EPISTEMOLOGICAL REQUIREMENTS TO ALLOW FOR CHANGE AND DEVELOPMENT IN EDUCATIONAL SUBJECT-MATTER

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C O N T E N T S

A C K N O W L E D G E M E N T S

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I N T R O D U C T I O N

It is a generally accepted view that responsible educational practice depends on an understanding of the interrelationships between the child, the learning process, and the subject-matter to be learned. It is not surprising, therefore, that throughout the nineteen-sixties western educational literature has directed considerable attention to changing views and practices in task analysis, learner characteristics in the light of teaching procedures, the teaching process itself, and the evaluation of learning outcomes. What is surprising and, as I intend to show, disquieting, is that subject-matter which, in behavioural terms, is supposed to provide the stimuli for learning and become a major part of the complex of responses to be acquired, has been given abysmally low priority in terms of its epistemological status and reliability.

This lack of epistemological concern is particularly noticeable in the attitudes of educationalists to change and development in educational subject-matter. There are, for example, two extreme reactions which the idea of change and development seems to elicit from practising educationalists: On the one hand there is an energetic if sometimes unthinking resistance to anything that challenges the established order; while on the other, there is an acceptance of the 'inevitability' of change within a framework of thought that presupposes change can only be for the better. Such reactions are, of course, not new to theoretical educationalists who, for the most part, regard them as further evidence of the continuing tension between 'progressive' and 'traditional' schools of thought.

There is a tendency, however, for some theoreticians[1] to limit their analyses of the situation to an assertion about sources, a listing of similarities and differences, and a judgement in historical perspective as to whether reasons 'X' are greater than reasons 'N'. Little or no attempt, it seems, is made to expose the epistemological issues which underlie the views held.

It is all too easy to categorize one view as protagonist and the other as antagonist, as theorists are wont to do, and assign the whole process of change and development to the pigeonhole of empirical fact. What is often overlooked is that the tensions between 'progressive' and 'traditional' schools of thought, for practising educationalists, continue unabated in spite of theoreticians' attempts to demonstrate the superiority of one school of thought over the other. The history of education is filled with examples. A most arresting one occurs in mid-nineteenth century England. About that time, a number of articles and items of correspondence appeared in the press condemning the traditional school curriculum. Men as influential as Matthew Arnold and Cardinal Newman were defending an enlightened liberal reform based on the classics against supporters of scientific studies such as the then popular Spencer, who would relegate classical studies to the background, and the respected T.H. Huxley, who believed in a balanced curriculum. In spite of the raging controversy, the majority of grammar school teachers simply continued to teach an old and restricted curriculum in the same manner it had been taught for centuries.[11] One could hardly say that the grammar school teachers were uninformed

1. vide, for example, Brauner, C.J. and Burns, H.W. Problems in Education and Philosophy pp. 56-79
Weiss, T.M. and Hoover, K.H. Scientific Foundations of Education pp80-121
Verduin, J.R. Cooperative Curriculum Improvement pp20-35

11. Curtis, S.J. and Boultwood, M.E.A. A Short History of Educational Ideas p.428

of the issues which, by nineteenth century standards, were quite well publicised. Nor could one label a body of learned men ignorant, in the strict sense of that word. How does one explain such a situation? Words and phrases like 'complacent', 'authoritarian', 'believers in old-world values' and 'unscientific' might help to provide fitting descriptions or relieve the tensions of modern 'progressive' critics but they do not offer satisfactory explanations.

What I am suggesting is that there are epistemological issues underlying the 'traditional' tendency to resist change. These are usually deep-seated and not always obvious but they do become apparent from time to time. Consider, for example, a more modern kind of resistance which Schwab (1964) met in his efforts to help a group of American teachers, curriculum-makers and administrators revise courses in high school biology. He reports:

"(They) were prepared to believe that science might grow by accretion and that minor errors of past researches might be discerned and corrected. They were horrified by the suggestion that far more radical alterations of this body of knowledge had been made in the past twenty years."[1]

After outlining some of the major conceptual changes made in biology, Schwab goes on to say:

"More than two years of intensive effort were required to persuade school men and women that such radical changes had occurred. The problem, indeed, was to persuade them that such radical changes were possible."[11]

While this kind of resistance might be disappointing at a time when considerable re-evaluation of educational curricula needs to be made in the light of increasing knowledge and technology, it is by no means surprising if one considers that generations of teachers have grown up with the impression, amplified by text-books, classroom experiences, and examinations , that what they themselves learned was, somehow, always

1. Schwab, J.J. "Problems,Topics, and Issues" in Education and the Structure of Knowledge p.5

11. op.cit., p.5

knowledge - objective, explicit, and certain.

It must be appreciated that this impression of knowledge is not peculiar to teachers alone. As a group, they merely reflect what has been and, to a large extent, still is, part of our western cultural outlook. The roots of this kind of thinking lie in antiquity from whence stems the dream of 'manifest truth'. As Majorie Grene (1966) has observed, as a conception of knowledge it 'is the pattern so powerfully impressed upon western minds through the rise of modern science.'[1] What is known is known objectively, it can be stated in final and precise form and, if it is knowledge, it is certain. We shall have to come to terms with this concept of knowledge, and see what there is in it of value to education, not because it places great weight on reason nor simply because it stems from ancient wisdom, but because whenever and wherever the objectives of education are proclaimed, a statement on the importance of the acquisition of knowledge nearly always heads the list. After all, if teaching involves the teaching of knowledge, how do we know we are handling the genuine article?

The epistemological issue exposed here can be stated quite simply. If knowledge is objective, explicit and certain, how is change and development in educational subject-matter possible? Dare we assume that knowledge changes, that what was known for certain now becomes uncertain, or that what once could be stated precisely is no longer clear or even relevant? Could we be mistaken about what has been universally accepted as fact? If we feel uncertain about our position on the matter, it would be a salutory experience to examine some of the things we unconditionally accept as being the case. How could we possible doubt the things we see

1. Grene,M. The Knower and the Known p.17

and touch? Surely an apple is an apple, and a tree, a tree. How could we be mistaken about facts such as 'oxygen is necessary for combustion', or 'energy is conserved', or that 'parallel lines never intersect each other'? We shall examine this issue shortly but first, let us look at the other side of the coin.

The typical reaction of any group continually confronted with contradictions of its most cherished beliefs is to adopt an alternative point of view. It is little wonder, then, that having to cope as they do with a multiplicity of far-reaching changes, not only informational and technological, but also socio-political and psychological, some educationalists should abandon the idea of 'manifest truth' in favour of something more practical and accommodating. One solution has been to adopt the practicality of instrumentalism - the idea that knowledge is personal, and shaped by an individual adapting himself to new situations.

Its originator,[i] Dewey, neither the only nor the first of the 'progressive' reformers, was certainly one of the most influential in encouraging educationalists to reject the notion that subject-matter was something fixed and immutable, and to incorporate within their several theories the child's experience as a major component in the learning process. He was not, of course, advocating the overthrow of subject-matter per se, but was pointing out that it was the nature of the educational experience to which educationalists should direct their attention.[ii]

1. Dewey's philosophy can be distinguished from the philosophies of W. James and C.S. Peirce.

ii. vide, Dewey, Experience and Education

How Dewey's pragmatic viewpoint requires some explanation, not only because it provides a coherent and widely accepted epistemological alternative to the conservative view of knowledge, but also because as an influential body of thought it has been called upon to cover a number of educational malpractices.

Dewey[1] attacks what he calls 'the spectator theory of knowledge', the view that knowledge is the passive contemplation of an eternal and immutable reality. He denies that there is such a permanent reality and that the 'knower' plays a spectator's role. What is uncertain lies in nature - not ourselves, for in coming to terms with our experiences we are able to change and modify nature. By the use of the experimental method we can determine and hence control our environment. That which is doubtful or confused, can be clarified and settled according to our needs, interests and desires. 'Knowledge', then, consists of an intellectual grasp of a situation, which grows out of, but is not identical with, experience.[11] Experience is not to be confused with reflections on experience, it is to be interpreted as providing the situation for 'knowledge' outcomes. In problem-solving terms, experience might pose a problem - in the cognitive, affective or physical domain. Its recognition, analysis, and an estimation of the means of dealing with it provide a step towards 'knowledge'. 'Knowledge' is attained when the problem-solver has so reorganised the problem situation as to overcome all its difficulties. It was in this kind of context that Dewey defined 'knowledge' as successful practice. Even so, he added other provisions. While theory itself was to be arrived at by the same process - experimentation, Dewey acknowledged that it was fatal

1. Dewey, J. The Quest for Certainty
11. Passmore, J. A 100 Years of Philosophy pp.117-121

to sharply divide theory from practice. The true, insofar as the term is applicable, must satisfy the scientist and not just anyone.

In terms of its modern application, Dewey's epistemology presents us with something of a conundrum. On the one hand it seems to be generally accepted at the theoretical level, but does not appear to affect the practice; while on the other, its practical applications are seen as indispensable, while the theoretical implications are ignored. There are also cases where both the theoretical and practical aspects are reduced in terms of either one or the other. Childs (1950), for example, sees the 'experimental inquiry' as the vade-mecum for all human concerns. Locating it in a 'democratic' setting, he describes the process in a series of negatives:

> "....no reliance on external authority and suppression of difference, not by persuasion through propaganda, not by individualistic process of inner intuition, but by universalizing the community of inquirers, by confronting and utilizing doubt to test and expand beliefs.....etc. (1)

Assuming for a moment that a 'problem' could arise in so 'democratic' a setting, how would the inquiry reach a fruitful conclusion in terms of 'knowledge'? Childs continues:

> "...the basic postulate of experimental methods is that we get meanings - knowledge - by the process of referring consequences to conditions and conditions to consequences, and by no other methods whatsoever." (2)

Brubner and Burns (1965) echo Dewey's pragmatism with the persuasive statement: That students must not mindlessly accept judgements -

> "(prejudgements; prejudices) offered to them by "commonsense". In short, to train the mind means to develop habits of inquiry that, by fruitful resolution of problems, increase a person's control over future experience. Much of minding involves doubting the fixed truths that the classical tradition hands

1. Childs, J.L. Education and Morals pp.176-177
2. " " " " p. 169

> down as knowledge. This sets the fallibilist against the dogmatist, the absolutist against the relativist...." (1)

But see nothing incongruous in prefacing their statement with: Education involves " providing people with the conceptual tools" in order to analyse the data" to distinguish beliefs grounded in experience from those imposed by authority."

