

R.J. BERRY**The Research Scientist's Psalm¹**

Psalm 111 links the works of God in creation with his works in history and salvation. Verse 2 ('Great are the works of the Lord, studied by all those who delight in them') is often taken as a mandate and challenge for scientific research. This is legitimate, but it should not be divorced from other emphases in the psalm, particularly God's providential upholding throughout time. The psalmist also reminds us that 'the fear of the Lord is the beginning of wisdom'. A research scientist is one who should properly humble him or herself before their data.

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Psalm 111 is not one of the most quoted psalms. It is not used in worship or meditation as often, say, as Psalms 23 or 51. It is not imprecatory, confessional, messianic or kingly. It does not raise acute difficulties of translation or interpretation. Most commentators regard it as a hymn, although Ernest Lucas treats it as a wisdom psalm. Willem VanGemenen² suggests it may have arisen in a teaching context. However, it has a special attraction for scientists because of its second verse, which is translated in the Authorised and Revised Versions (KJV, RV) as 'The works of the Lord are great, *sought out* of all them that have pleasure therein.' Because of this, the Psalm is often treated and welcomed as a mandate for research. But its message should not be confined to scientists. Spurgeon wrote of it, 'Many are ignorant of what their Creator has done, and hence they are foolish of heart and silent as to the praises of God: this evil can only be removed by a remembrance of God's works and a diligent study of them. To this, therefore the psalm is meant to arouse us.'³

All English translations use similar wording for the second verse. The RSV and NRSV have 'Great are the works of the Lord, *studied* by all who have pleasure in them'; NIV, JB, NEB and REB render the second half of the verse, 'they are *pondered* by all who delight in them'. ESV combines the RSV and NIV wording, '*studied* by all who *delight* in them'. GNB changes the words but with the same sense, 'How wonderful are the things the Lord does! All who are delighted with them want to understand them.' Leslie Allen in the Word Com-

1 Based on a sermon preached at St Barnabas Broadway, Sydney, Australia and Waikato Cathedral, Hamilton, New Zealand. Unless otherwise noted, Bible quotations are from the Revised English Bible.

2 Johnson, P.S. Appendix 1, in Johnson, P.S. & Firth, D.G. (eds.) *Interpreting the Psalms*, Leicester: Apollos (2005), pp. 295-300; VanGemenen, W.A. *Expositor's Bible Commentary, Volume 5*, Grand Rapids, MI: Zondervan (1991), p.700.

3 Spurgeon, C.H. *Treasury of David*, London: Passmore & Alabaster (1878), vol. 5, p.209.

mentary⁴ translates the verse, 'Yahweh's deeds are so great, worth studying by all who revel in them.' Eugene Peterson paraphrases similarly, 'God's words are so great, worth a lifetime of study.'⁵

In the Vulgate form (*'Magna opera Domini exquisita in omnes voluntates eius'*), the verse is carved into the heavy wooden doors of the old Cavendish Laboratory (Department of Physics) of Cambridge University, albeit in ornate gothic lettering which is not easy to read. It was apparently put there at the behest of James Clerk Maxwell, the first Cavendish Professor, at the time of the building of the laboratory in the early 1870s.⁶

In earlier years, Maxwell had been an elder of a church which he had helped to found near his home in Glenlair, near Dumfries in Scotland. His biographers record a prayer in the spirit of Psalm 111:2 found in his papers after his death which reflects his faith in a God who calls us to care for and use the created world:

Almighty God, who created man in Thine own image, and made him a living soul that he might seek after Thee and have dominion over Thy creatures, teach us to study the works of Thy hands, that we may subdue⁷ the earth to our use and strengthen the reason for Thy service; and so to receive Thy blessed Word, that we may believe on Him Whom Thou hast sent, to give us the knowledge of salvation and the remission of our sins. All of which we ask in the name of the same Jesus Christ, our Lord⁸

Maxwell's successor as Cavendish Professor was Lord Rayleigh, who four years after they were initiated, received a Nobel Prize for Physics for his work on gas densities and the discovery of argon. Rayleigh was also a man of deep Christian faith.⁹ His 446 scientific papers were collected into six volumes, each of them with the words of Psalm 111:2 on the cover – despite the alleged objec-

4 Allen, L.C. *Word Bible Commentary Volume 21: Psalms 101-150*, Waco, TX: Word Books (1983), p. 88.

5 Peterson, E. *The Message: Psalms*, Colorado Springs, CO: NavPress (1994).

6 The evidence for this is circumstantial, but the architect (Fawcett of Cambridge) had a reputation for carrying out all Maxwell's suggestions (Andrew Briggs, personal comment). In his book *The Cavendish Laboratory, 1874-1974* (London: Macmillan), p.49, J.G. Crowther gives the translation 'The works of the Lord are Great, searched out by all those who have delight in them', and rather quaintly attributes them to 'Basic English, invented by that eminent Cambridge man, C.K. Ogden', who developed his ideas between 1926 and 1930.

7 The word 'subdue' is an instruction to humankind, used in Gen. 1:28. Although it has often been taken to sanction plundering the earth, it is better regarded (and can legitimately be interpreted) as an instruction for stewardship (Bookless, D. *Planetwise*, Leicester: IVP (2008)).

