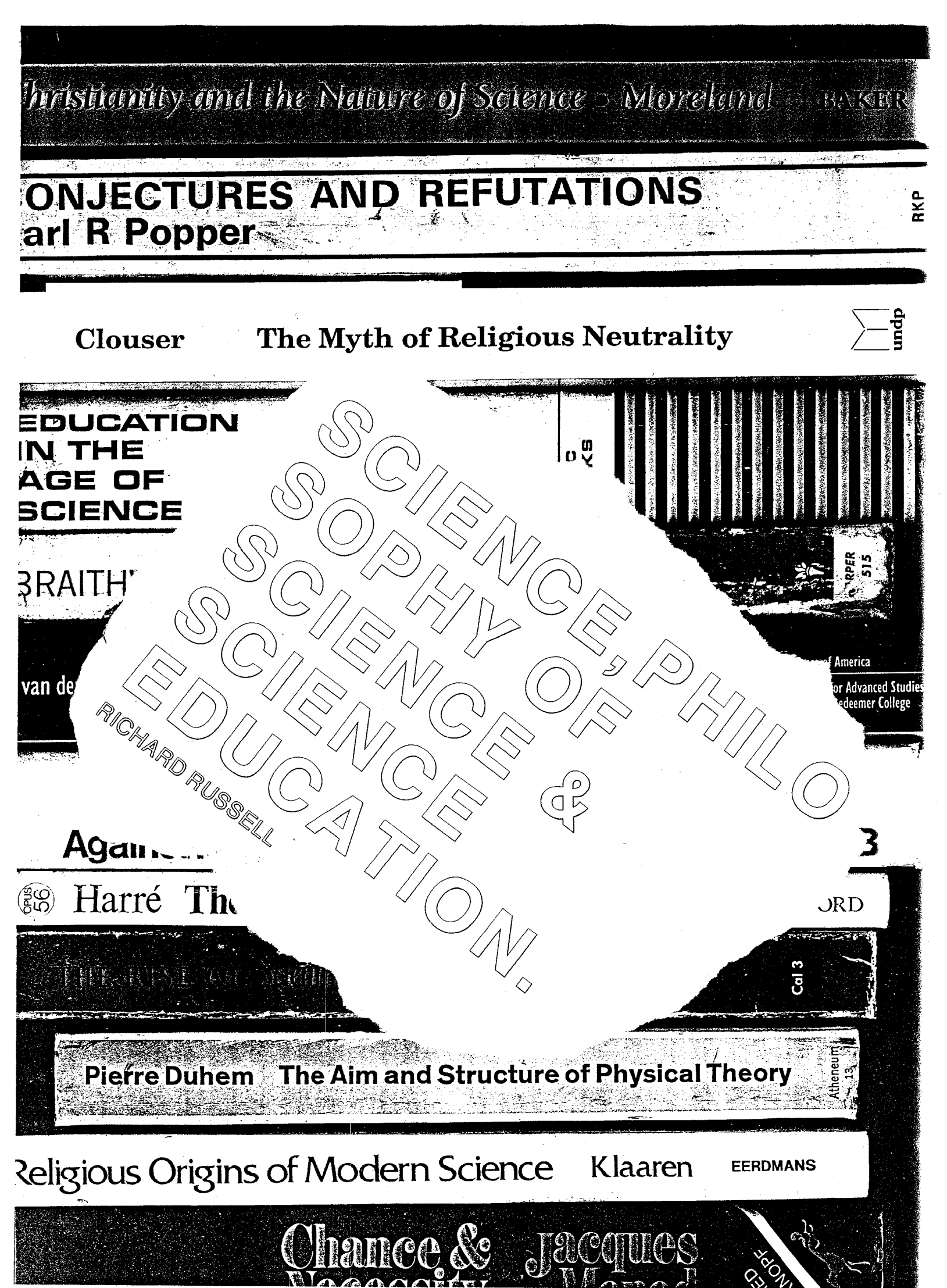

hristianity and the Nature of Science . Moreland BAKER
ONJECTURES AND REFUTATIONS
arl R Popper
RKP
Clouser The Myth of Religious Neutrality
undp
EDUCATION
IN THE
AGE OF
SCIENCE
BRAITH
van de
SCIENCE, PHILOSOPHY & SCIENCE & EDUCATION.
RICHARD RUSSELL
America
or Advanced Studies
edeemer College
Harré
OPUS 56
Cal 3
Pierre Duhem The Aim and Structure of Physical Theory
Atheneum
Religious Origins of Modern Science Klaaren EERDMANS
Chance &
Jacques

Rev'd Richard & Janice Russell
The Christian Studies Unit
76 Waterside Way, Westfield
Radstock
Bath BA3 3YQ
Tel/Fax: (01761) 433217
E-mail: 113135.2044@compuserve.com

SCIENCE, PHILOSOPHY OF SCIENCE AND SCIENCE EDUCATION.

SCIENCE.....what on earth is it ?

1. What are the characteristics of scientific knowledge? Is it ... rational, objective, demonstrated true, unbiased, certain reliable exact verified falsifiable self-corrective progressive

2. Can there be non-scientific knowledge ?

Is it.....uncertain, biased, vague confused

Or is all real knowledge scientific ? What about 'common sense', knowing Bristol, your friends or God?

3. What is it to be unscientific? Is it to be.....irrational ignoring the facts superstitious stupid obscurantist obsolete

Or is it OK to be unscientific because science is .....impersonal cold, mechanistic, objective abstract mechanical hypothetical impractical because theoretical merely a model boring and colourless uncreative

4. Which of these disciplines are scientific ? .....physics psychology mathematics art history literary criticism geography geology philosophy astronomy economics sociology theology

5. What makes them scientific?.....laboratories technical jargon use of mathematics offering a B.Sc. using the Scientific Method

6. At what point did they become scientific?

7. Or, what would they have to do to become scientific?

