Committee I
The Unity of the Sciences
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THE DIVISION OF KNOWLEDGE

by

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"In counterpoint to these attempts to reconstitute a unified epistemological field, we find at regular intervals the affirmation of an impossibility."
--Michel Foucault [1]

"If the logical structure of existing knowledge is one of distinct, unique, irreducible forms, it cannot readily be regarded as unity, but neither is it a chaos."
--Paul H. Hirst [2]

I. INTRODUCTION

The purpose of my paper is to consider, and to criticize, that particular version of the doctrine of the disunity of the sciences - or of the division of knowledge - that is most common and influential today: namely, that which stems from a Wittgensteinian approach to philosophy.

First, however, I wish to comment more generally on our topic.

I do not know whether and to what extent the sciences are or can be unified and am not entirely clear about what the issues are. As I read the papers of my fellow speakers, I found an assurance in their remarks that is perhaps not warranted by the real state of our understanding. From a commonsensical point of view, the sciences are obviously not unified. Of course science probes beyond commonsense; but if we are going to argue a hidden unity in the sciences, we need to show that this doctrine has explanatory or interpretive power, and is not simply a reflection, perhaps in new dress of, say, the shopworn old ideology of the unity of the sciences. In the sciences, just as anywhere, it is easy enough to point to similarities and differences; whereas what are needed are important similarities, important differences.

This uncertainty does not mean that I have no opinions; and I shall mention a few of them now.

The first opinion is that professional philosophical and methodological literature on this subject tends to be of little value. It continues to be littered

with, and filtered through, the detritus of obsolete philosophies and research programmes. Much of it is either positivistic in approach, in the sense of the old Encyclopedia of Unified Science; or it deals onesidely and rather ideologically with questions and programmes of reduction, to the exclusion of other issues.

My second opinion is that some pertinent and valuable work has been created by scientists working outside the main tradition of discussion of these matters, and outside the philosophical profession - work that is ignored by most of those who discuss these questions. This work includes Gregory Bateson's Mind and Nature: A Necessary Unity, and the work of F. A. von Hayek - as represented by The Sensory Order and many of his other books. Today we are taking a step towards better integrating Hayek's views into the larger discussion. But the subject of the unity of the sciences cannot really be taken seriously, I suspect, until it has been fundamentally reworked: until it has, on the one hand, been cleansed of professional philosophical superstition, and has, on the other hand, integrated (by which I do not mean "accepted") the work of such "outsiders."[3]

Until all this has been done, one must be wary of imposing common notions and distinctions that characterize discussions about the unity of the sciences: the notion of verstehen, for instance; or the distinctions between Naturwissenschaften and Geisteswissenschaften, or between natural and social sciences. Such distinctions may turn out to be neither fundamental nor even important. The alleged distinction between Naturwissenschaften and Geisteswissenschaften is not part of the answer; it is part of the problem. That at least ought to be clear from our discussion today.

My third opinion has to do with the issue of reduction. While it is fruitful to attempt reductions, I believe that philosophical reductionism - the idea that ultimate explanations can be given strictly in terms of the concepts and theories of one fundamental and underlying science - is nonetheless a mistake. That is, while it is valuable to attempt analytic reductions in individual cases (for such attempts

can be revealing and even lead to pathbreaking research), there is no reason to suppose that a general reduction will ever be possible, and every reason to suppose the contrary. Nor have there been more than a few successful reductions in the past: philosophical reductionism persists despite lack of evidence in its favour, and the presence of overwhelming logical and empirical arguments against it. On this issue I have been convinced by the arguments of Medawar and Popper, and by Donald Campbell's important argument about "downward causation." As Popper reports: "Hardly any major reduction in science has ever been completely successful... one of the very few... is the reduction of rational fractions to ordered pairs of natural numbers."[4] If the possibility of complete reduction is what is meant by the programme for the unity of the sciences, then I do not believe in the unity of the sciences.

My fourth opinion is that there is nonetheless a fundamental unity to the sciences, one that does provide some explanatory and interpretive power, and that this is a unity of underlying method.

I side with several other speakers in this Committee in supposing that the unity of the sciences - and, in the wider sense, the unity of all endeavours concerned with the growth of knowledge - consists in a unity of method, and that a good account of this method emerges from the work of Popper. That is, chemistry and physics, say, cannot be reduced to on another; but they employ the same underlying method. And the same applies to the other domains of knowledge. In fact, I go further than those who maintain the unity of the sciences. So far as this underlying methodology is concerned, I believe that there is a unity to all areas devoted to the growth of knowledge, whether they be called "scientific" or not.[5]

The basic method of the growth of knowledge is the method of variation and selection found in living organisms. It is the evolutionary Darwinian method of

conjecture (variation) and refutation (selection). Within this basic unity, many important subdivisions or speciations of knowledge may of course exist: that, for example, between simple and complex phenomena that is so important to Hayek's discussion, and which has been brilliantly developed for the session by Gray and Weimer, and by Naomi Moldofsky. Whether one speaks of the unity or division of knowledge depends, it seems to me, on whether one is speaking of the underlying unity or is concentrating on speciation within this unity.

The basic methodological unity, and the discovery of its parallels or even identity with evolutionary processes in biology, is of great importance.

But even here, where some members of the panel appear to agree, there are problems. There are, for instance, problems about the interpretation of our key figures - in particular, of Popper and Hayek. For example, I disagree with the interpretation of Hayek and Popper presented by Gray and Weimer. And they differ with one another too.[6]

Much more important, there are problems in fleshing out what this underlying method consists in - indeed, even in interpreting the idea of conjecture and refutation. I myself prefer to say, with Campbell, that the three essential and distinct components of the growth of knowledge - and of the evolutionary process, which is itself a knowledge process - are 1) the occurrence of blind, unjustified variations; 2) selection: i.e., weeding out, according to certain criteria, from variants; 3) a mechanism for the preservation, duplication, propagation, transmission of selected variants. And that the methodological problem, in all areas of knowledge, is how to interact with these stages so as progressively to enhance "fit" or correspondence between theory and fact.

Yet Walter Weimer carves out three different basic components: 1) creativity or productivity; 2) rhythm and its progressive differentiation; and 3) regulation by opponent processes. And he does not state a methodological problem

with respect to these. The first and third steps here seem close to my first and second steps. But what of my third step and Weimer's second? Are these just minor differences, easily reconciled? Or does a major disagreement lurk here? And what of the fact that Weimer, although he declares himself an evolutionary epistemologist, rejects the idea of "verisimilitude" that underlies the "hypothetical realism" of Popper, Lorenz, and Campbell, and which has been intended, particularly by Popper, to capture the fit or correspondence attempted between theory and reality?[7]

These are just a few questions and reflections in a situation where I am not sure what the questions are. With them I conclude my introductory remarks, which have been intended only to alert readers to my approach and prejudices, and to some doubts and reservations about the subject matter, and about our discussion today.

II. THE DIVISION OF THE SCIENCES AS A DOGMA OF ANALYTICAL PHILOSOPHY

The main purpose of this paper is to combat an important representative of the opposing, dominant, position: namely, that there are <u>essential</u> underlying limitations to the possible methodological unity of the sciences - that the sciences are essentially divided. Analytical philosophy of the Wittgensteinian sort is more responsible for this doctrine, and for the form in which it usually appears, than anything else. However the sciences may really be - whether unified or divided - this particular <u>doctrine</u> <u>about</u> the division of the sciences seems to me to be seriously wrong.

Yet it is widespread. One finds it everywhere in the arts: indeed its prevalence among members of Art faculties confirms the continuing persistence of

"Two Cultures." But the idea is also held by some scientists. It is, on the face of it, commonsensical; one finds it in the work of many people who have never read Wittgenstein; one finds similar doctrines in the sociology of knowledge; in Habermas and in the writings of the Frankfurt school; in Heidegger; in the work of Michel Foucault and the "archeologists of knowledge"; in the sort of American pragmatism represented by Morton White or, more recently, by Richard Rorty.