In effect affirming Dewey's experimental procedure,(2) Verduin (1967) points out the necessity of the outside expert, whom he describes as:

> "...may be a college professor of some academic discipline or, occasionally a curriculum specialist..." (3)

and in terms of his responsibility:

> "The expert is the sole judge of curriculum changes. He may make his judgement after a cursory or lengthy observation of the existing curricula, or may offer an opinion without any examination of curricular offerings. His opinions on curriculum changes can be for a specific school or system, or he may attempt to improve American education in general...." (4)

Staff would consider the proposals, of course; but we are left with the germ of a thought:

> "...since there is much" expert"opinion on the educational scene at present, the expert approach should receive considerable attention...." (5)

Accepting, theoretically, the abandonment of certain knowledge, many practitioners nevertheless like to provide a certain curriculum. There is nothing quite like having a clear, uncomplicated, and definitive

1. Brubacher and Burns, Problems in Education and Philosophy p.52
2. Verduin, Cooperative Curriculum Improvement 87-90
3. " " " " p.15
4. " " " " p.16
5. " " " " p.16

description of what the 'world' is in terms of the disciplinary viewpoints that might 'fit' comfortably into a 'progressive' curriculum, and we seem to get the situation Reid (1962) refers to and comments on as follows:

> "Many children are given the impression that you must begin science by learning, in text-books, definitions which are in fact the result of the highest abstractions of the most advanced thinking." (1)

Or, in terms of the experimental method which begins with the foreknown result:

> "....it is not experiment or discovery at all: they are not themselves finding out anything, but obediently confirming." (2)

Perhaps the most important feature Reid refers to, particularly where experiments fail and are passed over.

> "The sense of reality is missed: pseudo attitudes are bred. And, as I have said, how often does one hear teachers introducing a 'therefore' or 'this proves' where there is no such inference?" (3)

(The idea that knowledge is personal, and shaped by an individual adapting himself to new situations might be a solution in part to the problem generated by the view that 'knowledge' is objective, and certain; but it is not clear in the practice of education whether this has come to be accepted as the case. For many educators, there is something uncomfortable about the subjectivity implied in such a view. Experience is experience, but do problems, conflicts and tensions automatically arise within it? If they do, are they conflicts, tensions and problems worthy of the time, energy and resources required to solve them? What solutions would be educationally worthwhile - in terms of modern schooling? Where would they lead? Are not some problems more easily resolved by model solutions put forward by those who have already

1. Reid, L.A. Philosophy and Education p. 31
2. " " " " p. 31
3. " " " " p.31

experienced them? How is 'knowledge' actually derived from reflections on experience after the experience? Isn't some knowledge certain - beyond all doubt? The instrumentalist would be able to solve all these problems, of course, simply by engaging in experimental inquiry. 'Knowledge' would arise out of successful practice. But for many educators this won't do. For some, 'knowledge' is more likely to be found in the respective disciplines.[1] Phenix maintains that schools and other educational institutions should draw their subject-matter from the disciplines rather than from the needs, concerns, and problems of learners. According to Phenix, learning can be made simple and useful by

1. Providing analytic simplification, through which we can make understandable the classes and generalizations which are formed by particulars;
2. Providing synthetic co-ordination, by which we make evident the patterns and relationships that exist in subject-matter; and
3. To assure the presence of dynamism, the "lure to discovery", or the force which leads us on to new knowledge. It is in the disciplines, Phenix thinks, one can find the answers to his needs, concerns and problems.

Descart thinking has stressed that knowledge can be obtained more easily by relating facts, concepts and minor principles to major significant concepts. Bruner and others have promulgated this view. In terms of economics, for example, there are:

> "four principles on which all of economics depends. Know these and you have the "hooks" on which the minor principles and the facts of economics hang. The details of economics may change, i.e. time may retire some of them, and new details may replace old ones, but the fundamental structure of economics will remain and it is the fundamental structure that counts...V(2)

Come back to Schwab's difficulty in trying to persuade curriculum-makers, administrators and teachers of the major conceptual changes made in biology and we seem to have travelled a full circle.

1. Phenix,P.H. "The Use of the Disciplines as Curriculum Content" Educational Forum Vol. 26 No. 3, March, 1962 pp.273-280
2. Doll, R.C. Curriculum Improvement p.80

Is it possible to break it anywhere to clarify the fundamental epistemological issues?

One issue we have so far raised - if knowledge is objective, explicit and certain, how is change and development in educational subject-matter possible? If there is another, and I think there is, it might be stated as follows: If 'knowledge' is to be continually subject to change by experimentation, and if 'knowledge' is subjective in the sense that it depends on the individual's adapting himself to new situations, and if the reliability of the judgements of the past is always in doubt, how can what is labelled 'knowledge' be so called?

In the following section, I have attempted to explore the ramifications of both issues by personalizing the arguments in the form of a dialogue. I do this with a view to clearing as much ground as possible.

Speaker A is intended to represent the whole range of positions which might fairly be labelled objectivistic. Speaker C is intended to represent that odd assortment of positions which might fairly be labelled subjectivistic - with a leaning towards collectivism. Speaker B is intended to be the devil's advocate and to clear a way for the conclusions I hope to draw. I mean nothing ominous by my selection of these two categories, and the fact that I've allocated, by implication, educationalists to one side rather than the other is simply because it seems to me to be more convenient to do it that way. I think it is true to say that in epistemological discussions, proponents who begin from one point of view will seldom end up in quite the same place.

D I A L O G U E

Most of us are confident enough to assert that we know some things, and some of us might even be willing enough to assert explicitly some of the things we would say we know. Now suppose person A were disposed to draw up a list of specific items of 'knowledge', and suppose someone else, B, were to query each item. What kind of argument could A offer B in order to assure him that each item on his list was, in fact, an item of knowledge?

If he was prepared to offer argument in support of his assertions, A might point to the claims of others as being confirmatory of his own. "Experts in the various subject fields have discovered 'laws', uncovered 'facts', and invented procedures that help us describe and explain the world as it is. The list of knowledge items," A might argue," is part of the picture of our world and its workings built up through the investigatory and objective contributions of such thinking men."

Accepting A's word that the items on his list are 'part of the picture' supplied by experts, B might inquire of A what justification he has for his reliance on collective authority. "Who are the experts," B might ask, "and what grounds do they have for supposing that their contributions are 'knowledge' contributions? More importantly, "B might insist, "what grounds do you have for accepting them as such?"

A might retort that experts are in a position to 'know' what they are talking about. "As men of integrity in the main," A might point out,"experts in the various subject fields are not likely to make contributions they believe to be false. They believe what they say to be the case, and they can produce good evidence to show what they say is true. Furthermore, as the term 'expert' implies, they can be

adjudged competent in the matter. Their having read the literature, each in his respective field, their undertaking of the relevant experimental work or supervised enquiry, their having been lectured to by eminent men, being granted degrees or diplomas by recognized institutions, and so on, entitle them to be sure.[1] From this point of view, we can accept that the expert is in a position to 'know' what he is talking about."

"But surely the expert's 'right to be sure', as you call it, does not guarantee that the world is what he says it is," B might reply. "The expert could be mistaken. After all, we are all subject to error. The expert may genuinely believe that what he says is true and his beliefs may be confirmed by others, but they may be mistaken too. Perhaps they have graduated from the wrong universities, read the wrong literature,or are part of a political conspiracy to deceive the public. Unlikely perhaps, but what assurance does one have that this is not the case?"

1. It is sometimes assumed that success in a given domain of 'knowledge' is sufficient grounds for granting a person the 'right to be sure that X is the case. A.J. Ayer (1957) goes so far as to say that the <u>necessary</u> and <u>sufficient</u> conditions for such 'knowledge' are:

1. What one is said to 'know' be true
2. That one be sure of it
3. That one should have the right to be sure

<u>vide</u> Ayer, A.J. <u>The Problem of Knowledge</u>

pp. 31 ff.

A might retort with,"An expert's statements are verifiable. They can be tested by approved procedures appropriate to the subject field." This line of argument, by no means unfamiliar in learned circles, seems plausible. B, however, might not be without some objections.

"Let us suppose for the moment, that an expert's statements are, as you say, verifiable, "B might begin. "Who would verify them - another expert? What kind of procedure would another expert use - the same that made the original statements possible? Aren't you begging the question? If the proposition of your last statement is to be understood as, 'expert's statements about the world are correct because they can be verified by experts', then you're assuming the very point at issue. On the other hand, if you're suggesting that the expert's statements are verifiable by me you're being unreasonable. Suppose that one of the items on your list is an alleged 'fact' in the domain of atomic physics, how would I or any non-physicist be able to verify it? To do so would involve me in acquainting myself with the literature and methodology of the subject-matter, and I would ipso facto become an 'expert' and thereby subject to my own objections."

In an effort to compromise at this point, A might reply with, "You needn't become an 'expert' in the strong sense of that word. True, you would need to know what you were doing and which procedures were necessary, but being able to verify a fac t, once it was known, wouldn't necessitate your becoming an expert."

"That's all very well," B might say, "but what would happen if I couldn't verify the <u>fact</u>. Suppose I acted in good faith, employed the procedures usually thought necessary to investigate whether or not X is the case, and came to the conclusion that the

experts were wrong. Suppose I tried more than once and in many ways to obtain verification of an expert's statement and failed each time. Wouldn't you say that it was I who was mistaken and not the expert? You would have to say he was qualified and I wasn't if your present line of argument is to hold."

A might deny this. "Not necessarily. You may have turned up something new. Perhaps your lack of experience may have enabled you to employ the given procedure in a novel way. You may have discovered a hitherto unknown variable. This is sometimes the way new discoveries are made."

B might press home his advantage here. "If I investigate X as a non-expert, find that X is not the case the 'experts' thought it was, and it is conceded that I am not mistaken, doesn't that support my main contention? Under such circumstances, how can you accord 'experts' the right to be sure that they 'know' what they are talking about! "

Unwilling to dispense with this line of argument altogether, A might add the following modification:"I'm not suggesting that experts are infallible. I agree that any one of us can make mistakes. Perhaps what you say is true, based as it is on the hypothetical situation you propose. But, "A might contend, "surely you'll allow that an expert in a particular field is more likely to 'know' what he is talking about than not. Consider scientists such as physicists and chemists. Surely they are, in general, the best people to decide whether or not statements in physics and chemistry are 'knowledge' statements. It may be true that they can make a mistake, but most of the time they know what is true. They employ rigorous methods to show that X is the case. The confirmation of X is followed by

further confirmations. You can hardly deny them the right to be sure most of the time."

