Critical Rationalism: A Critical Essay

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A thesis submitted in partial fulfilment of the requirements of London Guildhall University for the degree of Doctor of Philosophy

January 1994

Contents **Page**

Acknowledgements

I would like to thank all those who have read and commented on drafts of chapters for this essay. I am particularly grateful to my supervisors Barry Hindess, Anne Phillips and Brian Hall for their comments and guidance.

The essay is dedicated to my parents.

Abstract

The aim of this essay is to establish that critical rationalism currently exists in an incoherent state. This is demonstrated through an analysis of the discourse's key fields (its metaphysics, metascience and politics), their constituents and conditions of co-existence. Looking at each field, the study shows that critical rationalism is beset by issues that undermine its cohesion. These range from contradictory proposals, through deficiencies in argument to inadequate conceptualisation. In the light of this assessment, it is suggested that greater coherence could be achieved by sacrificing its metaphysics and politics, and focusing on the regeneration of the metascience.

Introduction

Critical rationalism is a discourse whose diverse elements defy contemporary taxonomies of intellectual labour. It is a multi-disciplinary entity, a composite of assumptions, theories, postulates, prescriptions and arguments that contributes to a range of fields of inquiry including: metascience, politics, epistemology, and metaphysics. In metascience the discourse provides falsificationist methodologies for both the natural and social sciences. It employs a Darwinist biology to resource its evolutionist metaphysics, a conception of conjectural knowledge as the foundation of its epistemology, and Hayekian liberalism as the principled basis of its politics.

This listing of its contributions to different fields of inquiry gives an indication of the discourse's range; it does not however do justice to its complexity. That is provided more accurately by the dispersion of concerns within each field. In metaphysics, critical rationalism seeks to provide a general evolutionary foundation for its accounts of science, social science and politics. To this end, it looks at such diverse matters as genetic dualism, orthogenesis, the origin and development of language and the evolution of human reason.

In metascience, it considers various aspects of both the science it advocates and the pseudo-science it rejects. It discusses the grounds for viewing testing as a matter of falsification rather than verification; why such testing should be part of a deductive rather than an inductive explanation; why observation statements should be treated as conjectural rather than certain; why logic must be treated as testable; the importance of education

and training to research methodology; the significance of criticism; the distinctive nature of social science subject-matter and explanation, and the possibility of a rational defence for the metascience's form of rationality.

Its contributions to politics are as diverse. As well as describing the constituents of the liberalism it recommends, it also provides detailed analyses of the theories and ideologies of the totalitarian politics it rejects. It addresses such matters as: the historical and political pre-requisites of an "open society", the bases for political reform, the role of the State, the primacy of individual liberty, the virtue of tolerance and the threat of coercion and violence.

It is, then, a discourse with very different realms of intellectual inquiry. In each field there are myriad concerns, proposals and assumptions. Some form a clear nexus, others are linked but are capable of surviving independently. Some are dealt with in great depth, others are treated cursorily. Some emerge through debates with contrapositions, others are generated through a reaction to critical rationalism's own earlier analyses.

The juxtaposition of these different fields gives the impression of a changing, and increasingly elaborate discourse; an expanding labyrinth of concerns. It has not, however, always possessed this complexity. What has been described is the juncture of a process of development which has taken decades.

At its inception, the discourse was concerned with metascience and, within this field, with the problems of induction and the demarcation of

science. Now, its accumulated interests simply register these as two issues addressed by one of its several fields. An illustration of the nature of critical rationalism's growth can be found in a chronology of the works of its principal proponent, Karl Popper.

In Popper's first major work, Die beiden Grundprobleme der Erkenntnistheorie (written in the period 1930-1932) he addresses the metascientific problems of induction and demarcation. The latter concerned the question of how critical rationalism might draw a distinction between the "genuine sciences" (physics and the other natural sciences) and "pseudo-sciences" (such as astrology, Marxism and psycho-analysis). As Chapter Three indicates, in offering falsifiability as his demarcation criterion, Popper is not only proposing a new, non-justificationist, basis for scientific testing but also a rationale for the exclusion of induction from scientific research methodology.

In his next text The Logic of Scientific Discovery (written in 1934), Popper enlarges the realm of metascientific interests to include a conception of knowledge and an array of new methodological proposals. Here we get the initial attempt to draft the notion of conjectural knowledge as well as discuss such matters as: corroboration, determinism, the constituents of theories and the nature and role of test statements.

The first significant move outside the field of metascience takes place in The Poverty of Historicism (initially published as three articles in 1944) and The Open Society and its Enemies (published in 1945). Popper uses these works to set out his critique of historicism and holism both in terms of

their proposals for social science analysis and their perceived use as resources for totalitarian politics. This criticism, in turn, is employed as a catalyst for the expression of his preferred form of social scientific analysis and its concomitant liberal politics.

Popper's Conjectures and Refutations (published in 1963) and Objective Knowledge (published in 1972) are collections of essays. The former is a collection of essays written in the late 1940's and 1950's. These extend the range of discussion in the fields of metascience and politics and do so through both the repudiation of other positions (such as, historical materialism) and the incorporation of new arguments (as for instance in the use of Tarski's calculus of deductive systems).

Objective Knowledge is a collection of essays which were written in the 1960's. As well as enlarging and further refining the discourse's metascientific considerations, some of these essays also announce the renaissance of metaphysics. What had previously existed as a vague form of metaphysical realism is now re-created as metaphysical evolutionism. Through this metaphysics, Popper provides a much wider conceptual and substantive brief for critical rationalism. The process of science is still seen as the pinnacle of rational deliberation, but the knowledge it produces is now recognised as just one form among several generated by different species using a method of development, trial-and-error, common to all living organisms.

Postscript to the Logic of Scientific Discovery (published in three volumes in 1983) marks the return to metascientific issues and, as the title

suggests, issues that were first considered in the Logic of Scientific Discovery. Initially drafted twenty years after the original German version of The Logic of Scientific Discovery it circulated in the form of galley proofs among Popper's students and colleagues and, with extensive additions, has been published under the editorship of W.W.Bartley. Volume 1 deals with the fallibilist theory of knowledge and the confrontation between Popper and his critics on the problems of induction, falsifiability, the demarcation dispute, instrumentalism versus realism and the propensity theory of probability. Volume 2 re-addresses and re-affirms his commitment to indeterminism, while volume 3 discusses revisions to his interpretation of quantum mechanics.

As Popper's work indicates, running in tandem with the discourse's development has been a critical dialogue with other persuasions. What began simply as an uncompromising rejection of induction has grown into an opposition to most other forms of thinking. Indeed, throughout its history critical rationalism has been a highly sophisticated and yet highly controversial discourse.

Perhaps the most frequent object of attack has been the justificationist metascience proposed by the Vienna Circle. But a number of other positions have also been severely criticised over the years. These include: Aristotelianism and Wittgenstein's language analysis (both dismissed for their "scholasticism"); the writings of Hume (opposed for its "idealism"); those of Nietzsche and Freud (rejected for their "irrationalism") and, finally, those of Plato, Marx and Hegel (criticised, among other things, for their endorsement of "totalitarianism"). Each has been measured against

the discourse's concern for the criticisability of arguments, found to be inadequate and subsequently dismissed.

Using criticisability as the evaluative base of other persuasions has done as much as anything to polarise opinion about the significance of critical rationalism. Its supporters speak highly of the power of criticisability and, more generally, of the importance of the discourse in its rejection of Positivism, Idealism, Historical Materialism and philosophical linguistics. In their terms, its "ideas represent the most important development in the philosophy of the twentieth century" (1) and provide "a coherent account of knowledge, life and society" (2). Popper has been described as: "the greatest living philosopher" (3) and, in less restrained terms, as the: "greatest philosopher of science that has ever been" (4). Critics, however, see matters in a very different light. Popper is described as "a philosopher of little rigour" (5) and the discourse is seen as making "grossly inflated claims" and operating with a "conception of scientific practice [which] is completely unjustified". (6)

The more accurate assessment would seem to exist somewhere between these extremes. Critical rationalism has made important advances in the field of metascience and, particularly, in terms of the methodology of the natural sciences. It has confronted the once dominant justificationist metascience and shown it to contain serious weaknesses. The enthusiasm for the discourse expressed by its proponents and, indeed, their respect for Popper is therefore understandable. Nevertheless, a close analysis shows that they have made unwarranted assumptions and claims about the nature of critical rationalism's successes particularly concerning the unity of its

metascience and, more generally, the coherence of the discourse. For all its incisiveness on particular issues of metascience, critical rationalism is an incoherent discourse.

This essay aims to provide the analysis to support this contention. It will do so by addressing critical rationalism's contributions to metaphysics, metascience and politics and showing how they are beset by issues that undermine their cohesion. Some of these issues concern contradictory proposals, the majority however are matters of deficient argument or inadequate conceptualisation.

It should be made clear from the outset that the task is not being pursued through some kind of partisan analysis. The essay does not use external standards as the basis of its assessment in the manner, say, that Anderson uses Marxist arguments to dismiss critical rationalism as 'counter-revolutionary' (7) or Feyerabend uses anarchism to pour scorn on the discourse's conception of science (8). The analysis presented here takes a different path. It is concerned with the internal relations of the discourse's postulates, proposals and arguments and their conditions of co-existence. It is looking at the tacit reasoning involved in their employment, the gaps that exist in what they propound and, where possible, exposing their conflicts. Once these potentially problematic features have been uncovered, the task is to ascertain their importance. Can, for instance, the gaps in arguments be bridged with current discursive constituents? Can the conflicts be resolved? Are the assumptions made in conjunction with particular arguments necessary? Are they optional or even profligate? What consequences do negative answers to these questions have for the field being assessed?

This form of 'internal' assessment has been chosen because it is the most suitable for the problem at hand. The contention of incoherence will be a more powerful indictment if it can be established on critical rationalism's own terrain and on its own terms rather than through the imposition of external standards from some alternative discourse.

Chapter One of the essay serves as a prelude to the analyses that follow. Previous research has tended to assume that critical rationalism forms a coherent unity. In this chapter I set out to demonstrate that such an assumption is problematic. I make my case through an analysis of the categories that have been used to represent the discourse's coherence arguing that they operate only by distorting what it is they are supposed to represent. The categories should not , however, carry total responsibility for the distortion, for the discourse's constituents repeatedly conflict with proclamations of unity and, in so doing, demonstrate the need to question critical rationalism's coherence.

Chapter Two begins the discussion of critical rationalism's fields with an assessment of its metaphysics. It starts with an outline of the changing status of evolutionism in the discourse's history and the problems this holds for the reading of works which precede Popper's Objective Knowledge. It then describes the major features of what is proposed. The description centres on: the appropriation and amendment of Darwin's view of evolution, the three-world ontology, the decision to differentiate human from non-human evolution and the proposed conceptual links between evolutionary development and the growth of human knowledge.

The evaluation of these notions is initially organised around the points made by other critics such as Bartley (9), Currie (10) and O'Hear (11). To their illustrations of conceptual inadequacies, are added my own critical comments about exosomatic processes, the limitations of unsubstantiated taxonomies and the inept operation of the discourse's conception of 'trial-and-error'. The combined assessment not only indicates the inchoate form of the metaphysics but also the fragile and fragmented nature of its current constituents.

Chapter Three addresses critical rationalism's metascience and, more specifically the proposals for the natural sciences sub-field. It looks initially at the metascience's critique of induction and its replacement, deductive fallibilism. It then considers a number of constituent elements that include: methodological decision-making, the conjectural status of empirical observation, the nature and role of corroboration, the calculation of verisimilitude and the general conception of the rationality of science. The chapter suggests that each of these elements is beset by issues which both undermine their individual viability and introduce discord in terms of the general field. Their collective impact renders untenable what is currently offered as the rational or scientific pursuit of truth.

Chapter Four discusses the metascience's prescriptions and recommendations for the social sciences. Although these currently form little more than a rudimentary sketch of both the sub-field's potential phenomena and its conception of explanation, the chapter will argue that what exists gives a clear indication of the problems that will confront the discourse's social science analyses. It begins with an outline of the uses and

assessment that the discourse makes of two of its social science rivals 'historicism' and 'holism'. Thereafter, it addresses the metascience's own proposals, its definition of social science subject-matter and proposals for constructing explanations.

In the assessment of this sub-field, it is argued that Popper's rejection of the historicist and holistic contra positions are in the majority of instances flawed. Of greater importance, however, are the flaws in the metascience's own proposals for social science subject-matter and explanation. Here, the chapter will establish that what the discourse offers as social science phenomena is restrictive and what it provides as explanation is both vague and in conflict with its own metaphysics.

The politics of the discourse is the subject-matter of Chapter Five. The chapter begins with a discussion of the theoretical resources and analysis of what the discourse views as the only political alternative to the liberalism it advocates, namely, the historicism and utopian engineering of totalitarian politics. Thereafter it examines the constituents of the proposed liberalism, the birth of the 'open society', the principle of liberty, its links with democracy, the role of the State and the notion of reform as piecemeal engineering.

In the evaluation of this field, critical rationalism's views of both political positions are seen to contain serious problems. These principally derive from the discourse's notion of 'politics' which is little more than a compilation of principles and practices. Such a view overlooks necessary aspects of any realistic account of political action. More specifically, it

ignores both the instruments of policy employed in the pursuit of principle and the social, political and economic conditions in which they operate. Without such factors, what is proposed is a mere shadow of the practical politics the discourse seeks.

The final chapter of the essay, Chapter Six, is divided into three sections. The first looks to draw together the field-specific analyses and show why the problems that beset critical rationalism support the contention that it is an incoherent discourse. The second refers back to the discussion of unity in Chapter One and offers a characterisation of the discourse's unity in that incoherent state. The third and final section addresses the question of whether the discourse can be reconstructed to form a coherent unity and, if so, at what cost to its existing concepts, postulates and fields. The argument here is that if the discourse sheds its fields of evolutionism and politics and focuses on the issues of metascience, it may be able to produce a more coherent set of methodological recommendations and test procedures for the sciences and social sciences.

Chapter One

Making an Issue of Coherence

> "We must question these ready-made syntheses, those groupings that we normally accept before any examination ... they must be driven out from the darkness in which they reign. And instead of according them unqualified spontaneous value, we must accept, in the name of methodological rigour that, in the first instance, they concern only a population of dispersed events". Michel Foucault (1)

1 Introduction

Given the level of analytic interest that has been shown in so many of critical rationalism's concepts, it is somewhat puzzling to find that those categories depicting its coherence have remained largely unexamined. (2) It is not as if such categories are concerned with peripheral matters. They are, after all, employed by both critics and proponents to portray the manner in which widely dispersed statements constitute a single, coherent, entity. So how can their neglect be explained? Why, in this case, is there an absence of analytic interest?

The answer to these questions can be found in the conditions of their deployment. In the language of the Foucault quotation (above), the unifying categories are used as "ready-made syntheses" and are accorded an "unqualified spontaneous value". With that status, they create an identifiable context for the investigation of other matters. Effectively, they are resources used in the consideration of other topics.

This chapter sets out to alter their status, in other words, to consider them as objects of investigation rather than resources. The reason for doing so, however, is both more instrumental and more specific than Foucault's general appeal to methodological rigour. The chapter argues that in their

neglected taken-for-granted state, these categories have performed an important role for critical rationalism: they have suppressed the question of its general coherence. The argument turns on their modus operandi. Not only are the categories per se treated as ready-made syntheses, they also operate in assumed relations to provide accurate and unproblematic representations of a given, coherent, entity. Thus, what has been assumed in their operation is not simply their conditions of existence but those of their referent as well.

To confront the claim that critical rationalism is a coherent discourse, it must first be shown why the operations involving these categories and their referent should no longer be assumed. This will be considered through an examination of each of the major conceptions that have been employed in the characterisation of critical rationalism's coherence.

The categories in question range from material conceptions of unity such as the use of an author's name ('Popperianism'), and that of an educational institution ('the L.S.E. position') through to the more theoretically based conceptions which appeal to the universal presence of 'philosophy', 'criticism', 'evolutionism' or the hierarchical significance of 'morality'. In each instance, the chapter will look at their conditions of existence and their mode of operation. What it will demonstrate is that each category is unable to operate in the manner assumed. Specifically, they are forced to distort the constituents of the object they are considered to unproblematically represent.

1.2 Representations of Coherence

The material unity of 'author'.

The categories which have been most frequently used to unify the statements of critical rationalism as a coherent body are also those which, because of their familiarity, most easily disguise their unifying conditions. They are the material unity of 'author' and its accessory unit 'book'. Indeed, they are so popular in the analysis of the discourse (particularly the use of Popper's name) it almost seems artificial to examine them. How could researchers investigate critical rationalism without reading particular books by particular authors? And don't library catalogues encourage this form of individuation? So why not turn these material conditions of intellectual endeavour into conceptual conditions of research?

Certainly, it seems an attractive and uncomplicated strategy which would allow the amalgamation of books by one or more authors to set the limits to the object of research. Critical rationalism could then be whatever is contained in the books; the discourse's topics would be their topics, its analyses would be their analyses. A number of researchers do use these means to both identify critical rationalism and invoke a sense of coherence. Ackermann and Schilpp, for example, have both described critical rationalism as the 'philosophy of Karl Popper', (3) Lieberson proposes criticisms of "Popper's philosophy of science" (4) while O'Hear offers the title Karl Popper for a text which covers several major fields of critical rationalist enquiry. (5) Although occasionally enhanced by other unities, there is an assumption in each of these instances that the use of 'Popper' generates a primary coherence for the discourse.

It must be the very simplicity of this idea which makes analysts indifferent to the sheer immensity of what is being claimed through its use. If we accept that there is no problem of authorship that, say, Popper wrote the statements that are attributed to him in books bearing his name (and conversely did not write those attributed to other authors and he has not written under a pen-name) then what is being claimed is that a massive array of statements, from different articles or books, written in different languages, about widely differing topics at different times form (or ought to form) a coherent body because they were written by one person: Popper.

Other than the sheer familiarity of this way of individualising writing, what are the grounds for this claim? There are no obvious answers. There are however two good arguments for denying that it provides a ready-made unity or even a suitable characterisation of critical rationalism's supposed coherence. These arguments are, in fact, reactions to two highly questionable conditions of existence which, individually or jointly, underwrite the use of the name. The first condition suggests that author must refer in exactly the same way to all the writings it is synthesising, while the second more specifically sites the use of author within a psychology of creation.

The first condition operates a simple egalitarianism. To assume that writings cohere because they are penned by Popper, requires you to treat a wide variety of writings on different topics and with different qualities in exactly the same way. Whether they are statements detailing prescriptions of scientific practice, autobiographical comments on adolescent views or the rhetorical dismissal of a critic like Feyerabend, makes absolutely no difference; the category of author does not differentiate or act as a measure

of quality. Its modus vivendi involves linking statements with a particular person on the grounds that s/he wrote them. Differentiation by topic, style or quality have either to be ignored or seen as the function of a supplementary unity as in 'Popper's philosophy' or 'Popper's autobiography'. But whilst these supplementary unities divide Popper's writing, each division or appendant category nonetheless retains the fundamental condition of treating all that it includes as equal and cohesive because it was penned by Popper.

Thus far, the chapter has considered author in the singular and specifically in terms of the discourse's principal proponent: Popper. Now, although Popper is recognised as the major advocate of critical rationalism, he rightly acknowledges that other writers such as Bartley, Campbell, Jarvie, Tarski and Watkins have also contributed to the discourse's growth. How, then, does the category of 'author' cope when asked to provide a coherence for the work of several authors? Well, whilst it could accept the addition of other writers without much problem, what it could not do is differentiate their writings. This constitutes a problem for critical rationalism as some of its proponents (Bartley, for instance) have also spent periods as critics of the discourse. The inclusion of all their work would therefore create quite obvious conflicts in what it is that critical rationalism is proposing.

But there are more telling issues for this category than those concerned with its inability to discriminate. If, as is being suggested, author can only produce coherence by the simple appeal to who-wrote-what, then it really cannot do justice to the discursive complexity and variety of critical rationalism's concepts and arguments. It cannot, for instance, recognise the

conceptual wealth of the discourse, its range of fields of inquiry, the unevenness of their developments, their strengths and weaknesses, their conceptual configurations and dislocations. It cannot cope with conflicting proposals by the same author, conceptual disjunctures or contradictions, or conflicting views held by different authors, all of which the ensuing chapters will demonstrate are part and parcel of critical rationalism.

There are further limitations associated with the second condition of existence: the psychology of creation. This condition treats the public statements of authors as reflecting their private intentions, reasons or concerns. Using such grounds, analysts speak about what an author was concerned to do here or the issue s/he was trying to tackle there. They utilise these aspects of the author's psyche as the means for creating coherence. Magee's text Popper (6) provides an illustration, it contains numerous instances of this operation. Lodged in Popper's personal and intellectual history, all of critical rationalism's arguments either: (i) emanate from his intentions or desires or, (ii) exist as responses to the historical and political circumstances that confronted him.

The following quotation depicting Popper's concern in writing The Open Society and Its Enemies is a typical example:

> "Although in my view the most relevant aspect for today of The Open Society and Its Enemies is its philosophy of social democracy, and although this was close to Popper's heart when he wrote it, it was not his chief reason for writing it. One has to remember that for most of the period while he was working on it Hitler was meeting with success after success conquering almost the whole of Europe... In these circumstances what Popper was concerned to do was to understand and explain the appeal of totalitarian ideas..(7)

Note here how the statements of the text in question are seen to record the 'concern' of the author and how, in effect, it is this "chief reason for writing" which is used as the grounds for the text's creation and therefore as the basis for its coherence. What is effectively invoked is a psychological reductionism in which the public word is seen as a product of an author's intentions and these intentions are then proposed as the basis of a coherent unity.

Even limiting the discussion of this condition to a single author, it can clearly be asked whether it is credible to read intentions in statements. Should it be assumed that every statement is an expression of an intention? Think once again of the diversity of Popper's writings, beyond the grossest conception of desire and design, does Popper authorise what his intentions are or were? Can they be attributed by others, and if so, on what grounds? And how can such activity be allocated a pre-analytic status? As soon as one begins to examine this means of generating coherence, its durability as a supposition weakens. Such weakness is further amplified once critical rationalism is seen as the work of a number of authors, for, who could say that they speak with one voice or think with one mind or that the mind corresponds with the voice?

In sum, the category 'author' does not, indeed, cannot act as a means of unifying the statements of critical rationalism. Its attempt to lend coherence to the dispersed statements of the discourse results in it distorting what it claims to represent. It is not simply that Popper did not write all that critical rationalism currently is and clearly will not write all that it might be in the future; it is much more that the category of author/s can only

generate coherence by the simple appeal to who-wrote-what or, in a more reductionist vein, what their intentions were. Such grounds for coherence simply would not do justice to critical rationalism's discursive complexity.

The Accessory Unity: 'Book'

The same tenor of argument can be used against one of author's appendant units, 'book'. The statements of a book co-exist as part of a clearly identifiable material unity. Printed on pages, statements are literally bound together. The issue here, however, is whether this material unity should also operate as a conceptual unity? Is it conceivable that critical rationalism could be presented as the contents of particular books? Well, it is certainly conceivable, and in combination with Popper's authorship has been offered as a basis of critical rationalist unity by Johansson. (8) He argues that the contents of Popper's text The Logic of Scientific Discovery can be treated as the basis of the discourse's coherence:

> "I shall interpret Popper as if what he writes elsewhere than in the Logic of Scientific Discovery is consistent with what he says there. This, of course, unless Popper does not explicitly say that he has changed his opinions, which he sometimes does. This way of looking at Popper is also congruous with the fact that he incessantly makes minor changes, additions and explanations in later editions of his books. He obviously thinks that there is no reason for an extensive revision". (9)

Johansson seems to be making the assumption that all of Popper's writings are consistent with the proposals in The Logic of Scientific Discovery unless Popper tells him otherwise! Is this to suggest, then, that the text's material limits and the theoretical limits of Popper's writings coincide? In spite of the caveat of "minor changes," it would appear so. The text's arguments, concepts and postulates are supposedly mirrored in the

rest of Popper's writings, mirrored not only as individual arguments but also in their corporate consistency. But if all of Popper's writings are seen to be mirror images of this one text, is Johansson implying that there have been no major developments since the publication of The Logic of Scientific Discovery? What then does he make of the constituents of the evolutionist metaphysics that have become so important a feature of Popper's more recent essays and how does he handle major conceptual developments like the appropriation of the Tarskian definition of truth-as-correspondence and the introduction and revision of the conception of truthlikeness? Each has been developed since the publication of The Logic of Scientific Discovery and none can safely be presumed to be consistent with it.

These conceptual innovations illustrate the dubious practice of assuming that the material unity of a book works as a basis for discursive unity. Johansson's additional attempt to endorse this manoeuvre by appeal to Popper simply makes matters worse, not only does it presume that Popper would know all the changes that have or have not taken place in critical rationalism over fifty years but it assumes that an author's inferred word is sufficient testimony on which to base a claim to coherence.

The materio-theoretical unity of 'school'.

A third means employed in drawing the statements of critical rationalism together as a cohesive body, is the materio-theoretical unity of 'school' or in the case of critical rationalism, a specific school: the London School of Economics. (10) Whilst this is less frequently used than author, the conception is nonetheless an important one because, unlike author, it

proposes a collective identity. The conditions of existence of that identity can, perhaps, be more clearly understood through the initial consideration of another collective category, 'community'.

If researchers were to use community as a mechanism for enjoining critical rationalism's statements as a coherent unity, it would involve relegating or suppressing all forms of difference in favour of shared properties. The shared properties would provide the necessary communality for the notion 'community'. As applied to critical rationalism, it is people who would constitute the individual units of the community and their problems, arguments, and strategies in the fields of the sciences, metascience, metaphysics and politics would be the communal ideas or what is shared.

Now, the notion of 'school' is a reified version of community. It conceives of critical rationalism's coherence as a combination of accepted problems and arguments which are shared by proponents who are sited in a particular physical as well as theoretical space. School, then, as in The London School..is both noun and verb, the institution and the instruction. The precondition for its communality is some form of physical attendance at the institution in which the instruction takes place.

Unlike 'book' or 'author', school not only allows the idea of a community of scholars, it also permits a controlled form of internal discrimination, specifically, a hierarchy for the dissemination of ideas as in teacher-pupil relations. This creation of internal difference does not conflict with the communality of school but, rather, offers it the opportunity of continual renewal and thus an historical passage for its achievements. What

it conveys is a humanist history of the transfer of ideas, suitably endorsed and embellished by other categories designed to promote continuity and coherence like 'influence', 'taught by' and 'follows'.

School, in other words, works the unity of statements through community and the renewal of community through the continuous transfer of the shared currency: ideas, concepts and arguments. However, in spite of this recognition of a history and its abilities to accommodate internal differences, school still carries the indelible mark of a unity primarily based on material individuality and there are problems of enjoining this physical space with a collective, intellectual, space. Two are of particular significance. The first is quite straightforward and can be expressed as follows: it could well be the case that people have contributed to the intellectual development of the discourse without being part of, or party to, the physical space. This seems certainly to be the case with critical rationalism. The London School of Economics has provided a theoretical and physical residence for proponents like Popper, Watkins, Bartley, Agassi and Jarvie but has not done so for Campbell, Settle and Tarski, who have been neither pupil nor teacher at the School. Again, if we are not limited to past and present times, would analysts want to exclude future changes to critical rationalism purely on the grounds that the authors of such developments were not at the School?

The second and slightly more complex problem can be formulated as follows: a unity of producers does not (and cannot) guarantee the coherence of what is produced. In other words, even if all the contributors to critical rationalism are or were teachers and/or pupils at the London School of

Economics and even if it is possible to chart a continuity of received ideas through the human links, this does not and cannot provide a basis for maintaining or assuming the unity and coherence of the statements they produce as critical rationalist discourse.

The theoretical unities of : 'philosophy', 'evolutionism', 'combined themes', 'criticism' and 'morality'.

A number of categories have been used in portraying critical rationalist unity in terms of its processes of thought and argument. The one most frequently employed is 'philosophy', but others used include: evolutionism,' a combination of themes, 'criticism,' and 'morality'. Discussing these unities in this sequence, the chapter spends a little time on the categories of 'philosophy' and 'evolutionism' before looking in greater depth at the more powerful portrayals offered by Watkin's conception of thematic unity, Popper's case for criticism and Settle's proposed moral coherence.

'Philosophy'

Whether offered as a general unity (as in 'critical rationalist philosophy'), as a complementary unity to 'Popper' (as, for instance, in the title of Ackerman's text The Philosophy of Karl Popper) or even in an implied plurality of philosophies (as for instance in the title of Lessnoff's article: 'The Political Philosophy of Karl Popper'), (11) the unifying activity of the category -'philosophy' - is typically taken for granted. The extreme version of this occurs when having described critical rationalism as 'philosophy' the discussant then claims other features of the philosophy as the means of

coherence. Bartley, for example, repeatedly speaks of Popper's "philosophical perspective," and "Popper's philosophy" only then to suggest that this philosophy is unified by its evolutionist metaphysics. (12)

There are of course centuries of intellectual history to support the category's assumed character. Although subject to periods of expansion and contraction, there has been a discipline of 'philosophy' certainly since the time of the Ancient Greeks. But is it this notion, the changing and imprecise limits to a discipline that writers like Bartley, Ackermann and Schilpp are invoking as a first outline to Popper's writing? It would appear so. They seem to be saying that critical rationalism (or, in some instances, Popper's writings) forms part of a larger sea of philosophical statements. Within that sea, they then require a secondary specification to characterise them as a coherent, distinguishable, unit. It is philosophy, but it is one philosophy among many and thus requires its own more specific identity.

As a discipline, philosophy itself generates the possibility of further specification. Its contemporary division of labour provides critics and proponents with a ready-made taxonomy that allows them to divide the writings of Popper or critical rationalism into: 'political philosophy', 'philosophy of science', 'philosophy of social science', and 'metaphysics'. As later illustrations indicate, the analysts of critical rationalism take full advantage of this opportunity. It is, however, a somewhat limited manoeuvre.

It is not simply that they are imposing an assumed division of intellectual labour or that such a division reinforces the taken-for-granted nature of the initial unity, 'philosophy', but in a more straightforward vein,

they are assuming that philosophy can bring together all that has been expressed as critical rationalism or even all that has been written by Popper, and it cannot.

Unless the term is used to embrace all argumentation, there are many aspects of critical rationalism, and indeed Popper's writing, that cannot be contained within philosophy's disciplinary limits. Employing examples from Popper's writing, one could take: his evolutionist arguments which make numerous encroachments into the world of experimental biology; his propensity theory of probability that ventures into statistical theory and, his suggestions about policy-making in liberal capitalism which are features of an explicit, if limited, politics. All three make a case against the use of 'philosophy' as the category of unity, on the grounds that it would exclude constituent features of the discourse and, thereby, distort the very entity that it is supposed to represent. (13)

Evolutionism

As indicated, it is Bartley who maintains that evolutionism provides a coherent base for critical rationalism. His contention is derived from Popper's proclamation that evolutionary processes are universally applicable:

> ".the definitions of life and the characterisations of problem-solving introduced by Popper..leave one no alternative but to interpret evolution theory as a universal theory about how all life anywhere must evolve. He now speaks of evolution theory as applicable to any world... in which there are entities of limited variability, wherein some of these entities will survive and others will perish. In short, evolution applies wherever life has arisen". (14)

If these metaphysical proposals apply to all life and life's products then, says Bartley, they can clearly provide the framework for Popper's writing. (15) To a degree, one can see Bartley's point. If Popper's writings are trawled with a net composed of postulates and concepts drawn from the metaphysics then a whole variety of what previously seemed discrete arguments would be enmeshed. To begin with it would catch scientific inquiry as a form of evolutionary activity. It would also net Buhler's theory of language functions, Popper's theory of rational tradition, his argument for interactionism, his thesis on the relation between expectations and observations as well as new arguments for the defence of objectivism and realism. But, and this is an important qualification, such trawling also fails to net other significant elements of Popper's writing. Most prominent amongst these are the prescriptive or "normative" statements of the discourse's metascience as well as the directives and guidelines for policy-making advocated by Popper's politics.

Evolutionism is a descriptive metaphysics which does not possess the means to embrace critical rationalism's many prescriptive statements. In other words, if it provides a means of coherently enjoining some of critical rationalism's arguments and proposals, it does so at the cost of omitting many others. What it can proffer as a unified discourse can only ever be a partial representation of the statements that currently exist.

Coherence as a unity of themes

Thematic unities postulate a cohesion based on the general presence of important elements of the discourse. Whatever the elements, whether its problems, their resolutions, general proposals or arguments, they are

offered as a continual presence, the common thread(s) to the dispersion of statements. Themes are therefore abstractions whose properties are selected in terms of their pervasiveness and their centrality; the abstractions work on the rest of the discourse interpreting it as so many expressions of themselves. Thus thematic unities not only require the extraction of 'key features' or an 'original core', they also need to see these features resound from the distant reaches of the discourse if, that is, they are to provide the statements with a unitary credence.

The contention is that like 'evolutionism' and 'philosophy', the use of themes as the means of establishing critical rationalism's coherence can only operate by excluding or disguising aspects of the discourse that it would claim to represent, in this case, the dislocations or breaks between the different fields of endeavour and between different postulates within those fields. It is a point that can be more specifically conveyed through examples, as for instance, Watkins' and Popper's appeals to thematic unities.

Watkins on the Thematic Unity of Critical Rationalism

In his paper 'The Unity of Popper's Thought,' (16) Watkins identifies critical rationalism not only as 'Popper's Thought' but also as the combination of three linked themes: 'indeterminism,' 'evolutionism' and 'falsificationism'. These are distributed in a history of Popper's writing which closely parallels that proffered by Popper himself. (17)

Falsificationism is considered the "original core" of the thought, indeterminism intervenes "around 1950" and evolutionism: "got under way in

the late 1950's". The conceptual co-ordination parallels the historical connection. Thus: "indeterminism is significantly linked to evolutionism which in turn is significantly linked to ...falsificationism". (18)

In appearance, Watkins' combination of themes seems to operate to provide an effective cohesiveness. Indeterminism, for example, is combined with objectivism and with realism and these in turn are linked with the biological notions of plastic control, genetic dualism, orthogenesis and 'world three'. Drawing on this connection Watkins relates problem-solving within the metaphysics with problem-solving in science and thus with falsificationism. Its effectiveness is however no more than appearance. Once examined in depth it quickly reveals itself to be a flawed arrangement of Popper's statements.

To begin with, the themes that are employed operate from different terrains; indeterminism and evolutionism are both offered as means of synthesising descriptive postulates while falsificationism is organised as a collection of prescriptions on how science should be undertaken. Watkins is aware of this but thinks he has an answer:

> "It might be supposed that my attempt to relate Popper's falsificationism to his indeterminism via his evolutionism is bound to fail for a very simple reason: his falsificationist methodology is essentially normative: it proposes an aim for science..from which it derives rules for playing the scientific game well. His indeterminism and evolutionism, on the other hand, are not normative doctrines; so his methodological 'oughts' cannot derive from those metaphysical 'isms'. To this the short answer is that whereas an 'is' does not imply an 'ought', 'ought' does imply 'can'. (19)

This so-called "short answer" is, to say the least, opaque. Watkins has set the problem of the relation between descriptive and prescriptive statements within the context of the naturalistic fallacy, that is, the claim that it's

fallacious to try to infer 'ought-statements' from 'is-statements'. He accepts that the prescriptions of the metascience cannot be linked by derivation to the descriptions of evolutionism and responds to this by suggesting that 'ought-statements' imply can.

Whether this is the case or not (and it seems a dubious manouevre) how does it help Watkins with the problem of uniting the different themes? How, that is, does it help him link the metascience with evolutionism and, through evolutionism, with indeterminism? How, in his cryptic terms, is the 'can' meant to bridge the 'ought' and the 'is'? There is no further elaboration on this short answer, Watkins instead appeals to a "longer answer" which he describes as "more interesting". (20)

The 'longer answer', interesting or not, turns out to be no answer at all. Watkins describes Popper's conceptions of scientific rationality, inborn expectations and his reaction to Locke's notion of sense-experience but nowhere in the rest of the article does he return to the relation of prescriptive and descriptive statements. Having raised the problem, and offered an opaque short answer, the appeal to a longer answer simply becomes a guise for dispensing with the issue.

Beyond this general problem, Watkins' conception of unity also runs into difficulty with particular relations between the themes. For example, in his association of evolutionism and falsificationism, he offers an analogy involving their joint use of a process of problem-solving (as trial-and-error):

> "..there is an obvious analogy between the relation of mutations to environment according to neo-Darwinism, and that of conjectures to experience according to Popper". (21)

His argument is that as critical rationalism offers trial-and-error as a fundamental feature of problem-solving for all organisms in their evolutionary development and as it recurs in a significant way for the testing of hypotheses in falsificationism, it provides an "obvious" means of bridging the themes. The concern is: at what cost? If the unification of these themes is based on similarities, what are the similarities between an amoeba's problem of survival and a scientist's problem of developing her/his theory? Again, what are the similarities between the strategies the amoeba adopts in response to its issues and those scientists use as empirical procedures of falsification? It would seem that the markedly different constituents of their respective problems and strategies defy the simplicity of the analogy.

This is a matter that will be considered in more detail in Chapter Two, but the point there, as here, is that the attempt to impose common terms on markedly different processes of widely varying complexity says more about the vague nature of critical rationalism's conception of evolutionism and here, of Watkins' overly simple attempt to link it with falsificationism, than it ever could about the processes the terms supposedly embrace.

Watkins' analogy also points to a more basic problem with his general argument, namely, the ease with which he asserts rather than establishes connections both within and between the themes. This point is conveyed in a somewhat diplomatic tone by another of critical rationalism's proponents:

> "I found myself somewhat unsatisfied with Watkins' central line of argument regarding unity. I thought that the various elements that he brought together with indeterminism to yield yet other elements of Popper's philosophy were only rather fortuitously connected with each other by him. Perhaps this was because Watkins did not connect all the doctrines he expounded with the problems they were presented to solve, nor show us the links between the problems.." (22)

So far, the comments on Watkins conception have focused on the statements he employs to support his view of thematic unity. Brief consideration should also be given, however, to what such statements overlook in the discourse. Earlier it was suggested that the conception of themes requires the general presence of particular, significant, components. Consistent with this requirement, Watkins does identify elements of each of the themes. What he does not do, however, is to allow for the complexities involved when these components are changed in any way. Thus, for example, while he conceives of science in terms of the theme of falsificationism, he does not allow for changes in its episteme (in, for instance, the categories of 'truth' and the site of 'objectivity') or in its recommended research practices (such as the changing significance of the calculation of verisimilitude).

Watkins would have immense problems trying to take such factors into account. His notion of unity simply cannot accommodate conflicting argument or controversy whether it is in terms of individual elements of a particular theme or the inter-relations of themes. His thematic unity operates by a conceptual consensus and anything which threatens that consensus such as shifts or transformations in the meaning or contents of categories has, in consequence, to be omitted.

Popper's theme of 'Criticism'

Although on different grounds, Popper also thinks that Watkins' version of unity needs to be replaced:

> "I see the 'unity' of my philosophy in a slightly different way: I should be inclined to regard my emphasis on criticism .. as being more appropriate to the unity of my theoretical and practical thinking". (23)

For Popper then, 'criticism' is the unifying theme for the discourse. The major proposals of critical rationalism, he contends, are developed by criticism; they are selected from among rivals following an appraisal of their success at dealing with problem situations. This seems a somewhat weak argument for coherence. While criticism may well operate as a means of selecting proposals of the discourse and even act as the ground retaining them, it does not produce the conditions to account for their inter-relations and that should be an imperative for any version of coherence. Settle makes this same point in the following terms:

> "...criticism does not explain the unity of his [Popper's] thought. Criticism tells us how each theory is to be held - that is, open to criticism -and it may explain why, within a particular field, this theory rather than that has been selected, usually because it stood up better under criticism. But what is proposed as a candidate for what unifies a person's thought should do more than that, because knowing how to hold a theory and knowing piecemeal how each theory came to be selected is consistent with a philosophy not yet integrated. What unifies a person's philosophy should enable us to explain how a theory in one field is linked to a theory in a different field or why one particular field rather than another elicits interest. That each theory is to be selected critically does not give such a ground." (24)

So, like Watkins' attempts to combine themes and Bartley's appeal to evolutionism, Popper's attempt to provide a means through which critical rationalist discourse might be seen to cohere, does not fare too well. In Popper's case, it is a product of appealing to a feature of the discourse

which does not possess the capacity to unify, while with Watkins and Bartley it is more a question of employing conceptions which might unify some elements but which fail to include other important features of the discourse.

Settle's conception of a moral coherence.

Whereas other representations of unity have primarily used the discourse's descriptive propositions as their basis for claiming coherence, Settle takes the unusual step of invoking its 'moral views' (specifically the "normative" views propounded in Popper's texts) for his proposal for unity. In his own words:

> "I am arguing that..his [Popper's] work takes on an especial logical unity when viewed from a particular vantage point, from the moral point of view" (25)

Settle's argument for such a unity is based on two basic conceptions:

(i) The existence of "key moral doctrines" that are treated as the core of the discourse, and which are divisible into three distinct "constellations"; and,

(ii) The notion of a "problem-structure" for the discourse which is based on the overlapping problems generated by each of the constellations and their resolutions.