8 Campbell, L. & Garnett, W. *The Life of James Clerk Maxwell*, London: Macmillan (1882), p. 160.

9 In his Presidential Address to the British Association for the Advancement of Science in 1884, Rayleigh declared, 'Many excellent people are afraid of science as tending towards materialism. That such apprehension should exist is not surprising, for unfortunately there are writers, speaking in the name of science, who have set themselves to foster it. It is true that among scientific men, as in other classes, crude views are met with as to the deeper things of Nature; but that the lifelong views of Newton, of Faraday, and of Maxwell are inconsistent with the scientific habit of mind, is such a proposition that I need not pause to refute.'

tions of the publisher, Cambridge University Press, on the grounds that there could be confusion as to which 'Lord' was meant.

God at work

In his commentary on the Psalms, John Eaton entitles Psalm 111, 'Redemption Renewed through Remembrance'.¹⁰ A more evocative description is 'God at Work', used by both Derek Kidner¹¹ and Leslie Allen¹² in their respective commentaries.

In recent years, scholars have argued that the order of psalms is not random, but that psalms are grouped to reflect the theological concerns of the editor(s).¹³ Psalms 111 to 114 (and 116) all begin (in the REB translation) with the exhortation 'Praise the Lord'. On this ground, Psalms 111 and 112 are often included with the so-called Egyptian Hallel of Psalms 113-118, used at the Passover Festival. But Psalms 111 and 112 stand out from the others in the group and are particularly strongly linked to each other. Both are skilful acrostics of 22 lines, with the Hebrew of each half-verse beginning with successive letters of the Hebrew alphabet. Psalm 111 tells of God, Psalm 112 speaks of the godly person; Psalm 111 is God in covenant with man, Psalm 112 is man in covenant with God. Kidner and Allen emphasise their complementarity by calling the latter 'Godliness at Work'. Psalm 111 provides the theological basis for the moral conviction of Psalm 112.¹⁴ The world is morally coherent because the Creator stands by his covenant (111:5, 9) and requires obedience (111:5, 10).

The emphasis in Psalm 111 is on God's 'works', the word occurring in different forms in five of the ten verses (RSV translates the words as 'works' in all five places, but three different words are used in the Hebrew. This is reflected in the NIV and REB translations: 'works' is used in vv.2, 6, and 7 but 'deeds' or 'wonders' in vv. 3 and 4). We praise a God whose goodness is practical and personal: he is described as 'gracious', 'compassionate' and 'righteous', words Yahweh uses of himself when giving the Law to Moses on Mount Sinai (Ex. 34:6-7; see also Ps. 145:8-9). In Psalm 112, human life is characterised by faithful actions, not innate essence. Such a life is 'happy' because there is a true harmony between created and Creator. C.S. Lewis calls this 'inner life made audi-

10 Eaton, J. *The Psalms*, London & New York: Continuum (2003), p. 387.

11 Kidner, D. *Psalms 73-150*, Leicester: IVP (1975), p. 396.

12 Allen *op. cit.*, (4), p. 88.

13 Wilson, G.H. 'The shape of the Book of Psalms', *Interpretation* (1992) 46:129-142; Wilson, G.H. in Johnson & Firth *op. cit.*, (2), pp. 229-246.

14 Another comparison of Psalms 111 and 112 is with Psalms 103 and 104: 103 tells of the goodness of God in salvation, 104 of the greatness of God in creation. Ps. 104 follows approximately the same order as Genesis 1, beginning with light and ending with human beings. In addition, there are links between Pss 111 (a creation psalm) and 103 (a salvation psalm): there are six vocabulary links between the two and both relate back to Ex. 34:6 (see Allen *op. cit.*, (4), p.90).

ble'.¹⁵ Walter Brueggemann identifies the harmony as the result of how such a person relates to others in his 'derivative governance of creation, i.e. the way he exercises his dominion (Gen. 1:26-28). He gives generously (v.5). He practises justice (v.5). He cares for the poor (v.9)... The psalm is a clear affirmation that virtue is relational.'¹⁶

In the Psalms as a whole, 'works' most commonly refers to things God has made, but sometimes to his work in history (as in v. 6 here and in Pss. 64:9; 103:6); sometimes either (or both) could be meant (e.g. Pss 66:5; 145:4-6). Creation and providence are not set apart from each other. The implication is of a God intimately concerned with and important to both creation and his creatures.¹⁷

The acts of God reveal his commitment to his covenant. It is worth pausing here. 'Covenant' is a key concept in the Bible. Only the God revealed in the Bible reaches out to his creation; in all other religions, created beings have to reach up to please or placate their creator. In his covenant, God promises to be present with his creation in blessing and protection. It is wholly his initiative. Indeed the New Testament word for covenant (*diatheke*) is more commonly translated 'will' or 'testament' (the usual Greek word for covenant is *suntheke*). Secondly, God made his covenant 'with *all* the creatures on earth' as well as with humankind (Gen. 9:9, 10). He renewed it with Abraham, Moses and David, but it is the same covenant. Unfortunately, it is often assumed that it applies to human beings alone.¹⁸ This is wrong. The 'new covenant' brought by Christ 'through the shedding of his blood on the cross' specifically includes 'all things' (Col. 1:20) and in that sense continues the original covenant. Paul repeats 'all things' to make sure that the point is not overlooked. The fact that the covenant extends beyond humanity is implicit in the references in Scripture to the universe being 'held together' or 'sustained' by Christ (Col. 1:17; Heb. 1:3).¹⁹

Consequently we can speak of a relationship of God both to us and to the

15 Lewis, C.S. *Reflections on the Psalms*, (originally published by Geoffrey Bles in 1958), included in *C.S. Lewis: Selected Books*, London: HarperCollins (2002), p.342. Some contemporary implications of this harmony are described by Brian Heap and Flavio Comin (2007) in Berry, R.J. (ed.), *When Enough Is Enough*, Leicester: Apollos, pp.79-98.