This popular position is held not only in a purely theoretical way but also has had a social and educational impact: - for example, through the account of "forms of knowledge" advanced by the Wittgensteinian philosopher, Professor Paul H. Hirst, of the University of Cambridge.[8]

Hirst's work has not only been influential; he actually appears to have succeeded in introducing his account of the essential division of knowledge into the British school curriculum. Professor Malcolm Skilbeck, Director of Studies at the British Schools Council - and formerly Director of the Australian National Curriculum Development Centre - testifies that:

> academic theory of liberal education underlies Her Majesty's Inspectorates's view of the curriculum. I am referring to Paul Hirst's analysis of forms and fields of knowledge."[9]

And Professor Richard Peters, of the University of London, writes of Hirst's account of the "forms of knowledge", and of their bearing on education, that "anyone working in the field has to take up some stand" with regard to them.[10]

I stand opposed. Yet I am not chiefly interested in opposing Hirst; I want to reach the Wittgensteinian assumptions that lie behind his approach; his work is simply a socially important example for that purpose. In any case, Hirst does not claim originality for his position, and acknowledges as antecedents, in addition to Wittgenstein, Michael Oakeshott's Experience and its Modes, John MacMurray's

Interpreting the Universe, R. G. Collingwood's Speculum Mentis, and Louis Arnaud Reid's Ways of Knowledge and Experience. A position similar to Hirst's in some ways, and similarly inspired, has been published by Stephen Toulmin in the The Uses of Argument and Human Understanding.

III. AN EXAMPLE: HIRST'S POSITION THAT KNOWLEDGE IS COMPARTMENTALIZED AND RATIONALITY IS LIMITED.

According to Hirst, the "domain of knowledge" is the "domain of true propositions or statements"; and all such knowledge is divided into "seven or eight" essentially different, "primary," "necessary," "final," "unique" and "irreducible" categories or "forms," each of which has a "distinctive logical structure" stemming from the "logic," "truth criteria," "criteria of validity," "criteria of meaning," "manner of justification," and "central concepts" that are peculiar to it and distinguish it from all the others. These categories are described alternately as "forms of knowledge" and "forms of understanding."[11] Hirst also sometimes identifies these forms with Wittgensteinian "language games." All of this constitutes a "basic philosophical truth about the nature of knowledge"[12] which he proposes to analyze. Any knowledge that occurs must occur within one or another of these basic categories. And although these categories are not indentical with traditional school and university subjects or disciplines, different areas of research nonetheless tend to follow these allegedly logical distinctions.[13]

These essentially separate, "logically delimited" domains seem to be mathematics, the physical sciences, knowledge of persons, literature and the fine arts, morals, religion, and philosophy. I write "seem" because Hirst makes differing listings in different places: thus he once seemed to want to distinguish "historical knowledge" as a separate form, but later thought it best "not to refer to history or

the social sciences in any statement of the forms of knowledge as such." He also sometimes writes as if there is a more general underlying distinction between the "human sciences" and the "physical sciences." And he has vacillated over the question whether religion really does constitute a separate form of knowledge.

About one thing, however, he is definite: whatever the forms may be, they are essentially different, "primary," "necessary," "final," "unique" and "irreducible." That is, his theory, like much British philosophy, despite its pretence to analyze the concrete, is a priori. Hirst got it from reading Wittgenstein, not from any investigation of the different areas of knowledge about which he purports to write. He did not for instance get it from investigation of, or reflection on, the current state of the sciences. There is no evidence in his work of the sort of relevant current knowledge of, say, cybernetics, the central nervous system, or economics, that characterizes several of the papers presented to this Committee. Indeed, Hirst does not really give an "analysis" of the "forms and fields of knowledge" at all.

Not only is knowledge essentially compartmentalized by Hirst; a further important component of his position is that rationality is essentially limited. This is not the Hayekian doctrine of the limits of rationality - limits with regard, that is, to prediction and explanation in the treatment of complex phenomena. Hirst's is a doctrine according to which some principles are exempted from rational consideration, assessment and criticism, and require commitment to them.

Hirst gives the following account of rationality:

1. Any rational activity, "as such", is characterized by commitment to two fundamental principles concerning the possibility of justification which mark the limits of rationality.[14]

2. This applies to the pursuit of knowledge. To pursue knowledge rationally, one must be committed to the fundamental principles of justification.

3. These principles are ultimate. They themselves cannot be justified, and hence cannot be assessed or questioned: justification, and hence assessment, can be made only by means of them.

Hirst's doctrine of the division of knowledge works closely together with his doctrine of the limits of rationality: they reinforce one another - leading to what Popper calls "a reinforced dogmatism." For once one has conceded that rationality is limited in its critical range, it becomes more plausible to suppose that there exist disciplines or "forms of knowledge" where the standards of logic and science, the chief instruments of rationality, should be forbidden to range: disciplines and practices, that is, that are instrinsically protected from the judgement of logic and science.

And thus, for Hirst, there is indeed no way for the standards of one discipline (or form of knowledge) to be assessed in terms of the standards of another discipline: such standards are, in effect, self-assessing, and can, themselves, only be assessed in terms of Hirst's "principles of rationality". And the principles of rationality cannot be assessed at all; we are asked to believe, rather, that "their justification is written into them."

IV. AN APPROACH TO THE DISAGREEMENT.

Wittgensteinian philosophy is so much at odds with the approach of most speakers at this session (with the possible exception of Gray) that when we compare and contrast approaches there is a risk of failing even to reach any understanding of the underlying disagreements, let alone any resolution thereof. To refute claims such as Hirst's, it is ineffectual to begin by disputing details, and this paper is not the place for a disputation over details.[15] In such situations, a little

preparatory work, a little context, helps. So I will sketch the background problem situation, and some of the main steps that lead to the sort of position Hirst represents.

Next, I shall try to do the same for the members of our panel, that is, for philosophers of a rather Popperian disposition, who tend to uphold a unity of method in the growth of knowledge.

If successful, my attempt will identify the main assumptions about which most Wittgensteinians differ from most members of our panel; and thus also identify the main assumptions which force them to deny the unity of the sciences. Our question might be: Why is it that a Wittgensteinian must deny, a priori, the unity of the sciences? Or - why must a Wittgensteinian compartmentalize knowledge and limit rationality?

V. THE BACKGROUND CONTEXT TO HIRST'S POSITION: THE 'WITTGENSTEINIAN PROBLEMMATIC'.

The question is, then: Why is it that a Wittgensteinian must deny, a priori, the unity of the sciences? Why must a Wittgensteinian compartmentalize knowledge and limit rationality?

Two independent but closely related features of the Wittgensteinian position force this result. The first is contextual, and is distinctively, although not uniquely, Wittgensteinian. It comes from what I call "The Wittgensteinian problemmatic." The second is structural, and comes from what I call "justificationism" - something that is not distinctively Wittgensteinian but which is especially prominent in Wittgenstein's On Certainty, and which he shares with most other philosophies that also have never felt the impact of Darwin - i.e., with most contemporary philosophies.[16]

I shall discuss the Wittgensteinian problemmatic in this section, and justificationism in the following sections.

1. It is often forgotten that Wittgenstein's later philosophy was created in specific opposition to a false doctrine about the unity of the sciences.

The false version of the unity of sciences that I have in mind is of course that of the logical positivists. The positivist position was a form of scientific imperialism according to which all legitimate utterances are to be judged in terms of the canons and criteria of science - "science" being understood in a positivist sense.

It is clear how this position was meant to provide a unity to intellectual endeavour. For the positivist notion that sense observation is the foundation of all legitimate discourse provides a universal theory of criticism and explanation of error. If observation is the only true source of knowledge, and if reports of sense observation serve as the only legitimate premises in valid argument, their truth will be - in accordance with elementary logic - transmitted to the conclusion of that argument.[17] Thus, any legitimate - i.e., properly sourced or justified - statement would be derived logically from, and justified in terms of, such true observational premises. Whereas an unacceptable theory would be one that could not be so derived. Hence the main source of error would lie in accepting a position not derivable from sense observation reports.

But this positivist approach is untenable. Its proponents - from Hume to the present - are confronted by an insuperable difficulty. That is, many perfectly legitimate scientific claims cannot be justified in the way demanded. For example, every universal law of nature is logically too strong to function as the conclusion of a valid argument whose only premises are sense observation reports. And it is not only scientific laws that are not derivable from sense observation reports: various principles ofter supposed, particularly by positivists, to be indispensable to

science, - e.g., principles of induction, verification, and causality - also cannot be thus derived.

But this means that the principle of criticism that had been advanced, far from being universal, hardly works anywhere at all. Moreover, it would appear that any relationship between evidence and conclusion must be illogical.