B might concede that A has a point. "It is true that we more often than not have to rely on the expert in a particular field for confirmation or not of whether X is the case. It is also true that we expect experts to be able to decide correctly which matters in their respective fields are matters of 'knowledge'. But how can we be sure that our expectations are being fulfilled? You have already admitted the possibility that experts can make mistakes. If it is possible that they can make one, it is possible they can make more. How do we know that they are not, in general, mistaken? I concede that it is sometimes wiser to put one's trust in an 'expert' rather than a non-expert. For example, if my car breaks down, I take it to a mechanic - not the grocer. When I am ill I go to a doctor - not a plumber. Now it may be the case that neither the mechanic nor the doctor can effect his respective cure, but I'd go to them just the same. I'm not suggesting that expert opinion ought not to be given serious attention. Just as X cannot both be the case, and not the case at the same time, from the same point of view, so too, some opinions will be more reliable than others. Opinions, however are opinions - not knowledge, and expectations are expectations - not certainties. You are arguing that the items on your list can be confirmed as 'knowledge' items by experts to whom, because of their specialization and training, you accord the right to be sure. Because none of us is infallible, I recognize no such right. I concede that some opinions will be more reliable than others, and that we expect experts to be more often right than wrong, but opinions and expectations do not guarantee 'knowledge'. So far, you don't seem to have been able to

provide me with any assurances that the items on your list are 'knowledge' items."

Of course, A is not without a reply. "If you are not going to accept the judgements of experts about the world, what will you accept? I have put it to you that the 'picture' we have of our world has been built up by experts, who have discovered 'laws', uncovered 'facts', and invented procedures to describe and explain it. I have suggested that experts, and I am talking about men of integrity, not only believe what they say is true, but also that they have produced evidence that supports those beliefs. Consider these steps in a little more detail. Before an expert will admit to X being knowledge X will firstly, have to be true; secondly, be believed to be true; and thirdly, be supported by the evidence. These are the 'accepted' conditions for 'knowledge'.[1]

1. An increasing number of writers in philosophy and educational philosophy seem to be attempting to short-circuit the problem of how one can be said to 'know' anything by postulating what they call 'the conditions of knowledge', Having stated them most writers go on to add modifications about the nature of the 'evidence' requirement. The examples used are drawn, for the most part, from our common stock of 'knowledge', and are ones with which nobody would want to disagree. The arguments used, then, are more often than not persuasive rather than logical in that the reader is asked to accept what in the writer's opinion would be 'adequate evidence' for 'knowing' what the reader has never doubted! Examples appear in:

Brown, L.M. General Philosophy in Education p.92

Scheffler, I. Conditions of Knowledge pp.21 ff

Hospers, J. Introduction to Philosophical Analysis pp145 ff

Woozley, A.D. Theory of Knowledge pp.183 ff

"Now, on grounds that we are fallible, " A might continue, "you deny the expert the right to 'know'. It would seem that you are in the absurd position of carrying doubt too far. Either you will have to deny a priori that knowledge is possible, or be prepared to accept some assurance that the items on my list are 'knowledge' items. If you want to play the part of an out-and-out sceptic, our discussion will be fruitless. I can say nothing that will convince you, and you will merely assert doubt after doubt until, perhaps, we'll end up with you doubting that our conversation is taking place! If, on the other hand, you accept that knowledge is possible, what assurance could you want other than the one I've given you? After all, you yourself have admitted that we sometimes have to rely on experts' judgements, and surely you can accept the fact that experts are aware of the conditions of knowledge - their reputations will depend on it!"

B might reply as follows: "I am not an out-and-out sceptic as you suggest, and I am surprised that you should suggest that I am. Not only do I believe that knowledge is possible, there are some things of which I am certain. One of these is that if you believe what you're saying, it is you who has adopted the sceptic's position. If scepticism earns your low esteem, be it on your own head!"

"Let us consider your 'accepted' conditions for knowledge." B might suggest. "What you're saying is, in schematic form, that an expert (E) knows that X is the case, if and only if:

1) X is true

2) E believes X is true

3) E can give adequate evidence that X is true.

Now the distinction between 2) and 1) is justifiable if you have in mind the possibility that X is true when E does not believe it, and E believes that X is the case, when X isn't true. It would be agreed then, that 1) and 2) together are necessary conditions for it to be correctly said that E knows X. Consider, however, the relationship between 2) and 3), and 1). Now either E knows X or he doesn't. If he knows that X is the case (i.e. believes that X is true, and it is), what justification will there be for 3) as a condition for knowledge? On the other hand, if he doesn't know that X is true, how will 2) and 3) work to support what he does not in fact yet know?"

In order to clarify his point B might suggest, "If I give something to someone and ask him to tell me what it is, and he correctly tells me that it is an apple, what purpose would be served be my demanding evidence for his judgement? Suppose that when I ask him how he knows it is an apple, he begins listing certain characteristics as evidence. Would his doing so make it any more certain that it was an apple? Surely he would have to know it was an apple before he listed its characteristics."

Anticipating A's dissent B might continue. "Imagine I have given you an apple and am asking you questions about it. Our conversation might go something like this:-

"How do you know it's an apple?" I ask.

"Because it's red,"you reply.

"A box can be red. How do you know it isn't a box?"

"Because it's round and red."

"How do you know it isn't a round, red ball?"

"Because it's round, red and it tastes sweet."

"How do you know it isn't a large, red-coloured, round piece

of candy?" I ask; and so on.

An indefinite number of questions could be asked concerning the evidence for your knowing that X is an apple. Consider the kinds of characteristics you could point to - colour, shape and size at one level, chemical components at another, chromosomes and genes at another, and so on. How many characteristics would you have to turn up, and of what kinds would they have to be to ensure that you 'knew' it was an apple? Clearly, you would have to know it was an apple before you could state any of these as apple characteristics. Notice too, how you would reject each alternative that fits each finite set of characteristics. For example, you would choose apple over box, ball, candy, peach, and so on. Clearly, evidence for X is superfluous when you know X already."

"On the other hand, "B might point out," suppose that you don't know that X is the case. How will 2) and 3) be conditions for your knowing it? Using the elements from our previous example, let us work it backwards. You have something red. What will it be? Perhaps you look for another characteristic and you recognize 'roundness'. Still not enough to tell you what it is? 'Sweetness', 'pulpy texture', and so on, are discovered in turn. Even if you discover other characteristics M, N, and O, and so on, how will you know what they are characteristics of? As I have suggested earlier, if characteristics such as M,N, and O are known by you to be some of the characteristics of X, then surely you already know X ! Now you have asserted that in order to know X certain conditions must be fulfilled; but as I have suggested, if you fulfil only the conditions for X, you can't know X. It would seem to follow, then, that if experts depended on the 'accepted' conditions for knowledge as you say they do,

knowledge would be impossible! "

At this point A might reply, "As far as it goes, your analysis seems quite reasonable; but aren't you confusing two things here? When I suggested that experts depended on these conditions being fulfilled before they considered the matters in their respective subject fields as matters of 'knowledge', I was not attempting to describe how that knowledge was obtained in the first instance. In your analysis of the conditions you seem to be confusing the product 'knowledge', with the process of attaining it. There are two general questions involving knowledge; one asks what knowledge is, and the other asks how knowledge is possible. Now I concede that simply knowing, shall we say, characteristics, in no way implies you know what they are characteristics of. I agree you would have to know X before you could say that M, N, and O,and so on, were characteristics of it. Verification, however, although it involves a process, demonstrates that what is already known to be the case is, in fact, the case. Up to now we have not discussed how these 'knowledge' statements on my list were obtained. What I have been trying to do is to provide some assurance that the items on my list are 'knowledge' items."

"You ask what knowledge is, and I give you some examples - a list of things 'known' about the world. You ask how I 'know' them to be 'knowledge' items, and I suggest that they are because they meet the conditions for knowledge - i.e. are true, are believed to be true, and are supported by adequate evidence. How are we going to distinguish between 'knowledge' statements and non-knowledge statements? Shouldn't we have some criteria? I fully appreciate that we do not need evidence to support certain kinds of private

knowledge.[1] I am aware of the fact that statements like 'This looks white to me', 'This tastes sweet', and so on, need merely be stated. But what about discrepancies between two or more judgements? Isn't there a need for some criteria to settle public disputes? How are we going to avoid authoritarian a priori assumptions[11] unless we have some means for sorting out what is the case from what is not the case? I suggest that the 'accepted' conditions for knowledge serve a necessary function, not as a description of how knowledge is obtained, but as a means of verifying that what has been obtained is 'knowledge'."

" Your point is well taken."B might admit. "Limiting ourselves to the first of the two questions, however, let us inquire as to whether your 'accepted' conditions for knowledge really provide the criteria you are looking for. You will be aware that knowledge of the various subject fields has undergone considerable change and development over the last few decades. As teachers and researchers will confirm, the subject-matters, of say, science, mathematics and history, are quite different today from what they were some thirty years ago....

11. 'authoritarian a priori assumptions', i.e. assumptions held as true in spite of any evidence that may turn up to the contrary.

1. People who argue from A's position often overlook the fact that it is our private 'knowledge' that provides us with the basis for certainty. In debates about public criteria for 'knowledge', the subjective element is not taken into account except insofar as it might be a source of error. Augustine puts the matter quite plainly:

"I do not see how the Academician can refute him who says: 'I know that this appears white to me, I know that my hearing is delighted with this, I know this has an agreeable odour, I know this tastes sweet to me, I know this feels cold to me.'.....When a person tastes something, he can honestly swear that he knows it is sweet to his palate or to the contrary, and that no trickery of the Greeks can dispossess him of that knowledge."

Augustine, Contra academicos, xi, 26

The reasons for this seem fairly obvious. Knowledge in the various subject fields has increased at a tremendous rate, giving rise to the accumulation of new 'facts' and new theoretical frameworks in which to accommodate them. As the fact that an increasing number of text-books are becoming out-dated seems to suggest, there is a continual restructuring and recategorisation of subject-matter content where, because of their irrelevance or insignificance, a number of so-called 'knowledge' items have been dispensed with. More importantly, perhaps, in some instances, what was considered to be factual knowledge or theoretically reliable has since been discovered to be in error."

"Now if knowledge which is believed to be true, is true, and is publically examinable on the basis of the evidence for its truth, changes , aren't we involved in a paradox? How can what is true at one time be false at another? I am not concerned here with matters that have not been labelled 'knowledge'. Conventions per se are neither true nor false in a final sense. Beliefs may change when new evidence is brought to light; and statements of loyalty depend more on attitudes and belief than actual evidence, and can be legitimately maintained in spite of evidence to the contrary. Knowledge,however, is another matter. According to your 'accepted' conditions, before X can be said to be 'knowledge' it must be true. How can X be true at one time and false at another and still correctly be labelled 'knowledge'?"

