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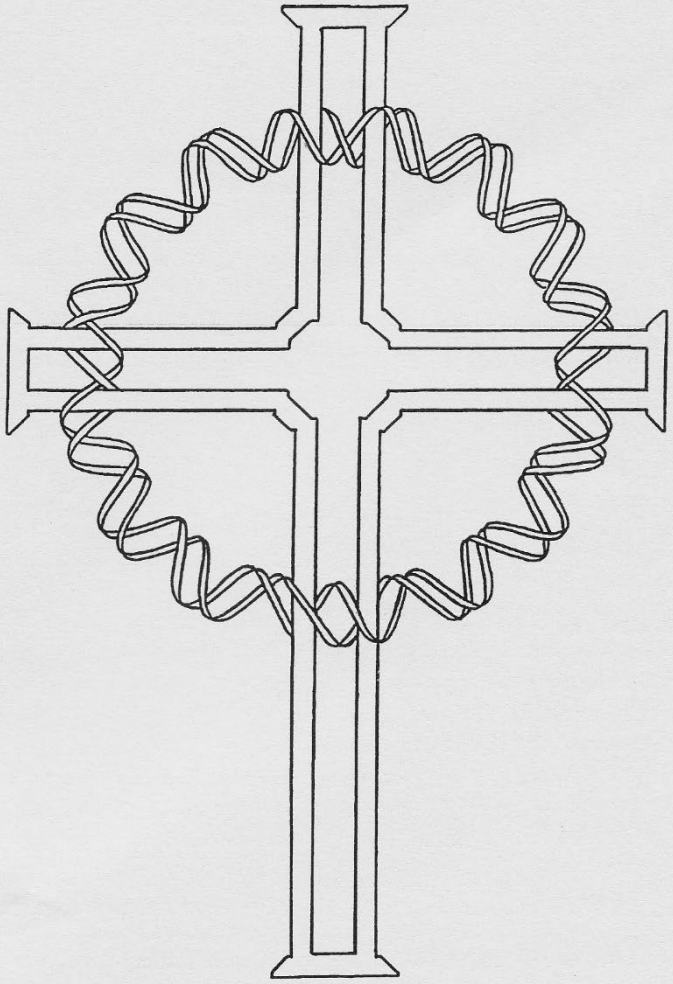

BULLETIN

AUTUMN 2022

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From: The Editor

It is a great pleasure to publish a substantial Bulletin this Autumn. What a joy it was to be able to meet at Launde Abbey for our Annual Gathering. The Retreat Addresses were given by Dr Margaret Barker and summaries of her papers are included in the Bulletin together with Sermons preached by +David, our Visitor and Stig, our Warden. We were delighted that Roger Pullin was, at last, admitted as a Full Member and we have an article from him, paying tributed to the teacher who inspired him. +David Atkinson has published a moving tributed to our first Warden, Arthur Peacocke who inspired and supported him. Mike Kirby writes about 'The Gilbert Scott Lectures in Faith and Science' hosted by Liverpool Cathedral, and part of its ongoing ministry in this field, while Tom Broadbent gives us a letter to his parishioners entitled 'A Scientist looks at Easter'.

We have a paper by Paul Monk entitled 'Electrochemistry with love', in which he applies the language of the sacraments to science and we have an abstract of a paper published in 'Theology' and entitled 'The Prodigal Climate Crisis' from Mark Siddall which makes fascinating reading. Mark gave this paper at a recent Southern Chapter meeting: it is well worth reading the whole paper!

Ursula has been reading widely and has provided some insights into recently published books for us to enjoy.

On a sadder note, Eric Albone has shared with us his Eulogy for his wife, Kumyul, which he gave at her funeral.

Thank you to all who have contributed and I hope you will continue to share thoughts, papers and appreciations with the whole society.

Maureen Palmer

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GATHERING PHOTOGRAPH LAUNDE 2022

SERMON FOR THE ADMISSIONS EUCHARIST +DAVID

I love being a minister in a church that has a set lectionary for every day. Not only does it save me from having to pick passages from which to preach, it offers me opportunities I would never have grasped. So, here today, as we meet to admit a new member and reaffirm the vows of existing Ordained Scientists, we have, in our Old Testament passage (1 Kings 18: 20-39) an account of one the most rigorously executed scientific experiments in antiquity. So let's have a look at how it might help us today.

