

CAN SCIENTIFIC DISCOVERY BE A RELIGIOUS EXPERIENCE?

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The Churches of Science and Religion

In a recent commentary on the “two cultures”, Mary Warnock and N. G. McCrum contrast the current debate with the course it took in C. P. Snow’s day.¹ Forty years ago one commentator on the insularity of scientific culture had observed the reluctance of scientists to evangelise on behalf of their disciplines: according to David Waring, attempts to convert the non-specialist were often seen as beneath contempt. One found the “typical attitude of a proud and infallible church which does indeed discuss its own theology with its own initiates but cannot condescend to speak to the multitude”.²

The situation has certainly changed. Lay sermons in science have become a popular genre. But that image of the Church scientific deserves further comment. The analogy between organised science and organised religion has been used by historians of science as a heuristic device for exposing facets of the scientific enterprise that might otherwise be missed. A recent example would be Margaret Wertheim’s controversial but revealing book *Pythagoras’s Trousers*, in which she reflects on a recurrent exclusion of women from science by a priesthood of physical scientists.³ As a *jeu d’esprit* one might point to other parallels between scientific and religious communities. The scientist as priest is a long established trope. In seventeenth-century England Robert Boyle presented himself as a “priest in the temple of nature”,⁴ while Isaac Newton saw himself as spiritual heir of an ancient priesthood which had worshipped the one true God in a heliocentric universe.⁵ The image is powerful, too, in popular discussions of secularization where the scientist is commonly seen as usurping the authority of the priest.

Faith and Dogma

Is there room for faith within the Church scientific? Certainly a pervasive faith in the power of the technological fix, but surely also of another kind – that faith most fervently professed by Professor Peter Atkins, a faith in the ability of science (we probably ought to say scientists) not only to explain but to explain away every last shred of mystery in the universe.⁶ Continuing our *jeu d’esprit*, there is also room for dogma in the creed of scientific materialism. Religious institutions, when reeling from the attacks of scientific prophets, have

been quick to spot the dogmatism where it exists. Scientists with a strong religious affiliation have spotted it too. Here is the French Catholic physician Pierre Jousset, protesting in 1889 against what he saw as the new religion of evolutionary naturalism:

Anti-Christian science has perhaps never been more dangerous than at this moment. Rich in positive knowledge, it has become proud and authoritarian. The intolerance it blames on the Catholic Church has become its supreme law. It imposes its theories as dogmas, its hypotheses as incontestable truths; the dreams of imagination become articles of faith – science is infallible!⁷

But it is not only those who might be thought to have a religious axe to grind who have complained about dogmatism within the promotion of science. When he attacked the notion of a single, privileged 'scientific method', so often perpetrated by apologists for science, the philosopher of science Paul Feyerabend insisted that "the separation of state and *church* must be supplemented by the separation of state and *science*, that most recent, most aggressive, and most dogmatic religious institution".⁸ A place for dogma must also mean a place for heresy. I have always been struck by a comment of the distinguished organic chemist Herbert C. Brown as he described the response he had received at a chemical symposium held in St. Louis in 1961. He had suggested that many of the proposed non-classical structures for carbonium ions had weak experimental support. He had expected to be given a fair hearing. Instead, his suggestions were treated as a "heresy, triggering what appeared to be a 'holy war' to prove me wrong".⁹

Still other facets of the religious life might be replicated in the life of science. The scientist as evangelist has become a more prominent figure in recent years, partly in response to concerns about defective public understanding. It is not a new phenomenon. In Victorian England when Thomas Henry Huxley proselytised on behalf of Darwin and scientific naturalism he used to preach what he deliberately called "lay sermons".¹⁰ One recent biographer speaks of Huxley as desiring a second Protestant Reformation in which cultural authority would pass to a new scientific meritocracy.¹¹

I have been describing this game of mooting parallels as a *jeu d'esprit*. In fact there can be hidden depths to the analogies. One was pointed out long ago by the Scottish evangelical Thomas Chalmers.