16 Brueggemann, W. *The Message of the Psalms*, Minneapolis, MN: Augsburg (1984), p.46.

17 It is worth noting that the Israelites tended to fear the natural world (e.g. Pss 42:7, 83:7, 107:26-30, 121:1), but in Ps. 111 (and elsewhere, for example Pss 104, 148), there is no indication of actual or potential conflict.

18 e.g. VanGemeren *op. cit.*, (2) concentrates entirely on God's providential upholding in history in his comments on covenant in vv. 5 and 9. He writes, 'The first mention of God's acts are particular: the Exodus, the Wilderness Wanderings, and the Conquest; the second mention reminds God's people of the acts during the periods of the judges, the kings, and even after the Exile (v.9)' (p.703).

19 The assumed restriction of the biblical covenant to humankind is probably the reason why Christians – especially evangelicals – tend to have a poor understanding of creation care (see Fowler, R.B., *The Greening of Protestant Thought*, Chapel Hill, NC: University of North Carolina Press (1995); Berry, R.J. (ed.) *The Care of Creation*, Leicester: IVP (2000); Bookless, D. *op. cit.*, (7)).

rest of creation as a sign of God's purpose. 'Covenant' is a source of comfort to Christians and an important element in evangelistic apologetic, and it should be an unanswerable encouragement to Christians to engage with the natural world. C.S. Lewis puts it: 'God has given to His works His own character of *emeth* (truth, firmness, veracity); they are watertight, faithful, reliable, not at all vague or phantasmal...[a] result of believing in Creation is to see Nature not as a mere datum but as an achievement'.²⁰ Verse 3 of Psalm 111 pairs 'deeds' with 'righteousness'; verse 7 'works' with 'precepts'.

Verse 4 says '[God] has caused his wonders [works] to be remembered' which points to his providential care (e.g. Ex. 3:20, Dt. 32:4, Ps. 105). A number of commentators (including Luther) see this as a reference to the Exodus events celebrated in the Passover, but Kidner is right to warn us 'not to draw too sharp a line between what He has made and what He is doing'. Kidner draws attention to the conversations imagined by Isaiah (Isa. 45: 9-12) between pot and potter, child and parent, and God and his purposes.²¹ Creation was not an inevitable and automatic result of some pre-existing situation; it was conceived and executed in 'wisdom' (Ps. 104: 24, Pr. 3:19, etc.). The God of the Bible is not a remote deist, but one who cares for his work; not a mindless 'First Cause' but an effective influence and transforming agent. As Keith Ward writes,

It is God who defined the nature of things and ensures conformity and regularity of their interactions. But now we can see more clearly that God is not merely an external watchmaker. God is the sustainer of a network of dynamic interrelated energies, and might well be seen as the ultimate environing non-material field which draws from material nature a range of the potentialities which lie implicit in them.²²

Put another way, God is both immanent and transcendent.

God and his works

Christians seeking to identify how God interacts with his creation are perhaps susceptible to a mild form of deism (or semi-deism) because they tend to look for mechanisms by which he might work. This can lead to accusations of naturalism – assuming that all observable events in nature are explainable by natural causes. Richard Dawkins has exposed this tendency by his clear demonstration (particularly in *The Blind Watchmaker*²³) that known mechanisms are adequate to explain the form of our physical world. However Dawkins (and others who argue from a similar reductionist standpoint) is guilty of illegitimate extrapolation when he assumes that any one explanation necessarily accounts

²⁰ Lewis *op. cit.*, (15), p.353.

²¹ Kidner *op. cit.*, (11).

²² Ward, J.F.K. *God, Chance and Necessity*. Oxford: OneWorld (1996), p. 57.

²³ Dawkins, R. *The Blind Watchmaker*, London: Longman (1986).

for the whole of a particular phenomenon; he falls into the fallacy of ‘nothing-buttery’²⁴. He fails to acknowledge that there may be different levels of explanation. When Psalm 19:1 declares that ‘Heaven’s vault declares [God’s] handiwork’, it is not describing astronomical complexity but rather what Psalm 8 refers to as God’s ‘glorious’ or ‘majestic’ name. Psalm 111 is a useful antidote to the temptation of such illogical scientific naturalism.

Can we prove God’s existence or find irrefutable demonstrations of his work? Philosophical theology held sway throughout the Middle Ages with a barrage of ‘proofs’ – from teleology, cosmology or design, ontology, morality, miracles, religious experience. None of these are wholly valueless, but none can provide completely incontrovertible evidence. They became even less convincing with the increasing discovery by Galileo, Harvey, Newton, Descartes and many others of mechanisms in the natural world. Don Cupitt summed up the result, ‘Mechanistic science was allowed to explain the structure and working of physical nature without restriction... [while] religion dealt with the ultimates: first beginnings and last ends, God and soul... But there was a fatal flaw in the synthesis. Religious ideas were being used to plug gaps in scientific theory.’²⁵ The God of the Gaps was born,²⁶ and is still with us, invoked by religious people to account for any unknown influence – but inexorably shrinking with every new discovery.

