

# THE KNOWING SUBJECT

A Philosophical Study with Special Reference to the Contribution  
of Jean Piaget

## 1 : THE PROBLEM IN HISTORICAL CONTEXT

### 1.1 INTRODUCTION

#### 1.1.1 The Aims of This Study

There are three closely related aims to this study:

- 1: To examine carefully the contribution of the epistemology of Jean Piaget in dealing with the problem of the knowing subject.
- 2: To compare the Piagetian contribution with the contributions of philosophers in the contemporary English-speaking world, concentrating on the contributions of Karl Popper and Michael Polanyi with more limited references to Paul Feyerabend and Max Deutscher.
3. To offer a critical evaluation of these various contributions in the context of the development of the outline of an alternative theory of knowledge.

Without attempting a watertight separation, section 2 will be concerned primarily with the first of these three aims, section 3 with the second and section 4 with the third.

#### 1.1.2 Research Background

In so far as Piagetian epistemology has a major part in this study it suggests links with my earlier study (1982) of the work of Jean Piaget. And, indeed, the recognition of the significant, but neglected, contribution of Piagetian epistemology with regard to the role of the knowing subject gained from the earlier study was a significant factor in the decision to pursue the implications of that contribution in the present study. However, the two studies, though having this

link, represent two quite distinct research projects with quite different foci and aims.

The focus of the earlier study was the epistemology of Jean Piaget with special reference to the role of logic; the epistemological issues discussed were such as arose directly from this study of Piagetian epistemology.

The focus of the present study is the problem of the knowing subject as this problem has been treated in recent epistemology. It is not a study in Piagetian epistemology, though that epistemology figures prominently in it, but a study of a specific epistemological problem in a wider epistemological context.

Piagetian epistemology is included because of the significance of its contribution to the consideration of this problem in the context of contemporary epistemology. Because it has been generally neglected, and in my view poorly understood by philosophers especially in the English-speaking world, it receives special attention and more extended treatment than the other contributions considered in order to ensure that its contribution is well understood.

The treatment of Piagetian epistemology in the present study is in no sense a recapitulation or reworking of the earlier study but represents the results of fresh research based on extensive further study of relevant texts, both primary and secondary, together with two months research and discussions at the Centre international d'Épistémologie génétique and Fondation Archives Jean Piaget attached to the University of Geneva. A comparison of the bibliographies will indicate the much wider range of texts that have been consulted for this study. Therefore, while it inevitably touches the themes of the earlier study in places, the presentation in the present study provides an entirely fresh treatment of Piagetian epistemology. On some points, which I have endeavoured to note at the appropriate places, this has led to a

revision of the conclusions of the earlier study.

In the present study the Piagetian texts, both primary and secondary, have been consulted, in every case, in the language of original publication to ensure greatest accuracy of understanding. The English translations that I have used to facilitate the smooth reading of the text of this study are, for the most part, my own. I have added the French original where it contains an important nuance difficult to capture in translation.

### 1.1.3 The Special Importance of a Systematic Historical Orientation

As an introduction to the study of the problem of the knowing subject in 20th century epistemology I propose to sketch an historical outline of the treatment of this and related problems in Western philosophy, beginning with Plato. In the circumstances this can be no more than an outline drawn in bold lines.

The purpose of this historical outline is to identify various typical approaches to the basic problems involved that can provide a systematic framework for understanding and evaluating the various contemporary contributions that will be studied. Such a framework is important, I suggest, for achieving critical penetration and "objectivity" in such an evaluation.

In the absence of such a systematic historical orientation philosophical thought tends to be enclosed within the canons of the particular systematics with which the philosopher works and which are accepted as "orthodox" by the philosophical community to which he belongs. The conceptual framework and problem formulations endorsed by these canons, are taken without question as universally normative. "Genuine" philosophical problems and "acceptable" philosophical argument are taken to be such as conform to these canons. Philosophical discussion outside this closed circle, so far as it is noticed at all, is trans-

posed into the conceptual framework of the prevailing orthodoxy (a transposition that commonly changes the meaning of the ideas discussed) and its worth is judged by its relevance to problems formulated within that framework.

In this situation philosophical discussion may be vigorous and penetrating within the canons of this prevailing orthodoxy but those canons themselves, which set the fundamental terms of the discussion, are seldom critically scrutinised and evaluated. Deutscher (1983:253-259) discusses such a tendency in 20th century English-speaking philosophy, though, in my view, he does not give adequate attention to the significance of the lack of a systematic historical orientation in relation to that tendency.

Of course a systematic historical orientation does not of itself guarantee critical openness and "objectivity" in philosophical discussion. Historical studies themselves may be enclosed within a closed philosophical system that systematically presses all philosophical thought within its own conceptual framework so that the historical studies only serve the purpose of reinforcing the assumptions of the system.

An historical orientation that facilitates a more penetrating philosophical critique must be the result of an investigation that, on the one hand, empathetically endeavours to understand the work of each philosopher or group of philosophers on its own terms, within its own conceptual framework, distinguishing clearly the various positions that have been adopted; and, on the other hand, sets out to trace systematically the connections and interactions between the positions so distinguished, identifying common problems underlying the diverse problem formulations and typical patterns connecting the diversity of solutions.

A systematic historical orientation of this kind opens the way to a

more penetrating philosophical critique by providing a broader frame of reference for critical evaluation. So far as such an historical orientation is taken seriously the philosopher can no longer merely assume the universal normativity of his own systematics. This systematics, together with any other being evaluated, is placed in the context of interacting alternatives, with alternative conceptual frameworks and alternative formulations of common problems. It is a context in which the interaction of alternatives is not frozen ahistorically in the present but is placed within the perspective of historical interactions around common philosophical problems.

It is no longer the philosopher's own systematics, or that of the philosophical "school" to which he belongs, but the broader historical context of philosophical discourse that provides a frame of reference for genuine philosophical dialogue and critical evaluation. In this important sense philosophical discussion becomes more objective.

This is not to suggest that a systematic historical orientation will lead to philosophical discourse that is "objective" in the sense of conforming to subject-independent standards. Such discourse is, in my view, impossible since any standards that may be set are set, in one way or another, by subjects, albeit with reference to a subject-independent reality. Even a systematic historical orientation such as is proposed must be established by a philosophical subject working within a frame of reference that is wider than the resultant historical frame of reference. What is claimed is that, by setting philosophical discourse within an historical frame of reference, a systematic historical orientation of the kind described enables the philosopher to engage in a critically penetrating analysis with a breadth and depth that cannot be achieved without it.

In the pages that follow I hope to provide this kind of historical orientation for the subsequent discussion of the problem of the know-

ing subject, and related problems, in contemporary epistemology. This is given special importance by the second of the three aims of this study, the comparison of Piagetian epistemology with contemporary epistemological thought in the English-speaking world.

At first sight there seems to be no basis for such a comparison given the disparity in the problems being addressed. The situation seems to be like trying to compare research on the syntax of the English language with research on the process by which a child learns to speak English. In such a situation there may be a measure of overlap between the two areas of research such that researchers in one area may benefit from a study of the results obtained in the other area but there can be no question of a comparative evaluation of the two results since they address two quite different problems.

It is in just this way that Piagetian epistemology, when taken seriously at all, has generally been viewed by philosophers in the English-speaking world. Philosophers such as Hamlyn (1971), Toulmin (1971) and Kitchener (1980) discuss Piaget's work in a way that views it, primarily at least, as psychological research addressing psychological problems that is of interest to philosophical epistemology but dealing with problems distinct from those of philosophical epistemology. Piaget himself provides support for this view by his claim that the epistemology he developed is a scientific and not a philosophical epistemology (See section 2.1.6 below).

Nevertheless it is my contention that this view of Piaget's work is mistaken. That he developed an extensive program of psychological research as an indispensable source of data for the development of his epistemology is beyond question. It is also acknowledged that he adopted a method for the development of an epistemology that is not the customary method of philosophical epistemology. However the fundamental problems with which he was concerned were not psychological

problems but epistemological problems identical with problems customarily addressed in philosophical epistemology.

Piagetian epistemology and philosophical epistemology in the contemporary English-speaking world have substantially different agendas for solving the problems but the fundamental problems being addressed are the same. The difficulty is that the widely differing agendas, with their widely differing problem formulations, not only obscure this common concern with common problems but, more importantly, make it difficult to see how the results obtained by following one agenda can be compared with those resulting from the other agenda.

By placing these differing agendas in a wider historical frame of reference we can overcome this difficulty. The widely divergent problem formulations, reflecting divergent philosophical developments in the 19th and 20th centuries, are seen to converge in a common philosophical tradition with common problems and the divergence is put into perspective as a divergence in the way of approaching these common problems.

At the same time it becomes impossible to sustain the illusion that one of these agendas can claim a privileged place as the representative of the historical mainstream of philosophical thought, with the other dismissed as an aberration. We shall find that each has equally sound historical credentials, each representing a modern version of a way of approaching the basic problems that has a respected place in the Western philosophical tradition reaching back to ancient Greece.

Within this perspective the differing approaches, with their differing agendas, can be brought together in fruitful, critical interaction without losing the distinctive character of either one by conflating it with the other.

## 1.2 IDENTIFYING THE CONTOURS OF THE PROBLEM

Before developing this historical orientation it is important to develop further the contours of the problem to be investigated. For this purpose I begin with certain problem formulations offered by Karl Popper to highlight what he sees as his decisive divergence from his predecessors with regard to the central epistemological problem.

I begin with this not because I take the Popperian discussion as definitive but because it offers a starting point in philosophical discussion in the contemporary English-speaking world that illustrates well the way in which a divergent problem formulation can obscure a convergence in an underlying common problem or problems. On careful analysis the divergent formulations of problems prove to be steps in developing answers to a common basic problem.

From this starting point the main contours of the epistemological problem, and the related subsidiary problems that will provide the focus for this study, will be developed.

### 1.2.1 The Justificationist Problem

Popper (1983:18-28) claims that the central problem of the philosophy of knowledge, at least since the Reformation, has been the question: "How can we adjudicate or evaluate the far-reaching claims of competing theories and beliefs?" This, he says, has led, historically, to a second problem: "How can we justify our theories or beliefs?" He claims to have made a decisive break with this tradition by rejecting the second problem as irrelevant and, with this, denying the assumption that leads from the first problem to the second.

In Popper's discussion of this it is not easy to distinguish what he is presenting as his own ideas from the presentation of ideas about his position expressed by W.W. Bartley, III in conversations with

Popper. However, as he gives us no way of disentangling Bartley's views on this matter from his own but rather appears to adopt Bartley's views as his own, it is not unreasonable, for the purpose of the present discussion, to treat Popper's presentation as a presentation of his own ideas as illuminated and developed in his discussions with Bartley. In the following discussion, therefore, I shall refer to these views simply as Popper's views

As befits his purpose, Popper has formulated the problems in a way that highlights the divergence between himself and others because he believes that a failure to see it clearly has frustrated rational discussion by providing a persistent source of misinterpretation of his theory. He may well be right in this belief but the obscuring of the underlying convergence that results from this strategy may equally frustrate rational discussion.

If I see only the theoretical differences between myself and a critic of my theory it is unlikely that I will accept his criticisms as relevant to my theory. They are most likely to be regarded as arguments based on his own divergent theory and, since I reject the premiss - the critic's theory - I will reject, on good logical grounds, the conclusion - the criticism of my own theory.

Rational discussion, and mutually beneficial rational criticism, requires some common ground for the discussion and criticism. This does not mean that rational discussion can occur only within a common theoretical framework. It is saying only that there must exist areas on which there is agreement, explicit or implicit, between the parties to the discussion. It seems clear, for example, that rational discussion between two parties will lead nowhere if one party denies all value to rational discussion, unless, of course, some other agreed basis can be established for the discussion. It seems equally clear that, given agreement about the value of rational discussion, the

discussion will be futile unless there is some agreement on a problem, or problems, to be discussed. There is little hope of rational discussion between two people, one of whom wants to discuss the problem of little green men on Mars while the other wants to discuss the problem of a lost tribe of pygmies in Africa, unless, of course, these two problems can be shown to converge in a third problem common to them both.

As we examine Popper's two central problems more closely it is evident that the second embodies a specific answer to the first. It presumes that the answer to the first problem is: We adjudicate between competing theories by admitting only justified, or at least justifiable, theories. It is only after this answer has been given to the first problem that the second problem can arise. Popper rejects the second problem as irrelevant because he rejects the answer to the first problem presupposed by the second problem.

The first of his two central problems thus appears to be a point of convergence between Popper's position and justificationist theories. The divergence, it seems, results from divergent answers to this common problem. But this apparent convergence is brought into question by Popper's claim (1983:19) that his solution to the first problem is not merely a particular answer to that problem but changes the structure of that problem completely.

Popper is not explicit about how the structure of the first problem is changed by his solution. After a swift rejection of the assumption that leads from the first problem to the second the ensuing discussion is occupied wholly with the second problem now called the central problem. Popper's solution is said to have not merely displaced the second problem from the central position but to have replaced it altogether with a new problem, the problem of criticism. All this, however, including the rejection of the assumption leading from the

first problem to the second, concerns the divergence in the solution to the first problem rather than any change in the structure of the first problem. The assumption leading from the first to the second is itself the first step in the justificationist solution to the first problem.

It seems that the change in the structure of the first problem that Popper claims has been produced by his solution is not a change in the internal structure of that problem but the removal of a tacitly assumed connection between the first and the second problems. The argument appears to be that previous epistemologies have tacitly assumed the second problem as an intrinsic component of the first rather than as the first step in an attempted solution of the first. Such a view explains why, after introducing the first problem as the central problem with the second flowing historically from it, all the ensuing discussion treats the second problem as itself the central problem. The argument appears to be that, historically, the first and second problems have been taken, mistakenly, to be logically one problem.

Popper's solution to the first problem, therefore, is said to change its structure by denying the assumption of previous epistemologies that it entails the second problem. As a result it is argued that Popper's solution diverges from all previous epistemologies, rationalist, irrationalist and sceptical, by introducing a new central problem that replaces the problem that all had previously taken as central. Popper alone has escaped the domination of the pseudo-problem of justification (Popper, 1983:21).

The divergence between Popper and others is thus made to seem complete. Yet, when we look more closely the basic problem remains the same for Popper as for the justificationist: How are we to evaluate knowledge claims? In this basic problem all serious epistemologies converge. The claim that Popper has changed the structure of the

central problem obscures the fundamental convergence with justificationism in this common basic problem. As we examine this problem further we find that it divides into two distinct, but interrelated problems: The problem of evaluative criteria and the problem of intersubjective universality.

### 1.2.2 The Problem of Evaluative Criteria

For Popper, and also for Piaget, the chief concern of epistemology is scientific knowledge. Neither denies that there is knowledge other than scientific knowledge but each maintains that the problems of a theory of knowledge can be resolved satisfactorily only by a study of scientific knowledge.

Underlying this emphasis on scientific knowledge as the object of epistemological investigation is the claim of universality attaching to scientific knowledge. H.A. Prichard's claim (1950:87) that an assertion of which I am certain but which is widely disputed by others remains an assertion of genuine knowledge may be worth considering in a general theory of knowledge but it will not serve as a criterion for evaluating scientific knowledge claims. For this we need intersubjective criteria for evaluation.

A central and persistent epistemological problem in the history of Western thought has been the identification of universal epistemic criteria. It is their continuing interest in this problem within the modern context that leads modern thinkers like Piaget and Popper to focus epistemological attention on scientific knowledge as the paradigm of universal knowledge.