Writing on popular education he held there was a "very close affinity between a taste for science, and a taste for sacredness". The reason? Both were "refined abstractions from the grossness of the familiar and ordinary world". The mind that relishes either has achieved a "certain victory of the spiritual or the intellectual, over the animal part of our nature". His conclusion was that "the two resemble in this, that they may make man a more reflective and less sensual being, than before".¹²

An earlier diplomat for science, Francis Bacon, saw a comparable moral depth in the fact that both Christianity and an experimental philosophy could prize, even generate, the virtue of humility. For Bacon there was hubris in any claim that one could know *a priori* how God must have made the world. To establish which of the many possible worlds that God had been free to make had actually been instantiated required a humbler, empirical methodology.¹³ The idea of experimental science as a generator or bearer of virtue was largely secularised during the eighteenth century but certainly not dissolved. The perpetual secretary of the French Academy of Sciences, Fontenelle, waxed eloquent on the virtues of the academicians as each one in turn was buried. Their virtues included seriousness of purpose, dedication, the absence of self-interest, unswerving allegiance to truth, fortitude,

tranquillity. One might almost say righteousness. As he constructed the scientific character, replete with virtue, Fontenelle declared that physics “becomes a kind of theology when it is pursued correctly”.¹⁴

There is depth too in the realisation that scientific cultures commonly operate according to methodological conventions that may easily solidify into a worldview, having metaphysical as well as physical components. The distinction between Darwinism as a technical hypothesis about the origin of species and as a naturalistic worldview hardly needs spelling out. Whereas Darwin himself had refrained from speculating about the origin of the first few living forms, the scientific naturalism of John Tyndall demanded the rejection of what he construed as Darwin’s ambivalence.¹⁵ For Tyndall, thoroughness in science required that no door be left open to the intrusion of theological discourse. It is crucial to recognise that the slippage from a methodological to a dogmatic naturalism has occurred because of the powerful success of scientific methods; but nor should we be blind to the ideological freight that such transport has carried. Remarks to the effect that Darwinism would have to be defended even were significant empirical objections to arise, or that only those phenomena are to be taken seriously that can be measured, typify forms of metaphysical intolerance that recur in well known works of scientific popularisation.

We might also ask whether the pressures on the scientist to be constantly innovative have not transformed the sciences into a kind of apocalyptic activity. The culture of research grant applications, for all its fecundity, encourages a discourse in which the great breakthrough is just around the corner. Among the less discerning this can easily lead to a devaluation of the past. We are always, it seems, on the brink of a brave new world. And with an investigation such as the human genome project, it would appear that perhaps we are. The Director of the National Human Genome Research Institute, Francis Collins, might even be invoked to underscore the question in my title. He has gone on record as saying that for him it is humbling and awe-inspiring to realize that we have caught the first glimpse of our own instruction book, previously known “only to God”.¹⁶

Religious Experience and Science, Analogies and Disanalogies

Given that explicitly religious language, and given the analogies we have just been rehearsing, is it far-fetched to ask whether scientific discovery can, sometimes at least, be a religious experience? It is a serious question because there have been philosophers of religion who have analysed what Ian Ramsey called “disclosures” – those occasions when for the scientist the penny drops, a problem is seen in a new light, or a pattern is seen in previously disparate data. The language used on such occasions is sometimes revealing of a kind of revelation. For Ian Ramsey it enabled one to say that scientists are engaged in a personal “dialogue with the universe”.¹⁷ An elementary example would be the reaction of two great chemists, Dmitri Mendeleev and Lothar Meyer, who, on reading a short essay by Cannizzaro, saw in a moment of insight that a revival of Avogadro’s hypothesis would eliminate much of the confusion in the determination of atomic weights. The situation in chemistry was so frustrating in 1860, the year of the first international chemical congress, held in Karlsruhe, that no fewer than sixteen different formula were in circulation for a compound as simple as acetic acid. Both Mendeleev and Meyer described their experience as one in which scales fell from their eyes, Meyer adding that “doubts vanished, and a feeling of calm certainty came in their place”.¹⁸

A richer example perhaps is provided by the modern physicist Frank Close when asked to describe the most thrilling moment his work had given him. His reply was the “first time an

experiment confirmed my theory and I felt humbled by having ‘caught Nature at it’”. Note the personal dialogue. He went on to say the fact that Nature already “knew” about his equations was an “eerie and mystical experience”. It was “an incredible surprise that quarks were for real!” And so, from the interviewer came the inevitable question: “Do you believe in a god”. To which came the conventional reply: “not in a conventional sense”.¹⁹

Clearly there is a fascinating question lurking here somewhere. Before exploring it further, we should, however, note some objections. We need to heed the disanalogies as well as the analogies between scientific and religious experience. The question “what counts as a religious experience?” is one that cannot be evaded. But there is then a problem in that many of the answers that have been given would seem, superficially at least, to exclude the category of scientific discovery.

