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Part II: General Principles

1 What Is This Thing Called Science?

All of Life is Religion

We cannot re-establish Christian culture and community without re-establishing Christian education. And we cannot re-establish Christian education without developing a distinctively Christian approach to every area of the curriculum. It is not just a matter of Christian RE. The great Christian scholar, Lesslie Newbigin, is quite right when he affirms that,

Whatever we may say about the religious neutrality of the state, the experience of passing through school and university is shaping the minds of young people in certain directions. It is not and cannot be religiously neutral. The omission of religion from the [secular] curriculum is itself a momentous statement about what society believes and expects its children to believe ... the very idea of treating religion as a subject that can be put into a list alongside physics, history, and literature is itself an assault on the foundations of belief.¹

If Christianity is true, then it addresses all of life, including the sciences. In this sense, all of life is religion. Our response to this reality must include the development of a rich Biblical worldview in which the sciences can be affirmed, but in a right relationship to all the other aspects of human life and discipleship before God.

Science and Community

A major purpose of Christian science education, as of Christian education in general, is to equip us for our different callings in the life of our community, and of wider society. For that we need knowledge, and the understanding and wisdom to use that knowledge responsibly and with integrity. But science, as we meet it in the life of our society, is shaped and directed by the different faith commitments of the secular scientific community.² The content and methods of science teaching will enshrine those commitments, as well as other secular commitments that derive from the competing traditions of English education (Figure 1.3).³

If we are to be equipped for our Christian calling then we must develop and use Christian tools and strategies of analysis in order to uncover all these influences, and develop Christian alternatives. If we don't do so, we will inevitably absorb, and then reproduce, the dominant secular views.

At present our Western education system tends to promote utilitarian views (emphasising what is useful to human beings) as part of a general focus on science, technology and economic growth (Figure 1.2). There is also a clear focus on individuals. Schools easily assume the desirability of individualistic lifestyles and

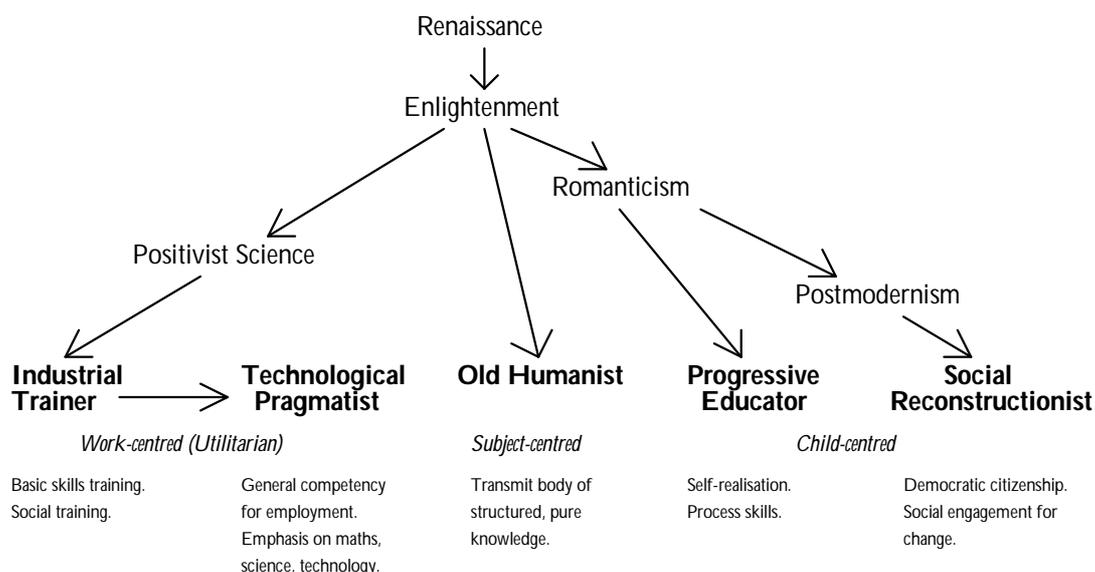
devote their resources to helping students adopt a middle-class orientation which privileges academic success and economic mobility.⁴ The underlying faith in reason surfaces as the promotion of *individual rational autonomy*. These emphases all undermine community and serve to marginalise religious commitment. The implications for Christian educationalists are enormous. To be effective, Christian education must become part of wider programmes of Christian community development and cultural critique. Science is not autonomous and cannot be pursued independently of all the faith commitments which root the cultural life of human beings (Figure 1.1).

Science in Faith

God has created all things for a purpose and He is faithful to all He has made.⁵ Hence the sciences are possible, but possible only in faith. For all scientists, it is first of all a faith in the lawfulness of reality, and, for Christians, in the One who faithfully upholds and governs His creation.

