Pathways

Roger Bolton - Industrial chemist

Dr Roger G. Bolton, MA, D Phil.
Head of Regulatory Affairs Group, Zeneca since 1984.
Accredited local preacher in the Methodist Church since 1970.

Some may ask what a chemist who has spent almost twenty years in industry, the majority in product development rather than primary research, can offer to a collection of ideas relating our faith to real science. My answer would be that the broader issues into which I have been plunged as a result of my involvement in projects associated with the development of new drugs have given me particular opportunities to consider how science fits in a divinely created world.

Life is an exploration for all of us; from the earliest age we learn chiefly by our experiences. God’s gift of the means to record and accumulate information, and to communicate and transfer important facts, adds an extra dimension to our learning ability without in any way lessening the need for experience. A scientist is given the training to be able to use and learn from his experiences in an objective manner. Is our scientific training a help or a hindrance in our earthly Pilgrimage?

I frequently wish that I had a humanities background so that I could better understand the historical, cultural and philosophical context of biblical truth. It is an open question whether competence in linguistics, philosophy or ancient history serves the Christian better than scientific training. Does the student of literature have the edge when attempting to understand the truth of God’s word? After all, we tend to enter that field of study which first took our enthusiasm and which captured our interest at the critical age for options; are we hindered in our Christian life by our adolescent choices? Perhaps the answer is that our own particular expertise sets a foundation on which other skills can be developed in a complementary manner, giving each of us our unique perspective.

There are many pathways in life, not all of which lead to good destinations; some are recorded for us simply as pictures of routes that we have not or never will experience. The important thing is that we each have our own experience, and this is, in part at least, the result of learning from our mistakes, however much we strive to shape our way in accordance with what we believe to be right. For myself, I find it helpful, in following the path that Jesus described, to have also a glimpse of our exploration of the physical world; a scientific training is a privilege, opening an opportunity to appreciate man’s best attempts to understand God’s creation. So my testimony is of two paths, down which I travel faltering; one records my discovery of my own faith and the other amplifies that faith in my perception of the physical world. There is nothing unique in this; such an analysis will be familiar to many in their own lives. Of course, we make mistakes or false turnings on both paths due to our inadequate training or understanding, but these in themselves can be necessary lessons to restore our perspective or refer us back to that part of our understanding which is secure. We share with many when we overstretch ourselves and wrongly leap ahead of the truth.

Experience

As a teenager I was introduced to the writings of Pere Teilhard de Chardin who had shocked his Jesuit establishment by espousing evolutionary views consistent with his palaeontological studies. This led him to his mystical concept of an ‘Omega Point’ and a perception that creation is a continuing work of God, a remaining presence and not a completed piece of history. As a consequence of such readings I was introduced to a vision of life as a journey of both discovery and mission, in which each individual has to learn new things and to leave the world changed as a result of having been there—an allegory of
the uncertainty principle to which I shall return.

A vivid recollection of my university days is of two series of lectures given in the unusual location of the lecture theatre of the University Museum in Oxford. I say ‘unusual’ because almost all regular teaching was done within the departments themselves, but the old museum had an enormous auditorium which could be used if large numbers were expected.

Charles Coulson, who was Rouse Ball Professor of Applied Mathematics, used to give a foundation course in wave mechanics to a very broad group of undergraduates reading physics, mathematics, chemistry and engineering. His ability to make this abstruse subject come together and make sense was admirably displayed in his books, but even more so in his lectures, which were de rigueur for all of us. But this was the same Charles Coulson, Vice-President of the Methodist Conference, who opened his home (within a week or two of our arrival in Oxford) to those of us who were freshers from Methodist churches. He saw no contradiction between this and the development of his mathematics into a fundamental understanding of the nature of matter; his modelling of atomic structure displayed the beauty and symmetry we expect of God’s creation. From that time I began to appreciate the benefits of being able both to understand man’s insight into the world and have an awareness of God’s purpose and guiding hand.

During my research years we were privileged to have Melvin Calvin as a visiting professor in the university for a year. Nobel Laureate for his studies into the mechanism of photosynthesis, he was focusing then on ‘Chemical Evolution’. The wide appeal of his work meant that his series of lectures were also delivered before audiences of several hundred in the museum. His description of mass-spectrometric studies of oil shales did not devalue my appreciation of creation: on the contrary, it served to whet my appetite to continue the exploration of the true extent of the wonder.