The moral doctrines are taken to divide into constellations of problems; the problems and their solutions (drawn from the rest of the discourse) overlap to the point where Settle thinks it is possible to speak of coherence. The notion's 'moral point of view', 'key moral doctrine' and 'constellation' exist as undefined and unproblematic conceptions. Some indication of their contents

and function, however, can be obtained through Settle's discussion of the major directive of each group of morals and the "overlapping" problems such morals are considered to pose.

The first of the three constellations directs us to: "respect humanity in ourselves and in others, which implies respect for the opinions of those who differ from us, the aim to alleviate suffering, the aim to avoid violence".(26) The second lays down the rules for societal living:

> "we should organize ourselves for living in communities, Popper holds to the humanitarian theory of justice which endorses the principle of individualism and demands of the state the impartial treatment of its citizens and the protection of their freedom". (27)

The third constellation is concerned with respect for the authority of truth. This is: "an impersonal, objective truth which it is our task to find, and which it is not in our power to change, or to interpret to our liking".(28)

The "overlapping" groups of problems that the directives pose, concern "the autonomy of the self,..the realization of a just society, and..the possibility of knowledge". (29) They inter-relate or overlap through their mutual conditions of existence, a point clearly illustrated in the following quotation:

> "..unless the self is real and autonomous, not only are moral prescriptions pointless but also the humanitarian theory of justice is vacuous, and there can be no pursuit of truth perhaps there cannot even be truth at all". (30)

That the groups of problems are considered to overlap is clearly of immense importance. It both establishes their inter-relation and, as importantly,

situates the rest of the discourse as so many responses to the problems. The responses, in turn, are seen to form a series of consistent, inter-related answers that add up to a single, coherent, moral viewpoint.

Settle's conception of unity seems to be a particularly inventive attempt to secure a discursive coherence for Popper's writings. But, for all its ingenuity, it is still seriously flawed. Central to the conception are the two moves in which he links the constellations of morals with groups of problems and then links these groups of problems to the arguments in Popper's writings. There are deficiencies in both moves.

The limitations of the first move relates to Settle's claim that these constellations give rise to or "immediately pose" their respective groups of problems. Take, for instance, the case of the link between the moral directive which beseeches us to respect ourselves and others and the group of problems to which it is bonded concerning the 'autonomy of the self'. What is not at all clear is why this cluster of morals poses a group of problems based on the autonomy of self. As the last quotation indicated, Settle rightly accepts that unless people are autonomous, that is, unless they are seen to live in an indeterminate world, morals are pointless. But surely if this is so, autonomy is a condition of the directive's existence rather than a problem emanating from it. In like manner, the morals concerning the alleviation of suffering and avoidance of violence are also lodged in this constellation, but they too assume rather than pose the problem of autonomy.

The issue in both instances is not that there is a link between morals and problems, but that their relation is structured in a way which suggests that the moral directive precedes and poses these problems. Of course Settle needs to argue this line in order to claim both the primacy of moral issues in critical rationalism and the discourse's coherence on a moral basis, but he offers little in the way of support for his position and it is not at all clear as to how he could support such contentions.

The other two constellations and their respective problems also provide examples of the difficult nature of this link. How, for example, does the problem of the "just society" stem from an opaque moral directive which suggests that "we should organize ourselves for living in communities" or base that organisation on "the humanitarian theory of justice which endorses the principle of individualism"? Settle does not describe the humanitarian theory of justice nor how it endorses the principle of individualism. He gives no clear indication of what the problem of the just society is, other than to say that it is geared to the prevention of totalitarianism. In a similar vein, it is not at all clear what constitutes "respect" for objective knowledge and why or how this respect should raise the problem of the "possibility of knowledge".

Settle's second tier of unity, linking the groups of problems with Popper's postulates proffered as their solution, also generates concern. Of critical importance in this linkage is the shaping of these postulates in order to read them as responses to the problems. Consider, for instance, Settle's discussion of the problems concerning the possibility of knowledge. If the resolution to these problems is meant to incorporate not only Popper's proposals concerning conjectural knowledge, but also his discussion of

evolutionist metaphysics then it offers an extremely poor representation. It simply does not reflect the multitude of issues that Popper discusses or the complexity of resolutions that he offers. The Introduction to this essay gave some indication of the dispersion of topics discussed by the metascience and the metaphysics. Their representation cannot be reduced to a response to clusters of problems which centre on the possibility of knowledge. Clearly there are arguments which address these problems in the metascience. What is offered as conjectural knowledge is consistent with some methodological postulates and practices in the sciences. However, to see the question of rationality or the training of scientists solely servicing this cluster of problems, or to see all elements of the evolutionist metaphysics addressing these matters, involves a form of discursive homogenisation that results in quite severe misrepresentation.

Similar cases can be made against the reading of responses to the other two groups of problems. Using the group which centres on the 'just society' as the illustration, it seems quite clear that undue emphasis is paid to those particular features of Popper's politics that are commensurate with Settle's conception of the moral problems of justice. While Popper does describe unjust or totalitarian societies, it is primarily in terms of the theories they advocate (such as historicism) and their mode of policy implementation (utopian engineering). He does not propose a just society say in the manner of Plato's utopian commonwealth, nor does he see the politics of his manifesto as primarily geared to justice. Popper is basically interested in protecting liberal capitalism (and the freedom on which it is based) from the threats of totalitarian alternatives. Settle's emphasis on the writings that might be construed as responses to the problems of a 'just society' are

therefore at the expense of the political concerns to which Popper ascribes a primacy, namely, liberty, the market economy and controls on the interventionist activities of the State.

If there are misrepresentations in Settle's proposals for unity, there are also omissions. Two examples are of particular importance. The first concerns the absence of the social sciences from his general picture of moral unity. It is unclear as to whether this sub-field's proposals are implied in the response to the possibility of knowledge, in the response to the moral problems of a just society, or whether they have simply been overlooked. Whichever option is adopted, however, they will create difficulties for the current conception of unity.

Clearly, if they have been excluded or overlooked, then the proposed unity is not a unity of all of Popper's writings. If they form part of the answer to the possibility of knowledge, then Settle needs to explain how he has overcome the qualitative differences that Popper sees between the sciences and social sciences. If, instead, they feature in the resolutions addressing the problems of the just society then it is incumbent upon him to explain how he has bridged the gap that exists in Popper's writings between the production of societal knowledge and its use in policy or political decision-making.

The second instance is an equally important form of omission. It concerns the consideration of imperfections which Popper, other proponents, and critics, have recognised in their own arguments. Taking the response to the possibility of knowledge as our illustration once more, both

proponents and critics have been sorely troubled by the contents and function of several central ideas of the metascience. Notions such as the 'empirical base', 'verisimilitude', 'the corroboration of theories' and 'rationality' currently possess flaws which undermine their value to the metascience and, more generally, the discourse. With the exception of rationality, Settle does not discuss or even recognise the flaws let alone assess their impact on his view of moral unity. Ignored in this way, these notions would appear to undermine the moral problems-response link since in their current state they are unable to facilitate any kind of response at all.

It would seem then that in seeking coherence to Popper's writings through his prescriptive statements, not only does Settle have difficulties with the sequence of arguments linking prescriptions with problems, and problems with responses, but their co-ordination as a moral unity also ignores the acknowledged imperfections of some of the responses and omits (or under-values) consideration of the sub-field of the social sciences.

1.3 Making Coherence an Issue

Thus far, the chapter has looked in some depth at the categories used to register critical rationalism's supposed coherence. It has been seen that, in every instance, these categories have misrepresented and/or failed to take important features of the discourse into account. This section addresses why such problems exist. How can the collective failure of these quite diverse conceptions of unity be explained?

If it is assumed that the intended (correspondence) relation between the categories and the discourse is itself unproblematic, there would seem to

be two possible ways of explaining what has happened. One would appeal specifically to the deficiencies in the categories, while the other would invoke both the categories and their referents within the discourse.

What the first explanation would say is that the responsibility for the limited achievements of 'author', 'school', 'evolutionism', 'morality' and so on, begins and ends with the categories themselves. Neither the constituents of the discourse nor the assumptions on which they are based are in any way culpable. There may well be qualitative differences between the categories in terms of their conditions of existence and modes of operation but, both individually and collectively, they and they alone must carry the responsibility for their performance.

The second explanation would offer a different and somewhat more complex source for these deficiencies. It would re-ascribe at least some of the responsibility for the mis-match with the discourse. Basically, it would say that while the categories of unity have varied conditions of existence producing qualitative differences in their powers of representation; their collective failure is in fact symptomatic of problems within the constitutive formation of the discourse. In other words, the categories are (in part at least) struggling in their operation because critical rationalism does not possess the unproblematic cohesion that has been assumed.

These differing explanations would also provide differing recommendations for dealing with the categories' failure. Accepting the first explanation would mean continuing to treat the discourse as unproblematic and cohesive in nature and looking to overcome the mis-representations

with a new, more comprehensive, and more accurate conception of unity. Accepting the second explanation would suggest another path. It raises serious doubts about the nature of critical rationalist unity and throws out an invitation to suspend the assumption of discursive cohesion and treat the discourse's unity as an important issue in its own right. Taking up this invitation would automatically relegate the question of representation to a subordinate status which would only regain its prominence once the question of unity per se had been resolved.

In the light of the analysis of the preceding section, it is the second of the two explanations which seems to be the stronger. The first looks extremely limited by comparison. Although the categories were the primary focus of that analysis, it is clear that the continual challenge to their representative authority was more than a matter of category properties and conditions of existence. Yes, there were deficiencies in some notions that other categories did not possess and this, of course, would make it possible to see variations in their individual representational qualities. At the same time, however, the discourse was far from being a passive participant. It was presenting the categories with problems: confronting them with proposals, arguments, areas of analysis, discursive complexities that denied their proclamations of unity. It was offering reasons for suspending the assumption of unity and rendering it problematic.

The message drawn from the category analysis and this second explanation is that: no matter what aspects of critical rationalism researchers are interested in, no matter what their commitments to the discourse, one cannot treat either the categories representing its unity or the

unity itself as unproblematic. These notions cannot act as the assumed theoretical bases for investigations into specific features of the discourse. They are issues in their own right and require the status of research topics.

It is the question of critical rationalism's discursive unity which is taken up in the body of this essay beginning in Chapter Two with an analysis of the evolutionist metaphysics. The matter of what kind of unity it forms and how best this might be represented is considered afresh in section 2 of the final chapter of the essay.

Chapter 2

Evolutionism as a Field of Critical Rationalism

2.1 Introduction

This chapter addresses critical rationalism's evolutionist metaphysics. The last chapter talked about evolutionism in terms of its use as a possible base for critical rationalist unity, this chapter looks at its constituents and their conditions of deployment. It begins with a sketch of the conflicting opinions concerning evolutionism's history within the discourse which then acts as a base for a detailed analysis of its constituents and an evaluation which suggests that it is beset by issues which affect both its assumed coherence and its value to the rest of the discourse.

2.2 Evolutionism's Entry and Development within the Discourse

There is little or no dispute about the current significance of evolutionism to critical rationalists. Since the publication of his Objective Knowledge (sub-titled: 'An Evolutionary Approach'), Popper has happily talked about the discourse as a form of neo-Darwinian evolutionism. Other proponents, like Watkins and Campbell, have shown similar enthusiasm in recognising these metaphysical postulates as extremely important and even critics like O'Hear point to their value, in his case, their use as a framework: "in which to locate many of the apparently diverse concerns". (1)

There is a dispute however about the point of evolutionism's incorporation within the discourse and this in turn has an impact , not only on the reading of materials in texts prior to Objective Knowledge but also on their evaluation. At the centre of the controversy are Popper's writings.

Popper is rightly seen as a major contributor to the development of evolution. The problem is that not all of his writings express his current commitment.

In, for instance, The Logic of Scientific Discovery there is no detailed discussion of evolutionism and the sparse phrases that might suggest some embryonic commitment could equally be interpreted as figures of speech. And in the Poverty of Historicism, Popper takes up a position which seems to contradict what he has advocated since. In terms of the former, the issue is one of deciphering whether phrases like "struggle for survival" (2) and "the one which by natural selection proves the fittest to survive" (3) actually signify an embryonic evolutionism or whether they are little more than evolutionist metaphors. With regard to the latter, it is a question of what can be made of a conception of evolutionism which is at odds with the works that follow it (and, if you assume The Logic of Scientific Discovery expresses an embryonic evolutionism, with a major work that historically precedes it).

In The Poverty of Historicism evolutionism is seen to propose no more than a singular scientific hypothesis about: "the ancestry of a number of terrestrial plants and animals". (4) This viewpoint contrasts sharply with two later versions of evolutionism used by the discourse, the first of which treats its postulates as a pure metaphysics and therefore as non-testable, (5) while the second sees it as a field dominated by metaphysical tenets but also containing some testable statements. (6)

The problems of interpreting these early texts are not alleviated by Popper's own retrospective comments. In his intellectual autobiography, he

talks about: "always [being] extremely interested in the theory [of evolutionism]" (7) but does not say how that interest manifested itself in his writing and/or whether it has changed in any way over the decades. He speaks of having hinted at the resemblance between his 'trial-and-error' formulation of scientific practice and the Darwinian evolutionist conception of natural selection but does not say whether this hint is a retrospective discovery or, if it was supposed to signal evolutionism's incorporation into the discourse, why it was so diffidently expressed, then rejected, only to be picked up once again in more recent works.

Small wonder then, in the face of these issues, that there are conflicting readings of the development of evolutionism within the discourse. The major points of conflict can be seen in the different conclusions that Bartley and Campbell reach from their respective readings of Popper's writings. (8)

In Campbell's reading, the discourse and its evolutionist metaphysics are coextensive in time and theoretical space. To offer such a history involves scything through the issues previously outlined. This Campbell does by, firstly, treating ambiguous statements like 'struggle for survival' and '..the fittest survive' as if they were literal and problem-free representations of an embryonic evolutionism and, secondly, by completely ignoring what is said about evolutionism in The Poverty of Historicism. By these means, he is able to trace a continuity stretching from the earliest hint to the expansive writings of the recent decades and record it as a growing 'fullness' of expression, a "willingness to identify the process of knowledge with the whole evolutionary sequence".(9)

In sharp contrast to this, Bartley's reading of Popper denies that evolutionism has been a continuous feature. In fact in his interpretation, the metaphysics was not incorporated until the 1960's. (10) Prior to the '60s, Bartley maintains, critical rationalism's history is one of incremental developments in which Popper's responses to the problems of induction and demarcation (in The Logic of Scientific Discovery) act as resources for answers to a number of other issues (such as 'indeterminacy' and 'conventionalism'). The work on evolutionism he sees as a new departure. It is qualitatively different, a metaphysical incursion which is employed to underwrite preceding postulates rather than feed off them.

Faced with these conflicting histories, analysts of this field are forced to take sides or, perhaps, offer an alternative reading. In this case, it is to offer support for Bartley's reading. Campbell is forced to ignore ambiguity and conflicting evidence in order to generate his view of the continuous presence of evolutionism throughout critical rationalism's history. Bartley's view seems historically more accurate and can accommodate the complexities in the discourse's use of evolutionism. Thus, in the discussion that follows in this chapter, evolutionism is treated as a metaphysics which critical rationalism adopted in the 1960's and which has subsequently won widespread support among its proponents. The apparent appeal to evolutionist notions in The Logic of Scientific Discovery will be read as metaphors.

2.3 The Constituents of This Evolutionism.

'Neo-Darwinian' and, after Huxley, 'New Synthesis' are both labels that critical rationalism has employed to identify its evolutionist metaphysics. The labels are seen to draw together a body of postulates which describe and order the nature of existence and thus both circumscribe the research processes of the sciences and social sciences and provide an outline context for the discourse's political manifesto.

Evolutionism is presented as a complex series of relations involving living organisms and their environments. The environments are seen as states which gradually but persistently change; they are worlds of 'limited constancy'. The organisms which live in these worlds are also changing. Through both random and non-random variations, they affect and are affected by their environments. Organisms must find their means of existence within their environments which, in orthodox Darwinist terms, means that they must struggle to survive. In this struggle, those organisms or phyla which are best able to adapt to the changing environmental conditions (that is, are 'fitter') are considered more likely to survive. The organisms' struggle for survival is registered in critical rationalism's conception of "problem-solving":

> "All organisms are constantly ... engaged in problem-solving; and so are all those evolutionary sequences of organisms -the phyla- which begin with the most primitive forms and of which the now living organisms are the latest members". (11)

Organisms are invested with a disposition to want to resolve the problems they face and, equally importantly, with a method for doing so; the method is called "trial and error-elimination". The trials are trial attempts to

resolve the problems which confront the organisms and may include changes in preferences, skills, behaviours or even the development of new organs. Their success is controlled by "error- elimination". This works in one of two ways: it proceeds either by completely eliminating the intended solution (and, perhaps, the organisms as well) or by forcing the organisms to reject the trial as a solution to the problem.

Trial and error-elimination is seen to embrace not only the relation between individual organisms and their environment, but also between these organisms and their phyla. So, for instance, just as the individual organism's behaviour is a trial solution to a problem, so, in this activity, is the individual a trial solution for its phyla. In this way, the individual organism is:

> "a kind of spearhead of the evolutionary sequence of organisms to which it belongs.. it is itself a tentative solution, probing into new environmental niches, choosing an environment and modifying it".(12)

The metaphysics is suggesting that organisms and their phyla, in their struggle to survive, are constantly engaged in generating trial solutions to the problems which confront them. The unsuccessful resolution of the problems may result in the suppression of the tentative solution or in the elimination of the organisms. The successful resolution results in changes in the organisms' behaviour and, possibly, their genetic structure.

Such changes in evolutionary development are portrayed by the discourse in the following schema: P → TS → EE → P
where P represents the problems that organisms face, TS their tentative solutions, and EE the forms of error elimination. The second P in the sequence is regarded as being qualitatively distinct from its predecessor:

".. it is the result of the new situation which has arisen, in part, because of the tentative solutions which have been tried out, and the error-elimination which controls them". (13)

To recognise this, the discourse calls the second problem P(2). For similar reasons of qualitative distinction, it also amends TS and EE and thereby takes account of a range of possible trial solutions and forms of error-elimination that might occur in the attempt to resolve P. Hence the more accurate version of what the sequence entails would be something like:

$$P(1) \rightarrow \begin{matrix} TS(a) \rightarrow EE(a) \rightarrow P(2a) \\ TS(b) \rightarrow EE(b) \rightarrow P(2b) \\ TS(n) \rightarrow EE(n) \rightarrow P(2n) \end{matrix}$$

Critical rationalism combines this version of evolutionary change with a number of precursory Darwinist notions. The most important of these are: 'heredity', 'natural selection', 'variation' and 'variability'. Their combination, in Popper's terms, yields the following evolutionary schema:

"(1) The great variety of the forms of life on earth originate from very few forms ...: there is an evolutionary tree, an evolutionary history.
(2) There is an evolutionary theory which explains this. It consists in the main of the following hypotheses:
(a) Heredity: the offspring reproduce the parent organisms fairly faithfully.
(b) Variation: there are (perhaps among others) 'small' variations. The most important of these are the 'accidental' and hereditary mutations.
(c) Natural selection: there are various mechanisms by which not only the variations but the whole hereditary material is controlled by elimination. Among them are mechanisms which allow only 'small' mutations to spread; 'big' mutations..are as a rule lethal, and thus eliminated.
(d) Variability: although variations in some sense - the presence of different competitors - are for obvious reasons prior to selection, it may well be the case that variability - the scope of variation - is controlled by natural selection; for example, with respect to the frequency as well as the size of variations. A gene theory of heredity and variation may even admit special genes controlling the variability of other genes." (14)

The decision to call the metaphysics 'neo-Darwinian' is based on what are seen as two important amendments to Darwinist orthodoxy. The first is relatively straightforward and involves the conception of the problem(s) that organisms face. Whereas orthodox Darwinists are seen to have argued that organisms face one problem, that of survival, critical rationalists maintain that there are a variety of issues confronting organisms and these are not irrevocably reducible to the question of survival: "Most problems - perhaps all - are more than 'survival problems', they are very concrete problems posed by very specific situations". (15)

The second amendment is more complex and concerns the constituents of the notion 'variation'. In the discourse's reading, orthodox Darwinists treat variation as a synonym for random variation, in other words, an organism's ability to adapt depends on its selection of a problem's answer from a haphazard set of environmental solutions each of which is produced by blind chance. This for Campbell and Popper is a limited formulation of evolutionary change and for two reasons:

(i) It supposes that the pressures of selection will always be external, and,

(ii) It focuses on anatomical changes to the exclusion of behavioural changes.

To remedy these limitations, they propose the expansion of the conception of variation to include non-random variations and within the notion's new terms of reference suggest that:

(i) Evolutionary change should include internal selection pressures and,

(ii) These internal pressures should take the form of "plastic" (that is, flexible) forms of genetic control.

In more detail, Popper and Campbell suggest that the main forms of internal selection pressure are behavioural phenomena. These, they argue, have their own genetic base ("b-genes") distinct from those which control an organism's anatomy ("a-genes"). The genes controlling behaviour are themselves sub-divided into those controlling preferences ("p-genes") and those controlling skills ("s-genes"). The two sub-types are seen to operate hierarchically in mutation processes. Thus, changes in preference structure are seen to precede changes in skill structure and, together, changes in preference and skill structure precede changes in anatomical structure. The preference structure, then, is regarded as the 'spearhead' of evolutionary change.

An example will clarify what is involved here. Assume that environmental changes have led to new problems for a phyla and as a means of solving these problems some of its members adopt new preferences. In the first instance (and due to the flexibility of the genes controlling the organisms' behaviour) the new preferences can appear as a new type of tentative behaviour which need not involve genetic changes. If however the new behaviour successfully resolves the problems, it will mean that those member organisms choosing this trial solution will have effectively created a new environmental context which, in turn, will favour those individuals amongst them whose genetic preference structure (that is, their instinctive preferences or aims) anticipates or fixes the new behavioural pattern of preferences. This step is considered important since the changes in the skill structure that will be favoured are those which conform to the new preferences. Carrying the argument a step further:

> "..only after the (skill)-structure has been changed will certain changes in the (anatomical) structure be favoured; that is, those changes in the anatomical structure lead to a kind of orthogenesis". (16)

These revisions of the Darwinist conception of selection (and therefore of the conception of evolutionary change) are of no little importance to the discourse, since they offer the means of drawing human and other life forms together as parties to the same general evolutionary processes. They also assist in the internal differentiation of these processes and, in particular, help in the identification of the distinctive nature of human evolutionary development.

The Distinctive Nature of Human Development

Critical rationalism offers two means of distinguishing human evolutionary development from that of other life forms, these are:

(i) The language functions that are (currently) unique to human beings, and,

(ii) The degree of exosomatic development involved in human change.

With regard to (i), the discourse maintains that the comparison of human languages with those of other life forms, produces a picture of similarities and differences in their respective capacities. The similarities concern the "lower" language functions such as "expressive" communication and "signalling". The differences concern the possession or non-possession of the "higher" language functions, the ability to describe and argue. Only human languages, it is suggested, possess these higher functions.

The higher language functions are seen to create the conditions for the unique evolutionary development of human reasoning. Human reasoning is a synonym for critical argument. Critical argument becomes possible once a language has developed descriptive and argumentative functions. Expressed as an evolutionary process, with human beings possessed of the necessary genetic preferences and skills, the development of the descriptive function in human languages enables people to depict the world around them. Because these descriptions are subject to different interpretations, the argumentative function of language evolves. This leads to the need for regulators or standards for disputes and discussion which, in turn, leads to the emergence of truth and validity, the primary and unique standards of human reasoning.

In terms of (ii), critical rationalism maintains that non-human evolution proceeds largely, if not exclusively, through the modification of organs (or behaviour) or the emergence of new organs (or behaviour). In contrast:

> "Human evolution proceeds, largely, by developing new organs outside their bodies or persons: 'exosomatically'. These new organs are tools or weapons or machines, or houses". (17)

The difference between human and non-human exosomatic development is clearly one of degree. Non-human life forms make exosomatic developments like nests, lairs, dens and dams, but these are always in relation to anatomical and/or behavioural changes. Human exosomatic development, on the other hand, is largely in lieu of anatomical and/or behavioural changes:

> "[People] instead of growing better eyes and ears, grows spectacles, microscopes, telephones and hearing aids.. [and] instead of growing better memories and brains,... grow paper, pen, pencils, typewriters..and libraries". (18)

The differentiation of human evolution from that of other life forms has an important theoretical role to play for the discourse. As described in Bartley's view of the appropriation of this metaphysics, the pre-evolutionist writings had focused on its epistemology and metascience. It was concerned to develop conditions to promote the growth of scientific knowledge. Scientific knowledge was regarded as a specifically human knowledge, that is, a product of human investigation. To retain this viewpoint after the incorporation of evolutionism meant that the discourse had first of all to establish that only human beings have evolved sufficiently to produce scientific knowledge, and, secondly, to show that whatever acts as their collective and specifically human capacities is compatible with the pre-existing conception of the growth of science. In its own terms, critical rationalism meets both of these conditions through the descriptive and argumentative functions of language and through the peculiarly human use of exosomatic products as a replacement for behavioural and, thus, anatomical changes. (19)

Evolutionism and Epistemology

As could be inferred from the preceding section, the appropriation of evolutionism has had an important impact on the constituents and parameters of critical rationalism's epistemology and metascience. This can be seen, for example, in the changing formulation of epistemology's central problem. Prior to evolutionism, the discourse offered the problem in the following terms:

> "The central problem of epistemology has always been ... the problem of the growth of knowledge". (20)

Epistemology's task is to do all it can to enhance the growth of knowledge. Knowledge, in this instance, is scientific knowledge and scientific knowledge is the product of human labour. Compare this conception with the following view of epistemology, introduced after the incorporation of evolutionism:

> "The main task of the theory of knowledge is to understand it as continuous with animal knowledge; and to understand also its discontinuity - if any - from animal knowledge". (21)

Here the remit for epistemology is much wider. It is no longer a province solely devoted to the consideration of human knowledge. It encompasses animal knowledge as well, and thereby, the possible comparison of human/non-human knowledge. (22)

Within this wider base, scientific knowledge is still recognised as the prime form of knowledge, but it is now one of many processes united by their common use of trial and error-elimination. Popper makes this point in a quite vivid fashion:

> "From the amoeba to Einstein, the growth of knowledge is always the same: we try to solve our problems, and to obtain, by a process of elimination, something approaching adequacy in our tentative solutions".(23)

The main elements of this "evolutionary epistemology" and its associated metascience are discussed in the next two chapters. Nonetheless it would be useful to pave the way for these later discussions by providing further detail of the way in which evolutionism is seen to embrace the production of scientific knowledge.

Science, like all the other processes of life, is seen to begin with problems. Its knowledge is considered to evolve through problem-solving in which conjectural solutions to problems are produced as falsifiable

explanations. These are then subjected to criticism and empirical attempts to falsify them. In most cases, these conjectural solutions eventually break down and, thereby, give rise to new problems. The quadratic sequence:

P(1) → TS → EE → P(2)

fulfils the same summary task for the growth of scientific knowledge as for the more general schema of evolutionary development. Conjectural explanations (TS) of problems are critically assessed (EE) and in their wake give rise to new problems P(2). Scientific knowledge consists of those conjectures or theories which withstand the attempts at error elimination, that is, they withstand the attempts to falsify them.

This view, at this level of abstraction, clearly allows for a straight-forward identification of science's operations with those of evolutionism's general tenets. Like animals and plants, scientists are problem-solvers, and like animals and plants, they solve their problems by the method of trial and error-elimination. Extending the comparison, the tentative solutions:

> "which animals and plants incorporate into their anatomy and their behaviour are biological analogues of theories: ..theories correspond (as do many exosomatic products such as honeycombs, and especially exosomatic tools, such as spiders' webs) to endosomatic organs and their ways of functioning. Just like theories, organs and their functions are tentative adaptations to the world we live in. And just like theories or like tools, new organs and their functions, and also new kinds of behaviour, exert their influence on the world which they may help to change..New behaviour or organs may also lead to the emergence of new problems. And in this way they may influence the further course of evolution..". (24)

The distinctively human feature in the processes of science is a corollary of the discourse's discriminating use of language functions. The argumentative and descriptive functions provide the reasoned criticism of

science's form of error-elimination. So, while animal knowledge may grow through, at minimum, the threat of death to those holding the theories, the human capacity for critical rationality is seen to drastically reduce that threat. Popper makes this point in the following comment:

> "scientific criticism often makes our theories perish in our stead, eliminating our mistaken beliefs before such beliefs lead to our elimination". (25)

Evolutionism and the Three Worlds

The critical rationalist proposal of the existence of three worlds is an important, if underdeveloped extension of the conception of evolutionism. It is, in particular, an extended form of representing the different sites of human activity within the doctrine. The three worlds are characterised in the following terms: world 1 is the physical world, the world of physical objects or of physical states. This is the world that science sets out to explain. World 2 is the subjective world of human thought and experience, the "world of consciousness or of mental states or perhaps of behavioural dispositions to act" (26); while world 3 is seen to contain the "objective contents of thought." (27)

The three are considered to be inter-related worlds, existing in either a direct or indirect relation with each other. The first and second worlds directly interact, as do the second and third worlds. The relation between the first and third worlds is, however, always indirect. World 2 mediates between the first and third worlds. Combining these relations with the preceding characterisation of each world produces a picture of a pluralist universe in which the world of subjective thought and experience directly interacts with

the world of physical states and the world of objective ideas. The world of objective ideas only relates to the physical world through the processes of subjective thought.

As part of the evolutionist conception, the three worlds thesis is very much a metaphysical proposal. One of its values to critical rationalism concerns its provision of new grounds for claiming that the discourse's science produces objective knowledge. Prior to the emergence of evolutionism, the objectivity of science's knowledge was sought in "intersubjective criticisability" or the testing of theories by enlightened, critical and rational scientific communities. Now, in the expanded discourse, it is sought in the proposed existence of a world 3 or, more specifically, in the independent existence of the constituents of that world. Objectivity is thus ascribed to the contents of world 3 on the grounds that this world is distinguishable from the subjectivity of human thought which forms world 2. World 3's constituents include such items as true and false theories, problems, problem situations, critical arguments and, more generally, social entities like: traditions, groups and institutions. Their individual and collective objectivity is founded on the premiss that they possess a reality which is not contingent upon human subjective awareness. They are:

> "totally independent of anybody's claim to know;.. independent of anybody's belief, or disposition to assent; or to assert, or to act". (28)

One of Popper's favourite ways of illustrating this independence appeals to the natural numbers system. Human beings, he says, created the natural numbers system but no one will think of all the natural numbers, just as nobody will ever know all the consequences of a theory. Nonetheless, the consequences of the natural number system, as with all third world items, is

considered to be there, existing in that world, awaiting discovery. When discovered, some of its consequences:

> "may be subjectively surprising, and may enrich our culture or our technology. In this way the world of theories, problem situations etc. influences [human] mental and physical life". (29)

Implied in this notion of influence is a conception of an "open" or indeterminate physical world, by which is meant a world that is not causally-closed and, thus, allows the: "non-physical in some way or other [to] influence the physical world". (30) As an illustration of such influence Popper provides the following case:

> "For example, a scientific argument between builders of bridges can lead to a change in the plan for the construction of a bridge, and therefore influence the part of the physical world represented by a completed bridge". (31)

Here, the critical discussion of world three contents by "inmates" of world two can, it is being suggested, lead to a change in subjective awareness and, as a consequence, lead to a change in the nature of the physical world or, more accurately, in what is added to it.

To summarise, the third world is treated as a largely autonomous world and used by the discourse as a new means of generating the objectivity of its conception of scientific knowledge. The constituents of that world transcend human awareness and, in their state of independence, are seen as capable of influencing world 2 and, through it, world 1 as well. Like the other two worlds, world 3 is seen to evolve and it is this conception which allows a further notion: "feedback" in which the constructed world itself affects human thinking, behaviour and its manifest physical products:

> "we constantly act upon [world three] and are acted upon by it: it is our product and ..it has a strong feed-back effect upon us; that is to say, upon us qua inmates of the second and even the first world". (32)

2.4 Existing Assessments of the Discourse's Evolutionism

Of the few assessments of the discourse's evolutionism which have been published, only Bartley's work confronts it at the same level of generality. The other assessments, for instance, the analyses of O'Hear (1980) and Currie (1978), focus on selected aspects of the proposed evolutionism and usually on the "three worlds thesis". I will begin the section with an evaluation of Bartley's general assessment and follow this with a discussion of O'Hear's and Currie's analyses.

Bartley's Arguments

Bartley offers three grounds for criticising the discourse's version of evolutionism, they are: its self-proclaimed originality, its conceptual flaws and the confusion over its general status. Dealing with them in that order, the first, originality, is perhaps the weakest of the criticisms. Here, Bartley tries to produce evidence in the form of quotations from the literature on evolutionism to undermine Popper's claim to have made an: "important contribution to a theory of evolution of the Darwinian type". (33) Bartley states, for instance, that what Popper thinks of as his original contribution can, in fact, be found in preceding works by well-known evolutionists like Ewer, Waddington and Hardy.

There seems little purpose in making this an issue. Bartley might be irritated by the procession of Popper's claims to have 'discovered' this

argument or made an "important contribution" to that argument but where does the denial of originality lead? As I suggested in the previous chapter, critical rationalism is more than the writings of Karl Popper and its theoretical strengths and weaknesses whether developed by Popper or anyone else do not depend on a history of who-said-what first.

The second ground for criticism - conceptual flaws - is more innovative. Here, Bartley attempts to trap critical rationalism with a choice of equally damaging options. He states that critical rationalism's evolutionist proposals are limited because they omit an important form of internal selection. However, as this form of internal selection conflicts with other evolutionist postulates, to rectify the omission and include it within the discourse would mean the radical revision of what it currently proposes and, importantly, the creation of a disjuncture between the exosomatic growth of knowledge and the endosomatic developments from which it springs.

Based on his reading of theoretical and experimental biology, Bartley notes the absence of "co-ordinative conditions of..biological organisation" in what critical rationalism currently offers as its evolutionism. Briefly, this notion is taken to describe genetic conditions in organisms which are either unmodifiable or, where modifiable, allow only a very restricted amount of change. Bartley suggests that such conditions are of paramount importance because they control the range of possible mutations on "pre-competitive genetic grounds". In his own terms:

> "..in living forms..we find some evidence of structures which are unmodifiable or radically limited in their modifiability, 'biological archetypes' as Arthur Koestler calls them, whose full recognition seems to impose an a priori element in biological development". (34)

Now while this obviously provides a different conception to critical rationalism's own account of internal selection (the latter, it has been said, is based on behavioural dispositions), Bartley maintains that the two forms are not only compatible but together provide a more comprehensive conception of internal selection processes. (35) However, in spite of their compatibility, Bartley sees major problems accruing for other evolutionist postulates should the discourse ever think of offering space to this notion of "biological archetypes":

> "To the extent to which co-ordinative conditions cannot be modified in biology and evolution, the evolution process is not parallel to the process of the growth of [human] knowledge as conceived by Popper (a process wherein all structures are open to modification or revision through criticism). If so, Popper's [evolutionism], the bedrock of his later work, fails. The exosomatic evolution continuing in the growth of knowledge follows laws different from the endosomatic evolution from which it springs. In particular, the exosomatic process does not have the same limiting conditions as the endosomatic process". (36)

As this account indicates, Bartley's 'trap' is set by drawing inferences from a biology which stands outside the discourse's existing vision of life processes, insisting that these inferences would enhance what is currently proposed and then looking to their damaging repercussions for the discourse's other evolutionist postulates. If that biology's conception of internal selection is not accepted by critical rationalism, the discourse will be accused of proposing a partial and, thereby, an inadequate form of endosomatic processes. If, on the other hand, it is appropriated, the enhanced conception of internal selection will have damaging consequences since it forces a major disjuncture in what had previously been described as a universal evolutionary process.

Although Bartley's reasons for proposing a wider conception of endosomatic processes are persuasive, (37) they are nonetheless controversial. Beyond their rhetoric, they confront the discourse's evolutionism with what he accepts is partial and "indirect" evidence produced by a form of biological research that uses methods of scientific testing which are incompatible with those proposed by critical rationalism. Standing against this, however, is the fact that they could have a substantial impact on the discourse. Critical rationalists maintain that all their postulates are open to criticism and development, they would not therefore want to hide their conception of endosomatic processes from possible revision. But rather than accept Bartley's attempt at conceptual imposition, their own test procedures would demand to see the empirical support for, say, his view of biological archetypes. Should that evidence be forthcoming then, as Bartley argues, it would have devastating effects on their current conception of evolutionism. Specifically, it would create a serious, and seemingly irresolvable, rift between the processes governing the growth of human knowledge and those covering the development of other life forms. This, in turn, would completely undermine the supposed universality of the discourse's evolutionism.

Such derivations are, however, based on conjecture. The fact is that in the years since Bartley's paper was published, critical rationalists have not responded to his arguments concerning internal selection. The most positive view that one can take of the matter is that proponents are still considering a response. But, of course, while that consideration is awaited, evolutionism languishes and the silence will neither vindicate nor reject Bartley's argument.

Bartley's third contention concerns the status of evolutionism. At the time he was writing, critical rationalism had replaced its view of evolutionism as a single scientific hypothesis with one in which it became a general metaphysics. What Bartley says is that neither view is adequate. He denies that as science, evolutionism could ever constitute a non-universal hypothesis or that a total transition to metaphysics has been induced. He makes the point in this way:

> "I do not believe that evolution theory is either nonuniversal or .. nonscientific, I understand and appreciate why it should seem to Popper and others to be so; but I suggest that this is a misperception". (38)

He deals with the two elements of this 'misperception' separately. In terms of the issue of non-universality, Bartley suggests that given Popper's own statements in Objective Knowledge and his response to his critics in the Schilp edited The Philosophy of Karl Popper , he must himself be aware that evolutionism is, and always has been, more than a singular hypothesis. Popper's definitions of problem-solving and error-elimination leave: "no alternative but to interpret evolution theory as a universal theory about how life anywhere must evolve". (39)

Bartley is a little more circumspect about the apparent metaphysical status of evolutionism. According to the discourse's criterion for demarcating science, a theory or proposition is scientific if, and only if, it is testable or falsifiable. What Bartley maintains is that if this criterion is applied to evolutionism, then several of the seemingly metaphysical propositions would in fact be scientific. As he states:

> "It [evolutionism] speaks not only of survival and adaptation but states quite specifically how evolutionary change may and may not occur. One way in which it may not occur is through Lamarckian inheritance of acquired characteristics. This claim is falsifiable".(40)

Two years after Bartley made this point, critical rationalism actually reformulated its view of evolutionism. (41) In the latest proposal, it is a combination of scientific and metaphysical statements, but a combination which can still be used as a metaphysical backdrop to research. Popper conveys this view in the following quotation:

> "I have in the past described the theory as 'almost tautological', and I have tried to explain how the theory of natural selection could be untestable .. and yet of great scientific interest. My solution was that the doctrine of natural selection is a most successful metaphysical research programme. It raises detailed problems in many fields, and tells us what we would expect of an acceptable solution of these problems. I still believe that natural selection works in this way as a research programme. Nevertheless, I have changed my mind about the testability and the logical status of the theory of natural selection; and I am glad to have an opportunity to make a recantation". (42)

It would seem from the above that the discourse, through Popper, has actually answered Bartley's accusation concerning the 'misperception' of status. What, however, both the recantation and Bartley's examination overlook, is the relation invoked by a conception of a metaphysical programme in which both testable and non-testable statements co-exist. Is, for example, the relation testable? What impact would the falsification of the testable statements have on their non-testable counterparts? Should the corroboration of those testable elements of the metaphysics be construed as continued support for the non-testable aspects?

Popper makes it plain that although aspects of the discourse's evolutionism are testable, it is nonetheless primarily a metaphysical

research programme. This however would seem to leave the programme in a precarious state. It is incumbent upon critical rationalism to explain the relation between testable and non-testable statements within its metaphysics. Bartley falls short of making this demand, but it is a clear consequent of his recognition of scientific statements in the metaphysics and critical rationalism's acceptance of that point.

Currie's Critique of 'World 3'

Unlike Bartley's global assessment, the evaluations provided by Currie and O'Hear concentrate on the arguments that Popper employs to support the autonomous existence of 'world 3'. Currie's evaluation begins by dividing Popper's arguments for autonomy into two basic types: "arguments from dispositions" and "arguments from discovery". He suggests that both types of argument are individually flawed and they fare no better when they are combined.