Elijah sets out with a clear hypothesis - that the God of Israel is supreme and Baal is nothing. He makes every possible concession to allow his hypothesis to be disproved - giving his adversaries plenty of time, dousing his own offering three times in water - before finally proving his proposition. You can imagine it set out, not as a passage of scripture, but as an article for a modern peer reviewed journal. My only quibble with his scientific method is that, in having his enemies seized and killed (in a final verse the lectionary chooses to omit), he has perhaps taken the task of cleaning up the laboratory afterwards, to excess. Of course, those were the days before Ethics Committees pored in such detail over every aspect of even the simplest research proposal.

Integrity in Experiments

Elijah, of course, has a lot invested in the success of his endeavours. Had his adversaries succeeded, or had he failed, he would have been the one seized by the crowd and destroyed. And yet he is meticulous in doing nothing that might lead to accusations that he has rigged the experiment in his favour. Over the last five years, I've become increasingly involved in supporting those living in high and medium rise buildings affected by the cladding scandal. Many of them are living in fear of both fire and the financial ruin they will suffer in seeking to rectify the mistakes of developers and freeholders. Back in March I was able to take Archbishop Justin on a visit to meet residents of one particular city centre block in Manchester. From the balcony of one apartment they listed the costs in millions it would take for each of the blocks we could see to be made safe enough for their homes to be capable of attracting a mortgage again. As the Grenfell Inquiry has discovered, many unsuitable materials found their

ways into the fabric of people's homes because the tests for combustibility were rigged; fully real world conditions were not simulated. In a parallel case, at least one major motor manufacturer has been found to have installed test cheating software into their systems. To move to yet another sector, pharmaceutical companies are regularly accused of hiding unhelpful research findings that might destroy the potential of a drug they have spent significant sums in developing.

Central to our calling, as Ordained Scientists, is that science must be honest. No matter what the positive or negative consequences, be they commercial, reputational, or career damaging, the integrity of the research process must be paramount. Every falsified experiment not only damages its own hypothesis, it undermines the entire scientific exercise. In my most suspicious moments, I have wondered whether the water Elijah threw over the wood might have actually been highly distilled, and readily combustible, alcohol, but I doubt it. It's a fair experiment, as experiments should be. Over 2500 years on, our own engagement with God's creation is too precious to let us collude with anything less than full integrity in our research processes and practices.

Experimenting with God

Arguably, one of the oldest ethical restrictions for any experiment is issued by Jesus himself. When he's challenged by Satan to throw himself from the pinnacle of the temple, he memorably responds "You shall not put the Lord your God to the test". At first glance, that might seem to be a rejection of what Elijah did, in proving God's power to the Israelites. But the two are actually almost direct opposites of each other. Elijah's experiment offers space in which God can choose to act; Satan seeks to deny God space, to force him either to intervene or to see Jesus's ministry destroyed at the very outset. If Satan can force God's hand, then he can lay claim to be God's equal or greater. Having failed here to get Jesus to collude with his experiment, he retreats, only to return later and seek to force God a second time, this time in the baying voices of those on Good Friday who shout for Jesus to prove himself by calling on angels to bring him down, unharmed, from the cross.

By contrast Elijah performs an experiment that allows God to show his power, if he so wills. God remains supreme.

The scientific endeavour, in all its fields, is, at its very best, an exploration of the wonders of God's creation. It should evoke, both in those who engage in it and those who simply receive their results and discoveries, a sense of awe that is only a short step (if even that) away from worship. Far from confining God into ever smaller gaps in our human knowledge, science reveals the ever increasing complexity and beauty of all that his hand has created, from the delicate interplay between universal physical constants that makes complex molecules and hence life forms possible, to the gentle pressure of evolutionary forces, moulding life into multiplicity. St Francis (you wouldn't expect me to complete a sermon without at least one reference to him) loved every aspect of God's creation, even death itself, because in all of it he saw the handiwork of his creator and redeemer. Our role as ordained scientists is not simply to do science, but to exult in it, something we see the very best public presenters of science do on TV. Our response should be at the level of our passions and emotions as well as our intellect, so that the world can catch a glimpse of the glory of God in our endeavours.

Elijah's successful experiment doesn't bring his troubles to an end. Only a few verses later he is once more fleeing for his life, with Jezebel, her mind closed to any event that doesn't fit her own faith, having vowed to destroy him. But whatever troubles he has yet to face, his journey deeper into God goes on, first to encounter his Lord in the still small voice on Mount Horeb, and eventually to be taken up to heaven in a fiery chariot. Our own journeys may not contain quite such explicit theophanies, but they play their part, and do so to the glory of God. Amen.

2022 Annual Gathering, Launde Abbey

WARDEN'S ADDRESS

I came across a new phrase last year – or at least a new understanding of an older one 'closing the loop'. An astronomer was talking about, and I quote, the 'magical moment' as a blurred and indecipherable on-screen image resolves into an exquisitely defined picture of a planet, a star or a far-away galaxy.