8. Or is it impossible that some of these disciplines should ever become scientific ....or undesirable that they should? What is it that makes it impossible or undesirable? Is it to do with their subject matter?.....too complex or what? (unlike DNA.....defeatism?)

Are their methods too 'subjective'(appreciation, insight, sympathy, empathy, etc.) so that it is never possible to overcome a diversity of opinions and evaluations and so arrive at one agreed truth to which all 'experts' hold?

9. If some of these disciplines are not scientific - then what on earth are they? Why should they have any place in the university if it is doubtful if they contain any definate knowledge of reality? Unless they intend to become scientific will they not for ever remain morasses of opinions, speculations and unsupported arguments...as some have said of philosophy? Should such disciplines - pseudo-disciplines - be supported at huge cost to the taxpayer in schools, colleges and universities ? Surely the money could be better used as aid to the Third World or to finance truly progressive disciplines (i.e. the sciences)which would aid our economy rather than invest in failure?

10. Many philosophers and scientists have maintained that the secret of scientific progress and the identity of science is the Scientific Method. But what on earth is that? No one seems to know any longer.....and here in a nutshell is why.....

(a) Inductivism(from the 16th.century to the 1930's, from Francis Bacon, to Mill, to Logical Positivism....and where most of the'educated'public still are.) You go out in the world and gather empirical facts - you can't argue with the facts. You notice patterns in the facts which gives rise to a hypothesis. You then check out the hypothesis (i.e. verify it, i.e. show it to be true) so that you now have a verified theory or law. Anyone can check it themselves and the more this is done the greater the justified certainty. How many generations of schoolboys have checked the boiling point of water!