For example, in her book *The Evidential Force of Religious Experience*, Caroline Franks Davis presents a taxonomy in which the disclosure experiences I have mentioned do not obviously fit. She includes the sense of a spiritual presence, which would certainly be something rather different. The union of the mystic with a transcendent ‘other’ would again be an experience of a quite different kind. There might just be a tenuous analogy between the “dying to oneself” of the mystic and the renunciation of subjectivity in traditional ideologies of science; but the disanalogy again intrudes. In the one case there tends to be a renunciation of this world; in the other a positive embrace as a source of mental stimulus and delight. Under religious experience one could subsume the regenerative experiences associated with the language of salvation; but again this seems removed from what the scientist might experience in dialogue with nature. And if the focus shifts to feelings of the numinous, to a sense of being overpowered by a majestic holiness, this again seems not to chime with the scientist’s own quest for power over nature. It is under the category of numinous experiences that Davis refers to the Psalmist’s question:

When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou hast ordained, What is man, that thou art mindful of him?²⁰

We perhaps get closer here to that sense of wonder that natural philosophers of old used to express; but does there not remain a striking disanalogy between the incomprehensibility at the heart of the religious experience and the rational quest for comprehensibility epitomised by the sciences?

There are at least two other deterrents to assimilating a scientific insight to a religious experience. One concerns what Ian Ramsey called the different logics of verifiability that obtain in the two cases. For all the kinship between science and religion on which Ramsey insisted, it had to be conceded that a proposition of the form ‘God is love’ could not be tested in the same manner as propositions about the workings of nature. Secondly, there is the issue, again raised by Caroline Franks Davis, whether an experience not claimed by the subject as a religious experience could be said to be one by a third party.²¹ Her answer is a firm ‘no’ and this would preclude the ascription of a religious experience to a scientist’s elation if the scientist concerned did not place a religious interpretation upon it. This is an interesting and topical issue because Richard Dawkins has claimed that the aesthetic pleasure the scientist might derive from an elegant theory should not be confused with any form of religious sensibility.²² For Dawkins, any slippage from aesthetic to religious discourse would be a lamentable confusion. Accordingly, one would have to say that for him the aesthetic delight of which he eloquently writes simply cannot be a religious experience. But what to him would be a confusion might not be to someone who already adhered to a form of theism in which beauty in nature, whether mediated by scientific theory or not, reflected in some way the beauty of a godhead.²³

Theological Underpinning to Science

Here we come back to our theme because there certainly have been many scientists of distinction who, from within a theological framework, have conferred religious meaning on their scientific efforts and on such discoveries as they have made. For them the invocation of religious language has not been a confusion. So let us look a little more closely at the theological conceptions that have allowed scientific discoveries to be translated into religious terms.

Prominent among them has been the presupposition of an ordered, intelligible world, derivable from belief in an intelligent Creator, the constancy of whose will is reflected in the uniformity of nature. It was this connection that allowed Whitehead to suggest that there was a sense in which modern science was a derivative (albeit unconsciously) of medieval theology.²⁴ The formula is doubtless too neat but belief in a Creator who had made the world according to principles of “number, weight and measure” could certainly be given additional meaning through scientific analysis and discovery. In the astronomical work of Johannes Kepler, a Neoplatonist metaphysics was conjoined with aspects of a Lutheran theology to inspire an elegant geometrizing of the planetary orbits. Otherwise hidden harmonies could be revealed by viewing the planetary system from a static sun placed at one focus of an ellipse.²⁵

When Kepler uncovered what we know as his third law of planetary motion, that which correlates the orbital period with the mean distance of the planet from the sun, his elation was expressed in language at once scientific and religious: he spoke of “unutterable rapture at the divine spectacle of heavenly harmony”.²⁶ This was not a science with religious meaning artificially grafted on, but the articulation of a cosmic mystery in which mathematical analysis played an indispensable role.