2. There is nothing distinctively Wittgensteinian about the step of the argument that has just been rehearsed: such a "difficulty" - an epistemological crisis, rather - has occurred repeatedly in the history of philosophy, and that created by Hume's work in the 18th century is, in essentials, identical to the crisis that the logical positivists faced in the twentieth century.

What is distinctively Wittgensteinian is, rather, an extension of the strategy commonly adopted to resolve this crisis. The most common way of resolving the crisis had been the following. It is asserted that the relationship between evidence and conclusion is not illogical, only non-logical. There are two kinds of inference: there is deduction, which defines logic; and there is induction, which defines the natural sciences. Induction is indeed not deductive; but there is no need for it to be so. The whole epistemological "crisis" was in fact a "pseudo-problem" artificially created by the unwarranted (imperialistic) assumption that canons of science must conform to canons of logic. Whereas, instead of being a faulty sort of deduction, induction is ultimate, defining science, just as deduction is ultimate, defining logic. Thus the problem of induction is "dissolved" by learning not to apply logical standards to inductive inference.

One should, then, so it is concluded, not judge between deduction and induction, not judge induction by deductive standards. Rather, the task is to describe and clarify the standards and principles of deductive and of inductive reasoning, as they are embedded in actual practice. And to do so is to make clear that there is no way to unify the principles of these two domains. I have

emphasized the last sentence to stress that the initial and crucial sundering in the old doctrine of the unity of the sciences already occurs at this point. But it is passed over quietly or may even go unnoticed. For most positivists, although accepting the division between deductive and inductive logic, nonetheless continued to maintain the unity of the sciences: maintaining, that is, that the sciences consist of all and only those activities that include both deductive and inductive logic.

3. At this point, however, a new, and distinctively Wittgensteinian development threatens the old doctrine of the unity of the sciences in a more explicit way.

A simple question is raised. Why not extend the process a step further? For there exist other disciplines and "forms of life" whose principles are neither logical nor scientific - neither deductive nor inductive. There are, for instance, history and jurisprudence and religion and politics. In the past, practitioners of such disciplines have often been criticized by reference to logical and scientific standards. Yet if logic cannot be permitted to judge science, why should science or logic be permitted to judge such other forms of life? Why eliminate only the imperialism of deductive logic? Why not eliminate the imperialism of inductive logic as well?

Under the approach adopted by the later Wittgenstein, and taken up with variations by Hirst, each "language game" or "form of life" - or, in the case of Hirst, "form of knowledge" - is said to possess its own ungrounded ultimate standards or principles or "logic" that need not conform to any other standards.

This means that there is no arguing or judging among different forms of life - or knowledge - anymore. Not only is there no longer a universal theory of criticism; there is no longer even a cross-disciplinary theory of criticism. Logic cannot judge science, or science, history; or, history, religion. And so on. There

is no unity to knowledge - or science. Scientific imperialism makes way for disciplinary independence - and for the division of knowledge.

Some of the consequences of this move are considerable and should be mentioned at least briefly: preservation of a minimum of "Two Cultures" is underwritten by professional philosophy; the fragmentation of the university and of the community is given a theoretical justification. Another consequence is a new conception of the task of philosophy, and the creation of the research programme that dominates Wittensteinian philosophy.

For in this theoretical justification itself resides all that remains of unity. Whereas the positivists provided a universal theory of criticism, the new explanation of error that arises here does away with such criticism; philosophical error is now thought to arise from the imposition of standards in usage in one area in different areas. Philosophical critique becomes critique not of content but of criteria application: the activity of showing how language may stray from its proper place and then bringing it back to its correct context. On this view, positivist philosophy as a whole may be regarded as a grand "category mistake", that of supposing that different forms of knowledge must satisfy the criteria of one supremely authoritative form of knowledge: science. Yet there is nothing wrong, so it is contended, with a positivistic empiricism within proper limits: positivism is all right for science in so far as it expresses the "inductive" principles behind the shared practice of the scientific community.

An explanation of error often leads to a program of reform whose aim is to create conditions under which such errors will no longer arise. So it is here. Wittgenstein himself never claimed that all identifiable disciplines and activities in which people engage are separate language games each with its own sets of rules. And Hirst is careful to say that existing disciplines only tend to conform to the forms of knowledge. But other Wittgensteinians went further, to suggest that each

individual activity - law, history, science, logic, ethics, politics, religion - has its own special grammar or logic; that mixing the grammar of one of these with that of another leads to error; and that it is the new job of the philosopher - his new research program under the Wittgensteinian disposition - to describe in detail these separate logics or grammars. In this spirit two generations of British and American professional philosophers came to write books with titles such as The Vocabulary of Politics, The Language of Morals, the Logic of Moral Discourse, The Logic of Historical Explanation, The Language of (Literary) Criticism, The Language of Fiction, The Uses of Argument, The Logic of the Social Sciences, The Logic of the Sciences, The Province of Logic, The Language of Education, The Logic of Education, The Logic of Religious Language, Faith and Logic, Christian Discourse, The Language of Christian Belief, The Logic of Colour Words, and so on. Hirst's work in education is one of the most influential examples of the carrying out of this research program.

This is a research program according to formula - a very simple "research formula" whereby a book or learned paper can be generated: "Take one of the phrases 'The Logic of x', 'The Language of x', or 'The Grammar of x'; substitute for x some activity or discipline such as those just named; write a treatise on the topic so created." The ease with which such programmes could be carried out further explains the success of such philosophizing - as witness to which each of the titles cited has decorated a book or monograph actually published.

Latent in all this is a new imperialism, generally unconscious, according to which disciplines or forms of life must conform as follows: true forms of life - or forms of knowledge - (a) must not judge one another; and (b) must not try to describe some common world in collaboration with another discipline since each form of life creates its own world.

VI. A DIFFERENT, POPPERIAN, LOOK AT THE BACKGROUND CONTEXT

Popperians see the matter differently.

The whole chain of argumentation just rehearsed depends on the first steps: the claims that sense experience is the foundation and justification of all knowledge; that induction exists; and that the problem of induction cannot be solved nor the scientific method charted in a purely deductive way. But Popper argues that these claims are all invalid. And if he happens to be right, the whole argument unravels, and a whole generation of philosophizing is intellectually undone.

Watch how the argument looks to Popperians. Popper gave a solution to the problem of induction, showing that there is a falsifying deductive relationship between evidence and theory. Thus there is no need to chart a separate inductive logic for science. Quite the contrary, there is no such thing as induction! If logic is permitted to hold sway in the natural (or "inductive") sciences, if it is not necessary to chart a special canon for the natural sciences, the rest of the argument - an argument for developing a special canon or set of criteria for each form of knowledge - does not even arise; and there is no reason any longer for the assumption of underlying and irreducible disunity.

What then is at the heart of the dispute between the two sides? It is the question whether Popper has indeed given a sound deductive solution to the problem of induction. If he has, there is no difficulty in formulating an account of the unity of the sciences. If he has not, the argument that we have rehearsed - what I call the "Wittgensteinian problemmatic" - will continue to exert some force.

This is the background context of our dispute. If we neglect it, and neglect to consider what weight rides on the rival claims that the problem of induction has or has not been solved, we are not likely to reach understanding or

agreement on any other point.

VII. JUSTIFICATION AND RATIONALITY: COMPREHENSIVE RATIONALITY.

As stated above, two independent and closely related features of the Wittgensteinian position force the conclusion that knowledge is essentially divided. We have just discussed the first, contextual, feature - what I call "The Wittgensteinian problemmatic". The second - to which I turn in this section - is structural, and comes from "justificationism", a feature that Wittensteinian philosophy shares with most other philosophies.

Justificationist philosophy is non-Darwinian, as mentioned above. I believe that much contemporary epistemology remains pre-Darwinian, indeed lamarckian, with disastrous consequences. Here I agree with John Dewey, who stated, in his essay "On the Influence of Darwin on Philosophy" that Darwin's Origin of Species had introduced a mode of thinking that transformed the logic of knowledge.

What is involved here is theory of rationality. Hirst's account of rationality (like Wittgenstein's) is that form of justificationism that I call "limited rationality" (to be explained below).

Rationality is action and opinion in accordance with reason. But what that amounts to is disputed by rationalists and other philosophers. What I call theory of rationality has grown from this disagreement. While there obviously are numerous ways to categorize theories of rationality, I believe that all important variants fall into one of no more than three main categories, which I call: comprehensive rationality, limited rationality, and pancritical rationaity. Let us take them in turn.

