based on the inferiority complex. Popper was familiar with their work, and became close to Adler, but soon rejected much of their thinking. As Popper recalls it, he was influenced by the implications of Einstein's revolutionary theory of relativity in theoretical physics. He was especially fascinated with what he saw as Einstein's scientific method that encouraged bold theories, dispensed with the goal of certainty and valued rigorous criticism. Popper developed such ideas in the context of arguments with members of the Vienna Circle, who were the most important exponents of scientific philosophy. Their members included Rudolf Carnap, Otto Neurath, Moritz Schlick and Viktor Kraft, and they had extensive network of correspondents and disciples throughout Central Europe and North America.

At the time at which Popper wrote, a widespread view of science was that it was based on induction, which is the inference of universal statements or propositions from a set of singular or particular statements such as the accounts of results of observations or experiments (Popper 1959, chapter I, section 1). In this view, the accumulation of

past experiences allows the scientist to devise laws and make predictions about the future. For inductivists – scientists and philosophers of science – the logic of scientific discovery was identical to the 'logical analysis' of inductive methods (Popper 1959, chapter I, section 1). Although Popper previously accepted this principle, by 1930 he had come to see it as problematic. Following David Hume, Popper concluded that, from a strictly logical point of view, we are not justified in inferring universal statements from singular ones. By 1932 he formulated an alternative criterion for demarcating science from non-science, namely the principle of falsifiability. Falsifiability derives its strength from the logical point that, while it is impossible to verify universal statements on the basis of past singular statements, universal statements can be refuted by the acceptance of a basic or singular statement. Popper extended this epistemological principle into a scientific methodology, which became the focus of his book, *Logik der Forschung*.

2. POPPER ON INDUCTION

Although it may seem unusual given its central role in Popper's work, we decided not to commission a paper on Popper's treatment of induction. The reason was that the views of scholars with a specialist interest in this topic are varied but, by now, well entrenched. It seemed to us best if we were to offer a brief guide to Popper's views on the topic, and a consideration of what some of those most closely associated with him have made of his ideas. A useful starting point for any reader who is not already familiar with it would be Popper's (1974b) own treatment of the problem in his 'Replies to My Critics' in *The Philosophy of Karl Popper*, sections 13–15, or the material in section 7 of Popper (1985).

Popper, while accepting Hume's criticism of induction, argued that, in order to solve the problem of induction, one needed to reformulate it. Popper wished, particularly, to get away from formulations such as: 'What is the justification for the belief that the future will resemble the past? [or] What is the justification of so-called inductive inferences' (Popper 1974b, p. 1014). He argued, also, that one should discuss, separately, the logical problem of induction, the psychological problem of induction and the pragmatic problem of induction (see Popper 1972, chapter 1). To his responses to each of these we will turn, shortly.

As Popper (e.g. 1974a; 1976) explains in his intellectual autobiography, *Unended Quest*, he was for many years concerned with the problem of demarcation. That is, he wanted to know what makes scientific ideas distinctive, and how they could be distinguished from metaphysical and pseudo-scientific ideas. Popper has explained that what played the key role here was the idea that scientific theories are

open to empirical test. That is, they can in principle be refuted. He also argued that this offered a resolution of the problem of induction. Popper endorsed David Hume's criticism of the claim that induction was a valid form of argument. Russell and others suggested that if Hume was correct, this was an intellectual disaster (e.g. '[Hume] arrives at the disastrous conclusion that from experience and observation nothing is to be learnt' [Russell 1946, p. 645]). Popper responded by arguing not that Hume was wrong in his criticism of induction, but that both science itself and common-sense knowledge are not inductive. Popper was critical of induction as a psychological theory and also at the level of logic.