The natural sciences provide important tools for the study of God's creation. A prime aim of these sciences is to formulate laws (law statements) which seek to describe the regular workings of God's world, laws that must eventually be embedded in theories which can explain how the phenomena the laws describe are generated. However the sciences are not autonomous; they are not independent of the scientists' faith commitments. Science is not the only way to true knowledge; nor can it explain the whole of reality. Even if there were unlimited time and money available, scientific technology could not solve all our problems. Science and technology must never be promoted in a way that explicitly or implicitly denigrates other areas of life, or of the school curriculum. Sadly, the National Curriculum does just that. Science's tools are for the development of God's creation, but for use by those who will be responsible stewards and servants of that creation.

Figure 1.3 Traditions of English Education



Finally, science is a human activity which, by its very nature, can only be tentative, approximate and fallible. Scientific laws, theories, hypotheses, models and facts are all *human inventions*, i.e. in the sense that they are our attempt to understand God's ways with His creation, and articulate that understanding in the human language of our own particular culture and time. Consequently, they are always subject to correction, modification, or even replacement. But we do engage with a real, knowable world, so our science is never just a human construction imposed on reality. To the extent that we live in an obedient relationship with God as members of listening communities we will know freedom from all else that would mould us.

Atoms, Antibiotics and Washing Machines

Throughout the modern era, the natural sciences have been the leading example of objective knowledge. Indeed, they have been paraded as the proof that such knowledge is possible. This is why it has been so important for the media scientists to show that science is universal - the same anywhere in the world. It can seem so obviously true. Isn't the composition of water, or its boiling point, the same for everyone? Of course the answer to that question is 'yes and no'. The sciences, are not just about abstract (contextless) 'facts', but about the frameworks of meaning – the systems of belief – within which those 'facts' are located. For example, generations of scholars have agreed that 'all matter consists of atoms', but what was meant has varied enormously (Table 1.1, page 24).

These different perspectives are not just a matter of advancing discovery. The inescapable and controlling presence of personal religious commitments in even mathematics and the sciences has been a clear - if unwelcome - conclusion of the historians and philosophers.

Overall the sciences cannot be regarded as either divine or demonic, but, as faith-embodied enterprises, their every product will come in both truth and error. For example, antibiotics are often mentioned as one of the unquestionably good products of science. But even they are a mixed blessing. They have saved countless lives, but, as the development of resistance is almost inevitable in the long-term, they do not represent a permanent solution. As it is, wrong motives and indiscriminate use have led to multiple resistance and a new era of needless suffering and death. Antibiotics also cannot be abstracted from the context of a modern medical enterprise based almost exclusively on chemical and surgical intervention. The overall efficacy of that approach must certainly be questioned.

Similarly washing-machines have been a godsend for many families, but they are energy- and water-hungry. They are also linked to lifestyles that are destructive of families and communities, and that cut children off from cooperative work. More generally, key cultural developments that are rooted in science have led to the marginalisation and weakening of Christian communities and Christian faith in the modern Western world.

Table 1.1 What are Atoms?

Democritus (5th century BC, Greek philosopher): Eternal, immutable, indivisible, and invisible particles, absolutely homogeneous, full, and incompressible.

Kanada Kasyapa (2nd-3rd century AD, Indian philosopher): Smallest, indestructible parts of the world, inactive and motionless in themselves.

Isaac Newton (17th century, English physicist): solid, massy, hard, impenetrable, moveable particles.

John Dalton (19th century, English chemist): tiny, indestructible particles; those for each element being identical in all properties.

Ernst Mach (1886, Austrian physicist): useful fictions introduced to gain economy in the intellectual organisation of sensory impressions.

Joseph Thomson (c1900, English physicist): negative *electrons* embedded in uniform spheres of positively charged matter (plum-pudding model).

Ernest Rutherford (1911, New Zealand physicist): tiny, positive nuclei (with nearly all the mass) and orbiting electrons.

Niels Bohr (1913, Danish physicist): positive nuclei and electrons found only in orbits from a fixed set of possible orbits.

Francis Aston (1919, English chemist): most elements consist of more than one type of atom (*isotopes*).

Werner Heisenberg (1920s, German physicist): not independent parts of reality, but mathematically expressed potentialities, or possibilities.

James Chadwick (1932, English physicist): electrons orbiting around a nucleus of *neutrons* (neutral) and *protons* (positive).

Murray Gell-Mann (1964, American physicist): neutrons and protons each consist of three *quarks*.

John Schwarz (1980s/1990s, American physicist): patterns of resonances of tiny one-dimensional *strings* (10^{-35}m) vibrating in multi-dimensional space.