Another context in which one finds what Amos Funkenstein called the seventeenth century’s “unprecedented fusion” of scientific and religious language was in the apprehension of a unity in creation.²⁷ Newton would speak of the “analogy of nature”, a principle that allowed one to extend the range of inductive inference. For example, Newton’s theory of gravitation was given a universal extension beyond its initial range of application. The grounds for the analogical extension were at least partly theological, deriving from Newton’s affirmation of divine dominion and omnipresence. As he put it in one of his manuscripts,

if there be an universal life and all space be the sensorium of a thinking being who by immediate presence perceives all things in it ... the laws of motion arising from life or will may be of universal extent.²⁸

Theological reflection could also provide sanction for scientific activity. The metaphor of God’s two books, the book of his ‘word’ and the book of his ‘works’, was frequently invoked for this purpose, as it was by Francis Bacon who emphasised the obligation to study both.²⁹ For Bacon the ‘Fall’ narrative in Genesis provided an additional resource. Knowledge sought for altruistic purposes (though not for self-gratification) when applied to the relief of man’s estate could help to restore the dominion over nature that had been God’s original intention for humankind and even pave the way for Christ’s return.³⁰

The claim that it was a religious duty to study the natural world can of course be read as a species of rhetoric designed to silence critics. Recent research has unveiled a genuine difficulty faced by clerical naturalists in the seventeenth century: could one justify time spent in studying nature’s curios when one’s primary loyalty was to one’s clerical calling?³¹

But it does not follow that the justification offered was merely window dressing. Each case would need to be separately examined in the light of the biography of the individual concerned. It is, however, clear that arguments constructed to legitimate scientific activity could draw on theological motifs offering religious insights into human responsibility. During the Enlightenment, the great taxonomist Linnaeus emphasised human uniqueness. Alone among God's creatures we are able to appreciate the beauty and architecture of creation. It was therefore a reasonable inference that the deity had intended that his creation should be studied for precisely that purpose.³²

Linnaeus's work in taxonomy introduces a further link with theology in that one could read into the Genesis text a divine injunction to name, order and classify God's creatures. Linnaeus did it rather well and became known as a second Adam. The relish (and responsibility) he brought to the task is not a thing of the past. When John Rodwell delivered the Alister Hardy Memorial Lecture in November 1998 he communicated a sense of joy in the immense labour he had undertaken in cataloguing plant species and determining their frequency in Britain and Europe. Professor Rodwell's scientific analysis has been geared to an understanding of the relationships between different species and the characteristics of climate, soil, and human impact that determine their prospects for survival. In his lecture he declared that,

This task has a profound religious resonance for me. Is it really too fanciful to see what I do on naming as somehow recognising the gift of identity and freedom in those things which are the subject of my study ... surrendering supremacy over them and trying to see them as God intends them to be seen? For me this is a religious experience, articulating what St. Paul called the 'eager longing' ... of the natural world, what I would call its yearning to be recognised as creation. In naming, by divine invitation, humankind makes it own struggle to sense and signify the world part of God's creative purpose.³³

That phrase, seeing flora "as God intends them to be seen", might be a cue for another example of an insight that can come suddenly to the naturalist – the abandoning of a completely anthropocentric view of creation. Such an insight came to the explorer John Muir in the middle of a Canadian swamp in 1864. He had chanced upon some white orchids. As John Hart has reported, Muir was thrilled by the experience, realising that no one else had seen these rare flowers. Muir reflected that there were many other facets of creation that no person would ever see, and concluded that nature cannot exist solely for human benefit and use. Most of the Earth's creatures could be said to exist for themselves and for their Creator.³⁴