The Argument from Dispositions

Popper's argument from dispositions is seen to operate by ascribing an exclusive disposition to entities that feature in world 3, namely the disposition to be understood. Unlike the entities of other worlds, Popper maintains that all world 3 objects, are capable of being:"grasped (or deciphered, or 'known') by somebody". A book for instance has a "dispositional character of being understood or interpreted or misunderstood or misinterpreted.." (43)

Currie finds this a very limited means of differentiating world 3 from the other worlds. Despite his own use of a somewhat arid example about

aliens from another planet and their possible interpretations of a pile of stones, he does produce the effective and justifiable counter-argument that all physical objects are capable of being interpreted, grasped or known. Indeed, "any finite sequence of objects or events may be construed as a sign and may be interpreted in some intelligible way". (44) In Currie's terms, then, the use of dispositions is an ineffective way of claiming 'world 3' autonomy.

The Argument from Discovery

What Currie views as the 'argument from discovery' has been formulated by Popper in a variety of ways. One of the more popular methods involves an extension of the previous illustration concerning natural numbers. Popper has this to say:

> "[People] may have invented the natural numbers or, say, the method of proceeding without end in the series of natural numbers. But the existence of prime numbers.. is something we discover. It is there and we cannot change it. It is an unintended and unforeseen consequence of that invention of ours. And it is a necessary consequence: we cannot get round it. Things like prime numbers, or square numbers, and many others, are thus 'produced' by world 3 itself, without further help from us. To this extent it may be described as 'autonomous'". (45)

For Popper then the potential consequences of human creativity transcend the act of creation itself. That these consequences, as in the case of the discovery of prime numbers, can occur, is considered proof of the independent existence of world 3.

Currie's reaction is to deny that a conception of a third world is needed to explain what are effectively matters of logical consequence. Once

certain postulates are formulated as possessing particular properties, then what follows as their logical consequences also possess these properties. It simply does not require the proposal of an independent world to accommodate or explain them, such consequences can be sited in the mental calculations of world 2. This argument, he says, can be applied to all of Popper's illustrations concerning discovery, since each involves the logical consequences of preceding creations. In the case of natural numbers, Currie also thinks that Popper has misunderstood his own example since it is not the discovery of actual prime numbers which is significant but the desire for logical consistency.

3.3 O'Hear's Criticisms of the Justification of World 3.

O'Hear offers an analysis of world 3 which reaches similar conclusions to Currie's, but he gets there by a different route. In O'Hear's reading, Popper's main argument for the autonomy of world 3 is that the humanly-constructed items existing in that realm have unexpected and unavoidable consequences. So, whether it's the rules of logic, particular theoretical systems, problems and problem situations, or even the evaluation of artistic standards, their location in world 3 is controlled by the argument that once created, their existence and development is independent of the hopes, intentions and predictions of their creators.

O'Hear challenges this conception. He maintains that much of Popper's support for the autonomy of world 3 (like the unforeseen consequences of logic and mathematics) is a matter of activities governed by rules. There is, he suggests, a sense in which it is true to speak of

autonomy but only in so far as no one has foreseen every application of every rule:

> "To talk of a rule-governed activity as having consequences unforeseen when the rules were first elaborated does not show that those consequences are laid up in heaven awaiting discovery independently of the dispositions of the agents to recognize how the rules are to be applied and their ability to recognize when they are being applied". (46)

Choosing to base this argument on the case of logic and mathematics, he suggests that there are three possible interpretations of the claim that we discover facts and problems inherent in our logical and mathematical constructions, they are:

> "(i) we discover surprising and substantial truths about the systems we have created;
> (ii) there are at least some facts about these systems which go beyond cases where what is at issue is the application of our rules in types of cases which established practice already rendered unproblematic and which may even transcend our ability to recognise these facts;
> (iii) our practices are autonomous in the sense that they are beyond our control: they control us". (47)

O'Hear suggests that Popper wants to hold all three interpretations. Interpretation (i), he maintains, is implicit in all Popper says about world 3, interpretation (ii) is implicit in what Popper says about the autonomous problems that we may never control, and interpretation (iii) is implied by Popper's claim that the rules of logic are exosomatic systems of control.

Assessing each of the three interpretations, O'Hear maintains that position (i) does not need an autonomous world. He cites the example of a rival position, Intuitionism, where the determination of mathematical

properties like primeness and oddness are regarded as implicit in the original definitions of these notions and where less obvious properties are 'discovered'. These, he maintains, would be construed as the product of rules and their applications and not as a vindication of the existence of some external or autonomous universe:

> "for (Intuitionists) our rules and the constructions deriving from them are the subject matter of mathematics, rather than merely the means of making discoveries about an independent subject matter with an existence autonomous of human imagination. For them, there can be no appeal to any existences other than what we can construct in our practices". (48)

What he is offering here is not simply a rival conceptualisation of the discovery of new mathematical truths. It is a rival view that he thinks could and should be adopted by critical rationalism and at the expense of its argument for an autonomous third world.

O'Hear attacks interpretation (ii) on what he calls "constructivist" grounds. Constructivists argue that it makes no sense to speak of objects, like mathematical objects, as if they are beyond the ability of human beings to recognise or construct, because mathematics can never cease to be what it originally was, a human construction. He argues that Popper provides no convincing argument for maintaining the reverse position. Interpretation (iii), is seen as the main conclusion that Popper wants to draw from interpretation (i) and this applies not only to logic and mathematics, but to all the other elements of world 3. Popper argues that the elements of world 3 are not only beyond our control, they control us. In response, O'Hear offers counter examples which contest this conception of external control. He cites a

variety of cases (49) in which, on Popper's terms, world 3 workers far from being controlled actually manipulate premises and do so in the light of projected or discovered implications.

O'Hear develops this assessment by attacking the argument that he feels is common to all three interpretations, namely, that the development of the entities involved in world 3 is independent of the hopes, intentions and predictions of their creators. What he contends is that while human beings cannot always develop theories in ways that they want nor anticipate all their consequences, this is not because these theories are autonomous in some superhuman realm. Scientific theories, like artistic styles and standards, are controlled in their development and in the ways they affect us by the "facticity of their respective materials (nature and the artistic media)". Institutions, too, clash in various ways with other institutions and the human beings who come into contact with them. So, saying that theories have unintended consequences need not imply that they develop autonomously but only, as Popper himself once argued, that: "the individuals who man them do not understand enough about the consequences of their actions". (50) Theories, styles and institutions, O'Hear argues, do not take on a life beyond human control simply because people cannot anticipate all their consequences. Such entities exist and develop through the conjunction of what Popper calls worlds 1 and 2, the physical world and mental worlds, no third world is required.

To summarise, both O'Hear and Currie think that Popper's arguments for the separate existence of world 3 are inadequate and, furthermore, that all its constituents could be accommodated within developed conceptions of the physical and mental worlds. The acceptance

of their position would have several major consequences for the discourse. If proponents of world 3 now rejected the notion, not only would they remove the current site of objective knowledge (and for that matter the site of social science phenomena), they would also remove the means of conceptualising the influence of science and knowledge on general human action.

4. Further Assessment

To the flaws exposed by O'Hear, Bartley and Currie, can be added several other comments. These are of two forms, those illustrating the conceptual mechanisms which are absent from the metaphysics and should be present, and those describing the limitations in what is presented. The parts are not mutually exclusive but they do carry different critical weight. The identification of neglect simply indicates incompleteness and while this may be sufficient to demonstrate the fragmentary nature of evolutionism, it does not carry an implication of necessary fragmentation or incoherence in the way, say, produced by either a conflict between concepts or as will be argued here, by the false assumption of a category's universal application.

The Absences

From the various absences which could be discussed, two provide illustrations. The first concerns the doctrine's use of taxonomies, in one instance of genes and in another of language; the second looks at the question of technology in human development. It was stated earlier that among the constituents of this evolutionist metaphysics was an extension of the Darwinist conception of variation which introduced a classification of genes based on the arenas of their control. Thus it spoke of "a-genes" (genes controlling the anatomy of an organism) and "b-genes" (controlling

the behaviour of an organism) and, within the latter, of "s-genes" (controlling skills) and "p-genes" (controlling preferences). But nowhere in its several presentations of this taxonomy does the discourse query or discuss the ease with which the classification is developed, the limitations of the teleology by which the gene-types are separated or, beyond the imposition of an hierarchical formation, how they inter-relate.

This same kind of absence is also repeated in the discussion of the taxonomy of language functions. Construed in terms of purposes, there is no questioning of how these types might inter-relate in use or combine to form the totality 'language'. There are no clear ties between language functions and the preferences and skills which are considered to facilitate them and, importantly, no clear statement of what is actually involved in the notion 'function' such that it can permit the easy discrimination between 'description' and 'argument' in human languages and 'expression' and 'signalling' in all languages.

What is absent in both cases is the theoretical detail needed to support the respective forms of classification. What is offered is an opacity borne of generality. Whether such opacity could be replaced without the eventual loss of these taxonomies is itself a matter of speculation. Certainly the detail required in their support is far from clear.

A second and somewhat different absence can be found in the discussion of technology in evolutionism. The discourse is prepared to recognise technology as an exosomatic development which influences the form and direction of human change. It does so, however, without thought or

consideration for the political (social and economic) aspects of whether, when and how this technology is introduced. Typewriters, word processors and computers are seen to be developed in lieu of better memories and brains, but there is absolutely no mention of the political and economic calculations which in contemporary capitalism decide whether, when and how such technologies are introduced into the labour process or into human leisure time. The contention here, then, is that the discourse's evolutionism neglects what must be central elements of any explanation of exosomatic development and influence in liberal capitalism, namely, political and economic calculation. It is a point that critical rationalism really should not neglect for, as Chapter 5 indicates, it advocates what it considers to be a politics which coheres with metaphysics and metascience, and with liberal capitalism as well.

The Limitations in What is Presented

In terms of what is presented, the focus is on the inadequacies which occur in critical rationalism's attempt to see evolutionism as a universal process. In section 2.3 it was suggested that while the discourse recognises difference (for instance, in developments within a phylum and between phyla), it chooses to view such developments as so many internal variations of an evolutionary process whose central characteristics are shared by all species. All species engage in the pursuit of resolutions to the problems which confront them and utilise common mechanisms (trial-and-error elimination) as the means of finding an answer.

Such universality has been questioned by Bartley, although his is an indirect form of attack via criticism of the discourse's proposed endosomatic

processes. The doubts raised here follow a more direct line and address the conditions under which the categories representing the evolutionary process are universally applicable. Can, for instance, terms like 'problem', 'knowledge' and 'trial-and-error' be universally applied? What, for example, are the conditions of commonality that permit the recognition of 'problems' in the diverse situations of theoretical physicists and spirogyra?

Critical rationalism seems unable to provide answers to such questions in the sense that it does not appear to possess the theoretical resources to generate answers. It is not an essentialism that is required, but rather, an expression of the theoretical conditions to support its own categories. It offers the elements of its evolutionary process as "objective" categories; it should therefore be expected to specify or have the means to specify the objective conditions under which the categories are utilised. Look, for example, at the use of the category 'problem'. In an illustration quoted earlier (see note 23) activities of the amoeba and Einstein's development of theoretical physics are both seen to be stimulated by 'problems'. Popper is not suggesting here that these different pursuits are produced by identical problems but rather that whatever it is that operates in each instance can be called a 'problem'. It is this assumed commonality that is being questioned. There clearly has to be some form of commonality if the discourse wants to speak of evolutionism as a universal process. But what are the theoretical conditions which permit, say, the amoeba's search for food and the theoretical physicist's struggle with the category of absolute acceleration, to co-exist as illustrations of the same evolutionary notion?

Critical rationalism does not provide answers or even clues to the answers. To search for an answer within the discourse's non-relativist, non-subjectivist limits, would seem to involve one of three possibilities. Seek the commonality of 'problem' in universally shared properties or constituents; seek it in 'family resemblances' or similarities or, seek it in some common identification of functions. Considering them in that sequence, the first two options can be quickly dismissed.

In the case of the first, the sheer diversity of the problems the category is meant to embrace seems to defy the very possibility of universal properties for 'problem'. What could the problems of the amoeba and Einstein's theoretical physics share? The question itself seems to undermine the credibility of the proposal. In the same vein, there seems to be no justifiable grounds for thinking that family resemblances or similarities might provide a credible basis. Family resemblances would argue that, say, any pair of problems may have shared features which identify them both as problems, without all problems having a single common feature. Outwith the fact that this notion is drawn from Wittgenstein's later writings which seem to be an anathema to critical rationalism, the appeal to similarities does not appear to meet what critical rationalism wants of its evolutionary categories. In both postulates and examples, it would seem to assume a common feature or features to the categories in its evolutionary process. To suggest that the problems of the physicist and the amoeba resemble each other through the intermediary problems of spirogyra, fish, cats and monkeys, does not seem to meet that requirement.

The third possibility, the identification of commonality in terms of functions, would seem to possess greater credence. The discourse is concerned to stress the retrospective way in which problems are recognised "when we speak of a problem, we do so almost always from hindsight". (52) and this would seem eminently suitable for a conception which recognises functions through their consequences. But its superiority over the other two options is merely a facade, for if problems are identified in terms of what they do, the identification implies that there are either universal properties or constituents to these activities of sufficient similarity to enable universal recognition and both these options have been previously rejected.

To dismiss these options is, in effect, to suggest that critical rationalism is operating in a 'scholasticist' manner, that is, it is treating a vague idea as if it were a detailed conception with grounds for application in each of the multitude of situations to which it applies. 'Problem' is no more than a vague idea. There are no grounds for assuming its universal applicability and thus no warrant for thinking that it features in a realistic summary of the processes of development of all life forms. The same argument applies with equal force to the other general categories of the process. If 'knowledge' or 'error' or 'trial' are to mean anything, if they are to possess a general credence, then they must each have a general utility which suggests they must have grounds of applicability. What one finds in seeking these grounds is that critical rationalism neither presents the necessary statements nor appears to have the theoretical resources to provide them. What could 'knowledge' be if the category is to apply to a formulation of the general theory of relativity and some organism's successful resolution of its food problem? To simply equate 'knowledge' with

the equally vague 'successful resolution of problems' is to do no more than co-relate vague abstractions, it does not provide either with any greater viability.

In like manner, 'trial' and 'error' have a place within this conceptual abstraction but no grounds for application and, as far as can be ascertained, no resources to provide them. Both are post facto recognitions, both have a purposive role in the general conception, but neither could (with any sense of credibility) permit the multiple and diverse applications that they supposedly embrace.

So, in spite of evolutionism's current significance to critical rationalism, it is abundantly clear that the conception is beset with problems. It is not simply that the status of evolutionism has changed three times in the discourse's history that raises issues or, that there are serious absences in what is conveyed. Far more important is the fact that the abstract conceptual picture of coherent evolutionary development disintegrates with either the examination of integral features such as world 3, or the demand for the conditions under which major evolutionary concepts might be applied to real world entities and processes. Bartley has illustrated the potential problems that exist with the endosomatic processes postulated by the discourse's evolutionism and the disastrous consequences involved in revising them. Currie and O'Hear have shown the paucity of Popper's arguments for the existence of a world 3 and conclude that, in spite of its significance to this evolutionism, its constituents should feature in more developed forms of world 1 and world 2. This chapter has added further criticism concerning the utility of the abstract elements of evolutionist development. Together, they

would seem to provide a forceful display of the fragility of critical rationalism's evolutionism, its absences and conceptual limitations, a stark contrast to what critical rationalism chooses to see as the firm, coherent and untroubled basis for the rest of its discourse.

Chapter Three

Critical Rationalism's Metascience and Epistemology: The 'Natural Sciences' Sub-Field

3.1 Introduction

The previous chapter addressed the categories and postulates of critical rationalism's field of metaphysics. This chapter looks at the discourse's epistemology and a sub-field of the metascience, the natural sciences. In particular, it:

(a) Outlines the epistemological goal(s) of truth (and truthlikeness),

(b) Addresses the metascientific prescriptions and postulates offered as the natural scientific means of realising the goal(s), and,

(c) Considers the view of rationality that underwrites critical rationalism's scientific procedures. The significance of this notion cannot be underestimated for, as the preceding chapter indicated, there is: "nothing more 'rational' [for critical rationalism] than the method of critical discussion, which is the method of science". (1)

3.2 The Aim(s) of Science: Truth (and Verisimilitude)

Critical rationalism has used two inter-related categories to describe the aim of the sciences, these are 'truth' and 'verisimilitude' (or truthlikeness). They are offered as consistent and related means of expressing the sciences' pursuit of knowledge. The need for two such categories can be found in their respective conditions of existence. Truth is posited as objective or absolute truth, that is, as a correspondence with the facts. But, it is also an uncertain truth, a truth that has no general criteria by which it can be recognised and thus gives no obvious signs as to its possession:

> "..we search for truth, but (do) not know when we have found it;...we have no criterion of truth, but are nevertheless guided by the idea of truth as a regulative principle.." (2)

To advocate truth as a regulative principle and yet deny that criteria exist which enable its recognition clearly creates a problem. How are critical rationalism's scientists to know whether the explanations they proffer contain more truth than those proposed by predecessors? If truth is the goal and scientists can never know for certain whether a particular explanation is true, how can they choose between rival theories or explanations? What critical rationalists offer as a solution is summarised in the notion of verisimilitude (backed as we will see later in the chapter by proposals concerning the empirical contents of theories and corroboration). Verisimilitude is employed to suggest that:

> "we can never rationally justify a theory - that is ...claim to know its truth - we can if we are lucky, rationally justify a preference for one theory out of a set of competing theories for the time being ... our justification can be the claim that the theory is a better approximation to the truth than any competing theory so far proposed". (3)

What is on offer then is a means by which rival scientific explanations can be compared in terms of their proximity to truth. Truth is the formal goal, the abstract regulative principle, the incentive for doing science. Verisimilitude is its substantive or practicable counterpart, the 'modest', 'realistic' mechanism for recognising increasing proximity to truth and thereby a growth of knowledge.

Once seen in this light, it is clear that the inter-relation of the two categories is more than a simple matter of consistency or complementarity, it is actually a relation of mutual dependence. Truth needs verisimilitude as a way of concretising its worth as the regulative ideal of science, that is, as a

way of giving it a practicable value. Verisimilitude has truth's conditions of existence as its raison d'etre. As section 3.4 of the chapter will be looking in some detail at the nature and practicability of truthlikeness , the rest of this section will be devoted to a brief discussion of truth and, in particular, the reasons for its characterisation as fallible and uncertain.

Truth and the Rejection of Certainty

The discourse's rejection of the notion of certain truth is couched in criticism of those who advocate its possibility. The major targets are the correspondence theories of truth promoted by Schlick and Carnap. These theories (hereafter summarised as 'justificationism' or, on occasion, more specifically as 'Positivism') are seen to claim that:

(a) Certain truth is scientifically attainable, and

(b) Its attainment is founded on the infallible nature of 'immediate experience' or 'sense data'.

It is (b) which is the direct object of the metascience's criticism and the means through which (a) is also rejected.

What the justificationists have argued is that there is a class of a-theoretical statements (variously called 'protocol statements', 'observation statements' or 'experiential statements') whose truth can be ascertained with certainty:

> "There are some hard facts on which knowledge can be built such as our clear and distinct sensations or sense data: direct or immediate experiences cannot be false". (4)

Experience or sense data is seen to provide us with facts about particular events and the facts are recorded in observation statements. Such statements (which are themselves a-theoretical) are then used to test

hypotheses or, more specifically, to test the predictions derived from hypotheses under specified initial conditions. In so far as the predictions are repeatedly confirmed by further observation statements, the hypotheses are themselves also confirmed. If observation statements can be known with certainty then, say the justificationists, theories can be confirmed (or refuted) with equal confidence.

Critical rationalism's main objection to this argument rests on the denial that sense experience can provide an infallible basis for testing hypotheses. Popper works the objection through an argument which both suggests that observation statements contain universal terms and, further, that these terms convey law-like properties which by their very nature must transcend "immediate experience".

He makes his case through what he calls their 'dispositional' nature. Popper maintains that for an observational statement like 'Here is a glass of water' to be true, the internal propositions 'This is a glass' and 'This is water' have also to be true. Such propositions, he suggests, contain universal terms ('glass' and 'water') and these terms are dispositional. In the case of glass, for example, the disposition might be that if it were dropped on a stone floor from a particular height it would break. With water it might be that it would freeze at sea-level at 0 degrees Celsius. Given such dispositional properties, Popper argues, the truth of even simple statements like 'This is a glass' or 'This is water' cannot be discovered by sense experience. This is because the claims that the glass would break if dropped, or that the water

would freeze, must themselves involve law-like statements concerning the molecular structure of glass and water and law-like statements "transcend experience".

The implication of the argument is this: if scientists cannot treat observation statements as factual records whose certainty is beyond question, then they cannot use such statements as known confirmations of truthful theories. In Popper's eyes, this argument offers sufficient grounds for rejecting the justificationist goal of certain truth. What he offers as its replacement is a view which sees truth as objective, as a correspondence with the facts, but where both the facts and the corroborated hypotheses are permanently fallible. It is a conjectural truth. No scientific propositions, whether observation statements or highly credible explanations, are ever considered certain. This is clearly a very different conceptualisation of truth to that proposed by the justificationists. Popper and other critical rationalists are recommending that:

i) Scientists should seek true statements, but,

ii) Never assume that either the propositions they use or the tests they employ will give them grounds for claiming that they have discovered a truth that is certain. Scientists may agree that propositions are more or less credible but no proposition, however credible, ever becomes more than conjectural truth.

3.3 The Methodology of the Sciences

As with the discussion of truth, much of what critical rationalism has to say about the methodology of the sciences is couched in contrasts with the categories, arguments and prescriptions of justificationism. An important

illustration of the nature of these methodological contrasts concerns inductive argument. For justificationism, and more particularly for Positivism, induction is a procedure of science. For critical rationalism, it is something which must be expunged from science. Such contrasts however involve more than the specification of difference, they involve a claim on critical rationalism's part to being a better metascience as well. When critical rationalism is criticising the use of induction, it is explaining why it is absent from its own methodology and, at the same time, demonstrating the inadequacy of a metascience that advocates its use. The following discussion employs the problem of induction as its window to wider aspects of the methodology of the sciences. It begins with what the discourse calls the "problem of induction".

The "Problem of Induction"

Justificationists are seen to advocate a science which bases its explanations on pre-theoretical observations of repeated events. They suggest that scientists should begin their studies by collecting a large number of examples of the object/event they are investigating. By noting the environmental features that occur at the same time as the object/event, they should then sift the constantly recurring features from other more ephemeral items and, within this sifting, identify the potential 'causes' of what is being investigated. Once these causes have been identified, they should then feature in hypotheses which are tested by looking for further confirming instances.

As has been seen with the dismissal of the justificationists' criterion of truth, critical rationalism denies that it is possible to observe anything in

an a-theoretical way. The critique of induction, however, does not stop there. Associated with their belief in an a-theoretical observation language, inductivists are also seen to believe in the uniformity of nature. They accept, in other words, that repeated observations of the same event can act as grounds for the acceptance of universal laws.

Critical rationalists attack this contention with a fair amount of relish. There are, they maintain, no grounds for generalising from particular observations to universal laws. No matter how many times I have seen the sun rise in the morning, the aggregate experience does not provide me with a justification for saying that the sun will rise tomorrow morning and/or all other mornings in the future. Why? Because no amount of experiential data can confirm a universal law. Universal laws by their very nature will always transcend any amount of attainable experience.

The source of induction's problems are seen to rest with justificationism's desire to combine a belief in a science which seeks universal explanations with a process of ascertaining truth by looking for, and aggregating, confirming instances. It "proposes and uses laws everwhere and all the time". (5) It retains a: "principle of empiricism: which asserts that in science only observation and experiment may decide upon the acceptance or rejection of scientific statements including laws and theories", (6) and it maintains that such observations and experiments have the capacity to produce data to confirm universal hypotheses. In combination these beliefs produce the "irrational" situation in which it is proposed that scientists should attempt to justify a law by means which do not permit that possibility.

A similar argument is employed against the more recent formulation of truth based on inductive probability. Justificationists, recognising some of the limitations of the sciences' pursuit of certainty, have advocated a probabilistic truth as the revised goal of the sciences. Here, confirming instances of events would provide something like 'highly probable' or 'well-supported' explanations. Critical rationalism finds this proposal as untenable as its predecessor. As Popper states:

> "My own view is that the various difficulties of inductive logic.. are insurmountable. So also I fear are those inherent in the doctrine .. that inductive inference although not strictly valid can attain some degree of 'reliability' or 'probability'." (7)

The insurmountable difficulty of inductive inference again concerns the belief that an analysis of past events can have a bearing on (in this instance, the probable occurrence of) events in the future. This Popper and other proponents of critical rationalism maintain cannot be licensed by the premises of probability theory. The initial probabilities of statements referring to the future cannot be increased by evidence from the past without an assumption that there is conformity between the past and future and there are simply no grounds for making this assumption.

Fallibilism and Deductivism

Having sited and described the problem of induction and, to its own satisfaction, shown sufficient reason for excluding inductive practices from the sciences, the discourse formulates the elements of its own conception of methodology against this background. Whereas justificationism is seen to advocate induction and confirmation for its science, critical rationalism

suggests the reverse, in other words that deductivism and fallibilism should form key elements of scientific methodology.

To a large degree the methods that it proposes turn on the insight that while it is never possible to confirm universal statements, it may be possible to falsify them. Whilst no amount of observations of black cockroaches can ever confirm the universal statement that: 'All cockroaches are black', an observation of a single blue cockroach may, critical rationalists argue, be sufficient grounds to falsify the universal statement. This insight allows the sciences to continue to pursue universal statements without encountering the irrationalities of induction and confirmation. Scientists cannot give positive reasons (or evidence) for holding their theories, but they can develop valid grounds for rejecting them.

Instead of trying to demonstrate the correctness of hypotheses through confirming observations, critical rationalism maintains that empirical scientists should attempt to improve them through critical assessment. Critical assessment here means making ideas empirically falsifiable. Scientists should propose radical hypotheses and then ruthlessly try to overthrow them by empirical tests. On those occasions on which hypotheses withstand these empirical tests, scientists have good critical reasons for claiming that the hypotheses are true.

Combined with this fallibilism is a strict deductivism. This is clearly illustrated in the discourse's discussion of the constituents and organisation of scientific explanations. The constituents are an explicans (a statement of the explaining laws and conditions) and an explicandum (a statement of the

event to be explained). The explanation is always the deduction of the explicandum from the explicans:

U	Universal Laws	(Premises forming
S	Specific Initial Conditions	the Explicans)
	↓	↓
E	Event to be Explained	Explicandum

Popper offers the following illustration:

> "A dead rat has been discovered and we wish to know what has happened to it. The explicandum may be stated thus: 'This rat has died recently.' This explicandum is definitely known to us - the fact lies before us in stark reality. If we want to explain it, we must try out some conjectural or hypothetical explanations .. that is explanations which introduce something unknown, or at any rate much less known to us. Such a hypothesis may be, for instance, that the rat died of a large dose of rat poison. This is useful as a hypothesis in so far as, firstly, it helps us to formulate an explicans from which the explicandum can be deduced; secondly, it suggests to us a number of independent tests - tests of the explicans which are quite independent of whether the explicandum is true or not. Now the explicans - which is our hypothesis - does not only consist of the sentence 'This rat has eaten some bait containing a large dose of rat poison', for from this statement alone one cannot validly deduce the explicandum. Rather, we shall have to use, as explicans, two different kinds of premises - universal laws and initial conditions. In our case the universal law might be: 'If a rat eats at least eight grains of rat poison it will die within five minutes'. The (singular) initial condition (which is a singular statement) might be: 'This rat ate at least eighteen grains of rat poison, more than five minutes ago'. From these two premises together we may now indeed deduce that this rat recently has died (that is, our explicandum)". (8)

Methodological Decisions

Presented in this way, the metascience's conception of explanation (and implicitly, testing) looks a reasonably simple exercise. Unfortunately, it is nowhere near as straightforward as the illustration

implies. Scientific explanation involves more than deductive explanation and empirical refutation, it involves a process of decision-making. Popper indicates his understanding of the point when he suggests that: "the testing of a theory depends upon (observation) statements whose acceptance or rejection, in its turn, depends on decisions". (9) Theories are tested against observation statements, but observation statements carry no greater certainty than the theories they test, they too are conjectural. It follows from this that if a theory contradicts an observation statement, the scientist must decide which to reject or, whether to reject both of them.

Elaboration of the test procedures reveals the complexity of the process. To reject a theory on the basis of a test requires a prior decision to accept the observation statement being used for testing. Further, what is being decided is not simply the dismissal of a hypothetical explanation operating under specified initial conditions, but the rejection of a nexus involving: hypothesis, initial conditions, mathematics, logic, and predictions. The decision-making, then, has to cover all aspects of the theory since all the elements of a scientific theory are, in principle, refutable:

> "[A scientist] decides to test a certain universal statement and he therefore makes the appropriate observations..Having provisionally decided to accept the resulting [observation] statements he compares them with his more or less complex system of theories, singular descriptive statements, logic and mathematics. If he finds a contradiction then he has a problem. He must decide which part or parts of the system to reject. Logic cannot help him here. Instead he must provisionally decide that the result of the test entails the rejection of such-and-such a part of his system of theory. That decision may be mistaken and is always open to further testing. Refutation is always a matter of decision. (10)

Because refutation is a matter of decision, much of the discourse's methodology is devoted to providing edicts or injunctions in situations (11) where decisions have to be made. Although occasionally conveyed through past examples of 'good' and 'bad' scientific practice, for the most part they are offered in an abstract prescriptive format. An example of what is entailed (and a first instance of the difficulties that beset the discourse through such prescriptions) is provided by its consideration of 'ad hoc strategies'.

Ad hoc or 'conventionalist' strategies have been viewed by critical rationalists as a perennial danger to their science. Such strategies are seen as an attempt to protect or immunise a theory from refutation. This would happen, for example, if a scientist chooses to read test results that would ordinarily lead to a theory's refutation as the outcome of malfunctioning equipment or when she chooses to interpret them as refuting initial conditions rather than the major premise of the explanation.

Looked at in terms of scientific procedures, a simple illustration would be something like the following. An entymologist 'A' publishes a paper in which she proposes the theory that 'all cockroaches are black'. Other researchers, having read the paper, write to 'A' informing her that they have counter-evidence, they have seen blue cockroaches. 'A' then has the choice of either:

(a) Accepting their evidence (or, more realistically, attempting to repeat their observations) or,

(b) She could choose to defend her theory in the face of this conflicting evidence, say, by claiming that what they actually saw was not a cockroach but some other insect.

It is this latter move which is the conventionalist strategem. It is conventionalist (or ad hoc) because all that 'A' is doing is repeating the universality of her theory. She is then employing it to translate what would otherwise be conflicting evidence into information that is inconsequential for her theory.

Recognising conventionalist strategies as a perennial danger and, in particular, the negative impact they have on the desired openness or falsifiability of science, critical rationalism initially offered the following as a prescription for its scientists:

> "We decide that if our system is threatened we will never attempt to save it by any kind of conventionalist strategem". (12)

In the abstract, such a decision seems reasonable and was certainly consistent with drawing up a methodology to meet the pursuit of truth through falsifiability. However, once the injunction was applied to specific situations and, indeed, to past instances of major scientific success, it seems to conflict with what actually happened. This was the case, for instance, with the discovery of Neptune.

Working through Newton's theory of universal gravitation (and with an auxiliary hypothesis that all the planets that existed were known) Leverrier in France and Adams in England attempted to predict the orbit of Uranus. In both instances the predictions failed. On the basis of the discourse's conception of science, Leverrier and Adams should have rejected Newton's theory - but they did not. Instead they chose a conventionalist strategy of revoking the auxiliary hypothesis that all the planets were known and introduced the ad hoc hypothesis that the presence of an as yet unobserved

planet (Neptune) could explain Uranus's orbit. They had, in other words, a greater faith in the explanatory value of the theory than in the anomaly produced by these failed predictions. It is historical cases of this order which have encouraged critical rationalism's science to revise this injunction and to accommodate what it terms a "degree of dogmatism". Popper expresses the point in the following way:

> "I..realised that we must not exclude immunisations not even all which introduce ad hoc auxiliary hypotheses. For example, the observed motion of Uranus might have been regarded as a falsification of Newton's theory. Instead the auxiliary hypothesis of an outer planet was introduced ad hoc, thus immunising the theory. This turned out to be fortunate; for the auxiliary hypothesis was a testable one, even if difficult to test, and it stood up to tests successfully. All this hows..that some degree of dogmatism is fruitful.. (13)

In the face of another example (Pauli's positing of the existence of neutrinos), the metascience goes as far as warning its scientists quite specifically not to: "pronounce too severe an edict against ad hoc hypotheses". (14) This stands in opposition to the original injunction and leaves the metascience with a problem of what regulation could be introduced that would enable a scientist to decide when an edict is "too severe". The problem remains unresolved.

In sum, because its forms of empirical testing and theoretical criticism are never conclusive, critical rationalism must resort to the notion of regulating its decision-making as a way of provisionally concluding research. Decisions are made in the interests of science which is to say in the interest of the pursuit of truth. To protect such interests the metascience proposes edicts or injunctions about what should or should not be done in particular circumstances. The original injunction introduced to counter conventionalist

strategies ran into trouble because it conflicted with successes of past science. The subsequent dilution of this edict has rendered it ineffective, it offers no guidance at all. What future sub-sections demonstrate is a variety of theoretical circumstances which have produced similar effects, that is to say, they collectively deprive the methodology of the conditions that it requires to meet science's goal.

The "Empirical Basis"

This sub-section considers the metascience's conception of the empirical basis of its sciences. In particular, it looks at the question of the conditions under which observation statements can be said to form the evidential base - the test statements - involved in rejecting (or corroborating) theories. This, unfortunately, is not a straightforward matter for the discourse. In fact, two of its principal proponents, Bartley and Popper, offer different and conflicting views on what constitutes acceptable conditions. The original position, proposed by Popper, suggests that the conditions concerning evidence should be sought in what scientists agree will form test statements. (15) Bartley finds this unacceptable. He thinks that Popper's position invokes a conventionalism which is both inadequate and unnecessary and should be replaced by the 'criticisability' of test statements. (16) Whilst Bartley's critique of Popper's conventionalist position seems warranted, his own counter proposal has problems. Specifically, his notion of criticisability would disrupt the existent relation between scientific test procedures and the metascience's view of the conditions under which scientific knowledge grows.

Poppers discussion of the empirical basis opens with, and revolves around, Fries' trilemma as presented in Neue oder anthropologische Kritik der Vernunft (17). In this text, Fries poses the question of the grounds on which scientists should accept test statements. He considers three options. Scientists could, he maintains, simply accept their test statements dogmatically. As an alternative, they could attempt to justify them. If, however, they attempt to justify them through reasoned argument, they are appealing to statements to justify other statements and are thus embroiled in an infinite regress. Because of the limitations of these options, Fries throws his support behind the third possibility - 'psychologism'- that is, the belief that statements can be justified not only by statements but also by perceptual experience. (18)

For reasons outlined in the discussion of observation statements, Popper finds this third option as unacceptable as the other two, hence his use of the term 'trilemma'. Fries is seen to opt for psychologism on justificationist grounds:

> "In sense experience, he taught, we have 'immediate knowledge': by this immediate knowledge, we may justify our 'mediate knowledge'- knowledge expressed in the symbolism of some language. And this mediate knowledge includes, of course, the statements of science. (19)

Popper offers his own view of the natural sciences' empirical basis as an answer to the trilemma. (20) Summarising the resolution is difficult, but what it basically amounts to is a listing of formal and material conditions for those observation statements that are to act as test or basic statements in the empirical testing of a theory:

> "Formally, they must be singular existential statements; must be able to contradict a universal statement; and must be underivable from a universal statement alone without initial conditions. Materially, basic statements must be testable intersubjectively by observation. (21)

Such conditions, Popper maintains, enable a conception of scientific test statement that need not resort to psychologism or dogmatism, and which produces little more than an "innocuous" regress. But how do these conditions assist in the resolution of Fries' trilemma?

Addressing each option of the trilemma in turn, Popper argues that his stipulated conditions overcome the use of dogma because researchers must agree about which observation statements meet these conditions and therefore as to when they have been satisfactorily and sufficiently tested. He also sees a second role for such decision-making. Unless scientists can agree about test statements, the tests themselves will lead nowhere. Thus, the collective acceptance of observation statements as test statements enhances the possibility of scientific progress.

With regard to the second option and its threat of infinite regress, Popper concedes that the chain of deduction in terms of which universal statements are tested against observation statements is indeed infinite. But, he contends, this is innocuous since in a metascience that recognises the conjectural nature of truth and operates with falsifiability as its means of testing, there is no desire to prove anything.

Finally, in terms of Fries' preferred option, psychologism, Popper agrees that sense experience can motivate decisions to accept basic statements but he remains unmoved by Fries' attempt to use it as the justification of such statements:

> "Experience can motivate a decision, and hence an acceptance or rejection of a statement, but a basic statement cannot be justified by them - no more than by thumping the table".(22)

In sum, then, whilst making partial concessions to the second and third options, Popper is claiming that the conditions that he specifies for test statements avoids the snare of the trilemma.

The Positivist critic Ayer (23) rejects Popper's argument on two grounds. He objects to the dismissal of Fries's appeal to psychologism and, he thinks that Popper's proposal concerning the conventional basis of observation contains an inherent weakness. Ayer maintains that basic or observation statements can only be directly justified by experience. Experience is the source of claims to knowledge and is authoritative. It provides the "right to be sure". He supports this claim with the contention that if experience cannot play this role, then there is no point in doing empirical science:

> "If these observations give us no authority for accepting any basic statements, they do not constitute a test of anything, so that there is nothing to be gained by examining the facts: if they do give us this authority, our claims to know basic statements are validated by their sources". (24)

This argument, however, poses no threat at all to Popper's anti-psychologism for it is drawn from the very justificationist sources that Popper has dismissed on other grounds. (25) Ayer's point on conventionalism, however, has much greater potency.

Ayer suggests that to use conventionalism or agreement between scientists as the grounds for recognising particular observation statements in the test of a theory inevitably results in arbitrary decision-making:

> "True basic statements are those that we decide to accept; false basic statements are those that we decide to reject". (26)

There is, he says, no alternative to this conclusion. If convention or communal decision-making provides the means for accepting observation statements as true, then arbitrariness will effectively rule.

As others have noted, the article that forms the response to Ayer (27) is riddled with inconsistencies. Popper begins by accusing Ayer of basing his criticism on a mistaken assumption, namely that every decision or convention is arbitrary. Yet on the following page he admits that the kind of decision he is describing could be considered arbitrary - but that it is not "totally arbitrary". Three pages later, Popper is suggesting that the decision to accept or reject particular singular statements as test statements involves: "no element of arbitrariness at all". Two sentences further on, he is arguing that decisions about the acceptance of test statements are "somewhat arbitrary".

Although nothing can rationalise the total range of inconsistency here, Bartley has suggested that Popper's argument might be reconstructed to suggest that: the acceptance or rejection of given basic statements is only arbitrary 'from a logical point of view'. (28) What seems to inhibit the charge of total arbitrariness is Popper's appeal to the training of scientists and the collective nature of their decisions. In terms of training, Popper has this to say:

> "Any empirical scientific statement can be presented (by describing experimental arrangements etc) in such a way that anyone who has learned the relevant technique can test it". (29)

And linking that training to his conception of scientific community:

> "I have no intention of defining the term' observable' or 'observable event'.. I think that it should be introduced as an undefined term which becomes sufficiently precise in use: as a primitive concept whose use the epistemologist has to learn, much as he has to learn the term 'symbol', or as the physicist has to learn the use of the term 'mass-point'. (30)

What Popper is suggesting is that the result of any test (and therefore the content of conjectural knowledge), must depend on the forms of training which prevail within the scientific community at the time of the test. So, given that the empirical rejection of scientific theories depends, amongst other things, on the prior decision to accept particular observation statements, the training of scientists is actually used to provide a means for obtaining the acceptance or rejection of these statements from other members of the scientific community and, thereby, to overcome a threat of total arbitrariness in decisions about basic statements. The point is made again in a more abstract way via an analogy between scientists making decisions about whether to accept basic statements and juries making decisions:

> "The jury decides about a fact - say, whether or not Mr.A killed Mr.B. Its decision is the result of.. deliberation; much time is needed for coming to a common decision (which is the meaning of 'convention' intended here). But who would say that a jury which has long and seriously debated the issue decided 'completely arbitrarily'? Its decision is the result of a common effort to find the truth". (31)

But how strong is this argument? Does the appeal to training and community either eliminate or control the threat of arbitrariness? Hindess argues that it completely misses the issue at hand. Making the case in terms of the jury analogy, he states:

> "The problem at issue concerns the logical capacity of accepted basic statements to support conclusions based on them. Popper offers a 'good reason' in the shape of the seriousness of the scientific jury and the effort it devotes to its task. Unfortunately the problem concerns not the existence of effort and seriousness on the part of the jury but whether they are put to any useful purpose. Popper's 'good reason' has no bearing at all on this latter question". (32)

Hindess' point is that if a scientist choses to question accepted observation statements in terms of their logical capacity to support conclusions based on them, the scientific community's response would have to be of the order: 'yes, the choice of these statements is logically arbitrary, but they have been seriously debated by trained scientists'. Recognising arbitrariness and then trying to shroud it in compensating mechanisms is not an answer. If the aim of the sciences is to pursue truth then Popper's conception of the empirical base simply does not assist them in that pursuit.