The 18th.century philosopher Hume discovered a small problem in this account.If you started with the empiricist assumption that all genuine scientific knowledge must be based on actual experience then it is not possible to draw conclusions about the boiling point of water (past,present and future)i.e.all water on the basis of the small amount of water we have checked.The problem is not so much with the tiny sample we have taken (although that is an interesting problem in itself)because the situation would not be much improved if we tested a lot more water e.g. if we had every housewife checking her kettle daily ! The problem for inductive logic is going from some to all.How can you base universal claims(i.e.typical scientific laws) on a finite number of instances? Is this not going beyond the tested facts to a logically unjustified speculation ? Are not all claims to know such laws to be true on the basis of experience and logic a giant fraud.

Two attempts to make inductivism more plausible have been tried.The first has introduced a principle of the uniformity of nature in order to underwrite the inference from some to all.But this principle itself is far more problematic than the claim about the boiling point of water.We have moved from a claim about the uniformity of the boiling point of water to the uniformity of the whole of nature....past,present and future! How could we come to know that in a manner consistent with our empiricist assumption...unless we are God!(Many evolutionary biologists,at least,give the impression that they were there, complete with television cameras,when the fish crawled out of the water and grew legs and lungs!).The second attempt has been to maintain that while one cannot show a scientific theory to be true(i.e.verified) you can show it to be probable, with every positive instance adding to its probability.But how probable in terms of probability theory.Some theorists(e.g.Karl Popper) maintain that the probability of any theory is close to 0. So'probable'comes to mean 'not totally impossible' and so loses the pretty likely or ever so likely connotation that probable normally bears.However on this basis any theory whatever,so long as it is not logically contradictory is possible and thus 'probable'.

(b)Falsificationalism

In the face of these(and many other)problems Karl Popper in The Logic of Scientific Discovery(in German 1934,English 1959)wrote in a new appendix(p.317);

> I think we shall have to get accustomed to the idea that we must not look upon science as a 'body of knowledge' but rather as a system of hypotheses,that is to say a system of guesses or anticipations which in principle cannot be justified,but with which we work as long as they stand up to tests,and of which we are never justified in saying that we know that they are 'true' or 'more or less certain' or even 'probable'.

Popper's view then is that while no number of positive intances can show a theory to be true or probably true yet one negative instance will show a theory to be false. Science is to be characterised ,not by induction but by falsification.True science consists of creative conjectures(for which there are no rules or methods)followed by the most vigorous attempts to refute the conjecture with negative instances.

But when is a theory refuted or falsified ? Consider this illuminating little tale told by Imre Lakatos:

> The story is about a imaginary case of planetary misbehaviour.A physicist of the pre-Einsteinian era takes Newton's mechanics and his law of gravitation (N),the accepted initial conditions,I,and calculates,with their help,the path of a newly discovered small planet,p. But the planet deviates from the calculated path.Does our Newtonian physicist consider that the deviation was forbidden by Newton's theory and therefore that,once established,it refutes the theory N ? No.He suggests that there must be a hitherto unknown planet p1 which perturbs the path of p.He calculates the mass,orbit,etc.of this hypothetical planet and then asks an experimental astronomer to test his hypothesis.The planet p1 is so small that even the biggest available telescopes cannot possibly observe it;the experimental astronomer applies for a research grant to build a yet bigger one.In three years time the new telescope is ready.Were the unknown planet p1 to be discovered,it would be hailed as a new victory of Newtonian science.But it is not.Does our scientist abandon Newton's theory and his idea of a perturbing planet?No. He suggests that a cloud of cosmic dust hides the planet from us.He calculates the location and properties of this cloud and asks for a research grant to send up a satellite to test his calculations.Were the satellites instruments(possibly new ones,based on a little-tested theory) to record the existence of the conjectural cloud,the result would be hailed as an outstanding victory for Newtonian science.But the

cloud is not found.Does our scientist abandon Newton's theory,together with the idea of the perturbing planet and the idea of the cloud which hides it? No.He suggests that there is some magnetic field in that region of the universe which disturbed the instruments of the satellite.A new satellite is sent up.Were the magnetic field to be found,Newtonians would celebrate a sensational victory.But it is not.Is this regarded as a refutation of Newtonian science? No.Either yet another ingenious auxiliary hypothesis is proposed or ...the whole story is buried in the dusty volumes of periodicals and the story never mentioned again.
(from 'Falsification and the Methodology of Scientific Research Programmes' in Criticism and the Growth of Knowledge,ed.I.Lakatos & A.Musgrave,C.U.P.1970.pp.100-1)