"Perhaps I should clarify this problem further," B might suggest. "Now it is true that what at one time is a seed, at another is a flower. We know that children grow into adults, and that copper sulphate crystals grow larger when suspended in a saturated solution of the substance of which they are composed. But these cases of change are not the kind related to the problem I am posing. Seeds before

they grow into flowers are surely seeds, children before they grow into adults are surely children. Seeds, children, copper sulphate , etc., would not be something else at the same time and from the same point of view. To say so would be self-contradictory. Yet we seem to be involved in a self-contradictory situation where we try to superimpose your 'accepted' conditions for 'knowledge' on a background of change. Some items of 'knowledge', true at one time, have been found to be false at another. What was 'true' at T1 has been found to be false at T2. For example, we now know that the earth is round and not flat. It is now known that the nineteenth century surgeon was mistaken in his belief that inflammation of the brain could be cured by applying leeches to the temples. It is now known that the planet Mercury does not have a year of the same duration as its day. Mathematicians no longer insist that Euclidean geometry provides an exact description of our physical universe. Our present day view of the atom is very much different from what it was some twenty-five years ago; and so on. In each case, what was thought to be 'known' is now in fact untrue. But the problem does not end here. Recognition of this problem leads to another. What guarantee do we have that what we **now** say we 'know', will not turn out to be false in the future?"

"Let us restate these problems in another way. If 'knowledge' is to be understood in your terms, we would have to assume that the conditions for someone 'knowing' X at T1 were not fully met. Perhaps someone had a strong belief about X, and perhaps what he believed to be sufficient evidence for X made, for him and others, X true at that time. At T2, however, further evidence to hand shows that X is not what it was thought to be, i.e. true. But what guarantee do we have that the evidence is sufficient for our 'knowledge' now, at T2?

Surely we must concede that in the light of increasing 'knowledge' (as many describe it), it is always possible for more evidence to turn up and that some of it will contradict the things we say we 'know'. If the conditions for knowledge are supposed to hold good, at what point would we be certain that they had been correctly fulfilled? Could we ever know? I suggest that if you insist on the 'accepted' conditions being fulfilled before we could properly call the items on your list 'knowledge' items, we could never be sure that our so-called 'knowledge' was even probable! "

At this point it would seem that both A and B have reached an impasse. B's request for some assurance that the items on A's list are items of 'knowledge' have not been satisfied, and A has been forced into a situation where either he accepts that his line of argument leads to scepticism, or he admits that the 'accepted' conditions for knowledge are inadequate. If A is to be consistent, then neither alternative will be satisfactory. Perhaps the horns of the dilemma need to be examined more closely. Let us introduce a third party, C, for this purpose.

Having heard the outline of the previous discussion, C might try to resolve the situation in a not unfamiliar way. "How can you both state that 'knowledge' is possible when the very arguments you bring to bear on the problem show that the case is otherwise?" C might ask. "You both ought to accept the fact that there are no alternatives. In your respective ways you are stating the obvious - we can never be sure of anything other than analytical statements which, because of their internal consistency, would be self-contradictory to deny. So-called 'knowledge' claims can never be substantiated because the evidence for them can never be complete. But look around you. Isn't it the case that what we say we 'know' is only ever probable? Our own experience

teaches us that we can never be certain of anything. Why do you insist that 'knowledge' is possible when everything is against its being so?"

"I think you both take the word 'knowledge' too seriously." "C might continue. "By implication it would seem that you are using it to stand for some special state of mind - an abstraction that has no cash value in the practice of daily living. We are all part of a busy, evolving community - local, national and international. Our prior experiences are rooted in public conventions and strong beliefs, and these are what influence our judgements. Beliefs and conventions change to meet the needs and priorities that arise within the social context. Old beliefs are replaced by new. That is how we move forward. 'Knowledge' has no denotation outside these things. You learn that X is called this or that - a noise to distinguish it from something else. You learn that this works and that doesn't - such decisions ultimately resting on what is required to survive. You learn that this is painful and that is pleasurable, this advances and that retards; and so on. Life is a business run on trial and error lines. In order to survive, one keeps one's eye on the probabilities. "

"Your dilemma, "C might insist, "can be resolved simply by using the word 'knowledge' in a less formal way. You are not able to say with <u>certainty</u> that X is the case, now and forever. Your own examples show that. On the other hand, it would be foolish to deny the efficiency of our system of beliefs and conventions which, in the main, work for the general good. I'm not advocating out-and-out scepticism here. I'm merely suggesting that adopting a middle-road position is the sensible thing to do. If you both accepted the term 'knowledge' in a weaker sense - something like a synonym for 'information' - you would

not get yourselves into logical tangles about its possibility. Of course 'knowledge' (in this weak sense) is possible! It consists of informational items that arise from strong beliefs and conventions bound together by sets of stipulated rules. This is what 'public knowledge' has usually consisted of. Now the effectiveness of such knowledge is judged within the democratic social context. This not only explains why changes occur, but also why changes at certain points in time are necessary. It could be argued, for example, that the flat earth hypothesis was not only appropriate to those early times but was efficacious as well. When ships and men were unlikely to be sturdy enough to stand up to the dangers of open uncharted seas, such a belief probably helped to conserve human resources and materials. The idea that the earth might not be flat became more credible in a social context impregnated with aims of political expansion and economic gain. The construction of sturdier vessels, the improvement of navigational techniques, and so on, made the exploitation of the 'new' idea possible. Thus progress **begets** progress. Old beliefs are overhauled or replaced by new ones. If this wasn't so, how would we be able to send men to the moon?"

"You can see then, "C might conclude, "that the 'accepted' conditions for 'knowledge' are in fact, acceptable. The case X is true when it works for us in a particular time and at a particular place. Arising as it does from the social content, the usefulness of X within that content is its own sufficient evidence. When X is judged to be no longer effective, it is either overhauled or replaced by one or more 'informational' items added to the general system of beliefs and conventions. Truth, belief, and evidence, then, are useful conditions for 'knowledge', but they are always relative to time and place. In this way you can justify X being true at one time and false at another.

There are no absolute truths and inviolable items of evidence, only progress."

"This doesn't seem to me to be a very effective resolution of the dilemma," A might retort. "If life were to be run on trial and error lines as you suggest it is, things would be more chaotic than ever. How would you distinguish between the trial that worked and the error? How would you know what was useful and what wasn't? If you had to replace, say, X with Y because X was no longer useful, wouldn't you have to 'know' that X wasn't satisfactory? When on looking out my back-yard window I see the large, green pepper tree, surely my experience involves more than strong belief! It is indubitably a tree! It is true that the name I give to the object of my experience, i.e. 'tree' is peculiar to time and place in the sense you imply. Learning this particular word does depend on convention. But surely, by simply uttering the conventional name at the right time, I am indicating 'knowledge' of a kind. I know, for example, the rule for its use. I don't mistakenly call the fence beside it 'tree', nor the grass below it. My understanding and use of conventional language, proves my ability to discriminate between one object and another. In my estimation, this is 'knowledge' more formal than mere 'information'. You argue that 'knowledge' changes because what we call 'knowledge' is really nothing more than strong belief and well-accepted convention. If this were true, I repeat, how would you know which belief was right and which was wrong? Surely you would need to be able to make such a distinction if you wanted to survive! "

"I think you mistake my meaning," C might reply . "I don't deny that there is 'right' information and 'wrong' information. I agree that we have to decide which is which in order to survive.

What I am suggesting is that 'right' and 'wrong' are not absolutes, and that they are always relative to current sets of beliefs and conventions. Your ability to make judgements is not in doubt. When you make them, however, you should realise that they are based on your prior experiences, and these in turn will be shaped by the beliefs and conventions of the culture to which you belong. You seem to want to believe that 'knowledge' is something more than this - a special state of mind where you grasp, perhaps, some inviolable truth and hold it with certainty. If you think carefully about it, you will see that 'knowledge' of this kind is never possible. If you believe that it is, you are simply confusing the metaphor and the case it is being used to describe. Just as our language reflects attitudes when, without actually believing it, we animate non-living matter, or attribute human qualities to the lower animals, so too 'knowledge' is used in such a way that it reflects our need to be secure in stating what the world is with a measure of confidence. The way you are using 'knowledge' seems to suggest that you are mesmerised by the accompanying attitudes which are part of our psychological make-up. Unfortunately, those kinds of attitudes, if seriously maintained, lead to authoritarianism and dogmatism. We need to be secure, but we also need to change our viewpoint when new evidence comes to hand. Progress depends on our being able to be receptive to new ideas and flexible in our thinking. It would be a mistake to regard our so-called 'knowledge' as being true beyond all doubt. We can never find <u>certainty</u> in knowledge. It is always susceptible to change - as your own examples have indicated."

"But surely we can be certain of some statements other than analytical ones," A might insist. "There are many occasions when our senses provide us with unmistakable evidence that X is the case.

It would be simple-minded simply to attribute the things we see, hear, touch and taste to strong belief or convention. Our attitudes to, and appreciation of the things we sense will to some extent be determined by the social context in which we live; but we know what those things are, and we know that they are. With all your talk about the social context you're forgetting about individual perception. The basis of our knowledge is the totality of actual, particular sensory perceptions. I would concede that there is a tendency for people to rest content with the 'authority' of public belief and convention in matters of knowledge rather than make the effort to find out for themselves. On the other hand, it is obvious that all of us need to supplement our own perceptions with those of others. But when you come right down to it, what we call 'knowledge' begins with our own certain, particular, sensory perceptions. We know what we see with our own eyes, we know what we hear with our own ears, and we know what we touch with our body!"

"If you believe that your 'knowledge' is based on particular, sensory perceptions in the way you say they are, what kind of thing can your 'knowledge' be?" C might inquire. "Consider the nature of your organs of perception. You seem to be saying that you know X because you can see it, touch it; and so on. I suppose you would state that X is a tree because the light waves emanating from it impinge upon the retina of each of your eyes, causing an electro-chemical impulse to be conveyed along the optic nerve from the eyes to the occipital lobe of your brain. But suppose it was part of the human condition that our eyes did not focus on to one image and we saw everything double. Or suppose, like some animals, we had one eye on each side of our heads, so that we could see at an angle of nearly 180^0 with no spacial depth. Or suppose like most other mammals, we were unable to distinguish one colour from

another; or, like some insects, we had a thousand eyes; or like bees, we could see what we cannot now imagine - ultra-violet light. Would not the world look much different to us than it does now? How can you rely on the constuction of your own perceptual organs in order to 'know' what the world really is ? "

"Consider the human organs of perception as they stand, "C might continue. "Are they really reliable? The illusionist can trick us even when we are unwilling to suspend our disbelief. A stick looks bent when it is immersed in a glass of water. In artificial light a blue suit looks black. In the classical Muller-Lyer illusion, two equal lines appear unequal because of their surrounding arrowheads. In some instances, we may not be aware of the fact that we are experiencing an illusion. Continual exposure to colour - say yellow - under bright light leads us to perceive a more watered-down shade than that which we observed at the outset. Then there are perceptions we have of things that are not there at all. It is not clear what part our organs of perception play, if any, when we experience hallucinations. Aside from induced hallucinations brought on by drugs and alcohol - although the situation is very real for those that take them - the human psyche is subject to environmental conditioning. Tiredness and set attitudes affect our judgements. A person may feel pain in a limb although it has been amputated some time before. People said to be on the verge of neurosis perceive objects in a most unusual way. Kittens, for example, can be perceived as if they were as fearsome as lions. We can have perceptions of a kind when our sense organs are not functioning. For example, sensations can be aroused in a conscious person, by electrical stimulation of the relevant part of the cerebral cortex. The world, then, is not always what is experienced. How is the kind of 'knowledge'

you want possible through particular sensory perceptions?"