There are two parts to the requirement of epistemic universality. On the one hand, knowledge must fit universally the human experiential universe - the problem of evaluative criteria - and, on the other hand, the tests for this universal fit must be such as to satisfy all rational subjects - the problem of intersubjective universality.

We might rephrase this by saying that knowledge must pass tests for universal empirical truth such as are acceptable to all rational subjects. However, while an instrumentalist would balk at the testing of scientific theories for truth value, even on an instrumentalist account theories must fit the experiential universe in some sense in order to be useful. The formulation of the problem in terms of a fit between the knowledge claim and the experiential universe, therefore, best satisfies the requirement of a convergent problem common to all theories of knowledge that are concerned with the problem of universality of knowledge.

When Popper, in formulating what he calls the first central problem, speaks of evaluating the claims of competing theories, therefore, whatever else such claims may involve they will always involve claims to a consistent fit with the human experiential universe. Any evaluative criteria must include, or presuppose, an answer to the fundamental question: What constitutes an acceptable test of the fit between the theory and the human experiential universe?

It is in the solution he offers to this problem that Popper diverges from previous theories of knowledge in the immediate past of the tradition within which his thinking was developed. Whereas others looked for tests that test for an exact, definitive fit, Popper asks only for tests that test for an approximate, provisional fit; whereas others demanded the best possible fit, Popper asks only for the fit that all things considered in the present circumstances is the preferable fit. In truth value terms he substitutes the criterion of best approximation to the truth for that of absolute truthfulness.

At the same time he shifts the emphasis from the testing of a theory for the adequacy of its fit with the experiential universe to the testing for inadequacies; he shifts the evaluation from testing for empirical truth to testing for empirical falsehood.

All this is no doubt a significant divergence from the mainstream of previous epistemological thought. Nevertheless it converges with that mainstream in the basic problem: What constitutes an acceptable test of the fit between the knowledge claim and the human experiential universe?

It should be noted carefully that the formulation of this first basic problem embodies no presupposition as to the nature of the experiential universe or its relation with human knowledge. It does not, for example, presuppose the experiential universe as a body of data to which knowledge must correspond or as a pre-ordered universe to which knowledge must conform. The experiential universe may just as well be an irrational universe susceptible to being ordered by a rational structure supplied by human thought. In this latter case the test for the fit between the theory and the experiential universe will be a test for the success of the theory in rationally ordering the experiential universe rather than a test for its success in giving account of an already ordered experiential universe.

The basic problem that we identify with this formulation is a bed-rock problem in which all theories of knowledge that give a positive account of scientific knowledge converge.

### 1.2.3 The Problem of Intersubjective Universality

Closely linked with this first basic problem is the second problem: What is the basis for intersubjective agreement in the testing of knowledge claims?

The dominant view in the Western philosophical tradition has founded this intersubjectivity in a universal and self-authenticating rationality common to all subjects which, if isolated from all non-rational elements, will ensure intersubjective agreement. On this view, scientific knowledge is universal not only in the sense that it has a

universal fit with the human experiential world but also in the sense that it commands the universal assent of all rational subjects.

This leaves the problem: How does this universal, self-authenticating rationality function to secure universal intersubjective agreement? About this there is no consensus commanding universal assent even among rationalists. Popper has given one possible answer by proposing that it functions by rational criticism leading not to truthfulness - as has been most commonly assumed by rationalists before him especially among those whose ideas form the immediate background to his own thought - but to relative truthlikeness.

A feature of epistemological discussion over the past thirty years or so has been the prominence of theories of knowledge that, instead of attempting a new solution to the rationalist formulation of the problem of intersubjectivity, have challenged the rationalist assumption itself - i.e. the assumption of a self-authenticating universal rationality. Yet, so far as they wish to maintain the value of scientific knowledge as intersubjective knowledge, these also have had to deal with the problem of the basis of intersubjective agreement in science. Michael Polanyi, for example, arguing for "the fiduciary rootedness of all rationality" (Polanyi,1962:297), abandons the attempt to ground the intersubjective universality of scientific knowledge in a self-authenticating rationality. He does not, however, dismiss the basic problem as irrelevant. He offers (Polanyi,1962: 308-316) a non-rationalist solution by arguing that intersubjective universality is secured by the bi-polar structure of a shared commitment the impersonal pole of which gives to scientific activity a common universal intent.

There is probably no more thoroughgoing example of an "irrationalist" reaction to rationalist theories of science that still gives a positive evaluation of science than that of Paul Feyerabend. Feyer-

abend (1975:224-285) argues for a doctrine of incommensurability that leaves us with a plurality of scientific theories with, in some cases at least, no possible basis for comparative evaluation. Refutations and measures of truth value that are applicable within one theory are not applicable to the other and there is no possibility of any independent standard against which both can be measured. Given this situation even the internal refutations that are possible are quite weak.

This incommensurability is inevitable not by reason of any logical necessity but because scientific theories are logical systems occurring within the context of "comprehensive cosmological points of view" that rest, in the final count, on "aesthetic judgments, judgments of taste, metaphysical prejudices, religious desires", in short on "our subjective wishes" (Feyerabend, 1975:284-285).

Yet even Feyerabend with this doctrine of the incommensurability of theories, while challenging rationalist bases for intersubjective agreement and denying that intersubjective universality is intrinsic to science, does not dismiss the problem as meaningless. Feyerabend (1965:216-218; 1975:295-309; 1981:238) proposes intersubjective tests to be used for making practical decisions between incommensurable theories the application of which depends, it appears, on an intersubjective agreement whose foundations are extrinsic to science. His solution may be challenged, of course, as it has been (e.g. Suppe, 1977:170-180, 636-643) but there seems no doubt that he takes seriously the basic problem; so far as a self-confessed "flippant Dadaist" (Feyerabend, 1975:21n) may be said to take anything seriously!

The problem of the intersubjective universality of knowledge, then, is a second basic problem in which all the main lines of epistemology converge. Whereas rationalist solutions find the solution is a rational necessity of some kind, irrational solutions are founded in some form of intersubjective consensus.

In this connection Popper misses the point when he argues, following Bartley's suggestions, that all sceptics and irrationalists have adopted these positions because they have assumed that the fundamental question is the question of justification - a question that Popper regards as a pseudo-problem. The implication is that if they had only understood Popper's own position they would have had no need to abandon rationalism (Popper, 1983:21).

It appears more likely that they have been driven to their positions by the persistent failure of rationalism to deliver the goods with regard to the basic problem: How is the intersubjectivity of knowledge secured?

Operating on rationalist assumptions it should be possible to produce a solution to that problem that will command the assent of all rational subjects. The failure to do so after centuries of persistent attempts, including the failure of Popper's own solution to command universal or even near universal assent even among rationalists, is sufficient to explain the turning to irrationalist solutions without resort to the assumption that everyone before Popper has had a blinkered preoccupation with justificationist formulations.

It seems that Popper himself finds his theory so rationally compelling that he has difficulty in understanding how other rational persons could fail to be equally compelled if only they understood it properly by stepping outside the justificationist framework within which they are imprisoned. However, while the attempt to identify and clarify misunderstandings is an important component of rational discussion, the resort to misunderstanding as the explanation for the failure of a theory to command universal rational assent does nothing to advance the rationalist argument.

The only way for the rationalist to refute the irrationalist position decisively is to produce a rationalist solution - i.e. a solution

to the problem of the intersubjectivity of knowledge founded in a universal rationality - that will command the assent of all, or at least nearly all, rational subjects. Lacking this a rationalist approach to the theory of knowledge can only be founded in the rationalist belief that such a solution to the problem is yet possible and therefore may be found if only we persist in trying.

At the same time it is not surprising that some forsake that rationalist belief not because, as Popper argues, they have been side tracked by a pseudo-problem but because they are dissatisfied with the persistent failure of rationalist attempts to solve the common, convergent problem of intersubjective universality in scientific knowledge.

#### 1.2.4 The Role of the Knowing Subject

Widely divergent theories of knowledge in the Western philosophical tradition thus converge in these two basic problems:

What are acceptable tests of a fit between knowledge claims and the experiential universe?

What is the basis for the intersubjective universality of knowledge?

Justificationist formulations set one of the possible agendas for a solution to the first question and objectivist formulations set one of the possible agendas for a solution to the second. In both cases other formulations are possible that set a different agenda for solving the same basic problems.

If an evaluation of divergent agendas is to avoid being nothing more than reinforcement of a belief in the correctness of one of these agendas and become a critical discussion of the comparative merits of the agendas we need to do more than compare the contrasting agendas; we need to evaluate them in terms of their success in solving the common basic problems in which they converge. Theories of knowledge that may appear to be incommensurable when considered in terms of

their divergent formulations of the problems prove commensurable in terms of underlying basic problems of which these divergent formulations are the first steps toward an attempted solution.

These two basic problems are inseparable from a third convergent problem, which is the central problem of this study:

What is the role of the knowing subject?

No one can deal with the first two basic problems without, implicitly at least, dealing with this third problem. Any answer to the first two will imply an answer to the third and conversely any solution to the third will affect the possibilities for solving the first two.

For example, any rationalist solution to the first two must presuppose a self-authenticating rationality of the subject that can override all non-rational factors. Conversely, if we conclude with Polanyi that all rationality of the subject has a fiduciary rootedness, a rationalist answer to the first two problems becomes impossible.

Popper, in spite of his "Epistemology without a Knowing Subject", is no exception. An argument for the exclusion of the knowing subject is itself, of course, addressed directly to the problem of the role of the knowing subject, to which it gives a negative answer. But, further than this, Popper does not, in fact, exclude the subject from a role in cognition. In arguing for "Epistemology without a Knowing Subject" he is simply arguing for the recognition of a realm of objective, autonomous knowledge the existence of which is independent of all knowing subjects. He does not deny that there is also a knowing of a knowing subject and indeed, asserts (Popper, 1979:158-161) that the world of autonomous, objective knowledge is itself the product of knowing subjects.

In relation to this question of the role of the subject Piaget (Piaget & Garcia, 1983:293-294) saw his position as contrasted not only

to that of Popper but to that of other major figures in recent English-speaking philosophy of science, Feyerabend, Hanson, Kuhn, Lakatos, Toulmin, though he also recognised parallels between his position and theirs. He regarded them all as defective because of their preoccupation with methodological questions to the neglect of a thorough consideration of the nature of the activity of the subject.

Undoubtedly there is a gulf in this respect between Piaget and his contemporaries in the mainstream of philosophical epistemology in the English-speaking world. It is a gulf that makes it difficult for philosophers to take Piaget's work seriously if they have become accustomed to regarding the way of formulating the problems within that mainstream as the universal norm for rational philosophical discourse about issues of epistemology.

Yet underlying this divergence Piaget and the group of English-speaking philosophers whom he names share significant common ground in relation to this very problem of the role of the knowing subject. Historically there have been, at least, four basic positions developed with regard to this problem with, of course, important variants within each position: the knowing subject has been regarded as (i) apprehending intelligible objects (ii) abstracting intelligible objects, (iii) registering and processing knowledge as sensory impressions, and (iv) forming knowledge in accordance with an intelligible structure. This will be discussed more fully in section 1.5.

The positivist tradition, that has had a strong influence in English-speaking epistemology, assumed that the subject's role in cognition is the registering and processing of sensory impressions. In its Logical Positivist development epistemological discussion centred on the identification of universal logical norms governing this processing, with the formulation of logical rules to ensure the correspondence of theoretical terms with sensory observations taken as unques-

tioned data.

The group of philosophers cited by Piaget in the above passage, in spite of the sharp divergences between them, is united in a shift toward the position that the subject is formative of knowledge. That shift is reflected in the shift of attention to the role of theories as human formations and not merely a logical arrangement of data. Popper (1972:117) is quite explicit about this: "Theories are our own inventions, our own ideas; they are not forced upon us, but are our self-made instruments of thought".

Though there remains a significant divergence, Piaget takes common ground with this group of philosophers in rejecting the view that the subject is a mere processor of data in favour of the view that assigns a key formative role to the knowing subject. In Piaget, indeed, this is combined with the view that the epistemic subject abstracts knowledge from objects resulting in a significant modification in the tradition that regards the knowing subject as formative of knowledge.

This is to be discussed in more detail later. For the moment it is sufficient to make the point that in the problem of the knowing subject Piagetian epistemology converges with epistemological developments in the mainstream of epistemological discussion in the English-speaking world.

The problem of the role of the knowing subject is the immediate concern of this study. However, the inseparability of this problem from the other two basic problems - the criteria of testing for a fit with the experiential universe and the basis of intersubjective universality - will demand that close attention be given also to these problems as they relate to the central problem under discussion.

### 1.3 THE METAPHYSICAL PROBLEM

Both Piaget (1970b:111-127; 1972:37-56) and Popper (1983:80-82) claim to have developed an epistemology without metaphysical presupposi-

tions. They both reject the positivist claim that metaphysical questions are meaningless (Piaget,1972:59-61,305-307; Popper,1983:179-181,194-214). Not only do they agree that metaphysical discussion has a meaningful place in the totality of human experience but they agree in asserting the value of metaphysical problems for scientific knowledge in the identification of basic problems, or research programs, for science (Piaget,1972:307; Popper,1983:189-193). Nevertheless they each claim to have developed an epistemology that is independent of all metaphysical presuppositions.

In the case of Piaget the claim rests on the scientific character of the epistemology. By reformulating problems of philosophical epistemology as scientific problems to be dealt with in a rigorously scientific way they are removed from the metaphysical context.

In the case of Popper the claim rests on the logical character of epistemology as methodology. Since the logical structure of the methodology does not require metaphysical propositions Popper's epistemology is wholly independent of metaphysics.

At this point a gulf appears between the two positions. As a purely logical discipline, a methodology, Popper's epistemology eschews all empirical claims. On the other hand, as a scientific discipline Piaget's epistemology has an indispensable empirical basis. It is one of his criticisms of Popper's epistemology that it disregards empirical data to restrict itself to the formulation of methodological norms (Popper,1983:xxv; Piaget & Garcia,1983:293,294).

Yet, in both cases, the claim to an epistemology wholly independent of metaphysics goes hand in hand with a recognition that the epistemology has been developed within a wider context where metaphysical questions have a meaningful place. Popper (1983:xxv,81) tells us that his methodology is "largely based on metaphysical realism" which serves as "a kind of background".

Piaget, for his part, in claiming that a world view ("une conception du monde [Weltanschauung]") (Piaget & Garcia, 1983:280) has a significant role in the development of scientific theories, acknowledges, implicitly at least, the influence of such a world view with its metaphysical components in the development of his own epistemology. Nevertheless, as a scientific epistemology he claims that it functions independently of metaphysical presuppositions.

What each appears to be claiming is that, while an epistemology can only be developed within a wider context that includes metaphysical elements that, one way or another, influence the shape of the epistemology, once developed it can function, and his does function, as a self-contained system without metaphysical reference. That is, no metaphysical concept or value is necessary to the internal logic of the theory.

It may be granted that a theory of knowledge may be developed without employing metaphysical concepts in its internal logic. However if, as Piaget and Popper both appear to acknowledge, the theory, in its overall formulation, is dependent on a wider network of theories and beliefs which includes metaphysical presuppositions as essential components, is not the validity of the theory, as a theory of knowledge - as distinct from a merely formal logical system - dependent on these metaphysical presuppositions?

If this is the case what, if anything, is to be gained by the exclusion of metaphysical propositions? Does not such an exclusion serve only to confuse the issue by making it appear that the epistemology stands or falls by its own internal consistency when all the time its validity is dependent on hidden metaphysical presuppositions?