2 Learning Science

Stories and Questions

In the sciences we learn about all those things created by God which physically act (physics, chemistry) or that live (biology). First and foremost that means finding out where they belong in His plan. He has revealed His plan as a great story, told as the outworking of three great pivotal events: Creation, Fall and Redemption. It is not only a true story; it is also our story. In discovering where all that we study belongs in God's plan, we also become responsible to live accordingly.

Together we are seeking to answer three kinds of question:

- Questions about creation and design.
- Questions about human sin and rebellion.
- Questions about redemption, reconciliation and healing.

Setting the Scene

**What is God's understanding of the thing or living being we are studying?
What did He create it to do?**

In answering this question, we must take great care:

(1) God's creation is wonderfully diverse and created things can function in a rich variety of ways (see section 3 below). Table 1.2 sets out some of the questions we can ask in order to explore that variety.⁶ Not all these functions will be particularly relevant to a given topic, but usually more aspects will be necessary to real understanding than are given in most science courses. For example, limestone (calcium carbonate) cannot be understood just as a source of chemicals for industry. Its functions in relation to agricultural soil, landscapes and aquifers (water resources) are also important, but depend on the rock being left where it is. The conflicts which arise show that moral, social and economic issues cannot be separated from those of chemistry (see Chapters 3 and 4).

Even within a single realm of functioning each creature or organ has more than one role (or purpose) in God's creation and most things have many. We must not fall into the trap of concluding that the discovery of one particular role excludes other roles. For example, within the animal realm, pointed canine teeth are not just for ripping meat (as by wolves or lions). Deer use them for stripping bark, and apes, monkeys and fruit bats for piercing fruit. The giant panda feeds solely on bamboo despite its 'carnivore' dentition, and many bears are largely vegetarian.

(2) As has been already noted above, there are usually key or major roles to which other roles are subordinate. For example, many bacteria and fungi obtain the energy they need for life by aiding the decay of dead animals and plants. Many also produce substances (such as vitamins) that are of use to us as well as to them, but these functions are subordinate to the primary role.

(3) Whenever development occurs, roles usually change. New roles may come into operation and old roles may cease or be transformed. This applies to many realms of creation. Living things go through life- and seasonal cycles and from one stage to another major role changes may occur. For example, caterpillars may feed on leaves, whereas the butterflies feed on nectar; a bird's plumage may conceal it from predators in one season, but attract mates in another.

The non-living world is not excluded. We were intended to enjoy and develop all of God's creation in the context of a right relationship with Him. Consequently the roles of things - including non-living things - are affected by their relationship with people. In some cases (e.g. domestic and farm animals; limestone quarried for use in the

chemicals industry; air 'tamed' by a wind instrument; water held in a reservoir) the relationship is quite intimate and the role changes marked; in other cases the relationship is more or less distant and the role changes less significant. Human pollution reaches everywhere in the world affecting the lives of almost all organisms, but otherwise uninhabited islands have only a distant relationship with humans. We must make sure that we understand as much as we can of the full picture in each case.

Table 1.2 The Richness of Creation: Key Questions

ASPECTS (norms)	KEY QUESTIONS
Quantitative (accuracy)	How many? Are all measurements/assessments accurate?
Spatial (extensiveness)	How big? What are the relative positions? Is the coverage/solution/response adequate in range and detail? Are all aspects properly connected?
Motion (constancy)	How fast? What is the relative motion? Which factors/processes are constant in the situation? Which ones vary?
Physical (effectiveness)	How reactive? Is there an effective (sustainable, non-polluting) use of natural resources? Are all aspects well-balanced?
Biological (fruitfulness)	How productive? Is there a fruitful/health-generating relationship with living things?
Psychological (maturity)	How stimulating? Is the work emotionally fulfilling, or draining? Are the stresses destructive or maturing?
Technological (appropriateness)	How creative? Are initiative and imagination encouraged and trained? Are developments culturally appropriate and useful? Too specialised, or integrated? Enough decentralization? Too uniform, or diverse? Too large-scale or small-scale? Too demanding on resources and infra-structure?
Aesthetic (delightfulness)	How pleasing/delightful? What is the implicit message/hidden agenda? Does it have a challenging allusiveness/nuancing?
Symbolic (clarity)	How clear? What language/symbols are being used? Is there fluent, open communication?
Analytical (consistency)	How intelligible? Is there internal and external consistency? Are different items/aspects clearly distinguished?
Social (co-operation)	How sociable? What communities and associations are present? Are co-operation and service encouraged?
Economic (stewardship)	How valuable? Is it affordable, cost-effective, stewardly?
Judicial (justice)	How just? Is it right and fair for all involved? Can the action or decision be justified? Is there too much/too little regulation?
Moral (loving care)	How moral? Is it loving, careful, merciful, safe? Are promises being kept or broken? Is loyalty called for?
Confessional (trustworthiness)	How trustworthy? What do we hold to be ultimate or certain? Are we being true to our beliefs? What faiths/ world-views/ideologies are at stake?