Bartley also recognises the flaw in the appeal to convention. He maintains, however, that it could easily be avoided by eliminating requirements relating to agreements. If test statements are criticisable and revisable, he suggests, there is no need to appeal to agreements between scientists. He combines this view with Popper's own on the infinite nature of testing, but thinks that no infinite regress need occur because there is no question of proving statements, not even proving that they are false:

> "If (basic statements) are incompatible with a theory, then the theory is false relative to them, and they are false relative to the theory. There is no question of theory proving reports wrong, or reports proving theory wrong. Both could be wrong.." (33)

As far as Bartley is concerned then, the requirement that scientists should agree on test statements can only have adverse effects. Critical rationalism can not only survive but would be improved if it removed this conception of agreement from the metascience. But what happens if this conception is

removed and a theory is incompatible with a basic statement? According to Bartley, scientists have:

> "..only to give an account of what is happening, and to state how theory and report stand..in relation to one another..Hence a theory may be provisionally and conjecturally rejected because it conflicts with some less problematic view. Any theory is refuted only relative to critical arguments incompatible with it, which are themselves open to criticism by the testing of their own consequences. These in turn are criticisable forever". (34)

Although of a different nature to Popper's formulation, this argument also has its problems. Popper had employed the conception of communal agreement in a dual role, to both counter Fries' option of the dogmatic justification of sentences and also to give science a sense of direction. If scientists can be seen to collectively decide which observation statements were true, they would then have the facility to agree on those statements which are incompatible with a theory and thus on the grounds for that theory's rejection. In other words, the communal acceptance or rejection of observation statements facilitates the view of how scientific knowledge grows.

So if Bartley's attack on the arbitrariness of convention is correct, it also seems to result in his eliminating the means of conceptualising the growth of scientific knowledge. Bartley anticipates this criticism. By constructing a hypothetical research situation he attempts to show that: "one contributes nothing to this situation by adding..a requirement that one need to decide by agreement ." (35) This may be so, but the point is more one of what is taken away from the situation by abandoning conventionalism. He describes a research situation composed of the following elements:

(i) A theory concerning (say) the movement of 'macroscopic physical bodies',

(ii) A specification of the "sorts of events" involving position and movement that would be incompatible with the theory,

(iii) Experimental arrangements designed to attempt to produce such events, and,

(iv) "To maximise criticism and provide mutual testing of test reports, one will invite or permit more than one reporter. Note: one does not get these additional tests, pace Popper, to elicit an agreement". (36)

Making the further supposition that the empirical reports go against the theory, he suggests that:

> ".one makes a report on what has happened: that the theory is now problematic in that it is false relative to the test reports, and that the test reports are themselves, as may be at the moment, unproblematic". And,
>
> "If the test reports had conflicted amongst themselves - if some of them had gone against the theory and some failed to go against - one would have a different situation: then one would more accurately report that although the theory was rendered problematical by some of the test results, the test was itself also problematical in having produced several conflicting reports". (37)

The problem with Bartley's stance is that it does not attempt to meet the wider purpose of testing formulated by proponents such as Popper and Watkins. This is displayed in the last two quotations. There, he seems to be saying no more than when test reports conflict with a theory, or conflict with one another, critical rationalism's scientists should simply report these discrepancies. What it therefore overlooks is what Popper and Watkins proposed as a link between the testing of a theory and the growth of scientific knowledge.

If, as they suggest, testing is designed to develop scientific knowledge through the attempted refutation of existing theories, how will the

reporting of conflict facilitate that development? What the conventional acceptance of basic statements gave the metascience (albeit inadequately) was the raw material to (conjecturally) refute theories and replace them with falsifiable alternatives. For Bartley to talk about the criticisability of theories is all very well, but the bottom line for the original prescriptive falsificationism involved specifying the conditions for treating theories as falsified and replaceable, which involves amongst other things the conditions concerning the acceptance of observation statements. Without these, the discourse's science seems to lack a sense of direction and, indeed, progress.

The metascience, then, seems to have its own dilemma concerning the empirical basis for its sciences. If it uses the sense of convention or agreement advocated in Popper's formulations to accept or reject test statements, it can clearly and correctly be accused of creating an arbitrary and, therefore, irrational evidential base for its sciences. If, with Bartley, it abandons this conventionalism it appears to deny itself the means of conceiving of the growth of scientific knowledge.

Given that several other aspects of the discourse's methodology are consistent with the appeal to conventionalism, this chapter continues to work with this conception in the following sections on corroboration and verisimilitude only to raise it again as an issue for the discourse in section three of Chapter Six.

The 'Corroboration' or Empirical Support for Theories

The previous sub-section looked at the empirical basis of the discourse's projected science, that is, at its notion of test statements and the proposed conditions governing their acceptance. This sub-section considers two other methodological features of test procedures, these concern:

(i) The question of when a fact is taken to support (or corroborate) a theory and, relatedly,

(ii) When one scientific theory is to be regarded as better (that is, better supported or 'corroborated') than a rival theory. (38)

To discuss (i) will involve extending the description of the discourse's conception of scientific testing. Thus far, the chapter has given the impression that testing in critical rationalism's science is a two-part relation between theory and observation. In fact, these were the principal components of the metascience's original formulation of scientific testing. Its more recent proposal however adds a further component: 'background knowledge'. (39)

Background knowledge consists of all those statements provisionally accepted by the scientific community as unproblematic at the time a theory is tested. The point of its introduction into the test procedures is to give the metascience greater control over what is acceptable as the factual support for a theory, a point which is best illustrated by looking at what testing could be like in its absence.

Without background knowledge it would be possible to, say, test a theory (to provide it with potential falsifying statements) simply by using the 'known' results of existing tests. Scientists could introduce as potential

falsifiers existing test results that they knew were not actual falsifiers. The introduction of background knowledge is designed to inhibit such possibilities. A theory is only corroborated, the metascience now maintains, if it both describes a fact and if the fact can be seen as a discovery of the theory. The theory is not supported by facts which, at the time of testing, constitute part of the theory's background knowledge. So, discovering that a fact is deducible from a theory (together with suitable initial conditions) is by itself not acceptable as support for that theory. Couched in terms of the severity of tests, the metascience states:

> "an empirically accepted consequence of a theory supports the theory only if it describes the outcome of a severe test of it..a test of a theory is not a severe test if the theory (together with 'background knowledge') predicts the same outcome as is predicted by 'background knowledge' alone". (40)

Turning now to (ii), the issue of when one theory is better supported by evidence than another theory, the metascience operates from a premise in which scientific theories can be distinguished according to the results of their tests. It grades hypotheses not only in terms of whether they pass or fail tests but also in terms of the degree to which they pass their tests:

> "By the degree of corroboration of a theory I mean a concise report evaluating the state (at a certain time t) of the critical discussion of a theory, with respect to the way it solves its problems; its degree of testability; the severity of tests it has undergone; and the way it has stood up to these tests. Corroboration (or degree of corroboration) is thus an evaluating report of past performance ..it is essentially comparative: in general one can only say that the theory A has a higher (or lower) degree of corroboration than a competing theory B, in the light of the critical discussion, which includes testing, up to some time t." (41)

A corroborated theory is one which has passed empirical tests, a better corroborated theory is one which passes more tests and more severe tests than its rivals. Popper gives an illustration of what is involved in this comparison of theories with the following example from the history of physics:

> "most physicists will say that Maxwell's theory of light is 'better corroborated' or 'better tested' than Fresnel's theory of light. The reason is that Maxwell's theory has been more widely and more severely tested.. even in fields in which Fresnel's theory cannot be tested. At the same time, Maxwell's theory has a much greater logical content than Fresnel's; Maxwell's is a wave theory of light and a theory of electromagnetism, while Fresnel's is merely a wave theory of light". (42)

It is this notion of degree of corroboration or better-tested theory which is used by the metascience as the grounds for choosing between rival theories as say when a scientist is considering a future programme of research. It is therefore an extremely important conception for it forms one component of a relation (the other being verisimilitude) which links the process of testing with the growth of knowledge. The best-tested theory provides the best platform for future research and thus the best possibility of extending scientific knowledge. Offered as an edict:

> "Since we have to choose, it will be 'rational' to choose the best-tested theory. This will be 'rational' in the most obvious sense of the word known to me: the best theory is the one which, in the light of our critical discussion, appears to be the best so far, and I do not know of anything more 'rational' than a well-conducted critical discussion."(43)

As several commentators have pointed out, this proposal is not the 'rational' edict the metascience thinks it is. It contains an implicit inductive argument which, of course, means that it conflicts with the metascientific

prescription that seeks to exclude all inductivist argument from the metascience and, more generally, from the whole of the discourse. The source of the issue is the attempt to choose between theoretical explanations on the basis of their past successes, that is, their past corroboration. The anti-inductivist injunction sees this as unwarranted. In its terms, there is no reason to assume that an event which has been experienced (such as the past success of a theory) can provide grounds for deciding about events which have not been experienced (such as the future success of the theory even in areas where the theory has been previously successful).

This conflict of edict and injunction clearly leaves the metascience in a predicament, for there are no clear means of reconciling them. If the metascience withdrew its opposition to inductivism, it would effectively undermine the combination of deductivism and fallibilism in its general conception of testing. If, on the other hand, it retained its general anti-inductivist stance there would seem to be no other option to resolving the conflict than by denying that corroboration can provide a rational basis for theory-choice. But if the latter option was taken and the past successes of a theory were not grounds for developing future research, the discourse would be left with nothing even remotely resembling a rational basis for choosing between theories and thus would be forced to abandon the potential growth of knowledge to irrationality.

Conscious of these negative options Popper has attempted to defend the use of corroboration in theory-choice against this line of criticism. However his form of defence is somewhat suspect. Accepting that

corroboration is a less than perfect means of opting to pursue one theory rather than another, he nonetheless stoutly maintains that at least it is a better basis for choice than either leaving things to chance or choosing dogmatically. It does, he argues, at least demonstrate which theories have been falsified. This may be the case but in terms of choosing between corroborated, partially-corroborated theories or even two falsified theories as a platform for future research, the notion of best-tested theory seems no more capable of providing a rational or effective choice than either rolling a dice or choosing on dogmatic grounds, a point which is ironically reinforced with Popper's own dogmatic support for corroboration.

In sum, to develop a methodology which meets the metascience's conception of an evolutionary growth of knowledge, critical rationalism requires a notion of empirical support that allows its scientists to rationally choose between rival explanations in terms of their future potential. However, because of its strict anti-inductivism, the discourse is obliged to work with a conception of corroboration which has no theoretical power to meet this requirement and, in effect, makes the choice between empirically supported theories an irrational matter.

Verisimilitude

Verisimilitude (or truthlikeness) is what the discourse describes as the sciences 'more modest' or practical goal. Through rational criticism, the sciences are seen to have the capacity to change the content of what passes as truth at any given time, a change which is considered to lead to an increase in truthlikeness or, what amounts to the same thing, a growth in scientific knowledge. The question raised here is: does the metascience

make adequate theoretical provision for such growth? The importance of the question should be clear. Unless the discourse can show that the application of rational criticism entails a means of assessing the growth of scientific knowledge, then it is impossible to demonstrate the required link between science's goal and its methodology. The contention is that it is currently unable to make this link and that, in consequence, verisimilitude provides another illustration of the break or disjuncture between the goal and methodology of the sciences.

Verisimilitude, it was said earlier, is born of truth's conditions of existence. Truth exists as the absolute and objective goal but it also exists without criteria, that is, it offers no means whereby scientists can say with any justification that they truly know anything about any aspect of the world. In such circumstances, truthlikeness is seen to provide a way of indicating the differential truth contents of theories and thus a plausible conception of the sciences' progress in the pursuit of truth. To repeat an earlier quotation concerning verisimilitude's rationale:

> "..we can never rationally justify a theory - that is, claim to know its truth - we can if we are lucky, rationally justify a preference for one theory out of a set of competing theories for the time being..our justification ..can be the claim..that the theory is a better approximation to the truth than any competing theory so far proposed". (44)

Popper has made several attempts to enhance this notion of truthlikeness but each has, in one form or another, failed. One reason for this is the opaque relation between corroboration and verisimilitude. Given their theoretical proximity and their joint use of notions like the truth contents of theories, one would expect the metascience to clearly establish the link

between these categories. However, when the literature is scanned for a description of their relation, much more can be found about what their relation is not, rather than what it is. The following quotation is a good illustration of this point:

> "I want to make quite clear that the degree of corroboration of a theory cannot be interpreted simply as a measure of its verisimilitude. At best, it is only an indicator of verisimilitude..The degree of corroboration of a theory has always been a temporal index: it is the degree to which the theory appears well tested at the time t. This cannot be a measure of its verisimilitude, but it can be taken as an indication of how its verisimilitude appears at the time t.. Thus the degree of corroboration is a guide to the preference between two theories..it only tells us that one of the theories seems -in the light of discussion - the one nearer the truth". (45)

This is the most detailed comment in the metascience's existing literature linking these categories. And what does it say? It says that corroboration and verisimilitude are not identical and that corroboration cannot straightforwardly be taken as a "measure" of verisimilitude but that it can be taken as an "indicator", that is, of how one theory appears more truthlike than another at a particular time and in the "light of discussion".

Given that corroboration is perceived as a rational analysis of theory preference, it is presumably also seen to operate as a rational guide to verisimilitude. Whilst the previous section may have cast serious doubt on the possibility of corroboration being a rational guide to any kind of choice, it is nonetheless an inadequacy for critical rationalism's metascience to suggest that one category acts as a guide to another without clarifying the nature of that guidance. Why the tentativeness? Why the opaqueness? How does corroboration operate as an indicator? What links the indicator to verisimilitude? How are both, or either, linked to the practices of the

sciences? If corroboration and verisimilitude are to be jointly effective features of the sciences' methodology they cannot be left with their current levels of specification.

The failure to offer a more detailed account of this relation is in part attributable to the fact that verisimilitude is facing another serious obstacle to its development, namely providing a practicable measure of truthlikeness. Popper, in particular, has faced this matter in his attempt to formalise verisimilitude but , as will be seen, without much success.

The Formal Definitions of Verisimilitude (46)

The formalisation of verisimilitude is designed to enhance the intuitive notion that one explanatory theory (even if its false) might be nearer the truth than a rival theory. Supporting this formalisation is a combination of the epistemology's view of truth and the metascience's notion of the true contents (that is, the corroborated contents) of a theory. Together these notions are seen to facilitate the possibility of defining truthlikeness as a comparison of the relative truth and falsity contents of two rival explanations. Verisimilitude then is always a relative measure. The kind of comparative circumstances Popper has in mind here are those in which it is possible to say that one theory, say t is more precise or more universal than a rival theory t': that it has passed tests which t' has failed, and where it has failed tests, t' has also failed them. In Popper's words: verisimilitude says that:

> "Assuming that the truth-content and the falsity-content of two theories [t] and [t'] are comparable, we can say that t' is more closely similar to the truth..if and only if either (a) the truth-content but not the falsity-content of [t'] exceeds that of t or (b) the falsity-content of [t] but not its truth-content exceeds that of [t']" (47)

Popper describes two ways of comparing the truth and falsity contents of theories (48) Following Tichy, these will be referred as the "logical" and "probabilistic" definitions of verisimilitude. Tichy, and since his article other writers, (49) maintain that both these definitions have major problems. Specifically, in both accounts the conditions (a) and (b) in Popper's description of verisimilitude above can only be fulfilled together when t' is true. Popper's two accounts of truthlikeness, in other words, cannot compare false theories for their relative verisimilitude. This, of course, is a particularly damaging criticism of a metascience that wants to develop the relation between truth and the growth of knowledge through the conception of truthlikeness.

Popper's definitions are offered against the backcloth of Tarski's calculus of deductive systems. In this calculus, a deductive system is any set of sentences closed under the operation of logical consequence. Following Tarski, Popper uses Cn for the consequence operation. In this notation the content of a theory A is the set of its logical consequences, written (Cn(A)). The theory's truth content (At) is the set of its consequences belonging to the true sentences (T) of the definition's language, and it follows from Popper's description of verisimilitude that as A's falsity content (Af) is the relative content of A given At, that Af is the set of A's consequences belonging to the false sentences F of the language.

In Popper's "logical definition ", verisimilitude is described in sub-class relations this (in O'Hear's symbols) is characterised by $At \subset Bt$, where At is a proper sub-class of Bt. The definition states that theory A has less

verisimilitude than theory B if and only if their truth contents and their falsity contents are comparable through sub-class relations and either:

a) $At \subset Bt$ and $Af \not\subset Bf$, or

b) $Bt \not\subset At$ and $Bf \subset Af$.

The comparability involved means that:

$Af \not\subset Bf$ only if $Bf \subseteq Af$ and $Bt \not\subset At$ only if $At \subseteq Bt$.

In the logical account then, theory A has less truthlikeness than theory B if and only if either:

> "(i) A's truth content is a sub-set of B's and B's falsity content is a subset of or the same as A's, or,
> (ii) A's truth-content is a subset of, or the same as B's and B's falsity content is a subset of A's". (50)

The crux of Tichy's argument concerning this definition is that whenever B is false, neither of these conditions hold. In other words, it is never possible to compare two false theories for their verisimilitude. O'Hear offers the following lucid variation of Tichy's more complex proof:

> "..since B is false, there is a false sentence say f, in Cn(B). Assume first that $At \subset Bt$. Then there is a sentence, say b, in Bt -At. But then f.b is in Bf, but not in Af (or b would be in At). Thus $Bf \not\subseteq Af$, so condition (a) fails. On the other hand, assume that $Bf \subset Af$. Then there is a sentence, say a, in Af- Bf. Then a V- f is in At, but not in Bt, for, if it were in Bt, then either - f would be in Cn(B) or a would be in Bf and, given that B is consistent, these possibilities are ruled out by the choices of f and a. So condition (b) fails as well".(51)

Tichy illustrates this deficiency through one of Popper's own examples. In his essay 'Two Faces of Commonsense' (52) Popper gives the following example of two theories (consisting of single statements) which, although both false, he thinks can be considered in terms of their relative proximity to truth. Let, he suggests, theory A consist of the single sentence 'It is now between 9.40pm and 9.48pm' and theory B of the single sentence

t is now between 9.45pm and 9.48pm' where the 'between' in each entence excludes the upper limit and we assume that it is 9.48pm. What 'opper suggests is that even though both theories are plainly false, they are ot only comparable but that theory B can be said to have a greater uthlikeness than theory A. Tichy argues in response that:

> "It is true that At $\subset$ Bt, but as B is false and the (only) member of B is in Bf, but not in Af, Bf $\not\subset$ Af. Hence it cannot be maintained that A has less truthlikeness than B. (53)

Tichy and O'Hear see the "probabilistic definition" of verisimilitude as ossessing equally damaging results for the development of truthlikeness. s its name suggests, in this definition Popper quantifies the contents of ieories by using logical probability. The content of a theory, say A, is equal) the improbability of A, that is 1 - p(A) which is to say, the less A's logical robability, the greater is its content. Representing the sets of statements nplied by theories A and B with the letters a and b respectively and the set f true statements of the language by t (all the sets being closed through the peration of logical consequence), A's content becomes 1 - p(a). Following opper in the use of the symbols (a V b) to describe the product of the sets and b (it contains all their common consequences), O'Hear describes opper's conception of A's measured truth content (ct_T(a)) as the tersection of A and the set of all true statements which in symbolic form is: - p(a V t). What this means in terms of the definition is:

> "..if A is true, its truth-content increases directly with its logical improbability. A's falsity content (ct (a)) can then be given in terms of the probability of A, given its truth content, that is, 1 - p(a, a V t). Thus, if A is true, its falsity content is zero. A's measured verisimilitude (Vs(A)) is its truth-content less its falsity-content. (54)

As indicated earlier, the major outcome that Tichy and O'Hear want to draw from this formulation is that the probabilistic definition like the logical definition is "practically useless for the comparison of false theories".(55) This contention O'Hear describes in terms of instances: "where the theories involved are not universal and can be assigned greater than zero probabilities". His argument is:

> "If A is false, it is incompatible with t, so p(a V t) becomes equal to p(a) + p(t). So A's truth content becomes 1 - [p(a) + p(t)]. Because by the probability calculus, the relative probability p(a,b) is p(a.b)/p(b), A's falsity-content can be re-written as 1 - [p(a.(a V t))/p(a V t)], which in view of A's falsity becomes 1 - p(a)/[p(a) + (pt)]. The unwelcome consequence of this is that it is clear now that these computations of truth and falsity contents of false theories will vary solely according to the absolute logical probabilities of the theories. As the definition of verisimilitude has as its sole variables the measures of truth- and falsity-contents the same goes for computing comparative verisimilitudes of competing theories. (56)

The fundamental argument against this definition then is that once a theory is false:

> "no empirical facts will be relevant to determining its truth and falsity contents or its verisimilitude. Any two theories with the same logical probability and hence with the same content will, if false, have the same verisimilitude". (57)

This is clearly an unwanted outcome of a measure which is supposed to distinguish between rival explanations covering the same ground. With false theories neither of Popper's conditions of verisimilitude can be fulfilled if truth and falsity contents are calculated using either sub-class relations or logical probability methods.

Popper has accepted these criticisms. Initially it led him to respond with a third formal definition, (58) but this has also been shown to be

inadequate as have the various attempts at definitions offered by other critical rationalists. (59) One might therefore conclude that the attempt to develop the conception of verisimilitude by providing a formal definition has failed. Popper appears to have admitted defeat. However, in his most recent comment on the issue, he has tried to minimise its significance by arguing that it is a 'negligible' matter for the metascience. He states with undiminished confidence:

> "the widely held view that scrapping this definition weakens my theory is completely baseless".

And:

> "nobody has ever shown that my theory of knowledge is shaken in the least by this unfortunate mistaken definition, or why the idea of verisimilitude (which is not an essential part of my theory) should not be used further within my theory as an undefined concept". (60)

As an undefined concept, verisimilitude reverts to its original appeal for acceptance, the intuitive grasp that a comparison of two competitive explanations may reveal that one is nearer the truth than another. Popper uses as an example the:

> "statement that the earth is at rest and that the starry heavens rotate round is further from the truth than the statement that the earth rotates round its own axis; that the earth and the other planets move in orbits round the sun." (61)

This is supposed to illustrate the fact that it is possible to speak "sensibly" of truthlikeness without the need for a formal definition. But talking sensibly in this case is not enough. Illustrations like the above show that this sensibility operates on an <u>assumption</u> of increasing truthlikeness. In other words, to understand the shift from an earth-centred to a sun-centred conception of the Universe, involves us in assuming that progress has taken place in order then to read it as verisimilitude.

But more than this, if verisimilitude is to operate as a way of directly or indirectly assessing the growth of scientific knowledge, then surely it must have practical guidelines. These are clearly not offered in the most recent conception of the category and, of course, speaking of the intuitive grasp of truthlikeness does little to resolve the problematic nature of the category's relation with corroboration. Indeed, the ill-defined nature of this relation would seem to be put under even further strain by describing verisimilitude as a matter of intuition. Does this, for example, mean that the relation between corroboration and truthlikeness should also be undefined? If verisimilitude is now to be dismissed as inessential should corroboration also be seen as a peripheral matter or one that is made more marginal through its relation with verisimilitude? How then should the conception of the growth of scientific knowlege be conceptually constituted or is this to be made peripheral as well?

The metascience appears to be caught in a trap of its own making. Given its formulation of truth, it would seem to require a clear and practicable conception of truthlikeness which also coherently and consistently links up with a clear and practicable conception of empirical corroboration. Unable to produce either notion with the required properties and, thereby, a consistent and coherent relation between them, the discourse is left with a gulf between the goal of its sciences and the methodology designed to pursue it.

3.5 Rational Criticism and the Limits of Rationality

This final section of the chapter addresses an issue that has caused more dispute among proponents of critical rationalism than between them

and critics of the discourse. The dispute concerns the question of whether the rationality invoked by the metascience (and therefore the discourse) can be rationally defended.

The original position held on this matter (proposed by Popper in Die beiden Grundprobleme der Erkenntnistheorie and in The Open Society and Its Enemies) treated the question of defence as a matter of justification and argued that rationality could not be rationally justified. In recent times this stance has been rejected by Bartley (62) who claims that the metascience is capable of a rational defence. His position has not however met with universal acclaim. Watkins (63) in particular maintains that Bartley's argument is untenable, a line of argument that has also met with criticism. (64)

Popper's irrational defence of rationality is a reaction to a position that is termed 'comprehensive rationalism'. According to the latter, rationality consists of holding only those arguments that are justifiable by appeal to some standard of rationality. Popper maintained that this line of justification was untenable since the standards themselves cannot all be similarly justified:

> "comprehensive rationalism can be described as the attitude of the person who says: I am not prepared to accept anything that cannot be defended by means of argument or experience..it is easy to see that this principle ...is inconsistent; for since it cannot, in its turn, be supported by argument or by experience, it implies that it should itself be discarded". (65)

To avoid such problems while still trying to justify the discourse's conception of rationality, Popper finds it necessary to make what he calls a "minimum concession to irrationalism". He suggests that:

> "whoever adopts the rationalist attitude does so because [s/he] has adopted, without reasoning, some proposal or decision or belief, or habit, or behaviour, which therefore in its turn must be called irrational. Whatever it may be, we can describe it as an irrational faith in reason..the fundamental rationalist attitude is based upon an irrationalist decision, or upon faith in reason. Accordingly, our choice is open. We are free to choose some form of irrationalism, even some radical or comprehensive form. But we are also free to choose a critical form of rationalism, one which frankly admits its limitations, and its basis in an irrational decision (and to that extent, a certain priority of irrationalism). (66)

This recognition of the limits of rationality and the ultimate, if "minimal", commitment to irrationality is expressed with even greater clarity in Die beiden Grundprobleme der Erkenntnistheorie where he states:

> "We share with conventionalism the view that the final basis of all knowledge is to be sought in an act of free postulation, that is, in a fixing of an objective which itself cannot further be justified rationally". (67)

In his opposition to this argument Bartley suggests that Popper's form of defence is both unnecessary and undesirable. It is unnecessary because critical rationalism need not resort to irrationality to defend the rationality it advocates. It is undesirable because it reduces the discourse's proposals to a set of arbitrary postulates. If the rationality of science's methodology is ultimately a matter of belief, there are no (rational) means by which one can differentiate it from a metascience which is avowedly irrationalist. (68) In other words by taking this path, Popper has made critical rationalism susceptible to the irrationalist provocation that it, like all other discourses, is ultimately based on arbitrary grounds.

Bartley's alternative proposal (which he terms 'CCR' or 'comprehensively critical rationalism') is founded on the rejection of a crucial feature of Popper's argument, namely, the concern to justify rationality. Bartley argues that there is no need to justify the discourse's rationality, the latter is after all based on a notion of criticisability and no more can be asked of critical rationalism than that it makes itself open to criticism.

Bartley offers two related formulations of what he means by criticisability here. The first and more general is that all the discourse's statements should be capable of revision. In the second and more detailed formulation, he suggests:

> "all positions are criticizable [in the sense that] it is not necessary, in criticism, in order to avoid infinite regress, to declare a dogma that cannot be criticized (since it is unjustifiable); I mean that it is not necessary to mark off a special class of statements, the justifiers which do the justifying and criticizing but are not open to criticism; I mean that there is not some point in every argument which is exempted from criticism; I mean that the criticizers - the statements in terms of which criticism is conducted - are themselves open to review". (69)

As an illustration of how this openness to critical review might operate, Bartley offers the conditions under which CCR would itself be revised or rejected. He suggests that the rationality of CCR depends on the logical possiblity of specifying the conditions which if they obtained would lead to its abandonment as irrational.

Watkins' basic disagreement with Bartley focuses on these conditions. Watkins maintains that they could never obtain because CCR is constructed with an inherent criticism-deflecting device. What he means by this can be set out as follows:

(i) Because the rational defence of rationality is based on its criticisability, any criticism would count as further evidence of its rationality and thus,

(ii) No criticism can demonstrate the irrationality of CCR's defence. (70) Bartley is thus accused of offering a 'heads I win, tails you lose' type of argument. If the critic comes nowhere near to meeting the critical challenge, Bartley wins; and if s/he does meet the challenge, Bartley also wins, since the critic is re-establishing the criticisability of the position. Watkins calls this a "dictatorial strategy". Bartley's position, he contends, is never threatened by criticism whatever its quality, he is always assured of "victory".

Set within a somewhat vitriolic reaction in which he accuses Watkins of a "deplorable argument" and a "know-nothing approach" (71) Bartley's response has basically been to suggest that Watkins' criticisms are misdirected. He argues the case on two counts. First of all, CCR neither intends nor makes its position uncriticisable, there is no such thing as a general "uncriticizability":

> "A system that is uncriticizable is uncriticizable in some particular specific respects. That is, it must use a particular criticism-deflecting strategem; it must use a particular ad hoc device". (72)

Secondly, to engage in criticism-deflecting strategies would be self-defeating:

> "For it would strengthen the hand of the critic, who would now add to his previous indictment. The critic would now say that in addition to having all those criticism-reducing strategems at his disposal, the [proponent of CCR] was also putting them into practice to the extent of using any criticism of his position as evidence of the correctness of his position. Worse, the poor man was even ignoring all the laughter". (73)

In summary, Bartley argues that all collections of ideas that:

> "encouraged the kind of behaviour that Watkins suggested - i.e. using criticism as evidence of criticizability at the expense of not taking criticism seriously - would be grossly defective".(74)

There is, he contends, no evidence that CCR has ever been held or could effectively be held in such a way.

Whilst both Bartley's response to Watkins and his critique of Popper's appeal to faith seem eminently reasonable arguments, what he proposes is not without its costs to critical rationalism. It's a situation very similar to the earlier argument concerning the empirical basis of the sciences. (75) There Bartley was also trying to sweep away the vestiges of justificationism on that occasion by excluding the notion of agreement or convention from empirical testing. Critical rationalism's scientists, he maintained, do not need to agree on the acceptance or rejection of observation statements. Although this was in itself a worthy argument, there were immense costs in removing it, most notably, the conception of a direction to the growth of knowledge.

In the present discussion, Bartley is once again trying to replace the traces of justificationism and his argument is entirely reasonable. It would nonetheless have negative consequences for critical rationalism as a whole if it were adopted. Why? Because there are a number of important features of the current discourse which are not open to revision in the way that Bartley's notion of criticisability demands. Indeed, Popper actually makes a case for excluding some notions from criticism. Amongst these are: the conception of rational action that operates in social science explanation(76); the conception of truth as a matter of correspondence; the representation of the growth of scientific knowledge through verisimilitude; and, the principle

of liberty whose primacy is not and cannot be subject to revision without the destabilisation if not the disintegration of the rest of the discourse's political programme. In sum, if Bartley's contention were to prevail and criticisability became the acceptable defence of rationality, it could well be at the expense of a number of what are currently significant categories and proposals of critical rationalism.

This section of the chapter has outlined a dispute that is taking place between proponents of the discourse concerning the possibility of a rational defence for the methodological rationality proposed by the discourse's metascience. Some proponents like Popper and Watkins maintain that it can only be irrationally founded, while others like Bartley think that it can be defended rationally once all traces of justificationism are removed. The former group have to contend with the consequence that a rational discourse founded on irrationality is, in the last resort, just as arbitrary as a persuasion which exalts irrational action. The latter group are confronted with the consequence that their option whilst offering a rational defence of rationality could also be forced to exorcize a number of currently important proposals.

The issues involved in the defence of rationality add to the litany of problems that beset the methodology of science. They pervade both prescriptions and envisaged research practice, and are of sufficient proportion to seriously undermine the discourse's claim to offer a coherent and practicable programme in the pursuit of truth.

Chapter Four

Critical Rationalism's Metascience:

The Social Sciences Sub-Field

4.1 Introduction

When compared with its labours to produce a methodology for the natural sciences, the effort critical rationalism has devoted to its social sciences is meagre. Whatever the limitations of the natural science proposals, they did at least indicate the discourse's commitment to producing a comprehensive research programme. The same cannot be said for the proposals for the social sciences which amount to little more than rudimentary sketches of its subject-matter, methodology and form of explanation.

One might be tempted to treat this uneven effort as inconsequential. If, for instance, critical rationalism had argued that the methodology and form of explanation of the natural science sub-field applied equally to the social sciences, then the absence of detailed discussion concerning the latter would indeed be insignificant. But it has not produced this argument. Although there is an intended symmetry in terms of the conception of truth and the test procedures for both sub-fields, there are important differences with regard to subject-matter and form of explanation.

How, then, can the absence of work on the social sciences be explained? The answer would seem to be that critical rationalists - other than Jarvie - are simply less interested in the questions of social science methodology and explanation. It is something of a backwater. Jarvie has proposed an outline methodology (in his text Concepts and Society). (1)

Other proponents such as Popper and Watkins however, have done no more than pursue particular issues like the autonomy of the social sciences, its conception of explanation (2) and, at great length, their reasons for rejecting alternative (historicist and holist) social science methodologies. To date, the total contribution falls short of the level of specification required to produce a genuine methodological programme capable of guiding empirical research. Nevertheless, enough has been said by proponents to enable a discussion of: the sub-field's rejection of the historicist and holist contra-positions, and, the metascience's own proposals for social science.

The chapter begins by outlining the historicist and holist contrapositions before discussing the problems the metascience faces in dismissing them. It pays particular attention to historicism as historicism plays such a significant role in critical rationalism's own conception of social science and (as we will see in Chapter Five) is considered an important resource for totalitarian politics. The metascience's own proposals for the social sciences will be addressed through its views concerning the autonomy of the social sciences, and its conceptions of subject-matter and explanation. The examination of both the contrapositions and the discourse's proposals will suggest that what is currently offered as the social sciences is severely limited.

4.2 Historicism

As with all contrapositions, historicism's function is to provide a contrast with what the discourse itself proposes. In this case, however, it is not just a counterpoint, it is also a dangerous option. Historicism is a force that lures researchers along a path of irrationality to a world steeped in

prophecy and false conceptions of scientific law and explanation. By the nature of its criticism, the metascience implies that it can offer a very different journey, in a different world, seeking universal truths in the correct methodological way and without the miscreant offerings that confuse laws and trends, prophecies and predictions.

What is suggested is that:

(i) There are problems with the metascience's presentation and compilation of historicism which act to cloud the manner by which historicism becomes a discrete theoretical entity and,

(ii) Through the use of arguments proposed by Suchting and developed by Urbach (3) that several of the proposed grounds for discarding historicism are inadequate for their task.

The situation is only retrieved with what critical rationalism calls its 'logical refutation' of historicism but even here there is reason for doubting its applicability to the range of persuasions that the metascience wants to reject as historicist.

The Issues of Presentation and Compilation

As they have such an important bearing on critical rationalism's account and evaluation of historicism, the discussion with the compilation and presentation of the contraposition. In terms of its presentation, it is now accepted by both Popper, and several commentators (4) that his major work on historicism - The Poverty of Historicism - is very badly organised. In Popper's own terms the text is:

> "one of my stodgiest pieces of writing. Besides, after I had written the ten sections which form the first chapter, my whole plan broke down". (5)

This is an unusually candid admission from the author. It is nonetheless partial, for nothing is said in the quotation (or elsewhere) about the consequences of the breakdown of the text's plan for either the representation of historicism or its analysis. As following paragraphs will demonstrate, these are important absences.

The Poverty of Historicism is formally organised as four chapters, each with its own general theme. Chapter One describes 'anti-naturalistic doctrines of historicism', that is, those historicist doctrines that deny the use of the methods of the natural sciences in the social sciences, while Chapter Two looks at historicist doctrines which argue the reverse line and accommodate the natural sciences.

The themes of Chapters Three and Four are conveyed by their titles: 'Criticism of the Anti-Naturalistic Doctrines' and 'Criticism of the Pro-Naturalistic Doctrines'. With regard to their contents, Chapters One and Two present in some detail the arguments purportedly offered by historicism. For instance, each of the ten sections of Chapter One sets out particular historicist objections to the use of the methodology of the natural sciences for the subject-matter of the social sciences, while each of the sections of Chapter Two describes particular historicist arguments that support this employment. But when it comes to Chapters Three and Four where the focus turns to criticisms of historicism, not only is there an asymmetrical structure (in the sense that the number of sections devoted to criticism do not match those articulating historicism) but, much more importantly, the

contents of the sections do not correspond to the arguments of the preceding chapters. To provide just one example of this, the counter-arguments (in Chapter Three) to historicist anti-naturalism (presented in Chapter One) are not only organised in fewer sections, they simply do not follow the contents of the original historicist contentions. Only three sections of Chapter Three (sections 23, 25 and 26) directly confront the historicist issues raised in chapter one, and the issues of 'novelty,' 'complexity,' and 'inexactitude' are not discussed in any detail at all.

This uneven presentation in the sectional structuring and textual argument are dealt with sympathetically by Jarvie who suggests that it is in large part due to the fact that Popper is not: "critical of all the arguments that he attributes to the historicists". (6) But even Jarvie recognises the limits of this defence when he states later on the same page:

> "But,..Popper tells us only at times which argument is not objected to, or is objected to only if developed in certain ways". (7)

Whilst Popper is not expected to present a coherent account of something which primarily operates as a catalyst for his own views, having catalogued a series of historicist arguments in two sections of a four-part text, it is incumbent upon him to specify those arguments to which he is opposed, those to which he remains unopposed, and the respective grounds supporting these decisions.

These difficulties of presentation are compounded by those concerning compilation. Not content with describing and evaluating existing historicist arguments, Popper actually sets out to develop and add arguments in order then to show the power of his anti-historicist position:

> "...I have tried hard to make a case in favour of historicism in order to give point to any subsequent criticism. I have tried to present historicism as a well-considered and close-knit philosophy. And I have not hesitated to instruct arguments in its support which have never, to my knowledge, been brought forward by historicists themselves. I hope that, in this way, I have succeeded in building up a position really worth attacking". (8)

There is nothing inherently wrong with this strategy, it is the manner of its use which creates problems. Quite simply, Popper does not state the grounds and conditions that license either the development or the construction of new historicist arguments. How, for instance, should we read the link between existing and proposed historicist arguments? How are they theoretically connected? How is it decided that an existing argument needs to be or has been 'built up', or, that the arguments which have been added are better?

There is a further facet to this problem, for the grounds and conditions which enable the development of new historicist arguments are presumably also the grounds and conditions which bring statements together as historicism. In failing to specify the conditions that it uses to operate this strategy, the metascience is also exemplifying the more general omission concerning the way in which it collects statements as expressions of historicism. It should perhaps be emphasised once again that conditions of unity are not the same as conditions of coherence and that what is missing and what could be expected of Popper is that he provide the conditions which unify the diverse statements of historicism and thereby distinguish it from critical rationalism. Popper does offer definitions (9) but these do not meet the requirements of conditions of unity.

Clearly with the difficulties associated with presentation and compilation, the recognition of historicism as a discrete theoretical entity presents something of a predicament. Following the lead of Suchting and Urbach, this chapter tries to by-pass the issue by working through those abstracted historicist arguments that Popper has chosen to address and attack. (10) In that way whilst recognising his limited presentation, and his failure to establish how persuasions as varied as Dilthey's intuitionism, Marx's historical materialism, Hegelianism and Platonism are drawn together as examples of this contraposition, it will still be possible to examine the grounds for their rejection.

Historicist Arguments and Critical Rationalist Counter-proposals

The major arguments that Popper addresses concern what he sees as historicism's scientific pretensions. He is particularly interested in historicism's search for evolutionary 'laws', 'trends' or 'rhythms' and their supposed ability to permit the prediction of the future. As historicists are also seen to maintain that no social uniformities hold good beyond individual periods of history, the laws they seek are those which explain the transition from one period to another as, for instance, in Toennies' account of the transition from Gemeinschaft to Gesellschaft or Comte's law of the three stages of societal development. Popper describes the predictions derived from such laws as something akin to Old Testament prophecies in that they are large-scale unconditional assertions about the future occurrence of events. They also bear a trace of fatalism in the sense that they suggest the futility of any attempt to try and alter impending changes.

All of his criticisms have been voiced in The Poverty of Historicism. The three major arguments in the body of the text address historicism's conceptions of 'law' and 'prediction'. The fourth, the 'logical refutation' was added as a Preface to the 1957 edition of the text. Suchting's and Urbach's criticisms of the first three arguments will be used to show the difficulty Popper has in discarding historicism as a less than adequate conception of the social sciences. Popper's logical refutation will, however, be defended against Urbach's criticism, only then to suggest that it is not applicable to all the persuasions ascribed the label 'historicist'.

Argument One

In the first argument Popper takes to task the historicist goal of discovering the laws of societal evolution. He maintains that such an objective is scientifically unattainable and thus should be banished from the aims of the social sciences. The force of his argument rests on the characterisation of two notions, 'scientific laws' and 'evolutionary process', and more specifically on their depiction as irreconcilable opposites. Popper describes scientific laws as universal statements which can be tested and re-tested by new events:

> "Universal laws make assertions concerning some unvarying order..and although there is no reason why the observation of one single instance should not incite us to formulate a universal...it is clear that any law, formulated in this or in any other way, must be tested by new instances before it can be taken seriously by science". (11)

The processes of evolution are however described as unique combinations of events: "[t]he evolution of life on earth, or of human society, is a unique historical process". (12) The reason for excluding historicism's

goal from critical rationalism's social sciences is then a simple derivation from these depictions. The social sciences seek laws of social action. If there are to be laws of evolutionary social processes then those processes must be capable of testing and re-testing. But the metascience describes them as unique occurrences which means that they cannot be repeatedly tested and, in consequence, cannot be the subject of social science laws.