#### 1.4 THE COGNITIVE STATUS OF SCIENCE

In tracing the contours of the problem to be discussed science and

scientific knowledge have been given a prominent place. There is a good reason for this. For both Piaget and Popper scientific knowledge is the chief interest of epistemology because scientific knowledge is taken to be the highest level development of knowledge. All other forms of knowledge are more primitive forms of the same basic kind as scientific knowledge. While Polanyi (1962:374-379) takes a broader view of knowledge, for him also scientific knowledge has a prominent place in the cluster that constitutes the highest level of knowledge, ("superior knowledge").

This concentration of attention on scientific knowledge raises a further, and final, problem for the present study: What is the cognitive status of science?

Logically there are several possible answers to this question. We might say, with Piaget and Popper, that scientific knowledge is the most sophisticated, highly developed form of knowledge. Or, we might go a step further in that direction and say, with Monod (1970:213-217) that science alone yields true knowledge. Or, we might join Polanyi in saying that scientific knowledge is one component of knowledge in its highest level of development. Or, with Feyerabend (1965:217) we might say that scientific knowledge is merely an excellent example of actual knowledge without giving it special status or authority. Then again we might say that scientific knowledge is one kind of knowledge among others that are to be seen not as a hierarchy but as mutually complementary forms of knowledge.

Which, if any, of these logically possible solutions to this problem we should adopt and on what grounds will be an important part of the following discussion.

In addressing this question the problem of the demarcation of science inevitably arises. In considering the contribution of Piaget within the context of the French-speaking philosophical tradition a

dimension of this problem comes to view that has commonly been neglected in recent discussion in the English-speaking tradition.

Discussion in the English-speaking world generally assumes that science means the physical sciences together with such other disciplines as adopt successfully the model of the physical sciences. Piaget (1970) endorsed this view of science as a normative proposal but, operating within the French-speaking tradition he could not take it for granted. He had to argue the case for it - as he did at some length.

In the French-speaking tradition, as elsewhere in continental European thought, a broader conception of science has prevailed in which science embraces all academic disciplines. On this conception of science the physical sciences constitute a sub-group of the larger group of scientific disciplines.

More is involved here than a mere semantic difference. The conception of science as embracing all the academic disciplines is based on the assumption that underlying the differences between these disciplines there are common characteristics that unite them and mark them off from other areas of human life as a single enterprise with distinctive features. On this conception the problem of demarcation has two dimensions: there is the question of the demarcation of science as a whole and there is the question of the demarcation of sub-groups of disciplines - e.g. "natural" sciences, "human" sciences - within science.

On the other hand, the conception of science as restricted to disciplines conducted on the model of the physical sciences assumes a fundamental disparity between the academic disciplines such that it is inappropriate to designate them all with the common term "science". There is the further assumption that, since it is the physical sciences that meet the requirements of what has been intended historically

by "science", it is most appropriate that this term be restricted to the physical sciences and, with qualification, to other disciplines modelled on them. On this conception the problem of demarcation is a simple one. It is the question of the demarcation of the physical sciences as a single, self-contained epistemic enterprise.

A critical discussion of these two conceptions of science and the assumptions involved will be essential to an adequate treatment of the theme of the present study.

### 1.5 THE HISTORICAL BACKGROUND

In dealing with the historical background I make no attempt at a comprehensive historical survey of the treatment of epistemological problems. To do this in any satisfactory way would require a major study in itself. The purpose of the present survey has the strictly limited purpose of identifying certain typical answers to the basic problems being considered in this study that are significant for understanding and comparing Piagetian epistemology and contemporary developments in the English-speaking world.

Given this limited purpose I leap over centuries and pass by philosophers that could not responsibly be ignored in any comprehensive historical study. Similarly, while I do not believe that I attribute to any philosopher views that he has not espoused in his published works, I do not attempt to explore all that a particular philosopher or group of philosophers has said on the relevant epistemological questions. So, for example, when I associate certain typical answers with Plato and Aristotle I do not suggest that these constitute anything like exhaustive accounts of the treatment of epistemological themes in Plato and Aristotle respectively. What I do claim, and all I claim, is that the basic contours of these typical answers to epistemological problems are to be found in the writing of Plato and

Aristotle respectively.

### 1.5.1 Knowing as Rational Apprehension of Universal Truth

An important approach to epistemological problems within the Western philosophical tradition, which Plato may be credited with establishing firmly within that tradition, has regarded knowledge as the rational apprehension of truth.

Plato resolved the problem of intersubjective universality by postulating, as the object of knowledge, a realm of eternal Ideas. Since these are infallible and invariant, the apprehension of them gives knowledge that is universally true for all apprehending subjects.

The apprehension of these Ideas is by an intellectual activity that transcends sensory experience. Sensory experience is disqualified as a source of knowledge because it yields only opinion which may be either true or false, with the mixture of truth and falsehood varying from person to person (see, for example, Plato, 1953: *Theaetetus*, 191c-195b). As a practical guide to action, true opinion is as valuable as knowledge but it lacks the universal certainty and stability of knowledge. The stability and certainty of knowledge can result only from the reasoning processes of the intellect transcending sensory experience (Plato, 1953: *Meno*, 97-98c).

There is, in the Platonic scheme, a complete epistemic disjunction between sensory experience and the reasoning processes productive of knowledge. Knowledge does not begin with sensory experience in order to go beyond it; it sets aside all sensory experience. To attain knowledge of astronomy, for example, we must ignore observations of the heavens since these can never lead us to the exact truth that alone counts as knowledge (Plato, 1953: *Republic*, 430a-c).

Mathematics acquires a special place in this scheme as a kind of bridge from sensory experience to knowledge. Mathematical study is invaluable because it compels the mind to leave the world of sensory

experience in order to get at the truth by pure thought. In this way it trains the mind for apprehension of the universal truth of the Ideas (Plato,1953:Republic,521e-531e).

Yet, though there is this complete disjunction between sensory experience and the acquisition of knowledge, knowledge once acquired is not disconnected from the world of sensory experience. It is knowledge of the order of reality that gives form to the world of sensory experience. As the world of becoming, the world of sensory experience is a world of instability and change that can never engender the stability and certainty of knowledge (Plato,1953:Republic,534a,b). But the order of reality that the intellect apprehends in the Ideas is the order for this world of becoming so that knowledge of these Ideas is knowledge of the real nature of things in the sensory world (Plato, 1953:Republic,534b,596-597d). Only by ignoring sensory experience in order to apprehend intellectually the real world of Ideas can I truly know the world of sensory experience.

The Platonic solution to the problem of intersubjective universality in knowledge, then, has two essential elements. Knowledge is knowledge of an eternal and invariant intelligible reality that is the universal order for the whole world of human experience; what is known is the universal order of reality. The second element in the scheme is that as an intelligible reality this universal order can be apprehended only by the human intellect so that the human intellect replicates in human thought the universal order of reality. Genuine knowledge, then, so far as it is possessed at all will be identical in all subjects at all times and places since it is the replication of the invariant universal order of reality.

As regards the problem of acceptable tests of the fit between knowledge claims and the experiential universe the Platonic scheme excludes all empirical tests that require the use of sensory experience.

Sensory experience is intrinsically unreliable. It can give us no standard by which to measure truth and reality. This can be attained only on the level of pure thought isolated from all sensory experience. The only admissible tests of knowledge claims, therefore, are logical tests. Any knowledge claim must pass the logical tests of the Platonic dialectic (Plato, 1953:Republic, 531d-534e).

To the mind accustomed to an empiricist frame of reference this will seem to be a strange way of testing for a fit between knowledge claims and experience. How can we test for such a fit without any reference to the world of sensory experience which the knowledge is supposed to fit? It seems like the absurdity of a tailor testing the fit of a suit of clothes without any reference to the person whom the clothes are to fit. It seems clear, on this argument, that Plato's tests are only tests for the logical coherence of knowledge claims and cannot be tests for a fit between knowledge claims and the experiential universe.

But the argument depends on an empiricist ontology and collapses as soon as we shift the discussion into the framework of the Platonic ontology. An empiricist ontology assumes that the world of sensory experience is the real world giving us reliable primary cognitive data. On such a view it is absurd to test knowledge claims without testing them against our sensory experiences.

On the other hand, the Platonic ontology takes the reverse view that the intelligible world is the real world giving form to the uncertain world of sensory experience. On this view knowledge will fit this world not if it matches the sensory experiences but only if it matches the intelligible reality that gives form to this world. Any fit with sensory experience will be a deceptive and, at best, transient fit, since it is a fit only with the transient face of the sensory world and not with the enduring reality of its intelligible forms.

On the empiricist view knowledge may well be likened to a suit of clothes which needs to be tailored to fit the body of sensory experience. On the Platonic view knowledge is more like identifying the genetic code that enables us to make sense of the body of sensory experience.

With regard to the problem of the knowing subject, the Platonic subject is an intelligent subject who replicates the intelligible universal order of reality by a process of rational apprehension.

Knowledge, in this Platonic epistemology, is normative rather than informative; it is concerned with how we ought to act rather than with giving information about the experiential universe as it is. Associated with this is the view that right human action is not a matter of conforming to the existing order of things in the sensible world but is a matter of conforming the sensible world to the normative order of the intelligible reality. This feature is important in understanding the persistent vigour of this approach to epistemology in the subsequent history of philosophy.

It needs to be reiterated that this discussion of Platonic epistemology has not been an attempt to present a comprehensive view of the complexities of epistemological discussion in the writings of Plato. Nothing more has been attempted than to trace the basic features of a type of epistemology, of particular relevance to the present study, that is to be found in Plato. This same restriction will apply, to a greater or lesser extent, to each of the other philosophers or groups of philosophers yet to be discussed in this section.

#### 1.5.2 Knowing as Rational Abstraction from Sensory Experience

This second basic approach to epistemological problems gained a firm place in the tradition through Aristotle. A thorough analysis of the Aristoteleian epistemology would involve a number of complex questions, including questions related to stages in the development of Aristo-

tle's thought, that go beyond the present purpose. As with Plato, for the present purpose it is sufficient to identify in Aristotle the basic contours of a distinctive approach to epistemological problems that is relevant to the present study.

In direct and conscious opposition to Plato Aristotle (1928:De Anima,432a) asserted the necessity of sensory experience for knowledge; "... no one can learn or understand anything in the absence of sense ..." (see also Aristotle,1928:Metaphysica,980a). All knowledge is founded in sensory experience.

What is registered in the mind by sensory perception, however, is not the material object but a sensory impression of the form of the object abstracted from the object which is a form-matter composite. In this connection Aristotle (1928:De Anima,424a) uses the metaphor of a signet ring in wax. The impression in the wax does not correspond to the ring as a material object. It corresponds to the form of the ring. Similarly the sensory impression in the subject does not correspond to the object of sensory perception as material object but to the form of the object.

So far it simply looks like a realist correspondence theory of truth. Since it would be an absurdity to propose that material objects as such or a material replica of these objects is present in the subject, Aristotle uses the form-matter distinction to establish a correspondence theory with regard to sensory perception. What is registered in the subject in sensory perception corresponds to the form of the object of perception; that is, it corresponds to the cluster of properties that are characteristic of the object of perception.

Yet, looking more closely we find that, while knowledge is impossible without them these sensible forms in the mind of the subject are not cognitive data; the possession of them does not, in itself, constitute knowledge nor are they any kind of elementary units of know-

ledge.

The reason Aristotle gives for this is that sensory perception is perception of individuals (particulars). The sensible form that is registered in the subject in sensory perception, as the form of an individual, is itself individual, a particular cluster of particular properties. Knowledge, on the other hand, is always of universals (Aristotle, 1928: *De Anima*, 417b; *Metaphysica*, 980b, 981a, 1003a, 1059b-1060b; *Ethica Nicomachea*, 1039b-1141a). Although knowledge depends on sensory perception the two are not to be confused; the one has to do with the knowable and the other with the sensible. The knowable is always distinct from the sensible (Aristotle, 1928: *De Anima*, 431b). Knowing is the result of thinking and not of sensory perception (Aristotle, 1928: *De Anima*, 429a).

Although the sensible form is not the knowable, outside thought the knowable is inseparable from the sensible. In cognition the knowable is abstracted from the sensible form by definition; this abstracted knowable is a universal which can be isolated from the sensible form only by the mental process of definition (Aristotle, 1928: *Metaphysica*, 103a, 1059b).

The use of the term "definition" in Aristotle needs careful consideration since it is a ready source of confusion. "Definition" in Aristotle's epistemology is not an exercise in propositional logic or the fixing of the meaning of words within a language system. Definition identifies in precise terms the universals that are the intelligible core of reality. It is the identification by the human intellect of an intelligible reality that exists independently of that intellect. The Aristotelian universal is not a mental construct, a notion in the mind; it is not a class of particulars, the product of inductive logic. Universals are the ultimate and innermost core of reality. A true definition, therefore, is a proposition that corres-

ponds to an element in this innermost core of reality.

On the lower cognitive level of technical knowledge (art), it is true, Aristotle (1928:Metaphysica,981a) appears to regard knowledge as gained by inductive generalisation but at the higher level of knowledge properly speaking (science) definition identifies the universal not by induction but by abstraction. In thought the mind dissociates the universal form from the sensible form given in sensory perception just as in sensory perception the senses dissociate the sensible form from the form-matter composite of the object of perception. "The mind is the form of the forms and sense the form of sensible things" (Aristotle,1928:De Anima,432a). It is this abstracted universal that is the object of knowledge properly speaking.

It is, therefore, misleading to speak of the Aristotelian universals as instantiated in the particulars. To do this is to project back onto Aristotle a modern, individualistic notion of universals that is alien to him. The particulars are the ever changing sensible face of reality; the universals are its invariant inner core. In reality they are inseparable but in definition they are separable, being quite distinct from each other (Aristotle:De Anima,413b,432a; Metaphysica,993a,1034, 1040b). In knowledge we do not begin with the particular, as in sensory perception, and proceed from these to the universal. By definition knowledge begins from the universal (Aristotle,1928:Metaphysica, 1018b).

The Aristotelian epistemology embodies a correspondence theory of truth but not the modern theory that holds a proposition to be true if, and only if, it corresponds to sensibly observable reality. In the Aristotelian scheme a proposition is true if, and only if, it corresponds to intelligible reality which is distinct, though inseparable, from observable reality.

D.M. Armstrong (1973:122), therefore, misses the whole point of

Aristotle's view of reality when he asserts that "Aristotelian Realism about properties is independent of Aristotelian Essentialism". Certainly, it is possible eclectically to reject Aristotle's essentialism while maintaining a realism of properties of particulars that parallels Aristotle's views in certain respects, but then we no longer have "Aristotelian Realism". For Aristotle, ultimate, unchanging reality is the reality of essences, the intelligible reality that is the inner core of all we experience.

Armstrong, it seems, misses the necessary connection between Aristotelian realism and Aristotelian essentialism because he reads Aristotle's essentialism in terms of his own non-Aristotelian ontology. In this ontology, characteristic of the modern philosophical mainstream, the basic categories are mental and physical. Given this ontology the intelligible is equated with the mental; there is no room for any non-physical non-mental intelligible reality.

When Aristotle, therefore, says that nothing is given in sensory perception but propertied particulars this can only be interpreted to mean that outside of thought nothing is known to exist except the propertied particulars. Hence the essences of mental reality must be nothing but those clusters of particular properties that are the essential sensory properties of the thing. The universals, as intelligibles, can only be interpreted as mental categories, the products of thought that are instantiated in the sensible particulars.

The interpretive logic is compelling given the modern ontological framework of mental and physical. However, it is entirely unsatisfactory to interpret Aristotle with such an ontological framework that was alien to him. In the Aristotelian ontology, as in the Platonic, the intelligible is an ontic category distinct from, though closely related to, the mental. Unlike the Platonic ontology, the intelligible reality that gives form to the material world does not consist of

intelligible entities separate from material reality but neither does it consist of mental categories that universalise the sensible particulars. It consists of the intelligible core of material reality distinct from its sensible appearance and identified by intellectual abstraction from the sensible givens.