Testimony

There is not necessarily a fundamental conflict between the scientific and the religious mind; indeed, both ought to have similar features—a combination of critical reasoning with a measure of inspiration. Probably none of the fundamental discoveries that have changed established thought have come from the hard slog of routine scientific detective work; the great advances in science all spring from minds prepared through careful and painstaking observation and thus enabled to make a leap forward in thinking. When tested by experiment, this vision is confirmed to the satisfaction of the peer group.

Scientific advance needs a firm foundation in fundamental principles and in general these are learned with the help of models, which consolidate their conceptualisation. For example, it is usual to learn wave mechanics after simple quantum theory, and that in turn after some simplistic ‘billiard-ball’ representation of atomic and molecular structure. Scientific modelling is a broad-based pyramid and employs basic skills. So in my Christian life I have found that lasting commitment must be based on sound scriptural knowledge and an active prayer-life if the mountain-top experiences of inspiration are not to fade away. The presence of the Holy Spirit is personally real to everyone at certain times, but the individual can only witness to that Spirit in his or her life when we build on its gifts with the facilities God has provided. Christ came into my life most clearly as a teenager at a large evangelistic mission, but the Holy Spirit was able to take a mind prepared by a childhood exposure to Methodism and use a gifted counsellor in follow-up who introduced me to the means of grace—a great blessing and strength subsequently.

The molecular sciences have given me an awareness of the properties of matter which enhances for me the wonder of God’s creation. Who cannot marvel at the manner in which complex molecular structures can be understood in terms of orbitals obeying simple rules of symmetry? The routine study of biosynthetic pathways whetted my appetite to study applications relevant to biological systems. To see the elegant radiolabelled studies which established the origins of complex polyisoprenoids in acetate residues is to recognise a divine work of beauty. The study of living systems reveals the miracles of
structural chemistry and exquisitely balanced thermodynamic relationships which are concealed from the observer at a macroscopic level. As each new revelation is made, the subtleties of enzymically-induced molecular reactivity have enhanced my confidence that such biochemical mechanisms are no chance artefact: they are a vital part of that complex, highly adaptable self-supporting system of energetics which is a living organism. I perceive in Darwin’s empirical observations another indication of the wonder of creation by God’s continuing and guiding hand.

Having been fortunate to be able to develop broad interests rather than a narrow academic speciality, I have been encouraged to find that they have been mutually reinforcing. In his book The Tao of Physics, Frijtof Capra bemoans the absence of mysticism in Western philosophy and draws attention to the contradictions in seeking a wholly mechanical approach to sub-atomic structure. He cites the Heisenberg uncertainty principle as an example of this. (For any unfamiliar with it, the principle says that as soon as anyone looks into the atom to measure an electron you change its energy; it is impossible to describe both the energy and the position of an electron at the same time.) This led me to think again of Professor Coulson. In his theological lectures and writings he rejected a ‘God in the gaps’ in which God is imported like the proverbial US Cavalry merely to deal with the inexplicable. I believe that glimpses of fundamental order and design which God-given scientific insight has revealed are wholly consistent with a Bible-based awareness of order and design in creation. As with both God’s revelation in Scripture and with our scientific exploration, it is the search for overall understanding which is more important than the discussion and analysis of every full stop and comma. Or in reverse, the great experimentalists support their hypotheses not by an all-embracing comprehensive modelling of the macro-system but by the unequivocal display of one or more key facets through cleverly designed experiments.

This is surely what the scientist who is a Christian must share with his non-scientific brethren; just as Crick and Watson needed only to confirm the existence of an a-helix crystallographically before describing the double-stranded DNA chain, so it is wholly inappropriate to expect Scripture to be a rigorously reasoned case in the twentieth-century sense for God’s presence in the world and its origins. Instead, we must surely see the Bible as the divinely inspired source of records of God’s hand at work, and which, to the person who has real faith, constitutes the independent observations that support our own witness. Thus I submit that there are immense parallels between ‘real science’ and ‘real faith’, for each has much to encourage the other. Just as the origins of both science and formal education in Europe were in the Christian church, so today the synergy and complementarity of the scientific mind and the religious mind is evident.

Difficulties

It probably appears that all the above is very rosy and simplistic, and in fairness I have to share also the difficulties that I have experienced, and my perception of the conflicts between science and faith.