Is it really so amazing though? After all, the CSI franchise, amongst many Hollywood others, has been processing a photograph of a speeding car on a foggy night half a mile away to reveal in pristine condition the number plate of the car and thereby the identity of the culprit for several decades now.

Well, yes, it really is amazing. But much more than that, the real joy, the sense of the magical is coupled with a deep understanding of how it happened: the powerful, fast computers involved, the array of algorithms aligning and controlling a bundle of hardware and software to a minute degree, and ultimately producing, not just data and knowledge, but sometimes something beautiful and unexpected.

Closing the loop is that moment when all comes together, the work, the study, the careful preparation, and from fuzziness emerges clarity, of vision and of understanding.

Closing the loop also reminds me of another scientific descriptive phrase which has illuminated my life and practice: 'Collapsing the wave front'. I did actually look this up to see how it is presently defined. 'In quantum mechanics, wave function collapse occurs when a wave function—initially in a superposition of several eigenstates—reduces to a single eigenstate due to interaction with the external world. This interaction is called an "observation"'.

What a wonderfully laconic afterthought. This interaction is called an "observation"'. The infinite possibilities of quantum mechanics meet the reality of the one-eyed observer. Shades of Van Moltke's observation that 'No plan survives contact with the enemy'. All the planning, the myriad possibilities formulated, considered and adjusted for, but in the moment of contact, a decision, perhaps a decision without alternatives, must be made.

For me, both phrases share a sense of approaching a moment, a cusp point, when we can hold, and contemplate, our discovery. And yet, the other hand, one brings all things together into something greater that its parts, whereas the other reduces all those possibilities together into one outcome. And reducing is not always a bad thing, that is how we make delicious stocks for thing, and, as scientists we do reassure one another, occasionally comfort one another, that a negative result is also positive outcome.

Balaam, Paul and the blind man at Bethsaida, all encountered new and different ways of seeing the world, quite literally for one of them. Balaam's encounter with the angel made it clear that the world was not as he thought it was, not least a talking donkey, and that he should return the way he had come. For Paul, for him too, when he encountered the risen Christ, he understood the world was not the way he thought it was, but the only way was forward and yet, at the same time, on a very different path. For the blind man, it seems rather more ambiguous: his awakening is gradual, coming only slowly into focus, with additional help from Jesus. And then Jesus tells him to go home and not to go into the village.

Oh, so wasn't his home in the village? I remember as a child worrying over the apparent illogicality of that. The sensible adult within me saying, don't be silly, be reasonable, but the child still says, 'Yes, but if he did live in the village . . .'

But now, after this week, I have a new problem to agonize over. Which was the clearest perception – seeing people as trees or people as people. The most obvious answer is people but is there a possibility that seeing trees was an indication of seeing through eyes of knowledge and wisdom, a divine perception perhaps. As we have learned, tree mythology interweaves throughout our Biblical texts. Do we grasp for understanding as we do for a branch? Did he gain insight only to lose it?

Interestingly, the story of the blind man is framed by the disciples not grasping the significance of the feeding of the multitudes with each event producing way more scraps than what they started with and followed by Peter recognising Jesus as the Messiah only for them all to be told, 'Yes but don't tell anyone'.

My point being – I do have one – is that such moments do not happen in isolation. There is always an approach, and an arrival and there are always outcomes, consequences, new plans, new ideas. Whether the recognition involves joy, trepidation, or anxiety, whether we see from our present peak to the new and next summit or realise that the peak upon which we thought we stood has crumbled away.

It may be that our momentous discovery is made on Friday evening, and we have to wait in excitement and isolation for the weekend to end and the new week to arrive, to share our news. But Monday morning, decision time, invariably arrives.

Whether we close the loop or collapse the wave front we must move on, forward or backward, or on a new path altogether. Neither science nor faith, personal or corporate, can be static. Nature may or may not abhor a vacuum, but it certainly abhors stasis.

We have gained in knowledge this week.

Hopefully, we have gained in wisdom too.

As we struggle to make sense (well I struggle and am probably not entirely alone) of such a potent mix of symbols, myths, metaphors, and parables and try to decide where to go next, there is comfort in Jesus' final instructions to Peter and, consequently, to us. Simple words and yet miraculous too. There are, indeed, lambs and sheep waiting to be fed and tended, to be cherished and nurtured.

ANNUAL GATHERING
RETREAT ADDRESSES GIVEN BY DR MARGARET BARKER

These are summaries of the Addresses:
There were three sessions about some imagery in the Eden stories and then a fourth about the recent discovery in Jordan of some lead books that may illuminate the early years of Christianity.