In his first substantive work on the topic, *Die beiden Grundprobleme der Erkenntnistheorie* (*DbG*) (*The Two Fundamental Problems of the Theory of Knowledge*) (Popper 1930–33; 1979), Popper's approach was systematically anti-psychologistic. Popper developed his arguments in part by way of a detailed critical discussion of some themes in Kant, and of the ideas of the Kantians J. F. Fries and Leonard Nelson. He had had extensive discussions about this material with Julius Kraft (Popper 2008, chapter 1). Although Popper was not a thoroughgoing Kantian, Popper's response to this material served to distance his approach from the empiricism of the Vienna Circle. He also made suggestions about a non-inductivist psychology, which drew in part on studies, including his own, on issues in human and animal psychology (see Petersen's discussion [Chapter 3] in the present volume). He refers in this context to Karl Bühler, Otto Selz, H. S. Jennings and to the biological aspects of Ernst Mach's work. At the same time, however, Popper suggested that his own approach in *DbG* transfers ideas from his epistemology to psychology, and he was later to write of a 'principle of transference': 'what is true in logic is true in psychology' (Popper 1972, p. 6).[1] Exactly when Popper developed his approach is not easy to discern. Troels Eggers Hansen (2006; see also Hacohen [Chapter 2] in the present collection) discusses some of Popper's earlier writings in which he seems to take an inductivist approach to demarcation, and suggests that Popper might have read later ideas into his accounts of his intellectual development.[2] But it is clear that, in Popper's systematic writings on the topic from *DbG* onwards, his approach is non-inductivist.

We will address Popper's ideas about induction at three levels. First, what were they, and how did they change over time? Second, is it the case, as some of Popper's critics have suggested, that Popper's account is, in fact, inductivist in its character? That is, does it depend on covert inductive assumptions for its cogency? Here the discussion will be brief, as a particularly clear and in our view telling account of these issues is given in David Miller's work (Miller 1994, chapter 2; see also Popper 1974b). Miller documents and then critically discusses nine different

objections, including ones concerning the presuppositions of science, the repeatability of tests and whether there are problems concerning Popper's account of the severity of tests. Third, there is the question: Is Popper's non-inductive account adequate; does it, in fact, solve the problem of induction? In particular, it has been questioned whether Popper offers an adequate understanding of the way in which, in one way or another, our actions may be guided by scientific theories, or of what is sometimes referred to as the 'pragmatic problem of induction' (Popper 1972, chapter 1). We will discuss these issues, by way of considering not just what Popper has had to say about these topics but also what has been made of them by some of those most closely associated with him. With this discussion, we aim to give an account of the state of play concerning Popper and induction; readers may then be able to pursue their interests in more specialised literature.

3. POPPER'S NON-INDUCTIVE THEORY OF KNOWLEDGE

In his 'Conjectural Knowledge' (Popper 1972, chapter 1), Popper suggested that one should look at induction at three levels.

First, there is psychology. Popper's approach here is to reject the view that we learn inductively (see Petersen's discussion in the present volume). There are various parts to his argument. Popper argues that in response to causal triggers (which we do not experience consciously as such), we offer conjectural interpretations, the adequacy of which may be checked on an ongoing basis. We operate psychologically by conjecture and refutation. Although certain kinds of responses may be biologically pre-formed, this does not mean that they will necessarily be valid. When discussing animals, he indicates that in some cases it would appear as if they are unable to learn that their interpretations are incorrect, and may suffer as a consequence (cf. Popper and Eccles 1977, Part I, section 24). Popper takes a biological – and implicitly an evolutionary – approach to all this. At the level of humans, he stresses the way in which description takes us beyond the content of what is directly experienced. In this vein, he points out the role of theories in influencing our psychological interpretation of the world. There is also a critical side to this approach. In an inductivist account, we start from resemblances between the things that we experience. By contrast with this, Popper argues that resemblance is always from a point of view – thus suggesting that purely inductive accounts of learning by repetition are flawed (Popper 1959, Appendix *x).[3]

Second, there is Popper's account of a non-inductivist epistemology. These are two elements to this: his ideas about 'basic statements' and his ideas about the evaluation of theories.