Can we see evidence of God in the natural world? Paul certainly believed we can. In his sermon to complete non-believers (at Lystra), he declared ‘[God] has not left you without some clues to his nature in the benefits he bestows: he sends you rain from heaven and the crops in their seasons, and gives you food in plenty and keeps you in good heart.’²⁷ In his letter to the Romans he wrote, ‘Ever since the world began his invisible attributes, that is to say his everlasting power and deity, *have been visible to the eye of reason* (or ‘understood’ [NRSV] or ‘perceived rationally’ [J. Dunn in the *Word Bible Commentary*]) in

24 Dawkins’s reductionism (and that of those who argue from a similar viewpoint, such as Peter Atkins, Daniel Dennett, Lewis Wolpert, Christopher Hitchens) has been repeatedly challenged (e.g. by Medawar, P. *The Limits of Science*, New York: Harper & Row (1984), Ward, J.F.K. *op. cit.*, (22), Conway Morris, S. *Life’s Solution. Inevitable Human in a Lonely Universe*, Cambridge: Cambridge University Press (2003), McGrath, A. *Dawkins’ God*, Oxford: Blackwell (2005)). Positive answers to doctrinaire scientific reductionism have been developed by Polanyi, M. *Knowing and Being*, London: Routledge & Kegan Paul (1969), MacKay, D. *The Clockwork Image*, London: IVP (1974) and Haight, J. *Is Nature Enough?* Cambridge: Cambridge University Press (2006).

25 Cupitt, D. *The Sea of Faith*, London: BBC (1984), p. 59.

26 The term ‘God of the Gaps’ is normally attributed to Charles Coulson. However Coulson himself refers back to Henry Drummond (1851-97), ‘There are reverent minds who ceaselessly scan the fields of nature and the books of science in search of gaps – gaps which they fill up with God. As if God lived in gaps.’ (Coulson, C.A. *Science and the Idea of God*, Cambridge: Cambridge University Press (1958), p.13). Coulson’s attitude was that ‘when we come to the scientifically unknown, our correct policy is not to rejoice because we have found God; it is to become better scientists’. (Coulson, C.A. *Science and Religion: a Changing Relationship*, Cambridge: Cambridge University Press (1955), p.2).

27 Acts 14:17

the things he has made' and 'When Gentiles who do not possess the law carry out its precepts by the light of nature, then, although they have no law, they are their own law.'²⁸ James Barr has examined with considerable rigour the arguments for and against the existence of 'natural theology', that is whether it is legitimate to find evidence for God without any 'special' or supernatural revelation. He concludes that a complete denial of natural theology produces a series of contradictions which outweigh any desire to insist on the importance of revelation. Intriguingly a key for Barr is the image of God in humankind, which according to Genesis 1:26 is the one element which distinguishes us from other animals and enables us to relate to God and creation, both human and non-human.²⁹

The author of Psalm 111 had no doubt that he had experienced God: by pondering over his works (v.2) and by remembering his wonders (v.4). This stimulated him to urge the need for reflection, recall, caution, reverence and community (or proclamation). Let us consider these elements in turn.

Reflection (v.2)

This is an implication of linking the admonition to ponder God's works with the warning in verse 10 that 'the fear of the Lord is the beginning of wisdom', lest 'claiming to be wise' (NIV, RSV) or 'boasting of their wisdom' (REB) they make fools of themselves (Rom 1:22). We are warned elsewhere that 'anyone who

28 Rom 1:20, 2:14. The existence of a widespread – perhaps universal – 'Golden rule' ['Love your neighbour as yourself'] was the factor that caused Human Genome Project Director, Francis Collins to doubt his atheism and then come to Christian faith (Collins, F. *The Language of God*, New York: Free Press (2006), p.00).

29 Barr, J. *Biblical Faith and Natural Theology*, Oxford: Clarendon Press (1993), esp. pp. 156-173. Malcolm Jeeves and I have discussed the interpretation(s) of 'image' in 'The nature of human nature', *Science & Christian Belief* (2008) 20(1), 00-00. Polkinghorne, 'Where is natural theology today?', *Science & Christian Belief* (2006) 18(2), 169-179, describes natural theology as 'an intrinsically limited exercise that affords valuable, if only partial, insight into the remarkable world of which we are inhabitants. It flourishes today, not because it provides complete and unquestionable answers to all the questions it addresses, but because it can claim to do a better job of giving insight into the fundamental nature of reality than is the case for natural atheism' (p.179). Debates where creation was separated from design only became acute during the nineteenth century with the introduction of time into the history of creation. In 1691, John Ray (*The Wisdom of God Manifested in the Works of Creation*, London) saw no tension between creation and design. A century later, William Paley (*Natural Theology*, London, 1802) used Ray's examples to 'prove' that God was the Great Designer or Watchmaker. Oliver Barclay has set out in detail the weakness of this extrapolation. As he points out, 'there is a huge difference between the concept of a God as merely the great designer and the biblical idea of the living God... It is an empty victory to have persuaded people that the God of the Bible is merely a great designer. The history of Deism warns us that making such a view prominent can be a barrier to faith in the living God.' (Barclay, O. 'Design in nature', *Science & Christian Belief* (2006) 18(1), 49-61). A creator could be presumed to design perfect organisms for an unchanging world, but such 'perfection' would disappear if the environment changed. Ernst Mayr has described this as the 'Achilles heel of natural theology' (Mayr, E. *The Growth of Biological Thought*, Cambridge, MA: Harvard University Press (1982), p.349).

lives on milk is still an infant, with no experience of what is right. Solid food is for the mature whose perceptions *have been trained by long use* to discriminate between good and evil' (Heb. 5:13, 14). Likewise, 'do not be children in your thinking, my friend; be infants in evil, but in your thinking be grown-up' (1 Cor. 14:20). The digestion advocated is, of course, a proper approach to the work of God in both creation and history; and in this context the psalmist is anticipating the recognition of modern theologians that 'Wisdom theology is creation theology.'³⁰ We are created by God and live in a world created by him,³¹ not in a neutral theatre serving merely as a backdrop for salvation. If we are to aspire to wisdom in the biblical sense, it has to be anchored as firmly as possible in the study of reality; ideas and data have to be tested as rigorously as possible.³²