(4) Scientific knowledge is always approximate and incomplete. However many roles we have identified, there may still be others to be discovered, even significant ones. Conversely, we may misunderstand some of the roles we have identified, or even get them completely wrong. The methods of the sciences are far from fool-proof and our ignorance of God's world is still very great.

(5) Christians have generally concluded that all God's creatures are *optimally designed* - what they are (their structure) and what they do (their function) will be the best possible for their roles in God's world.⁷ The principle would seem to be the only one consistent with the biblical teaching on creation,⁸ and with our experience of God's world. It has been the expectation of Christians down through the ages. Even atheists have recognised how very well 'designed' things are. In general, it is the expectation that roles will be fulfilled in the most efficient and economical way possible. It has been an important and fruitful principle in all the sciences. The expectation that every creature or organ has a real purpose in God's world has repeatedly been vindicated, even when many have doubted. Conversely, the assumption that certain organs are without purpose (e.g. are *vestigial*) has always been shown to be false. At one time some 180 organs in our bodies were so regarded. It would be a brave person who would identify any organ as vestigial today.⁹ For example, our appendix is now known to be an important part of the immune system in young children. Of course this increases our confidence that this is indeed how God does things: 'Lord, you have made many things. With your wisdom you made them all. The earth is full of your riches.' (Psalm 104:24).

(6) In affirming optimal design, we are not forgetting the Fall. Biblically, we do expect to find cases of decline from perfection. This is not now the world that God originally intended for His creatures. Conditions have changed forcing some creatures to degenerate (*devolve*) in order to survive (e.g. flightless flies on windswept islands and blind animals in deep caves). Humans have also altered some creatures (e.g. domestic animals, garden flowers) for their own purposes, so that overall they are no longer organically optimal. Such cases are usually not difficult to recognise; they are quite different from the evolutionary imperfection of organisms that have not yet attained an optimal adaptive state, e.g any of the supposed 'missing links' between different kinds of organism.

The conclusion to be drawn is the need for humility. In the end, only God may know all the factors which have to be considered in coming to a true judgment:

Where were you when I made the earth's foundation? Tell me, if you understand ...
Do you know the laws of the sky? Can you understand their rule over the earth?¹⁰

The Great Rebellion

How has this thing been affected or distorted by sin?

Is God's creation being developed or used in wrong ways (i.e. contrary to God's Law) that ought to be discontinued? Or is the use right, but misdirected or distorted in some way? For example, nuclear physics enables us to produce energy for home and industry and for treating cancers, but it also enables us to make nuclear bombs

of horrific destructive power. Even some peaceful uses of nuclear energy create dangerous waste products which are very difficult to dispose of safely. In other cases of harm there was no malign intentions at all. The drug thalidomide was produced to calm pregnant women. The researchers were so sure of its good properties, and the enormous profits to be made were so tempting, that medical trials were very inadequate. When it was used some 8000 children were born with serious abnormalities. The chemists had failed to fulfil their responsibilities.¹¹

Human sin and rebellion affect our understanding of the sciences in more indirect ways. Even though a majority of people claim to believe in a God, or even to be Christians, in practice most people order their lives and thinking without reference to God. One result is that many scientists look for the source of the universe's orderliness within creation, i.e. that it must have evolved naturally from some very simple beginning. Almost inevitably they seek to reduce the rich diversity of creation to some one aspect of it - usually the physical, but even just the mathematical (see section 3 below). This reductionism spoils many science syllabi and textbooks. Similarly our society's faith in science, technology and economics colours science syllabi, both in regard to the selection of topics and in the way in which they are presented. For example, in chemistry, presentations jump immediately from properties to human industrial and economic uses. Aluminium will be known for aircraft frames and kitchen saucepans, but not for its crucial role in the formation and properties of soil; silicon will be known for computer chips, but not for its central role in rocks and rocky planets, and so on.¹² Implicitly, meaning is given by humans and reflects their agendas. More indirectly still, the false claims that science is objective - independent of values and beliefs - and that it disproves religious views of life, will help to undermine Christian commitment and Christian community. Christianity will continue to be marginalised in Western societies.

Saving Grace

How may this realm of creation be reconciled to God, *ie*, brought back into line with His purposes?