"It's all very well to talk about what our organs of perception might have been," A might reply. "How do you imagine that they might have been what you suggest? The fact that you can compare the human organs of perception with those of other entities in the animal kingdom already presupposes that 'knowledge' is possible. You would have to rely on your own organs of perception to make the comparisons in order to pose the possibility of them being other than what they are. I do admit that our perceptions are not infallible. We sometimes do see visions, hear 'voices', and suffer hallucinations in the way you suggest. But the 'reality' of these experiences is questioned because they are in disagreement with other sensory experiences, or with the regularities within perceived events of the same kind. The very fact that you were able to list what might be termed 'unreal' events suggests that you already 'know' how to distinguish between 'reality' and illusion."

"You have already hinted at how 'knowledge' is possible in your reference to 'seeing a tree'. The sensory information about external objects comes into the brain through the various afferent neural pathways and reaches the cerebral cortex where it is stored and/or processed by the operation of the mind. When we look at a tree, we perceive its primary qualities - such as solidity, extension, figure; and so on; and the secondary qualities which depend on these - such as colour, smell, the sound it makes in the wind; and so on. The accumulation of qualities such as these from all the objects of our totality of experiences are the building blocks of our 'knowledge'. They provide the material in terms of which the mind reflects, wills, doubts, reasons and thinks. Our 'knowledge' of the external world, then, begins with these simple qualities, and develops as the mind constructs

more complex ideas from them. Consider the 'tree' example once more. Perceiving its qualities as we do through more than one sense organ, we arrive at concepts such as 'hardness', 'thickness';and so on. Some of our knowledge is possible by degrees as our minds turn inwards, so to speak, and reflect on the objects or our experiences, repeating, comparing and uniting them. Our 'knowledge' of the external world is possible in the sense that it consists of an agreement or disagreement between the qualities we are perceiving at a particular time and the simple or complex qualities we have already experienced, retained and processed in the mind. There is a one-to-one correspondence between each object and the idea we have of it in the understanding."

"A plausible argument from one point of view," C might reply. "But if you consider it more carefully, you will notice a number of flaws in it. In the first place, how do you know that your perceptual experience of an external object actually is an experience of an external object? How would you know they were the same, or where would you begin to look for the resemblance? Surely it would be impossible to compare a perception, actual or remembered, with a non-perception - the external object itself. Secondly, how are your perceptions possible at all? Are you suggesting that the external qualities are in some way emitted from the object and they are the cause of the sensations you have of them? How could you prove either connection? In the very process of trying to show that the objects of our thinking are the qualities produced by an external world, you have to assume beforehand that there is an external world, and that we already have 'knowledge'(in your sense of the word) of it. Only by 'knowing' that an external world exists would what you're saying make sense; but if what you say is true, you can never 'know' that there is an external world."

"Remove the flaws and you'll see I've been right all along," C might suggest. "We cannot prove that there is an external world beyond ourselves, on the other hand, it would be foolish to categorically deny its possibility. The sensible thing to do is to accept the external world's existence as a working hypothesis. All we can ever 'know' are our own perceptions. I agree that these perceptions are the basis of our 'knowledge' and I agree that our 'knowledge' (in the weak sense) is built up from these basic perceptual units as you suggest. We must not suppose, however, that there is a necessary connexion here between our immediate perceptions and our past ideas of them. The first is merely a sufficient condition for the second. You will appreciate the power of imagination. Sometimes with and sometimes without our awareness of it, our imaginations and memories work on our stored perceptions, presenting us with both workable and unworkable complex ideas. Compare, for example, our ideas about, say, atoms, and cells, with, say unicorns and spectres. As you have already hinted, we do distinguish between sets of ideas, but not because we can check them against something outside of ourselves. As I have shown, this is precisely what we cannot do. There are, however, some distinguishing characteristics of workable sets of ideas that serve as guide lines. Workable sets of ideas are more vivid in that as the memory preserves the perceptual elements of which they consist, it also preserves their natural order and position. Ideas consisting of perceptual elements united through fancy do not have the same vividness. Another feature is that our workable ideas seem to occur for each of us in a similarly regular way, which explains why 'knowledge' in several different cultures sometimes corresponds. More importantly, perhaps, the constant conjunctions of the elements making up our more complex ideas and theories are such

that we can suppose further or future regularities. We can never be sure that X will always occur simply because it regularly follows Y now, but we can act on the assumption that it is likely to. Now when our assumptions turn out to be false, we can examine other regularities. If these prove more useful, then 'knowledge' changes. It follows then, that 'knowledge' is not a state of mind of the kind you seem to imagine it to be. It is not the apprehension of absolute and certain truths. Our 'knowledge' is only ever of probabilities."

"Your attempt to show that it is not possible to demonstrate the existence of an external world not only solves little, but raises more difficult problems," I might suggest. "Firstly, your methodology presents us with something of a paradox. It is by appealing to our assumptions about the existence of an external world that you hope to show that we can have no 'knowledge' of it. Thus by appealing to our sense of objectivity, you try to convince us that ours is a totally subjective universe. But whence come our ideas of objectivity? Are these not more vivid than those of our imagination? Secondly, and taking this matter further, if 'knowledge' is built up from our perceptions, what are our perceptions perceptions of? If they are not perceptions of anything, how do they occur - by chance? If so, how would you 'know' this much? How would you explain the regularities, vividness, and so on that supposedly distinguish the veridical from the illusory? Thirdly, when you talk about the regularities and vividness of workable ideas, how are you able to suggest that the unification of their constituents is attributable to memory? Surely some of the ideas of imagination can be more vivid than and/or, in a non-necessary universe, at least as workable as those of memory. If memory and imagination work in the way you suggest, we couldn't make mistakes; but this, clearly, is absurd.

Finally, it's all very well to suggest, as you do by implication, that our greatest discoveries are little more than the result of regular associations of perceptual elements generating roughly satisfactory sets of beliefs, and thereby relegate us all to a probable world of unimaginative custom; but who would believe it? What you're forgetting is that 'knowledge', even to be probable, would have first to be possible."

At this point A might interject. "I would agree with that contention. Unless there is 'knowledge' worthy of the name, then even probable 'knowledge' has no justification. But where do we go from here? You can't leave perceptions hanging in the air, so to speak. Perceptions must be of something, and, as I have already implied, something real. We don't have to call it an 'external world', other synonyms would do just as well - the 'given', 'physical data', and so on. We can write the word 'real' with quote marks to show that we understand some of the issues involved in its use. When we get down to it, however, we don't doubt in practice that there is a world outside of us, and that we 'know' it through our senses."

"But as we have already seen," B might point out, "we cannot rely on our senses alone. That way, there would indeed be no 'knowledge' worthy of the name. The dimension we seem to have been ignoring in our discussion so far, is the rule-giving activity of mind. We are not passive beings who automatically file away at random the perceptual elements with which we happen to be confronted. It is true that some of us are, at times, more receptive than active in terms of our 'knowing'; but our perceptions do not, by themselves, build up into items of 'knowledge'. It is we, as authors of language and other symbolic forms through which we express the content of our experiences, who make sense

of our world. Our perceptions, if they are to mean anything, must be given shape and significance by ourselves as experiencing persons. Let us not ask how the world out there somehow gets into us. To that kind of question, as C has shown, we can only get a partial and unsatisfactory answer. Let us ask, rather, what we as experiencing persons, 'knowers' and potential 'knowers', contribute to the objectivity of our experiences."

"That sounds rather paradoxical," C might reply. "How is the mind able to contribute anything that is not given it through experience? Surely you're not going to suggest that we have inherent in our make up some natural light, or innate ideas? I appreciate the fact that we sometimes behave as though what we take to be 'knowledge' is based on some godlike foreknowledge of principles; but as our intellectual history has shown us, we rely very much on the empirical."

"Our intellectual history has also shown that such empiricals themselves rely on frameworks we provide," D might reply. "We do not find at work therein any godlike foreknowledge of principles. But we do find man, shaping and organizing his experience to make it intelligible to himself. Consider the development of a theoretical conception about the nature of matter that comes down to us from antiquity. Plato, in his dialogue, the Timaeus , attempts to give a plausible account of the nature of material things by matching the then familiar properties and transformations of 'fire', 'solid', 'air' and 'liquid' with the more fundamental principles of geometry. With limited conceptual materials - the mathematics of Pythagoras, the atomism of Demokritos, and the 'elements' as postulated by Empedokles, Plato attempts a synthesis in an effort to establish a body of 'knowledge', the validity of which in turn might be established by reason. He proceeds by selecting as a starting point the fact that there are only five regular convex solids

- tetra-hedron, cube, octahedron, dodecahedron, and icosahedron. Arguing that if material substances are three-dimensional, the 'atoms' of which they are composed must have similar dimensions; Plato assigns the geometrical shapes to the various materials according to the latters' 'known' and supposed characteristics.[1] From a set of innumerable triangles, Plato selects and uses two with which to look for correspondences between constructions and reconstructions of the groups of material substances as he understood them, and the geometrical shapes he has imposed."