What light does any proposed Scientific Method throw upon this situation? At what point would it have been rational to consider Newton's theory refuted? By the initial deviation of p ? By the failure to locate the gravitational field? Or never? Would Newtonian scientists be prepared to abandon Newton unless they had another alternative general theory up their sleeve?

The conclusion drawn from this is that there is no method by which one can show a scientific theory to be true,probably true,probably false or false.P.K.Feyerabend argues this in detail in Against Method(New Left Books,1975).He also argues that he can find little evidence from the history of science that anything like anyones version of Scientific Method(whether inductivist or falsificationalist) was ever used by those responsible for the great breakthroughs inscience.He provides a detailed account of Galileo and argues that if Galileo had been a Popperian he ought to have abandonned his theory as falsified. The growth of science requires the rejection of Scientific Method and the acceptence of Feyerabend's new rule of method 'Anything goes!Furthermore contemporary science is dogmatic and science education at all levels is little more than indoctrination.In addition he has severe doubts as to the contribution of science to human happiness and wellbeing.

In short there is a crisis about the authority of Science from within the secular humanist academic community itself.This is opening up a gap between those who have a messianic view of science(and technology) and those who see it as virtually demonic. Historically the authority of Science has been pitted against the authority of Christ and his Word.To what new Idol will western civilisation turn if they lose their faith in Science while yet refusing to turn to Christ.

Consider these two passages:

'Stinking rivers,filth in the air we breath,omnipresent noise,the plunder of raw materials,weapons of devilish savagery - all these bear witness to the dark face of science and technology.Despite attempts by the experts to persuade us that such horrors are merely temporary problems thrown up in the course of progress,people have recently begun to rebel.The products and processes of science and technology are under sustained attack.Yet,seen on a broader canvas,there are even more serious allegations against science on a different level altogether.The crucial criticism - all the more potent because we are seldom consciously aware of the case that supports it - is the extent to which science dominates our lives, our "worldview",habits of thought,human relationships,and values - our entire cradle-to-grave existence.
(B.Dixon What is Science For?(New York,1974)p.165.

Philip Handler,President of the National Academy of Science (USA) in an essay entitled 'In Praise of Science' in contrast writes:

'Our current malaise malaise stems from a few bad experiences - from time-delay in meeting the high hopes and expectations raised in the minds of those who appreciate the great power of science,the force of technology.Those expectations have taken on a new light as science has also revealed the true condition of man on earth.....I retain my faith that the science that has revealed the most awesome and profound beauties we have yet beheld is also the principal tool that our civilization has developed to mitigate the condition of man'.
(New York Review of Books,(Supplement)27 Sept,1979,p.15.My italics.

Where do we stand on these issues? What is our Christian philosophy of science and technology?What prophetic contribution have the thousands of Christian scientists and technologists made towards a perspective on science and technology which desctibes its proper creaturely reality - it pace,nature and limits - as a blessing to man which points towards the glory of God our Creator and Redeemer. What view of science are our Christian teachers and lecturers propagating amongst pupils and teachers? Is it subversive of the Christian faith?