The Baconian justification for the applied sciences had been largely anthropocentric: they would contribute to the relief of man's estate. Success in finding such relief could, however, also translate into a religious experience. Here is a modern example, which I take from an improbable source: a British Airways flight magazine. It contained an interview with Robert (now Lord) Winston, a leading specialist in women's fertility and *in vitro* techniques. He was reflecting on what he called a moment of discovery:

Back in 1973, there had been a general feeling that for women with the very common disease of damaged fallopian tubes, rather than unblock them, it would be better to transplant new ones. I took various approaches to this for months in a cold basement working on rabbits and rats and other rodents – one of the things I had to do was learn to put a rabbit to sleep. And then suddenly I discovered that there was a trick to this: if you wrap the artery in clingfilm from a sandwich wrapper you get blood flow and the organ survives.

It is the next sentence that I found arresting:

I went down on my knees because I thought here we have the possibility for a complete cure of a very common disease which could change a thousand lives.³⁵

This is a particularly interesting example because, as he admits, his own technique was quickly overtaken by events. A year later the first test-tube baby was born. Scientific discoveries that get overtaken by events tend to get lost from the record; there may have been many like this, where an overwhelming sense of gratitude may bring one, if only metaphorically, to one's knees.

Following a taxonomy I have introduced elsewhere, it is plausible to suggest that theological presuppositions have also found expression in the motivation of scientific enquiry.³⁶ Nature could be scoured for evidence of divine wisdom and foresight. Scientific knowledge could be prized if it appeared to bolster one's theological position against that of adversaries. To be sure, exaggerated claims were often made for the argument to design, but there can be no doubt that it constituted a bridge between scientific and religious discourse until well into the nineteenth century. It is difficult now for us to recapture the worldview of a William Paley in whose *Natural Theology* (1802), the argument for design was cumulative, the eye proving it without the ear, the ear without the eye. But we can perhaps empathise with those for whom seeing a divine design for the first time could be a revelatory experience. I am thinking of the excitement with which Robert Boyle greeted the minutest mites revealed for the first time by the microscope. That life was possible at all on such a scale was more to be wondered at than the physics of the solar system in all its majesty.³⁷

The early texts of physico-theology make much of another special insight – that finely honed human artefacts when seen through the microscope are revealed in all their flaws, whereas the most mundane of God's creatures (even the scales of a fish) can look strikingly beautiful.³⁸

This reference to beauty introduces yet another respect in which a theological predisposition might generate a religious experience through an encounter with nature. For the Scottish evangelical Hugh Miller, the study of fossil forms revealed architecture of great beauty, presaging that of the finest Gothic cathedrals. It was evident to Miller that the human mind shared with its Creator the same aesthetic sensibilities, the study of paleontology adding weight to the doctrine of *imago Dei*.³⁹ Miller's case is absorbing because his description of his first encounter with fossils almost suggests that the intensity of an uninterpreted novel experience might reorientate one's interests. In an essay entitled 'gropings of a working man in geology' he recalled the kind of paroxysm he had felt:

I was lost in admiration and astonishment, and found my very imagination paralysed by an assemblage of wonders that seemed to outrival, in the fantastic and the extravagant, even its wildest conceptions.⁴⁰

I do not wish to conflate a religious conversion experience with a scientific awakening. The example of Miller is interesting precisely because that raw experience of nature and his intense response actually preceded his religious conversion, which came through a different channel. But once his evangelical Christianity was in place, the rocks bore unequivocal testimony to their Creator, as New England spiders had for Jonathan Edwards. As Miller later put it: to the geologist every rock bears its inscription engraved in ancient hieroglyphic characters that tell of the Creator's

journeyings of old, of the laws which He gave, the tabernacles which he reared.⁴¹

Conversion and De-Conversion

It has been observed by historians of science that first-hand accounts of a scientific awakening do sometimes use language reminiscent of a religious conversion. To regard a career in science as a vocation would not be unusual and this has had special meaning for scientists with religious convictions. An example would be Charles Coulson, noted for his distinction as a physical chemist in the University of Oxford and as a Methodist preacher. For Coulson, there was a thrill in the excitement of scientific discovery that matched the feelings of a religious devotee or a lover:

whether or not he is accustomed to speak of it in public terms, there is no scientist who does not sometimes feel himself in the presence of something other than himself, ... some power which he may partly understand, but to which he must confess an ultimate obedience.⁴²