Address 1 Adam

The Eden talks explored the themes of Adam, the Tree of life and the Water of life as they were understood in the early years of Christianity, showing that the story in Genesis 2-3 was reversed and became the framework of the New Testament. The final vision in the Book of Revelation shows the faithful restored to Eden with access again to the Tree of Life, and the water of ife flowing again.
In the time of Jesus, Adam was remembered as the great royal high priest of the original Jerusalem temple, set there not 'to till and to keep' but 'to serve the liturgy and preserve the teachings', which is the other way to translate Genesis 2.15. Adam was the high priest of creation, not the steward. He was the material 'incarnation' of the divine, the 'image' of the likeness whose invisible eternal state was in the unity, light and wisdom of the Holy of Holies.

The temple represented the Hebrew cosmos: the outer part was the visible, material world and the Holy of Holies was the hidden eternal state in which the forms of all creation existed in unity, outside time and matter. The Adam image needed both male and female incarnations in the material state, to represent fully the undivided image that was in the Holy of Holies. This idea underlies Galatians 3.26-28.
In the original temple, the Holy of Holies housed the cherub throne on which Isaiah saw the Lord, but which in temple ritual was occupied by the royal high priest as the human presence/face of the Lord. The Davidic kings saw themselves as the Adam, a son of God and clothed with light. They were angels endowed with heavenly wisdom to rule and to uphold the eternal covenant which is mentioned in Genesis 9.16 and underlies Hosea 6.6-7.
In the time of Jesus, the Hebrew of Genesis 1.28 was understood differently. Adam was not to be fruitful and multiply, but to be beautiful and great, and to fill the world with glory. The dominion was the role of binding all things together –upholding the covenant - not of subjecting the creation. This covenant was based on loving kindness and God-given knowledge: *ḥesedh* and *da'ath 'elohîm*.
According to Genesis 2.7, Adam was formed from dust. The Lord formed him as a creature of clay and then breathed into him to make him live. Tradition in the Targum of this passage was that this inbreathing gave him the power of speech and so of teaching. The same tradition knew that the water in Eden which compacted the dust into clay came from the cloud of glory that rained onto the dust.
Adam was intended to eat from the Tee of Life. Embedded in the Eden story was the distinction between the two trees that the deceiving snake presented as identical. The distinction was that one was forbidden. Even the snake was the evil one in disguise, as the snake was an ancient symbol of wisdom. '

Address 2 The Tree if Life
The Tree of Life was a symbol of Wisdom (Proverbs 3.18), one of the many names by which the much-neglected almost-forgotten Holy Spirit was known. 'Spirit' in Hebrew is a feminine noun, and so all her titles in Hebrew tradition are in feminine form. The evil one set the forbidden tree in Eden to cause Adam's downfall by nourishing him/them with the wrong type of knowledge. The *Gospel of Philip*, now recognised as an early Christian text, shows how the two types of knowledge were distinguished: the forbidden tree was the Law of Moses and the way of life it implied.

> There are two trees growing in Paradise: the one bears [ ], the other bears men. Adam [ate] from the tree that bore animals and he became an animal ... The Law was that tree. It has power to give the knowledge of good and evil, but it neither removed him from evil nor set him in the good, but it created death for those who ate of it. *Gospel of Philip 71, 74*

This text was rediscovered in Egypt in 1945 and is broken in places, but the gist is clear enough. It uses the temple conventions of describing angels as 'men' and mortals as animals. To retain the original angel state, Adam needed the fruit of the Tree of Life.
Eden story tells how Adam, the high priest, rejected Wisdom and so became mortal. The ancient story in fact describes events in the history of Jerusalem, when there was a revolution in the temple and priesthood. The story is found in *1 Enoch*, in a stylised history where each period is a 'week'. This book was used by the early Christians and is quoted in Jude 14:

> In the sixth week [8th-7th century BCE] all who live in the temple shall lose their [spiritual] sight, and the hearts/ minds of all of them shall forsake wisdom. In it

a man shall ascend, and at its close the house of the kingdom shall be burnt.' *1 Enoch 93.8*

This revolution – rejecting the Spirit/Wisdom - began in the time of Isaiah, and the message he was given for the people of unclean lips - false teaching – was that they would be punished by what they had chosen: they would see and not see, hear and not hear, they would be unable to understand God-given knowledge which was the gift of the Spirit, Isaiah 6.9-10. This is the most-quoted Isaiah text in the New Testament, occurring in Mark 4.12 and its parallels, John 12.39-40 and Acts 28.26. The loss of access to God-given knowledge, Wisdom, was a key part of the Christian message, and the faithful were promised that they would again have access to the Tree of Life, Revelation 22.14.