The first two of these share the assumption that rational action and

opinion must be justified or given a foundation. On such an assumption, theory of rationality would have to be concerned with how to justify - i.e., verify, confirm, make firmer, strengthen, validate, make certain, show to be certain, make acceptable, probabilify, cause to survive, defend - whatever action or opinion is under consideration.

Comprehensive rationality dominates traditional philosophical approaches, and remains the most common account of rationality. It is explicitly state as early as Epictetus (Discourses, Chapter 2), and combines two requirements: 1) a rationalist accepts all positions that can be justified by appeal to the rational authority; and 2) a rationalist accepts only such positions.

But what is the nature of this rational authority? Here defenders of comprehensive rationality differ among themselves, their answers falling into two main categories:

> 1) Intellectualism (or Rationalism), according to which rational authority lies in the Intellect or Reason. A rationalist justifies his action and opinion by appealing to intellectual intuition or the faculty of reason. This position is associated with the philosophies of Descartes, Spinoza, Leibnitz.
>
> 2) Empiricism (or Sensationalism), according to which the rational authority lies in sense experience. An empiricist justifies his action and opinion by appealing to sense observation. Associated with this view are the philosophies of Locke, Hume, Mach, and the Carnap of Der logische Aufbau der Welt.

Such comprehensive accounts of rationality - or comprehensive justificationism or foundationalism - are widely thought today to have failed. There are a number of reasons for this, of which I shall cite only four:

First, the two main candidate authorities - pure reason and sense observation - are hardly authoritative. Sense observations are psychologically and physiologically impure: they are theory-impregnated, subject to error and illusion. (This consideration plays a prominent role, of course, in the theories of Popper and

of Hayek.)

Second, even overlooking such difficulties, both authorities are intrinsically inadequate to do what is required: for they are too narrow and too wide. Clear and distinct ideas of reason let in too much, are too wide, in the sense that they can justify contradictory conclusions - as Kant showed with the antinomies of pure reason. Sense observation, on the other hand, is logically inadequate to justify scientific laws, causality, memory, and the existence of other people and the external world (as noted above); and in this sense it excludes too much and is too narrow for the purpose in hand.

Third, the two requirements for comprehensive rationality - that all and only those positions be accepted that can be justified by appeal to the rational authority - are mutually incompatible: they cannot be held simultaneously. Thus if we accept the second we must justify the first. But the first requirement is not justifiable by sense observation, intellectual intuition, or any other rational authority ever proposed. Moreover, any such justification of the practice of accepting the results of argument, even if it could per impossible be carried out, would be pointless unless it were already accepted that a justification should be accepted at least here - which may be at issue. So if the first requirement cannot be justified, either theoretically or practically, the second requirement forbids that one hold it. Worse, the second requirement also cannot be justified by appeal to rational criteria or authorities. Therefore it asserts its own untenability and must, if correct, be rejected.

Fourth, and most serious, no version of comprehensive rationality can defeat the ancient argument about the limits of rationality that is found already in Sextus Empiricus and the anciet sceptics, to the effect that there are essential limitations to justification. Any view may be challenged by questions such as "How do you know?", "Give me a reason", or "Prove it!" When such challenges are

accepted by citing further reasons that justify those views under challenge, these may be questioned in turn. And so on forever. Yet if the burden of justification is perpetually shifted to a higher-order reason or authority, the contention originally questioned is never effectively defended. One may as well never have begun the defence: an infinite regress is created. To justify the original conclusion, one must eventually stop at something not open to question for which one does not and need not provide justificatory reasons. Such a thing - e.g., a standard, criterion, authority, basic presupposition, framework, way of life - would mark the halting point for rational discussion, the limit of rationality.

To sum up these four difficulties in comprehensive rationality: the first two argue that all proposed authorities are, for various reasons, inadequate to their task; the third argues that the position is inconsistent; the fourth, that it demands unlimited justification whereas justification is essentially limited.

VIII. LIMITED RATIONALITY.

There have been two chief reactions to these difficulties in comprehensive rationality. There is no essential difference between these two reactions, only differences of emphasis. Both reactions fall under what I call theories of limited rationality.

The first reaction is frankly irrationalist, or fideist. It joyfully takes the difficulties to mark the breakdown of an over-reaching reason. The fideist makes a claim. I will not call it quite an argument: for the radical fideist is concerned with argument only to the extent that it is an effective weapon against someone, such as a rationalist, who is moved by argument. This claim is simple. Since an eventual halt to rational justification is inevitable and cannot be made with

objective and universal reason, it must be made with unreason, subjectively and particularly. Thus the fideist deliberately makes a final, unquestionable subjective commitment to some particular principles or authority or tradition or way of life, or some framework or set of presuppositions. Such a way of life creates and defines itself by reference to the limits of justification accepted within it: by reference to that to which commitment is made or imposed, in regard to which argument is brought to a close. (Note that Gray appears to think that Hayek chooses this approach whereas Weimer identifies Hayek's approach with my own different one, to be presented below.[18]

Although this limit to justification is a limitation to rationality, and although reason is now relativized to it, it remains a logical limitation. This point is emphasized, in order to press home the attack on rationality. For if no one can escape subjective commitment, then no one may be criticized rationally for having made such a commitment, no matter how idiosyncratic. If one must, then one may: any irrationalist thus has a rational excuse for subjective irrationalism. He has a "tu quoque" or boomerang argument. To any critic, the irrationalist can reply: "tu quoque", reminding him that those whose rationality is similarly limited should not berate others for admitting to the limitation. The limitation is the more telling in being accompanied by the remark that in those things which matter most - one's ultimate standards and principles - reason is incompetent; and that those matter whcih reason can decide are of comparatively little importance. Kierkegaard, in his Fear and Trembling, in his Johannes Climacus, or De Omnibus Dubitandum Est, is one of many writers who have used such an argument to reach such a conclusion.

The second main sort of reaction to the difficulties of comprehensive rationality does not differ structurally from the one I have just described; and it reaches most of the same conclusions. Yet there is a marked difference of emphasis and mood. It can be, and often has been called "fideism", and yet if it

is so, it is a fideism "without glee". It is taken up by some, such as Wittgenstein and Hirst, who, far from having any particular animus against rationality, rather indicate their respect for rational argument by taking the arguments against comprehensive rationality seriously, and by attempting to chart a more adequate, limited - i.e., non-comprehensive - approach to questions of rationality.

Such a limited view of rationality is common within British philosophy of the so-called analytical sort, and also within American "neo-pragmatism". Taking such a general approach, but differing greatly in individual emphasis and attitudes to rationality, are Sir Alfred Ayer, Robert Nozick, Hilary Putman, W. V. Quine, Richard Rorty, Morton White, and many others. It is now difficult to find a philosopher who does not take some such approach, however reluctantly.

Despite differences, virtually all who take this limited approach to rationality share at least two assumptions: one about commitment and the limits of justification; the other about description as the only alternative to justification.

First, they accept that grounds or reasons or justifications must be given if something is to be rational, but insist that the standards - principles, criteria, authorities, presuppositions, frameworks, or ways of life - to which appeal is made in such justification cannot and need not be themselves justified, and that a commitment must hence by made to them.

Hirst's account of rationality, conforms to this first assumption. Recall that, for him, any rational activity, "as such", is characterized by commitment to fundamental principles concerning the possibility of justification which mark the limits of rationality. And these principles are ultimate. They themselves cannot be justified, and hence cannot be assessed or questioned: justification, and hence assessment, can be made only by means of them. On the other hand, it is claimed that they do not need to be justified, since their justification "is written into them".