Recall

The psalmist looks back on God's works because 'he showed his people how powerfully he works by bestowing on them the lands of the nations' (v.6). This 'bestowal of the lands of the nations' becomes in the New Testament the inheritance we have in the New Jerusalem³³ rather than (in Tom Wright's words) 'one piece of geographical countryside'.³⁴ God's mighty works for ancient Israel are most clearly seen nowadays as part of the ongoing and unfolding purposes of God in his overriding and protecting care.³⁵ Note how God's covenant is linked with physical care (the provision of food) in verse 5 and with salvation in verse 9. We are additionally supported because God prompts us about the past: 'he has caused his wonders to be remembered' (v.4).

Caution

Although God causes the sun to rise on the good and bad alike, and sends the rain on the innocent and the wicked', Psalm 111 adds the proviso that 'he provides food *to those who fear him*' (v.5) and '*all who follow his precepts have good*

30 e.g. Kidner, D. *Wisdom to Live By*, Leicester: IVP (1985), pp. 12-14; Murphy, R.E. *The Tree of Life*, Grand Rapids, MI: Eerdmans (1990), pp. 118-120; Brueggemann, W. *Reverberations of Faith*, Louisville, KY: Westminster John Knox (2002), pp. 232-235.

31 1 Chr. 29:11-14; Pss 8:3, 24:1; Rev. 4:11; etc.

32 Alexander, D. (ed.) *Can We Be Sure About Anything? Science, Faith and Postmodernism*, Leicester: Apollos (2005). Spurgeon (*op. cit.*, (3)) comments on v.2: 'Those who love their Maker delight in his handiworks, they perceive that there is more than appears on the surface, and therefore they bend their minds to study and understand them. The devout naturalist ransacks nature, the earnest student of nature pries into hidden facts and dark stories, and the man of God digs into the mines of Scripture and hoards up each grain of its golden truth.'

33 e.g. Heb. 9:15, 11:10; 1 Pet. 1:4; Rev. 21:7.

34 Soderlund, S.K. & Wright, N.T. (eds.) *Romans and the People of God*, Grand Rapids, MI: Eerdmans, (1999), p.26; see also Johnston, P. & Walker, P. (eds.) *The Land of Promise*, Leicester: Apollos (2000); Sizer, S.R. *Christian Zionism*, Leicester: IVP (2004).

35 This theme is developed by Walter Brueggemann in *The Land*, Philadelphia: Fortress (1997) and by Chris Wright in *The Mission of God*, Leicester: IVP (2006), chapter 12.

understanding' (v.10). We must not expect instant withdrawal of God's provision when we sin, but we will certainly be held to account for our exercise of stewardship; remember the condemnation of the one who carefully buried his talent in the ground (Matt. 25:30). Our part is reverent awe ('Hallowed be your name') and intelligent obedience ('Be transformed by the renewal of your minds').³⁶ We live within God's covenant: he initiated it and he lays down its terms.

Reverence (vv. 3,10)

We are to show reverence because those who fear (or reverence) grow in understanding. We are to approach this world with awe (v.3), because it is 'the fear of the Lord which is the beginning of wisdom, and they who live by it will grow in understanding' (v.10).³⁷ The thrust of the great creation Psalm 104 is summed up in verse 24 of that psalm, 'Countless are the things you have made, Lord; by your wisdom you have made them all.' The writer reminds us how God has given light, orderly waters and dry land, springs of fresh inland water for the animals and plants, rain so that there is grain for food, trees for the birds, and the seasons with day and night. He is amazed, as we should be, at the variety of creatures on the land and in the seas and at the rhythm of life in terms of death and new generations, all ruled by God's spirit. No wonder the psalmist exclaims, 'by wisdom you have made them all'.

The axiom that 'the fear of the Lord is the beginning of wisdom' is a recurring motif in all the Wisdom writings (e.g. Job 28:28; Prov. 1:7, 9:10; Ecc. 12:13), with slightly different nuances. In Psalm 111, wisdom relates particularly to God as Creator, Redeemer and Provider, for whom reverence should be mingled with delight (v.2), gratitude (vv.4, 9) and trust (v.5). Solomon prayed for wisdom in the task of government, but did not confine his thinking to politically useful areas, but spoke also of 'trees... of beasts, and of birds, and of reptiles, and of fish'. Kidner is happy that v.2 'is well taken as God's charter for the scientist and artist, [but] v.10 must be its partner, lest "professing to be wise" we become fools, like the men of Romans 1: 18-23.'³⁸

36 Charles Raven wrote, 'In relation to the world, the scientist experiences a sense of awe which at once abases and exalts him... This experience is the basic stuff of religion; and that which is properly called holy' (*Science and the Christian Man*, London: SCM (1952), p.11). It is a matter of record that very many natural scientists trace their fascination with science to experiences of awe at natural phenomena (*q.v.* Berry, R.J. *God's Book of Works*. London & New York: Continuum (2003), chapter 10). It is also a matter of record (and regret) that only a small proportion of them follow this with obedience to the creator.