As Christians we are called to bring God's message of redemption and judgement. Through Christ all people can be reconciled to God. It then becomes possible to live at peace with each other and with His creation. If, in rejecting His Gospel, we misuse His creation, then we are likely to suffer the consequences. However this can often be changed. For example, the Clean Air Acts of the 1950s and 1960s quickly made the London 'peasouper' smogs a thing of the past.¹³ But even Christians can still be living and acting in damaging ways. The power of the gospel must be seen at work in all areas of life, and the restoration of right living must be a focus of our life as a Christian community. Not only is this a right response to the Gospel; it is part of that winsome attractiveness that draws people to Christ.

Overall, we want to know:

- the foundational creational roles;
- the roles associated with people, carefully analysing them to see if they are legitimate, wrong, or distorted;

- the ways in which reconciliation, healing and restoration can be achieved.

Appendix: What's Right About 'Rights'?¹⁴

Human 'rights' are much discussed today, i.e. the idea that people have a right to such things as adequate food and shelter, freedom of movement, freedom of speech, education, health-care, and paid employment. In the Western world this is almost unquestioned, but if there is no God, and no cosmic plan or purpose, then the idea of 'rights' is a problem. The only secular basis for rights would seem to be *existence* and *occupancy*, i.e. we have rights simply because we exist and are where we are. But then why should we include just humans? Restriction to humans is impossible to defend in purely secular terms. How, for instance, should we treat newborns, or severely intellectually disabled humans, who show less signs of self-awareness than apes?. The only basis for human uniqueness is that humans alone - and regardless of age or intellectual status - are created in the image of God. Having forsworn all religious considerations, secularists must either exclude some humans, or include other creatures. Thus some people argue that apes,¹⁵ or dolphins, should have the same rights (or same moral status¹⁶) as humans. However the same problem remains: why should we include just these animals? What about insects and worms? Some Hindus and Buddhists would support that extension of rights. The problem is still there: why should we stop at animals? Cabbages also exist where they are. Don't they have a right not to be eaten?

In order to make a moral judgement, we must be able to distinguish between good and evil, right and wrong. This presupposes that we can distinguish between the way something *is* and the way it *ought* to be. Secular reductionism (section 6 above) removes all basis for those distinctions. In the evolutionary perspective of secularism, everything simply is. There is no basis for morality, and thus no basis for rights. Preference is usually given to intelligence and self-awareness, but with no reason for doing so that anyone ought to accept.

In a world created by God, no creature is, or can be, independent of Him. None can have any rights in themselves. No creature has any rightful claim on its Creator.¹⁷ In biblical perspective we can only talk about rights in relation to justice before God.¹⁸ For there to be justice, there must be just treatment, and just treatment is that which respects the proper place and calling of a thing in God's purposes. Hence judicial rights (whether in regard to humans, human institutions, other living things, or non-living things) are human, legal arrangements that reflect and safeguard the just treatment that God requires. Since there is so much sin and rebellion in the world, we need properly enforced just laws. We know only too well that no one can be relied upon to always do what is right (and for the common good) of their own volition.¹⁹

This analysis provides a proper basis for a Christian approach to all the difficult issues of ecology and environment. It is not an easy solution; it demands the hard work of an issue-by-issue study in order to establish the proper roles and purposes that are to be respected and safeguarded in each case. Such work should be a natural part of the expression of the Lordship of Christ through a local Christian community.

3 Riches of Creation

Celebrated in Scripture

The universe is very remarkable. It has a richness and variety that is awesome. Scripture celebrates the diversity of both the human and natural realms. Nowhere does it support our radical separation of nature from culture. Rather both the natural and human realms are placed equally under God's covenant and are treated as one:

This is what the Lord says: I have an agreement with day and night. I agreed that they will continue for ever. Day and night will always come at the right times. If you could change that agreement, you could also change my agreement with David and Levi. Only then would descendants from my servant David not be the kings on their thrones. And only then would the family of Levi not be priests serving me in the Temple ... If I had not made my agreement with day and night, and if I had not made the laws for the sky and earth, only then might I turn away from Jacob's descendants and only then might I not let the descendants of David my servant rule over the descendants of Abraham, Isaac and Jacob.²⁰

The heavens tell the glory of God. And the skies announce what His hands have made ... The sun rises at one end of the sky, and it follows its path to the other end. Nothing hides from its heat. The Lord's teachings are perfect. They give new strength. The Lord's rules can be trusted. They make plain people wise.²¹

Scripture declares that all things are created and ordered by God directly. Psalm 104 is typical:

You make the clouds your chariot. You ride on the wings of the wind. You make the winds your messengers. Flames of fire are your servants. ... You make springs pour into the ravines. ... You water the mountains from above. ... You make the grass for cattle and vegetables for the use of man. You make food grow from the earth. ... The lions roar as they attack. They look to God for food. ... All these things depend on you to give them their food at the right time. ... When you take away their breath, they die and turn into dust. When you breathe on them, they are created. You make the land new again.²²

That this is not just poetic exuberance (though it is certainly that) is clear when we turn to the diversity of human culture which Scripture treats in some detail. As regards human institutions - families, courts, businesses, church communities etc. - both Old and New Testaments give us a picture of many different responsibilities and freedoms. Parents, employers, magistrates, teachers, state authorities, and church community leaders all have specific responsibilities to God. None may take control over the others or exert any influence upon them beyond what God lays down as their proper functions and concerns. This is exactly the picture that makes most sense of the rich diversity of the world that we experience in everyday life.

Evident in Daily Life

If we take any object, a little thought soon convinces us that it can function in a rich variety of ways. Apples, for example, are first and foremost *biological* objects - fruits containing seeds (the pips) whereby the apple tree reproduces itself. That is an

apple's primary role, and science courses are unlikely to mention anything else. But this is not its only role as becomes apparent when we use Table 1.2 as our guide.

Apples function *mathematically*²³ (they are one or many, have particular shapes and dimensions, and a certain number of pips) and *physically* (they require energy to grow, contain many chemicals with their own specific properties, and also play their part in the natural cycling of various chemical elements).

They have other *biological* functions - for example, they serve as food for animals and nourish bacteria and fungi if they decay on the ground.

Psychologically, an apple stimulates our senses, and, *analytically*, we can reason about it and form a concept of an apple.

Symbolically, apples are represented by words in various languages, different varieties are identified by names, and apples function in various proverbs and sayings (e.g. 'apple of the eye', 'upset the apple cart', 'apple-pie bed', 'apple-pie order').

Aesthetically, an apple may be a thing of beauty and an object of art, and *technologically*, it can be genetically manipulated to enhance size, taste, or disease resistance.

Apples function *socially* at adult and children's parties (e.g. apple dunking), and *economically*, they are a commodity with a market value.

Judicially, court cases can be fought over apples and their use can raise *moral* issues (e.g. should a poor country give valuable land to produce apples for export when many of its own people are starving?).

Finally, and *confessionally*, apples are seen as created things - instances of wise design - or regarded as the chance products of a purposeless process of evolution, or treated purely as a commodity.

As already noted these and other functions will not all be particularly relevant to a given topic, but more aspects will be necessary to real understanding than are given in most science courses. However, the crucial point is that none of these realms depends on, or can be reduced to, or derived from any other. Each and every created thing is what God created it to be for His purposes. They are all created by God, depend on God, and He determines their nature (structure and function) and sets their limits. The overall order, meaning, and unity all come from Him alone.

Those many people today who reject creation lose much as a result. C.S. Lewis wrote all too truly that those who treat nature as God, or as Everything, 'lose the whole pith and pleasure of her':

Come out, look back, and then you will see ... this astonishing cataract of bears, babies and bananas: this immoderate deluge of atoms, orchids, oranges, cancers, canaries, fleas, gases, tornadoes and toads. How could you ever have thought that this was the ultimate reality?²⁴

Our word 'universe' is clearly not the right word at all. It suggests something that is a unity in or of itself. It implies that nature is autonomous, an ultimate fact that you cannot get behind. This is precisely what the universe is not and cannot be. Nature is nothing of itself. What it was, is and will be is solely what God determines according to His purposes. But for those who reject God, or at least want to leave Him out of science, the ultimacy of nature is the only possible position.

A Universe without God?

The universe is richly diverse. Yet that diversity is rooted in a remarkable unity. Throughout time and space it would appear that every kind of matter remains the same and behaves in accord with exactly the same fundamental constants and laws. Our understanding of these laws may change (e.g. Einstein replacing Newton), but we do not doubt the lawfulness (law-obeying stability) of the natural world.

More than 100 years ago (in 1873) the great Scottish scientist James Clerk Maxwell [1831-1879] wrote that we discover from their light that stars are made of the same kinds of matter that we find on earth. In modern terms we would say that molecules, atoms, electrons, protons etc. are all everywhere exactly the same. Maxwell concluded that, 'No theory of evolution can be formed to account for the similarity of molecules ... the exact equality of each molecule to all others of the same kind gives it, as Sir John Herschel [1792-1871] has well said, the essential character of a manufactured article, and precludes the idea of its being eternal and self-existent.'²⁵

If the universe was actually chaotic and ever-changing - if it was not everywhere the same, and did not everywhere follow the same principles of order and regularity (laws) - then it would be pointless trying to understand anything about it. The presumption of order and regularity is the inescapable grounding for science. Without order and regularity, there could be no scientific investigation.