SCIENCE EDUCATION.....A FEW CRITICAL REFLECTIONS

It would be a very interesting exercise to see what kinds of response one would to the ten questions about science that we have formulated on page 1 if we were to ask science students at O,A,B.Sc. and Ph.D. level.When I have asked these questions the 'scientists' didn't know how to begin and admitted that they had never been required to think about what science is.Nor did they feel that they had in any way been equipped to do such thinking.Some of them found the questions fascinating and served for a few to bring science alive for them.For others the questions were threatening for instead of using 'science' as the criterion by which other activities were evaluated (and fell short) science itself was in the dock and being interrogated about its identity and credentials. Yes,these 'scientists' had picked up a few slogans about science....usually the fifth-hand remains of long obsolete histories and philosophies of science about which they knew nothing and could not defend against the most elementary criticism.

However the problems with contemporary science education at all levels are not only that it has little educational value as a form of intellectual culture.Its intellectual poverty has huge social implications.Let me refer to a few passages by scientist--theologian John Wren-Lewis from an essay entitled'Educating scientists for Tomorrow'.

> Today,the fact that science is the great agent of change for mankind's future good or ill is blindingly obvious to everybody except,apparently, to large numbers of those who organize and practice the teaching of science. Overwhelmed by the ever-growing complexity of scientific knowledge,they retreat into their various specialisms and relegate consideration of the impact of science on human life to the status of an extra-curricular interest, an optional addition which students who like that kind of thing are free to pursue with their friends,or with the aid of political theorists or historians, as long as it does not take too much time from their serious studies.
>
> As a result.those whose education has been predominantly scientific are apt to be among the most conformist,unquestioning members of the community. While notable exceptions hit the headlines from time to time,like Nobel-prize-winning chemists who are also brilliant musicians,they are exceptions that prove,rather than disprove,the rule.In general,the nature of scientific education is such that there is a direct correlation between success in science courses and lack of awareness of wider human issues.....
>
> The fact that "social responsibility in science" has become something of a hysterical campaign slogan in the last few years is evidence of the degree to which scientists with active concern about the future feel themselves to be in a tiny minority in their professions.And unless positive steps are taken to correct this bias in scientific education it becomes self-reinforcing. Recent psychological studies of scientists' career-motivation(for example,those of Dr.Stephen Box at the University of Kent in Britain) have show that the impersonal,specialized structure of science courses tends to attract those students whose fear of their own emotions makes them want to retreat into a world of abstractions.At the same time,the more vigorous,concerned minds are so repelled by what they see science has become that they retreat into a counter-culture which is more and more explicitly antiscientific,so that it becomes possible for an American historian,Theodore Roszak,to write a campus best seller ,The Making of a Counter Culture,which argues that antipathy to science,as such,rather than simply to the nasty consequences of technology,is the underlying motif of the whole youth-protest movement of our time.This trend,if not altered,could spell disaster for the human race, since it would lead to a situation in which those who possess knowledge which is power are lacking in all conviction,while those whose concern about the future has passionate intensity remain powerless to translate their ideals into practice.

John Wren-Lewis then argues for the need to 'De-Specialize the Scientist' - which really and simply means that he needs a good general education like everyone else.Nor is this merely(!) to culturally enrich him as a person - which is all that most courses in liberal studies aim at.Rather,it has profound implications for the development of the science itself and for wise and effective applications of that science. He writes:

> The narrowly specialized applied scientist will tend to be pedestrian in his work and will also be prone to waste time,energy and resources on projects which are rendered obsolete by advances on other fronts,whereas a more broadly ranging imagination will be constantly alert to the possibility of such advances.In more basic science,narrowly specialized training leads to a phenomenon which ought to be impossible, a contradiction in terms,but is regrettably all too common -scientific dogmatism,the assumption that contemporary concepts and theories are more or less final truths,which inhibits all those truly radical advances that depend on the development of fundamentally new ways of thinking.
> Learning for Tomorrow:The Role of the Future in Education (Ed.Alvin Toffler, Vintage Books,N.Y.1974).pp.158-60,166.