In On Certainty, Wittgenstein states such a position as follows:

> Must I not begin to trust somewhere?...somewhere I must begin with not-doubting; and that is not, so to speak, hasty but excusable: it is part of judging. (150)... regarding (something) as absolutely solid is part of our method of doubt and enquiry. (151)... Doubt itself rests only on what is beyond doubt. (519)... The questions that we raise and our doubts depend on the fact that some propositions are exempt from doubt, are as it were like hinges on which those turn. (341)... If I want the door to turn the hinges must stay put. (343)... Whenever we test anything, we are already presupposing something that is not tested. (163)... At the foundation of well-founded belief lies belief that is not founded. (253)... Giving grounds... justifying the evidence, comes to an end; - but the end is not certain propositions' striking us immediately as true, i.e., it is not a kind of seeing on our part; it is our acting, which lies at the bottom of the language-game. (204)... The language-game is...not based on grounds. it is not reasonable (or unreasonable). (559)... if the pupil cast doubt on the justification of inductive arguments...the teacher would feel that this was only holding them up, that this way the pupil would only get stuck and make no progress. - And he would be right...this pupil has not learned to ask questions. He has not learned the game that we are trying to teach him. (315)

Wittgenstein's statements here are clear, and to make clearer, his student Norman Malcolm has explained, in his essay on "The Groundlessness of Belief", that Wittgenstein means that justification occurs within a system and that there can be no rational justification of the framework itself. Rather, as Malcolm puts it: "The framework propositions of the system are not put to the test." It is, he maintains, a conceptual requirement that inquiries stay within boundaries. The implications of this claim for the "unity" of the sciences are obvious, and echo the remark by Hirst which I used as an epigraph for this paper.

Moreover, scientific and religious frameworks are on a par here, according to Malcolm. Quite in line with Wittgenstein's own remarks about the justification of induction, Malcolm states: "the attitude toward induction is belief in the sense of 'religious' belief - that is to say, an acceptance which is not conjecture or surmise and for which there is no reason - it is a groundless acceptance...Religion is a form of life...Science is another. Neither stands in need in justification, the one no more than the other".

There is however a difference between Wittgenstein and the gleeful fideist who glories in the limitations of reason and calls for deliberate commitment to the absurdity of one's choice. Malcolm reports that, on the Wittgensteinian view, one does not decide to accept framework propositions. Rather, "we are taught, or we absorb, the systems within which we raise doubts... We grow into a framework. We don't question it. We accept it trustingly. But this acceptance is not a consequence of reflection."

So much for the first assumption made by proponents of "limited rationality". Their second assumption is that the task of the philosopher, once he has seen that any attempt to justify standards or frameworks or ways of life must be made in vain, is to describe them. That is, the task of the philosopher is the subject-neutral description of all standards and frameworks - a description in terms of which no particular set of standards is given authority over any other. This is Hirst's specific task in education, and I have discussed briefly the research programme that is part of this second assumption in section VI above.

We have now reviewed in a very general way several sorts of comprehensive rationality and several sorts of limited rationality. Almost all contemporary philosophers, including Wittgenstein and Hirst, assume implicitly that there are no other options: they do not even consider other possibilites. On this point, Popperians differ utterly from the mainstream of philosophy, and I should like to indicate our own solution - pancritical rationality - in the next section. The solution to the problem of induction, combined with the nonjustificational account of criticism that I am about to present, enable us to avoid the related Wittgensteinian doctrines of the division of knowledge and the limits of rationality, and make it at least theoretically possible for there to be a unity of the sciences.

IX. PANCRITICAL RATIONALITY

The Popperian position differs utterly from the theories of rationality just relearsed in that it provides a nonjustificational account of rationality. In this account, rationality is unlimited with regard to criticism (although there are various other limitations to rationality which Popper, like Hayek, stresses, in opposition to various forms of "scientism"); and there are no intrinsic logical reasons requiring the division of knowledge.

Before stating the position, I would like to note and concede - lest we be sidetracked in textual exegesis - that there are, in Popper's early works (e.g., in his first book, Die beiden Grundprobleme der Erkenntnistheorie, in Logik der Forschung, and also in the first three editions of The Open Society and Its Enemies) a few fideistic remarks. In The Open Society and Its Enemies (Chapter 24), this fideism appears in Popper's "irrational faith in reason", as he calls it when he urges us to "bind" ourselves in reason. In Logik der Forschung (Chapter 5), a similar fideistic "decisionism" emerges briefly in his discussion of the acceptance of basic statements; and in Die beiden Grundprobleme, such a fideism appears in passing in his remarks about the selections of aims and goals, and about "Kant's idea of the primacy of practical reason".

In my view, these early fideistic remarks are relatively unimportant; they play no significant role in Popper's thought but are superfluous remnants of justificationism, out of line with the main thrust and intent of his methodology, empty baggage carried over from the dominant tradition. They may be dropped without loss, as Popper himself has done, with considerable improvement in consistency, clarity, and generality in the position as a whole. When, in 1960, I proposed a contrast between justificationist and nonjustificationist theories of criticism as a generalization of his distinction between varification and falsification,

he dropped this remaining fideism from his approach, and adopted instead the approach that I am about to describe. Our contrast between justificationist and nonjustificationist accounts was introduced at that time.

The alternative approach, which Popper continues to call "critical rationalism," and which I prefer to call "comprehensively critical" or "pancritical" rationality, is then an attempt to overcome the problem of the limits of rationality by generalizing and correcting Popper's original approach.

Popperians begin by denying both assumptions of limited rationality mentioned above: that is, they deny that justifications must be given in order for something to be rational. And they do not turn to description when justification proves impossible. Rather, they abandon all justification whatever. And they see criticism, not description, as the alternative to justification.

While agreeing with Wittgenstein (and Hirst) that principles and standards of rationality, or frameworks and ways of life, cannot be justified rationally, we regard this as a triviality rather than as an indication of the limits of rationality. For we don't think that anything at all can be justified rationally. Not only do we not attempt to justify the standards; we do no attempt to justify anything else in terms of the standards. We do not think that there is any such thing as "well-founded belief" anywhere in the "system."

Rather, we locate rationality in criticism. (And thus the resulting name "pancritical rationality" (or comprehensively critical rationalism).) A rationalist is, for us, one who holds all his positions - including standards, goals, criteria, authorities, decisions, and especially his framework or way of life - open to criticism. He withholds nothing from examination and review. He does wish, by contrast to Malcolm, to put the framework propositions of the system to the test. We believe that the framework can be held reasonably or rationally only to the extent that it is subjected to and survives criticism. Thus we wish to enhance the

role of "reflective acceptance" of frameworks, not deny it. In connection with our examination of frameworks, we have gone so far as to challenge the very existence of inductive reasoning, and obviously neither "believe" in induction or regard it as immune from criticism. Anyone who will return to reread the selections from Wittgenstein quoted above we see that we are, then, from Wittgenstein's point of view, "bad pupils."

Not only would we reject induction; we would reject Hirst's principles - i.e., the principles that he claimed one must commit oneself to in order to be rational; the principles that he claimed are presupposed in the rational pursuit of knowledge. We would claim that both principles are, to be sure, unjustifiable, but that they are also criticizable and false!

Some may object to our position that it is simply impossible - not only practically impossible, as it may well be, but also logically impossible. They will insist that all criticism is in terms of something which must be taken for granted as justified, and which is hence beyond criticism. They may add that it is a mark of our being bad pupils that we do not understand this.

But we do understand it: we understand what the claim means and know that Wittgensteinians (and many others) make it all the time. We also understand something of the historical background of the claim. This claim is itself a "framework" or structural feature. But we deny it. We deny that it is correct: we deny that it is necessary to trust something - a "hinge" as it were - that is beyond doubt. "Regarding something as absolutely solid" is not part of our method of doubt and enquiry. Nor do we suppose that something that is not tested must be presupposed whenever a test is made.

For the distinctive character of our position lies in its quite novel separation of the question of justification from the question of criticism. Of course all criticism is "in terms of" something. But this "something" in terms of which

the criticizing is done need not be taken for granted as justified or beyond criticism -- indeed, it need not be taken for granted at all. One example of such nonjustificational criticism is Popper's account of corroboration. To test a particular theory, one determines what sorts of events would be incompatible with it, and then sets up experimental arrangements to attempt to produce such events. Suppose that the test goes against the theory. What has happened? The theory definitely has been criticized in terms of the test: the theory is now problematic in that it is false relative to the test reports; whereas the test reports may at the moment be unproblematic. In that case, the theory may be provisionally and conjecturally rejected because it conflicts with something that is unproblematic or less problematic. Does this prove or establish or justify the rejection of the theory? Not at all. Test reports are hypothetical, criticizable, and revisable - forever - just like everything else. They may become problematic: they are themselves open to criticism by the testing of their own consequences.

This process of testing and attempting falsification is of course potentially infinite: one can criticize criticisms indefinitely. Rationality is in this sense unlimited. But no infinite regress arises since there is no question of proof or justification of anything at all. This approach may produce in one who is unaccustomed to it an uncomfortable feeling of floating, of having no firm foundation. That would be an appropriate feeling: for it is floating; it is doing without a foundation. But this approach does not produce paradox: nor is floating logically impossible, however difficult it may be physically. Thus the tu quoque argument is defeated: no commitment is necessary; all commitments may be criticized.