For Aristotle, therefore, the essences are not particular properties or groups of properties that stand in a special relation to material objects. The essences are the intelligible reality that is abstracted by definition from the observable in which it is embedded. Certain clusters of particular properties are the essential properties of a particular, not because they constitute its essence, but because of their necessary relation to the essence. Indeed, the particular properties of sensory perception, so far from functioning as essences, themselves have corresponding essences (Aristotle, 1928: *Metaphysica*, 1029b-1032a).

Aristotle, as much as Plato, regarded the world of sensory experience as lacking the stability and certainty necessary for knowledge. Consequently, like Plato, he founded knowledge in the experience of an intelligible reality beyond sensory experience. Unlike Plato, he did not detach this intelligible reality from the sensible but embedded it within the sensible as the unchanging order of reality giving constant form to the sensible. As a result the knowing subject instead of transcending sensory experience abstracts the intelligible from the data of sensory experience.

Lezi (1975:361) suggests that it may be confusing to use the term "abstraction" univocally in this connection since there is a distinction in Aristotle between the cognitive dissociation of universals and of mathematical entities. There may well be merit in this but the distinction is not important for the present purpose. In both cases there is an intelligible reality embedded in the sensory data that is

identified by dissociating it from the particularity of the sensible; it is in both cases abstraction in the sense of distinguishing an intelligible reality by dissociating it in thought from its inseparable coherence with the material reality in which it is experienced.

The Aristotelian answer to the problem of intersubjective universality of knowledge, then, is to make knowledge consist in the replication in thought of an intelligible reality that is the universal and invariant order for the whole world of human experience; the universal order of reality is replicated in the thought of the human subject. In this respect there is a close parallel with the Platonic answer although the manner of the replication is quite different.

Also similar to Plato's scheme is the answer to the problem of the fit between knowledge and the experiential universe. Knowledge fits the experiential universe as it corresponds to the intelligible order of reality that is the constant and universal order for the experiential universe. Tests for this fitness, therefore, are primarily logical tests. Unlike Plato such tests must include an empirical reference but this empirical reference is limited to showing that a logically coherent account of the material world of our sensory experience can be given in terms of the cognitively defined intelligible order.

When we come to the role of the knowing subject the divergence of the Platonic and Aristotelian approaches to epistemological problems comes into sharp focus. Whereas Plato's knowing subject must ignore sensory experience in order to apprehend the transcendent Ideas, Aristotle's subject must penetrate the world of sensory experience in order to abstract from it intelligible, form-giving reality that is the inner core of that world; an inner core inaccessible to sensory perception and accessible only to abstractive thought.

For knowledge as rational apprehension of universal truth as transcendent reality Aristotle substitutes knowledge as rational abstrac-

tion of universal truth as immanent reality.

Aristotelian epistemology also differs from the Platonic in its emphasis on knowledge as knowing the necessary order of reality, the way things are rather than the way things ought to be. This is reflected in Aristotle's interest in the knowledge of ultimate causes as the highest level of knowledge.

### 1.5.3 Knowing as Rational Processing of Sensory Data

A third fundamental approach is that associated with Stoicism, in which knowledge is understood as a rational processing of sensory data.

As with Plato and Aristotle it is beyond the present purpose to attempt a detailed exposition of Stoic epistemology with an analysis of the variations between Stoic thinkers that this would require. No more is required and no more is attempted than an outline of the main contours of an epistemology that has had a significant influence in the subsequent development of epistemological thought.

Unlike both Plato and Aristotle, the Stoic epistemology took the data of sensory perception as primary cognitive data. Where Plato held that cognition must transcend sensory experience and Aristotle that it must abstract from it the primary objects of cognition, the Stoics held that cognition begins with the data of sensory perception. The impressions registered in the mind by sensory perception are the fundamental units of knowledge.

Whereas Aristotle maintained a disjunction between the senses and the thinking mind, the Stoics regarded the senses as the instruments of the mind providing the communications link between the mind and the external world. In much the same way as the television cameras in a closed-circuit security system feed information to the security monitor the senses feed inputs to the mind (Hicks, 1962:63-66).

However, while Stoic theory made the impressions of sensory experi-

ence the primary and direct source of knowledge it by no means reduced knowledge to a stream of sensory impressions. The impressions must be processed by Reason ordering the impressions in accordance with its own rational order.

Rist (1969:24) argues that it is confusing if we simply equate the Stoic Reason with the modern conception of rationality. That is no doubt true in so far as the Stoics did not distinguish sharply the rational function from other functions of the human mind. But, as Hicks (1962:64) suggests, this is due to the merging of all the functions of human consciousness in the rational function rather than a lessening of the rational. The Stoic Reason (*λογος*) which has the epistemic function of processing the stream of sensory impressions so that coherent and certain knowledge results is decidedly rational thought.

It is by this Reason that we both distinguish true from false impressions - that is, impressions that rightly represent reality from misrepresentations - and give to our impressions a systematic order that corresponds to the order of reality (Hicks, 1962:66f-73; Epictetus, 1940:224-225). While Reason needs to be trained if it is to function effectively, so that education is primarily the training of the Reason (Epictetus, 1940:226-227), it possesses an innate structure that is peculiarly fitted to systematise the sensory impressions.

Epictetus (1940:260) makes this point by describing Reason as a "system framed from impressions of a certain kind". Taken in isolation it may be tempting to take this to mean that Reason is amorphous until it is structured by the sensory impressions impressed in it, but that would miss the point Epictetus is making in this context. He is arguing for the unique nature of Reason as that alone of the human faculties that is able to take cognisance of itself. He argues that it can have this power of self-cognisance only if it is itself of like

kind with the objects of which it takes cognisance. Since a faculty of the mind can take cognisance only of those matters for which it is fitted, Reason, which is fitted to take cognisance of impressions can take cognisance of itself only because it is itself of a like kind with impressions; "it is a system formed from impressions of a certain kind". In Epictetus' system, then, it necessarily has this character before it receives any sensory impressions, otherwise it could not take cognisance of any impressions.

Since Reason is an innate faculty that enables us to deal rightly with the impressions we receive through the senses there can be no question of its being produced in us by sensory impressions though it can be developed by interaction with those impressions. Rather, Reason, as an innate human faculty, is homogeneous with the impressions it receives through the senses. All this comes together when we take note that this reasoning, as an innate human faculty, is part of the divine Reason that is the immanent ordering principle of reality. Consequently, human Reason is uniquely suited to process the sensory impressions that, so far as they are true impressions, are impressions of a reality ordered by the divine Reason.

Basic to the Stoic epistemology was the notion that nature and human thought share in a common rationality as the common ordering principle. It was this notion that gave the Stoics their confidence in sensory perception as the prime source of knowledge. In the Platonic scheme thought must transcend nature to apprehend the Ideas that are the ultimate order of reality. In the Aristotelian scheme thought must penetrate nature to uncover the intelligible Forms that are the ultimate order of reality. In the Stoic theory rational thought participates innately in the rationality that is the ultimate order of reality.

According to Hicks (1962:22), already in the school of Zeno of

Citium the Platonic Ideas came to be seen as notions in the mind. Epictetus (1940:261), much later, more clearly appears to maintain the existence of innate rational principles in the form of primary conceptions common to all men. Zeller (1962:80,81) argues that, despite the admitted appearance of innateness in these primary conceptions, such a view cannot be correct since it would be contrary to the whole character of the Stoic system. However, it seems altogether consistent with the notion that human rationality is part of the universal ordering principle of reality to add the notion of innate rational conceptions as ordering principles of knowledge corresponding to the ordering principle of reality.

The Stoic approach to the intersubjective universality of knowledge, then, found the answer in the universal participation of rational human thought in the universal rational order of reality. And the fit between knowledge and the experiential universe is assured by the rationality common to nature and thought provided the sensory data is correctly processed. The test of this correct processing is the achievement of intersubjective universality in the analysis of sensory experience.

As to the role of the knowing subject Stoic epistemology regards the subject as the rational processor of the data of sensory experience. The subject neither transcends this data nor abstracts from it since the data as given in sensory perception is the primary data. What is required of the subject is the rational processing of the sensory data.

#### 1.5.4 Rationalism and Irrationalism, Intellectualism and Empiricism

Before attempting a systematic review of these three epistemological types emerging from Greek/Hellenistic thought it is important to clarify some key terms that I will be using in that review and, from time to time, throughout the rest of this study. Although these terms

are common enough in philosophical discourse their exact meaning often remains ambiguous, not always helping us to make clear distinctions. For this reason I regard it as important to make as clear as possible the sense in which I will be using them in this study in order to give some precision to the categorisation of epistemological types.

I use the term "rationalism" for the view that the rationality of the subject functions as the universal, self-authenticating subjective authority in cognition.

By "subjective" authority I mean that it functions as cognitive authority in and for the subject.

By "universal" authority I mean that the nature and operation of this rationality is taken to be identical, in principle, in all subjects in which it operates. Its operation may be suppressed or retarded in one subject and more developed and advanced in another so that we may speak of the one as more or less rational than the other, but so far as the specified rational faculty is operative its characteristics will be identical in each subject leading to identical results in its functioning.

By "self-authenticating" authority I mean that the rationality in question is regarded as carrying with it the credentials of its own authority, not being dependent on any extrinsic accreditation to establish its subjective authority.

In this connection it is important to distinguish this quality of self-authentication from autonomy. An autonomous rationality is one that contains within itself the principles or law of its own functioning, not being subject in that functioning to any authority outside itself. Thus an epistemological rationalism built on the notion of an autonomous rationality will regard the principles of cognition as intrinsic to that rationality independently of any authority external to such rationality.

A rationality of limited authority that is dependent on an authority external to itself, though lacking autonomy, may still be self-authenticating. Plato offers an excellent example of such dependent but self-authenticating rationality as universal subjective authority. In his discussion of dialectic (1953:Republic,531d-534) he makes it clear that dialectic is the means by which we grasp in pure thought the very first principle as a reality external to thought. In such a scheme it is clear that we cannot speak of an autonomous rationality of the subject; the ultimate principle or law by which the subject's thought is deemed to be governed is external to that thought and not given in thought. What "gives the objects of knowledge their truth and the knower's mind the power of knowing" is not some quality of the knowing subject but "the Idea of the good" that, though it can be known, is beyond knowledge, beyond the knower and all other objects of knowledge (Plato,1953:Republic,508e).

Yet, though clearly not autonomous, the rational functioning of the subject's mind that Plato here identifies under the term "dialectic" is self-authenticating in its unique ability to give the subject a grasp of the very first principle in pure thought. This rational functioning authenticates itself by its unique ability to give the required clear and distinct definition of the Idea (Plato,1953: Republic,534b). It cannot be the Idea that authenticates the rational functioning that leads to it since apart from this rational functioning we have no knowledge at all of anything but only uncertain opinion. And Plato offers us no other authority that can establish the credentials of this rational functioning as the one authentic guide to true knowledge. Indeed the whole procedure of his dialogues is founded on the assumption, taken as self-evident, that if truth and true knowledge as universal values are to be found they will be found by the human subject through rational argument.

I shall discuss in the next sub-section the emergence of the notion of an autonomous rationality leading to what I prefer to distinguish as a distinct sub-type of rationalism. I use the term "rationalism", however, to embrace all those views that hold the rationality of the subject to be the universal, self-authenticating subjective authority in cognition, with or without autonomy.

I use the term "irrationalism" for any view that identifies the subjective self-authenticating authority in cognition in an aspect of the subject's functioning other than rationality. I do not, of course, imply by it a rejection of the rational function in cognition but only that the rational function is subordinated to some other aspect of the subject's functioning as the final subjective authority. Polanyi's epistemology is thus irrationalist because he subordinates the subject's rationality to the subject's believing as the ultimate subjective authority.

The other pair of terms the use of which it is important to clarify at this stage is the pair "intellectualism/empiricism".

I use the terms "intellectualism" for those views that take the primary cognitive objects to be intelligible objects, objects directly accessible to, and only to, the intellect. The term "empiricism" I use for those views that take the primary cognitive objects to be empirical, or sensible, data given through, and only through, sensory experience. This primary data may, of course, as in Hume (1978) generate secondary data that function also as objects of knowledge.

The intellectualism/empiricism distinction does not correspond to the rationalism/irrationalism distinction. The practice that has become common in modern philosophical discourse of contrasting empiricism with rationalism is, I suggest, confusing. We may take empirical data to be the primary cognitive objects while also assigning subjective authority to a universal rationality of the subject as the arbi-

ter and processor of this data. Indeed, the predominant forms of empiricism till the 20th century have been rationalist in character. Similarly, intellectualism is not tied to rationalism but may be either irrationalist or rationalist in character.

It is important to note, further, that while intellectualism implies the cognitive primacy of the intellect and empiricism the cognitive primacy of sensory experience intellectualism does not exclude the cognitive use of the senses just as empiricism does not exclude the cognitive use of the intellect. Kant (1933:41), for example, insisted that "all our knowledge begins with experience" since it is only by sensory experience that our faculty of knowledge is awakened. Yet his epistemology is decidedly intellectualist and not empiricist since while sensory experience plays a role in cognition it does not furnish the primary cognitive data.

Neither is an epistemology to be classified as "empiricist" merely because sensory experience is taken in some sense as a source of knowledge. An epistemology is "empiricist" only when the primary cognitive objects are given in sensory experience as empirical data; cognitive objects may be derived from sensory experience in some way without being given in that experience as empirical data. The distinction, I suggest, is important for reasons that will be discussed further in the following sub-section.

#### 1.5.5 The Greek Heritage

Any complete discussion of the epistemologies of the Greek/Hellenistic periods, of course, would need to take account of a host of subtleties and variations that have been passed by in the foregoing survey. However, this would take us beyond the purpose of the present discussion which is to identify three basic views of the role of the knowing subject that emerged from Greek/Hellenistic thought and played a decisive formative role in the subsequent development of Western

thought. More detailed treatment of relevant issues - with which I do not necessarily agree - is given, inter alia, by Ross (1953), Sinaiko (1965) and Stenzel (1964), with regard to Plato, Dancy (1975), Hartman (1977), and Leszl (1975) with regard to Aristotle, and Long (1971), Rist (1969) and Zeller (1962) with regard to Stoicism. Merlan (1975) offers relevant discussion ranging from Plato to neoplatonism.

In the subsequent development the original models associated with the Platonic, Aristotelian and Stoic philosophies underwent more or less extensive modification and variation but the basic approaches to epistemology persisted.

Using the categories as defined in the last sub-section the epistemology associated with Plato is clearly intellectualist in character, the primary cognitive objects being the Ideas as intelligible entities apprehended by the intellect. The type associated with Stoicism is clearly empiricist, the primary cognitive objects being the impressions as sensory data registered in the subject through the senses.

Stoic empiricism may be further described as "sensationalist" (or "sensualist") since the sensory impressions, and these alone, appear to function as the immediate objects of knowledge. However it seems to me that this is best regarded as a further refinement within the broader empiricist category, sensationalism being regarded as a sub-type of empiricism. Similarly we can distinguish sub-types within the intellectualist type of epistemology.

The type of epistemology associated with Aristotle - rational abstraction from sensory experience - is less straightforward. At first sight the origin of knowledge in sensory experience suggests an empiricist epistemology of some sort. And, indeed, it may well be that at a certain stage of his thought Aristotle did entertain a kind of empiricism.