Popper's account of basic statements is discussed in detail in Andersson's contribution to the present collection (Chapter 5). But three features are here worth bringing out. First, in *Die beiden Grundprobleme*, there are, in effect, two complementary accounts. On the one hand, Popper offers an account of basic statements – influenced by both his non-inductivist psychological ideas and elements from his engagement with Kantianism. In this view, experience is produced as a reaction to a stimulus, but this is a matter of our producing things that are then matched against the world, rather than the content of our experience being given by instruction. There is, then, a more formal account of issues to do with induction, in which context experience is taken as given. Popper here places emphasis on the idea that what counts for the purposes of knowledge is experience that is repeatable. That is to say, the reports against which theories are tested consist not just of reports about what took place when a test was made but also of a formula or instructions for the production and testing of our results. There is, later in the book – and elaborated in *The Logic of Scientific Discovery* – an account in which two points are brought out. First, in line with the first element in *DbG*, Popper stresses the theoretical content in our descriptions, and how they go beyond anything that might be described as 'given'. Second, Popper makes explicit that our 'basic statements' are conjectural in their character, and gives an account in which the 'empirical basis' of science consists of an open-ended consensus as to what is the case. It is open to someone to challenge this consensus, and they might well be prompted to do so as a result of a new theory suggesting that hitherto accepted basic statements are incorrect. But this challenge would itself need to be tested, and if the previously accepted but now questioned basic statements are judged to be problematic, we would like to be able to offer an explanation as to how it was that things had looked as they had done to people in the past (cf. Popper 1972, chapter 5; Agassi 1966). Popper (1959) offers an account of basic statements as being about such publicly observable objects as the readings of pointers in a scientific laboratory. It is against claims understood in terms of such an account of experience that theories are to be tested. In *The Self and Its Brain* (Popper and Eccles 1977, pp. 106–07), Popper makes it clear that, in his view, his account can be extended to refer to people's psychological experiences. (For example, an approach developed by the Würzburg School suggested how claims about the character of people's psychological experiences – e.g. their experience of illusions – might be testable.) But we would use such an approach not to test, say, theories in physics, but rather only when our theories themselves are about aspects of human psychological experience.

This brings us to the second level – that of theories. Popper sees us as typically starting from problems, which may be posed by the disappointment of our expectations, or by the discovery that there is an inconsistency within our ideas. To such problematic situations, Popper depicts us as responding creatively. In *The Logic of Scientific Discovery*, he argued that our ideas here may involve 'creative intuition' (Popper 1959, section 2). But this is obviously compatible with our ideas being influenced by what Popper described as research programmes or by what Kuhn referred to as paradigms, or more generally by prior knowledge. Popper's concern was to stress that ideas were not produced simply by the phenomena that we were trying to explain. On his account, we seek to produce ideas that would serve as an explanation of the phenomena in which we are interested, or that offer a resolution of the problem which we wish to resolve, and which would themselves be independently testable, in their turn. As is well known, on Popper's account, boldness is represented as a virtue, and it is a particular point of merit if our ideas conflict with our previous assumptions. Science, for Popper – and, indeed, our knowledge, generally – is a process in which we come up with such testable hypotheses that are then tested. If and when these hypotheses are found problematic, new ideas are advanced in their place.

Two points are worth emphasising here. The first is that Popper (e.g. 1930–33, 1979; 1934, 1959) was well acquainted with conventionalist theories of science. Popper himself stressed that our knowledge faced the world as a system[4] and he was well aware that it was open to us to make modifications to it. He thought that conventionalism – the view that we should make minimal modifications to our existing knowledge – was a perfectly possible view to take. Nonetheless, he stressed that there was a contrast between conventionalist views on the aims of science and the dynamic character of science that so attracted him (Popper 1959, section 19). Although he did not put it in these terms at the time, Popper was a realist, who thought that we should be bold in our theories and open to the modification of our views in the hope of reaching truth about the world. In the light of this, he suggested various methodological rules that should be adopted with the aim of reaching this goal. For Popper, however, there clearly could be no guarantee of attaining the truth. But the fact that he recognised that someone could coherently be a conventionalist also made it clear that they – if their aim was different – could cogently adopt very different methodological rules to those which he favoured.[5]

The second point to be emphasised is that, as indicated earlier in the chapter, Popper argued that we should prefer bold theories. In *The Logic of Scientific Discovery*, Popper suggested that this approach offered a

way in which one might explain the preference for simple over complex theories. He (Popper 1959, chapter VII) argued that, rather than having to make a substantive assumption here – the justification of which (like all justifications) would be problematic – the preference can be explained if simplicity is understood in terms of the degree of falsifiability of our theories. For Popper, such a preference could be argued for in methodological terms. Popper (1963, chapter 10, p. 241) subsequently referred to the idea that a new theory should proceed from 'some simple, new, and powerful unifying idea'. Maxwell's contribution to the present collection includes some critical discussion of these arguments.