If these comments on contemporary science education are even half-true then it becomes evident why so few Christian scientists are able to articulate the relationship between the Christian faith and their science.Their scientific training has incapacitated them from thinking about science in a general manner .Being ignorant of the history and philosophy of science they have fallen as very easy victims to the (positivist) dogma of the religious and philosophical neutrality of science.

This dogma is strongly reinforced in scientific education .Michael Yudkin provides two clear examples.Writiten accounts of scientific work give it the appearance of a mechanical and routine activity whose results are inevitable.He writes:

> Scientific papers generally rationalize not only the discoveries but also the progress of a scientific investigation.Written after a piece of work is completed,they give the impression that paths of inquiry all led directly to the vindication of a particular theory.They tend to ignore the inconclusive experiment;they seldom mention the false starts and wrong turnings. They are composed with the advantage of hindsight,and in order to prove a point;they wish to make a theory as plausible as possible.They are not written in order to make clear the complex and irrational progress towards a conclusion; they generally describe experiments in logical,rather than in chronological sequence.Scientists are not usually concerned,when writing papers,to describe the steps by which they groped towards a hypothesis.(pp148-9)

Nothing could be better calculated to give the impression that the scientific community possessed some sort of infallible Scientific Method which surely and reliably gets scientists to the truth.Similarly the practical work of schoolchildren -and not a few undergraduates - tends to reinforce this same image of science.Yudkin writes:

> Traditionally,their work in the laboratory has been designed to demonstrate facts or teach techniques.Experiments are assigned 'to demonstrate the laws of chemical combination' or 'to show the use of the melting-point apparatus'. Instructions are provided in detail;they allow no initiative either in the experimental investigation or in the conclusions to be drawn.Indeed,there is no investigation ,and there are no conclusions:the printed instructions leave no scope for the tentative approach that is at the heart of experiment and inference.Instead they descibe a manipulation that must inevitably'turn out the right way';to follow them requires nothing beyond a modicum of manual skill and the ability to read. General Education(ed.M.Yudkin,Penguin Books,1971) p.150.

Virtually all of us have been indoctrinated into this neutralist view of science.It is the view of the man on the street who left school at 15 and uses Scientific toothpaste.It is the view of the literary critic,the BBC producer and the theologian whether evangelical or liberal.The only principal difference between the latter two is where they limit science.Both say thus far and no further yet both feel awkward about drawing the line....for how can one justify such a line ? And should theology not be scientific ? And should not the Bible be treated as any other book? And religious experience as any other experience?Is not methodological atheism the only possible approach to all things...including all things religious?

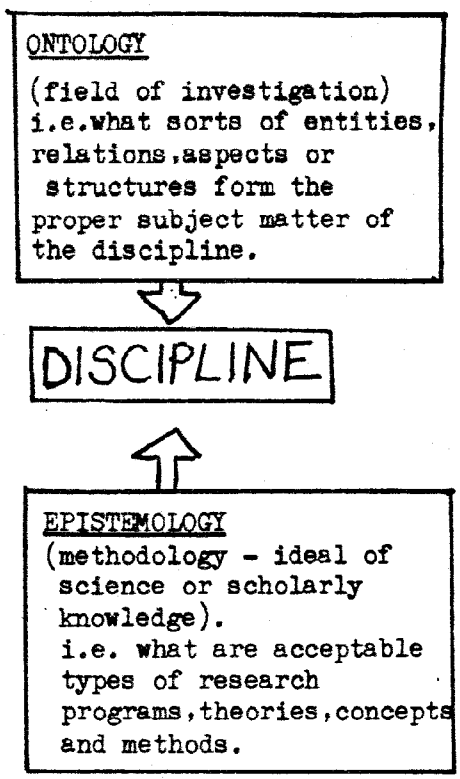
Under the pressure of this 'Science ideal of humanism'(as Dooyeweerd calls it) conservative theologians are anguished and liberals wonder how to fight off a total secularisation and retain some 'religious dimension'(Cf.J.H.S.Kent The End of the Line: The Development of Christian Theology in the Last Two Centuries,SCM,1982).