37 It is intriguing how many atheists ascribe their fascination with the natural world to specific experiences of awe (e.g. Julian Huxley, Max Nicholson, Arne Naess, Ed Wilson). It is a topic well worth further study. Dachmer Keltner and Jonathan Haidt 'Moral, spiritual and aesthetic emotion', *Cognition & Emotion* (2003) 17, 297-314, suggest that two requisites for awe are perceived vastness and an inability to assimilate the experience into existing mental structures – both of which are proper reactions to God.

38 Kidner *op. cit.*, (11), p.397.

Community

The psalmist is not reflecting on his own deliverance or communing simply with himself. He extols the Lord 'in the council of the upright and the assembly' (v.1). The Lord causes his wonders 'to be remembered' (v.4) – which implies that they can be known, presumably beyond the eye of the observer. Some are qualified and equipped to be evangelists and others teachers, but we are all required to be able 'to give the reason for the hope within us'.³⁹ A key part of this witness is thanksgiving (vv.1, 10) – the alpha and omega of our role as seen by the psalmist. God's blessings are bestowed on his people (plural); our part as individuals is to study/ponder/seek out God's works (v.2) and proclaim then 'in the assembly' (v.1).⁴⁰ We have a responsibility to be diligent in publishing our results in ways that can be understood.

Great are the works of the Lord

The Cavendish Laboratory in Cambridge was at the heart of scientific discovery from its early years, with 29 Nobel Laureates awarded for research, ranging from basic work on electricity and magnetism under James Clerk Maxwell, through a concentration on nuclear physics in Rutherford's days to molecular biology and radio astronomy in recent years. In 1953 Francis Crick and Jim Watson were based in the Cavendish when they worked out the study of DNA and rushed out through the doors that bear the inscription of Psalm 111:2 to the pub across the street 'to tell everyone within hearing that we had found the secret of life'.⁴¹

The great and good of Victorian times not uncommonly embellished their buildings with pious inscriptions. But such faith did not die with Queen Victoria. In 1973, the Cavendish Laboratory moved from its city centre site to a green field site on the edge of Cambridge. Sir Brian Pippard, who was Cavendish Professor at the time has written,

Shortly after the move to the new buildings, a devout research student⁴² suggested to me that the same text should be displayed, in English, at the entrance. I undertook to put the proposal to the Policy Committee, confident

39 1 Cor. 12: 28-30; Eph. 4:11; 1 Pet. 2:5, 3:13.

40 There is a strong case for a greater recognition of creation in public worship. Traditional harvest festivals tend to be well supported but dissociated from modern understanding of either theology or science. In the US, the Evangelical Environmental Network promotes 'Creation Sunday' on the closest Sunday to 'Earth Day' (22 April); elsewhere many churches (with the encouragement of the Anglican Consultative Council) regard the nearest Sunday to World Environment Day (5 June) as Environment Sunday. A Rocha www.arocha.org produces helpful material for this. Some Church of England lectionaries treat the 2nd Sunday before Lent as Creation or Environment Sunday; other places (especially Eastern Europe) observe a 'creation season' in the autumn.

41 Watson, J.D. *The Double Helix*, London: Weidenfeld & Nicolson (1968), p.197.

42 The 'devout research student' was Andrew Briggs, a member of Christians in Science and now Professor of Nanomaterials in the University of Oxford.

that they would veto it; to my surprise, however, they heartily agreed both to the idea and to the choice of Coverdale's translation, '*The works of the Lord are great, sought out of all them that have pleasure therein.*'⁴³

There are other places that blazon the same words. They are carved on the memorial plaque to Joseph Hooker, friend and scientific confidant of Charles Darwin and Director of the Royal Botanic Gardens at Kew for 20 years, in St Anne's Church, Kew Green. They are engraved on a stone at the highest point of the island of Great Cumbrae in the Firth of Clyde, home to the Universities' Marine Biological Station and formerly of the Scottish Marine Biological Association, with awe-evoking views westward to the hills of Arran and north to the mountains of Perthshire. The full inscription there is:

GREAT ARE THE WORKS OF THE LORD – PSALM 111:2

Who is like God –
Creator, Lord! In awe we worship You,
Eternal One, Who created the heavens
And gave the earth its form
Almighty and Omnipotent God.

Not the God of the philosophers and men of science⁴⁴

Science is an immensely potent tool. It connects us with the material world. It enables us to discover properties and ways to modify 'nature'. But it cannot give the answers to all questions that we can ask. In his book *The Limits of Science*,⁴⁵ Peter Medawar examined its boundaries. He described science 'as the most successful enterprise human beings have ever engaged upon'. He was happy to accept that there are no discernible limits to the power of science to answer those questions which it is capable of answering, mainly those where we can suggest and investigate the causes(s) of some phenomenon. But he unapologetically believed that there are some questions that science cannot answer. For him there was a class of 'ultimate questions', which are simply outside scientific logic, just as it is impossible to deduce 'from the axioms and postulates of Euclid a theorem having to do with how to bake a cake'.⁴⁶ In this he followed Karl Popper, who had written, 'Science does not make assertions about

43 Pippard, A.B. 'The Cavendish Laboratory', *European Journal of Physics* (1987) 8, 231-235.

44 Two weeks after being almost killed in a road accident, the French mathematician, Blaise Pascal had a religious experience in the middle of the night, which he recorded in a note to himself: '23 November 1654: From about half past ten in the evening until half past midnight. Fire. The God of Abraham, the God of Isaac, the God of Jacob, and not of the philosophers and the scholars. I will not forget Thy word' [Ps.119:16]. When he died eight years later, this note there was found sewn into his clothing. See Ward, J.F.K. *Pascal's Fire: Scientific Faith and Religious Understanding*, Oxford: Oneworld (2006).