Insisting on the artistic and vocational aspects of science, Coulson deemed it “of the spirit”: science was to be construed as an essentially religious activity. It clearly has been that for many practitioners in the past, even if we are more used today to hearing anti-religious sound bites from purveyors of a narrower understanding. The philosopher who first coined the word ‘scientist’, William Whewell, saw in the very possibility of scientific progress an argument for design – the design (however effected) of a mind having the special gift of access to truths through the interplay of fundamental ideas and experiment.⁴³

Conversion experiences within science can of course contribute to de-conversion experiences in religion if a religious faith has been made to depend on the particular scientific perspective that has just been rendered obsolete. A vivid and recurring example would be the description given by students of the life sciences when they first see how the world might look through Darwin’s eyes rather than through those of William Paley. To see, sometimes in a flash, that what had once been taken to be God’s creatures might rather be seen as nature’s products, as survivors in a long struggle that had extracted an enormous cost in terms of bloodshed and extinction – this, to use Darwin’s own word, was to be staggered. Here is just one account, from Darwin’s contemporary Alfred Newton. He is referring to that issue of the *Journal of the Linnaean Society* in which the innovative papers by Darwin and Wallace appeared together:

Never shall I forget the impression it made upon me. Here was contained a perfectly simple solution of all the difficulties which had been troubling me for months past. I hardly know whether I at first felt more vexed at the solution not having occurred to me, than pleased that it had been found at all. ... All personal feeling apart, it came to me like the direct revelation of a higher power; and I awoke next morning with the consciousness that there was an end of all the mystery in the simple phrase, ‘Natural Selection’.⁴⁴

The Quest

I have been suggesting that where a scientist’s work is given additional meaning from within a theological framework, there can be something akin to religious experience. This is particularly the case if a scientific result happens to conform to some metaphysical expectation that is itself rooted in the theology. Kepler’s ecstasy would spring to mind again, as he thought God’s thoughts after him. Can one go any further than this? Might the very quest for understanding in the sciences be seen as a process of discovery, the emphasis here falling on the process rather than discrete discoveries *per se*?

Caroline Franks Davis observes that in popular questionnaires on religious belief, a crucial facet of the religious life is routinely obliterated. Those who confess to their *searching* for

spiritual meaning in their lives are assigned to an agnostic category in contrast with those who may have a definite church affiliation or who may say they definitely believe in the authority of scripture or whatever. As she points out, the dynamics of the spiritual life are simply lost as a consequence.⁴⁵ And yet it is the questing spirit that perhaps bears the closest analogy to the scientific quest, understood as a process of enquiry rather than as a set of desiccated results. The point is worth raising because there have been eminent scientists, Einstein was one, who have seen in the processes of scientific enquiry something akin to the emotional facets of the religious life. The example of Coulson has already given us an intimation of this. Einstein earlier wrote that the emotional state that enables great scientific achievements to be made is

similar to that of the religious person or the person in love.⁴⁶

One feature of that state could be resistance to the ugly. In a well-known quip, Einstein said that

when judging a physical theory, I ask myself whether I would have made the Universe in that way had I been God.⁴⁷

The quest for the beautiful, the elegant, the harmonious in scientific theory itself can be one of the driving forces of creative work.⁴⁸

Conclusions

What might be said in conclusion? Einstein's reference to an emotional state in the process of scientific discovery will seem over the top to many and I would not wish to generalise from that example. But, as Thomas Söderqvist has observed, in a recent study of scientific biography, the passions have so far been only marginally treated in science studies.⁴⁹ Whether scientific discovery can be said to be a religious experience is always going to depend on how one defines 'religious'. But the examples I have given do support Söderqvist's main contention that it is important to reflect on the

passions of the scientist – both negative emotions, such as anguish and anxiety, despair and dread, embarrassment and fear, frustration and sadness, and positive emotions such as joy, hope and love.