However, when we look more closely at the epistemological scheme as

developed by Aristotle in the references cited above it becomes clear that what we have is an intellectualism, not an empiricism, though of a type distinct from the intellectualism of Plato.

While the knowing subject has access to the objects of knowledge only through sensory experience the sensory data in no sense constitute cognitive data; the primary objects of knowledge are not given as empirical data. In order to obtain any cognitive data the intellect must abstract the intelligible forms from the sensory data. This abstraction involves a discarding of the sensory given - the sensible form - in order to secure the cognitive data - the intelligible form. The cognitive data are the intelligible forms that are accessible only to the intellect.

The importance of this Aristotelian disjunction of the intelligible and the sensible may be elucidated if we compare it with Hume's impressions and ideas. Hume's position is decidedly empiricist since the sensible data as original impressions constitute the primary cognitive data (Hume, 1978:1-7, 275-277). Secondary impressions and ideas arise from the original impressions of sensation proceeding from them either directly or indirectly, and remaining inseparably related to them. The ideas, which are distinguished from all impressions are "faint images" or copies of the impressions that exist in thought always in an inseparable relation to the impressions (Hume, 1978:1, 72, 163).

In contrast to this, the sensible forms of Aristotle, unlike Hume's sensory impressions, do not constitute cognitive data but must be discarded in cognition. The original cognitive objects are the intelligible forms, not the sensible. Cognition begins not with the sensible but with the intelligible. Further, in sharp contrast to Hume's ideas that proceed or arise from the sensory impressions and remain inseparably associated with those impressions, Aristotle's intelligible forms, though given with the sensible are independent of and,

indeed, ontically prior to the sensibles, functioning as cognitive data only as they are dissociated from the sensible by intellectual abstraction.

This type of epistemology that we encounter in Aristotle, then, is as decidedly intellectualist as is that associated with Plato. The difference, which is important, is that whereas in the Platonic scheme the intelligibles, existing wholly apart from the sensible world, can be apprehended only as the subject transcends the sensible, in the Aristotelian scheme, the intelligibles, being the essential inner core of the sensible world, can be apprehended only as the subject abstracts them from that world. We may speak, therefore, of a transcending intellectualism in the Platonic scheme - with "transcending" indicating that the subject must transcend the sensible in order to apprehend the intelligible data - and an abstractive intellectualism in the Aristotelian scheme.

In the three types of epistemology identified above in Greek/Hellenistic philosophy then, we have two types of intellectualism and a sensationalist empiricism. Underlying these significant differences, however, there are important common features.

In the first place, they are all rationalist in character in the sense in which I use the term "rationalist"; they all locate subjective cognitive authority in a self-authenticating, universal rationality of the subject. It is not an autonomous rationalism since, in each case the ultimate authority is external to the rationality of the subject. Yet each is clearly rationalist in the broader sense discussed earlier.

I reiterate that "rationalist" and "empiricist" are not to be taken as mutually exclusive terms.

The practice that has become common in modern philosophical discourse of contrasting empiricism and rationalism as mutually exclusive

categories obscures the underlying convergence in a common rationalist base that has commonly characterised intellectualist and empiricist epistemologies. Until the 20th century the major versions of empiricism, from Stoicism to positivism in its several variants, have maintained in common with major versions of intellectualism the rationalist view that subjective cognitive authority lies with a self-authenticating rationality of the subject.

I recognise that the rationalism of this period needs to be distinguished from modern rationalism, which characteristically takes the rationality of the subject to be autonomous as well as self-authenticating. I concede, indeed, that the difference is such that a case can be made for restricting the term "rationalism" to the development of the notion of an autonomous, a priori reason that emerged in the 17th century - see Williams (1967:69) and Hart (1966:1-4,23). However, the affinity between this modern rationalism and its precursors such as we are now discussing are such that it seems to me preferable to adopt a definition of rationalism such as I have adopted that recognises this affinity while maintaining the distinction as a distinction of sub-types of a common rationalist type.

Broadly speaking and without attempting an exhaustive analysis of the various versions of rationalism that have occurred in the course of history, three major sub-types of rationalism can be identified. The first sub-type is one in which the fundamental rational principles or laws are external to the subject. Both the Platonic and Aristotelian epistemologies are of this kind. In the case of Plato the fundamental rational principles are identified with the transcendent Ideas apprehended by the subject's rational intellect and in the case of Aristotle they are identified with the Forms of the form-matter composite that are abstracted by the subject's rational intellect. The fundamental order of reality and the structure of cognition are ex-

ternal to the subject who has, nevertheless, privileged access to this order through a self-authenticating rationality.

The second sub-type is one in which fundamental rational principles corresponding to the principles of an original Rationality external to the subject are internalised in the rationality of the subject. In the development of Stoicism there is a tendency in this direction as the notion of human rationality as a fragment of the original divine Rationality lead to the possibility of innate rational principles. The development of Platonic thought in Hellenistic Middle Platonism led, in a somewhat different way, in the same direction with the introduction of the notion of innate ideas corresponding to original Ideas in the mind of God (See Merlan, 1967:53-55).

With modern rationalism - that is, from Descartes onwards - we encounter the third sub-type characterised by human rationality becoming a fully autonomous rationality in which the fundamental rational principles are wholly internalised in the subject as original principles.

Secondly, knowledge is founded in the conceptual replication in human thought of the rational order of reality; a replication that can be articulated precisely in propositional/symbolic form. The rationality of human thought corresponds to a rationality in the reality that is the object of that thought.

On the one hand, truth is identified with propositional/symbolic formulas that have universal applicability. Common sense and practical experience are given different cognitive value in each of the three approaches but there is agreement that knowledge in its highest, and most certain, form is articulated in propositional/symbolic formulas.

On the other hand, knowledge is regarded as the conformity of thought to the rational order of reality. There is no conception of human cognition as imposing an order on nature. Though the notion of

innate ideas laid the foundation for the later development of such a conception, all the major epistemological approaches of the Greek/Hellenistic period assumed that knowledge is the conformity of thought with a universal order of reality that exists independently of human thought; although in the Hellenistic period the notion begins to appear that this order, while existing independently of human thought, is internalised as an a priori principle in human thought.

Thirdly, epistemology is explicitly dependent on metaphysics. Platonic epistemology is dependent on the existence of a metaphysical realm of Ideas; Aristotelian epistemology depends on the existence of universal forms as a metaphysical, intelligible reality, within the world of sensory experiences; Stoic epistemology is dependent on the existence of a pervasive Logos as the metaphysical ordering principle of reality. When later the Ideas were shifted from an independent realm to make them innate to the mind the epistemology remained metaphysically dependent; the original of these innate mental Ideas is the metaphysical postulate of Ideas in the mind of God (Merlan, 1967:54,55; Van Dyk, 1981:48; Copleston, 1985:Vol.I,446-462).

More is involved than a coincidence of epistemology and metaphysics. There is an epistemological dependence on metaphysics such that if the metaphysical foundation is removed the character of the epistemology is changed fundamentally. Armstrong's separation of Aristotle's epistemological realism from his metaphysical essentialism (Armstrong, 1973:114-123) already discussed illustrates this well. The universals lose the character of metaphysical reality that they have in Aristotle to become nothing but logical constructs of the knowing subject. The result is that knowing ceases to be the process of abstraction penetrating the intelligible inner core of reality that it is in Aristotle to become a logical processing of the data of sensible particulars more akin to Stoic than Aristotelian epistemology.

### 1.5.6 The Consolidation of the Rationalist Tradition

The long period of socio-political ascendancy, with its concomitant intellectual dominance, of the Christian church in the Western world saw a consolidation of the rationalist position as the unchallenged epistemological orthodoxy.

In establishing its intellectual dominion, backed by the powerful sanctions of a State-Church alliance, Christian thought relied on a synthesis of the rationalism of the Greek/Hellenistic tradition with the dogmas of the Christian faith. Christian theology and the Greek/Hellenistic philosophical tradition were brought into a close alliance of mutual support and defence.

On the one hand, Christian theology and faith gained the status of universal rational certainty that was associated with knowledge in the philosophical tradition; anyone challenging the dogmas of the Christian church could be dismissed as defying the certainties of universal rationality. Any rational person must believe the Christian dogmas.

On the other hand, the rationalist epistemological position was established firmly as the epistemological orthodoxy by its association with the infallible truth of divine revelation embodied in Christian dogma. Any challenge to rationalist epistemology could be rejected as an act of infidelity.

The explicit metaphysical dependence of rationalist epistemology in the Greek/Hellenistic tradition facilitated this consolidating merger with Christian dogma. Because Greek/Hellenistic metaphysics already used explicitly religious language it was possible to recast its formulations in the language of Christian theology with minimal change to the basic structure of the metaphysics. To what extent this meant a reshaping of Christian theology in the image of Greek/Hellenistic metaphysics is another question. The result was a long period of merger, or at least close interdependence, of philosophy and Christian

theology, with a tendency to blur the distinction between them. During this period there was a consolidation of the rationalist tradition of epistemology.

The merger was effected in widely differing ways by different theologian-philosophers, of course, but a rationalist epistemology was common to all. It is important to note that William of Ockham is no exception.

Ockham's metaphysical voluntarism undoubtedly had significant impact on his epistemology. It is directly related to his particular form of empiricism with its rejection of the reality of universals as a reality distinct from individuals (Ockham,1967:Sentences,I,II,6). Nevertheless, his epistemology remains firmly within the rationalist tradition; the tradition that forms cognition by a self-authenticating rationality. His voluntarist metaphysics allowed him to separate empirical knowledge from matters of Christian faith without either denying that faith or sacrificing the rationalist character of empirical knowledge.

Knowledge, for Ockham, as for other Christian thinkers of the period, remained a matter for a self-authenticating rationality. At the most primitive level of cognition the intellect intuits objects through the instrumentality of the senses; nothing is required but the object plus the intellect. At the more advanced levels the intellect works abstractively, processing the data that it has gathered by intuition (Ockham,1967:Sentences,II,2,15; Quodlibet,I,Q, IXV).

Ockham's epistemology is an empiricist rationalism. Sensory experience is the sole source of cognitive data while a self-authenticating rationality is the sole authority for identifying and processing this data. The empiricism does not make it any less rationalist.

#### 1.5.7 The Divorce of Epistemology and Metaphysics

The factors that brought an end to the long marriage of philosophy and

Christian theology - a marriage lasting over 1000 years from Augustine to the 16th century - are too complex to be discussed in detail here. Inner tensions that developed in Christian thought, the rise of humanism, Renaissance and Reformation all played a part in bringing to an end the long period of the intellectual dominion of Christian theological/philosophical systems in the Western world.

What is important is that with the ending of this long alliance philosophy was established as a discipline distinct and separate from theology. The dominant position that theology continued to hold for a considerable period as "Queen of the sciences" meant that the philosopher who wanted a position of respect must at least give the appearance of respect for the basic features of the prevailing theological orthodoxy. Steadily, however, even if slowly, the two drifted further apart. Ultimately philosophy became a secular discipline wholly independent of all theology.

This secularisation of philosophy appears to be a peculiarity of the modern Western world. It did not occur in the ancient Greek or Hellenistic ages. During those centuries, as in the long period of Christian dominance, philosophy and theology were inseparable, though the relationship was, of course, different; in the period of Christian dominance theology was dominant over philosophy whereas in the Greek/Hellenistic periods theology was subsumed under philosophy. Nevertheless the idea of a secular philosophy without theology was never seriously considered. Epicurus, perhaps, came closest to it but even he was unable to make the decisive break.

This gradual secularisation of philosophy prepared the way for the divorce of epistemology and metaphysics. The union of theology and philosophy had given metaphysics a special role in philosophy. The union was based on an ontological division of reality into a realm of nature and a realm of supernature (grace) with philosophy authorita-

tive in the realm of nature and theology in the realm of supernature. In this scheme, whatever degree of autonomy might be ascribed to philosophy in the realm of nature, the realm of supernature was the primary realm of ultimate reality that determined the nature of things in the realm of nature. No philosophical understanding of nature could be true, therefore, if it was not in harmony with theology, the science of supernature.

In this situation, metaphysics, regarded as the philosophical discipline dealing with realities beyond nature, had a crucial role as the interface between philosophy and theology. Epistemology, therefore, was expected to take metaphysical specifications of nature and its relation with supernature as fundamental givens.

Ockham's empiricism, though it weakened the epistemological relation between nature and supernature, was no exception as regards the metaphysical dependence of epistemology. Ockham's empiricist epistemology depended on his voluntarist metaphysics.

For Thomas Aquinas the realm of nature was a realm of necessary rational order because it is an actualisation in time of the eternal forms of the Divine Intellect. The metaphysics specifies that true knowledge of nature will be the replication in thought of a fixed rational order.

Ockham did not meet this by declaring the metaphysics irrelevant for knowledge of nature. He could not do so while maintaining, as he certainly wished to do, the inseparability of theology and philosophy. Christian theology demanded that nature be regarded as the creation of a supernatural God with its constitution determined by this creational relationship. Ockham could establish his empiricist epistemology of nature, therefore, only by displacing the Thomist metaphysics with a metaphysical scheme congenial to his empiricist epistemology, yet still attempting to preserve a harmony between the metaphysics and

Christian theology.

The establishment of philosophy as an autonomous discipline entirely independent of theology removed the requirement of a metaphysical foundation for epistemology as a bridge between nature and supernature. It did not make it illegitimate to continue to provide such a foundation but it opened the possibility of an epistemology without such foundations. The autonomy of philosophy implied the autonomy of nature in relation to supernature, opening the possibility of the abolition of supernature; the two realms are, in principle, isolated from each other. It is possible, in principle, to know nature without any reference beyond nature.

That philosophers continued to give metaphysical foundations to their epistemologies was not due to any logical constraint but to the continuing belief in a supernatural - or supra-natural - realm as the ultimate reality that gives shape and meaning to the realm of nature. Only as that belief weakened so that nature came to be seen more and more as self-explanatory could a metaphysical foundation for epistemology beyond nature be abandoned. In this process the contribution of Immanuel Kant, which is essential background for the present study, is an important milestone.

#### 1.5.8 Knowing as Rational Formation

Until Kant it had been generally assumed that knowledge gives a true account of a reality that exists independently of our experiencing it. The differences had revolved around questions about the nature of that reality and the manner of our cognitive access to it.

Kant (1933:283) criticised both the empiricist approach to epistemology - represented by Locke - and the intellectualist approach - represented by Leibniz - as distorting reductionisms. In the one case all concepts are sensualised while in the other case all percepts are intellectualised. In each case it is mistakenly assumed that the

sensualised concepts or the intellectualised percepts, respectively, correspond to a reality independent of the subject - things in themselves.

Kant, who undoubtedly saw himself as the great reconciler bringing together in one coherent system all the conflicting elements in the rationalist tradition of philosophy, insisted that true knowledge could result only from the conjunction of understanding and the senses. In achieving this conjunction he asserted that the known is not any reality that exists independently of the knowing subject but is itself a construction of the subject.

On the one hand, the empiricist is right in asserting that knowledge begins with experience but is wrong in regarding experience as the registration in the mind of data given by the senses. On the other hand, the intellectualist is right in asserting that sensory experience is shaped by a priori concepts of the mind but wrong in regarding these concepts as having any correlate external to the mind. The experience in which knowledge begins is the experience of a world constructed by the subject as the matter supplied by the senses is given form by the a priori concepts of the understanding.

Without the senses there is no experience, only a priori concepts as the empty forms of possible experience. On the other hand, the senses without the a priori concepts of understanding do not furnish experience but only indeterminate - and indeterminable - series of disconnected sensations that provide no basis for knowledge. Whatever reality there may be outside this world of experience - the thing in itself - is unknowable; the knowable is the world of experience that is constructed by the interaction in the subject of understanding and the senses (See especially Kant, 1933:41,42,127,143-162,266-270).