For Popper, it is important that our theories be testable and tested. They should be put, especially, to tests that we would not expect them to pass. If they pass such tests, he describes them as having been corroborated. For Popper, our best knowledge will, at any one time, consist of bold, testable and well-corroborated theories. We may conjecture that they are true (or that they may represent progress over our earlier theories[6]). But he stresses that we cannot be sure that they are true. Here, the lesson of Einstein's challenge to Newton played a key role. In this case, Newton's theory, which had been better confirmed than any other, and in spectacular ways, turned out to be only an approximation to what we currently take to be our best theory in this field.

There has been extensive discussion of Popper's views on these topics, both as to their adequacy and as to whether, in some way, they are, in fact, inductive in their character. We can, however, spare the reader an account of this latter issue, because David Miller (1994), in the first part of chapter 2 of his *Critical Rationalism*, has offered a clear account of a range of important objections, to which he offers interesting responses in the second part of the chapter. Popper (1974b) himself also made a number of important rejoinders in his 'Replies to My Critics', sections 13–19 and 32.

We have, so far, briefly discussed two levels at which the problem of induction might be raised: psychology and Popper's non-inductivist epistemology. The third level relates to the question of whether Popper's approach to the problem of induction is able to deal adequately with problems about how scientific knowledge – and, indeed, common-sense knowledge – relates to our actions. What we seem able to accomplish as human beings has been transformed by scientific knowledge. Science has assisted us to explore space, treat diseases and construct computers that in turn aid us in achieving goals we could only have dreamed about in the past. All this takes place in ways that are influenced by our current scientific knowledge. Popper tells us 'that we should prefer the best-tested theory as a basis for action' (Popper 1974b, p. 1025). But can we understand such an idea without assuming some form of induction,

and if we can, does such a non-inductive account actually resolve the 'pragmatic problem of induction'?

In discussing these issues, Popper has stressed the fallibility of even our best knowledge. He also pointed out how various examples of well-established regularities turned out to be false (or, as far as we know, are only true if they are reinterpreted).[7] All this can be granted. But there has been persistent concern expressed as to whether Popper's views are adequate to explain what we do seem to know and to do.

This is not the place to offer our own views about this topic. We consider, rather, that it would be useful instead to survey the views of some of those who have been most closely associated with Popper and his work, particularly Imre Lakatos, John Watkins, Alan Musgrave and David Miller. From this survey, the reader will get some sense of the discussion and will be in a good position to explore further literature.

Imre Lakatos (1922–74) was a brilliant Hungarian philosopher of mathematics, who from 1960 was a colleague of Popper's at the London School of Economics. During the late 1960s, his interests turned to the philosophy of science, and, in two major papers, he wrote critically about Popper's work (see Lakatos 1978, chapters 1 and 2). Also, in the course of his contribution to *The Philosophy of Karl Popper* (Lakatos 1974; Lakatos 1978, chapter 3), he argued that Popper's views were, in the end, sceptical, claiming that 'only a positive solution of the problem of induction can save Popperian rationalism from Feyerabend's epistemological anarchism' (Lakatos 1978, p. 166). What was needed, on his account, was a '*synthetic* inductive principle connecting Popperian *analytic* theory-appraisals (like content and corroboration) with verisimilitude' (cf. Lakatos 1978, p. 163).

There are, however, two problems about any such proposal. First, what is its content supposed to be (bear in mind here the known fallibility of both some common-sense knowledge and some of our best scientific theories)? Lakatos suggested (Lakatos 1978, p. 164) that such a principle would need to be related to a 'major research programme' and also to be '*sufficiently richly formulated so that one may … criticize our scientific game from its point of view*' (*ibid*). Lakatos did not himself develop his idea further. One might, however, consider the approach of Nicholas Maxwell (see his contribution to the present volume [Chapter 7] for references) as offering something – albeit not an inductive principle – that might usefully be related to Lakatos's hopes about the criticism of science while at the same time avoiding problems that both Lakatos and Maxwell think face Popper's account (see, for some critical discussion, Miller 2006, pp. 92–94).

Second, is such a principle something that has to be rationally justified? From a Popperian perspective, there is nothing to stop anyone