"Whilst at a macroscopic level," it might argue, "Plato's attempt to account for the way in which nature works provides us with clues to the nature of 'knowing'. We cannot hope to understand our world just simply by looking at it. We must actively seek to find whatever is intelligible there. On the other hand, our quest for 'knowledge' cannot be undertaken blindly. While we must rely on our experience of the world, no agglomerate of experiential particulars will provide us with answers to questions we haven't asked. We have to shape our questions in a way that makes nature's answers intelligible. Consciously or unconsciously our efforts are moderated by such factors as our prior experience, the systems of 'knowledge' with which we are familiar, and the relevancies of the intellectual climate of our time. But if we are not merely to mark time, we must make explicit the underlying assumptions in our world of which we may have only the barest suspicions. Plato saw possibilities his predecessors never foresaw, and succeeded in ordering their rival views into a more comprehensive framework. He began from the viewpoint of a mathematician, and working with the 'observed'

1. Toulmin, S. and Goodfield, J. explain the details of this theory in The Architecture of Matter pp.82-89

properties of matter, he conceived a mathematical structure of invisible units to account for them – a procedure that has since been revived by modern physicists.[1] In all of this he was doomed to failure – a risk involved in any 'knowledge' quest and a fact which qualifies but does not negate the lessons inherent in his attempt. Our realisation of the theory's failure might prompt us to ask what prompted Plato's expectations of success. It should be understood that the synthesis obtained was interpreted by Plato himself as only a 'likely story'. Nevertheless he did begin from what he would have appreciated as a position of strength – the certainty of a mathematical system of 'knowledge' with its own necessity and universality, and itself beyond the flux of the empirical world. He would rely too, being the philosopher he was, on his confidence in the self-reflective power of thought, which acknowledges identities, differences, and self-contradictions. Distinguishable from, yet inextricably involved in the act of 'knowing' are those not so easily specifiable elements which might be termed the implicit variables. These we can recognise in Plato's effort – his knowledge of the way of doing things, his recognition of what in other situations would be insignificant, and that sense of intention and commitment that made the whole enterprise possible. It was these forms of a priori 'knowing', together with the implicit variables – not all of which we can specify – that Plato brought to the task of understanding how matter decomposes and becomes reconstituted in other forms. It was through these he might expect to see the workings of nature in a more intelligible light."

"We learn something from the fact of his failure too." B might contend. "From amongst the factors that contributed to the inadequacy of Plato's theory, we might isolate two, which relate each to the other. The methods of observation of natural phenomena around 350 B.C. were

1. Toulmin, S. and Goodfield, J. op. cit.

by no means sophisticated - indeed, shapes were attributed to the components of substances according to their states of matter by pure guesswork; and the order Plato attempted to impose by reason on the properties of matter elicited by such 'observations', predicted no empirical events. For want of a better analogy, it might be suggested that Plato formulated a complex banking operation for a currency that didn't exist. Even the components of the operation itself, from the modern viewpoint, were wanting. The geometry in which Plato placed such great faith has, on the one hand, been refined and extended, and on the other, been supplanted by a number of geometrical systems he could never have envisaged. But to the alert mind, whatever seems intelligible, stirs it to discover. Expectations might not be always realised; but unless such attempts are made, there could never be 'knowledge'."

"But there could be no 'knowledge' here", A might point out. "As you yourself said, Plato's theory predicted no empirical events. To be appropriately labelled 'knowledge', a theory would have to correspond with reality - be independently supported by the 'facts'. Plato's effort was pure theoretical guesswork. Such a theory could never be a candidate for 'knowledge', because it belongs to the subjective world of fiction. Our really worthwhile 'knowledge' arises from our direct contact with the physical world. At any rate, if your account of Plato's account is correct, he believed his effort to be only a 'likely story'. He may have had expectations, but they were not all false ones. We have nothing to learn about 'knowing' here."

"Nevertheless, you will appreciate that expectations do not arise from the inanimate physical world," B might argue. "They are part of our human condition and our personal quest for 'knowledge'.

Now I do not deny that our 'knowledge' of the world depends on our experience of it. What I am suggesting is that we need to clarify what kind of experience our experience will have to be if 'knowledge' is to be at all possible. As I have already stated perceptual experience alone cannot provide us with the basis for 'knowledge'. Our perceptions if they are to mean anything must be given shape and significance by ourselves as experiencing persons. If we recognise what we do in Plato and his enterprise, it is because it fits the familiar pattern of our intellectual history, and is similar to what we recognise in ourselves and our own undertakings. Consider, for example, our self-reflective power of thought which enables us to identify, differentiate, and categorize the objects of our experience. Consider our capacity to define, number and qualify what in our world we take to be uniformities. There is, I am suggesting, a subjective dimension to our 'knowing' without which our otherwise unsorted experience would be unintelligible to us."

"Now," B might point out, "it has so far been argued that all we can 'know' are our own perceptions; but attending to our perceptual receptivity alone, provides us with no grounds for 'knowledge' whatsoever, as C has amply demonstrated. In attending to the objects of our experience and accenting the external 'realities' we have forgotten the fact that no 'knowledge' would be possible without the active co-operation of the 'knower'. It is ourselves who are engaged in 'knowing'. It is our active, imaginative and reasoning participation with and within our experience that makes our total experience meaningful. Unless we had a priori frameworks to receive it, our experience would be one booming buzz of undifferentiated sensation. But in fact we already contribute order to our experience. In terms of our concepts of quantity, and

quality we perceive objects as having specific dimensions and characteristics. In our total experience, we sort out foreground from background, we recognize what constitutes X rather than Y, and we determine what magnitudes in terms of space and time shall be applied and in what circumstances. It is we who recognize relations between the objects of our experience, and determine what explanations, their extent and range, will be required to make them intelligible to us. Our concept of cause enables us to enquire into the connections presupposed in the phenomena of nature. Our concept of substance enables us to suppose the entities whose stability and permanence we are disposed to examine. Indeed, phenomena which did not operate within the frameworks our minds imposed, would not function as the objects we stabilize, in this world of flux, and retain in a recognizable way as the objects of our experience."

"Are we to take it then that it is the mind that makes the world?" A might inquire. "Are we to be deprived of the efficacy of our senses? In all your talk about the mind's so-called rule-giving activity the most important feature in our 'knowing' that you have failed to stress is the requirement of objectivity. Let's face facts! Our subjective world indeed provides us with theories, suppositions and imaginings that are the very spice of life. We see the subjective world explored in our literature, our music and our arts; but 'knowledge' of our physical world is clear, objective and checkable in a way our subjective world is not. I appreciate your remarks about a priori frameworks, implicit variables; and so on. We do sometimes overlook the fact that 'knowing' involves the total person. Unless we tinged our lives with a little inventiveness and creativity, we should indeed become uninteresting automatons. But these contributions of mind do

not alter the 'facts' of our empirical world one scrap. Our 'knowledge' is what is imprinted in the mind by the cold, hard, facts of reality."

"Now all of what you say seems to be based on a theory that failed," A might point out. "If you were supposed to be finding clues to 'knowing', then your example wasn't a very good one. Surely you'd agree that to be correctly labelled 'knowledge' something would have to at least be true - something that could be verified by the senses, or that at least corresponded with the 'facts'. Now in spite of our earlier discussions, I think I can now objectively demonstrate the usefulness of the 'conditions' for knowledge'. To be 'knowledge' something would have to be true, believed to be true, and there should be adequate evidence for its truth. Now while your sympathetic approach to Plato's theory can be appreciated from an aesthetic point of view, the plain fact of the matter is that his theory was false. Not only was it false, there is no evidence to support it. As you yourself said, Plato's theory predicted no empirical events. But, even more, Plato himself did not actually believe that he had achieved 'knowledge'. He interpreted his effort as only a 'likely story'. You present us with a theoretical conception which is false, unsupported and unbelieved. It would seem that you are equating 'knowledge' with pure invention."

"I'm not suggesting that our 'knowledge' of the world is either invented or made by mind, " B might reply, "merely that we contribute something to our understanding of it. Our quest for 'knowledge' is a venture, an enterprise embarked upon to make contact with the realities of which you speak. We do attempt to 'objectively' verify that what we obtain is 'knowledge'; but the whole enterprise is governed by two conditions. We have to 'know' on the one hand, in which direction our search is to be conducted; and, on the other, we have to

'know' that what we find has or has not satisfied our search. In terms of the first condition, it is our a priori frameworks that give direction and meaning to our search; and, in terms of the second, we can only understand the answers that our world provides in the light of the questions we have asked. By way of analogy, consider yourself as a spectator who views his environment through green spectacles. If asked why the world looked green , you might reply that your awareness of 'green-ness' was attributable to the spectacles you were wearing. Your response would be a correct one; but when pressed, you would have to agree that the spectacles by themselves would not determine the differences in the shades of green attributable to the objects in the environment you were surveying. Similarly the mind contributes to our experience of the world the element of order, of classification, category and definition; but the contribution it makes does not, by itself, determine what our experience of the world shall be."

"As far as Plato was concerned, " B might continue, "he had a conceptual framework that made his undertaking possible; but in terms of the problem he was trying to solve, the world had no answers to the questions he was shaping. For the reasons we have already discussed, his was an incomplete attempt at a solution. You were able to dismiss Plato's theory as 'knowledge' quite simply because no 'knowledge' was claimed there; but consider, now, something a little more thought-provoking".

"The phlogiston theory of the early eighteenth century arose from an investigation of an observed fact: The conversion of a metal to a calx, closely paralled the burning of an ordinary fuel to ash. There were at the time a number of alchemical theories few of which offered any 'fruitful' explanation for the event. But one promising one

taught that the process of calcination represented the loss of the material principle 'mercury', whose presence in metals conferred on them their characteristic cohesion and brilliance; whereas the process of combustion involved the loss of another principle 'sulphur' whose presence in wood and coal gave them 'solidity' and combustibility'.[1] A German chemist, Stahl , 'saw' that both processes were related. He concluded that two apparently distinct principles could be combined into one - which he christened, 'phlogiston'. Now Stahl and his successors had no difficulty in demonstrating the 'correctness' of his conclusion. Metal could be changed into calx when phlogiston was withdrawn, and calx could be returned to its metal when phlogiston was restored. Not only calcination, but also combustion could now be understood in a much more meaningful way. It also explained respiration. Priestley, for example, found that mice could survive in a bell jar of dephlogisticated air."

"Now from our modern point of view," B might continue, "we might say that the early eighteenth century 'experts' had grasped the wrong end of the stick. We might translate 'phlogiston' as 'oxygen', perhaps, but re-explain Stahl's experiment in terms of a metal gaining oxygen rather than losing phlogiston, and vice-versa for the heating of the calx. Now how do your 'conditions for knowledge' stand here? In the first place, the theory was believed and accepted in normal practice. The theory enabled chemists to determine which substances were the 'reactive' agents. It accounted for a number of reactions in which acids were formed through combustion. It explained the decrease of volume when fuels were burnt in a confined volume of air.[11]

1. Toulmin, S. and Goodfield, J. The Architecture of Matter p.238
11. Kuhn, T. The Structure of Scientific Revolutions pp.98-99.