In sum, Popperians separate justification and criticism; whereas in Wittgenstein and the Wittgensteinians, justification and criticism remain fused. The unconscious fusion of justification and criticism that permeates Wittgensteinian

thought explains why Wittgensteinians turn to description of frameworks and standards when justification of them turns out to be impossible. For criticism only appears as an alternative to justification after the two notions are separated.

The new problem of rationality - of criticism and the growth of knowledge - now becomes the problem of the ecology of rationality. Instead of positing authorities in terms of which to guarantee and to criticize action and opinion, we aim to construct a philosophical programme for fostering creativity and counteracting intellectual error. Within such a programme, the traditional "how do you know?" question does not legitimately arise. For we do not know. A different question becomes paramount: "How can our lives and institutions be arranged so as to expose our positions, actions, opinions, beliefs, aims, conjectures, decisions, standards, frameworks, ways of life, policies, traditional practices, etc. - whether justifiable or not - to optimum examination, in order to counteract and eliminate as much error as possible?"

This account of rationality happens to be parallel to the neo-Darwinian account of evolution and adaptation in terms of blind (unjustified) variation and selective retention: evolutionary adaptation is also a knowledge process. The question of the justification of opinion is as irrelevant as any question about whether a particular mutation is justified. The issue, rather, is of the viability of the mutation - or the proposed opinion. The question is resolved through exposing that opinion to the pressures of natural selection - or attempted criticism and refutation. Mere survival in this process does not guarantee the survivor: a species that survives for thousands of years may nonetheless become extinct. A theory that survived for many generations may eventually be refuted - as was Newton's. And a framework for thought - such as the inductivist framework, or the justificationist framework - may eventually be refuted too.[19]

I have, then, remarked that Wittgenstein and Popper take different

approaches to these issues, and I have tried to state a few of these differences. From the Popperian perspective, Wittgenstein is thoroughly justificationist, abandoning justification only vis a vis frameworks rather than systematically; and both abandoning and retaining justification, where he does so, for thoroughly justificationist reasons.

X. SOME SPECIFIC CRITICISMS, AND SOME MINUTE PHILOSOPHY

It seems to me that the criticism that I have given - contextualizing the doctrine of the disunity of knowledge and revealing its structure - is more effective than detailed examination. I have not aimed to carp at it, but to pull the rug from under it. But in this section I should like to make a few more detailed criticisms.

I have already remarked that the position is a priori. This point ought to be driven home, to illustrate the bogus character of the claim that Wittgensteinian philosophy is "analytical" and depends on careful study of individual concrete cases. Take an example. Hirst tells us that there are "seven or eight" forms of knowledge with irreducible principles and concepts, one of these forms being mathematics. But on Hirst's own terms, it would be possible to push this number very much higher. For instance, I do not think that many real mathematicians would be prepared to specify the principles of mathematics. Just restricting ourselves to geometry, consider the following table of the various geometries:

(4) Metrical (Euclidean) Geometry
(3) Affine Geometry
(2) Projective Geometry
(3) Topology

The relation between the higher and lower geometries here is very complicated, but it is not one of reducibility, as it would have to be if there were a set of principles of mathematics. Metrical geometry, for instance, is only partically reducible to projective geometry; rather, metrical geometry is an enrichment of projective geometry. The enrichment is partly of concepts, but mainly of theorems: there are concepts essentially present on higher levels which are lacking, and unobtainable, on lower levels. But Hirst stipulates that each form of knowledge possesses concepts peculiar to it. Then why not say that there are four "forms of knowledge" within geometry alone - not to mention the rest of mathematics? The same tactic could be taken in other areas of mathematics and also in the natural sciences, wherein chemistry is not reducible to physics but is an enrichment of it - and biology in turn an enrichment of chemistry.[20]

There are many other ways to break down any initial plausibility that Hirst's division may have. Even factual and moral statements, for instance, can be shown to be interrelated (without committing the "naturalistic fallacy", as I have argued elsewhere.)[21] Thus his "forms" have little real basis, but result from an a priori imposition of Wittgensteinian ideas on existing, crude, disciplinary distinctions.

Its a priori character is not the only remarkable characteristic of this position that argues the division of knowledge. Another characteristic, in many of its presentations, is its mystification and ritual affirmations and denials. This mystification takes a number of different, but typical, forms, that use rather similar...let us call them "argumentations", for they are not arguments.

One such argumentation is that the ultimate standards, which cannot be justified, also do not need to be justified, or are, in some higher sense, justified after all. As Hirst puts it: the fact that they cannot be justified does not mean that they are "without justification"; for "they have their justification written into them". In effect, he implies that these standards act as judge in their own cause.

"Nor", Hirst insists, "is any form of viciously circular justification involved by assuming in the procedure what is being looked for. The situation is that we have here reached the ultimate point where the question of justification ceases to be significantly applicable."

What Hirst says here is not an argument; it is simply a series of claims, simply words. It seems as if many analytic philosophers go into a kind of trance, and repeat such words as a kind of magic formula, when they reach any question of the assessment of principles. Hirst does not show how his procedure avoids circularity; he just denies that it does. He also begs the question and denies that he does that. He says that his principles are "self authenticating": they "have their justification written into them". But he would deny a similar move made by anyone else. How does he know that we have indeed here "reached the ultimate point where the question of justification ceases to be significantly applicable"? Hirst would I suspect reply by saying that the "apparent" circularity is due to "the inter-relation between the concepts of rational justification and the pursuit of knowledge". But by arranging matters this way, by inter-defining his concepts, he conceptually blinds himself, and prevents himself from considering the possibility that knowledge might be pursued nonjustificationally yet rationally. Not to mention that he has "solved" his problem by definition.

Another example of the same strange incanting is to be found in Sir A. J. Ayer's The Problem of Knowledge. Ayer even states explicitly that his standards "act as judge in their own cause". (p. 75) Ayer too concedes that it is impossible to provide a rational justification for basic philosophical standards, principles, procedures. It is impossible to give a proof "that what we regard as rational procedure really is so; that our conception of what constitutes good evidence is right." (p. 74) Yet simply to discard the demand that the standards of rationality be justified hardly suffices. Ayer must proceed to show how his approach, as a

theory of rationality, can afford to dispense with the requirement that standards be justified. Yet he does nothing of sort. Why on his account do our standards of rationality not need rational justification? Simply because any such standards "could be irrational only if there were a standard of rationality which it failed to meet; whereas in fact it goes to set the standard: arguments are judged to be rational or irrational by reference to it." (p. 75) "When it is understood", he explains, "that there logically could be no court of superior jurisdiction, it hardly seems troubling that inductive reasoning should be left, as it were, to act as judge in its own cause." (p. 75) "Since there can be no proof that what we take to be god evidence really is so, " then "it is not sensible to demand one." (p. 81)

What it is "understood"...Wittgenstein's word again. But this is the issue and cannot be conceded or "understood" in advance. Such a position, even if assumed to be conherent, must fail as atheory of rationality. The nub of the fideist attack on comprehensive rationality, as we saw in Section VII and VIII above, was not simply that it is impossible, but that since it is impossible, the choice among competing ultimate positions is arbitrary. A theory of rationality that begins by admitting the unjustifiability of standards of rationality must go on to show that irrationalism can be escaped without comprehensive rationality. In failing to do so, Ayer's discussion begs the question and is itself a variety of fideism - and hence no answer to it (contrary to his intention).

But matters are even worse. Consider his argument more closely. He contends that our standards of rationality enjoy an immunity from the demand for justification since it would be impossible to judge them to be irrational. For they set the standards on which any such judgement of their own irrationality would have to be based. Now an argument such as this could not be relevant, let alone valid, unless some particular standards and procedures of rationality, such as Ayer's own, which, like Wittgenstein's, include "scientific induction", are assumed to be

correct. If some particular standards of rationality are correct, then there can exist no other rational standards which are also correct but which can nevertheless invalidate the former as irrational. This "if" marks a crucial assumption: this is precisely what is at issue. Criticisms of putative standards of rationality have always questioned whether they were correct. Alternative conceptions of scientific method, such as Popper's, which deny the existence of inductive procedure, let alone its legitimacy, do claim that there are standards of rationality which positions such as Ayer's, Hirst's, and Wittgenstein's fail to meet.