THE STRUCTURE (OR CONSTITUTION) OF ANY POSSIBLE (SCIENTIFIC-SCHOLARLY)DISCIPLINE.

Every discipline is constituted by the combination of a disciplinary ontology (or field of investigation) and a disciplinary epistemology(a general methodology related to an ideal of science or scholarly knowledge). In short what is properly investigated and how it is properly investigated. This is a two-fold loyalty. Yes,we must take the facts seriously.But what are the facts,the states of affairs, which we must take seriously ? And what is it to take such states of affairs with scientific seriousness ? How must one (methodologically) proceed to do that?

We will not end with a well formed discipline if one of these loyalties eclipses the other.It may be thought that there can be no discipline or science of certain state of affairs because they are too rich or complex for what are taken to be the available (scientific) methods.The answer here is the development of appropriate methods.Secondly there may be such an attachment to a certain ideal of science or methodology that the existence of certain states of affairs is either denied or treated in a quite unappropriate fashion.Such an approach often claims when challenged to be 'purely methodological'.But is the methodology appropriate and adequate to the field of investigation ? Why not use another methodology ? Why is it rational to adopt such a 'working hypothesis' ? The usual answer is that such a method(or one analogous) is regarded as highly successful in some other discipline so it has been imported.Several points arise here.In the first place there can be questions about the 'success' of another discipline.Secondly,its success may not be due to the alledged approach or method.Both practitioners and outside observers may mischaracterise what has led to success.Thirdly,the question should be asked as to why the same method should be expected to be appropriate to a different field of investigation.Fourthly,how may one now differentiate the two disciplines if they share the same methodology ? If the differentiation is in the nature of the field of investigation then how is the same methodology appropriate. It is very easy for a discipline to lose touch with reality (i.e. lose all theoretical and practical value) if a disciplinary ontology is largely the product of a borrowed'successful' methodology. Not infrequently is such a research program qualified and diluted as it tries to inch it way back towards reality but usually an alternative program is required if it is to get out of such doldrums.

The Structure of a (scientific-scholarly) Discipline.



1.Nature of the field?

2.Differentiation from other(surrounding) fields?

3.Relation to,dependence on,other fields ?

4.Internal differentiation of the field?

1.Nature of sub-disciplines or divisions?
2.Differentiation?
3.Relations?
4.Internal structure 1,2,3,4, etc,etc.

1.Nature of the approach?

2.Differentiation from other approaches?

3.Relation to,dependence on,other approaches?

4.Internal differentiation of the approach into methods and proceedures. 1,2,3,4, etc,etc.

It is clear that the philosophy of the discipline(its ontology and epistemology) both transcend and structure the discipline.They are not merely some form of external commentary on the discipline from outside but rather control the discipline at every level - each 1,2,3,4, set of questions. These questions cannot be answered except for making(implicitly or explicitly) assumptions about general systematic philosophy (metaphysics or ontology) and epistemology.

Hence it is no accident that all the 'special sciences' arose from philosophy. However it is clearly a positivist myth that they have or can ideally leave philosophy behind.Their philosophies(disciplinary ontologies-epistemologies) may develop and change dramatically at times of scientific revolution.It may be that the professional philosophers are not involved or what they say about the discipline may be irrelevent or external as most'philosophy of science'is due to (a) their ignorance of the discipline and/or (b)the unfruitful nature of the research program to which they are committed.in philosophy,e.g. Logical Positivist philosophy of science. This failure of the philosophers however provides no excuse for special scientists becoming explicitly clear concerning the philosophy or philosophies which are actually structuring their discipline.Such clarity is essential to education,vital to the research policies of disciplines and to insight into the schools of thought that fragment most disciplines.

THE STRUCTURE (OR CONSTITUTION) OF ANY POSSIBLE (SCIENTIFIC-SCHOLARLY)DISCIPLINE.