Other significant advances were possible within the phlogiston framework. It would be reasonable to say that the empirical support for the theory was considerable at that time, not only in terms of repeatability, but also in terms of variety. To all extent and purposes the theory was 'true'. It corresponded with the 'facts' and the 'facts' coherently supported the theory. Now you will appreciate that our picture of combustion, calcination and respiration is very different today. If <u>your</u> version of 'knowledge' is correct, then, we have the absurd situation of a 'truth' at one time contradicting 'truth' at another.

"The 'truth' of the matter is that the eighteenth century chemists were mistaken," A might reply. "I have after all admitted that error is possible. They may have believed that they had attained 'knowledge', but in fact, as you have suggested yourself, they did grasp the wrong end of the stick. If they had examined the evidence more carefully they would have come to the correct solution that calcination involved the addition of a substance - a substance we now happen to call oxygen. It's as simple as that. But consider the failure of your so-called a priori frameworks here. If, as you said earlier, we impose order on our experience, how was it possible that a substance was overlooked? Where is the 'recognition' of quantity and quality you spoke of? Clearly, if we were to rely on mind to make its so-called contributions to our understanding of the world, we would be misled. Perhaps the illogicality of phlogiston can be explained by locating as its source the imaginings of the alchemical mind."

"We must indeed accept that the phlogiston theory is mistaken because it contradicts what we now 'know' to be the case," B might admit." But it is mistaken in terms of our own a priori frameworks.

We look at 'facts' similar to the ones 'known' in the eighteenth century, but we 'see' them, so to speak, through a different pair of spectacles. Insofar as we can 'know' it, reality hasn't changed, but our way of looking at it has. The rule-giving activity of mind should by now be apparent. If we can remove our own spectacles for a moment, we might see that the 'wrong end of the stick' description is applicable only from the modern point of view. To the early eighteenth century chemists, the phlogiston theory was an advance in 'knowledge'. Two 'principles' were seen as one by Stahl. That was when 'new' spectacles were donned for the early experimenters. Questions could now be shaped in such a way as to enable nature to give up more information about herself. The eminent men of the time could advance within the framework phlogiston theory imposed, because what had hitherto been unintelligible was now within human understanding. Now you were concerned about the question of substance. This can be easily explained in terms of the guiding theory. 'Principle' and not 'substance' was the operating concept. The fact that experimenters, with a few exceptions, didn't 'see' substance where we 'see' it was because they weren't looking for it. Indeed, at one point, a conclusion which involved the 'recognition' of substance, would have been the wrong conclusion. Some supporters of Stahl did try to postulate that 'phlogiston' was a substance with negative weight, but this idea merited no serious attention. There was nothing illogical about 'phlogiston' to the scientific mind. As one writer was to point out:-

> "You do not surely expect that chemistry should be able to present you with a handful of phlogiston, separated from an inflammable body; you may just as reasonably demand a handful of magnetism, gravity, or electricity..... There are powers in nature which cannot otherwise become the objects of sense, than by the effects they produce; and of this kind is phlogiston."[1]

1. Richard Watson. Chemical Essays vol.1.(London,1782).p.167
The quote appears in Hall, A.R. The Scientific Revolution 1500-1800 pp.329-330

Far from being the outcome of fancy imaginings from the alchemical mind, the phlogiston framework was a serious endeavour to make contact with reality."

"What we must not overlook," A might reply, "is that the phlogiston theory not only is wrong but was wrong. It didn't square with nature. I can appreciate the problems involved in discovery, and so on, and no doubt the phlogistonists saw themselves as advancing in 'knowledge'. But no amount of debate can cover over the error they made. There is a substance which we happen to call oxygen, and phlogiston was imaginary nonsense. If this is the way your so-called a priori frameworks work, then it is no wonder that man took so long to learn about his world. Your 'frameworks' are really 'attitudes'—the kind of attitudes that lead to authoritarianism and dogmatism. 'Knowledge' would be hard won under the conditions you suggest it builds up in."

"Recalling your remarks at the beginning of our discussion, I find it interesting to hear you speak this way," B might point out. "Authoritarianism and dogmatism are attitudes we might well avoid, and it might be well to re-examine the 'knowledge' items on your list in a new light. But let us not misunderstand the nature of our a priori frameworks. Your use of the word 'attitudes' seems to imply that such frameworks can be held in spite of the evidence of our senses. This is to misunderstand how they work and their relationship to the empirical world. Our a priori frameworks are indispensible because without them our world would be unintelligible. We would be unable to shape our questions and make sense of nature's answers. But whichever ones we choose, will depend on ourselves as persons - our prior 'knowledge' and experience, our ways of thinking, and the efficacy of our past judgements. Such frameworks as we employ will be, in a sense,

necessary. Necessary , that is, as opposed to contingent; not necessary as opposed to voluntary. In terms of their empirical application, our a priori frameworks are representative of our initiative of mind. In a sense - with regard to the total person engaged in 'knowing' - the mind is free to choose which a priori frameworks will make the world intelligible. What it is not free to do, if 'knowledge' is being sought, is to determine which a posteriori elements shall arise within the terms of that framework. It is experience we must accept willy-nilly. Once the frameworks are in operation, we must accept all experience it makes possible. Our a priori frameworks, then, impose no limitations on the empirical world except insofar as they allow us to 'see' more or less of it."

"The phlogiston theory represented an advance in 'knowledge' for eighteenth century scientists - although we may find it difficult to believe," B might continue. "Within that framework other kinds of 'knowledge' could and did develop. It imposed no limitations on experience and in fact made possible a more comprehensive picture of our world. It was within this framework that Black,Cavendish, Scheele and Priestley undertook and advanced the study of gases. The framework drew scientists together and provided the means of communication between them. Experimental results could be interpreted, shared and taught within its related concepts. Experimental techniques were refined to solve problems and puzzles the phlogiston framework defined. Apparatus was improved and produced more cheaply as the Phlogiston theory encouraged a wider range of inquiry. Quantitative procedures were refined, and these in turn were made possible by improvements in such apparatus as the balance.[1]

1. Vide Hall,A.R. The Scientific Revolution 1500-1800. pp305-340

Collectively, these developments altered the conditions under which 'knowledge' could be obtained. Thus 'seeing' the world through the phlogiston framework, some eighteenth century scientists could 'see' more."

"Now there is a time when some a priori frameworks become redundant," B might venture. "This may seem somewhat contradictory in the light of my previous remarks. I mentioned that a priori frameworks are necessary in that they make the world intelligible, and it might be asked how something said to be necessary can change. The question can be asked from two points of view: 'If something is necessary, doesn't that mean true in all possible worlds?'; and, 'If 'knowledge' changes, how can anything relating to the flux of the empirical world be said to be necessary?' The question as it might be asked from the second point of view is partly answered by the qualification I added previously. 'Necessary' is to be understood as being opposed to 'contingent' and not 'voluntary'. But some a priori frameworks are not necessary in a strictly logical sense. However, they are employed as though they were, and to all extent and purposes may be treated as such. If we can now raise 'necessary' to the meaning it would have from the first point of view, we would seem to have a gross contradiction; that is, something 'true' in all possible worlds, changes. The apparent contradiction can be cleared up if we can substitute the term 'replaces' for 'changes'. This way we can recognize a logical similarity between the terms and at the same time get a better psychological 'picture'. This can be demonstrated with reference to systems of mathematical 'knowledge'. A distinguishing characteristic between each of the geometries of Euclid, Lobachevsky, and Riemann is the axiom - which does not stem from our experience of the empirical world - relating to

parallels. According to Euclid, given a straight line and any point outside the line, only one straight line can be drawn through that point in the same plane which does not intersect the line. But according to Lobachevsky, more than one straight line can be drawn through a given point yet fail to intersect the other line; and, according to Riemann, no such lines can be drawn. Each system of geometry is necessary, i.e. internally consistent; but one may be employed instead of another not as a description of our world but to help us interpret what we 'see', i.e. as a priori frameworks. For many years we 'saw' our world through 'Euclidian' eyes, so to speak, and in fact we still do in many fields. Consider Surveying, for example. But our scientific frameworks are such that Euclidian geometry no longer helps us to find answers to the questions we want to ask about, say, the universe. In some instances Riemann's, and in others Lobachevsky's system of geometry has replaced Euclid's."

"It is the 'seeing' more that makes some a priori frameworks redundant," D might contend. "Within such frameworks, vocabulary, 'facts', concepts and theoreticals, together with modes and instruments of observation help to produce a consistent 'picture' of our world. With consistency, comes recognition of regularities, and expectations more often than not confirmed. But as the scope and precision of thought and practice extend within the framework, new and unsuspected phenomena may become revealed, or old phenomena may come to be 'seen' in a different light. Irregularities within regularities, and expectations unconfirmed, and even accidental change in the modes and instrumentation of observation, may lead to the recognition of problems and puzzles not solvable within the frameworks which made their formulation possible. Such anomalies might at first be absorbed, but

should they become significant in terms of the frameworks, and for those that share them, they may lead to the discovery of new 'facts', procedures, or theoreticals through which a priori frameworks may be overthrown. As Kuhn describes it in his account of scientific revolutions - novelties of fact and theory 'produced inadvertently by a game played under one set of rules' requires for their assimilation 'the elaboration of another set'."[1]

"Let us return to the phlogiston example once more," B might continue. "By about the 1770's, considerable empirical data had accumulated within the phlogiston framework. This precipitated a chaos of unrelated 'facts'. As experimental techniques became refined, distinctions were drawn between hitherto similar findings, and these resulted in the development of a terminology that became ponderous and confusing - 'lambent inflammable air', 'dephlogisticated nitrous air' or even 'phlogiston' which had come to mean quite different things in different contexts. With the study of gases, gaps were discernible in both theory and practice, and the phlogiston framework became a serious impediment in the interpretation and confirmation of experimental work. The hitherto unrecognized 'enriched air' that would have been produced in many laboratories began to receive more serious attention. The problem of how genuine material substances were to be distinguished from what were 'known' as incorporeal agencies gained increasing significance in practice and concept, particularly since there was no doubt about the corporeal status of gases. Finally, its theoretical solution could no longer be avoided. The solutions that were proposed, led to the overthrow of the phlogiston framework - Lavoisier's ,

1. Kuhn, T.S. The Structure of Scientific Revolutions p.52

Berthollet's, Fourcroy's and Guyton de Morveau's attempt to reform the terminologies; Lavoisier's insistence on the physical axiom that in chemical change nothing is lost or created; Black's, Cavendish's, Scheele's Priestley's and Lavoisier's practical demonstration of the existence of gas substances. In this way one a priori framework is replaced by another, and our view of the world changes."