Many other examples of such incantation, as opposed to argument, about circularity could be given.

I have been able to find in Hirst (and not in Ayer) one additional, although partly overlapping, argumentation on behalf of the necessity of a sort of circularity or begging of the the question. Hirst argues (p. 210) that "To ask for the justification of any form of activity is significant only if one is in fact committed already to seeking rational knowledge. To ask for a justification of the pursuit of rational knowledge itself therefore pre-supposes some form of commitment to what one is seeking to justify."

Now this is a misapplied version of a very old argument that has an element of truth to it but is for the most part specious. The old argument is that one cannot persuade a man to be moral unless he is already moral, or persuade a man to be logical with logical arguments unless he already accepts logic, and so on.[22]

These arguments are clumsy and in themselves invalid applications of the more general point that one cannot argue a man into a position, including the position of listening to argument, unless he has accepted that argument counts. That is, if both morality and immorality are arguable positions, then one can argue a man into either if he accepts that argument counts.

I mentioned a version of this argument myself above (section VII), in my discussion of the second objection to comprehensive rationality. And in this version I believe that the argument is valid. Nonetheless, it seems to me that it is not a very good valid argument, and should be avoided if possible. For the argument remains a bit verbal; and it is more concerned with the source of the decision to adopt a particular position or way of life than with the more important question whether that decision and position are open to criticism. Thus when one is concerned with the question of whether a decision is criticizable, it hardly matters whether that decision was originally made as a result of argument, or whether the individual in question just stumbled into it, or whether he or she decided by tossing yarrow stalks, or by some other arbitrary method. Even if the rationalist position had originally been adopted as a result of an irrational arbitrary decision, it is possible that the person who made the choice would, by living in accordance with rational traditions and precepts, gradually become very rational, very open to criticism, as an unintended consequence of his original choice.[23]

My own view is that important choices, such as those of philosophical positions and ways of life - even of the rationalist way of life itself - are very often not the result of argument, any more than scientific theories are the result of sense observation. Theories are put forward; choices are made. The question of the sources of the theories and choices is not important. The question, rather, is whether such theories and choices are open to criticism. If they are, then they are held rationally, even if they were not originally made rationally as, for instance, the result or conclusion of an argument.

To bring this argument back to Hirst: Hirst sees none of these nuances, and he misses the point entirely. Remember, Hirst maintains that to ask for a justification of any activity is significant only if one is in fact committed already to seeking rational knowledge. He also claims that to question the pursuit of

rational knowledge is self-defeating since it depends on the very principles whose use is being called into question. But all this is false: fideists who had nothing but contempt for reason - who have had no commitment to it whatever - have repeatedly demanded from rationalists justifications of the principles of rationality precisely and only to taunt these rationalists with the observation that they cannot do this - and thus cannot live up to their own standards. Far from defeating themselves, they were very effectively undermining their opponents with this line of argumentation. For the argument can be used by an irrationalist in order to defeat a rationalist on his own terms. This ploy, which I call the tu quoque argument, has always been the most effective argument in the armory of irrationalism. That is, fideists have used rational argument, including this one, in order to frustrate rational argument; they have used it not because they were committed to it, but because their opponents were committed to it. They have turned the paradoxes of justification against would-be rationalists.

In sum, the objectionable but valid argument is that one cannot argue a man into a position, including the position of listening to argument, unless he has accepted that argument counts. Whereas Hirst's quite invalid argument, directly contradicted by historical practice and the whole problem situation, is that one cannot ask for the justification of rational activity unless one is already committed to what one is attempting to justify.[24]

The purpose of the minute philosophy of this section has been only to show that it is not only the background context, and the justificationism, of Wittgensteinian philosophy that is at fault. There are other very serious faults too, faults in the detailed working out of the programme.

XI. ON THE SPECIATION OF KNOWLEDGE.

Our contributions to this Committee were intended to have, where possible, some continuity with last year's session on Evolutionary Epistemology. My evaluation of the Wittgensteinian programme for the division of knowledge is clearly influenced by my own evolutionary perspective. There is no counterpart in biology to the "justification" that plays so important a role in Wittgensteinian thought. Whereas there is a clear counterpart to the nonjustificational criticism of the Popperian position.

I should, however, mention that there has been, within evolutionary and biological thinking, a line of speculation that is somewhat reminiscent of Hirst's forms of knowledge. I am thinking of the ideas of "biological archetypes" and "internal selection" that are associated with the names of L. L. Whyte, W. H. Thorpe, Ludwig von Bertalanffy, Arthur Koestler, Helen Spurway, and A. Lima de Faria. Some of this is related to D'Arcy Thompson's great work On the Growth of Form.

The idea of internal selection refers to the "coordinative conditions" (Whyte's term) of biological organization, conditions under which life may evolve at all. These conditions restrict the range of possible mutations on the basis neither of the facts of the external ecological niche nor of the internal dispositional state but rather on pre-competitive internal genetic grounds. This kind of selection is explicitly intended to be non-Darwinian, and supplements Darwinian theory by adding a separate source of selection. On this account, mutations reaching the external test have previously been sifted internally. These organizational restrictions in effect define unitary laws underlying evolutionary variety. Although permitting unlimited variations, they restrict the variations to a limited number of themes, thus confining evolution to particular avenues not defined or determined by

external factors. Thus there is not only selection at the phenotypic level but pre-selection at the molecular and chromosomal levels. (It is essential to the argument that this pre-selection is not random or even blind in Campbell's sense.)

While some of the discussions developed alone these lines are very interesting, most biologists seem to believe that the limited evidence for this kind of evolution can as easily be interpreted in a thoroughly Darwinian way. In any case, there is no evidence to suggest that Hirst or other Wittgensteinians even know about his line of thinking, let alone that they would want to tie their own programme to it.[25]

In closing, I would like to state briefly some of my own tentative conclusions not about the <u>forms</u> of knowledge, but about speciation in knowledge.

When one take an evolutionary and nonjustificational approach, something somewhat resembling forms of knowledge may remain, but would no longer have most of the fundamental properties that Hirst attributes to them. What would remain would be akin to varieties, not forms. Within such an approach, the fundamental speciation or demarcation that occurs within the structure of objective knowledge is with regard to the sorts of selectors or criticisers appropriate to different kinds of claims; moreover, all these presuppose a common organon of criticism. In disagreement with W. V. Quine, I believe that such an organon is presupposed in any self-correcting, self-revising system. Any further speciation that might approximate more closely to Hirst's forms of knowledge must be subordinate to this complex underlying - and unifying - structure.[26]

FOOTNOTES

1. The Order of Things: An Archeology of the Human Sciences (New York: Random House; 1970), p. 246. See also his The Archeology of Knowledge (London: Tavistock Publications; 1972), esp. Chapter 6.

2. Paul H. Hirst: Knowledge and the Curriculum (London: Routledge and Kegan Paul, Ltd.; 1974), p. 137.

3. See F. A. von Hayek: The Sensory Order (Chicago: University of Chicago Press; 1952); Gregory Bateson: Mind and Nature: A Necessary Unity (New York: Dutton; 1979).

4. See K. R. Popper: "Scientific Reduction and the Essential Incompleteness of All Science", in F. J. Ayala and T. Dobzhansky, eds.: Studies in the Philosophy of Biology (Berkeley: University of California Press; 1974), pp. 259-284, and Addendum 2 and 3 of The Open Universe: An Argument for Indeterminism, ed. W. W. Bartley, III (London: Hutchinson; 1982), pp. 131-162. See also Popper's The Self and Its Brain (New York: Springer Verlag; 1977), pp. 20-21., and Sir Peter Medawar: "A Geometric Model of Reduction and Emergence", in Ayala and Dobzhansky, eds., op. cit., pp. 57-63; and Donald T. Campbell: "Downward Causation in Hierarchically Organised Biological Systems", in Ayala and Dobzhansky, eds., op. cit., pp. 179-186.

5. See my "Logical Strength and Demarcation", in the Festschrift for Gerard Rednitzky, ed. Gunnar Andersson: Rationality in Science and Politics (Dordrecht: D. Reidel; 1984). See also my "The Philosophy of Karl Popper, Part I: Biology and Evolutionary Epistemology", Philosophia, 6, 3-4, September-December 1976, pp. 463-494; my "Philosophy of Biology versus Philosophy of Physics", in Fundamenta Scientiae, 3, pp. 55-78, 1982; and my "The Challenge of Evolutionary Epistemology:, in Proceedings of the 11th International Conference on the Unity of Sciences (New York, 1983).