At the end of Isaiah's warning to his people is an assurance about the fate of a tree - the Tree of Life that was represented in the temple by the golden menorah. This tree symbol was removed [and replaced] several times in the course of the century-long revolution, and Isaiah prophesied that even though the tree would be burned, it would survive and so would its seed, Isaiah 6.13. The Hebrew text is now hopelessly damaged, but it seems that the parable of the sower was about spreading this seed again.

The Tree of Life was not one particular type of tree: sometimes it was a palm, sometimes a vine or an almond. The Tree represented the Spirit as Mother, and her branches were her children, the anointed ones, Ezekiel 19.10-14. 'Branch' was a messianic title , using two different Hebrew words from 'Branch': Isaiah 11.1, Zechariah 6.12. The entire tree, stem and branches, was the presence of the Spirit, and the discourse on the vine and its branches, John 15, is best understood as Jesus being the central stem of the vine and the disciples the branches. The imagery in Galatians 5.22 follows naturally from this.

The early Christians knew that oil from the Tree of Life was the perfumed anointing oil, and the temple oil was an imitation:

> [St Peter taught] Although indeed [Christ Jesus] was the Son of God, and at the beginning of all things, He became man; Him first God anointed with oil which was taken from the wood of the Tree of life: from that anointing therefore He is called Christ. Thence He himself, according to the appointment of the Father, anoints with similar oil every one of the pious when they come to his Kingdom ...
>
> In the present life, Aaron the first high priest was anointed with a composition of chrism, which was made *after the pattern of the spiritual ointment* ... If this temporal grace compounded by men had such efficacy, consider how potent is the ointment extracted by God from a branch of the tree of life. *Clementine Recognitions*, 1.45-6.

Jesus had received the true oil from the tree and he used this for his followers.

The Secret Book of John is an early Christian text often described as 'Gnostic' which preserves Jesus' teachings about the mysteries hidden in silence that he entrusted to John. It describes the evil opposite of Tree of life, in other words, the forbidden tree that nourished with the forbidden way of knowledge.

> The root of their tree is bitter, its branches are death,
> its shadow is hatred, deception is in its leaves,
> its blossom is the anointing oil of wickedness, its fruit is death
> its seed is desire, and it blossoms in darkness.
> The dwelling place of those who taste it is the underworld,

and darkness is their place of rest, *Secret Book of John*, NHC II.1. 21.

Whoever wrote this knew more about the Tree of life than we can now recover from other sources.

Address 3 The Water of Life

Around the roots of the Tree of Life flowed the waters of life. In Hebrew tradition, salt water, a symbol of chaos [e.g. Revelation 21.1, no more sea in the new creation], was always distinguished from sweet water which was a symbol of wise teaching from the Spirit. Jesus used this imagery at the feast of Sukkoth, John 7.37, when he said that living waters would flow from the heart, that is, the mind, of those who drank from him. John explained that Jesus was speaking of the Spirit.

Wisdom teaching often uses the Water of Life imagery, and texts about this teaching warn that it is found mainly outside the canonical texts. The legend of how Ezra was inspired to restore the holy books lost when Jerusalem was destroyed, says that he was not allowed to make them all public. Seventy were to be reserved only for the wise, for in them was 'the spring of understanding, the fountain of wisdom, and the river of knowledge', 2 Esdras 14.47.

The rejection of Spirit-Wisdom Mother was described as the temple losing its stream of water, Isaiah 8.5-8. The prophets looked forward to the water being restored: Ezekiel 47.1-12; Joel 3.18; Zechariah 14.8. The water flows again in Revelation 22.1-2. Isaiah described the faithful returning across the desert - the place without water – and seeing it transformed and brought to life with water. The Spirit's gifts were restored so that spiritual sight and hearing were restored, and the effect of rejecting the Spirit was removed, Isaiah 35.1-10. Jesus' miracles were literally those of restoring the gifts of the Spirit: restoring sight, hearing, life.

Several non-canonical texts describe the water flowing in and from the Holy of Holies, for example Enoch's vision of the Holy of Holies:

> In that place I saw the fountain of righteousness which was inexhaustible,
> And around it were many fountains of wisdom
> And all the thirsty drank of them, and were filled with wisdom, 1 Enoch 48.1

This is echoed in Isaiah 55.1 and Revelation 22.17. It was also the original meaning of Psalm 110.7, a damaged text. The original probably described the newly anointed king and the wisdom he had received: 'He will drink from the stream in the sanctuary; therefore he has been raised up as the leader.'

