power of corporate silence for those who have been silenced, survived trauma, or experience marginalisation.

Brian A. Butcher's chapter considers Orthodox liturgical chanting and provides a theological analysis of three different styles: the monophonic unison of Coptic and Ethiopic churches as an enactment of how many are made one in Christ; the supporting drone voice in Greek, Romanian and Bulgarian traditions as embodying the apophatic and the changeless eternality aspect of worship; and the harmonisation and polyphony of Slavic churches 'to engage, we might say, in a kind of perichoresis' (p. 279).

The final chapter of this collection is by J. Aaron Simmons and Eli Simmons (no relation) on the theme of "Liturgy and Eschatological Hope". Like some of the earlier essays, Simmons and Simmons ask what makes a liturgy *religious* in character. They compare the views of Nicholas Wolterstorff, Jean-Yves Lacoste, and Bruce Benson, whose answers range from identifying liturgy as simply a species of religious worship (Wolterstorff) to seeing liturgy as a (not necessarily religious) way of 'taking oneself up as a work of art' (Benson) (p. 292). Constructively, Simmons and Simmons argue that religious liturgies inculcate eschatological hope – 'a refusal to allow historical possibility to have the final word' (p. 296).

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Bruce Ritchie, *James Clerk Maxwell: Faith, Church, and Physics* (Haddington: Handsel Press, 2024), pp. xxii+474, ISBN 978-1912052851. £15.00

This is a welcome and much needed contribution to the, now at last, growing literature on James Clerk Maxwell. The book itself is very well produced by Handsel Press, with high quality paper; which at 450+ pages makes it literally a weighty tome (I look forward to a Kindle edition). It is also very good value for money. The book is thoroughly researched, and

well written (a real page turner for the most part). Its importance is enhanced by its focus on Maxwell's personal faith journey: his theology, church relations, and concern for Christian social action. There are probably few who are as well qualified to write such a biography as Bruce Ritchie, being trained in maths, theology, and an expert in church history. And he does not disappoint.

Of course in writing the above I have taken for granted that the readers of this review know who James Clerk Maxwell is. Sadly, experience over many years has taught me that such an expectation is often misplaced. While Newton and Einstein are household names, relatively few have heard of Maxwell. Yet in the world of physics he is on a par with these other two. Einstein himself, with good reason, acknowledged that he stood on the shoulders of Maxwell not Newton. So who is James Clerk Maxwell? In this book we are presented with a picture of someone who, as well as being a brilliant physicist, was a humble and profoundly devout Christian gentleman.

James Clerk Maxwell was born on the Glenlair estate, Galloway in 1831. He was educated at home till the age of 10, first by his mother before she died of cancer when he was 7, and then by a tutor. His favourite question was, and remained throughout his life: 'What's the go o' that?' (p. 15), which means 'How and why does that work?' He was then sent to continue his education at Edinburgh Academy, residing with his aunt in Edinburgh New Town. Thanks to his eccentric attire (designed by his father) and broad Gallovingian accent he was given the nickname 'dafty' (p. 37). James thrived at school, but was particularly drawn to science, and had his first paper read at the Royal Society of Edinburgh at the age of 14.

When he left school he audited classes as a non-graduating student at Edinburgh University. After this he headed south to study at Cambridge, where he earned a degree and was second Wrangler. He remained in Cambridge for a couple of years after that on a Fellowship.

Maxwell's first academic post was at Marischal College in Aberdeen where he was appointed Professor of Natural Philosophy. There he met, fell in love with, and married Kathleen Dewar, the daughter of the Principal of Marischal College, Rev Daniel Dewar. While in Aberdeen he made some significant contributions that marked him out as a rising star. In particular, he created the best model of the rings of Saturn then known. It stood the test of time until further data became available from the Voyager mission showed that his idea was substantially correct. When the

two universities in Aberdeen merged in 1861 to form the University of Aberdeen, the new institution did not offer Maxwell a job. This episode is passed over very briefly in the book, though it is still an item of embarrassment in Aberdeen. (Curiously, not so in Edinburgh, which also rejected him for a job at that time.) So Maxwell moved south to take up a post at King's College, London. In London, amongst his other work, he published a paper on 'governors' (regulators) which arguably makes him the grandfather of control theory and AI.

When his father died James inherited the Glenlair estate. Here, as with all his other tasks and roles, he took his duties very seriously, and for a variety of reasons he retired from his post at King's to live at Glenlair. Free from the tasks and administrative commitments of academic life he was able to spend more time on his scientific research, in particular, the work on electromagnetic field theory forever associated with his name: the Maxwell equations. These equations underpin modem electrical technology, communication, and, though it was not recognised at the time, undermined Newton and pointed to Einstein. In a very real sense then he is the father of the modern scientific and technological world.