Popper anticipates two objections from historicists to this argument:

> "They may (a) deny our contention that the evolutionary process is unique; or (b) assert that in an evolutionary process, even if it is unique, we may discern a trend or tendency or direction, and we may formulate a hypothesis which states this trend, and test this hypothesis by future experience". (13)

In terms of the first objection, historicists could deny that the evolutionary process is unique by arguing that the same process (such as the transition from feudalism to capitalism) could occur in different societies. In terms of the second they would be suggesting that in spite of this uniqueness empirically testable inferences can be drawn.

In reaction to the first objection, Popper accepts that history can repeat itself in certain respects but that the instances of repetition involve dissimilar circumstances and that such circumstances may influence future developments and thereby deny the possibility of parallel changes:

> "I do not intend to deny..that history may sometimes repeat itself in certain respects,...But it is clear that all these instances of repetition involve circumstances which are vastly dissimilar, and which may exert an important influence upon future developments". (14)

What he concludes from this is that there is:

> "no valid reason to expect of any apparent repetition of an historical development that it will continue to run parallel to its prototype". (15)

As Suchting and Urbach have both noted (16) this is a very strange argument since it does absolutely nothing to support Popper's original claim about the non-testable, and thus non-scientific, status of evolutionary laws. In Urbach's own words:

> "This [argument] does nothing to establish that historicist theories must be untestable and it is odd to say the least, to find Popper objecting to a theory on the grounds that it is not proved from facts. After all the egregious feature of his philosophy is that credit is given to just those theories which transcend the given facts and are as testable as possible". (17)

The second objection to Argument 1 sees a situation in which a trend has been observed in some society and where the historicist simply generalises and proposes that the trend will continue indefinitely. In Popper's words it is the: "..belief that we may discern, and extrapolate, the trend or direction of an evolutionary movement". (18) His rebuttal is based on what both he and other proponents of the metascience regard as the crucial difference between trends and laws:

> "The practical significance of this logical situation is considerable: while we may base scientific procedures on laws, we cannot base them merely on trends. A trend..which has persisted for hundreds of years may change within a decade, or even more rapidly than that".(19)

As Urbach points out, this is also an odd contention in the context of Argument 1 since:

> "it merely repeats the triviality that universal historical theories cannot be logically inferred from statements describing trends..it does not even impinge on the claim that historicist theories are unscientific that is untestable". (20)

Argument Two

As if recognising the weakness of this first argument, Popper utilises a second which again calls for historicist 'laws' of evolution to be excluded from the goals of social science. Here, however, the line of attack is somewhat different. Instead of basing the exclusion on incompatible characterisations, Popper turns to elucidating the structure of historicist 'laws' and tries to demonstrate that there is a gap between such laws and what they purportedly explain. Historicist laws of evolution are seen to formulate universal propositions in the following way: 'All human social formations of type T pass through stages Si, Sii, ...Sn in a given temporal order'. In reaction to this, Popper argues that apart from a few minor exceptions, no concrete sequence of events can be described or explained by any single or single set of laws. (21)

Urbach (22) suggests that there are at least three different ways of interpreting this argument. Not one however is seen to provide sufficient grounds for excluding historicist laws from social science. In the first interpretation, Urbach simply injects the metascience's own conception of law as conjectural law into Popper's argument and then asks whether Popper is suggesting that historicism cannot:

> "construct a universal statement one of whose consequences, in the presence of suitable initial conditions, describes a finite sequence of events". (23)

He maintains that this kind of a priori dismissal of historicism is not acceptable to critical rationalism and thus is clearly a false reading of Popper's contention.

In the second interpretation, Urbach considers the possibility of whether Popper is denying that any single law as a true universal statement can explain a concrete sequence of historical events. But if that is so, he suggests, it is difficult to see what would justify such a denial. We are not actually told why, when an event is determined by initial conditions and a specifiable set of true laws, it could not also be described by a single covering law. And the argument is by no means self-evident.

Urbach's third interpretation of this argument sees it as a reaction to the concern about historicism's aim to discover 'inexorable laws' of succession. Thus while Popper might admit that historicism could discover a true universal statement of social evolution in this world, he would argue that such statements fail in some or all those possible worlds "which differ from our world, if at all, only with respect to initial conditions". (24) If however this is Popper's claim, Urbach does not think that it will damage historicist theory at all, since it is as likely to be a feature of the scientific explanations the discourse accepts as of those invoked by historicism.

Neither argument 1 nor argument 2 (in any of its interpretations), then, is seen to offer adequate grounds for excluding historicism's search for laws of evolution from social science. Popper, himself, accepts them as "inconclusive" (25) and uses this as the pretext for adding a third argument concerning what he sees as the historicist misuse of trends as laws.

Argument Three

In Argument 3, Popper considers a possible counter-argument to his contention that a "trend, as opposed to a law, must not in general be used as a basis for scientific predictions". (26) The historicist counterargument that he considers is as follows:

> "should we succeed in reducing a trend to a set of laws [that is, explaining the trend using laws], then we would be justified in using this trend, like a law, as a basis of predictions". (27)

He admits that explained trends do exist but thinks that: "their persistence depends on the persistence of certain specific initial conditions" (28) and it is this that historicists overlook:

> "Their confusion of laws with trends make them believe in trends which are unconditional (and therefore general) or, as we may say, in 'absolute trends'...This, we may say, is the central mistake of historicism. Its 'laws of development' turn out to be absolute trends; trends which, like laws, do not depend on initial conditions, and which carry us irresistibly in a certain direction into the future. They are the basis of unconditional prophecies as opposed to conditional scientific predictions." (29)

Popper is suggesting that historicism compounds a primary confusion of treating trends as laws, with a second related confusion of treating unconditional prophecies as if they were conditional predictions. Prophecies are considered unscientific while predictions are scientific. Historicism is seen to operate with prophecies hence, it must be unscientific.

Although contentious, this would seem a reasonably clear argument if it were not for the fact that earlier in The Poverty of Historicism Popper had spoken of two different types of prediction in science and called these 'prophecies' and 'technological predictions'. (30) As an option within science, Popper describes prophecies as events that we know about but cannot

control and therefore cannot prevent, as for instance in the case of an impending typhoon. Technological predictions on the other hand: "form a basis of engineering ..intimating steps open to us if we want to achieve certain results". (31) These, unlike prophecies, have initial conditions that can be controlled. Popper provides the following as an example of a technological prediction: "if a certain shelter is to stand up to a typhoon, it must be constructed in a way, for instance, with ferroconcrete buttresses on its north side". (32) The point to be made, however, is that there is nothing here which clearly differentiates the notion of prophecy as an accepted feature of science from that excluded from science later in the text.

How can this dual treatment of prophecy be explained? Is it another illustration of the disorganisation of The Poverty of Historicism or is it a more profound matter? Urbach suggests that Popper's article 'Prediction and Prophecy in the Social Sciences' printed in Conjectures and Refutations contains a potential explanation. In this article Popper suggests that there are circumstances which can occasionally license the scientific use of prophecies; however these circumstances are only ever encountered in the natural sciences:

> "long-term prophecies can be derived from scientific conjectural predictions only if they apply to systems which can be described as well-isolated, stationary and recurrent. These systems are very rare in nature and modern society is surely not one of them'. Let me develop this a little more fully. Eclipse prophecies, and indeed prophecies based on the regularity of the seasons ..are possible only because our solar system is a stationary and repetitive system; and this is so because of the accident that it is isolated from the influence of other mechanical systems by immense regions of empty space and is therefore relatively free of interference from outside.
>
> No basis [like this] can be found .. for the contention that we can apply the method of long-term unconditional prophecy to human history. Society is changing, developing". (33)

The strength of this argument is clearly based on what is meant by the notions: 'well-isolated', 'stationary' and 'recurrent'. But these, like so many other important metascientific notions, exist as enforced ambiguities by Popper's general aversion to definitions. As the preceding quotation suggests, Popper does speak of our solar system as being isolated (in terms of current theory) approximately stationary (with regard to mechanical energy and angular momentum) and recurrent (with respect to its position and momentum). However, as Urbach points out, in terms of many chemical and biological properties the solar system is not recurrent, nor is it well-isolated (even without Hoyle's speculations) and only stationary in some respects whilst not in others.

But even if these terms are allowed some rights of exclusion, it would still be difficult to exclude historicist prophecy from the social sciences. After all, it is not difficult to maintain that in spite of contemporary communications technology some societies, on some criteria, remain (relatively) well-isolated and structurally stable or stationary. Think, for example, of the utopian or religious communities like the Hutterites and Mennonites. It is also not difficult to think of groups within societies, effective micro-societies such as long-term prisoners in secure wings or the mentally-ill in secure wards, who are in certain ways also well-isolated, all too stationary and whose institutional order is recurrent. On these grounds, supporting Urbach would not be difficult. 'Argument Three,' like the preceding proposals, fails to exclude historicist arguments from the methodology of the social sciences.

Argument Four:

In the Preface to the 1957 edition of The Poverty of Historicism, Popper makes the following claim:

> "I tried to show, in the Poverty of Historicism that historicism is a poor method - a method which does not bear any fruit. But I did not actually refute historicism. Since then, I have succeeded in giving a refutation of historicism: I have shown that, for strictly logical reasons, it is impossible for us to predict the future course of history. (34)

He summarises the arguments of his refutation in five statements, the first three of which are the more important:

> "(i) The course of human history is strongly influenced by the growth of human knowledge.
> (ii) We cannot predict, by rational or scientific methods, the future growth of our scientific knowledge.
> (iii)We cannot, therefore, predict the future course of human history.
> (iv) This means that we must reject the possibility of a theoretical history; that is to say, of a historical social science that would correspond to theoretical physics. There can be no scientific theory of historical development serving as a basis for historical prediction.
> (v) The fundamental aim of historicist methods..is therefore misconceived; and historicism collapses". (35)

There have been a variety of critical reactions to this argument (36) none of which are particularly convincing. Perhaps the strongest is the logical critique proposed by Urbach. Popper suggests that both statement (i) and what he calls the "decisive step in the argument," statement (ii), are beyond dispute, and (iii) is seen to follow as the logical and irrevocable conclusion. Urbach maintains that this is not the case; there is, he suggests, a hidden assumption in statement (ii) which is untrue and which therefore subverts (iii) as a logical derivation. The hidden assumption states the following: "we cannot predict, by rational or scientific methods, events which are strongly influenced by unpredictable events". (37) This, he maintains, is incorrect:

> "clearly, the fact that each member of a sequence of events is strongly influenced by unpredictable occurrences is compatible with the existence of regularities - arising by accident, as it were - in the sequence. Indeed, we seem to accept some laws in physics but nevertheless acknowledge that these laws reflect only the broad characteristics of sequences of events which themselves are unpredictable. Boyle's law is a simple example of this. It relates rather general features (pressure and volume) of a sequence of states of interacting particles, none of which is individually predictable, without the truth of the macro-laws being put into question". (38)

Now whilst this is an interesting response to Popper's argument, it is nonetheless unacceptable. What Urbach has done is to introduce a conception of unpredictability that is markedly different from the notion of uncertainty implied by Popper's second premise. When Popper is saying that rational and scientific method cannot predict the future growth of scientific knowledge, he is trying to depict the massive sense of uncertainty that he thinks confronts the natural and social sciences. Scientists do not have a means of knowing or inferring what will happen tomorrow or of predicting future knowledge. It is a simple but reasonable epistemological postulate.

Urbach makes Popper's statement (ii) contestable by employing a different sense of unpredictability in which events are (a) known in advance and (b) have a predictable statistical incidence. What is unpredictable is the particular time and place at which they occur. While for Popper uncertainty is the future occurrence of any event, for Urbach's argument it is where events of a known character will occur and when they will occur. In the case of Boyle's Law for instance what is unpredictable (in Urbach's use) is not the general relation of the pressure and volume of gases at constant temperatures, but the occurrence of particular sequences of interactions

between particles in particular time-space. Given this difference in the conceptions of uncertainty, Urbach's argument does not pose a threat to Popper's statement (ii) or, therefore, to its derivative (iii). Popper can argue that knowledge involves uncertainties of an entirely different order to the kind of unpredictability Urbach reads as the basis of his (Popper's) refutation of historicism. (39)

Although able to resist Urbach's criticism, the 'logical refutation' nonetheless has problems. These concern its range of application. Historicism is characterised in the argument as a "theoretical history" offering a "scientific theory" of historical development serving as a basis for historical prediction. Whilst such a picture embraces several of the persuasions that Popper calls historicist, such as, Comte's and Spencer's theories of societal development, it by no means applies to them all. I cannot, for instance, see how the refutation would apply to Dilthey's intuitionism, to Platonism, to Hegelianism or to anything other than the most vulgar readings of Marxism.

Popper, the chapter has indicated, treats historicism as a contra-position. Utilising his own proposals for social science, he tries to explain why historicism's goals and methodological proposals should be rejected. What has been demonstrated is that:

(a) Because of problems concerning his presentation and construction of the contraposition it is actually difficult to see how historicism forms a discrete unity, but even assuming that it does,

(b) It is difficult for Popper to reject the historicist conception of the social sciences.

Of Popper's four major arguments only the 'logical refutation' of historicism is adequate and even here the adequacy refers to the formal nature of the argument. It is highly doubtful that conceived in this form it applies to anything like the variety of persuasions that Popper wants to collect under the title 'historicism'.

4.3 Holism and Individualism

The problems that confront the discourse's discussion of the holist contraposition are of a slightly different order to those involved in the use of historicism. They nonetheless have the same effect of throwing doubt on the possibility of it acting as a contrast in the way that the metascience desires. With holism, the doubt is created by the presence of the evolutionist metaphysics and, within this, by the postulates which describe the inter-world relations. The inter-world relations clash with the metascience's original anti-holist arguments and have forced a somewhat hesitant recantation.

In the original (or pre-evolutionist) conception, holism was seen to consist of ontological and methodological proposals. It included for example the ontological proposal that collective entities like 'society', 'culture', 'State' and 'class' existed as separate entities in their own right and combined this with the prescription that these collective entities can act as influential or causal factors in the explanation of social events. The importance of these two points can be seen in Watkins' characterisation of holism where:

> "..social systems constitute 'wholes' at least in the sense that some of their large-scale behaviour is governed by macro-laws which are essentially sociological in the sense that they are sui generis and not to be explained as mere regularities or tendencies resulting from the

> behaviour of interacting individuals. On the contrary, the behaviour of individuals should (according to sociological holism) be explained at least partly in terms of such laws (perhaps in conjunction with an account, first of individuals roles within institutions and secondly of the functions of institutions within the whole social system). (40)

As the quotation illustrates, the opposition to holism in the pre-evolutionist writings was primarily focused on the holist notion of explanation. What the metascience offered as a counter-proposal was summarised in its conception of 'methodological individualism' which suggested that collective entities should have no explanatory role. There is no other way to an understanding of social phenomena, it maintained, than through the comprehension of individual actions directed toward other people and guided by their expected behaviour:

> "..all social phenomena and especially the functioning of all social institutions, should always be understood as resulting from the decisions, actions, attitudes etc. of human individuals, and... we should never be satisfied with explanation in terms of so-called collectives". (41)

Supporting this attack on the form of holist explanation were several other individualist proposals whose presence as a contribution to methodological individualism might best be elaborated by using the tactic of comparing what they propose against three of the conceptions offered in Lukes' highly-regarded classification of individualism. (42) The first of these treats individualism as a combination of truistic assertions involving statements like: 'society consists of people' and 'institutions are composed of people who follow rules and adopt roles'. As might be expected, there is a marked contrast between this treatment and what critical rationalism advocates as individualism. Although the metascience has tended to <u>assert</u> its differences with holism, what its individualism proposed were not truisms but prescriptions concerning both the phenomena the social sciences should

investigate and the causes it could and could not invoke to explain its phenomena.

The second of Lukes' forms of individualism maintains that every meaningful statement about social phenomena is either a statement about individual human beings or else it is unintelligible and therefore not a statement at all. What this clearly offers is a possible criterion for the inclusion of expressions as scientific statements, namely, that all statements about social phenomena or, more specifically, all predicates of statements must be translatable without loss of meaning into statements which are wholly about individuals. In Jarvie's illustration (43) the criterion would read: 'Army' is a plural of 'soldier' and all statements about the Army can be reduced to statements about the particular soldiers who comprise it. This argument has, on occasion, also had an ontological concomitant to the effect that only individuals are real features of the social world and collectivities like 'institution' or 'Army' are constructions of individual minds.

There have been comments in critical rationalism's pre- evolutionist history that would seem to lend support to both the psychological reductionism of the first part of the thesis and also its ontological concomitant. In terms of the former, Watkins in an early article speaks of methodological individualism as the programme: "..of reducing all social phenomena and all social regularities to psychological phenomena and psychological laws". (44) With regard to its ontological concomitant, Popper has argued that:

> "social entities such as institutions or associations are abstract models constructed to interpret certain selected abstract relations between individuals". (45)

Such comments, however, seem to have been no more than brief flirtations with the position. For the most part, critical rationalism has stood opposed to the methodological and ontological tenets of psychological reductionism. Indeed as will be seen in the next section when it reappears as the contraposition (psychological individualism), the metascience actually criticises it for its attempt to encompass the social sciences.

In contrast to psychological individualism, what the metascience generally maintained then and continues to maintain now is that social entities do exist and exist independently of the individuals that compose them. Whether it's trees in a forest or people in an institution the relations between the individual elements of a collective entity are always more than and cannot be reduced to the individual elements themselves. So, the discourse's conception of individualism even in this early rendition is not seen to require an ontological individualism of the kind described. What is however argued is that whilst social entities exist, they do not and cannot act as causes in explanations of social phenomena. It is only by addressing the conscious calculations of individuals and the consequences of the actions which attempt to realise those calculations that the social sciences can explain social phenomena.

Lukes' third conception is one in which individualists are seen to claim that social science laws are impossible. As witnessed in the discussion of historicism, critical rationalism is clearly opposed to such a proposal. In its pre-evolutionist writings it wanted and still does want to see the social sciences seeking laws of social phenomena. Its position has not been

helped however by the presentation of very limited examples of what these laws might be like. Popper gives as examples of social science laws the statements: 'You cannot have a centrally planned society with a price system that fulfils the main functions of competitive prices' and 'You cannot introduce agricultural tariffs and at the same time reduce the cost of living'. Several commentators have found these illustrations dubious, questioning both their truth and their universal applicability. Flew, for instance, doubts whether the first example even makes sense, while the second he thinks is "plainly false". (46)

Throwing confusion at such criticism, Watkins calls Popper's examples of social science laws "half-way explanations" because in his view they do not draw on the beliefs, attitudes and dispositions of the active participants in political economy - individuals - in the way that individualist explanations are required to do. The matter can however be put to one side for the moment. Although critical rationalism is offering questionable illustrations of its conception of social science laws, it can at least be stated with some assurance that the metascience thinks that such laws are possible and that they should be the goal of empirical investigations.

Taking stock, then, the metascience has proposed a form of individualism that is: more than truistic assertions; that rejects both the ontological and methodological forms of psychological individualism, and, which uses its own individualism's constituents to draw limits to both the sub-field's subject-matter and the resources for its form of explanation. Having got this far in its pre-evolutionist writings and attained a certain level of clarity in terms of what kind of individualism it is proposing, the basis of

opposition to holism and, indeed what the metascience is itself advocating for its social sciences, becomes opaque once more with the appropriation of

the evolutionist metaphysics. This can be illustrated through the juxtaposition of the resources of individualist explanation and the contents and functions of world 3.

Chapter 2 described how the discourse's metaphysics saw world 3 as a largely autonomous world whose constituents included not only the "intelligibilia" of scientific knowledge and the contents of libraries but the collective entities: "society, social structure, institutions, traditions and groups", (47) as well. It also described how the entities of this world had inter-world influence. To repeat Popper's expression:

> "we constantly act upon [world 3] and are acted upon by it: it is our product and..it has a strong feed-back effect upon us; that is to say, upon us qua inmates of the second and even the first world". (48)

Given that an individual's aims and behavioural dispositions are items of the "world of consciousness or of mental states," (49) and that world 3 'acts upon' world 2, it would seem a reasonable inference to suggest that the contents of world 3 like institutions, traditions and groups might act upon individual consciousness and action. Clearly such an inference would stand in open conflict with the writings which base their opposition to holistic explanation on the primacy of the individual. For whereas methodological individualism gives individuals' aims a primordial theoretical status and utilises this fact to both define social sciences' subject-matter (as the unintended consequences of conscious or intentional action) and resource its explanation, the inference from the metaphysics would seem to be that this subjectivity may be far from primordial, it may actually be determined, created or produced by collective entities. If this is the case, then both the metascience's individualist definition of subject-matter and its view of the

explanation of human action would have to be radically altered to accommodate the discourse's adoption of its evolutionist metaphysics and, within this, the inter-relation of world 2 and world 3.

Although critical rationalism has not publicly acknowledged this conflict, it has given some indication of recanting its pre-evolutionist anti-holism. In a footnote to 'Of Clouds and Clocks' (50), for instance, Popper states that the metascience's earlier anti-holism was really aimed not at holism per se but at the superficiality of most holistic theories. What would seem to follow from this is that if there is no longer a total rejection of holism then, unless other grounds for exclusion are found, it would be possible for collective entities to feature as direct or indirect explanatory factors of the undesigned consequences of human actions.

Jarvie also wants to recognise a changing basis of opposition to holism and in his case he is prepared to describe the kind of holism - "ontological holism" - which would still feature as a contraposition. (51) However neither Jarvie nor Popper are prepared to state what consequences this change of position has for the fundamental discrepancy between the evolutionist metaphysics and the conception of social science explanation.

Critical rationalist metascience has drawn on arguments from its proposed methodology as a means of rejecting historicist and holist contrapositions. What the preceding discussion has attempted to

demonstrate is that many of these arguments cannot work to that effect, with the consequence that the contrapositions do not function in the manner desired by the discourse.

In the case of historicism it's a matter of several arguments being inadequate to their task while the logical refutation, although adequate, does not embrace all those persuasions it is designed to include. In the case of holism, the metascience's anti-holism has been thrown into confusion by its adoption of an evolutionist metaphysics which is at odds with the sub-field's anti-holistic conception of explanation. Unfortunately, this discrepancy pervades the sketches outlining the social sciences. Whereas the subject-matter is formally sited in the pluralist universe and thus at least recognises the evolutionist ontology, the discussions of explanation have remained avowedly individualist.

4.4 The Autonomy of the Social Sciences.

One of the few features of social science that the metascience has discussed in any depth, concerns the sub-field's independence from other forms of scientific inquiry. This claim to autonomy is expressed through a critical assessment of 'psychological individualism'. Psychological individualism exists as a contraposition primarily because of its reductionist view of the social sciences. It makes two claims:

(i) That all explanations of social phenomena are ultimately reducible to explanations invoking intra-individual characteristics, and,

(ii) That as psychological explanations invoke intra-individual characteristics, all social phenomena are ultimately reducible to psychological phenomena. In its opposition to such claims, the metascience

voices two separate objections. The first concerns the implied history or, more specifically, the pre-history inherent in psychological individualism's reductionist argument, the second utilises the difference in subject-matter between psychology and the social sciences to point to the paucity of applying this type of individualist explanation to the latter's subject-matter.

With the first objection, the metascience draws on an implication of the suggestion of a pre-social origin to all social phenomena. What it maintains is that if all regularities in social life, "the laws of our social environment, of all institutions etc..." are ultimately to be explained by or reduced to the characteristics and motives of people, then that not only forces "..upon us the idea of historico-causal development, but also the idea of the first steps of such a development". (52) In other words, the stress on the psychological origin of social institutions implies that there was a pre-social human nature which can explain the foundation of society. It is this consequence of psychological reductionism that critical rationalism finds untenable. Popper confidently states as the metascience's counterargument that we have every reason to believe that the ancestors to human beings:

> "..were social prior to being human (considering, for example, that language presupposes society). But this implies that social institutions, and with them, typical social regularities or sociological laws, must have existed prior to what some people are pleased to call 'human nature', and to human psychology". (53)

In terms of its second objection, what critical rationalism claims is that a reductionist analysis of the form advocated by psychological individualism necessarily fails to grasp the main task and subject-matter of the social sciences. While it is primarily geared to explaining the conscious activities of individuals, in terms of intra-individual categories like 'aspirations',

'personality' and 'motives', the social sciences are more concerned with explaining the undesigned or unconscious consequences of conscious actions in terms of inter- individual characteristics:

> "It is a mistake..to believe that..[social scientists] .. aim...to explain conscious action. This, if it can be done at all, is a different task, the task of psychology... The problems [the social sciences] try to answer arise only insofar as the conscious actions of many [people] produce undesigned results.." (54)

Undesigned results, says the metascience, are not phenomena that can be subjected to psychological analysis, they would not be tolerated by psychological individualism's categories or explanatory design.

Together these two objections are taken as sufficient grounds for claiming the independence of the social sciences' subject-matter and the irreducibility of their explanations. What they are seen to attain is a guarantee of autonomy from the only form of scientificity that might threaten this independence, psychology.

4.5 Social Sciences' Subject-matter and its Metaphysical Context.

It can perhaps now be seen as to why the metascience attaches so much importance to its conception of individual subjectivity. Conscious deliberation is a central resource in defining the subject-matter of the social sciences. It is not researched for its own sake but acts as a means of defining the boundaries to what can be considered the undesigned or unintentional consequences of conscious actions. This derivation of social scientific phenomena is made very clear by Jarvie in the following quotation:

> "Human action has consequences, especially unintended consequences, including patterned structures of relationships which we call institutions and, while these are the results of human action, they are not the results of human design". (55)

Among the various examples the metascience uses to illustrate what is meant by "undesigned results" the most popular are those taken from the theory of the market in neo-classical economics and, in particular, concern the determination of the price of commodities. How a commodity is valued at a particular price is seen to involve a combination of elements most notably, a notion of individuals who have aims (in this instance of maximising profits and minimising losses), a notion of situation (such as, the conditions in production and in the market), and an assumption that individuals will when acting attempt to realise their aims by using the most efficacious means known to them. The price itself is the unintended product of these circumstances, it is the unintended outcome of different buyers trying to minimise their outgoings and maximise their income. As a simple example of such undesigned results, Popper gives the case of people who in wanting to buy a house on the open market inadvertently raise house prices by adding to existing demand at a time of limited supply.

Supporting this conception of subject-matter are two suppositions: the first is the point contained in the definition, namely that conscious actions have unintended outcomes; the second is that much of what constitutes social reality - its institutions, traditions, laws and folklore - are the unintended products of intentional action. In the metascience's terms:

> "those [institutions] which arise as the result of conscious and intentional human actions are, as a rule, the indirect, the unintended, and often the unwanted byproducts of such actions". (56)

It is highly unlikely that many social scientists or philosophers would want to disturb the assumed status of the first supposition, some, however, would regard the second as too vague and in that state too contentious to leave as a supposition.

Extending the Characterisation of Subject-matter:
The conception of social mapping'

So far in the metascience's history, it is only Jarvie's Concepts and Society which has tried to extend Popper's characterisation of the social sciences' subject-matter. That extension follows two separate lines: the first involves siting social sciences' phenomena within the pluralist universe; the second takes a more indirect route of developing the conception of conscious action through the category of 'social mapping'. The discussion of holism indicated that , with the appropriation of the evolutionist metaphysics, the phenomena of the social sciences become world 3 entities. Jarvie extends this description through a conception of the inter-relation of the three worlds and more particularly by drawing on the properties of worlds 1 and 2 in order to depict world 3 items. World 3 is depicted as an independent realm which mediates between the "hard" physical world (world 1) and the "soft" mental world (world 2). But how, asks Jarvie, are these worlds mediated when it comes to the question of human action? His answer is that when people choose and act, they are constrained on the one hand by soft reality (their putative knowledge, morals, fears and imagination) and on the other by their physical surroundings and bodily limitations:

> "Between hard and soft, constraining us, canalizing all we do - the frame of reference, so to speak - is the social world made up of other people, groups, institutions, friendships, relatives etc. These are neither hard nor soft, but a bit of both. How are we to characterise this simultaneous intangibility (our five senses give us no direct access to, say, the institution of marriage or to the social structure in which it is embedded), and [the] manifest effectiveness of social entities? On the one hand, social entities are, like mental states, intangible; like friendliness and goodwill they may come out of nothing and fade into nothing. On the other hand, they are like physical states, they react strongly to our probes: when, as an exercise, one acts as though a brick wall is not there, one may suffer severe consequences, and the same is true of many social institutions, from table manners to taxes".(57)

The subject-matter of the social sciences, the by-products of conscious action, are thus capable of different manifestations. They can possess both tangible and intangible properties and whilst existing in world 3 may be initiated in the mental calculations of world 2. They may also through world 3's mediation be represented in world 1 as well. As intimated in section 4.3, this inter- relation between the worlds becomes an important part of the consideration of the discrepancy between the individualism of the social sciences' explanation and the evolutionism of the metaphysics.

As a development of conscious action, the notion of 'social mapping' contributes indirectly to the depiction and analysis of social science phenomena but it is nonetheless a category of some importance. Jarvie sets its ground through Hayek's conception of "levels" of ideas. There are, says Hayek, two levels of ideas. At the first level:

> "ideas...are constitutive of the phenomena we want to explain..a condition of the existence of 'wholes' ... which will exist irrespective of the concepts which people have formed about these wholes.' Contemporary philosophers might call these ideas inferred rules .as opposed to explicit rules. The existence of the institution is constituted by these rules.." (58)

At the second level is perception; these are the ideas that people have about the social entities that surround them. Jarvie uses the level of perception as his means of supporting his category of mapping and the level of constitutive ideas (presumably through the activities of the social scientists) as the objective means of controlling such subjective processes. Perception is seen to allow individual variation, in other words, to allow the possibility that different people can have the same or different ideas about the same or different social entities and then act according to their perceptions. The level of constitutive ideas is employed as the way of policing this subjectivity for what it says is that no matter how entities are perceived (that is, no matter how they are experienced in world 2) they have an objective existence (in world 3). Thus, in combination, the different levels of ideas are seen to permit multiple interpretations of social phenomena without a necessary concomitant conception of multiple realities.

Map-making is considered an active and continuing feature of people's everyday lives: "We are always having to redraw our internal maps as we go along ". (59) It's a practice which pervades all life's phases:

> "..we begin as soon as we attempt to grasp and come to terms with the world as infants..We acquire our initial maps during primary socialization..As we attempt to come to terms with social realities.. in school and job (secondary socialization), our perspective on the social world constantly shifts". (60)

Human subjects are seen to create maps as a basis for social action which means that map-making is treated as a condition of existence of all forms of social practice. The degree to which "perspective(s) on the social world. .shift" is seen to vary with different types of society. With a conception that seems akin to the holistic models of society proposed by writers like

Toennies and Durkheim, Jarvie maintains that "small-scale" societies with largely face-to-face interaction will have a:

> "close co-ordination of the component individuals' maps. Kinship network, political system, co-operative agriculture, rights and duties..[are] all closely defined and co-ordinated by constant exchange and intercourse". (61)

In contrast, in large-scale societies where only small groups are aware of each other, total communication and the total co-ordination of maps are seen to be impossible. Here the lack of co-ordination is of two forms, that between the maps of different people and that between people's maps and reality. The discrepancies in both instances are taken to foster social change. The "constant struggle, this pushing and pulling between competitive maps, this attempt by people to persuade others that things are not quite the way they think,"(62) is seen as a prime means or "motive force" for change in a modern pluralistic society. People in society strive:

> "..by trial and error to come to terms with it; to map it; to co-ordinate their maps of it. Living in.. unmanageably large and changing societ[ies] permits neither perfect mapping, not perfect co-ordination of maps. This means that the members of the society are constantly learning about it; both the society and its members are in a constant process of self-discovery and of self-making". (63)

It is not difficult at this point to see parallels here between what Jarvie proposes for critical rationalism's social sciences and forms of Weberian humanistic sociology. There is, for instance, a clear relation with:

(a) Weber's conceptualisation of action (as something which takes place at the level of the individual subject),

(b) His treatment of social institutions as the outcome of modes of organisation and individual action,

(c) His requirement that actions should be explained through an actor's own interpretation of events and,

(d) His view that action is behaviour to which an individual attaches a meaning, although on this last point the detail of critical rationalism's conception of map-making bears a far closer resemblance to Schutz' conception of individuals' social constructions of reality.

Such parallels are nonetheless outweighed by the metascience's differences with these persuasions. To begin with, its analysis of conscious action is developed as a means of explaining their unconscious consequences but, as importantly, such explanations are lodged in a metaphysics and methodology which is far removed from both Weberian and mundane phenomenological possibilities. Before commenting further on this notion of mapping however, the conception of social science explanation needs to be considered.

4.6 Explanation

> "..we explain in the social sciences by means of the device of the logic of the situation of the typical individual". (64)

As with the formulation of the sub-field's subject matter, the metascience also draws on material from Hayek to describe what it regards as explanation in the social sciences. In this instance, it is the distinction between two forms of explanation: 'explanation-in-detail' and 'explanation-in-principle' which is borrowed. Like Hayek, the discourse aims to use this distinction to depict what it views as the different explanatory efforts of the natural sciences and social sciences. It does so by linking the two forms of explanation to different types of research problem and then suggesting that whereas the natural sciences address both types of problem and thus utilise both forms of explanation, the social sciences, because of the nature of their subject matter, specifically seek explanations-in-principle.

So what is involved in these types of explanation? Explanations-in-detail respond to problems of: "explaining or predicting one or a smallish number of singular events". (65) Its type of problem is illustrated in questions like: 'When will the next lunar eclipse occur?' or, applied to the social sciences, 'When will the next rise in the rate of unemployment in the West Midlands occur?' In contrast, the problems that 'explanations-in-principle' address are 'types of event'. Using parallel illustrations, this form of explanation is concerned with issues like: 'Why do lunar eclipses occur again and again, and only when there is a full moon'? and 'Why is there a seasonal variation in the rate of employment in the building industry'?

The difference of explanation is also taken to involve a difference of explanatory constituent:

> "The differences between these two kinds of problem is that the first can be solved without constructing a model, while the second is most easily solved with the help of constructing a model". (66)

So, whereas the natural sciences tackle both kinds of problem invoking both kinds of explanation with their respective constituents, the social sciences are almost always concerned with problems about 'types of event', almost exclusively concerned with explanations-in-principle and thus seek to explain their research objects:

> "..by the method of constructing typical situations or conditions - by the method of constructing models". (67)

Situational Analysis

Central to model construction in the social sciences is what the metascience calls "situational analysis". Situational analysis draws on the conception of subject-matter and the metaphysical postulates outlined in 4.5

and ties them to a situational logic and a principle of rationality. Given the metaphysical basis and specified range of research objects, the task of the situational logic and principle of rationality is to build the model of typical conditions and situations which explains the repeated occurrence of events. People are taken to pursue their goals with limited perceived means in particular situations. It is their appraisal of their situation and their assessment of the preferred means to attain their goals which is called the 'logic of the situation', 'logic' because they are seen to try to find the best and most effective means of realising these goals, 'situation' because their decisions and actions are always made within particular limited combinations of the three worlds and, even within such limits, with particular personal maps that describe and prescribe the realms of action.

Social scientists are seeking abstractions from the concrete empirical events, 'typical' aims, conditions, circumstances and so on to account for the repeated occurrence of undesigned or unintended events. In order to understand these events, they have to understand why people undertook the actions they did in the manner that they did. This for the discourse means that its social scientists must reconstruct a "wider view" of the situation than that available to the subjects they are investigating. Further, it must be done in such a way as to allow the social scientists to see:

> " ..how and why the situation as the [subjects'] saw it (with their limited experience, their limited or overblown aims, their limited..imagination) led them to act in the way that they did; that is to say, adequately for their inadequate view of the situational structure". (68)

As an illustration, Popper uses the case of the "action of a madman":

> "We try to explain a madman's actions, as far as possible, by his aims (which may be monomaniac) and by the 'information' on which he acts, that is to say, by his convictions (which may be obsessions, that is, false theories so tenaciously held that they become practically incorrigible). In so explaining the actions of a madman we explain them in terms of our wider knowledge of a problem situation; and understanding his actions means seeing their adequacy according to his view - his madly mistaken view - of the problem situation". (69)

If situational analysis presents the possibility of a model, the question arises as to what animates it, how are typical social situations brought to life in these models? The answer rests with a principle of rational utility. As exemplified in the case of the 'madman' (and the earlier illustration of the determination of prices) what is involved is an assumption that people: "act adequately, or appropriately; that is to say, in accordance with the situation". (70) They will seek and use the most effective means known to them in trying to meet their aims. What is being suggested is not some implicit psychological conception that people always act rationally but a postulate operating at two levels. At the level of empirical inference it is synonymous with what has previously described as the 'logic' of the situation, that is, it embraces subjects' actions in terms of their calculations about how they go about attaining particular goals, or in Jarvie's terms: "the application of reason to tasks, effective action to achieve goals". (71) At the second level of analysis where the social scientist seeks a "wider knowledge," it acts as the grounds for constructing an objective measure of the adequacy of subjects' calculations and actions. It is the comparison of the typical maps or calculations and the use of the social scientists' wider knowledge which produces disparities and it is the constituents of these disparities which then allow social scientists to explain why particular unintended consequences occurred.

4.7 An Evaluation of the Social Science Sub-Field

This final section of the chapter offers an evaluation of some of the proposals for the social sciences. In particular, it draws attention to the gaps and limitations of the conceptions of 'rationality', 'individualism' and 'explanation' and considers their repercussions for both the definition of the sub-field's research problems and its view of explanation.

Rationality

The metascience depicts rationality as a matter of acting appropriately in a situation or, more specifically, of human actors seeking the most appropriate or effective means known to them to attain a particular goal. The goals themselves are neither rational nor irrational; they are to all intents and purposes simply present and presented as the individual's means of resolving the problems that confront them. People are considered to operate in a simple procedural way, they are confronted by problems to which they seek a solution; that search for a solution involves assessing the situation, deciding on appropriate action and then undertaking that action.

When compared with the rational choice theories of other persuasions there are serious gaps and not a little opacity in what the discourse proposes as a picture of rational action. (72) It is not clear, for example, whether there is an assumption of self-interest implied in this process or, if not, how it accommodates the possibility of altruistic action. Again because the metascience's illustrations of conduct involve singular goals and particular courses of action, it is not clear how this conceptualisation would cope with a

notion of an individual with differing problems to resolve and thus a variety of objectives which might clash at the level of goals and/or at the level of action.

A further concern is the current specificity of the notion of map-making. Given that it is the most expansive conception of subjectivity proposed by the metascience, presumably all deliberation concerning courses of action would be located within its parameters. But there are as yet no obvious ways of finding sufficient detail in the conception to allow its use as part of a general explanatory model. Among the issues treated in a limited way is the view of social relations. Dependent on the form of assessment and evaluation that actors bring to bear on the situations in which they find themselves, social relations could either form the conditions in which people deliberate and act and/or the goal of action. Critical rationalism appears unaware of this division; there is no recognition in its formulations that choices and goals of action might themselves be social relations. To take a somewhat trivial example, when Jarvie discusses the social action of men doffing their caps to women in the street, it's read as an expression of "a ritual gesture of respect observed only by those who know the received ritual" (73) which is to say, it is seen as an end-product of a form of social learning, it is not itself seen as an active way of choosing to relate to someone. The absence of this distinction in the sub-field's analyses inevitably means a much more limited conception of the nature and calculations of actions in human relations than the distinction itself could facilitate.

Looking at what the metascience does propose, people are seen to choose courses of action as attempts to achieve their objectives, so both the conscious deliberation that leads to intentions and the chosen course of action are extremely important items in explaining the unintended outcomes. The proposed relation between intention and action, however, seems unrealistic. It is a point of view which can be generally established through the consideration of several assumptions supporting the metascience's position, most notably:

(i) That it is possible to depict the typical maps that people have used in facing a problem,
(ii) That it is possible to portray a typical course of action in response to the problem, and,
(iii) That it is possible to see action as the realisation of intention.

However, as the problems of typicality will be discussed in the evaluation of social science explanation, the point will be made by contesting the suppositions supporting (iii). These include:

(a) that actors can be characterised as if they complete their assessments of situations prior to acting;
(b) that actors' intentions and assessments can be described through the notion of map-making;
(c) that actors will always employ the most appropriate means to pursue goals, and,
(d) that action undertaken always conforms with the subjects' intentions.