Kant has no intention of abandoning or downgrading metaphysics. In the preface to the second edition of his *CRITIQUE OF PURE REASON* he

tells us (1933:37) that he must reserve the little time left to him for the development of the metaphysics which he clearly regards as the pinnacle of his life's work. However, he isolated epistemology from metaphysics by denying all knowable connection between nature, as the sensible realm of the knowable, and supernature as the supersensible unknowable realm of ultimate realities.

Whatever ultimate, metaphysical realities there may be are epistemologically irrelevant. They have nothing to do with the order of nature, which is the sensible realm of the knowable. That order is given in the immanent categories of the understanding. We need look no further than the immanent structure of human understanding for possibility and necessity in nature (See especially Kant, 1933:147-173).

Metaphysics no longer deals with realities that are the ultimate source of order and meaning in nature. It deals with realities that are wholly beyond nature and so beyond knowing; realities of whose existence there can be no universal certainty but only a personal moral conviction that rests on wholly subjective grounds. "I must not even say, 'It is morally certain that there is a God, etc.' but 'I am morally certain, etc.'" (Kant, 1933:650) See also Kant, 1928:8-14; 1933:467-479, 528.

In the context of the present study Kant is also significant for the way in which he differentiated philosophy from the natural sciences. Only the material sciences yield empirical knowledge. Philosophy as such is not an empirical discipline but is a discipline of pure reason concerned with transcendental critique that identifies the a priori conditions of knowledge together with metaphysics that deals with those rational Ideas of an ultimate reality that, transcending experience, is in itself unknowable.

Kant follows clearly in the rationalist tradition, which, since the Hellenistic period, had ascribed to human rationality an innate struc-

ture in accordance with which knowledge is organised. However, prior to Kant this innate structure of thought had been regarded as reflecting the structure of reality that exists independently of thought. Kant decisively severed all connection between the structure of thought and any independent reality. It is thought that gives structure to experiential reality in accordance with its own innate structure that has no reference beyond itself

The Kantian answer to the question of the fit between knowledge claims and the experiential universe, therefore, is that knowledge claims must pass two fundamental tests: they must conform to the order of rational thought and they must have a content supplied from the senses. A claim to knowledge that has no sensory reference is false; it may be thought but it is not knowledge. Equally a claim to knowledge that does not correspond to the rational order of the innate structure of thought is false; it may be sensation but it is not knowledge. In neither case does the knowledge claim answer satisfactorily to experience since experience is the conjunction of sensation and the a priori structure of thought.

The Kantian epistemology founds intersubjective universality in the a priori character of human thought; the universal a priori structure of the mind furnishes the universal and necessary structure of knowledge. The inductive procedure by which Hume tried to establish an intersubjective universality could yield no more than generalisations with assumed universality leading to the scepticism to which it led Hume. It is the a priori structure of human rationality that alone gives a true universality to knowledge (See Kant, 1933:44,127,128).

Finally, Kant makes the knowing subject central to his epistemology. From the formation of the experience in which knowledge is initially given to its most complex formulations the subject is the authoritative constructor of knowledge. The rational subject is autonomous in

the most absolute sense. Previously human rationality was regarded as answering, in its cognitive activity, to a rational order beyond itself. With Kant it answers to nothing but itself.

#### 1.5.9 The Renewal of Empiricism

With the scepticism of Hume, and the rise of Kantian intellectualism, empiricism seemed to have become lost in a dead-end. Yet within less than a century of the appearance of Hume's "Treatise of Human Nature" there was a renewal of empiricism as a major philosophical force.

Whatever the appeal in Kant's idealism, it is a major obstacle to its general acceptance that it requires the total rejection of common sense realism. By common sense realism I mean the common sense view that our sensory experiences give us access to a real world of objects external to ourselves in a direct relationship such that our sensory experiences give us at least some reliable information about that world. While many of us will be ready to listen to argument to the effect that this common sense view needs to be modified few of us are ready to accept that it should be rejected as totally false. Yet this is just what Kantian epistemology requires of us.

It is not surprising, then, that the 19th century saw a renewal of empiricism in the form of positivism, a development inseparable from the name of Auguste Comte. The Comtean philosophy is by no means characterised by a total disjunction with the Kantian. There are important disjunctions but there is also important continuity.

In particular there is continuity in the view that empirical knowledge is scientific knowledge, that science is self-accrediting and that epistemology as the theory of this self-accrediting science is independent of metaphysics. In the latter respect, indeed, Comte (1975:Vol.1,20-41) went further than Kant by assigning metaphysics a transitional function in human intellectual development that is discarded by those who attain intellectual maturity. Kant isolated meta-

physics from knowledge but continued to give it an important place in his philosophy; Comte abolished metaphysics as something that, like alchemy and astrology, had outlived its usefulness and henceforth could only be a hindrance to human progress.

The decisive beginning of this age of maturing in human history, when men made the decisive turn away from metaphysics toward the positive knowledge of science, Comte (1975:Vol.1,27,39) associates with three main figures, Bacon, Galileo and Descartes. The inclusion of Descartes is interesting in view of the empirical character of Comte's positivism since not only was Descartes not an empiricist but he developed a philosophy with a decidedly metaphysical character. The affinity no doubt lies in Descartes' emphasis on science together with his strong mathematical orientation; for Comte "mathematical analysis is the true rational foundation of the entire system of our positive knowledge. It constitutes the first and most perfect of all the fundamental sciences" (Comte,1975:Vol.I, 76).

Comte's vision was grand and comprehensive. The sciences understood as the purest source of knowledge, independent of both theological and metaphysical considerations, would not only provide the only possible universal truth with regard to every area of human experience but would provide the basis for a restructuring of society, including education, that would effectively end the revolutionary crisis that "is distressing the civilised nations" (Comte,1975:Vol.I,38,39). This could be achieved, however, only if the sciences were co-ordinated by a general science which, initially at least, was to be the role of positive philosophy (Comte,1975:Vol.I,33).

It would take us too far beyond the present purpose to explore in any detail the extent to which the socio-political circumstances of the time influenced both the development of Comte's philosophy and the ready reception that it received in European thought. Certain it is

that he developed and published his ideas in the period of socio-political turmoil in Europe that followed the French Revolution.

It is also beyond question that the major intellectual forces behind that Revolution, in which Voltaire and Rousseau are key figures, had placed a low value on science, pinning their hopes rather on a human freedom that transcends science. It would not be surprising in this situation if disillusionment with the experience of this revolutionary movement generated a powerful movement toward science as the answer to the problems of mankind. Freedom having brought horror and instability, science might be expected to bring the desired peace and harmony.

However this may be, Comte's positivism represented not only the decisive naturalisation of philosophy, and, indeed, of the whole of human life, but also a decisive endorsement of science as both the one authentic knowledge and the one authentic source of norms for human action. In this last respect Comte stands in sharp contrast to Kant who maintained that normative direction for human action comes from practical reason that transcends the cognitive domain of science. After the long centuries during which Western thought had been dominated by the nature/supernature duality, Comte reduced all human experience to the realm of nature enabling him to postulate the natural sciences, together with human and social sciences modelled on them, as the comprehensive key to both knowledge and practice.

Comte's positivism did not achieve the lasting world conquest that his historical determinism led him to predict so confidently and his view of science appears naive today. Nevertheless he must stand with Kant as one of the two most decisive influences in the shaping not only of modern philosophy but also of much popular thought.

More specifically in relation to the present study Comte re-established the empiricist position that knowledge is given through the observation of the senses processed by the rational subject. Follo-

wing in the rationalist tradition, the rational processing is crucial to Comte's empiricism. The senses provide raw data which must be rationally processed by the subject in order to yield knowledge.

Comte continues in this tradition but now it is the scientific method that constitutes this rational processing. The scientific method renounces all search for absolute notions, inner causes of phenomena and answers to ultimate cosmological questions. It restricts itself to the observed facts in order to discover, by the combined use of reasoning and observation, their effective laws. These laws are not ultimate causes but simply the invariable relations between phenomena as experienced (Comte, 1975: Vol. I, 21, 22).

Though Comte often uses the term "phenomena" (phenomènes) he does so without any suggestion of the Kantian distinction of phenomena and noumena. On the other hand, he certainly does not think of the phenomena as giving access to knowledge of the things in themselves. The idea of the thing in itself is one of the illusory ideas of metaphysics that has no place in positive philosophy and science. For Kant the thing in itself is an ultimate reality of which we can have an idea but not knowledge. For Comte it is nothing but a metaphysical illusion. Positive knowledge simply accepts the phenomena as given since to ask anything about them other than this givenness can only lead back into the illusions of metaphysics.

The rational scientific method is also important in determining what counts as cognitive data. Not everything that we observe with the senses qualifies as cognitive data. Only the facts that result from the systematic observations of science qualify as cognitive data. The heart of the Comtean epistemology is a scientific methodology that ensures the universal truth value of scientific data that alone qualify as facts constituting cognitive data. According to Comte all scientific knowledge is founded in mathematical analysis and is devel-

oped in the empirical sciences by the experimental method. This experimental method consists in removing objects from their natural circumstances to place them in artificial conditions that are instituted for the express purpose of facilitating the examination of the phenomena from a specified point of view (Comte, 1975:Vol.I,447). In other words it is observation within a carefully controlled environment.

Comte's positivism, therefore, in distinction from the empiricism of Stoicism, is a scientific empiricism. Only sensible data secured by the specified scientific method constitutes cognitive data.

In the end knowledge, for Comte, is nothing but the results of the combination of mathematical analysis with observations obtained within the controlled experimental environment (Comte, 1975:Vol.I,76-78,446-449). All knowledge is, in the end, a matter of unquestionable factuality, and scientific theories are nothing but so many large-scale logical facts (*autant de grands faits logiques*) (Comte, 1975:Vol.I,33).

It is important for the present study to note that Comte anchored his empiricist epistemology in an historical determinism. That the human intellect should move from a primitive theological perception to a mature positive knowledge by means of a transitional metaphysical stage is a matter of universal historical necessity. The progress does not proceed at a uniform rate in all areas of experience but always and everywhere it follows an inevitable and necessary order (Comte, 1975:Vol.I,27).

This universal historical necessity in the intellectual progress of the race is replicated in the intellectual development of the individual. All knowledge is given in observation but, on the other hand, we can know nothing unless we have a theory by means of which we read our observations. Theories, then, cannot be the product of theory-free observations since all rational observation depends on a pre-existent theory. The most primitive theories in terms of which we make our most

primitive observations, both individually and as a race, are spontaneous theological conceptions. Without these we could know nothing. Yet, by an inexorable historical necessity we move from these primitive theological theories through the transitional stage of metaphysical theories to the ultimate intellectual maturity in which all our theories are positive (scientific) theories of pure factuality (Comte, 1975:Vol.I,21-25).

Although Comte renounced all search for transcendent realities beyond nature, in the Platonic tradition, and all search for inner realities within nature, in the Aristotelian and Stoic traditions, he rejected, as decisively as any, the reality of the common sense world of everyday sensory observation. The real world behind the world of common sense observation is a world ordered by invariant laws that are identified by the mathematical/experimental method of science. He denied the existence of any cosmic order accessible to human thought by which scientific knowledge can be unified. He held that each class of events has its own specific laws that are united in scientific knowledge only by the common method that establishes them and their common tendency toward the one essential destiny in subordination to the same general evolution (Comte,1975:Vol.II,772).

In Comte's positivism, then, knowledge fits the reality of the experiential universe by identifying invariant relationships between the phenomena of that universe - mathematically founded laws yielded by the scientific method - that underly the world of common sense experience. The appropriate testing of knowledge claims is by mathematical analysis supported by experimental observation.

Intersubjective universality is secured by a determinism that rigorously excludes the knowing subject from any formative role in cognition. The subject does no more than register knowledge; whatever deficiencies and flaws there are in human knowledge are due to the

disturbance of non-cognitive, subjective factors that distort the registration. In the positive knowledge of science these distortions are filtered out by the systematic exclusion from cognition of all factors other than the controlled observations of the experimental method ensuring an intersubjective concurrence in observation and mathematical analysis that has the character of universal necessity. Progress to this pure state of positive knowledge is assured by historical necessity.

Finally, whereas Kant founded the objectivity of knowledge in the universal structure of thought in a subject that actively forms knowledge, Comte endeavoured to secure it by reducing the cognitive activity of the subject to the registration of facts in accordance with a universal determining necessity.

#### 1.5.10 Epistemology as Logical Analysis of Language

Without doubt the dominant form of philosophy in the Anglo-Saxon world during the first half of the twentieth century has been that somewhat diverse, yet clearly identifiable, movement best described as analytical philosophy. The practice sometimes followed of calling this kind of philosophy "Logical Positivism" or "Logical Empiricism" is unsatisfactory because, as A.J. Ayer (1959:3) points out, it blurs a distinction within analytical philosophy which the philosophers concerned generally regard as significant.

Stumpf (1971:437) describes the common factor that unifies all analytical philosophers, from Russell and Moore to Ayer, Wittgenstein and Ryle, as "their agreement concerning the central task of philosophy. The task of philosophy, they say, is to clarify the meaning of language". Wittgenstein (1958:47) states this thesis clearly when he asserts that philosophical problems "are, of course, not empirical problems; they are solved rather by looking into the workings of our language ... Philosophy is a battle against the bewitchment of our

intelligence by means of language".

Analytical philosophy does not appear to have developed as a direct continuation of Comtean positivism. It seems to have developed first in Britain as a reaction to an often obscure neo-Hegelian metaphysics in an attempt to bring philosophy down to earth (Stumpf,1971:437). And, although Ayer (1959:4) includes Comte among those whom the Vienna Circle - the original Logical Positivists of analytical philosophy - regarded as their main precursors there are few references to Comte in their writings. Hume, whom Comte largely ignored, figures much more prominently in the writings of analytical philosophers than does Comte.

Nevertheless there is a clear affinity between analytical philosophy and Comte's positivism. There seems little doubt that analytical philosophy grew out of a philosophical environment that, whether directly or indirectly, had been significantly shaped by Comtean positivism. There is the same empiricist assumption that all knowledge originates in sensory experience, there is a similar mistrust of metaphysics, and there is the same confidence in inductive procedures.

The degree of this affinity varies but is clearest in the case of Logical Positivism. Since this is the version of analytical philosophy that is most significant as background to the present study the following discussion will concentrate on it.

While Logical Positivism was developed by the Vienna Circle who saw themselves as developing a Viennese tradition (Ayer,1959:4) its links with Anglo-Saxon analytical philosophy are undeniable. In the first place, in its development it received significant stimulus from British analytical philosophy and particularly the Cambridge school. Russell and Wittgenstein were especially influential. Bergmann (1967:1,2) argues that Logical Positivism is the result of interaction between the Cambridge School of Analysis and the Vienna Circle. In the

second place, the work of the Vienna Circle was fed back into the English-speaking world where it found its most congenial philosophical climate and where it had its strongest influence; an influence that was for a time overwhelming in the philosophy of science.

Through Ernest Mach, who was something of a founding father, or rather grandfather, of the Circle, the Vienna Circle appears to have had more direct links with positivism than did early British analytical philosophy (Hanfling, 1981:6). Certainly the affinity with Comtean positivism is pronounced in the writings of the members of the Circle.

There is the same emphatic rejection of metaphysics. Carnap (1959) not only argues forcefully that all metaphysical statements are meaningless but uses a very Comtean-like scheme to explain the prevalence of metaphysics in the history of human thought. He suggests that we may regard metaphysics as a "substitute for theology on the level of systematic, conceptual thinking" replacing the transcendent sources of knowledge of theology "by natural, yet supposedly trans-empirical sources of knowledge".