But academic life would not let him rest and he was coaxed back to head up the newly formed Cavendish laboratory at Cambridge University. This laboratory was set on solid foundations under his leadership and became one of the leading physics laboratories is the world (having produced 30 Nobel laureates as of 2019). Maxwell spent the rest of his short career at the Cavendish. He died at the age of 48 in 1879 (the year Einstein was born), victim to the same cancer that took his mother.

Ritchie describes Maxwell as a deep thinker, not simply with respect to his science, but also in philosophy, theology and ecclesiology. He was beholden to no man, and he considered that because he was a Christian, every question was open to investigation. Throughout his life he had multiple influences, sometimes even competing. In his boyhood, while living with his aunt, he experienced both Presbyterian and Episcopalian preaching and teaching (on Sunday mornings at St Andrew's Church of Scotland he learned the Westminster Shorter Catechism and in the afternoon he had Dean Ramsay's *Catechism Compiled and Arranged for the Use of Young Persons* at St John's Episcopal Church). This gave him a breadth of understanding and sympathy that endured throughout his life. He saw first-hand the results of ecclesiastical turbulence: as a boy during the Disruption, one of the two ministers in St Andrew's left to join the Free

Church while the other did not. His future father-in-law was also strongly evangelical and had been expected to join the new denomination but, in the end, opted to remain in the Kirk. This breadth of accommodation meant that he was happy to attend a variety of churches at different stages in his life: Presbyterian, Independent Baptist and Anglican (even sometimes quite high). The main thing for him was that scripture was appropriately expounded.

He had, as we have seen, a solid grounding in the teachings of Christianity, but his spiritual growth was not linear. While staying with a friend's family in England he underwent a profound spiritual experience. Such was the effect that some have seen this as the time of his conversion. However, Ritchie points out that there is good reason to believe that he was already a Christian and that this event was a deepening of his faith.

When he was approached to become an elder of the Kirk, such was the importance he placed on this that he reread the *Westminster Confession of Faith* very carefully to ensure that he could sign his name to it in good conscience. He took it on and exercised the role faithfully. He conducted worship daily with his household, and his pastoral visits to homes under his spiritual care were very well received. He was influenced by F. D. Maurice and Christian socialism, and while he did not agree with everything that came under that heading, it did give him a consistent concern for the wellbeing of those less well off than himself. To that end he was keen on social action and gave of his time and gifts to lecture in Mechanics Institutes.

Ritchie also shows Maxwell as someone who integrated his faith and his physics. He engaged with, and even provoked, those, such as Huxley and Tindall, whose agenda was anti-Christian. Several of the issues he addressed are still very relevant today. His scientific methodology, with its integration of the empirical and theoretical (no doubt influenced by the Common-Sense Realism of William Hamilton, whose lectures he attended at Edinburgh) was similar to William Whewell's, and resonates with post-1960s philosophy of science. He dealt with questions of determinism and free will, concluding, as one would expect, that humans are not automata. But, in particular, he believed that scientific problems must yield scientific solutions. (This was one of the reasons why he would not join the Victoria Institute; because while he was critical of Darwin, he was open to the idea of species development.) As such he had no place for a 'God-of-the-gaps' approach. God was not to be found in the gaps but rather as author and

upholder of the whole story. He did argue however that science could point to God, but through the extreme endpoints of scientific knowledge, which in the nineteenth century were atoms. (Whether this falls back into God-of-the-gaps is a moot point.)

No book is perfect in construction. The first thing noticeable here is that not there is no 'blurb' about the author. This is not so much negative as unusual. It is often nice to read a passage describing who an author is and why they have written the book. The next issue was more of an annoyance: while there is a name index, there is no subject index! (Though there are some curious exceptions: e.g. 'Darwinism'.) For a book of this size, covering all that it does, that is a glaring omission. One of the first things I wanted to find was the discussion of his relation to the Victoria Institute but had to read a significant chunk of the book to find it. Of course, the existence of the aforementioned (and hoped for) Kindle edition would obviate this for those who, like me, would buy it.

The one chapter I did not enjoy as much was the final one. At 32 pages it could almost form the basis for a separate monograph. I would have preferred to see more space given to the drawing together of the overall picture of Maxwell and appraisal of his impact. But this chapter is focussed on Tom Torrance's work on Maxwell, and an appraisal of that. Given that it was Torrance who first piqued Ritchie's interest in Maxwell, the book was bound to include something about him, but this strikes me as excessive. On the other hand, 'one man's meat is another man's poison' and I am sure that for many readers of this journal it will be 'not a bug but a feature'.

To end, I simply reiterate what I said at the beginning: this is an excellent, well-researched and enjoyable book. It is a must read for anyone interested in religion and science, or who wants to find out more about the (spiritual) life of one of the world's greatest scientists.

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