6. John N. Gray: "F. A. Hayek and the Rebirth of Classical Liberalism", in Literature of Liberty, Winter 1982.

7. I believe that Hayek is also a hypothetical realist, and on this point I find myself in disagreement with John Gray's article in Literature of Liberty, op. cit. It is an excellent article, one of the best even written about Hayek's work, and I want in no way to criticize it, for I appreciate it very much. But Gray's account of the epistemology of The Sensory Order seems to me to be in error. Gray states on several occasions that Hayek's theory of knowledge affirms "that the order we find in the world is given to it by the organizing structure of our own mind..." (p. 24). Or again, "both Hayek and Popper share the skeptical Kantian view that the order we find in the world is given to it by the creative activity of our own minds" (p. 27). Or (p.22): "It follows from this skeptical Kantian standpoint that the task of philosophy cannot be that of uncovering the necessary characters of things."

Now this is not Popper's view, and I do not believe that it is Hayek's view either; and it has the considerable disadvantage of making Hayek sound like some sort of idealist or phenomenalist. Hayek's views are however quite clearly stated on pp. 173ff. of The Sensory Order, where it is evident that he shares with the hypothetical realists the belief that the order created by our minds is an approximation to an order present in the external world which is independent of our minds (he refers to it (p. 173) as "an objective order); and that the structures of our sensory organs have been shaped, in the course of evolution, by their contact with these external realities.

8. Paul H. Hirst: Knowledge and the Curriculum, op. cit.; P. H. Hirst and R. S. Peters: The Logic of Education (New York: The Humanities Press; 1971); P. H. Hirst: "Liberal education and the nature of knowledge", in R. F. Dearden, P. H. Hirst, and R. S. Peters: Education and Reason (London: Routledge and Kegan Paul; 1972).

9. See Skilbeck's interesting Inaugural Lecture at the London Institute of Education: A Core Curriculum for the Common School (London: University of London Institute of Education; 1982), esp. p. 19. See also Her Majesty's Inspectorate: A View of the Curriculum (London: HMSO; 1980).

10. R. S. Peters: "General Editor's Note" to P. H. Hirst: Knowledge and the Curriculum, op. cit., p. viii.

11. Here is course Hirst betrays his subjectivist pre-Darwinian epistemology (in the sense criticized by Popper in Objective Knowledge).

12. Hirst, Knowledge and the Curriculum, op. cit., p. 5.

13. op. cit., p. 135

14. Hirst gives different accounts of the alleged principles of rationality in different places. A "third" principle that turns up is that to be rational one must start with clear and specific objectives. No one would deny the general desirability of clear specific objectives; and if one takes care to specify one's objectives as best one can, one gets a somewhat clearer idea of what is happening in one's life as one meets or fails to meet them. But it is "scientism" to identify rationality with such statement. Any such approach is thoroughly undermined by Hayek's argument concerning complex orders (in which, for instance, design emerges), and Popper's discovery that in objective knowledge it is impossible for one ever to know what one is talking about. Se Popper: Unended Quest (LaSalle: Open Court; 1983), section 7, and my "Wittgenstein and Homosexuality", Salmagundi, 58-59, Fall 1982-Winter 1983, pp. 166-196.

15. I would like simply to list here, without comment or explanation, some of the points on which I disagree with Hirst:

    1. He wrongly restricts knowledge to true statements, thus revealing that he holds to the epistemology of "justified true belief", and has failed to absorb (or even to notice) the biological and epistemological arguments for "objective knowledge" that includes false as well as true statements.

    2. Whereas he wants to distinguish forms of knowledge according to truth criteria, there are no truth criteria of any interest.

    3. Whereas his division of the forms of knowledge proceeds according to criteria of meaning, meaning analysis is irrelevant to most problems of philosophy - and the idea that such analysis is relevant is based on a false analogy between the propositions of philosophy and the logical paradoxes.

    4. His "principles" of rationality, which he regards as beyond assessment, I believe to be incoherently stated and, so far as they can be understood, false.

16. For more detailed discussions of the Wittgensteinian problemmatic, see my "A Popperian Harvest", in Paul Levinson, ed.: In Pursuit of Truth (New York: Humanities Press; 1982), and my "On the Differences between Popperian and Wittgensteinian Approaches", in Proceedings of the 10th International Conference on the Unity of the Sciences, November 1981. For discussions of justificationism, see my The Retreat to Commitment (New York: Alfred A. Knopf, Inc.; 1962; London: Chatto & Windus; 1964), new, revised and greatly augmented English-language edition forthcoming: LaSalle: Open Court; 1984; my Non-Justificationism: Popper versus Wittgenstein", in Epistemology and Philosophy of Science, Akten des 7. Internationalen Wittgenstein Symposiums. (Vienna: Hoelder-Pichler-Tempsky; 1983); and my "Rationality, Criticism and Logic", Philosophia, 11, 1-2, February 1982, pp. 121-221. See Also my "The Alleged Refutation of Pancritical Rationalism" in Proceedings of the 11th International Conference on the Unity of the Sciences (New York, 1983). See also K. R. Popper: Realism and the Aim of Science, Vol. I of the Postscript to the Logic of Scientific Discovery (London: Hutchinson; 1983), Part I, section 2.

17. See my discussion in "Logical Strength and Demarcation", op. cit.

18. See Gray, op. cit., and Walter B. Weimer: "Hayek's Approach to the Problems of Complex Phenomena: An Introduction to the Theoretical Psychology of The Sensory Order", in Walter B. Weimer and David S. Palermo, eds, Cognition and the Symbolic Processes, Vol. II (Hillsdale: Lawrence Erlbaum; 1982), pp. 241-285, esp. pp. 283-284. This is another point where I take issue with Gray's splendid article on Hayek believes that in social theory "we come to a stop with the basic constitutive traditions of social life", which "like Wittgenstein's forms of life, cannot be the objects of further criticism, since they are at the terminus of criticism and justification; they are simply given to us and must be accepted by us". A more accurate account of Hayek's Approach to Complex Phenomena", especially p. 284, where he quotes Hayek's New Studies, 1978, p. 298) as follows:

"The liberal must claim the right critically to examine every single value or moral rule of his society."

19. The claim that there is a formal parallel between, on the one hand, natural selection in organic evolution, and, on the other hand, trial and error learning, involves no naturalistic fallacy. The claim is not that the growth of knowledge ought to follow an evolutionary pattern, but that all processes that lead to increased fit - or correspondence - do happen to be parallel. Whether anyone should aim for such "fit" is another question.

20. I suppose that Hirst might try to evade part of this objection by claiming that the concepts of natural science, however they may differ in character, are all empirical. But this would be positivist nonsense, as can be seen from Popper's demonstration of how, on such terms, "God" can be rendered an "empirical concept". See K. R. Popper: Conjectures and Refutations (London: Routledge and Kegan Paul, Ltd.; 1963), Chapter 11, pp. 274-277.

21. Se my Morality and Religion (London: macmillian; 1971), Chapter 1, and my "Logical Strength and Demarcation", op. cit.

22. For an example of this sort of reasoning see Aristotle: Nichomachean Ethics, Book I, section iv, and Book X, section ix; F. H. Bradley: "Why Should I Be Moral?", in Ethical Studies, Essay II, second edition (Oxford University Press; 1927); H. A. Pritchard: "Does Moral Prilosophy Rest on a Mistake?", in Mind, N. S. 21, 1912, and in Moral Obligation (Oxford University Press; 1949). See my discussion of these arguments in my "Rationality, Criticism, and Logic", op. cit., footnote 37.

23. In this connection see my discussion of unintended consequence in my "Ein schwieriger Mensch: Eine Portraetskize von Sir Karl Popper", in Eckhard Nordhofen, ed.: Philosophen des 20. Jahrhunderts in Portraits (Koenigstein: Athenaum Verlag; 1980).

24. For a related argument about presuppositions of logic in logical argument, see my "On the Criticizability of Logic", in Philosophy of the Social Sciences, 10, (1980), pp. 67-77, as well as my "Rationality, Criticism, and Logic", op. cit., sections 17-19.

25. For a further discussion of this approach see my "Biology and Evolutionary Epistemology", op. cit., esp. pp. 480-486.

26. See my "On the Criticizability of Logic", op. cit.