45 Medawar, P. *The Limits of Science*, New York: Harper & Row (1984).

46 *loc. cit.*, p.67.

ultimate questions – about the riddles of existence or about man’s task in the world.’⁴⁷ Steve Jones made a very similar comment in his Reith Lectures:

It is the essence of all scientific theories that they cannot resolve everything. Science cannot answer the questions that philosophers – or children – ask: why are we here, what is the point of being alive, how ought we to behave? Genetics has almost nothing to say about what makes us more than machines driven by biology, about what makes us human. These questions may be interesting, but scientists are no more qualified to comment on them than is anyone else. In its early days, human genetics suffered greatly from its high opinion of itself. It failed to understand its own limits.⁴⁸

Scientists down the ages have insisted on the need to be humble in their practice, whilst frequently being pilloried for holding to what they considered to be truth. In our own day, the Prince of Wales has argued that there used to be ‘a sacred trust between mankind and our Creator, under which we accept a duty of stewardship for the earth... [but] recently this guiding principle has become smothered by almost impenetrable layers of scientific rationalism’.⁴⁹ This is to misunderstand the nature and role of the scientific enterprise. The difficulty is not with science as such, but with those who want to force scientific results to support their own preconceptions⁵⁰ or those who indulge in an

47 Popper, K. ‘Natural selection and the emergence of mind’, *Dialectica* (1978) 32, 339-355, p.342.

48 Jones, S. *The Language of the Genes*, London:HarperCollins (1993), p.xi. In an article in *The Times* (10 February 2007) discussing Richard Dawkins’s book *The God Delusion*, London: Bantam Press (2006) and headed ‘The questions that science cannot answer’, Alister McGrath chided Dawkins for ignoring the point raised by Medawar about the limits to science. Dawkins failed to deal with McGrath’s criticism; he responded (*The Times* 12 February 2007) ‘McGrath imagines that I would disagree with my hero Sir Peter Medawar on *The Limits of Science*. On the contrary, I never tire of emphasising how much we don’t know.’ But lack of knowledge was not Medawar’s point. Indeed, Medawar’s widow (Jean Medawar *A Very Decided Preference*, Oxford: Oxford University Press (1990)) wrote that her husband’s motive in writing the *Limits to Science* was to stress that ‘science should not be expected to provide answers to such as the purpose of life or the existence of God, for which it was unfitted’ (p.220). William James made the same point almost a century earlier: ‘Science can tell us what exists; but to compare the *worths*, both of what exists and what does not exist, we must consult not science, but what Pascal calls our heart.’ (*The Will to Believe and Other Essays*, New York & London: Longmans Green (1897), p.22).

49 In Patten, C., Lovejoy, T., Browne, J., Brundtland, G., Shiva, V. & HRH The Prince of Wales *Respect for the Earth*, London: Profile Books (2000), p.81. The Prince has Calvin on his side: ‘Although the Lord represents both himself and his everlasting Kingdom in the mirror of his works with very great clarity, such is our stupidity that we grow increasingly dull towards so manifest testimonies that they flow away without profiting us. For with regard to the most beautiful structure and order of the universe, how many of us are there who, when we lift out eyes to heaven or cast them about through the various regions of the earth, recall our minds to remembrance of the Creator and do rather disregard their Author, sit idly in contemplation of his works?’ (*Institutes*, vol. 1, v.11, p.63).

50 An outrageous example of the attempted manipulation of scientific results concerns the reality and causes of climate change. Naomi Orestes analysed 928 randomly selected scientific papers published between 1993 and 2003 containing the keywords ‘global climate change’ (*Science* (2004) 306, 1686). Every one of them accepted that climate change was happening and that it is largely due to greenhouse gases released through human activities. Over the same period, 53% of 636 articles published in ‘serious’ American newspapers expressed doubt about the human contribution

assumption of doctrinaire reductionism – that scientific results represent the whole of reality. Donald MacKay has written, 'In science facts (data) reign supreme; opinion is tenable only as far as the evidence allows and should (ideally) hesitate to go much further than the evidence demands... Since from the biblical standpoint the data that claim the scientist's obedience are God's data, Christians have particular reason to be enthusiastic in support of this emphasis.'⁵¹ He goes on, 'Science in biblical perspective is an activity pleasing to God. The Preacher (Ecclesiastes 1:13) may sound rather doleful as he spells out the scholar's mandate, "I applied my mind to study and explore by means of wisdom all that is done under heaven. It is a worthless task that God has given to mortals to keep them occupied"; but it is clear from less pessimistic passages that "seeking out the marvellous works of the Lord" is a natural response of "those who delight in them"... Although the Creator's thoughts are as far above our thoughts as the heavens are above the earth (Is. 55:9), nevertheless the regularities of the natural order are tokens of his faithfulness to us, to be observed and relied upon by us for our good ((Gen. 8:22, 9:16).'

Charles Raven was wont to point to the accurate portrayals of reality by those who carved the wood and stones of the mediaeval cathedrals, at a time when academic scholarship was obsessed with formal representations of nature, with allegory and abstraction.⁵² Scholarship changed in the sixteenth century as a result of the Reformers' concern to strip away allegorical interpretations and return to the actual text of the Bible.⁵³ Indeed, Raven used to argue that one of the springs of the Reformation was a reaction against the 'impenetrable layers' of scholastic reasoning, enabling a refocusing on the world as it really is.