Discussing the points in this sequence, (a) seems an extremely rigid and mechanistic conception. It views human action as if it were a two-stage process consisting of: conscious deliberation/ intention which invariably precedes and leads to action. Countering such a view with 'evidence' would mean stepping outside the form of analysis on which this study is based

(and drawing on data from symbolic interactionist and ethnomethodological studies which suggest that actions can precede the calculation of intention). (74) But even on intuitive grounds, there would seem to be the possibility, in some situations and/or on some occasions, that people engage in (non-habitual) pursuits without either knowing or being concerned with the reasons for their actions. Furthermore, they may only be able to provide reasons during the action or retrospectively. If such a contention is at all plausible (in the way that the studies in ethnomethods suggest), then it would make a nonsense of the metascience's supposition that people always seek the most appropriate means prior to engaging in social action.

The matter of intentionality and in particular the supposition that it can be embraced by the notion of map-making is the concern of (b). Intentional analysis deals with actors' goals, their calculations and choices, but how straight-forward a matter is it to depict the 'intentional' or to portray it in maps? Can Jarvie's conception of map-making accommodate the variety of world views that are taken to precede action, can it cope with the complexities of deliberation that are clearly part of human calculation? There seems to be some doubt. To begin with, there are the issues concerning the interpretation of subjects' meaning (a point taken up by persuasions as different as Habermas' critical theory and conversational analysis but notably absent from the considerations of critical rationalism). There are also issues about the 'stock of information' that different people possess and the way in which this may be enjoined with different reasoning, different politics and personal commitments. This is also ignored by the current conception of map-making. But more important than the presence or absence of particular constituents is the question of the process of deliberation.

People would seem to make choices, sometimes on the basis of specific calculations about particular ends and sometimes with only a vague awareness of potential outcomes; they may assess the conditions of their actions, change their minds about the constituent conditions and their significance, change their minds about the importance of their objectives and the significance of their assessments. If everyday life can be depicted as capable of such flexibility, with changes involving individuals in the re-assessment and re-construction of their deliberations then the current formulation of map-making would find it extremely difficult to cover the detail and depth of these deliberations. This is not simply a question of the ordering of the potential 'chaos of subjective maps' which is the issue that Jarvie sees with the conception (75) or a matter of the constituents of the notion which is a point raised above, but more its inability to embrace the potential histories of deliberations, calculations, values and assessments. In its current state, if map-making is at all viable, it is akin to a 'snap-shot' survey, that is, it can offer no more than one-off representations of personal histories. It would find it impossible to embrace developments over time.

A further dimension to this argument concerns the operationalisation of intentionality. Within the characterisation provided by Jarvie and in the absence of formal criteria, it would seem that the metascience is treating the question of operationalisation as a matter of commonsense. In terms of its own parameters of scientific practice this would be unsatisfactory, as commonsense creates a very loose and uncontrolled foundation for a major resource in the articulation and explanation of the social sciences'

subject-matter. In the face of no other statement from the metascience, however, this is all that remains for critical rationalism's social scientists.

With regard to (c), it was explained earlier in the chapter that the sub-field's form of explanation assumes that people seek the most appropriate means for reaching their goals. Whilst the premise is of vital importance to the current conception of social science analysis, it does not have a realistic basis for conceiving of all human action. Consider the case of insulin-injecting diabetics; the 'most appropriate' means for the maintenance of their health and thus their survival involves injecting themselves on a daily basis and following a strictly-controlled diet. Yet it has been known for patients to refuse to follow this regime in the systematic way the control of their illness requires in the full knowledge that their failure to do so could well lead to a coma and perhaps death. (76) This very particular case could, it is argued, be generalised not only to other illnesses but also to far less dramatic social events. People may choose means for acting which they know are not the most appropriate. To therefore suppress this possibility in favour of a utility model seems both theoretically unreasonable and empirically restrictive.

In terms of assumption (d), it will be argued that the metascience is forced to work with an indeterminate rather than the determinate relation between intention and action that it supposes. Jarvie's notion of map-making, it was suggested above, acts as the conceptual container for an individual's ideas, meanings, calculations and intentions; action is offered as the realisation of the maps and, more specifically, an individual's intentions. The intentions are seen to govern the action in the sense that the relation between intentions and action is supposed to be consistent and coherent.

Thus, whatever actions are invoked are seen to be constrained to conform to the prior determination of an individual's intentions. What has been suggested by Hindess (77) is that at both an individual and aggregate level (of typical actions) problems arise if it is possible for maps to contain conflicting intentions.

As realistic a possibility as this might seem, if conflicting intentions exist in, say, a given map then the means of realising the intentions must be indeterminate. His argument here is simple but powerful:

> "if contradiction is possible the action cannot be represented simply as the realisation of one [intention], since in the event of an action which realizes one of two conflicting [intentions] there is nothing in the [intentions] by themselves to account for the realization of one rather than the other in the action." (78)

If intentions govern actions and there is a conflict of intentions there is no way of explaining how one of the intentions overrides the others to be realised in action. If this conflict is accepted as a possibility then the connection between intention and action cannot be the determinate relation that the metascience assumes. If it is indeterminate in the way that is suggested then critical rationalism's conceptualisation of human subjectivity and action, and of action and its undesigned outcomes, collapses.

Explanatory models

Excluding the issues addressed under 'rationality' and those to be discussed under 'individualism', there are several others that need to be considered and which might best be dealt with under the heading of 'explanatory models'. These include the question of typifying human

intentions and actions, the predictive capacity of explanatory models and their supposed increasing truthlikeness.

The truth or truthlikeness that the social sciences seek, the discourse suggests, is to be obtained through the construction and manipulation of models. These models are taken to offer realistic accounts and to do so by explaining events in terms of typical intentions and actions. Now whilst social scientists would not argue against the construction of models per se, they would expect to be supplied with far greater detail on how such models should be constructed. To date, the metascience has simply suggested that social science models are always 'rough' or 'simple,' that they are deductive and permit the derivation of testable predictions, and that their explanatory constituents of undesigned events involves drawing a picture of the typical maps and intentions and thus actions which have produced these outcomes.

But how do social scientists draw these typicalities? It has already been suggested that it would be difficult enough to decipher an intention in the context of a changing or evolving individual's map let alone develop a typical map. The metascience gives no assistance here: it states what is required and, by implication, how such typicalities should not be obtained (namely, by induction). But nothing is said about how such typicalities are to be constructed. If, however, social scientists cannot use induction then how can they obtain a systematic and representative conception of, say, typical intention?

It can only be assumed that they are supposed to speculate about what is typical and test those speculations through the predictions derivable

from the model. In other words, typifications are treated as general empirical categories whose validity is assessed by the accuracy of the predictions that they facilitate about unintended outcomes. This, at best, seems a somewhat high-risk exercise, but it is something which is more appropriate to discuss at the general level of model construction.

The metascience accepts that its models are simplifications. In the previously quoted words of Popper, they : "must omit much and over-emphasise much". The question is then: what is left? From what has been said already, the metascience wants to produce a model containing an account which says that: 'X is the repeated (unintended) outcome of this typical action; it is the realisation of this typical intention in this typical situation'. From such models, critical rationalism expects predictions which can be tested and thus, it is assumed, the model can be tested for its explanatory truth. What is not at all clear is how a model which the discourse readily admits is a simplification and thereby unrealistic, is supposed to produce realistic predictions.

The discourse would seem to have two options as a response. It might: (i) suggest that what is typical is also what is essential to an explanation, or, (ii) appeal to the predictive accuracy of the model, that is, its truthlikeness or more specifically the empirical opportunity to increase its truthlikeness. In reaction to these, non-proponents might argue in terms of (i) that the sub-field still has to provide details on how to construct that typicality as well as proposals on how it would arbitrate in issues of conflict about what is essential or typical. In terms of (ii), they could contend that this option would effectively devalue model construction (and within this the

formation of typical intentions and actions) to the search for plausible images. Such images, of course, would be regarded by the sub-field as always capable of reform through the empirical testing of a model's predictions. They are nonetheless dependent on empirical tests which at most establish a relative falsity.

What is being suggested with regard to these options is that there seems to be a degree of arbitrariness about the proposed model construction for the social sciences. It is an activity whose controls are either unspecified or, alternatively, limited to a matter of empirical testing. If it is the former, these comments simply register an absence, if it is the latter, they are suggesting that the metascience is lax in its consideration of the selection of component elements of the models and thus seemingly unconcerned about its models' relation to reality other than through what Chapter Three established as a limited conception of truthlikeness.

Individualism

An earlier section of the chapter (4.3) indicated that critical rationalism had shown signs of recanting its commitment to a whole-hearted individualism and that to do so would be consistent with the relations that it ascribes to the three worlds in its pluralist universe. It also indicated that whatever shifts had taken place on this question they did not include the conception of explanation advocated for the social sciences which is still avowedly individualist. In this sub-section, it will be argued that this 'discrepancy' is an enforced contradiction. It is enforced in two senses:

(i) The individualist conception of explanation cannot accommodate the changes required by the evolutionist metaphysics and, within this the

apparent recantation of the critique of holism, and yet,

(ii) If the metascience sought to replace this view of explanation with something more compatible with the new metaphysics, it would at the same time be forced to re-write its conception of subject-matter.

The key to this argument is the supposition that sees the individual in critical rationalism's account of explanation as a 'free agent' in the sense of free from determining social conditions. Individuals are regarded as the animators of the social science conception of explanation and each individual is ascribed consciousness, intentions and the capacity to map his/her world. These attributes are taken to permit differences between individuals without throwing the universal attributes into doubt. Human action is regarded as the realisation of intention and it is this intention along with the other attributes and individual conditions of reasoning which are, for explanatory purposes, seen to exist in some a-social state. The resources of explanation begin with an assumption of free will in as much as they deny that there are social conditions which determine or explain the existence of this will in any and every person.

This stance on explanation, it has been noted, stands in sharp contrast to an evolutionist ontology which genuinely sees the possibility of feedback from world 3 to the world of mental calculations and consciousness, world 2. For the purposes of argument, however, assume that critical rationalism did accept the repercussion of its evolutionism and in consequence agreed that individual maps and their contents were the product of some social conditions; what would be the consequences? To suggest that someone's social map might be due to social conditions is to

suggest that it may be due to features which are not inherent in the individual. If this was the case, then undesigned outcomes are not automatically reducible to the constitutive calculations and actions of individuals. The corollary to this is that if this point is admitted by the metascience then there would be no difficulty in seeing firms, universities, trade unions and indeed any collective entity as institutional decision-makers, that is, as entities with intentions and thus as producers of undesigned outcomes.

This, of course, is anathema to critical rationalism's current form of explanation and if it were to replace the latter with the former it would involve a total overhaul of its conception of subject-matter as well. Indeed there would be very little of what has been proposed as the social sciences which would remain untouched by the change. That is the size of the matter. It is, nonetheless, required. Any attempt to incorporate social entities as potentially active decision-makers can surely only increase the realism of the position. If the discourse does not make changes to its form of explanation (and/or re-write its evolutionist ontology) then it will continue to be burdened by the contradictory proposals that inform its evolutionism and its individualism, and thus offer further support for the claim that it is incoherent.

Chapter Five

The Politics of Critical Rationalism

5.1 Introduction

This, the penultimate chapter, addresses critical rationalism's politics. It is a politics closely associated with the forms of social science described in Chapter Four. The discourse advocates a Hayekian liberalism which employs the social science sub-field as: its knowledge-base; its arbiter of political standards, and, as a guide to the better mechanisms for political reform. It is contrasted with a totalitarian politics which is seen to use historicism as its major theoretical resource. Historicism underwrites the prophetic statements of totalitarianism, and acts as the mainstay for the latter's recommendations for wholesale change.

Liberalism and totalitarianism are seen to exhaust the range of political options. Liberalism promotes individual freedom, something considered possible only within pluralist democracies where the motif of political change is piecemeal reform. The totalitarian politics it opposes is literally everything that liberalism is not. It is the residual category for every political assumption, principle or practice that critical rationalism refuses to accept as realisable in the name of individual liberty.

Drawing a political map in which every postulate or practice is always reducible to one or other of these alternatives, enables critical rationalism to offer politics as a simple matter of competing opposites. It exploits this possibility with evangelical zeal, cataloguing the contrasting qualities of liberalism and totalitarianism as a matter of: good versus evil; an open (or democratic) society versus a closed or (totalitarian) society; individual

freedom as opposed to the coercive consequences of historicism and utopian engineering; critical discussion and the peaceful resolution of issues as against the enforcement of solutions by power and violence; and policy-making viewed in terms of social scientific knowledge and piecemeal reform as opposed to policy-making in terms of ultimate political ends, revolution and centralised planning.

The primary purpose of this chapter is to examine the proposals of critical rationalism's liberalism but, of course, this cannot be done without also giving serious consideration to the totalitarian contraposition. As the discourse itself stresses, its politics do not:

> "proceed..from a doctrine of the intrinsic goodness or righteousness of [liberalism], but rather from the baseness of tyranny; or, more precisely, it rests upon the decision, or upon the adoption of the proposal, to avoid and to resist tyranny". (1)

The contraposition therefore not only plays the role of a register of what is to be resisted but also acts as a negative gauge of the liberalist arguments employed in active resistance. So whilst critical rationalism propounds principles and guidelines for the furtherance of individual liberty, the base-line of their acceptance concerns their susceptibility to totalitarianism.

The chapter's discussion of these political types begins with an account and evaluation of the totalitarian contraposition; thereafter it looks in some detail at the constituents of the discourse's liberalism before concluding with an evaluation of its principle of liberty. As the discussion is of overtly political matters it is perhaps worth indicating once more the concern of the essay. Consistent with the approach of earlier chapters, it is

addressing and evaluating critical rationalism's politics in terms of the adequacy of its postulates and their conditions of existence. It makes no attempt to use the external standards of other politics as an evaluative base. Where such standards are employed, as for example in the concluding discussion of liberty, it is to point out what is implicit or omitted from critical rationalism's own arguments.

The assessment will suggest that there are serious deficiencies in both the discourse's proposed liberalism and in its treatment of the contraposition. These in large part stem from ascribing a primacy to the theories (or, more specifically, the principles of both politics) and then treating selected practices as realisations of the principles. It will contend that such a view omits important elements of political analysis, most notably the instruments to be employed in the pursuit of objectives and their specific historical conditions of existence.

Whatever the theoretical resources, no politics can be translated into practices without thought for the instruments to be used and the conditions of their deployment. By failing to take such features into account, critical rationalism effectively dislocates the theory of each political type from its practices which, in consequence, leads to disturbingly simple accounts of both political forms.

5.2 The Totalitarian Contraposition

The approach to the discussion of totalitarianism involves a brief outline of:

(i) Critical rationalism's speculative history of the "birth" of open society and,

(ii) Its explanation of why this type of society is inherently vulnerable to what Popper (following Freud) calls the "strain of civilization". Although this may appear a detour from the immediate matter of detailing the resources and relations ascribed to the contraposition, taking this path provides a means of contexting the nature and function of the totalitarian threat.

The "Birth" of the Open Society

Popper characterises the open society in the following way:

> "What do I regard as the characteristic features of an open society? First, that free debate and especially debate about the wisdom or otherwise of governmental decisions, should be possible within a society and should exert an influence on politics; and secondly, that institutions should exist for the protection of freedom and the protection of the poor and weak". (2)

The transition to this open society is seen to have taken place for the first time in Ancient Greece where the development of a tradition of critical discussion enabled the concision of tribalism (an early form of "pre- critical" or closed society). In his essay 'Back to the Presocratics' (3) Popper describes this transition in the following way:

> "There can be little doubt that the Greek tradition of philosophical criticism had its main source in Ionia. It was a momentous innovation. It meant a break with the dogmatic tradition which permits one school only, and the introduction in its place of a tradition that permits a plurality of doctrines which all try to approach the truth by means of critical discussion. It thus leads, almost by necessity, to the realization that our attempts to see and find the truth are not final, but open to improvement; that our knowledge..is conjectural; that it consists of guesses,... rather than of final and certain truths; and that criticism and critical discussion are our only means of getting nearer the truth. It thus leads to the tradition of bold conjectures and free criticism, the tradition which created the rational and scientific attitude, and with it our Western civilisation, the only civilisation which is based upon science (though of course upon science alone).(4)

What is abundantly clear is that Popper sees critical rationalism as the direct descendant of this Greek tradition. However, of more immediate importance for the comprehension of the transition to the open society is the role of "philosophical criticism" as the liberating mechanism, the means by which the Greeks were able to rid themselves of the ideology - the dogma and taboos - of a more repressive and closed societal order. Through their new critical powers, it is claimed, the Greeks questioned the explanations contained in their cosmologies and aspired to better, more truthful, explanations. The same intellectual powers also provided them with new social and political choices, allowing people to work within a plurality of possibilities and the opportunity to accept responsibilities for their own decision-making.

The birth of the critical tradition, then, is seen to have involved the freeing of humanity's critical powers, and it was this liberation which enabled:

> "..the transition from the tribal or 'closed' society, with its submission to magical forces, to the 'open' society." (5)

From its birth, the open society has existed under threat from various forms of totalitarianism. There are two distinguishable elements to this threat: the condition of living in an open society which (following Freud) is described as the 'strain of civilisation'; and the theoretical conditions, that is, the political persuasions which in their existence in a pluralist universe exploit their presence to argue, consciously or otherwise, for restrictions in, if not the elimination of, the open society. I will consider these two elements in turn.

The 'Strain of Civilization'

The 'strain of civilization' is a phrase borrowed from Freud's Civilization and Discontents and used in a similar manner to describe what is regarded as the burden of liberty. It is, says Popper:

> "the strain created by the effort which life in an open society continually demands from us - by the endeavour to be rational, to forgo at least some of our emotional needs to look after ourselves, and to accept responsibilities". (6)

In an open society people have to accept responsibility for their lives, that is, the responsibility for making difficult choices and decisions and bearing the consequences when decisions go wrong. This, it is suggested, creates a continual source of tension in everyone's life:

> "there is something in all of us...which would like to escape [the burden] by having the load taken from our shoulders...We want the unavoidable and difficult decisions that govern our lives to be taken by someone stronger than ourselves who nevertheless has our interests at heart..; or else to be given to us by a practical system of thought that is wiser than we and makes fewer or no mistakes. Above all we want release from fear". (7)

In pre-critical society, the discourse maintains, this source of tension did not exist. The political authorities of ancient closed societies ruled through rigid hierarchies reinforced by ritual and taboo. They thereby created an order and stability which gave its people security and peace of mind whilst denying them liberty and, thus, personal, political and moral responsibility. The transition to the open society is a "shock" for many people involving the realisation that liberty has its costs. Magee illustrates what this means in the following terms:

> "We purchase freedom at the cost of security, equality at the cost of our self-esteem, and critical awareness at the cost of our peace of mind. The price is steep: none of us pays it happily, and many do not want to pay it at all. The best of the Greeks were in no doubt about the merits of the exchange: and...[y]et there was a reaction in which Socrates was put to death for his questioning. And from his pupil Plato onwards there has never been any lack of outstandingly gifted individuals opposed to society's becoming more 'open'. They have wanted it to go back, or forward, to one which was more 'closed'. (8)

The inherent danger for all open societies is that some of its citizens, being subject to the strain of civilisation, might also be subject to the persuasions that recommend illiberal principles and actions and, thus, a closed or totalitarian form of society. As Magee indicates, albeit in the opaque terms of "gifted individuals," there has been no shortage of persuasions advocating the return to a closed or totalitarian society and, as their incursions are an ever-present possibility, it is a threat requiring constant vigilance from the proponents of the open society.

The 'strain of civilisation' performs a valuable but enigmatic function for the discourse. Its value is its ability to translate totalitarianism's threat into a matter of individual concern. What is puzzling is that it seems to operate through a form of reductionism - psychological individualism - which the metascience has rejected as unsuitable for the explanation of social phenomena. Assuming that: (a) the threat is seen as a socio-political matter, and (b) critical rationalism continues to deny this type of individualism a role in social science explanation, why do intra-individual notions like "strain," "emotional needs," "peace of mind" and "release from fear" feature in the lexicon used to depict the open society's vulnerability? If this is not a contradiction then I would at least suggest that the grounds on which Freud's conception has been appropriated are far from clear.

The Theoretical Resources of Totalitarianism

The threat to the open society is in the first instance a question of ideologies or theories. Popper says quite clearly that totalitarianism "stems from false theories"(9) and Quinton is even more specific in identifying the major theoretical source for this derivation:

> "[critical rationalism's] main argument..is that totalitarian politics rests for its support..at least to the extent that it claims intellectual respectability on ...historicism". (10)

Now if totalitarianism does stem from the false theories of historicism and if it does constitute a practical threat to the open society, then it's clearly incumbent upon the discourse to specify what is involved in the relations between totalitarian theoretical resources and their corresponding politics. As indicated in 5.1, it meets this obligation by suggesting that the contra-position's political action is the realisation of its theories. Thus whether it is speaking of particular acts of violence, propaganda or the suppression of opposition, or whether it is considering systems of government like fascism and communism, critical rationalism reads totalitarian practices as the reification of (primarily) historicist persuasions.

The discourse exemplifies what is involved in the reification of these persuasions in The Open Society and Its Enemies where, having identified Platonism, Hegelianism and Marxism as variants of historicism, it then treats them as sources of specific forms of illiberal or totalitarian political practice. In the case of Platonism the relation is between its theory of forms and an imagined class-system, a totalitarianism based on the political power of the class of 'guardian-kings'. In the case of Hegelianism and Marxism it involves

contemporary historical connections, in which fascism (in the form of German National Socialism) is seen as the realisation of Hegelianism and Russian communism is proposed as the reification of Marxism.

This relation between the persuasions and particular forms of practice has attracted a variety of comments. (11) Most simply express doubt about the adequacy of the theory-practice relation, but some are more critical and suggest that there is a crucial disjuncture between what the discourse offers as historicism and what it suggests as totalitarian practice. Quinton, for example, says that these historicist variants are: "..at most associated with, and nowhere essential to, totalitarianism". (12) This is the position upheld by this chapter, although on somewhat different grounds to those Quinton employs. It can however be seen through an assessment of his arguments.

Quinton makes his case employing the same examples of historicism and totalitarian politics, Platonism, Hegelianism and Marxism, that Popper uses to convey the discourse's position in The Open Society. (13) Quinton's tactic is to take each of the persuasions in turn and compare his own reading of their proclamations and politics with what Popper wants to ascribe to them as theory and derived practice. Although there are occasions when he needlessly weakens his case, (14) he nonetheless does establish that there are problems with the proposed theory-practice relation of this contraposition.

With regard to Platonism, his argument is that critical rationalism falsely sites the theoretical source of its politics. Platonist politics does not stem from its historicism but rather from its theory of rationality and

knowledge. With the cases of Hegelianism and Marxism the argument is somewhat different. Hegelianism is, at most, considered to have a "broad temperamental affinity" with fascism, while Marxism "although utopian and violent.." has never been totalitarian. Follow Quinton's strategy, I will consider each of these persuasions in turn, beginning with Plato's historicism and politics.

In Quinton's reading, Popper's characterisation of Platonist historicism is based on an interpretation of the theory of forms and on the doctrine of regular political degeneration. Plato's conception of 'forms':

> "...according to Popper are at once the paradigms of their kinds and the creative originals of their particular instances. If this is correct, then the first is the best: the most primitive form of state or society is the one which most closely resembles the ideal exemplar. The first and best society, for Plato, is one in which the wisest and most god-like of men is king. It is followed by a heroic or feudal timocracy, then by plutocratic timocracy, which gives way to law-less mob-democracy and, finally, to tyranny". (15)

As has been suggested, Quinton accepts Popper's account of Plato's historicism but what he does not accept is the connection drawn between this and Plato's politics or indeed Plato's politics read as an illustration of totalitarianism.

Plato's politics describe an imagined or Utopian commonwealth in which political power is monopolised by a class of guardians who rule over two inferior classes: soldiers and common people. The guardians are initially chosen by a legislature, thereafter they are to succeed by heredity. What Plato seeks to establish for this commonwealth are the principles and conditions that will ensure the guardians use their power for the collective

good of the society. To this end he makes a number of educational, economic and ideological proposals as well as advocating a programme of eugenics for the rulers. The most important ideological postulate suggests that even if the guardians are not themselves convinced, they must ensure that the people of the other classes believe in the guardians' divine right to rule and, further, that they regard themselves as suitable only for the work assigned to their class. Economically, Plato suggests that guardians should be neither poor nor wealthy, they should live in small houses, eat simple food, own few possessions and basically share their lives with people from other classes. The education of guardians should be subject to rigid censorship, it should consist of 'music' and 'gymnastics' (in the traditional Greek senses of the terms) but within these boundaries limit its curriculum to subject-matter which cultivates the required virtues of gravity, decorum, courage and selfless dedication to the society and its existing political order.

Quinton accepts that these proposals form, in both the discourse's terms and his own, an illiberal politics. What, however, he does not accept is:

(i) that this illiberalism is tantamount to totalitarianism ("Plato is an authoritarian rather than a totalitarian proper") (16) or, (ii) that it stems from Plato's historicism. It has been suggested that the argument Quinton uses to distinguish Platonist politics from totalitarianism was ineffective. (17) However, before looking at this matter in more detail, it would be helpful to focus on (ii). Quinton maintains that although there is an element of historicism in Plato's writings, it is not the source of Plato's politics:

> "The historicist strain is entirely congruous with Plato's politics, but what the politics actually follows from are the premises that rationality and knowledge are the proper qualifications for political power and that these intellectual virtues are substantially present in, and dominate the personalities of, only a small minority of mankind. Together with the functional principle that each man should do what he is most fitted for, these premises about the nature of reason and human inequality entail that the ideal form of government is the dictatorship [by] an intellectual elite". (18)

This seems a powerful argument not simply because it is prepared to deny the significance of historicism within Platonism, but more importantly because it articulates a much clearer and more direct link between persuasion and politics than the so-called historicist element (the theory of forms) could ever facilitate. The argument therefore also carries the implicit criticism that the discourse has, at least in this instance, misunderstood the constituent relations of Platonism.

Quinton's arguments concerning Hegelianism and Marxism are directed specifically at Popper's claim that they form the respective sources for German fascism and Russian communism. Quinton accepts Popper's point about the "polluting effect" of Hegel's language and also his proposed procedures of philosophical argument (described by Popper as "bombastic and mystifying cant") but as far as the Hegelian conception of government is concerned, Quinton sees this as much more of a "constitutionalist kind" of authoritarianism rather than totalitarianism. What he wants to convey by this phrase is the fact that Hegel's proposed legislature:

> "..has a representative element, [although] the representation is functional rather than democratic. The legislature has limited powers. The real ruler is the bureaucracy, unified in the person of the sovereign". (19)

For his part, Popper regards the proposals for a formal constitutional state apparatus as a respectable cover for what he regards as the essence of Hegelian politics, fascism. He lists six theses which he maintains are typical features of fascism expressed by Hegel: (20)

i) Nationalism as expressed in the views that the nation is the collectivity to which the individual must subordinate himself and where the nation's aim is to dominate other nations,

ii) States are natural enemies which assert themselves in war,

iii) The interest of the state is the highest morality;

iv) The glorification of war;

v) The creative role of world-historical great men, and,

vi) The elevation of dangerous heroism above bourgeois mediocrity.

Quinton responds by suggesting that at most these amount to a belligerent nationalistic collectivism and supports this by suggesting that: "none of the institutions typical of fascism are proposed by Hegel - the party, the police working through terror, the propaganda ministry working through lies". (21) His conclusion is that there is at most "a broad..affinity" between Hegelianism and fascism and that:

> "fascism is more a lunatic continuation of Hegel's politics than a direct realisation of it. Hegel is more the theorist of Wilhelmine than of Hitlerian Germany. There is a marked lack of connection between Hegel and the later development of fascism".(22)

Whilst wholeheartedly concurring with this conclusion, one could question the method by which he arrives at it. Rather than using Popper's gambit of comparing postulate with event and treating perceived discrepancies as grounds for criticism, Quinton's case would have been stronger had he explicitly considered the possibility of any package of ideas or postulates being realised in the manner in which the discourse suggests.

Popper's attempt to draw a simple correspondence between theoretical resources and political practice ignores the very means by which these resources could be realised, namely the political, social and economic instruments available to governments and, also, the circumstances which can/might facilitate and/or hinder their possibility of realisation. This absence will be dealt with in some detail in the consideration of the discourse's principle of individual liberty, (section 5.4). Here, it is simply worth noting the remarkably naive conception of the growth of German Fascism which links Hegelian notions to fascist practices without so much as a thought for the political and economic conditions and events which facilitate and/or resist that development. Is Popper suggesting for instance that the world-wide economic crisis of the 1930's and therein the falling rate of profit for major German corporations like I.G. Farben, Siemens and Krupp is of no importance to the comprehension of the growth, and thus the practices, of fascism? Is he suggesting that the economic policy of the Pappen government in 1932 insisting on further wage cuts, or the National Socialists loss of 2 million votes in the elections of November 6 of the same year were not important circumstances in the determination of pre-war fascist practice? And what about the conflict between the different wings of Germany's military power the SA (Sturm-Abteilungen) and the SS (Schutz-Staffeln)? Did this not act as an obstacle in the development of National Socialism and later assist in its decline?

Expressed in this form, of course, these are no more than rhetorical points but they exemplify what is taken to be the crucial absence in critical rationalism's characterisation of politics, that is, an awareness of the

instruments and circumstances which may either facilitate, hinder or destroy the possibility of attaining particular political objectives or engaging in particular practices.

The same kind of comment can be made about the inadequacy of Popper's linking of Marxism and Russian communism. Quinton rightly denies that Russian communism could be the realisation of Marx's writings but does so again by following critical rationalism in the juxtaposition of postulate and practice. He states quite bluntly that Marx was not a totalitarian:

> "Marx's own writings contain hardly any totalitarian elements. Marx's ideal society is, indeed, anarchistic: the state has withered away. The vast totalitarian apparatus of Soviet Russia and its colonial dependencies was entirely created by Lenin and perfected by Stalin.. The idea of an elite party of dedicated revolutionaries is a Leninist invention.. (23)

He is right to point out this disjuncture, but he also repeats the error of not taking the argument far enough to incorporate an assessment of the process of realisation. In consequence, his criticisms have a more restricted impact than might otherwise obtain.

The limitations of his criticism can, perhaps, be best portrayed by looking at how critical rationalism could respond to them. On the discourse's terms, Quinton's criticisms clearly do not question the basic division between liberalism and totalitarianism and since totalitarianism is defined by the principle of liberty, they cannot threaten its existence either. All that they provide are grounds for doubting the specific relation between particular theoretical constituents and particular political practices. If critical rationalism accepted these grounds then it would simply be obliged to revise the constituent relations for totalitarianism's theories and practices.

Had Quinton however chosen to argue along the lines suggested, which is to say, to view the dislocations as a product of the discourse's implied process of realisation then his comments would have been far more damaging. After all, other than the assumption of reification, critical rationalist politics has no obvious alternative means of drawing theory and practice together. What is more significant however is that it could not simply add what is missing to its current view of totalitarianism because that would require it to consider different specific political, economic and social instruments and different historical circumstances and such consideration would quite simply destroy its abstracted unity of principles and practice.

In sum, damaging consequences accrue for critical rationalist discourse once the discrepancies between historicist postulates and totalitarian practices are viewed as the outcome of an overly simple conception of their relation(s). If illiberal practices are supposed to stem from historicist postulates and, as I argue, there is a disjuncture between postulates and practices as a consequence of this naively proffered relation, then clearly a large part of the so-called threat of totalitarianism is dissolved.

The Theoretical Resources of Totalitarianism:
'Utopian Engineering'.

The second major theoretical resource in the discourse's conception of illiberalism is: "utopian engineering". At its most general, this notion refers to the totalitarian view that rational political action should always be guided by an ultimate political goal usually through the mechanism of centralised state planning. Popper describes what is involved in utopian engineering in the following terms:

> "..we must determine our ultimate political aim or the Ideal State, before taking any practical action. Only when this ultimate aim is determined, in rough outline at least, only when we are in possession of something like the blueprint of the society at which we aim, only then can we begin to consider the best ways and means for its realization and to draw up a plan for practical action". (24)

Critical rationalism accepts that the combination of this form of planning with historicism could be considered contradictory. (25) Utopian engineering has a clear voluntarist line, it views the attainment of political objectives as a matter of deliberate or conscious action. Historicism, on the other hand, suggests that the outcome of events is predetermined.

The contradiction is however seen as no more than an apparent form of a more subtle linkage. There are, the discourse contends, forms of totalitarianism in which the notions are combined. Voluntarism is treated as subordinate to determinism; it acts to stimulate or hasten the determined course of history. In the case of Marxism, for instance, workers are urged to unite in the struggle against capitalism (voluntarism) and thereby crank up the pace of its inevitable collapse (historicist-determinism).

Critical rationalism's concern to seek theoretical links between utopian planning and historicism is perplexing. Given that it defines totalitarianism as everything illiberal, it need do little more than demonstrate that both conceptions contain postulates which are unacceptable to its principle of liberty and, of course, there is no demand that a contraposition contain only consistent postulates. But this apart, what specific threat is utopian planning considered to pose for the open society?

This can perhaps best be answered by using critical rationalism's own strategy of contrasting utopian engineering with what liberalism regards as acceptable planning. Acts of planning, in critical rationalism's terms, should draw on the knowledge-base of the social sciences. Given that 'knowledge' is always conjectural, always imperfect, the discourse's liberalism recommends that all programmes of social change should advance in small steps so that unexpected ill-effects can be corrected when they arise and before they do too much damage. With utopian planning such controls are not possible. Not only does it operate from a conception of knowledge which is unobtainable, but it also proposes changes on a much larger scale than it could possibly control and for this reason is viewed as having potentially disastrous consequences. The threat, however, is more than this. Because utopian engineering is recommending changes of great magnitude, the discourse believes that there is less chance of agreement about their implementation and therefore that they are more likely to be pursued by totalitarian means involving the suppression of opposition, the use of propaganda and violence.

5.3 Critical Rationalism's Political Manifesto

The importance of the principle of liberty for both the articulation of the contraposition and the depiction of the discourse's commitment has already been documented. Liberty is both the goal and the means. It is the political end-product and the means of measuring the consequences of individual policies and practices. The following quotations bear witness to this paramount importance. The first illustrates its use to dismiss socialism, while the second compares its value with issues of wealth and poverty:

> "[I]f there could be such a thing as socialism combined with individual liberty I would be a socialist still. For nothing could be better than living a modest, simple and free life in an egalitarian society. It took some time before I recognized this as no more than a beautiful dream; that the attempt to realize equality endangers freedom; and that, if freedom is lost, there will not even be equality among the unfree". (26)
>
> "Is the coexistence of wealth and poverty an intolerable social evil?' My answer is, yes, poverty is a great social evil and becomes still more iniquitous when it co-exists with great wealth. [But] [m]ore important than the contrast between wealth and poverty, however, is the contrast between freedom and its absence.." (27)

Both quotations clearly indicate the primacy of liberty. If, however, its value is clear, its constituents are much less so. Critical rationalism does talk in terms of, and also recommends, particular freedoms, for instance: "the freedom to create and the freedom to evaluate reasons or arguments" (28) but much more is said of a general and undivided notion of liberty and the conditions in which it might flourish.

Two qualities pervade this undivided conception of liberty, the first treats freedom as synonymous with the absence of coercion, while the second limits its application to individual human acts. The discourse employs the first quality as the means of uniting all the specifiable freedoms that it recommends. It uses the second to deny the relevance of all sorts of impersonal restrictions (such as, unemployment, and certain forms of state activity) as issues for individual liberty. So, for instance, while unemployment may well affect someone's freedom, because it is not considered to involve individual acts of coercion it is not a matter for individual liberty. (29)

Articulated in this way, liberty closely parallels the view developed by Hayek in The Constitution of Liberty. For Hayek, liberalism is a body of

political thought "concerned mainly with limiting the coercive powers of all government". (30) For critical rationalism, a liberal is someone: "who values freedom and who is alive to the dangers inherent in all forms of power and authority".(31) Both Hayek and the discourse discuss liberty and coercion in terms of the relations between a state and its citizens, as if the state is the primary source (or, sometimes, the only source) of coercion in modern societies. However, in contrast to other proponents of liberalism like Seldon and Harris, (32) neither critical rationalism nor Hayek are calling for the rolling back of all state activity.

Where Seldon and Harris seem to see all state practices (other than those which contribute to national security) as coercive, the liberalism proposed by Hayek and critical rationalism is more controlled, seeking reductions in those aspects of state practice which are deemed to unnecessarily restrict individual liberty. The discourse makes its case for this qualification through what it calls the 'paradox of absolute freedom'. This suggests is that if all restraints on liberty were removed, there would be nothing whatsoever to stop the powerful enslaving the weak. Popper is particularly concerned here with the potential outcome of unrestrained economic freedom and especially fears the uncontrolled exploitation of the poor by the rich. In the light of this, he rejects the conception of absolute freedom and argues instead for a principle of qualified liberty which involves a degree of state intervention. The position is conveyed forcefully in the following argument of Popper's on the need to protect the "economically weak":

> "We must construct social institutions, enforced by the power of the state, for the protection of the economically weak from the.. strong. ..This, of course, means that the principle of non- intervention, of an unrestrained economic system, has to be given up; if we wish freedom to be safeguarded, then we must demand that the policy of unlimited economic freedom be replaced by the planned economic intervention of the state. We must demand that unrestrained capitalism gives way to an economic interventionism". (33)

Those who advocate unqualified economic liberty are accused not only of re-creating the paradox of absolute freedom but, effectively, of pursuing totalitarian politics:

> "If the state does not interfere, then other semi-political organizations such as monopolies, trusts, unions, etc., may interfere, reducing the freedom of the market to fiction. On the other hand, it is most important to realize that without a carefully protected free market, the whole economic system must cease to serve its only rational purpose, that is, to satisfy the demands of the consumer... Economic planning that does not plan for economic freedom in this sense will lead dangerously close to totalitarianism". (34)

In overall terms, then, the discourse is arguing that liberty has to be qualified if it is to exist at all. If the demand for absolute freedom is a demand for coercion, the pursuit of liberty must be organised in relation to some state intervention which, in turn, means that maximising individual freedom is an optimum condition, a delicate balance of state intervention and liberty. Too little state intervention and freedom dies; too much intervention, it also dies. What then is the political context in which we might reach the optimal state? Answer: a democratic or open society.

Liberty and Democracy

The democratic society is carved in the image of liberty, it is offered as the best possible context for both sustaining and enhancing individual liberty. Magee catalogues what is required of such a society:

> "It has to be a society in which everyone is free to investigate problem-situations and to propose solutions; a society in which everyone is free to criticize the proposed solutions of others, most importantly those of the government, whether in prospect or application; and above all a society in which the government's policies are changed in the light of criticism. Since policies are normally advocated and their implementation supervised by people who are in some way or other committed to them, changes of more than a certain magnitude involve changes in personnel. So if the open society is to be a reality the most fundamental requirement is that those in power should be removable, at reasonable intervals and without violence, and be replaceable by others with different policies. And for this to be a genuine option people with policies different from those of the government must be free to constitute themselves as an alternative government, ready to take over: that is to say they must be able to organize, speak, write, publish, broadcast and teach in criticism of the people in power, and must have constitutionally guaranteed access to a means of replacing them, for example by regularly held free elections". (35)

Open societies are viewed as flexible and fluctuating entities, sometimes subject to retrograde change or "setbacks," at other times capable of progressing or evolving. In view of such fluctuations the discourse's manifesto lays down what it regards as the minimum (in Magee's terms the 'fundamental') requirement for democracy, notably a society's capacity to constitutionally and peacefully replace those currently elected to govern. This is democracy's sine qua non, other requirements like elections and representative government:

> "are ... no more than well tried and, in the presence of a widespread distrust of tyranny, reasonably effective safeguards against tyranny, always open to improvement, and even providing methods of their own improvement". (36)

Like the conception of liberty, 'democracy' and 'tolerance' are also articulated through paradoxes. With the paradox of democracy, the discourse basically issues a caveat against equating democracy with 'majority rule'. The argument here is that if democracy were no more than

majority rule, there is nothing to stop the majority voting for a political party which would deprive them of the future right to elect a government.

The reaction to this paradox is somewhat different to that of absolute freedom. With freedom it was a question of recognising the dangerous political potential of the absolute principle and therefore offering it in a qualified form. With democracy it is not a question of revising the principle of majority rule, but of holding its dangerous consequences in check by other democratic means such as the freedom to criticise or to be able to advocate minority views and the right to seek to constitutionally replace a government whose views are opposed.

The paradox of tolerance returns to the line of argument used with liberty. Accepting that democratic society should tolerate a variety of political and social creeds, the discourse nonetheless recognises that an unlimited tolerance will simply create the conditions for tyranny:

> "If we extend unlimited tolerance even to those who are intolerant, if we are not prepared to defend a tolerant society against the onslaught of the intolerant, then the tolerant will be destroyed, and tolerance with them". (37)

Critical rationalism clearly does not see itself as advocating the suppression of all expressions of intolerance. Intolerant views can be tolerated:

> "as long as we can counter them by rational argument and keep them in check by public opinion". (38)

Where this is not possible, a democratic society should claim the right to suppress intolerant views in conditions where the intolerant express their politics by renouncing rational argument and inciting others to violent action.