Ben Sira [Ecclesiasticus] records a poem known in Jerusalem in 200 BCE in which Wisdom describes herself and her waters, and how they inspired the prophets:

> I water my orchard, and drench my garden, and my canal becomes a river, and my river becomes a sea.
> I will again make instruction shine forth like the dawn
> I will make it shine afar.
> I will again pour out teaching like prophecy, and leave it to all future generations, Ben Sira 24.30-33.

This occurs in the Nicene Creed as 'The Holy Spirit... who has spoken through the prophets'.

Before Adam was created from the dust, 'a mist' watered the ground, Genesis 2.6. the Targum here expands the story and says more about the water. It came when a cloud of glory descended that was filled with water. The cloud of glory was a sign of the presence of the Spirit/Mother, for example, at the Transfiguration when a bright cloud appeared and her voice spoke to the disciples, telling them that Jesus was her Son and her authorised messenger: 'Listen to him', Matthew 17.5. It was this cloud

that dropped the water from which Adam's dust was compacted and he became a living being. When the Tree of life and its nourishing wisdom was rejected, Adam returned to the dust from which he had been taken, to live a life nourished by the forbidden tree.

The Gilbert Scott Lectures on Science and Faith – Liverpool Cathedral
Mike Kirby - Canon Scientist, Liverpool Cathedral; Senior Lecturer (Radiotherapy Physics), University of Liverpool

As fellow members of the Society of Ordained Scientists, we have much in common – not least the love of God as creator and redeemer of all that is; source and foundation of time and space, matter and energy, life and consciousness…as we commonly and frequently pray together. We have that common calling – to a combined life of science and faith; gifts from God we use within our calling to a ministry in Christ Jesus our Lord, and also to use our God-given talents within the wonders of science.
I am still in awe of my own calling to a life of science and faith and as such, always love sharing my experiences of both; as I am sure we all do. Especially so, when there are still many who feel that the two are not compatible – when we are all living proof that it is quite the opposite! As such, within my (relatively short!) ministry so far I have enjoyed sharing my own professional and ministry experiences in many different places and contexts and organising series of talks, lectures and other events to bring the voices of many (often much more experienced and knowledgeable than myself!) to be heard further.
One such medium has been lecture series held in the cathedrals in which I have had the honour of serving. So an inaugural series of lectures on Science and Faith was developed at Blackburn Cathedral in 2016; and a similar series (entitled the Max Planck Series, in honour of the famous physicist) was held at Chester Cathedral in 2018 (see here). It was at Chester that I was introduced to our Society by the Dean there, The Very Revd. Prof Gordon McPhate (one of our SOSc members and now Dean Emeritus). At Liverpool Cathedral (where I was initially the Cathedral Chaplain, but am now a residentiary canon with the title of Canon Scientist), we now have the Gilbert Scott Lectures on Science and Faith which began in 2019 and are still on-going (see here).
Contrary perhaps to one's initial impressions, the current series is not named after the famous Giles Gilbert Scott, the wonderful architect of the cathedral, but after his brother Dr Sebastian Gilbert Scott, who was a nationally and internationally renowned physician and radiologist in London. Twenty-nineteen (the year in which our series of lectures started), was a special year which marked the 140th anniversary since his birth in Hampstead in 1879. His obituaries in the British Journal of Radiology and the British Medical Journal highlighted his many clinical accomplishments….but also how good a teacher he was, teaching by example through a kindly, cheerful and optimistic manner with his patients to many a young, trainee radiologist.
In that vein, all of the series that have been organised (at all three cathedrals) invited speakers who would do just that - share their own thoughts, expertise and experiences in a similar manner; and also include speakers and discussions which are as accessible as possible to many different people, with elements of living a life of science (all types of science) within the realities of the world in which we live.
The pandemic changed everything for all of us – as such, the Gilbert Scott series moved to being fully online in 2021. That brought a greater visibility, as the internet

naturally does; and so now the current series is a hybrid of online lectures and in-person ones; the latter also being recorded and uploaded so that they are also available online.

The online world also opened up the possibility of speakers from across the world – so earlier this year, we had our first lecture live from the US, from our very own Revd Dr Pan Conrad giving the wonderful talk on "Catastrophe, Resilience and Evolution: A Planetary Record of Redemption" that she shared with us at our digital annual gathering back in 2021.

We've also just recorded our first short (about 30 min) 'In Conversation' piece between myself and Dr Bethany Sollereder (previously at Oxford University, now at Edinburgh University) on "Compassionate Theodicy"; and we are working on a similar pre-recorded lecture with the experts in AI analysis of the Dead Sea Scrolls (from Profs Popovic and Dhali from the University of Groningen in the Netherlands) for early 2023.