"The examples you've used are good ones; " C might point out, "but not for the reasons you might suppose. What you have succeeded in doing, is to add extra support to my contention that our 'knowledge' is only ever probable. It offers us no guarantees. There can never be any certainty about our world because the evidence we use to justify our so-called 'knowledge' claims can never be complete. Perhaps I can end this discussion by reiterating some of the things I said earlier. What we take to be 'knowledge' is really nothing more than well-accepted convention and strong belief bound together by sets of stipulated rules. Beliefs 'accepted' are the ones that work in a particular time and at a particular place. When they are no longer useful they are either overhauled or - in your terms - 'replaced'. That is how we progress."

"Progress, however, also depends on our being able to be receptive to new ideas," C might contend. "Flexibility in thinking will depend on our being able to overthrow the a priori frameworks that impose restrictions, and to accept the <u>full</u> import of our total experience at any one time. There is no point in extolling the dogmatic attitudes of the past, as you seem to do in your accentuation of 'a priori frameworks' as being an indispensible part of our 'knowing'. 'Knowing' does involve organization - the organization of 'facts' and ideas. Unorganized, our experience <u>would</u> be dispersive or chaotic. But we can organize our experience intelligently and scientifically by the exploration and

exploitation of the potentialities inherent within it. It should be obvious that we cannot organize what has not yet occurred. Our experience then is prior to your so-called 'a priori frameworks'-or should be, if we are to make any sort of progress. I must disagree with you, then, over the matter concerning how 'knowledge' (I think we 'know' what the term means now) is possible. 'Knowledge' arises because of our previous experiences and our reflections about them. New 'knowledge' arises when the 'knower' puts together what is being observed and what is recalled, to see what they signify. It is in this way that our 'knowledge' is possible. The sense we make of things, the things we find to be significant, will be determined for us by the kind and order of experiences we have. Change in 'knowledge' may be simply a matter of one well-accepted convention being replaced by another, but it is the way in which such changes are made that ought to concern us. The progress we have made over the centuries has been slow and tortuous because the wide range of meaningful experiences we might have enjoyed were limited by our false sense of certainty and the authoritarian and dogmatic attitudes we imposed."

"You, too, seem to have misinterpreted the nature and necessity of the a priori frameworks we employ," B might contend. "As I have attempted to demonstrate, a priori frameworks are indispensible because without them our world would be unintelligible. Such frameworks are not imposed in the sense you imply; i.e. from without rather than from within. They are adopted because they are pleasing to the mind or suggest the direction our quest for 'knowledge' might take; or because they make nature's answers to the questions we want answered, clearer. In short, they enable us to make sense of our world and our activities in it."

"Now let us not quibble about the chronology of experience," B might continue. "Clearly, nobody can 'know' anything prior to all experience. Your misunderstanding of my remarks suggests that you have shifted from the problem of how 'knowledge' is possible to the problem concerning how and when 'knowledge' takes place. We can suppose that our capacity to 'know' is called into play and differentiates itself progressively as our senses are stimulated; but this, strictly, is a matter for psychology. Insofar as your mention of chronology relates to the main issues here, however, there is something that needs to be pointed out. We cannot, as you suggest, separate experience from our organisation of it. 'Knowledge' is not built up in this way. Experience would not be recognisable experience unless it was already organised. As I have already stated, phenomena which did not operate within our a priori frameworks would not function as that which we stabilise and retain in a recognisable way. Your suggestion, then, that new 'knowledge' arises when the 'knower' puts together what is being observed with what is recalled to see what they would signify would not work unless there was already an awareness of significance from the observer's point of view. Before any contribution of memory, could be made, that which was being observed in immediate experience would have to be already organised so as to present the 'picture' or manifold which could be recognisable from a former experience."

"It is your failure to appreciate the rule-giving activity of mind that brings you to the precipice of scepticism" B might argue. "If our 'knowledge' builds up in the way you have described it, then we can indeed forego any possibility of guarantees about our world, and our 'knowledge' would be only probable. But our 'knowledge' is not merely probable and you 'know' it. If it were, there could be neither order

nor direction and, therefore, no progress. We would not be able to build up systems of 'knowledge', the certainties of which we question. Granted that there are degrees of certainty - there are some things of which we will be more sure than others - and granted that our 'knowledge is always subject to amplification and change, our 'knowledge' of the world is, nevertheless, reliable in terms of our own requirements. Reliability resides in the frameworks we employ to make our world intelligible, and in the theoreticals, concepts, instrumentation, definitions and modes of observation that are framework dependent. When our world ceases to be intelligible within them, they become redundant and more fruitful ones are explored. What we take to be certainties then are certain because we recognize them as such, and because we can show how they are deducible within the frameworks through which we view reality. Our 'knowledge' of reality depends upon our experience of it, but not on brute experience alone. It also depends on the way we are and the way we look at it. We cannot invent the objects of our observation and hope thereby to 'know'. To be certain we must attend to nature and faithfully record our observations of her, but the instruments through which the record will be written are ourselves."

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WHAT IS THE LOGICAL BASIS FOR B'S POSITION?

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We have a capacity for a variety of complex sensations made possible by our bodily sensory apparatus. Consider the sensations of sight, smell and taste. Consider the cutaneous sensations of pressure, temperature, pain; the proprioceptive sensations of body movement, posture, weight, balance, rotation and dizziness; and the visceral sensations which constitute the basis for such experiences as hunger, nausea, and sexual feelings. Consider the fact that all of these can be characterized severally or collectively in terms of quality, intensity, extensity and duration, and that the characterizations in turn can be understood to vary in degree. Our capacity for experiencing sensations, therefore, might be described as unlimited. 'Unlimited' at least would convey the correct impression of a very large number, as well as the fact that if there are any limits to the number of sensations we could experience, we do not as yet know how we would describe them.

How are our bodily sensory organs and nerves stimulated? We suppose them to be stimulated by the environment in which we find ourselves. Within the environment we might, perhaps, locate light waves of varying lengths and intensity; sound waves of varying frequencies, quality and pitch; heat radiation; molecules of varying chemical composition and mass, gravity, movement; and so on. We might consider the environment as capable of producing an unlimited number of stimuli for our separately located sense modalities. Now if the sense data we experience is that which follows immediately upon the stimulation of our sensory organs and nerves, the quantity of sense data we could experience can also be described as unlimited. Let us call this unlimited amount of possible sense-data the universal set.

Now it is a fact that some sense-data are grouped together in such a way as to become the 'objects' of our perception, e.g. tree, apple, hill. Any one group might be described as a complex of an unspecifiable quantity of cohering sense-data, and each complex in turn might be described as a sub-set of the universal set of all possible sense-data. Suppose, for example, that within the environment we were to sense an 'object' such as a 'tree'. We might describe our 'tree sensation' as a particular sub-set of cohering sense-data to which we give the name 'tree'; and the sub-set, 'tree', would be a particular sub-set of the universal set of all possible sense-data. Consider the following two points as facts: We have an unlimited universal set of possible sense-data; and, we 'know' a coherent sub-set of it 'tree'. How is the latter, so to speak, 'extracted' from the former?

If the objectivist's account is correct, 'tree' sense-data has reached the cerebral cortex via the dispersive afferent neural pathways and we have simply received the 'image' tree. If the subjectivist's account is correct, we have simply selected elements from the universal set of sense-data and have composed our own sub-set, 'tree'. B's position rests on the supposition that neither of these accounts provides a satisfactory basis for 'knowledge'. On the one hand, an important factor has been overlooked; and on the other, an obvious requirement has been dismissed.

The objectivist account presents us with a number of difficulties. The picture of a passive 'knower' whose experience consists of accumulative filling in of what in Locke's doctrine is a tabula rasa, makes it very difficult to account for any change and extension of the properties of a previously known object. If the objectivist is correct, if X is known it is known completely. It would seem that even error would be logically

excluded. Consider the sort of situation that might lead to a minor disagreement. Two normal people discussing a book, handle it, check the date of publication, briefly examine the bibliography, etc. After replacing the book and leaving the room, one might remark to the other that he liked the blue dust-jacket. The other might suggest it was grey - not blue. They may return to look at the book to settle the matter. Now if our knowledge of "book" depends on "book" sense-data coloring, how is it possible that one particular sub-set should have priority over any other possible sub-set of sense-data? When a particular sub-set, "book", has been sensed, all other possible complementary sub-sets within the unlimited universal set of possible sense-data have already been excluded. But why has any one sub-set of sense-data elements or any element within the set priority over any other element or sub-set? The criteria cannot come from 'objective reality', for this is the unlimited universal set and no part or element within it is more a part of it than any other. The criteria therefore, must at least in part be subjective. This forces us to recognise within ourselves what might be termed an organising principle.

Consider the subjectivist's account, where experience is constructed by oneself. A 'tree sensation' would involve a person's selecting an unspecifiable number of sense-data from the unlimited universal set of possible sense-data and constructing the sub-set, 'tree'; much like an artist, one supposes, selecting colours and features for his canvas. Now if the subjectivist's account is correct, two problems arise. There is firstly, the problem of consistency within one's own experience. Suppose one were to construct X now with properties m,n,o....and suppose at a later point in time one wanted to put X into relationship with P.Q.R.....which were also constructed earlier from other properties, how would one ensure that m,n,o...would 'fit' with the properties used in the construction

of P.Q.R...? Continually expanding sub-sets of cohering relationships would demand considerable genius to maintain. In the second place there is the problem of consistency in one's experience with that of other people. We do communicate, talk about and handle the "objects" of our perception. But in terms of the subjectivist's account how would consistency be possible? If our constructs, P.Q.R....coincided with sub-sets of other people, wouldn't this occur in the face of all the probabilities against it? Complete subjectivism, it would seem, would require omniscience. 'Knowledge' would be a miracle.

Our 'knowing' then involves something more than mere perception. The experiencing person has already added something to it. We must recognize in the structure of experience an active together with a passive contribution of our own. Indeed, it might be argued, there is no experience except as shaped by mind's activity. This is not to say that the person makes the order, in the sense of making the reality. As we have seen, were it possible to do so, our knowledge would be miraculous. But he does play a creative as well as a receptive part. It is, I think, within these terms the logic of B's position may be justified.

C O N C L U S I O N S

Knowledge changes. This fact we must accept and try to allow for. What allowances we make will depend on our awareness of the part we play in apprehending reality. We must then disabuse ourselves of the notion that the mind is simply passive, acquiring and retentive, and come to acknowledge that every act of intelligent apprehension including, even, perception, is an achievement which has already been transformed by the achiever. Equally, we need to recognize the richness of reality, which includes the achievements of human persons and traditions. For in a sense this transcends even the profoundest acts of comprehension and provides the matrix through which future knowers will achieve what we have not yet imagined.

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