A few questions concerning these proposals for controlling intolerance come to mind here, all in one form or another addressing their equivocal nature. What, for instance, is meant by the notion of "countering" intolerance by rational argument? How does one counter racial or religious bigotry? By rational argument? Is it a matter of establishing its prejudicial nature? And with what effect? Is the expectation that National Front members having been told that their views of racial minorities are irrational would be expected to abandon them or at least stifle the violent consequences of retaining them? If this is the case, the picture of political and religious conflict that critical rationalism creates seems much too simple. Perhaps the emphasis on controlling intolerance is more a matter of keeping it "in check by public opinion". But again how does this process of containment operate? How does a government decide that rational argument is no longer an effective democratic weapon? As with most other political matters, the discourse provides no specific means, no conditions, circumstances or illustrations that would allow its analysts to overcome the equivocation of its politics.

This last point is part of the more general matter concerning critical rationalism's presentation of its politics which we can re-state here and deal with in detail later in the chapter. Exemplified in its discussion of liberty and democracy, what the discourse proposes as its politics is a series of abstract postulates with no obvious concern as to how they will operate in a practicable democratic form. As with its formulation of the contra-position, critical rationalism ignores the instruments and conditions of democratic politics, as if they have no effect on the implementation or practical operation of its postulates.

Liberty and the Democratic State

The discussion of freedom indicated that the discourse's political manifesto recognises a positive function for the state within a democratic society. This sub-section looks at the State's anticipated work in a little more detail by asking what the manifesto sees as its legitimate activity in a democracy geared to the enhancement of individual liberty.

Given the primacy of liberty, the state's aim is to protect individual freedom. But what does this entail given the distrust of government? (39) How, for instance, does the discourse distinguish between protective activity and excessive state intervention? On such matters the manifesto is again less than precise, it talks generally about limiting state intervention to: "what is really necessary for the protection of freedom" (40) but apart from its discussion of types of economic intervention, it offers little in the way of clarification of what is meant here by "really necessary" intervention.

In terms of economic intervention, critical rationalism makes a distinction between an advocated form of state activity which it calls "institutional" or "indirect" intervention and a tolerated form of activity which it calls "direct" or "personal" intervention. The advocated activity involves designing a "legal framework" of protective conditions (such as laws restricting the powers of landowners); the "direct" intervention consists of empowering agents or agencies of the state to act as required to achieve particular government aims.

Democratic government, it is argued, should wherever possible utilise

indirect intervention. The direct type of intervention should be restricted to instances where the indirect method is considered inadequate to the economic task the state is set. But again the notion is nebulous, its gives no real idea of when indirect intervention might be inadequate and what sort of direct action might be acceptable in those circumstances.

In spite of this vagueness, the differences between the two forms of intervention are quite important to the discourse. Indirect economic intervention is seen to make it possible for the state to make adjustments in the light of criticism and experience:

> "It alone makes it possible to apply the method of trial and error to our political actions. It is long- term; yet the permanent legal framework can be slowly changed, in order to make allowances for unforeseen and undesired consequences, for changes in other parts of the framework, etc." (41)

In contrast, direct intervention by the state is considered beyond the methods of trial and error, here its agents are making:

> "short-term decisions, [decisions which are] transitory, changing from day to day, or at best, from year to year. As a rule they cannot even be publicly discussed, both because necessary information is lacking, and because the principles on which the decision is taken are obscure". (42)

There is a somewhat surprising and highly speculative second benefit to the indirect form of intervention which is that:

> "the legal framework can be known and understood by the individual citizen; and can be designed to be so understandable. Its functioning is predictable. It introduces a factor of certainty and security into socialife. When it is altered, allowances can be made, during a transitional period, for those individuals who have laid their plans in the expectation of its constancy". (43)

By comparison, direct intervention is seen to introduce ever-growing

uncertainty into social life:

> "The use of discretionary powers is liable to grow quickly, once it has become an accepted method, since adjustments will be necessary, and adjustments to discretionary short-term decisions can hardly be carried out by institutional means. This tendency must greatly increase the irrationality of the system, creating in many the impression that there are hidden powers behind the scene and making them susceptible to the conspiracy theory of society with all its consequences - heresy hunts, national, social, and class hostility". (44)

The manifesto's suggestion that the legal framework can be understood by the individual citizen not only underestimates its complexity, but also overestimates the interest and effort that individuals will expend on coming to terms with it. (45) But this is relatively unimportant and actually assumes two more serious issues concerning the stratification of economic intervention itself.

The first addresses the characterisation of direct and indirect intervention and how they relate to the more general contrast described in terms of piecemeal and utopian planning. One would expect consistency between the general conception of planning that the discourse advocates (piecemeal reform) and the form of indirect intervention that it recommends here and, indeed, we can see this by matching the properties ascribed to each. Both forms of intervention, for instance, make adjustments in the light of criticism and experience, they apply the methods of trial-and-error, and plan slow, long-term, changes in order to make allowances for unforeseen and undesired consequences.

There are also compatibilities between the less preferred state practices in both these dichotomies, for instance, direct state intervention, like utopian planning, works without the methods of trial and error, without

the necessary information required to pursue plans and often, it is suggested, without public, let alone critical, discussion. However, when we compare the two dichotomies as relations, there is no correspondence. Utopian planning is a feature of totalitarian state activity in the same way as piecemeal planning is a feature of liberalist state activity and yet, both indirect and direct economic intervention are deemed acceptable types of state activity within liberalism. There is clearly a marked preference for indirect intervention, but unlike the general conception of utopian planning, direct intervention in spite of its potentially dangerous consequences like "heresy hunts and class hostility", is still an acceptable type of state activity. This seems to be a straightforward inconsistency. Seemingly identical forms of state practices are described as both acceptable to liberalism under one label (direct state intervention) and unacceptable under another (utopian planning).

The second issue addresses the use of the distinction between direct and indirect activity and what, in part at least, seems a dubious if not illicit comparison between them. Critical rationalism maintains that:

a) The indirect form of state activity is the preferred form of intervention because piecemeal developments and adjustments allow the state greater control of the consequences of its actions and, thus greater opportunity to protect individual liberty, and,

b) The assessment of the different forms of state intervention should be based on the principle of individual liberty and that this conception eliminates impersonal restrictions from its realm of concern.

But if indirect state intervention enhances liberty to a greater extent than the direct form of intervention, it has perhaps as much to do with the fact that the kinds of restriction it imposes are impersonal forms of intervention which are deemed irrelevant to the calculation of coercion on individuals, as to the

outcomes of its specific practices. Thinking back, for instance, to Popper's characterisation of indirect intervention, it speaks of the long-term adjustments of the legislative framework as an example of how it operates. But suppose this legislation involved the denial of trade union rights, the denial of negotiating rights or, perhaps, dictated the size of pay rises and conditions of work. All could be considered to involve restrictions on liberty, but because they involve the indirect manipulation of individuals, their measurable consequences are excluded from critical rationalist calculation which, of course, can only benefit its political preference for this form of state activity.

In sum, because of the way in which liberty is formulated and the way in which indirect economic intervention is characterised, the comparison of direct and indirect state economic activity is heavily weighted in favour of the latter. This makes the comparison of the two types of activity a highly dubious if not illicit basis for recommending indirect rather than direct intervention.

"Personalism" in Democracy

Whilst the discourse has highlighted some of the conditions that it sees as enhancing individual liberty, others have been neglected. The most significant of these are the conceptions of "personalism" and the economy. Dealing with them in this sequence, "personalism," describes individual performance in the operation of democracy, a notion the manifesto has at least mentioned but not discussed in any detail. Popper emphasised its importance in The Open Society:

"the functioning of even the best institutions. ..will always depend, to

> a considerable degree, on the persons involved. Institutions are like fortresses. They must be well designed and manned". (46)

Now, to be "well manned" involves having people who can and will operate with the critical standards proposed by the discourse. As the chapter on the social sciences described, institutions are designed to resolve social issues. What can now be added from this chapter's discussion is that they are designed to resolve social issues in ways which minimally infringe upon people's liberty. This is the site of personalism's contribution since institutional performance is, at least in part, seen to be dependent on personal decisions and the critical standards on which they are based.

Given this importance, it is somewhat unfortunate to find that critical rationalism has not developed 'personalism'. How, for instance, do people acquire or develop these critical standards? The discourse offers no account of processes of socialisation and, in the name of intellectual freedom, opposes the authoritative or doctrinal presentation of educational programmes. (47) How does it relate to that equally vague notion of 'tradition' which is used as the cultural precondition of democracy and individual liberty? Again, the discourse's readers are not informed. What they are told is that the functioning of institutions will always depend on the persons involved and, therefore, that it is important that people develop the critical standards required for decision-making. What they are not offered is detail of how such standards are acquired.

The Absence of a Conception of Economy

While, however, there is some mention of personalism and vague appeals to tradition, there is next-to-nothing said about what surely must be a major element of any programme of democratic politics: the economy. It

seems clear from the way that it is employed in illustrations of individual liberty, that the discourse's manifesto basically favours a market economy with limited state intervention (to protect the "economically weak" and to provide national security). It is also clear that to be consistent with the abstracted form of the rest of its politics, it would have had to proffer an idealized notion of 'the market'. But it does not even provide this. Whilst this is not the place to spend time speculating about the grounds for this absence, it is nonetheless important to note its consequences.

Without presenting its conception of the market economy, the discourse can provide no indication of how the economic and political realms of society inter-relate. It can give no consideration to the role of corporations and their powers in national and international markets or their role in national and international politics. It can provide no discussion of the economic policies which might enhance individual liberty or of the market forces which might have negative effects on liberty. As Hayek's detailed consideration suggests, these are extremely important items for liberalism, which only goes to underline the significance of their omission from critical rationalism's political manifesto.

Policy and the Political Process

Critical rationalism states quite specifically that its political policies are primarily geared to the alleviation of human misery. In Popper's words, the instruction is to work for the elimination of concrete evils:

> "rather than for the realization of abstract goods. Do not aim at establishing happiness by political means. Rather aim for the elimination of concrete miseries...In brief it is my thesis that human misery is the most urgent problem of rational public policy".(48)

Although not presented in such terms, it can be assumed that the alleviation of misery is linked to the sovereign principle of liberty through the assumption that misery and freedom are inversely related. Thus, where critical rationalism's politics can reduce the restrictions fostered by: "abuses and anomalies within an existing pattern of .. power, possessions and "opportunity," (49) it is simultaneously generating greater liberty.

While this particular relation is not spelt out, what is offered in totally unambiguous terms is the discourse's aversion to linking its concern to minimise suffering with the Utilitarian maxim to 'maximise happiness'. There is, says Popper, no symmetry between them. No rational politics, he claims, can ever know how to make people happy, all it can discover are ways of lessening their suffering:

> "I believe that there is, from the ethical point of view, no symmetry between suffering and happiness, or between pain and pleasure.. human suffering makes a direct moral appeal, namely the appeal for help, while there is no similar call to increase the happiness of a man who is doing well anyway... Instead of the greatest happiness for the greatest number, one should demand, more modestly, the least amount of avoidable suffering...possible. (50)

With this kind of political policy, the manifesto envisages a perpetual stream of demands for political action to remedy wrongs. The way those actions should be undertaken, it suggests, is by the process of piecemeal engineering. As we have seen, this process invokes a gradualist response to problems that draws on the knowledge-base of the social sciences. By such means, it is suggested, policy-makers can plan their approach to issues aware, at least, of some of the possible consequences of their policies. In comparison to Utopian engineering, such policies are small-scale responses to particular issues and involve the criticism and amendment of past

government practice. Undesirable policies and policies with undesirable consequences can be weeded out in the same way as undesirable or inadequate scientific or social scientific theories by trial and error. Should conflicts nonetheless arise between individuals over such policies, they can be resolved by reasoning and critical discussion rather than by violence or any other form of totalitarian imposition.

There have been many criticisms of this process of piecemeal reform, (51) the two most incisive have been recorded by Gellner (52). The first is a criticism that he shares with others concerning the relation between problem-solving in political practice and problem-solving in the social sciences. As suggested elsewhere in the chapter, critical rationalism claims that the process of problem-resolution in politics mirrors that of problem-resolution in science. Gellner and other critics dispute this, arguing that the two processes are quite distinct.

He makes his case in terms of the processes different conceptions of 'openness'. Whereas openness in science invites a radicalism, that is, a suggestion that scientists should take maximum risks in finding solutions to their problems, openness in politics is the reverse, it invites a much more conservative vision: "..change..is to be piecemeal, and hence inevitably less than fundamental or far-reaching". (53)

Establishing differences between the processes in this way has important repercussions because the discourse claims to resource its liberal politics with the conception of scientific rationality. Without its support, the

politics not only becomes disengaged from the sciences but in critical rationalism's terms it also becomes difficult to recognise as a feature of the discourse.

The second of Gellner's criticisms concerns the rationale for piecemeal reform. We saw earlier that liberalism's justification of piecemeal rather than Utopian reform was derived from the characterisation of scientific knowledge. As scientific knowledge is always conjectural, reform is always preferable in small steps for in that way unexpected ill effects of political actions can be corrected when they arise or, at least, before they do too much damage. Gellner can find no value in this argument. He maintains that looking to small-scale change does not necessarily mean that we have a greater chance of assessing the effects of political action since such changes could well be:

> "swamped by the pervasive effects of the unchanged remainder of the social framework, and hence [could] neither be evaluated, nor be effective."(54)

Clearly, if Gellner is correct in his argument, and I think that he is, critical rationalism must find other and much stronger arguments to endorse its preference for piecemeal reform.

5.4 An Evaluation of the Manifesto's Principle of Liberty

This concluding section of the chapter will focus on the manifesto's principle of liberty and on two particular issues, its constituents and ascribed primacy and its role within critical rationalism's politics. Liberty is set within the more general principles of liberalism. By liberalism, here, the discourse means: "the principles of assessing, and if necessary of modifying or

changing, existing institutions". (55) They are the means of assessing acceptable politics and acceptable political change, liberty is of paramount importance among them. All other political principles are included or excluded from liberalism according to whether or not they contribute to the furtherance of individual liberty. As such the principle of liberty can be seen to define liberalism's parameters and constituents and, in so doing, defines the negative political alternative: totalitarianism and its primary instrument, coercion, as well.

Liberty is the absence of coercion, it is the freedom created when individuals are not subject to the arbitrary will of another or others. It is a principle steeped in individualism and thus is able to recognise as questions of liberty only those matters which in some form or another are reducible to individual actions. It is compatible with a market form of political economy. But, beyond using the market as an illustration of economic freedom, the nature of this market economy and the manner in which it would facilitate or optimise liberty remains unspecified.

Because of the recognised paradox inherent in appeals to an absolute form, critical rationalism offers liberty as a 'qualified freedom'. It is qualified in the sense that certain forms of state intervention are considered necessary to protect individual freedoms. No necessary contradiction is seen to emerge from this requirement and the state's treatment as the potential perpetrator of coercion. It is all a matter of keeping the state's activities under control, that is, orchestrating its functions for the furtherance of individual liberty.

But, why should liberty be given priority over other principles? Like Popper's response to the primacy of rationality, the manifesto's ultimate attempt at vindication is to suggest that its value is an article of faith. Critical rationalism believes that democratic politics should be based on a principle of liberty, a principle that conceives of freedom as the absence of coercion. This belief should be challenged and, following Hindess, (56) will be confronted with two arguments.

The first addresses the manifesto's presentation of liberty. It suggests that what should matter is not a general, inflexible, organising principle and particularly not one offered as an a-historical standard, but rather a conception which can recognise the dispersion of historical circumstances. Such a conception must allow for particular freedoms which may be more or less important in different historical circumstances. The second argument questions the primordial status ascribed to the principle of liberty in suggesting that freedom should be seen as one of many political considerations and not simply offered as the first or ultimate goal.

In terms of the first argument, Wootton has made the case clearly:

> "The freedoms that matter in ordinary life are definite and concrete; and they change with the changing ways of different ages and civilizations. Freedom today might mean, for instance, freedom to ask for your cards and sweep out of an objectionable job; freedom to say what you think of the government in language of your own choosing; freedom to join, or to refuse to join, the Transport and General Workers Union; freedom to start a rival Union on your own;..No one would suggest that all these freedoms are of equal importance; nor do these examples necessarily cover all the freedoms that we actually have, can have, or ought to have".(57)

For Wootton these distinct freedoms share a common aspect; they all express freedom as the "ability to do what you want". This, on the surface,

does not appear to be that different from the manifesto's absence of coercion, but in fact there are fundamental dissimilarities. First of all in Wootton's conception freedom is not tied to individualism. Whilst it accepts that there are individual freedoms and corresponding forms of coercion, it is also able to recognise impersonal forms of restriction or coercion. So, for instance, the effects of the market or of 'institutionalised' racism or sexism can feature in Wootton's assessments of liberty although it would be excluded from critical rationalism's assessment.

A second dissimilarity is that by having a conception of liberty which enables the recognition of multiple freedoms in a variety of circumstances and historical conditions and, most importantly, with fluctuating political value, limitations on particular freedoms need not be construed as an automatic threat to all other forms of freedom. Wootton makes this point in her Freedom and Planning where having distinguished different categories of freedom like civil, cultural, political and economic freedoms, she suggests that there is absolutely no reason to suppose that restrictions of say cultural freedoms will necessarily threaten all the rest. She is not denying a possible connection between these realms, but simply suggesting that we should not assume the connection.

Critical rationalism makes just this assumption. Its use of the absence of coercion as the evaluative standard of liberty means that every restriction of individual liberty (other than those which form part of the accepted system of state protection) is considered an automatic threat to liberty in general. What this means is that the discourse is forced into a naive political position in which it is required to argue that all freedoms and all threats to freedom

are of equal importance at all times. So, for example, banning smoking in restaurants, trains and cinemas is as coercive an action as taking the vote away from women or the detention without trial of a regime's critics.

It is Wootton's conception of different freedoms with different political weight in different circumstances which also prompts the questioning of the assumption of freedom's primacy. The argument here (58) is that if there are freedoms of different political value, then some restrictions may not matter very much; other principles could take precedence over that of liberty. Wootton makes the point in this way:

> "Freedom for everybody to do what he wants is not necessarily the sole purpose of the organised society. There may be other admirable ends which conflict with, or demand limitations upon freedom". (59)

Clearly this is not something critical rationalism would accept. It asserts the primacy of liberty; all other political principles are, as we have seen, subordinated to it.

What Wootton and Hindess are suggesting is the limited nature of such a viewpoint. There are other "admirable ends" that could and perhaps should take precedence over individual liberty in certain political situations and to deny such a possibility is to proffer a very restricted formula for political calculation. As Hindess argues and Popper's epitome of the open society (post-war Britain) ironically illustrates:

> "The political programmes of governments and parties always bring together a variety of distinct concerns and objectives. That means that any one concern say, with [individual liberty,] has to compete with others. Priorities may shift between these concerns in response to external conditions and to changes in the balance of forces within the government or party. (60)

But if this contention is a serious threat to the manifesto's formulation of liberty, it is nonetheless insignificant in comparison with the inadequacy we are about to consider with regard to liberty's supposed realisation in political practice.

The Principle of Liberty and Political Practice.

In the discussion of its political contraposition it was suggested that critical rationalism viewed totalitarian politics as the realisation of illiberal principles and, further, because this process ignored crucial elements like the instruments and conditions available to governments in the pursuit of their policies, that it effectively offered an overly simple characterisation.

Unfortunately the same serious charge derived from the same absences can be levelled at the discourse's own politics. As one would expect from the intended role of the contraposition, what critical rationalism provides as the constituents of liberalism, that is, principles and guidelines for political practice, closely reflects the provision for totalitarianism. What, in both instances, is missing is the consideration of how political objectives can be achieved in the specificity of particular historical situations.

This is clearly asking a great deal of the discourse's politics, perhaps too much, but it is what is required of any political programme. It is all very well making a case for one principle rather than another and seeking practices congruent with it, but it is to no avail if such principles and their derivative policies do not: (i) take account of what instruments (statutes, party endorsements, the support of employers' associations, trade unions) are available to serve these policies, and, (ii) give no recognition to the

circumstances (such as the state of the economy, the popularity of the government,) in which policy objectives are being pursued. Hindess portrays the omission in the following terms:

> "..governments act by means of specific policy instruments and [are] subject to the limitations of those instruments. Policy instruments can certainly be changed, but at any given time there are limits to the changes that can be introduced and to the costs that can be incurred in bringing them about. Governments are also constrained by the need to maintain at least some level of consent, not only within the electorate but also within state institutions themselves and various outside groups. The inauguration of the health service, for example, involved important compromises between the government and organizations representing GPs and other medical professionals".(61)

The contention then is that principles are but one consideration involved in the realisation of a political practice. Governments and other political and economic agencies have to work within existing political, economic and social conditions and these coupled with outside forces restrict their room for manoeuvre. By omitting consideration of these conditions the manifesto leaves itself open to the charge of offering vague political principles, dislocated practices and, thereby, an overly simple political manifesto.

Chapter Six: W(h)ither Critical Rationalism?

6.1 Introduction

This, the final chapter of the essay, begins by reviewing the field analyses of the preceding chapters and showing how each contributes to the argument that critical rationalist thinking is currently in an incoherent state (section 6.2). That argument will then be further reinforced (in section 6.3) by showing that the disjunctive features of intra-field arguments can also have damaging trans-field repercussions.

The rest of the chapter is devoted to two important questions that derive their status from this present constitutive disorder. The first (discussed in section 6.4) harks back to the analysis in Chapter One and is concerned with the nature of critical rationalist unity. What kind of unity does the discourse form in its present incoherent state? The second question (in section 6.5) looks to the future and is concerned with whether critical rationalism could become a coherent discourse. Is it to wither because of the nature of its problems or can it be rebuilt? And, if it is the latter, what will it cost the discourse in terms of its current fields, concepts, proposals and arguments?

6.2 The Field-Specific Analyses

Chapters Two to Five have provided what are primarily intra-field investigations. Based on an analysis which assesses critical rationalism's field constituents and their conditions of existence, these investigations have shown that the discursive ventures in metaphysics, metascience and politics contain problems that deny each field (and, through their aggregation, the discourse) an internal coherence.

In the field of metaphysics, the major problems involved deficiencies in concepts (and/or their conditions of existence), taxonomies and proposals. The analysis highlighted the impoverishment of the proposals used to establish a three-world ontology and the serious inadequacies in general evolutionist conceptions like 'internal selection' and 'trial and error'. It demonstrated the limitations of unsubstantiated taxonomies (such as those of languages and genes) and the effects of absences (like that concerning the possible human control of exosomatic development).

The outcome of such deficiencies is a metaphysics whose constituents are in a state of disarray. This, it was suggested, has little to do with the comparatively recent emergence of this field. Whilst the discourse's presentation of evolutionism is no more than a sketch of what is intended, it is the flaws in the constituents not the fact that it is a sketch, which is responsible for this disarray.

The problems that beset the metascience carry a similar message of constitutive limitation and subsequent disorder. In the sub-field of the sciences, this was generated through issues such as: the ineptness of particular methodological strategies; the limitations of important notions such as corroboration and verisimilitude; and, finally, the contradictory proposals generated by immiscible views of the rationality and evidential base of the sciences.

In the social sciences, the problems are of a more varied nature. There were deficiencies in the portrayal of contrapositions which had important consequences for their use as negative points of comparison. There were

also limitations in critical rationalism's own conception of social science phenomena and incoherencies in its explanatory notions of situational analysis, model construction and rationality.

Like its social sciences, critical rationalism's politics also has problems with the formation and use of a contraposition. In this case, however, the source of the difficulties was not the contraposition's specific contents but the discourse's general vision of what constitutes practicable political programmes. In both the liberalism that it advocated and the totalitarianism it renounced, critical rationalism spoke of politics as if it were comprised of just two elements: principles and their corresponding practices. It paid no heed to the question of the social, economic and political mediating instruments that would need to be used to translate these principles into practice and ignored the particular historical circumstances that could facilitate and/or inhibit that possibility. In consequence, both the positions discussed are little more than partial and disjointed formulations of practicable programmes.

Putting these field analyses together, a clear picture develops of the incoherence which currently exists within critical rationalism. In each field there are serious problems with disjunctive effects. Several problems bear witness to the presence of contradictions; most however describe either the absence of required notions or a field's current use of deficient concepts and arguments.

6.3 Trans-Field Implications

This view of discursive incoherence is reinforced when account is taken of the discordant repercussions that some of these issues have for arguments in other fields of the discourse. The transfer of metaphysical problems to the metascience provides several good illustrations. Two worthy

of immediate attention concern the effects of the collapse of the three-world ontology and, in particular, the failure of the proposals designed to support 'world 3'.

The first of these relates the effects of the loss of world 3 on the identification and characterisation of the social sciences. Chapter Four argued that the metascience characterises the social science sub-field in terms of its subject matter. The social sciences investigate human activity and, more specifically, they address the unintended outcomes of intentional human action. These outcomes are treated as world 3 constituents, while the consciousness or intentionality which precedes them are world 2 constituents and the phenomena of a different science, psychology.

Chapter Two suggested that the arguments which reject world 3 also cast serious doubt on the strict division between human subjectivity and the human creations (world 3 items) which transcend it. There are further implications to this point, since what is called into question is not just the means of dividing human conduct into the intentional and its unintentional consequences, but the rationale for making the division as well. It was the three-world ontology which had endorsed this separation and, through its conception of inter-world relations, subsequently acted as the metaphysical resource for linking them in social science explanations. With the collapse of the arguments supporting world 3 and, thereby, the general ontology, the metascience is forced to re-think this conceptualisation of human conduct. It is not that the division has to be abandoned, more that it cannot be authorised in the same way. Without an authorisation it cannot act as a surety for either the definition of social science's subject-matter or, given the latter's representative use, for the more general portrayal of the social sciences.

The second illustration operates along similar lines of thinking. It concerns the repercussion of rejecting world 3 for the metascience's notion of objective truth. The major property ascribed to all world 3 constituents is their independence from human subjectivity. In the case of truth, the ontological division also acts as a warrant for objectivity. Truth, as a world 3 constituent, is ontologically distinct from people's subjective beliefs, dispositions or claims to knowledge. Why are scientific truths objective? Because they are drawn from a world which is independent of the subjectivity of world 2. The implication here should be clear, if the proposals for a third world are rejected, then the metascience's site for truth and what it offers as grounds for truth's objectivity are also rejected.

On the surface this may not appear too damaging. Prior to its appeal to world 3, the metascience had employed an alternative conception of objectivity, namely, scientists' intersubjective acceptance of research findings. Could it not return to this argument once again? Well, it could, but there is likely to be some resistance to such a proposal since, for some of its proponents, this would be to resort to a form of irrationalism. If that is the case, then the demise of world 3 means the metascience must look elsewhere for conditions of truth and objectivity. It must seek them with some urgency, for until they are found it has only the strength of its negation of rival formulations to act as support for its own conception of objective truth and, in these circumstances, that is not a strong endorsement for the goal of the sciences.

Beyond the illustrations concerning 'world 3,' however, is a metaphysical conception, the notion of 'trial-and-error' with even greater negative repercussions for the metascience. Chapter Two described how this notion was employed to describe both the endo- and exo- somatic

development of all living organisms. It was in fact the keystone of the neo-Darwinian metaphysics and the nexus for this field and the metascience. Evolutionism embraced science as one more evolutionary process with conjecture and refutation as the field's illustration of trial-and-error.

Chapter Two also indicated that there were serious problems with the 'trial-and-error' notion. It was based on assumed commonalities between what looked to be markedly different processes. Not to provide the detailed conditions which facilitate the general application of its constituents was regarded as an important absence. Without them, the claim that the same evolutionist process applies to both the survival activities of biological organisms and the process of conjecture and refutation involved in the development of scientific knowledge is extremely weak. In consequence, the general relation between the fields of metaphysics and metascience is left in a parlous state.

This same issue also applies to the relation between the metaphysics and the discourse's politics. The major bridge between these fields is the assumption that piecemeal engineering, critical rationalism's guideline for all desirable political reform, is another illustration of trial-and-error development. Without adequate conditions of application for the latter, its link with piecemeal political reform becomes little more than a vague analogy.

It is difficult to isolate particular issues in terms of the metascience-politics field relations. The problem here is more general in that neither field can perform in the co-relative manner desired (and specified) by the discourse. In the critical rationalist design, the metascience and, in particular, the social sciences are meant to supply the knowledge on which the politics should base its policy decisions. What the discussions in Chapters Four and

Five suggest is that not only are the social sciences unable to produce conjectural knowledge of their phenomena, but, even if they could, the liberalism that critical rationalism proposes is not in a position to utilise it. The gaps in concept and argument in both fields, and the absence of the instruments required for translating knowledge into policy in the latter, means that their relation is a mere trace of what is required by their dual conditions of existence.

Although clearly operating in what is a very minor role in this essay, these instances of trans-field implications do provide further illustrations of breaches in critical rationalism's theoretical edifice. They thereby add weight to the field-specific arguments depicting critical rationalism's incoherence.

6.4 The Question of Critical Rationalism's Unity

A central question that seems to arise from this picture of constitutive doubts and disorder concerns the unity of the discourse. Chapter One rejected a number of specific material and discursive categories that had been used to communicate a sense of unity on the grounds that each distorted what they were designed to represent.

The analyses of Chapters Two to Five are also making a case against singular conceptions of unity albeit in a more general way. They are saying that given the current state of critical rationalism, there is no possibility of any individual concept, argument or theme consistently and unproblematically unifying the statements within and between its constituent fields. So how is the unity of this discourse to be generated? What acts to draw its statements together? Could a non-discursive feature unify its disparate proposals? Could, for example, a source of unity be found in the objects the discourse studies or the enunciative style in which it discusses them?

The answer is again in the negative. The non-discursive elements of the discourse have no more success than their discursive counterparts. Why is this? Because there is no single non-discursive feature which has the capacity to unify the very different elements that have been presented in this essay as critical rationalist thinking. Does this mean, then, that the level of dislocation is greater than the field analyses have suggested or even that the concepts, prescriptions and proposals do not constitute a discourse? No, rather, it suggests that the exercise of looking for single unifying conditions in a discourse as complex and as issue-ridden as critical rationalism is fruitless. Attention must be turned instead to an alternative notion of unity which, in terms of the discourse's current formation, respects the dispersion and heterogeneity of its sources, its arguments and concepts, and makes no assumption or demands concerning coherence.

Critical rationalism is most accurately represented as a unity whose constituents are linked in a variety of ways. It is a pastiche involving both discursive and non-discursive unifiers. It is an affiliation of descriptions, concepts, prescriptions, postulates and proposals which are united by such means as the discourse's style of enunciation, its application of generalised concepts and arguments, its establishment of common field goals and its conception of field strategies. Interspersed with these are a number of particular unifiers with quite specific applications. These are notions that critical rationalism has itself had occasion to use as binding elements. They include metaphors and allegories, instances of rhetoric, the invocation of the history of constitutive notions, appeals to the history of particular individuals, and appeals to the future value of, as yet, unexplicated notions. Although more specific in their application they, like the generalist notions which share their function, combine some features of the discourse and thereby facilitate the possibility of further links.

Only one unifier comes close to possessing the power to unite critical rationalism's constituents and that is the discourse's style of enunciation, in other words, the problem-solving style it uses to articulate and elaborate some of its concepts and arguments. As has been noted, this functions by proposing critical rationalist constituents as answers to pre-existing theoretical and practical problems. It is a style which operates both tacitly and explicitly, in each of the field analyses.

Critical rationalism confronts problems which are either features of its own development or, more frequently, exist as proposals of rival discourses. It answers these by demonstrating that they can be resolved or, alternatively, dismissed as ineffectual matters. In either case, the message conveyed in the solution is the same; it is that the theoretical means of resolution are discursive constituents of critical rationalism.

Using this style of enunciation the discourse articulates its commitment to liberalism (through its analysis of the problems of totalitarianism); it develops its arguments endorsing its proposed methodology of the sciences and social sciences (through, for instance, its critical assessment of the Positivist notions of verification and observation) and, it conveys its proposals for a revised evolutionist metaphysics via its analysis of the problems in the Darwinist conceptions of selection pressures and its focus on anatomical changes.

Problem-solving has also acted as an important mechanism for organising the distribution of critical rationalist arguments. It is, for instance, the clustering of problems along these lines which, in part at least, allows the division of statements into different discursive fields. These, in turn, become the theoretical space for the stipulation of goals and strategies designed to

resolve the problems, while the goals and strategies themselves act as inter-related co-ordinators for whole ranges of prescriptive and descriptive statements.

But if the impression has been created that this enunciative style offers anything more than a semblance of unity then it should be corrected straight away. 'Problem-solving' has its limitations as a unifier. Not the least limitation is the equivocal nature of the notion itself. To this, however, can be added the fact that some important ideas have been treated as 'primitive concepts' (as beyond discussion) and are thus not expressed in a problem-solving style. Thus, while it might offer a means of conceiving of the production and distribution of a number of the discourse's constituents, it would disregard others. The same argument applies to all the unifiers, both discursive and non-discursive. They all overlook some features of the discourse in unifying others and this, of itself, explains the need to appeal to multiple and heterogeneous unifiers to incorporate the diversity of critical rationalist argument.

The notion of multiple unifiers accommodates the variety of aims, objects, prescriptions and strategies that make up the discourse in a way that appeals to individual unifiers cannot. There is no need to seek unity through a process of homogenisation nor impose a sense of discursive coherence.

The metaphors, allegories, rhetoric and, indeed, the gaps in arguments, can take their rightful place as constituent features along with the reasoned positions.

6.5 W(h)ither Critical Rationalism?

Having summarised the incoherencies that permeate the discourse and offered a description of the kind of unity it forms in that state, what remains is the question of critical rationalism's future. Could it become a more coherent discourse and, if so, at what cost to its current concepts, arguments and fields? This is clearly a highly speculative exercise. Nevertheless, it is extremely important and for two reasons:

(i) It is incumbent on any critical analysis to address what might follow in the wake of its criticisms, and,

(ii) For all the discourse's incoherencies, its does formulate a number of powerful and incisive views regarding its own conception of science and a number of trenchant criticisms of Positivist metascience. Thus, to ignore its future potential would be to do an immense injustice to critical rationalism.

So, could the discourse become a more coherent entity? Assuming that the tenuous nature of the links between the different fields excludes the possibility of discourse-wide consideration, the first step must be to decide where to site this question. The metascientific field seems the most appropriate site on the grounds that it forms the discursive nucleus of the discourse.

From the analyses in preceding chapters, this would seem to be a simple and uncontroversial point. If a case has to be made, however, then it could be offered in one of two possible ways. It could either be made in terms of a history of ideas suggesting the centrality of metascientific issues

throughout the discourse's existence or, alternatively, through a simple 'thought experiment' which tries to imagine what the discourse would look like with or without each of its major fields.

With regard to the history, the essay has previously described how critical rationalism began its life considering metascientific issues. It is quite clear that this field qua field has remained of major importance throughout the discourse's existence. One could cite numerous instances in which the developments in and of the discourse's other fields have been organised to match those of the metascience. The fit is far from perfect, but that does not undermine the point that the metascience acquires an importance through its use as a gauge of what is to be accommodated in other parts of the discourse. The evolutionist metaphysics, for example, was developed with no intended conceptual costs to the metascience. It is the same with the field of politics. The parameters for political reform were set in terms of what was possible as scientific and social scientific conjectural knowledge. Viewed historically, then, the fields of metaphysics and politics were developed in the light of the existing metascience where the latter acted as a gatekeeper, supervising the acceptability of their constituents.

The 'thought experiment' acts to re-inforce this view of the centrality of the metascience. Try to imagine what the discourse might look like without each of its major fields. Without either the metaphysics or the politics, indeed without both, the discourse would be stripped of detail but would retain, in embryo, much of its current character. Why? Because it is the metascience which contains the prepotent notions, notions like conjectural knowledge, conjecture and refutation and falsifiability. Remove the metascience and what

you are left with are near-autonomous fields of politics and metaphysics linked only by loose analogies about the process of trial-and-error development.

On such grounds, then, the metascience appears to be the nucleus of critical rationalism and, because it is the nucleus, it has also got to be the site for assessing the future possibility of the discourse's coherence. So, the question posed at the beginning of this section now becomes one of whether it is possible to envisage the metascience becoming a more coherent entity. In response, a tentative 'yes' seems the most appropriate answer. Let there be no doubt, it will require a great deal of effort from the discourse's proponents, perhaps involving some far-reaching changes, but progress along this path can be made and the discourse need not wither. Given this, the essay will conclude by outlining what are considered to be steps that may lead to greater coherence in both sub-fields of the metascience beginning with the natural sciences.

The Natural Sciences

The issues which beset this sub-field include (in increasing order of importance): anomalies, the limitations of methodological regulations, limitations in conceptualisation and conflicting views among proponents concerning the empirical and rational bases of the methodology. The first step along the path to greater coherence would come with a decision on the fundamental conflicts concerning the empirical and rational bases of the methodology. In terms of the rational basis, the main source of conflict was the difference of views between those proponents (such as Popper and Watkins) who thought that conventionalism, whilst unwanted, was a necessary feature of the justification of methodological rationality and those

(such as Bartley) who saw "comprehensive critical rationalism" (or 'CCR') as the cornerstone of rationality and argued that a conventionalist justification of rationality was both undesirable and unnecessary.

Chapter Three argued that Bartley's conception of CCR was the stronger position. It overcomes the limitations of the Popper-Watkins conventionalist defence and, in consequence, the irrationalist provocation that critical rationalism is itself ultimately based on arbitrary grounds. The adoption of CCR as the preferred position also has subsidiary benefits. To begin with, it revives the discursive commitment to open criticism, something that is extremely important in discussing the imperfections of the metascience's own constituents as well as the assessment of empirical theories. This, of course, has always been a professed feature of critical rationalism but seems to have been ignored at controversial moments in the discourse's history. Reviving the commitment, accepting imperfections even when there is no ready solution, is a vital facet of future development.

CCR's second subsidiary benefit is that it provides a way of resolving the conflicting conceptions of the empirical basis of science. These concerned the conditions under which observation statements form the evidential base - the test statements - involved in rejecting (or corroborating) theories. As with the debate on rationality, it was also a conflict between proponents of the discourse. Those following Popper sought a conventionalist solution to the issue. They felt that the conditions concerning evidence should be sought in what scientists agree will form test statements. Others, supporting the initiative of Bartley, thought such a proposal a further example of unnecessary conventionalism and offered CCR as a better option. Bartley's option, again, appears to be the stronger and on similar grounds to the debate relating to rationality. To use agreement between scientists as the

grounds for recognising particular observation statements as tests of a theory inevitably results in an arbitrary and therefore, irrational, evidential base for its sciences.

Whilst offering a stronger rational and empirical base to the metascience than its conventionalist alternative, and thereby a fundamental contribution to greater coherence, CCR and its primary feature criticisability nonetheless also appears to create a problem. As previously indicated, this concerns the gap between the status of statements it empowers and the regulatory nature of previously-formulated elements of the methodology.

As this methodology was first presented, it consisted of edicts and injunctions that formed a heavily prescriptive and inflexible programme serving a conventionalist conception of rationality. There was a correct way to pursue truth and the injunctions and regulations would set the limits as to what was acceptable. Through CCR, this conception of methodology is transformed. It is not just a matter of the general timbre; the status of the individual methodological constituents and proposals change as well. As the rational basis for the empirical refutation of theories, CCR emphasises the fact that <u>all</u> aspects of scientific procedure are matters of conjecture. Nothing is ever proven or disproven and that includes the constituents of the methodology pursuing truth. They are part of an attempt to pursue truth through conjecture and refutation where the resources for engaging in that pursuit are themselves conjectures.

But where is the transformation? Surely, this is part of the stance originally formulated by Popper and Watkins? In the sense that Popper and Watkins have made claims that: 'everything is a matter of conjecture', this is the case. But that position is not consistent with the edicts and injunctions

which are then employed to regulate the methodology. They seem anything but conjectural. In contrast, CCR does convey this consistency by limiting the power of its methodological proposals. The imperfect and uncertain state of knowing limits the power of its methodological proposals to guidelines and advisory statements.

Once the methodology is conceived in this manner, the flaws that beset its individual proposals can also be addressed in a more flexible way. It is no longer a question of correct or incorrect practice, of banning particular procedures from science whilst regulating others. Rather, it is a matter of crafting particular research procedures which, whilst conjectural, are assessed as the best available procedures for the pursuit of truth.

The difference between the two conceptions of methodology can be illustrated through the case of 'ad hoc strategies'. Chapter Three described how Popper produced an injunction to ban 'any kind of conventionalist stratagem' from science. Faced with evidence that this injunction would have dismissed major scientific events (such as the discovery of Neptune), he was forced into a compromise in which he accepted 'a degree of dogmatism' and reduced the injunction to a caveat which sought not to: 'pronounce too severe an edict against ad hoc hypotheses'. In contrast to this, a methodology based on CCR would neither empower the injunction nor limit itself to the caveat. It would seek to provide a recommendation that recognised the dangers of utilising ad hoc strategies without either trying to ban them or simply issuing warnings. It would perhaps be along the lines that: 'critical rationalism recommends scientists to avoid the use of ad hoc strategies because such strategies tend to work against the pursuit of truth. Where, however, such a move seems unavoidable, then scientists should state their

grounds for introducing the strategy and what they construe as its theoretical and empirical consequences'. Other scientists can then critically review both the grounds and consequences in the light of the subsequent theory testing.