It would be great to open out the range of topics and, above all, experiences of lives of science and faith through these types of lectures, but also further 'In Conversation' pieces, pre-recorded talks, live (online and face-to-face) lectures, short podcasts etc for which it would be great to have more voices from ourselves as a Society of Ordained Scientists; either sharing our current or previous experiences and subject expertise. So, would you like to help develop the series with offerings of your own? I'd love to hear from you if you would, and it would be excellent to expand the involvement of the society here!

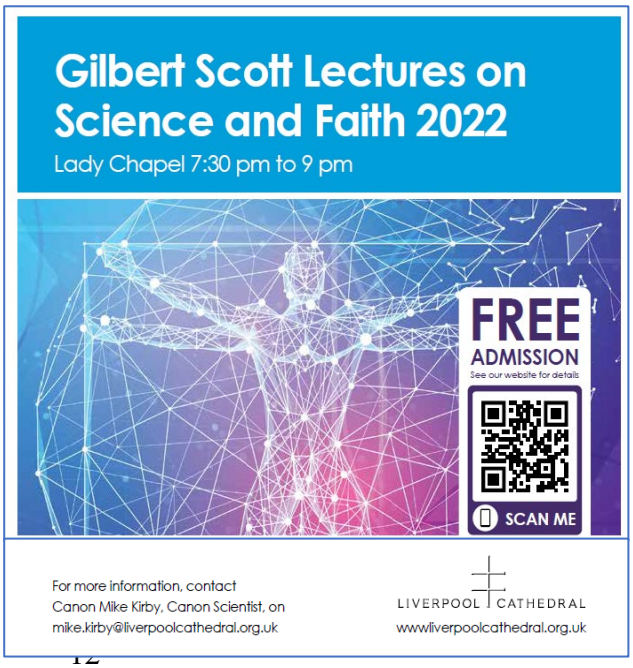
As we know, there are many other societies, and growing opportunities, for studying, researching and continuing to share so many glorious aspects of our science and faith, for which we should give thanks to God….and give our encouragement and support to. If you are interested in helping to support this particular example of those, at Liverpool Cathedral, please do get in touch!

Access to our dedicated webpage (which gives access to all available recorded lectures) can be found on the link or through the QR Code below. And please feel free to email me on mckirby@liverpool.ac.uk.

Many thanks!

Mike 😊

https://www.liverpoolcathedral.org.uk/exploring-faith/learning/lectures/the-gilbert-scott-lectures-on-science-and-faith/



Electrochemistry with love
Applying the language of sacraments to science and thence growing in Christian faith

Paul Monk
Vicar of Clarksfield: St Barnabas and Waterhead: Holy Trinity, in Oldham, Greater Manchester

Abstract
The author was a research chemist. His growth into scientific understanding was disabled by crippling doubt — nothing appeared to happen. That doubt was alleviated by combining his passions of science and art and the happy adoption of electrochromism as a sub-discipline because it explores the electrochemical generation of discernible colour.

This study then looks at analogies between faith and science, using the language of science to demonstrate commonality. Some common forms of scientific vocabulary are applied to theology. The scope for Christian growth is then explored within the concept of sacraments as a spiritual form of cause and effect.

The author's dilemma is then re-explored and re-described in terms of sacraments, inward and outward, invisible and visible. Finally, the study combines these ideas by suggesting that because 'God is love' (1 John 4), Christian growth can be catalysed by love, and that such growth through love can be regarded as sacramental because it points beyond itself.

Author's background
I went to a sink secondary school that served a large council estate in Hastings. I left that school with few qualifications. In fact, the only two O levels I achieved with any grade worth admitting were chemistry and art. Perhaps that combination of a chemical science and visual study helps explain the directions of my subsequent scientific career.

After school, I attended a local sixth form and, strange to say, encountered real teaching for the first time … and loved it. I later read chemistry at the University of Exeter. I stayed there for a doctorate in electrochemistry and persisted in that discipline until ordination in 2007.

I say 'I loved chemistry', which is true, but there always remained a small part of my mind that remained resolutely unconvinced. During lab work, there was a part of me that noted how we reacted a white crystalline powder, separated and purified the product, analysed it … but whatever the analysis said had happened, it remained a white crystalline powder. I could not believe that anything had really changed. I needed to see something—anything—to believe that a change had occurred. Perhaps that observation explains why I chose electrochromism as my doctoral topic.