Although we have received great benefits from science and technology, I am often aware that we rely excessively on material things. So we seek to bleed the planet dry of its natural resources, we treat the oceans as dumping grounds, and corrupt useful discoveries into instruments of domination or greed. Is this a consequence of the over-application of science as the key to unlock natural wealth? Have we taken our search for gain too far or is it just that we know too many examples of excesses? Certainly, former British Prime Minister Harold Wilson’s ‘technological revolution’ has taken place. His speech which set forth the science education boom of the sixties predated the micro-chip, lunar landings, recombinant-DNA technology and digital data-recording. Yet despite these exciting advances, we are witnessing a drift away from science in schools. A significant factor in the failure of the dream to hold must be the perception that science and technology have led mankind into greedy and destructive ways. Happily, science also offers the means of fighting back against the consequences of these excesses; we must encourage our scientific disciplines to improve the environment and support better stewardship of natural resources.
It would be dishonest to pretend that I do not frequently seek to rationalise improperly many biblical events. As a practical scientist one is encouraged to be solution-orientated, and valid though many of my rationalisations may be, we must still recognise that it doesn’t matter whether an earthquake did assist Joshua to bring down the walls or freak cross-winds could have parted the Red Sea. Human ingenuity has published many a theory that fits facts well and yet is wholly erroneous. Does it matter whether all or none of the miracles can be explained physically? If all are explicable or all are beyond explanation there would still be those who would claim God is an unsupportable myth and others who would argue that God can operate only through the established mechanisms of the physical world. Both positions are of course wrong since our God transcends human understanding and displays his power generously in excess of the recorded biblical miracles. Remember St Paul’s words on the foolishness of human wisdom and the stumbling-block of the cross (1 Cor 1:18-25).

As well as intellectual difficulties, it is clear that there can be significant clashes of faith with the cutting edges of our various disciplines. Typical of these is the embryo research debate in which a recognition of God’s loving hand is claimed by both sides. It is undeniable that life itself is already present in the fused gametes well before any recognisable cell-differentiation can be identified as signifying the start of uniquely human life. But, with the tools we now have available, there is every scientific and moral reason to conduct experiments towards the correction of genetic defects. Our resolution of such conflicts frequently depends less on objective criteria than on our preconceptions. The parents of wholly healthy children may be inclined to join with those who cherish a severely congenitally handicapped offspring in condemning the destruction of the embryo for experimentation. On the other hand, an expectant parent, or the exhausted guardian of a severely incapacitated child may associate with the infertile couple in rating most highly the investigation of genetic disorders. Whose is the greater love towards the life of the world? The one clear view I can take is that the least objective group is that whose research reputation depends on the availability of human embryos.

Undoubtedly, the future holds many challenges for the Christian who is also a scientist, especially in the areas of cell biology. The reconciliation of disparate views of what constitutes ‘life’ and ‘human life’ will continue to exercise many. The application of modern biotechnology to mammalian cells will raise serious questions of ethics and belief.

In dealing with such questions, it is important for all of us to be aware of opposing views. Useful applications of modern biotechnology are likely to be marred if cell biologists are deaf to the opinions of those who sincerely hold a seemingly conflicting perception of the nature of human life. Conversely, any assessment of the theological correctness of proposals for research in this area must be based on careful exegesis and not on a stylised collection of extracted scriptural verses. To challenge constructively is to raise the quality of debate to the greater profit of us all; we have a responsibility in debate for trying to ensure that opposing views neither stagnate nor develop into an unjustifiable obsession. Ultimately, the assessment for the Christian must be governed by biblical truth, but the search for a proper understanding will be enhanced by the challenges of the new science.

In conclusion, then, it seems to me that, just as God has given those gifted in the arts, literature and music the ability to strike new heights in expressing their perception of God, so the scientist can bring to mankind a deeper and richer understanding of God’s revelation in creation. Creation is so wonderful that it would be wrong to say that it should not be investigated. To behave thus invites the condemnation of the servant who buried the funds left him in trust because he was afraid of what might go wrong (Mt 25:14-30). Surely we should try to understand better the world and the living things in it. To do so will be to take on a great responsibility for behaving with integrity, and it is here that the dialogue between the Christian and the scientist is really critical. Just as physicists require standards of mass, length and time on which to base the measurement and modelling of the physical world, so all of us have need of an eternal reference standard against which to judge the ethics of our work, a yardstick to measure our pathway.

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