But how do we account for such universal order? Secularists have to account for it without reference to a God who exists beyond the universe. In other words, they must find some principle within the universe itself that can give it unity. Faced with the rich diversity that exists, they seek some original simplicity. One or other aspect of creation is chosen as a basic aspect on which all else depends, or even that all else can be reduced to, or derived (evolved) from. In effect this basic aspect becomes their god.²⁶ Thus for many scientists the goal of science appears to be to reduce psychology to biology ('psychology is just complicated biology') and then biology to physical science ('biology is only complicated chemistry'; 'life is DNA'; 'its all atoms and molecules in the end'). Some scientists even hope to reduce everything to mathematics. Leon Lederman (Director of Fermilab in Chicago) has put it like this: 'We hope to explain the entire universe in a single, simple formula that you can wear on your T-shirt.'²⁷

Godlessness: Stunted Humans in a Shrivelled World

Some scientists assert that there is no God. The consequences of atheism for our lives are dire in that atheistic science can provide us with no basis for the choices of life. If there is no Truth to be heeded, no Way to follow, then no choice can be justified over another. It is up to us to do our own thing, or else to accept a

consensus. However, that consensus carries no moral authority, and our agreement is an arbitrary act of will. There neither is nor can be any compelling moral force, though particular choices may well be imposed by whoever has the (totalitarian) power to do so (cf. Part I, Section 2 above).

Two examples will illustrate the dilemma. *First*, here is the physical chemist, Dr Peter Atkins, writing about euthanasia:

Science can shed light on life-and-death questions. It shows us that there can be no moral distinction between an administered poison and one which the body itself has slowly generated.²⁸

What he means, of course, is that, *given evolutionary naturalism*, there can be no objective basis for a moral rejection of euthanasia. But neither, of course, can there be any objective basis for a moral acceptance. Quite simply, secularism cannot provide an objective basis for *any* morality.

Second, here is *New Scientist* (1990) on Japan's decision to continue whaling:

Some ethical values are global; when these are transgressed, nations have every right to tell others what is and what is not ethically acceptable ... One such global value which must be respected is the moral imperative not to render a species extinct. Nor should a species be so genetically depleted that its ability to adapt to change is crippled ... It is not cultural imperialism, but an assertion of global values, for the rest of the world - and especially its scientists - to oppose such moves ... the continued excessive killing of whales is ... a global, moral wrong. Whalers should await a lead from the scientific community on how to govern whaling in a properly sustainable manner - then abide by the scientists' limits. If they do not restrain themselves, other nations must find more effective ways ... to stop them.²⁹

This is an extraordinary editorial comment. Where, we must ask, do these 'global ethical values', 'moral imperatives', 'global moral wrongs' come from? Certainly not from secular science, nor from evolutionary naturalism. In any case it is all 'bluff and bluster'. Scientists have not objected to the elimination of, say, the smallpox virus from the living world (accomplished, we are assured, in 1977). That secular morality is ultimately the mask of an arbitrary will to power is evident at the end of the quotation.

The values promoted in these two extracts are simply assumed; they have no conceivable basis in secular philosophy or science. If there is no God, then in the end that merely places us under someone's (some group's) arbitrary rule:

For the power of Man to make himself what he pleases means ... the power of some men to make other men what they please.³⁰

Other scientists do profess to believe in the Christian God, or at least in some kind of personal Creator. Others claim to be agnostic, and so accept that a God might exist. These positions avoid the problems of straight atheism, but the consequences are actually no less dire. The reality is that almost all scientists practise their science *as if* this is a God-less universe in which everything will ultimately be explained in terms of physics, or mathematics, alone.

This view of science has dominated so much of our recent history that even our language has been affected. Beliefs and language are very closely related. As we shall see in Part III and especially in Part IV, our history has handed down to us a very inadequate set of terms that reflects an enormous lack of understanding of the richness of God's world.

Notes

¹ L. Newbigin, *Foolishness to the Greeks: the Gospel and Western Culture*. London: SPCK, 1986, p 140 (cf. pp 39, 67).

² There are, of course many Christian scientists, but their influence on the scientific enterprise is all but invisible. One major reason for this invisibility is that very many have accepted the dogma that all proper science must be secular, i.e. must exclude God and faith. See Chapter 2, *Evolution or Creation?*, Part II, Section 5, for discussion and critique of this popular view.

³ See Paul Ernest, *The Philosophy of Mathematics Education*, London: Falmer Press, 1991, 329 pp.