That way we shall be able to transcend the idea of the scientist as a mere 'convenient indicator' for the sociologist or social historian and instead become aware of him or her as a discrete embodied mind. One of Söderqvist's own examples captures much of what I have been indicating, and in more vivid language. A scientist writes:

You go through this long, hard period of filling yourself up with as much information as you can. You just sort of feel it all rumbling around inside you. ... Then ... you begin to feel a solution, a resolution bubbling up to your consciousness. At the same time you begin to get very excited, tremendously elated – pervaded by a fantastic sense of joy. ... But there's an aspect of terror too in these moments of creativity...being shaken out from your normal experience enhances your awareness of mortality...it's like throwing up when you're sick.

Since that may not be the most appetising fare with which to conclude, let me finally draw out one additional corollary. I began this lecture with reference to an essay on the two cultures by Warnock and McCrum. In their account of the two cultures debate as they perceive it today, they not surprisingly refer to the permeation of the humanities by postmodernist precepts, spawning a kind of relativism with which many if not most scientists would feel uncomfortable if it were applied to their own work. I was once at a conference where Lewis Wolpert, then Chair of COPUS, the Committee for the Public

Understanding of Science, was thrown into an obviously emotional state as soon as the word 'postmodern' was mentioned. It was, he said, not a word to be even mentioned in his company. But to move on an inch: Warnock and McCrum refer to some explanations that might be given for the new "rampant relativism". These include the proposal from Anthony Quinton that

perhaps the denial of objective truth, of real knowledge and a real world to be known, may be a delayed reaction to the diminution of literal religious belief, for even in the Age of Enlightenment God was widely thought to guarantee the orderliness and intelligibility of the world.⁵⁰

This is an intriguing conjecture. To test it would require another lecture – many in fact. But there would, I think, be some support from the history of science. In early modern Europe, Copernicus was instrumental in turning what had been a largely instrumentalist science, mathematical astronomy, into a new discipline, a physical astronomy that purported to describe the cosmos as it really is. Kepler and Newton completed the process. All three saw themselves as revealing a divine harmony in nature that testified to the reality of the structures they were describing and to the robustness of the claims for knowledge that they were making. In a more recent period Werner Heisenberg spoke of the humility in which one had to accept the gift of "an incredible degree of simplicity" in the mathematical abstractions of physical theory. These beautiful interrelationships could not be invented: in his words

they have been there since the creation of the world.⁵¹

That confidence in the very possibility of scientific discovery was once again associated with a religious reference. Heisenberg's wife records that he had once said to her:

I was lucky enough to look over the good Lord's shoulder while he was at work.⁵²

NOTES

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4. Harold Fisch, 'The Scientist as Priest: A Note on Robert Boyle's Natural Theology', *Isis* 44 (1953), 252-65.
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7. Cited by Harry Paul, *The Edge of Contingency* (Gainesville: University of Florida Press, 1979), pp.46-7.
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11. Adrian Desmond, *Huxley: The Devil's Disciple* (London: Michael Joseph, 1994); *Huxley: Evolution's High Priest* (London: Michael Joseph, 1997).
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13. The possibility of a general correlation between a voluntarist theology of creation and an emphasis on experimental methods in the sciences has been widely canvassed but recently subjected to a searching critique by Peter Harrison, 'Voluntarism and Early Modern Science', *History of Science* 40 (2002). As an exemplar of the thesis he aims he correct, see Francis Oakley, 'Christian Theology and the Newtonian Science: The Rise of the Concept of Laws of Nature', *Church History* 30 (1961), 433-57.
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15. John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge: Cambridge University Press, 1991), 303.
16. *Research News and Opportunities in Science and Theology*, October 2000, 5.
17. Ian Ramsey, *Religion and Science: Conflict and Synthesis* (London: S.P.C.K, 1964), 24.
18. J. R. Partington, *A History of Chemistry*, 4 vols., iv (London: Macmillan, 1964), 489. For the background here, see Alan Rocke, *Chemical Atomism in the Nineteenth Century: From Dalton to Cannizzaro* (Columbus: Ohio State University Press, 1984) and John Hedley Brooke, *Thinking About Matter: Studies in the History of Chemical Philosophy* (Aldershot: Ashgate, 1995), ch.9.
19. Frank Close, Interview reported in *The DailyTelegraph*, 3 November 1993.
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