The methodological flexibility created by the adoption of this conception of rationality is not simply a by-product, it is a vital step in the development of greater coherence. It permits the critical accommodation of imperfections that injunctions simply reject and thus an uneven approach to the development of methodological procedures.

Many of the criticisms made of natural science methodology in Chapter Three point to gaps between injunctions/regulations and scientific practice. The ad hoc strategies injunction is one illustration; induction is another. Induction was considered a non-scientific form of argument and yet it is implicit in the practice of assessing whether one scientific theory is better corroborated than another. Bartley's conception and its more liberal approach would allow the metascience to operate with this imperfection whilst seeking better options. It is possible because CCR acts as the safeguard. Open criticism pervades the methodology. It is there in its operations; it is there in the review and assessment of scientific practice. Imperfections are accepted as part of the investigative environment. The critical challenge offered proponents is to develop better - more rational - procedures in the pursuit of truth. There are no primitive concepts, everything is open to question; there are no arguments that are ever treated as beyond dispute. Procedures are open to evaluation and change.

Accepting this purview in the consideration of specific methodological issues permits constructive options at points where the methodology was previously languishing. In the important case of corroboration, for example, it

would allow proponents to abandon the general injunction against induction and replace it with a recommendation that says, 'wherever possible, inductive arguments should be avoided'. This would permit the current version of corroboration to be employed until a more rational option becomes feasible. At the same time it would enable researchers and analysts to consider the empirical consequences of utilising a notion that contains an implicit inductive argument.

For all its benefits, however, CCR and its approach to methodological proposals is far from being a panacea for all the ills that beset this sub-field. It successfully responds to the conflicts concerning the empirical basis and the conception of rationality, it generates a more flexible and fruitful conception of methodology and it can accommodate conceptions of ad hoc strategies and corroboration to facilitate the possibility of greater coherence. But there is still a great deal of work for proponents to pursue. CCR does not, for example, propose an obvious means of connecting the test procedures and corroboration with verisimilitude and the conception of the growth of knowledge.

Offered as a final thought for this section, one radical possibility would be to see verisimilitude and the growth of knowledge as retrospective judgements of the history of the sciences and not as part of the scientific process. If this were done, the calculation of practising scientists would focus on developing better explanations, tested by a more adroit conception of relative corroboration. This would certainly fit more squarely with CCR, provide proponents with a narrower focus for the development of coherence and, perhaps, more accurately reflect the activities of practising scientists.

The Social Sciences

Because the social science and natural science sub-fields share test procedures, those recommended to enhance the coherence of the natural sciences will also apply to the social sciences. There are however additional contributions to coherence that can be specifically made in the social science sub-field. These are along three main lines:

(i) Changes in the conception and role of historicism and holism,

(ii) The reformulation of social science's subject-matter, and,

(iii) Developments in the models used to provide explanations.

The Contrapositions: Historicism and Holism

Critical rationalism has tried to employ historicism and holism as contrapositions (and inferior approaches) to its own conception of social science. Chapter Four established that in the case of historicism, most of the arguments used to construct and then criticise this contraposition were inadequate to their task. And furthermore, that the one acceptable argument - the logical refutation - had a much narrower range of application than that claimed by the discourse.

With holism there was a more general doubt about whether it could act as a contraposition at all. Indeed, if Popper's account in 'Of Clouds and Clocks' is accepted, it appears that the opposition to holism was more a hostility to the superficiality of some holist theories rather than an outright rejection of the position.

In terms of these positions, coherence would be enhanced if critical rationalism:

(i) Accepted that historicism describes a much smaller group of theories than Popper first intended and,

(ii) Abandoned the use of holism as a contraposition.

Whilst these moves would seem to involve a retraction of many of the discourse's published arguments (in, for instance, Popper's Poverty of Historicism and The Open Society and its Enemies) they would clarify what is currently a confused position concerning the contrapositions and facilitate more expansive and stronger conceptions of subject matter and explanation.

Given the compilation and presentation of 'historicism', there should be little surprise about the confusion that exists in terms of its constituents and applicability. The coherence of the contraposition would be greatly enhanced if the term 'historicism' was limited to those theories which claim that the future growth of scientific knowledge (and thus the future course of human history) can be predicted. The value to the discourse of such refinement is that the metascience could then:

(i) Develop genuine methodological guidelines to advise against the adoption of historicist arguments from clearer and stronger foundations, and thereby,

(ii) Make its own position available for critical assessment in a way that is not possible at present.

The ambiguity concerning the sub-field's stance towards holism is expressed in the clash between the discourse's evolutionist metaphysics and its individualist form of social science explanation. The clash centres on the question of whether individuals hold a primordial theoretical status (assumed by the individualist form of explanation) or whether (as argued by the metaphysics) individuals are influenced by collective or 'world 3' entities such as: society, social class, culture and the State. The metascience's stance in its early texts was unreservedly individualist:

> "(W)e must try to understand all collective phenomena as due to the actions, interactions, aims, hopes and thoughts of individual men, and as due to traditions created and preserved by individual men". (1)

In more recent texts, however, it is been possible to detect a shift of view. The shift has been slow in coming in the sense that illustrations are still scarce, and it has been uneven, in the sense that whilst not confined to, the examples are usually presented as features of, or derivations from, the metaphysics. Nonetheless there has been a definite move towards accepting the 'holistic' conception that social entities can influence individual consciousness and action. Commentators have recognised the shift (2) but there has been no formal statement from proponents in terms of the social sciences and no retraction of the earlier individualist form of explanation.

The deduction to be made from the illustrations is that if collective or social entities can influence individual consciousness then undesigned outcomes are not automatically reducible to the constitutive calculations and actions of individuals. And if this is the case, then as potential originators of social action, social entities should also feature as part of the subject-matter of the social sciences and holism recognised as a feature of the sub-field rather than a contraposition.

Abandoning holism's role as a contraposition therefore has three main outcomes for the metascience, it:

(a) Makes an open commitment where previously ambiguity had reigned,
(b) It enables an explicit acceptance of the role of social entities in the construction and re-formation of the social world and, thereby,
(c) Licenses a revision to the sub-field's conceptions of subject-matter and explanation.

The Subject-Matter of the Social Sciences

In the light of the amended status of holistic entities, the move to greater coherence in terms of the social sciences' subject-matter involves adjustments in the vocabulary of analysis as well as the explication and

revision of the central constituents of 'map-making' and 'rationality'. No change is required, however, to the sub-field suppositions that 'actions have unintended/uncalculated consequences', or that 'much of the social world is the indirect, unintended or unwanted by-products of social calculations'. And no adjustment is required to the focus of study which remains the unintended or undesigned consequences of actions.

Addressing unintended consequences in an individualist design required proponents to understand what was intended (through Jarvie's conception of map-making) and link intention to action through an assumption of rationality which states that individuals will employ the most efficacious means in pursuit of their goals. In a design that also accommodates collective entities, changes in the vocabulary of analysis are required. The active participants are 'actors' or 'agents' (to embrace both individual human beings and/or collective entities). The deliberations that are undertaken prior to action are also in need of overhaul, but provisionally can be called 'calculations' or 'intentions', while what were sometimes termed 'individual behaviours' are better seen as 'actions'. Thus, the social sciences investigate the unintended or uncalculated consequences of social action undertaken by individuals and/or other agents.

As the central resource in articulating the intentional features of action, 'map-making' carries an excessive burden. It is supposed to embrace:

(a) The deliberative processes of putative knowledge, morals, fears, imagination and expectations (world 3 elements) and,

(b) The deliberations addressing the 'hard reality' of physical and social contexts (world 1).

Expecting this much of map-making seems both unnecessary and unwarranted. Symbolic interactionism, for instance, would utilise an array of

notions to represent the same deliberations. And not only would categories like: the 'I and Me'; the 'self'; 'significant others'; 'signs and significations of language'; 'role-taking'; 'reference groups'; 'socialisation' and the 'symbolic universe' offer a more precise representation of conscious calculation, in so doing they would also facilitate a more detailed conception of the sub-field's subject matter.

The argument however needs further consideration with the recognition of collective agents. As Strauss, Glaser and their students have indicated in their research (3) the list of categories presented in the preceding paragraph can accommodate the calculations of collective agents. But what needs to be established is that changes are needed at a methodological as well as a conceptual level. It is not then just a matter of eliciting new categories to assist or replace map-making in the depiction of the calculative process; it also requires some specification of direct and indirect indicators of those categories that could be employed in deciphering, say, an organisation's calculations. What, for example, would researchers look for in an organisation's mission statement? How would they look for it? What would they check in its end-of-year financial statement? How would they check it?

If the accommodation of collective agents and the development of map-making add to the coherence of the sub-field's subject-matter, then a qualitative change in the conception of rationality would certainly complement them. Chapter Four described the link between calculation and action as an assumption of 'rational utility'. The discourse's social sciences assume that actors seek the most appropriate or effective means known to them in pursuing their goals. This conception, it was argued, omits as much as it reveals. It does not, for instance, specify whether actors are assumed to act

in a self-interested manner or, if not, how the notion copes with altruistic action. It does not state whether actors are assumed to have singular goals or how it could accommodate multiple, and perhaps conflicting, goals. It also takes-for-granted the existence of a determinate relation between conscious deliberations and actions.

The omissions are symptoms of a wider problem. Critical rationalism had adopted a conception of rationality from Hayekian individualism. Whilst this conception may have been appropriate for a particular form of economic theory, it is totally inappropriate, certainly at its current level of explication, as a general assumption for the wide-ranging complexities of social action that form the subject-matter of the social sciences. It would make a great deal of sense to jettison this assumption and turn what is currently a resource for analysis into a topic. In other words, rather than assuming that a form of rationality is at the basis of all social action, it would be better to investigate the subjective conceptions of effective action thereby making the matter of actors' rationality an empirical issue. It certainly would not detract from the primary concern of seeking the unintended consequences of action, indeed, it is more likely to bring them into sharper focus.

The major cost to making rationality an empirical matter is that it would lead to more complex analyses of unintended consequences. Against this, however, is the fact that it would form a positive response to the omissions concerning selfish or altruistic intentions, single or multiple goals, and the link between intentions and actions. They would all become empirical matters.

Furthermore, in so far as less is assumed and more empirically investigated, there would be a greater likelihood of generating more realistic explanatory models.

Social Science Explanations

Social science explanations, the metascience maintains, should be 'explanations in principle'. They are explanations which, through model construction, seek to account for types of event. The accounts are of the form: 'X' is the repeated (unintended) outcome of a typical intention, realised in a typical action in this typical situation'.

Chapter Four suggested there were several major issues with the sub-field's portrayal of explanation. Those pertaining to the individualism/holism dispute and rationality have been discussed. What remains are issues affecting the constituents and procedures of explanation. The main concerns here are: the vagueness surrounding the procedures of typifying and, relatedly, the realism of the models used in explanations.

If researchers are not to act intuitively in model-building, developing typifications in the construction of models would seem to involve inductive procedures. Whether speculating from personal or investigative experience or developing a systematic empirical construction based on the subjective processes of research subjects, it involves researchers producing general typifications from particular intentions, actions and situations.

Quite how researchers are to engage in such procedures has never been elucidated. It clearly cannot be a matter of researchers using their everyday skills - their 'commonsense' - because the conception of map-making (let alone what is proposed here as its development) indicates that

neither people (nor other social agents) can be assumed to share common perceptions, values or attitudes in everyday life. Again, it cannot be a matter of researchers simply assuming that they, as researchers, possess the skills to construct typifications because, as a tacit agreement, this would contravene the anti-conventionalism of CCR. It is therefore incumbent upon proponents of the sub-field to provide the procedures and guidelines of how researchers should construct types of intention, types of action and types of situation in a way that will account for repeated unintended outcomes.

As difficult as this will be, the gravity of the task requires that it is undertaken at the earliest opportunity. Social science researchers will need a practicable form of explanation. They will need to be able to test accounts of their subject matter and, as these accounts are explanations in principle, they will need to be able to construct typifications. Such typifications are not the 'second-order constructs' outlined in the mundane phenomenology of Alfred Schutz, nor indeed, are they the 'ideal-types' of Max Weber. If they are to generate the predictions required by the test procedures, they must have a validity and reliability that goes beyond the possibilities of both these options. They must, in other words, aspire to a higher level of empirical accuracy.

As an interim measure, and given the requirement of accuracy, the social sciences could do a lot worse than employ inductive procedures. For reasons previously discussed, in an ideal research world critical rationalists would normally avoid such procedures. But this is not an ideal world. It is the formative stage in the development of a social science based on fallibilism and it is a stage at which inductive procedures, for all their flaws, can assist in the provision of empirical accuracy. As an assurance to set against what might appear a regressive move, such procedures would be set within a

general framework in which CCR has a pervasive influence. This, of course, means that like all other aspects of the research process inductive procedures are subject to comprehensive critical review.

The concern about the realism of social science models is also assuaged by the enhanced empirical accuracy for the typifications. Indeed, when this is combined with the treatment of rationality as a topic of analysis, the sub-field does look to have the basis for a feasible conception of social science explanation. This is not to underestimate the labours required in constructing typifications or those to be invested in constructing empirically testable predictions; it is to suggest that there is a viable framework for empirical research.

This framework, although of general application in the social sciences, would make a particularly important contribution in evaluative or applied social and economic research. In such research, there is an attempt to measure inputs, process and/or the outcomes of a policy. There are generally specified aims to each of these elements of policy ('intentions' or 'calculations' in the current language of the sub-field). There are strategies of implementation, and socio-political and economic conditions in which implementations takes place ('situations' in the terms of Popper and Jarvie) and there are intended and unintended outcomes (or consequences). If the effort can be invested to develop the sub-field's modelling procedures, then this fallibilist framework could become a tour de force.

A Future Agenda

The last section of the chapter posed the question of the future possibilities of critical rationalism. Is it to wither because of the nature of its problems or can it be regenerated? And, if it is the latter, what will it cost the

discourse in terms of its current fields, concepts, proposals and arguments? The argument in response has been that in spite of its current range of problems there are grounds for optimism but at some cost to the current discursive formation.

Because of the weak links between the different fields, it seemed appropriate to sacrifice the metaphysics and the politics and focus the regeneration on the discursive nucleus, the metascience. Sub-dividing the metascience into its sub-fields, the grounds for optimism emanate from the possibility of developments that lead to greater coherence in both the natural and the social sciences.

In the natural sciences sub-field, these included: utilising CCR as the basis of resolving the conflicts of principle; creating a more flexible methodology and developing specific responses to conventionalism, induction and corroboration. In the social sciences sub-field, they included: refining historicism; changing the status of holism; adding collective agents to the subject-matter; elucidating the procedures of typifying and, generally, making the conception of explanatory models a more realistic enterprise.

Whilst by no means responding to all the issues that beset the metascience, such proposals do provide the potential for greater coherence and create a basis for the future advancement of critical rationalist discourse.

Notes

Notes to the Introduction

(1) Lakatos I. in Schillp P. A. ed. (1974) p.241

(2) O'Hear A. (1980) p.205

(3) Medawar P. BBC Radio 3 28 July 1972

(4) ditto

(5) Ayer A.J. (1974) p.687

(6) Hindess B. (1977a) p.165

(7) Anderson P. (1968)

(8) Feyerabend P. (1975)

(9) Bartley W.W. (1976)

(10) Currie G. (1978)

(11) O'Hear A. (1980)

Notes to Chapter One

(1) Foucault M. (1972) p.22

(2) I have read only three articles which directly address the question of critical rationlism's unity, they are Watkin's in Schillp P. A. ed. (1974), Popper's response to Watkins in Schillp P.A. ed. (1974) and Settle (1982). All three address the question of unity specifically in terms of Popper's writings and all assume that these writings are coherent, questioning only the means to accurately depict that coherence.

(3) Ackermann R. (1976) and Schillp P.A. ed. (1974)

(4) Lieberson J. (1982b) p.55

(5) O'Hear A. (1980)

(6) Magee B. (1974)

(7) Magee B. ibid p.87

(8) Johansson I. (1975)

(9) Johansson I. ibid. p.2

(10) Radnitzky G. & Andersson G. eds. (1978)

(11) Lessnoff M. (1980)

(12) Bartley W.W. (1976)

(13) It might be asked here whether critics and proponents could be considered to use the term 'philosophy' to segregate and unify that part of critical rationalism that they want to address? Well, in brief, yes they could, although I would argue that this has not been the case in any of the examples I have considered. But this would not relieve them of the problems that I am raising, they would still need to consider how philosophy can act to unify the dispersion of statements that it represents, what it is that constitutes the larger unit of which philosophy is a part and, furthermore, the relation that integrates philosophy with the more general unit.

(14) Bartley (1976) p.490

(15) Bartley ibid. p.466

(16) Watkins J. (1974)

(17) See his autobiography in Schillp P.A. ed. (1974) Part One.

(18) Watkins J. (1974) p.372

(19) Watkins J. ibid. p.400

(20) Watkins J. ibid. p.400

(21) Watkins J. ibid. p.406

(22) Settle T. (1982) p.112

(23) Popper (1974) p.1053

(24) Settle T. (1982) p.114

(25) Settle T. ibid. p.117

(26) Settle T. ibid. p.117

(27) Settle T. ibid. p.117

(28) Settle ibid. p.118
This quotation is taken from Popper (1963) p.375.

(29) Settle ibid. p.118

(30) Settle ibid. p.118

Chapter 2

(1) O'Hear A. (1980) p.172

(2) Popper (1959) p.42

(3) Popper ibid p.100

(4) Popper (1957) p.107

(5) Popper (1976) p.168

(6) Popper (1978)

(7) Popper ibid p.167

(8) Bartley (1976) and Campbell (1974)

(9) Campbell ibid p.415

(10) Bartley gives a specific date, 15 November 1960 as the first occasion (a seminar at the LS.E.) on which Popper tries to incorporate evolutionism as part of critical rationalism.

(11) Popper (1972) p.242

(12) Popper ibid p.243

(13) Popper ibid p.243

(14) Popper (1976) p.170

(15) Popper ibid p.134

(16) Popper ibid p.174

(17) Popper (1972) p.238

(18) Popper ibid pp.238-239

(19) See the discourse's use of 'world 3' in section 2.34

(20) Campbell expresses this new form of of epistemology as follows: "..it is argued that evolution - even in its biological aspects - is a knowledge process, and..the natural-selection paradigm for such knowledge increments can be generalised..". Campbell op. cit p.413

(21) Popper (1959) p.15

(22) Popper (1974) p.1061

(23) This quotation was also used in the Introduction.

(24) Popper (1974) p.1061

(25) Popper (1972) p.145

(26) Popper ibid p.261

(27) Popper (1972) p.106

(28) Popper ibid p.106

(29) Currie (1978) p.413 'human' in square parentheses replaces Currie's use of the term 'Man'.

(30) Popper (1972) p. 109

(31) Popper (1974) p.1073

(32) Popper ibid p.1073

(33) Popper (1972) p.112

(34) Bartley (1976) p.488

(35) Bartley ibid. p.486

(36) See Bartley ibid. p.485

(37) Bartley ibid. p.486, the word 'human' in square parentheses is my addition; evolutionism in parentheses is used instead of Bartley's term 'synthesis'.

(38) Bartley ibid. p.485

(39) Bartley ibid. p.490

(40) Bartley ibid. p.490

(41) See Popper (1978)

(42) Miller (1983) pp.242-243.

(43) Popper (1972) p.116

(44) Currie (1978) p.414

(45) Popper (1976) p.185

(46) O'Hear (1980) p.191

(47) O'Hear ibid. p.191-3

(48) O'Hear ibid p.192

(49) He describes, for example, Anderson and Belnapp's critique of the classical employment of modus ponens in accounts of entailment, and Lakatos's example of the alteration of definitions to rule out unwelcome consequences.

(50) Cited in O'Hear (1980) p.197

(51) Popper (1972) p.246

Chapter Three

(1) Popper (1972a) p.27

(2) Popper (1963) p.226

(3) Popper (1972a) p.82

(4) Popper (1972a) p.104

(5) Popper (1963) p.54

(6) Popper ibid p.54

(7) Popper (1959) p.29

(8) Popper (1972a) p.350

(9) Popper (1959) p.108

(10) Hindess (1977a) p.174

(11) In early texts like The Logic of Scientific Discovery, these edicts were described as 'methodological rules', however, when critics took the intended game analogy literally the conception was abandoned.

(12) Popper (1959) p.82

(13) Popper (1974) p.32

(14) Popper ibid p.986

(15) See, for instance, Popper (1959) chapter 5:section 29.

(16) Bartley (1982)

(17) Described in Popper (1959) chapter 5

(18) Ibid

(19) Ibid: section 29

(20) Ibid

(21) Ibid p.102

(22) Ibid p.105

(23) Ayer (1974)

(24) Ayer ibid pp.689-690

(25) That is, the Positivist claim that there are such things as 'protocol' or experiential' statements.

(26) Ayer ibid p.687

(27) Popper (1974) p.1110

(28) Bartley (1982) p.165

(29) Popper (1959) p.99

(30) Popper:ibid:103

(31) Popper (1974) p.1111

(32) Hindess (1977a) p.181

(33) Bartley (1982) p.167

(34) Bartley ibid p.168

(35) Bartley ibid p.167

(36) Ibid.

(37) Ibid.

(38) For such an important category it is somewhat surprising to find that corroboration has been described in a number of contradictory ways and generally left in a tawdry state. For a discussion of the range of possible specifications, see Bartley (1982) p.205 In this essay, the conception I have used is the one that I believe to be in greatest harmony with the rest of the metascience -although as we will see this does not mean a great deal.

(39) For a more detailed description of 'background knowledge' see Popper (1963) chap.10 section 4

(40) Worrall (1978) p.46

(41) Popper (1972a) p.18

(42) Popper (1983) pp.224-225

(43) Popper ibid p.22

(44) Popper (1972a) p.82

(45) Popper ibid p.103

(46) To write this section I have drawn very heavily on the criticisms of Popper's formal definitions proposed by Tichy in his 1974 and also on the account of these arguments offered by O'Hear in his 1980. In fact my account here should be seen as no more than an echo of Tichy's arguments translated and presented in O'Hear's notation (apart, that is, from the odd correction to the printing errors which appear in O'Hear's representation of the logical definition of verisimilitude). In spite of this lack of originality, I do think that it is important to include the discussion of the formal definitions within the text (as opposed to just noting their existence or consigning the arguments to an appendix) primarily because of verisimilitude's importance to my more general argument about the (absence) of a link between the sciences' goal and their methodology.

(47) Popper (1963) p.233

(48) These are described in Popper (1963) pp.391-397 and Popper (1972a) pp.47-52 and pp.331-335.

(49) See, for instance, Andersson (1978)

(50) O'Hear (1980) p.48

(51) O'Hear ibid p.49

(52) Popper (1972a) p.56

(53) Tichy's argument is on p.157 of his (1974), O'Hear's description is on p.49 of his (1980).

(54) O'Hear (1980) p.49

(55) O'Hear ibid p.50

(56) Ibid.

(57) Ibid.

(58) See Popper (1976)

(59) For a critique of Popper's third definition and Tichy's attempt to replace it, see Miller (1974); for a critique of Miller see O'Hear (1980).

(60) Popper (1983) pp.:xxxv - xxxvi

(61) Popper ibid p.xxxvi

(62) Bartley (1962). Bartley summarises his argument as "comprehensively critical rationalism" to distinguish it from the fideistic critical rationalism that he was criticising; in the second edition of the text he calls his argument "pancritical rationalism" but to maintain comparability with the literature I will continue to use comprehensively critical rationalism or its abbreviation CCR.

(63) See, for instance, Watkins (1969)

(64) See for instance Agassi et al (1971) and Kekes (1971)

(65) Popper (1945) p.230

(66) Popper (1945) p.231

(67) Quoted in Bartley (1962) pp.104-5

(68) See, for instance, Feyerabend's (1975)

(69) Bartley (1962) p.119

(70) See Watkins (1969) pp.59-60

(71) See Bartley (1984) Appendix 4 part 15.

(72) Bartley (1962) p.243

(73) Ibid.

(74) Bartley (1962) p.244

(75) Bartley ibid p.234

(76) See Popper (1983b)

Chapter Four.

(1) The 'outline methodology' is perhaps more complex than this statement conveys, particularly with regard to the link between the evolutionist ontology and social science's subject-matter. See section 4.5.

(2) See, for instance, Popper in Miller (1983) and Watkins (1957)

(3) See Suchting (1971) and Urbach (1978)

(4) See, for example, Donagan (1974) and Jarvie in Levinson ed (1982)

(5) Popper in Schillp ed. (1974)

(6) Jarvie (1982) p.86

(7) Ibid.

(8) Popper (1957) p.3

(9) The most frequently employed definition describes historicism as: "an approach to the social sciences which assumes that historicial prediction is their principal aim, and which assumes that this aim is attainable by discovering the 'rhythms', or the 'patterns', the 'laws' or the 'trends' that underlie the evolution of history". Popper (1957) p.3

(10) This style and the contents of the arguments were first suggested by Suchting (1971), they have been augmented by Urbach in his (1978). I am following Suchting in the discussion of arguments 1 and 2, and Urbach in the discussion of argument 3.

(11) Popper (1957) pp.108-109

(12) Popper ibid p.108

(13) Popper ibid p.109

(14) Popper ibid p.109-110

(15) Popper:ibid:111

(16) Suchting (1971) and Urbach (1978)

(17) Urbach (1978) p.119

(18) Popper (1957) p.112

(19) Popper ibid p.115

(20) Urbach (1978) p.120

(21) Popper (1957) p.117

(22) Urbach (1978)

(23) Popper (1957) p.120

(21) Ibid

(22) Ibid

(23) Popper ibid p.121

(24) Popper ibid p.120

(25) Ibid

(26) Ibid

(27) Popper ibid p.121

(28) Popper ibid p.128

(29) Ibid

(30) Ibid pp. 42-43

(31) Ibid p.43

(32) Ibid

(33) Popper (1963) pp. 339-340

(34) Popper (1957) p. v

(35) Ibid

(36) See for instance Himka (1975) and Mussachia (1976)

(37) Urbach (1978) p.125

(38) Urbach ibid p.126

(39) Barry Hindess assisted in the development of this argument.

(40) Watkins (1959) p.505

(41) Popper K (1945) p.98

(42) Lukes in O'Neill ed. (1973) chap. 7.

(43) Jarvie (1972) p.57

(44) Watkins (1952) pp.149-150

(45) Popper (1957) p.140

(46) Flew (1981)

(47) Jarvie (1972) p.153

(48) Popper (1972a) p.112

(49) Popper ibid p.106

(50) Popper ibid p.209

(51) Jarvie (1972) p.157

(52) Popper (1945) vol 2 p.92

(53) Popper ibid p.93

(54) Hayek (1952) p.39

(55) Jarvie (1972) p.3

(56) Popper (1947) p.92

(57) Jarvie (1972) p.159

(58) Hayek quoted in Jarvie (1972) p.160

(59) Jarvie ibid p.162

(60) Ibid

(61) Ibid p.164

(62) Jarvie ibid pp.164-165

(63) Jarvie ibid p.165

(64) Jarvie ibid p.167

(65) Popper in Miller ed (1983) p.357

(66) Popper ibid

(67) Popper ibid

(68) Popper K ibid p.363

(69) Ibid

(70) Ibid p.359

(71) Jarvie (1983) p.47

(72) See for instance the discussion in Harrison ed. (1979) and Hindess (1984)

(73) Jarvie (1972) p.7

(74) See for instance Douglas's studies of coroners and medical examiners (1971) chaps. 3 and 4 and Garfinkel's varying discussions of 'indexicality' in his (1967).

(75) Jarvie (1973) pp.161-162

(76) Kelleher (1987)

(77) Hindess (1977a) pp.8-9

(78) Hindess ibid p.9

Chapter Five

(1) Popper (1945) vol 1 p.124

(2) Popper (1972b) p.14

(3) Popper (1963)

(4) Popper ibid p.151

(5) Popper (1945) vol 1 p.1

(6) Popper ibid p.176

(7) Magee (1974) p.88

(8) Magee ibid p.89

(9) Popper (1972b) p.16

(10) Quinton (1976) p.151

(11) See, for example, Freeman (1975), Lessnoff (1980) O'Hear (1980) and Quinton (1976)

(12) Quinton ibid p.157

(13) Popper (1945)

(14) For example, to exhibit the differences between Platonism and totalitarianism, Quinton compares the former's politics with 20th century German fascism and Russian communism. There seems to me to be very little basis for comparison here and even on his own terms would have been better advised to compare Platonism with what the discourse describes as pre-critical Greek tribalism.

(15) Quinton (1976) p.153

(16) Quinton ibid p.154

(17) Quinton ibid p. 153

(18) Quinton ibid p.154

(19) Quinton ibid p.154

(20) Quoted in Quinton ibid pp.154-155

(21) Quinton ibid

(22) Quinton ibid

(23) Quinton ibid p.156

(24) Popper (1945) vol 1 p.157

(25) Popper ibid chapter 3

(26) Popper in Schillp ed. (1974) p.27

(27) Popper (1972b) p.15

(28) Popper (1982) p.113

(29) This point is made by Hindess (1987) p.158

(30) Hayek (1960) p.103

(31) Popper (1963) p.viii

(32) See, for example, Seldon (1981) and Harris & Seldon (1979)

(33) Popper (1945) vol 2 p.125

(34) Popper ibid p.348

(35) Magee (1974) p.78

(36) Popper (1945) vol 2 p.125

(37) Popper (1945) vol 1 p.265

(38) Popper ibid

(39) The discourse has expressed its suspicion of government in various texts, in an instance from The Open Society it has this to say: "..state power must always remain a dangerous though necessary evil". Popper (1945) vol 2 p.130

(40) Popper (1945) vol 1 p.265

(41) Popper (1945) vol 2 p.132

(42) Popper ibid

(43) Popper ibid

(44) Popper ibid p.133

(45) Freeman (1975) p.30

(46) Popper (1945) vol 1 p.126

(47) See, for instance, Popper ibid chapter 7

(48) Popper (1963) p. 361

(49) Magee (1974) p.86

(50) Popper (1945) vol 1 pp. 284-285

(51) See, for example, Freeman (1975), Gellner (1974), Irzik (1985) and O'Hear (1980)

(52) Gellner (1974)

(53) Gellner (1974) p.172

(54) Gellner:ibid.

(55) Popper (1963) p.351

(56) See Hindess (1987)

(57) Wootton (1945) p.9

(58) Hindess (1987) p.161

(59) Wootton (1945) p.10-11

(60) Hindess (1987) p.165

(61) Hindess ibid p.163

Chapter Six

(1) Popper (1957) pp.157-158

(2) See, for example, O'Hear (1980) chap.8

Bibliography

Ackerman R. — The Philosophy of Karl Popper
Amherst:University of Massachusetts Press 1976.

Agassi J. et al — 'The Grounds of Reason'
Philosophy 46 1971

Anderson P. — 'Components of the National Culture'
New Left Review 1968

Andersson G. — 'The Problem of Verisimilitude'
in Radnitzsky G. and Andersson G. eds. 1978.

Ayer A.J. — 'Truth, Verification and Verisimilitude', in
Schillp P.A. ed. 1974.

Bartley W.W. — The Retreat to Commitment
Illinois:Open Court 1962.
(Quoted here in the second English edition 1984).

Bartley W.W. — 'The Philosophy of Karl Popper',
Part 1, Biology and Evolutionary Epistemology,
Philosophia 6 1976

Bartley W.W. — 'The Philosophy of Karl Popper'
Part 3, Rationality, Criticism and Logic,
Philosophia 8 1982

Brown J.M. — 'Popper's Had a Brand New Bag',
Philosophy 59 1984

Bub J. & Pitowsky I. — 'Critical Notice of Sir Karl Popper's
Postscript to the Logic of Scientific Discovery',
Canadian Journal of Philosophy 15 1985

Campbell D.T. — 'Evolutionary Epistemology' in
Schilpp P.A. ed. op.cit. 1974.

Cohen R. et al — Essays in Memory of Imre Lakatos
Dordrecht:Reidel 1976.

Champion R. — 'A Case for Popper',
International Humanist 1 1985

de Crespigny A. & Minogue K. (eds) — Contemporary Political Philosophers
London:Methuen 1976.

Currie G. — 'Popper's Evolutionary Epistemology: a Critique',
Synthese 37 1978

Derksen A.A. 'The Alleged Unity of Popper's Philosophy of Science: Falsifiability as Fake Cement', Philosophical Studies 48 1985

Donagan A. 'Popper's Examination of Historicism' in Schillp P.A. ed. op.cit. 1974.

Douglas J.D. American Social Order: Social Rules in a Pluralistic Society New York:Free Press 1971.

Dunn J. & Hellman G. 'Dualling: A Critique of an Argument of Popper and Miller', British Journal for the Philosophy of Science 37 1986

Elster J. ed. Rational Choice Oxford:Blackwell 1986.

Feyerabend P. Against Method London:New Left Books 1975.

Flew A. 'Human Choice and Historical Inevitability' The Journal for Libertarian Studies ol V No.4 1981

Flew A. 'Popper and Historicist Necessities' Philosophy 65 1990

Foucault M. The Archaeology of Knowledge London:Tavistock Publications 1972.

Freeman M. 'Sociology and Utopia: some reflections on the social philosophy of Karl Popper' British Journal of Sociology 26 1975

Gardiner P. (ed) Theories of History Illinois:Glencoe 1959.

Garfinkel H. Studies in Ethnomethodology Englewood Cliffs, New Jersey: Prentice-Hall 1967.

Gellner E. Legitimation and Belief London: Cambridge University Press 1974.

Gillies D. 'In Defense of the Popper-Miller Argument', Philosophy of Science 53 1986

Gillies D. Philosophy of Science in the Twentieth Century: Four Central Themes Oxford: Blackwell 1993

Good I.J. 'A Suspicious Feature of the Popper/Miller Argument', Philosophy of Science 57 1990

Grunbaum A. 'Is Falsifiability the Touchstone of Scientific Rationality? Karl Popper versus Inductivism', in Cohen R. et al op.cit. 1974.

Harris R. & Seldon A. Over-Ruled on Welfare
London: Institute of Economic Affairs 1979.

Harrison R. (ed) Rational Action
Cambridge: Cambridge University Press 1979.

Hayek F. A. The Constitution of Liberty
London:Routledge & Kegan Paul 1960

Himka J.P. 'The Limits of Historical Poverty: The Philosophical Basis of Social Science'
Science and Society 39 1975

Hindess B. (ed) Sociological Theories of the Economy
London: Macmillan 1977(a).

Hindess B. Philosophy and Methodology in the Social Sciences
Hassocks: Harvester 1977(b).

Hindess B. 'Rational Choice Theory and the Analysis of Political Action' ,
Economy and Society vol 13 1984

Hindess B. Freedom, Equality and the Market
London: Tavistock Publications 1987.

Irzik G. 'Popper's Piecemeal Engineering' in
British Journal for the Philosophy of Science 36 1985

Jarvie I. Concepts and Society
London: Routledge & Kegan Paul 1972.

Jarvie I. 'Popper on the Difference between the Natural and the Social Sciences', in P. Levinson ed.1982.

Jarvie I. 'Rationality and Relativism'
British Journal of Sociology volume 34 1983

Johansson I. A Critique of Karl Popper's Methodology
Stockholm:Scandanavian University Books 1975.

Kekes J. 'Watkins on Rationalism', Philosophy 46 1971

Kelleher D. 'Non-compliance and the toleration of symptoms', Balance no. 100 1987

Lessnoff M. 'The Political Philosophy of Karl Popper' British Journal of Political Science vol 10 1980

Levinson P. ed In Pursuit of Truth Sussex:Harvester Press 1982.

Levy D. 'Karl Popper: his Philosophy of Politics', Modern Age vol 22 1978

Lieberson J. 'Karl Popper', Social Research vol 49 1982

Lukes S. Individualism Oxford: Basil Blackwell 1973.

Magee B. Popper London: Woburn Press 1974.

Miller D. 'Popper's Qualitative Theory of Verisimilitude', British Journal of the Philosophy of Science 25 1974

Miller D. (ed) A Pocket Popper Oxford:Fontana 1983.

Mussachia M.M. 'Further Comment on Karl Popper and Historical Predictability' , Science and Society 40 1976

Newton-Smith W.H. The Rationality of Science London:Routledge Kegan Paul 1981.

Nola R. 'The Status of Popper's Theory of Scientific Method', British Journal of the Philosophy of Science 38 1987

Oddie G. 'The Poverty of the Popperian Program for Truthlikeness', Philosophy of Science 53 1986

O'Hear A. 'Rationality of Action and Theory-Testing in Popper' Mind 84 1975

O'Hear A. Karl Popper London:Routledge, Kegan Paul 1980.

O'Hear A. 'Criticism and Tradition in Popper, Oakeshott and Hayek', Journal of Applied Philosophy 9 1992

O'Neill J. ed Modes of Individualism and Collectivism London:Heinemann 1973.

Popper K. Die beiden Grundprobleme der Erkenntnistheorie Tubingen:Mohr/Siebeck 1979.

Popper K. The Open Society and Its Enemies (2 volumes), London:Routledge, Kegan Paul 1945. (Quoted here in the fifth edition 1966).

Popper K. The Poverty of Historicism London:Routledge, Kegan Paul 1957. (Quoted here in the second edition 1966).

Popper K. The Logic of Scientific Discovery London:Hutchinson 1959. (Quoted here in the second edition, eighth impression 1975)

Popper K. Conjectures and Refutations London:Routledge, Kegan Paul 1963 (Quoted here in the second edition 1965)

Popper K. Objective Knowledge Oxford:Clarendon 1972(a)

Popper K. 'On Reason and The Open Society' Encounter 38 1972(b)

Popper K. 'Autobiography of Karl Popper' in Schilpp P.A. (ed) 1974(a)

Popper K. 'Replies to My Critics' in Schilpp P.A. (ed) 1974(b)

Popper K. 'A Note on Verisimilitude', British Journal of the Philosophy of Science 27 1976

Popper K. 'Natural Selection and the Emergence of Mind', Dialectica vol 32 1978

Popper K. 'The Importance of Critical Discussion', Free Inquiry 2 1981-1982

Popper K. The Open Universe NewJersey:Rowman & Littlefield 1983(a)

Popper K. Realism and the Aim of Science
NewJersey:Rowman & Littlefield 1983(b)

Popper K. Quantum Theory and the Schism in Physics
NewJersey:Rowman & Littlefield 1983(c)

Popper K. 'The Rationality Principle'
in Miller D. (ed) op.cit 1983(d)

Popper K. A World of Propensities
Bristol, Thoemmes Antiquarian Books 1990

Quinton A. 'Karl Popper: Politics Without Essences' in
de Crespigny A. and Minogue K. (eds) op. cit.

Radnitzky G. & Andersson G. (ed) Progress and Rationality in Science
Dordrecht:Reidel 1978.

Radnitzsky G. & Bartley W.W. (ed.) Evolutionary Epistemology, Theory of Rationality and Sociology of Knowledge
Peru IL:Open Court 1987

Ryan A. 'Carrying the Beacon of Reason'
The Times 28 July 1992

Schilpp P.A. (ed) The Philosophy of Karl Popper
La Salle, Illinois:Open Court 1974.

Seldon A. Wither the Welfare State?
London: Institute of Economic Affairs 1981.

Settle T. 'The Standard Bearer' in
Levinson P. (ed) 1982 op.cit.

Shearmur J. 'Epistemological Limits of the State: Reflections on Popper's Open Society',
Political Studies 38 1990

Stove D. 'How Popper's Philosophy Began',
Philosophy 57 1982

Suchting W. 'Marx, Popper and Historicism'
Inquiry 15 1971

Tichy P. 'On Popper's Definitions of Verisimilitude'
British Journal of the Philosophy of Science 25 1974

Urbach P. 'Is any of Popper's arguments against Historicism valid?'
British Journal for the Philosophy of Science 29 1978

Watkins J. 'Ideal Types and Historicial Explanation'
British Journal for the Philosophy of Science 3 1952
(also reprinted in O'Neill J. (ed.)1973 and quoted from that source).

Watkins J. 'Historical Explanation in the Social Sciences'
British Journal for the Philosophy of Science 8 1957
(also reprinted in O'Neill J. (ed.) 1973 and quoted from that source).

Watkins J. 'Comprehensively Critical Rationalism'
Philosophy 44 1969

Watkins J. 'The Unity of Popper's Thought'
in Schillp P.A (ed.) 1974

Watkins J. 'The Popperian Approach to Scientific Knowledge' in Radnitzky G. & Andersson G. (ed) 1978

Watkins J. 'Scientific Rationality and the Problem of Induction: Response to Criticisms',
British Journal for the Philosophy of Science 42 1991

Worrall J. 'Methodology of Scientific Research Programmes' in Radnitzky G. & Andersson G. (ed) op.cit.

Wootton B. Freedom and Planning
London: Allen and Unwin 1945.