Along with this there is the typical positivist respect for the scientific method as the sole source of truth. It is undoubtedly this feature of Logical Positivism that made it so attractive to analytical philosophers of science. Philosophy and science belong together, with philosophy clarifying the meaning of scientific statements and science establishing their truth. Philosophy is an activity distinct from science but there is no domain of philosophical truth, no set of philosophical statements, distinct from the truths and statements of science; "the philosophical activity of giving meaning is ... the Alpha and Omega of all scientific knowledge" (Schlick, 1959:56,57).

Neurath (1959:283), perhaps even more strongly, argues that the philosophical task of the clarification of the meaning of concepts is inseparable from the scientific method. The full title of the Vienna

Circle which Neurath gives in this essay itself speaks volumes - the "Vienna Circle for the Dissemination of the Scientific World Outlook (Weltauffassung)".

Carnap's footnote (1959:80) in his essay on the elimination of metaphysics provides a concise statement of the position of Logical Positivism in relation to Comtean positivism in these two respects. He explains that he uses the term "metaphysics" in the usual European sense to mean "the field of alleged knowledge of the essence of things which transcends the realm of empirically founded, inductive science" but that "it does not include endeavours towards a synthesis and generalisation of the results of the various sciences". This closely parallels Comte's statements both about what he is rejecting when he rejects metaphysics and the synthesis that he expects his new positive philosophy to achieve (Comte, 1975:Vol.I, 21-41).

Yet Logical Positivism differs from Comtean positivism in at least two important respects. Firstly, it does not take over Comte's historical determinism. Perhaps this retained too much of a metaphysical flavour to suit the tastes of the Circle. Secondly, it took a different view of the nature of the scientific method and of the relation between philosophy and science, a view suggested by its qualification as "Logical" Positivism.

Comte had seen the scientific method as a combination of mathematical analysis and experimental observation. Logical Positivism did not reject these components but added to them the "logical analysis of the statements and concepts of empirical science" as an essential ingredient that supplies "both the foundation and the apex of the edifice of science" (Carnap, 1959a:133; Schlick, 1959:57). In this respect it could be regarded as enlarging and refining rather than displacing Comte's conception of the scientific method.

In Logical Positivism the role of Queen of the Sciences, that had

once been assigned to theology, is taken over by philosophy (Schlick,1959:56). It can fulfil this role without being any threat to the sciences because, although not itself a science it has adopted "a new, scientific method of philosophising" (Carnap,1959a:133). Philosophy is restricted to narrower limits than ever before; it is now nothing but the logical analysis of language. On the other hand the dependence of science on philosophy for the clarification of its concepts, a clarification essential to its progress and, indeed, its very existence, gives philosophy unsurpassed authority in the cognitive domain (Schlick,1959:57-58).

The cornerstone of Logical Positivism was its verification principle that the meaning of a proposition is its method of verification - where verification means empirical verification. It is on the basis of this principle that metaphysical statements were held to be cognitively meaningless; they could not be verified within the specified understanding of verification. Logical Positivists experienced difficulty in arriving at an adequate formulation of the method of verification but, as Ayer (1959:14) observes "the employment of the principle did not wait upon its proper formulation; its general purpose was held to be sufficiently clear". In the process of its use philosophy was swept clear not only of more obvious metaphysical questions but "of most of the perennial problems of philosophy".

An important consequence was the reduction of epistemology to a logical methodology or, as Carnap (1959a:133) put it, applied logic. All empirical considerations are, in principle, excluded; epistemology is concerned only with the logical conditions of empirical science.

The method of verification is Logical Positivism's prescribed test for a fit between knowledge claims and the experiential universe. The universal validity of the logic of that method is the guarantee of intersubjective universality. In these respects it is a characteris-

tically modern form of rationalism.

Yet, it retains the fundamental approach to the role of the knowing subject that has characterised empiricist epistemologies since the Stoics. The subject registers and processes sensory data in accordance with a universal rationality. In contrast to Kantian epistemology the subject has no formative role but processes data according to the rules of a universal rationality. The way in which this universal rationality is seen differs significantly from earlier varieties of empiricism but the role of the subject remains substantially the same.

#### 1.5.11 The Development of a Constructivist Epistemology

Although philosophers in the English-speaking world have tended to act as though the analytical method is the only respectable way to philosophise in the twentieth century, it had little impact outside the English-speaking world and, to a lesser extent, Scandinavia (Ayer, 1959:7). Although the Vienna Circle has an important place in the development of the analytical tradition it was, in itself, an isolated and short-lived enclave in continental Europe whose main impact was felt in the English-speaking world.

At the same time that the analytical method was developing as epistemological orthodoxy in English-speaking philosophy, a quite different approach was being developed in French-speaking philosophy. The beginnings of this development can be traced to the distinguished French mathematician/philosopher, A.A. Cournot (1801-77), a contemporary of Comte. It came to its full development in the work of Léon Brunschvicg who was a major formative influence in the intellectual development of Jean Piaget.

Deschoux (1964:222) lists Brunschvicg, with Bergson and Blondel, as one of the three figures dominating 20th century French thought until the Second World War. Brunschvicg developed an epistemology that, following Kant, regarded knowledge, and the experience in which know-

ledge originates, as the construction of the subject. At the same time the epistemology he developed differs from Kant in too many fundamental respects to be classified as either Kantian or neo-Kantian. Deschoux (1964:210) describes him as both more "critical" than Kant and more "positive" than Comte.

In relation to Kant Brunschvicg rejected the notion of a fixed a priori structure of thought. He regarded this feature of Kantian philosophy as an aberration in the authentic tradition of intellectualism represented by Leibnitz and especially Spinoza. He saw himself as resuming this authentic tradition after the Kantian and neo-Kantian deviation (Brunschvicg, 1951-8:Vol.3,86,87).

For Brunschvicg human thought has no a priori structure but creates its own structures in interaction with the natural world. It structures all human experience, not according to any predetermined structure but according to structures that it constructs as it goes in interaction with nature. Totally rejecting all static views of reason and of nature he regarded reason and nature as two moments of the same activity; reason and experience are not two distinct, fixed categories but each is simply the extension of the other, two interdependent faces of a single growth ("deux faces solidaire d'une croissance unique") (Brunschvicg, 1951-8:Vol.2,65,66; Vol.3,71,72).

Action, or rather interaction, is the key to Brunschvicg's intellectualist epistemology. There is neither nature in itself nor mind in itself but only the two in interaction (Brunschvicg, 1951-8:Vol.2, 65,66). This is illustrated clearly in his view of the origin of the concept of number which, he argues, is neither to be found in a logical concept nor in an a priori form but in an act of thought in which experience and reason, both understood as activities, concur. The "act of relation precedes the function of the concept" (Brunschvicg, 1951-8:Vol.3,85,100,101,121).

He also rejected the Kantian noumenal realm of things in themselves. For us only the knowable exists. "Beyond this there is nothing; a thing that was beyond knowledge would be by definition the inaccessible, the indeterminable, which is to say that it is, for us, equivalent to the nothing" (Brunschvicg, 1951-8:Vol.2,68). Given that, for Brunschvicg the world of the knowable is the world of science, the affinity with positivism is apparent. The unknowable Kantian Idea transcending experience is metaphysical nonsense. The world of experience accessible to science is for us the only world there is (Brunschvicg, 1964:2).

Where Kant made room for a rationally ordered science and a creative human freedom by specifying separate realms peculiar to each Brunschvicg brought them together in one realm governed, even created, by a constructive rationality. In the Brunschvicgian world there are neither eternal truths of reason nor invariant laws of nature. In that sense we are wholly free. On the other hand, this free rationality in creating its own norms to which all experience and knowledge conform acts according to a universal law of unity internal to all thought. In this sense we live in a rationally ordered world the universal ordering principle of which is internal to the intellect of the knowing subject (Brunschvicg, 1964:235-237; Deschoux, 1964:212-214).

Emerging science is not enclosed as Comte, and before him Kant, wished, in the forms of science as already established. The constitution of these forms reveals a primitive dynamism the force of which continues in the synthetic generation of more and more complicated notions (Brunschvicg, 1981:567).

This conception of a dynamically ordering rationality led Brunschvicg to adopt what came to be known as the historico-critical method as the key method of epistemological investigation. A rationality such as Brunschvicg proposed could only reveal itself in history as the

field of ongoing interaction of reason and nature. The philosopher, then, must "make history his laboratory" since rationality cannot be known in any other way than by its activity in history (Deschoux, 1964: 214). Any attempt at atemporal definition will be futile.

While superficially this stress on history suggests the influence of Comte, on closer examination there are marked differences. Comte's historical determinism is closely linked to the empiricism that is basic to his positivism. In positive science the subject registers information about the object world as it is in its positive factuality because the subject possesses a rational framework that reflects the positive rationality of the object world. An historical necessity determines the progress from the primitive condition in which the world is perceived through a distorting framework to the state of all-embracing positive science which is the definitive human condition. Epistemology must be based on the study of positive science, as definitive knowledge, not on the study of history which does no more than provide positive evidence for the definitive character of positive science.

For Brunshvicg, on the other hand, there is no ultimately definitive human condition. History leads to no definitive state. What is definitive of the human condition, and of knowledge, is the activity of the rational intellect in interaction with nature. That activity is not being led by any historical necessity, as in Comte, to a definitive state, but is itself continually defining both history and itself in an indefinite process of development (Brunshvicg, 1951-8: Vol. 2, 67; Deschoux, 1964: 210, 214). Epistemology, therefore, cannot be based on the study of positive science in its present actuality since this is not definitive but only the immediately present definition that the defining rational intellect gives to knowledge. Epistemology can only be based on the study of intellectual history in which the

rationality that defines knowledge actively reveals itself.

Brunschvicg faults both Kant and Comte for having attempted to prescribe a definitive form or method of science. Philosophy, he argues, cannot enclose science within its systems since all philosophical systems are tied to the progress of science (Brunschvicg, 1981: 302-304).

For Brunschvicg as for Comte history is significant for epistemology but they take fundamentally opposing positions on the nature of history's epistemological significance. This opposition is directly related to the empiricist and intellectualist positions that they respectively adopted. In spite of the strong emphasis on historical studies, "historicism" is not appropriate as a description of Brunschvicg's epistemology. More appropriate is the classification "intellectualism" that he himself liked to use to describe his position. It is the rational intellect as ordering activity acting according to a universal law internal to itself that determines all things in human experience, including history.

Yet, although he wishes to avoid the Kantian deviation and maintain the "pure" intellectualism of Leibnitz and Spinoza, his intellectualism is decidedly influenced by the Kantian revolution. Even more decisively than Kant, if possible, he places the actively constructing, autonomous subject at the very heart of his epistemology.

This leads him to an intellectualist rationalism with a universal dynamic principle of constructive unity internal to the intellect as self-authenticating, autonomous authority. The autonomous rational authority is neither a Kantian a priori conceptual structure nor a Comtean a priori method, but is a dynamic principle of constructive activity. This ensures an inter-subjective unity of rationality that unites all rational minds at any given time and place. Though there is no supra-temporal rationality allowing us to define a rational order

once for all, individual knowing subjects are united by a universal law of action internal to thought that universally directs the constructive activity of cognition (Brunschvicg,1964:236-238; Deschoux, 1964:212).

This underlines the importance of historico-critical studies in Brunschvicg's epistemology. While we may hope to identify the Kantian a priori structure of understanding equally well at any historical moment and will expect to identify positivism's a priori method only when historical development has reached the positive stage, the nature of Brunschvicg's rational directing principle can be uncovered only from studying intellectual activity throughout history.

There is a more decisive link between Comte and Brunschvicg in Brunschvicg's emphasis on science as positive knowledge whose truth is assured by its rational method of mathematical analysis applied to systematic, experimental observation (Deschoux,1964:216.) However, whereas Comte's empiricism made mathematics a tool for the analysis of "facts", in the intellectualism of Brunschvicg mathematics is constitutive of knowledge. "The consideration of mathematics is fundamental to knowledge of the mind as it is to the natural sciences, and for the same reason: the free and fruitful action of thought dates from the time that mathematics furnishes man with the true norm of truth" (Brunschvicg,1981:577). It is by mathematical analysis that nature is revealed to the mind and, at the same time, the mind's own intellectual capacity is revealed. (Brunschvicg,1951-8:Vol.2,65,66).

This provides the demarcation criterion of science. Science is continuous with practical experience in that both are governed by the interaction of mind and nature that continually constructs experience. What distinguishes science is the use of systematic tests, a mathematical procedure of verification (*une règle de vérification*), that enables us to test systematically the results of this activity (Brun-

schvicg, 1951-8: Vol. 3, 71, 72, 86, 99, 100).

At first glance it is tempting to draw a parallel between this conception and the verification principle of Logical Positivism. On closer examination it becomes evident that the two conceptions are very different. In accordance with the empiricist character of Logical Positivism its verification principle held that the truth of an empirical statement is established by an appropriate logical connection between the statement and sensory observation; sensory observation is the ultimate locus of truth against which empirical propositions are to be tested. This gave to the verification an underlying dependence on inductive logic that became the focal point of Popper's attacks.

For Brunschvicg, on the other hand, the locus of truth is the activity of the rational intellect, with a strong emphasis on its mathematical character, in its interaction with nature. Verification, for him therefore, is the use of systematic tests that thought prescribes for itself as a check on its own activity. It does not establish the truth of statements by their logical relation with observations of a reality independent of thought; it prescribes inter-subjective rational tests that ensure the intersubjective universality of knowledge, tests that are never mere observations since they arise from the universal temporal intersubjectivity of rationality itself. There is no trace of reliance on inductive logic in Brunschvicg's verification; it is a deductive procedure for the systematic rational checking of the activity of rationality, an "internal audit" of rationality.

To ask whether such tests are logical or empirical - as the philosopher nurtured in the 20th century English-speaking philosophical world will be apt to do - is to ask a meaningless question for Brunschvicg. In the very nature of things they must be at once logical and empirical. There is no logic except in empirical interaction with nature and there is no experience of nature apart from the logical ordering of

reason.

It is also worth noting, especially in relation to Popper's falsificationism, that Brunshvicg gives considerable emphasis to the detection of errors as the purpose of verification. Brunshvicg's verification is certainly not Popperian falsificationism under a different, and misleading name, but neither is it the verificationism of Logical Positivism.

In brief, the epistemology developed by Brunshvicg and which had significant impact on the French-speaking world in the first half of this century, founds the intersubjective universality of knowledge in the rationality of human thought as a constructive rationality governed by a universal dynamic law internal to thought.

The fit between knowledge and experience is assured because the same intersubjective rationality that yields knowledge is also formative of the experiential universe. The tests for this are the systematic methods of verification that this rationality prescribes for itself.

In sharp contrast to the passivity of the knowing subject of Logical Positivism, and, indeed, of analytical philosophy in general, Brunshvicg's knowing subject is the epistemological key since knowledge is the construction of this subject acting wholly by a law internal to itself. With Brunshvicg the knowing subject has absolute autonomy.

#### 1.6 PIAGET, POPPER AND POLANYI - CONVERGENCE AND A NEW DIVERGENCE

In Brunshvicgian intellectualism on the one hand and analytical philosophy on the other we have the two sharply divergent epistemological traditions that make it difficult for philosophers in the English-speaking world to understand - or even take seriously - Piagetian epistemology.