⁴ The utilitarianism is overcome in some schools, notably many church primary schools, but the individualism is virtually universal.

⁵ See Jeremiah 10:12; 33:20-26.

⁶ For the philosophy behind Table 1.2, see L. Kalsbeek, *Contours of a Christian Philosophy: An Introduction to Herman Dooyeweerd's Thought*, Toronto: Wedge, 1975, 321 pp, and Roy Clouser, *The Myth of Religious Neutrality: An Essay on the Hidden Role of Religious Belief in Theories*, Notre Dame, Indiana: University of Notre Dame Press, 1991, 330 pp.

⁷ See Chapter 2, Part IV, in this book.

⁸ See, eg, Genesis 1:4, 10, 12, 18, 21, 25, 31; Psalm 104:24, 31; 119:68; Proverbs 8:22-31; Jeremiah 10:12 (51:15); 31:35; 1 Timothy 4:4.

⁹ See Jerry Bergman and George Howe, *'Vestigial Organs' are Fully Functional*, Kansas City, MO: Creation Research Society Books, 1990, 97 pp.

¹⁰ Job 38: 4, 33, but see the whole of chapters 38-41.

¹¹ The case is critically reviewed by the Nobel Prize-winning chemist Roald Hoffman in his *The Same and Not the Same*, Columbia University Press, 1996, 294 pp.

¹² See Part III, Section 3 below.

¹³ However polluted air still exists and still kills - maybe 10 000 people a year in England and Wales. See William Bown, Dying from too much dust, *New Scientist*, **141** (1916), 12 March 1994, pp 12-13, and Richard Wilson and John Spengler (eds), *Particles In Our Air*, Harvard University Press, 1997.

¹⁴ On 'rights' see Paul Marshall, *Human Rights Theories in Christian Perspective*, Toronto: Institute for Christian Studies, 1983, 23 pp, and Justice and rights: ideology and human rights theories, in S. Griffioen and J. Verhoogt (eds), *Norm and Context in the Social Sciences*, Lanham, Maryland, USA: University Press of America, 1990, pp 129-158 (with valuable critical response by Nicholas Wolterstorff, pp 159-163).

¹⁵ See Gail Vines, Planet of the free apes?, *New Scientist*, **138** (1876), 5 June 1993, pp 39-42. This reports on *The Great Ape Project* which is supported by writer Douglas Adams, biologist Richard Dawkins, and philosopher Peter Singer among others.

¹⁶ Prominent proponents of equality for animals, generally do not espouse rights as a philosophical grounding. Peter Singer, for example, appeals to the fact that animals can suffer and to a principle of equal consideration of interests. See P. Singer, Angling for equality of consideration. *Times Higher Education Supplement*, **1269**, 28 February 1997, p 22.

¹⁷ E.g. Isaiah 45:9; Jeremiah 18:1-6; Romans 9:20-21.

¹⁸ Cf. Deuteronomy 16:20 (NIV) 'Follow justice and justice alone'.

¹⁹ See David Selbourne, *The Principle of Duty*, London: Abacus, 1997, 2nd edn, 320 pp.

²⁰ Jeremiah 33:20-21, 25-26.

²¹ Psalm 19:1, 6-7.

²² Psalm 104:3-4, 10, 13, 14, 21, 27, 29.

²³ 'Mathematical' includes the Quantitative and Spatial of Table 1.2.

²⁴ C.S. Lewis, *Miracles: A Preliminary Study*. Glasgow: Collins, 1960, p 70 (First published in 1947).

²⁵ J.C. Maxwell, Molecules, *Nature*, **8**, 1873, pp 437-441 (p 441). Reprinted in W.D. Niven (ed), *The Scientific Papers of James Clerk Maxwell*, Cambridge: CUP, 1890, vol II, pp 361-378 (p 376).

²⁶ For this very helpful understanding of everyone's ultimate (i.e. religious) commitment, see Roy Clouser, *The Myth of Religious Neutrality: An Essay on the Hidden Role of Religious Belief in Theories*, Notre Dame, Indiana: University of Notre Dame Press, 1991, pp 16ff.

²⁷ Cited by Paul Davies, The creative cosmos, *New Scientist*, **116** (1591), 17 December 1987, p 43.

²⁸ P.W. Atkins, Will science ever fail?, *New Scientist*, **135** (1833), 8 August 1992, p 34.

²⁹ Comment: Good Hunting, *New Scientist*, **127** (1725), 14 July 1990, p 19.

³⁰ C.S. Lewis, *The Abolition of Man*, Glasgow: Collins, 1978), p 37 (First published in 1943).