Every discipline is constituted by the combination of a disciplinary ontology (or field of investigation) and a disciplinary epistemology(a general methodology related to an ideal of science or scholarly knowledge). In short what is properly investigated and how it is properly investigated. This is a two-fold loyalty. Yes,we must take the facts seriously.But what are the facts,the states of affairs, which we must take seriously ? And what is it to take such states of affairs with scientific seriousness ? How must one (methodologically) proceed to do that?

We will not end with a well formed discipline if one of these loyalties eclipses the other.It may be thought that there can be no discipline or science of certain state of affairs because they are too rich or complex for what are taken to be the available (scientific) methods.The answer here is the development of appropriate methods.Secondly there may be such an attachment to a certain ideal of science or methodology that the existence of certain states of affairs is either denied or treated in a quite unappropriate fashion.Such an approach often claims when challenged to be 'purely methodological'.But is the methodology appropriate and adequate to the field of investigation ? Why not use another methodology ? Why is it rational to adopt such a 'working hypothesis' ? The usual answer is that such a method(or one analogous) is regarded as highly successful in some other discipline so it has been imported.Several points arise here.In the first place there can be questions about the 'success' of another discipline.Secondly,its success may not be due to the alledged approach or method.Both practitioners and outside observers may mischaracterise what has led to success.Thirdly,the question should be asked as to why the same method should be expected to be appropriate to a different field of investigation.Fourthly,how may one now differentiate the two disciplines if they share the same methodology ? If the differentiation is in the nature of the field of investigation then how is the same methodology appropriate. It is very easy for a discipline to lose touch with reality (i.e. lose all theoretical and practical value) if a disciplinary ontology is largely the product of a borrowed'successful' methodology. Not infrequently is such a research program qualified and diluted as it tries to inch it way back towards reality but usually an alternative program is required if it is to get out of such doldrums.

THE STRUCTURE (OR CONSTITUTION) OF ANY POSSIBLE (SCIENTIFIC-SCHOLARLY)DISCIPLINE.

Every discipline is constituted by the combination of a disciplinary ontology (or field of investigation) and a disciplinary epistemology(a general methodology related to an ideal of science or scholarly knowledge). In short what is properly investigated and how it is properly investigated. This is a two-fold loyalty. Yes,we must take the facts seriously.But what are the facts,the states of affairs, which we must take seriously ? And what is it to take such states of affairs with scientific seriousness ? How must one (methodologically) proceed to do that?

We will not end with a well formed discipline if one of these loyalties eclipses the other.It may be thought that there can be no discipline or science of certain state of affairs because they are too rich or complex for what are taken to be the available (scientific) methods.The answer here is the development of appropriate methods.Secondly there may be such an attachment to a certain ideal of science or methodology that the existence of certain states of affairs is either denied or treated in a quite unappropriate fashion.Such an approach often claims when challenged to be 'purely methodological'.But is the methodology appropriate and adequate to the field of investigation ? Why not use another methodology ? Why is it rational to adopt such a 'working hypothesis' ? The usual answer is that such a method(or one analogous) is regarded as highly successful in some other discipline so it has been imported.Several points arise here.In the first place there can be questions about the 'success' of another discipline.Secondly,its success may not be due to the alledged approach or method.Both practitioners and outside observers may mischaracterise what has led to success.Thirdly,the question should be asked as to why the same method should be expected to be appropriate to a different field of investigation.Fourthly,how may one now differentiate the two disciplines if they share the same methodology ? If the differentiation is in the nature of the field of investigation then how is the same methodology appropriate. It is very easy for a discipline to lose touch with reality (i.e. lose all theoretical and practical value) if a disciplinary ontology is largely the product of a borrowed'successful' methodology. Not infrequently is such a research program qualified and diluted as it tries to inch it way back towards reality but usually an alternative program is required if it is to get out of such doldrums.