Brunshvicg, who was almost certainly the most important single influence in the formation of Piaget's basic epistemological position, represents a twentieth century development of the intellectualist

stream in rationalist epistemology. This stream is characterised throughout its history by the view that empirical knowledge originates in the intellectual apprehension of an intelligible reality that is normative for the empirical.

From Plato to Brunschvicg there was a steady and significant shift both in the location of this intelligible reality and in its character. Plato had identified the intelligible reality with an eternal realm of Ideas that transcends human thought. In its Hellenistic development the intelligible reality became identified with innate ideas in thought itself correlate with ideas in the divine intellect. With Kant it became an innate, self-contained rational structure of thought. With Brunschvicg the intelligible reality becomes wholly a construction of the subject functioning in accordance with a universal constructive principle internal to thought. Intelligible reality is neither transcendent reality nor innate reality but the product of the activity of the intellect governed by an innate law of action.

In the case of analytical philosophy we have the 20th century development of the empiricist stream that goes back to Stoicism. Again it is not Stoic but the major headwaters are to be found in the Stoic conception that knowledge is the conformity of thought to the world of sensory experience, a conformity that can be achieved only by the rational processing of sensory data. In analytical philosophy this crucial rational processing centres on the logical analysis of language, with a scientific emphasis in the case of Logical Positivism.

The third major epistemological approach of Greek/Hellenistic philosophy, the abstractive intellectualism of Aristotle, dropped out of the philosophical mainstream after the Reformation. Aristotle is still referred to with great respect and the name "Aristotelian" is used to describe a particular position such as Armstrong's Realism discussed earlier. However, it is an eclectic use of Aristotle in

which the distinctive heart of Aristotelian epistemology, the abstraction of the intelligible as the inner core of the sensible, is discarded. There is a disjunction of intelligible and sensible. Intelligibles become mental entities wholly internal to thought that are either a priori categories of thought or the products of thought.

In the heyday of Medieval Scholasticism Thomas Aquinas had been able to sustain an Aristotelian-type epistemology on the basis of an ontology of a material world of nature determined and pervaded by a supernatural intelligibility. Matter as such is indeterminate. It participates in determinate reality only through the activating presence of intelligible forms that are replicas of exemplar forms in the divine intellect. Knowing the material world, therefore, is a matter of abstracting these intelligible forms from the form-matter composites. (Some of the key passages of the *Summa Theologiae* in which Aquinas develops this are 5.3, 8.1, 14.8, 11, 15.1, 3, 44.2, 3, 45.1, 3, 75.4, 76.5, 79.3-8, 84.6, 85.1.)

The naturalisation of epistemology that began in the Renaissance period eroded the supernatural basis essential to this scheme. With Kant that basis is decisively abolished as the naturalisation process in epistemology is completed. As Brunschvicg observes (1981:566), the terms of the philosophical problem are changed so that "it is no longer God face to face with the universe but the human mind; it is no longer a matter of ascertaining a plan of transcendent creation but the conditions of scientific knowledge". The human mind takes the place that had belonged to the supernatural. The debate henceforth was not to be about the relation between supernatural and natural realms but between mental and physical realms.

In this situation the empiricist stream of epistemology was easy to maintain; knowledge results from the mind's rational processing of sensory impressions of the physical world. Equally readily, intellect-

ualist epistemologies of a "mentalist" type could be maintained; the qualification "mentalist" meaning that the immediate cognitive objects are mental categories with knowledge of the physical world originating with the mind. In the physicalist version of the empiricist stream the mental is reduced to the physical; in the more extreme versions of mentalist intellectualism the physical is epistemologically reduced to the mental.

With both the animistic conceptions of the Greek/Hellenistic world and the supernaturalistic conception of Christian scholasticism out of favour the abstractive intellectualism of Aristotle is left without a plausible basis. If the two categories with which we must work are the mental and the physical there is no room for an intelligible reality external to the mind without reintroducing an unacceptable supernaturalism, and hence no apparent basis for abstractive intellectualism. However, it becomes again a significant category when we come later to the detailed analysis of Piagetian epistemology.

If we adopt a Brunschvigian intellectualism then epistemology will necessarily focus on the rational activity of the knowing subject in which logical and empirical considerations are inseparably entwined; an inevitable consequence is that epistemology must be concerned with "psychological" questions concerning the nature of the thinking activity of the subject. Its primary concern cannot be knowledge as a product but must be knowing as a constructive activity. This, of course, is precisely the direction that Piaget took in developing his epistemology.

To the philosopher nurtured in the tradition of analytical philosophy this seems to result in a kind of bastardised hybrid in which the logical and empirical are hopelessly confused; hence Hamlyn's charge (1971:19,23) that Piaget is guilty of "a degree of incoherence" if not simply "a muddle" in his epistemology.

Such judgments beg the question. They assume the universal normativity of the philosophical conceptions of analytical philosophy which, on any view, represent only one segment of the philosophical world of thought. Piagetian epistemology is by no means immune from criticism but a charge of incoherent and muddled thinking such as Hamlyn makes is not justified. In terms of the Brunschvicgian intellectualism on which Piaget's work is in large measure founded it is not at all incoherent or muddled. On the contrary, viewed from that perspective Piaget (Piaget & Garcia, 1983:293) can argue, with good reason, that the epistemological endeavours arising from analytical philosophy, because they confine themselves to logical methodology, ignoring the activity of the subject, fail to address the real epistemological problems .

Of course, this is no more satisfactory than Hamlyn's charge about Piaget's incoherence. For philosophers in the analytical tradition the problems of logical methodology are the only epistemological questions. Constructive interaction between Piagetian epistemology and the mainstream of Anglo-Saxon philosophical epistemology will always be limited unless discussion can be shifted from these immediate epistemological differences to the underlying divergence in the philosophical traditions within which the epistemologies have been developed.

The divergence in the conception of epistemology discussed above undoubtedly separates Popper from Piaget. Educated in Vienna in the heyday of the Vienna Circle and then developing his academic career in the English-speaking world it is not surprising that he regards epistemology as logical methodology. The influence of Logical Positivism remains indelibly stamped on his work. At the same time he has moved away from this tradition in important respects in the direction of an intellectualism that leads to interesting convergences with Piaget.

First there is his view, central to his whole epistemology, that

scientific theories are conjectures, or guesses, of human subjects that are nothing but "our own inventions...our own self-made instruments of thought". The notion that observation is theory laden, is not, in itself, alien to the positivist tradition of course. It was basic to Comte's position. However, in the positivist tradition observation acts as a control on theories compelling a reshaping of theories to fit the facts of observation. Scientific theories, being based on systematic observations, are in accord with the facts. In making them nothing but self-made instruments of thought Popper breaks decisively with that tradition. He himself acknowledges that, in this respect, he is in agreement with the idealist (Popper,1972:117). He has replaced the classical empiricist notion of the subject as registering and processing sensory data with the notion of the subject as an active constructor of knowledge in the tradition of modern intellectualism exemplified by Kant.

Then there is his view of metaphysics to which, like Kant, he denies all cognitive value but which, unlike analytical philosophy and positivism in general and Logical Positivism in particular, he considers to be meaningful. He even argues that metaphysics may be a fruitful stimulus to scientific research programs providing a background to his own epistemology (Popper,1983:81,176,177,189-216).

Finally there is the World 3 hypothesis, with its strikingly Platonic overtones, on which Popper's view of objectivity rests. Unlike the Platonic Ideas Popper's World 3, of course, is not an eternal realm prior to all thought; it is a World generated by human thought. Yet, like the Platonic Ideas, it transcends all individual, and even all collective, thought, having an autonomy enabling it to generate ideas that no one has thought (Popper,1979:106-150). Popper's World 3 is a decidedly intellectualist conception.

Popper's epistemology is a determined attempt to save epistemologi-

cal rationalism from the crisis to which it has been brought in the English-speaking world by analytical philosophy, and particularly by the influence of Logical Positivism in the philosophy of science (see Popper, 1983:177). In the process, while retaining positivism's reduction of epistemology to scientific methodology, he makes a major shift away from the empiricism of positivism toward an intellectualist approach. Although he seems to think that he has simply fallen back to an Enlightenment position (Popper, 1983:177) his emphasis on the constructive role of the subject in cognition, is unmistakably post-Kantian in character.

Piaget and Popper represent major attempts to sustain a contemporary epistemology in the rationalist tradition. Their divergent backgrounds in Brunschvicgian intellectualism and the empiricism of analytical philosophy with its positivist background respectively results in significant divergence between their epistemologies. Yet each has created a distinctive epistemology that is not simply a reproduction of the philosophical background but carries the unmistakable marks of his own originality and, in the case of Popper, has brought a shift toward an intellectualism that converges in some respects at least with the intellectualist tradition in which Piaget worked.

In shifting the locus of rational authority to the rational judgment of the subject Popper may appear to have moved into irrationalism. This will be almost an inevitable conclusion if we limit rationalism to the two alternatives of a priori structure of thought as rational content or a priori method. However, as we have seen, Brunschvicg already opens up the third possibility of a self-authenticating, autonomous rationality governed neither by a priori content nor by a priori method but by a universal principle of acting. It is my contention, which will be developed further later in this study, that Popper's position is a rationalism of this type but with the important

qualification that the universal governing principle of Popperian rationality is a critical and not a constructive principle.

Michael Polanyi, on the other hand, is representative of the irrationalist trend that has arisen in English-speaking epistemology out of the crisis in rationalism. It should be stressed again that irrationalism is not an abandonment of rationality. This is something that the average irrationalist would not concede. What he is abandoning is not rationality but the notion of a self-authenticating rationality. Rationality, he argues, is necessarily founded in an extra-rational component of human experience as self-authenticating cognitive principle.

Polanyi is not the only important figure in this irrationalist movement nor necessarily the most important. And he is "representative" only in the broadest sense that he represents the movement to irrationalism within which a variety of other positions can be found.

He has been chosen as a comparative reference for the purpose of this study because, not only was he in the vanguard of the irrationalist movement in epistemology in the English speaking world but, unlike some other prominent figures in that movement, he has not concentrated his attention on issues specific to philosophy of science but has developed a broadly-based irrationalist epistemology though one that places a high value on science. Since this study is a study in epistemology understood in its broadest sense and not in philosophy of science per se Polanyi provides an eminently suitable comparative reference from within the irrationalist movement of English speaking epistemology.

Here also there is a shift of emphasis to the constructive activity of the knowing subject. In this respect the rationalism of Piaget and Popper converges with Polanyi's irrationalism. But beyond this there is an irreconcilable divergence concerning the locus of epistemic

authority in the subject. For Piaget and Popper, as rationalists, it is located in a self-authenticating rationality, in the first case as a constructive rationality and in the second as a critical rationality. For Polanyi, as an irrationalist, it is located in the extra-rational in which rationality is founded.

An important question to be considered before we conclude will be whether Piaget and/or Popper can save rationalist epistemology or whether some form of irrationalism must prevail. Or whether perhaps there is yet another alternative.

### 1.7 SUMMARY

This study aims to examine the epistemological contributions of Jean Piaget, with special reference to the role of the knowing subject, to compare this contribution with contemporary contributions in the English-speaking world, particularly those of Karl Popper and Michael Polanyi, and finally to evaluate these contributions critically while developing an alternative theory of knowledge.

In order to achieve these aims common problems have been identified that underly divergent problem formulations. This is of special importance because of the wide divergence between 20th century epistemological developments in the English-speaking world and the French-speaking tradition within which Piaget developed his theory.

The question of the role of the knowing subject in cognition is itself one such common underlying problem. The widely divergent formulations of epistemological problems in Piaget's epistemology, on the one hand, and his contemporaries in the English-speaking world, leading to different views on the nature of epistemology itself, is due, in a very large measure, to different approaches to this common problem.

Two subsidiary common problems are closely related to this central problem. The first is the problem of acceptable tests for a fit bet-

ween knowledge claims and the experiential universe; the second is the problem of the intersubjective universality of knowledge.

This study will be addressed, therefore, primarily to the problem of the role of the knowing subject in cognition together with the above two problems as subsidiary to this central problem. In addition, the development of epistemological discussion both in Piagetian epistemology and in contemporary philosophy in the English-speaking world raises two further problems that become significant for the present study: the problem of the relation, if any, between epistemology and metaphysics and the problem of the cognitive status of science.

An examination of the historical background has identified some typical answers, or approaches, to key epistemological problems that provide a framework for the comparative evaluation of contemporary epistemologies.

The Western philosophical tradition until the 20th century has been dominated by rationalist answers to epistemological questions. "Rationalist", in this context, embraces those views that, in one form or another, locate subjective authority in a universal, self-authenticating rationality. In its modern development, since Descartes, rationalism has been characterised by the ascription of autonomy, as well as universality and self-authentication, to this rational authority.

In this modern development three further sub-types of rationalism have been identified. One, represented by Kant, identifies autonomous rational authority with a universal a priori conceptual structure of thought. The second, represented by Comte, identifies the universal ordering principle of cognition with an a priori method accredited by autonomous rational authority. The third, represented by Brunshvieg and largely confined to the French-speaking world, identifies the universal ordering principle with with an a priori (innate) dynamic principle that governs the structuring activity of the subject's

thought; as a dynamic governing principle the a priori principle of Brunshvicg can be identified neither with a a priori conceptual content nor with an a priori method, but governs rationally the generation of both content and method by the subject's thought.

The 20th century has seen a decline in the influence of rationalist solutions with, on the one hand, a tendency, as illustrated in Popper's theory, to an attenuation of rationalist claims and, on the other hand, the rising influence of various types of irrationalism, as illustrated by Polanyi; understanding by "irrationalism" those views that locate the seat of cognitive authority in an extra-rational function of the knowing subject.

In this situation an important issue is the evaluation both of contemporary attempts to save rationalism, of which Piaget's epistemology is an important example, and of the possibilities offered by the rising tide of irrationalist alternatives.

A further important distinction arising from the historical survey is that between intellectualist and empiricist solutions to epistemological problems. It is a distinction that cuts across the rationalist/empiricist distinction. "Intellectualism" is used to distinguish those theories that take the primary cognitive objects to be intelligible objects of one kind or another while "empiricism" is used to distinguish theories that take primary cognitive objects to be empirical, or sensible, data. Intellectualism does not necessarily imply the exclusion of sensory experience from a role in cognition any more than empiricism rules out the cognitive use of the intellect; the distinction concerns what is taken to be the primary cognitive data.

Within intellectualism four sub-types have been noted. First there is a transcending intellectualism, associated with Plato, in which the subject apprehends intelligible objects by transcending the world of sensory experience. Then there is an abstractive intellectualism,

associated with Aristotle, in which the subject abstracts the intelligible objects from the sensible. Thirdly, there is an a priori intellectualism, represented by Kant, in which the intelligible data are given a priori in the subject's thought. Finally there is the constructivist intellectualism exemplified by Brunshvic in which the intelligible data are wholly constructed by the subject's thought. Both the last two have a characteristically modern mentalist stamp.

Within empiricism note has been taken of only two sub-types. One is a sensationalist empiricism, associated with Stoicism, in which simple impressions resulting immediately from sensation constitute the cognitive data. The other, which we encounter in Comte and again in Logical Positivism, is a scientific empiricism in which only the sensible data obtained in accordance with a specified scientific method constitute cognitive data.

As with the rationalism/irrationalism distinction so in the case of the intellectualism/empiricism distinction no attempt has been made at an exhaustive analysis of sub-types. This is particularly true with respect to empiricism. Because each of the three 20th century epistemological contributions that provide the main focus of this study have an intellectualist character more attention has been paid to the development of the intellectualist tradition than the empiricist. In considering the empiricist tradition special attention has been paid to those forms of empiricism with which these three have interacted - or perhaps to which they have reacted - which have been predominantly of a scientific type.