(Gore, A. *An Inconvenient Truth*, London: Bloomsbury (2006), p.263). Even more egregious – and on the same subject – was the acknowledgement of Philip Cooney, that he watered down reports on the adverse effects of human-derived emissions on climate when he was Chief of Staff of the White House Council on Environmental Quality. In a testimony to a congressional hearing (20 March 2007), he asserted, 'My sole loyalty was to the President and advancing the policies of his administration.'

51 MacKay, D. 'Biblical perspectives on human engineering', Originally published in the *Journal of the Institute for Reformation Studies* (1986) 219, reprinted in Tinker, M. (ed.) *The Open Mind*, Leicester: IVP (1988) pp.82-101.

52 Raven, C.E. *Science and Religion*, Cambridge: Cambridge University Press (1953).

53 Harrison, P. *The Bible, Protestantism and Modern Science*, Cambridge University Press (1999). This should not be taken as indicating a naïve literalism among the Reformers. As Reijer Hooykaas in particular has shown, Copernicus, Rheticus, Galileo and many others consciously rejected a literal interpretation of many Old Testament texts (*Religion and the Rise of Science*. Edinburgh: Scottish Universities Press (1972)). However, the Reformation attitude was complicated by the roughly contemporaneous influence of the Italian humanists of the Renaissance, who were preoccupied with the supreme dignity of humanity, so that the horizontal relationship of humans to creation (human beings as creatures who share with other creatures a creaturely relationship to the creator) was subordinated to the vertical relationship of humans to nature (human beings as rulers over the rest of creation): Bauckham, R. *God and the Crisis of Freedom*, Louisville, KY: Westminster John Knox Press (2002), chapter 7.

Which brings us back to our starting point: Great are the works of the Lord; studied/pondered on by all those who delight/revel in them. Verse 9 balances 'great are the works' in verse 2 with 'Holy and awe-inspiring is his name.' In verse 2, we are encouraged to study; in verse 9, it is God who 'redeemed his people and decreed that his covenant should endure for ever'.⁵⁴ We need to recognise a seamlessness between what we call history and what we call science. In Genesis it is almost impossible to say where God's work in creation shades into his work in history. The psalmist has given us both a mandate and a motive for the practice of science. Our God is not the God of the philosophers or of the scientists; he is not one who hides his message under suffocating layers of intellectual complexity; rather he is the Creator God who reveals himself to those prepared to seek, and who has entrusted his creation to us to tend and serve.⁵⁵ Richard Baxter (1615-91) wrote,

Your studies of physics and other sciences are not worth a rush, if it be not God by them that you seek after. To see and admire, to reverence and adore, to love and delight in God appearing to us in his works, and purposely to peruse them for the knowledge of God; this is the true and only philosophy, and contrary is mere foolery, and so called again and again by God himself.

The author of Psalm 111 directs us to God's works, but he repeatedly points to the fact that it is God's work and his initiatives with which we are concerned: it is God who provides food (v.5), who shows his power (v.6), who established universal precepts (vv.7,8), who has redeemed his people (v.9). We are here for God's purposes, on God's terms and in (and for) his world.

For Christians, science should be both a religious activity and an intellectual discipline. David Wilkinson, astrophysicist and theological college principal has written

It was always made clear to me that to be a scientist was as much a Christian calling as it was to be a full-time worker for the church, and I try to encourage students to see science as a vocation. God has created a universe where science is possible... We are only able to do science because of Jesus, and it should be for His glory.⁵⁶

The German astronomer, Johannes Kepler (1571-1630) had no doubts about this. As a young man, he wrote to a friend, 'I wanted to become a theologian; for a long time I was unhappy. Now, behold, God is praised by my work, even

54 John Stott comments that the expression 'fear of the Lord', is 'transcendence in modern language'. He argues that the growth of the New Age movement is recognition that materialism cannot satisfy the human spirit and shows a search for another, transcendent reality. He asks, 'Does our public worship offer what people are craving – the element of mystery, the sense of the numinous, transcendence?' His answer is 'Not often.' (*The Living Church*, Leicester: IVP (2007), p.45).

55 Berry, R.J. (ed.) *Environmental Stewardship*, London & New York: Continuum (2006); Berry, R.J. 'Eden and ecology', *Science & Christian Belief* (2007) 19(1), 15-35.

56 *Northern Light Magazine*, July/August 2003.

The Research Scientist's Psalm

in astronomy.'⁵⁷ For him, the practice of science was 'thinking God's thoughts after him'. His prayer was:

If I have been enticed into brashness by the wonderful beauty of thy works, or if I have loved my own glory among men, while advancing in work destined for thy glory, gently and mercifully pardon me; and finally, deign graciously to cause that these demonstrations may lead to thy glory and to the salvation of souls, and nowhere be an obstacle to that. Amen.⁵⁸

Kepler's prayer is a fit and proper one for any scientist.⁵⁹

R.J. (Sam) Berry was Professor of Genetics at University College London 1978-2000; he was President of Christians in Science 1992-95.

57 Letter to Michael Maestlin, 3 October 1595.

58 *The Harmony of the World* (1619), end of Book 5.

59 My thanks are due for comments, criticisms and corrections from Oliver Barclay, Andrew Briggs, Ernest Lucas, Colin Russell and two anonymous referees. I am grateful to Keith Fox for pointing me to Kepler's prayer. In addition, I have profited from a powerpoint presentation on Psalm 111 prepared by Sean Bird for an assembly at Covenant Christian High School, Indianapolis, IN (www.covenantchristian.org/Bible/Pslam111study.ppt).

NOTHING BUT ATOMS AND MOLECULES?

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