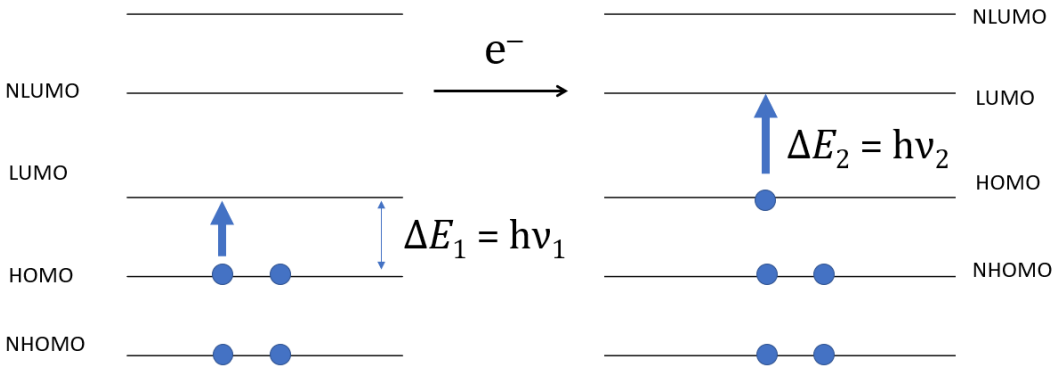
Scientific background

The term ‘electrochromism’ merely means that a current causes a change in colour. The underlying science is straightforward enough. Its two word roots are simple:

Electro At the heart of all electrochemical endeavour is the simple concept of redox (‘reduction–oxidation’): O + ne^- ⇌ R, where O and R are the oxidised and reduced forms of a chemical capable of redox chemistry and *n* is the number of electrons transferred.

Chromism The theory of colour says something like this. A substance shows a colour because it absorbs photons of light. (The eye ‘sees’ the light transmitted, so it’s the complementary colour.) The energy of those absorbed photons is taken into electrons in relatively high-energy orbital. They have the energetic wherewithal to promote into an empty orbital of even higher energy.

The only photons absorbed are those with the same energy as the energetic separation between the two orbitals — those which are occupied and empty. Different chemicals therefore show different colours because different photons are absorbed; ultimately, chemicals show different colours because their orbitals differ in terms of energy, energy separation, occupancy, and so on.



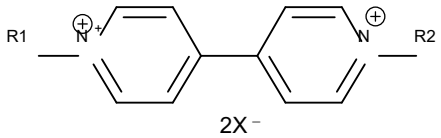
The different redox states of any chemical always have different numbers of electrons. They will always, therefore, absorb light differently. Different redox states almost always look different. That’s why the indicator in a redox titration changes colour. It also explains why a tarnish is different in colour to its respective metal.

My research

Electrochromism is a perfect way of combining chemistry with art because the redox forms differ in colour. It also addresses my underlying doubt that something has happened—*of course* something has happened because the electron-transfer reaction is accompanied by a change that’s readily seen by eye. Reversing the polarity of the electrode removes the electrons and the colour disappears. We say the device is ‘bleached’.

That change is easy to see because the chemicals I studied demonstrated dramatic shifts in colour. We may remember from school the intense purple colour of

permanganate, MnO_4^-, which has a so-called extinction coefficient e of about 1500. My PhD centred on bipyridilium compounds (sometimes called ‘viologen’ or ‘paraquat’ after the leading ICI weedkiller). The bipyridilium di-cation is generally colourless but the redox state produced by a one-electron reduction is a radical with a very large extinction coefficient. The extinction coefficient when R_1 = R_2 = methyl in the structure above is about ten-times larger than that of permanganate. But the coefficient can be a huge 100,000 if the *R* groups are based on benzene. No wonder we can see it.



The colour formed by an inorganic electrochrome is less intense than for an organic material. My post-doctoral fellowship involved, for example, tungsten trioxide and mixtures therefore, for which the extinction coefficient is low but still a respectable 5000. But the colours of inorganic materials are more photo-stable and therefore more suitable for applications involving daylight.

Much research into the electrochromic effect aims to produce either an optical shutter — a so-called ‘smart window’ for cars or helmets — or a device to convey information as, for example, a display or screen. Significant progress was made the 1960s and early 70s was it was curtailed by the rise of liquid crystals, but the underlying science is still being explored for niche applications.

My doctoral research had two aims: to increase the speed of the electrochromic transition and to tweak the hue of the colour evoked for making full-colour electrochromic displays.

Because the colour is formed by moving electrons, and each electron forms a single colour centre, it follows that the amount of charged passed is directly proportional to the intensity of the colour formed. Electrochromism can be taken as a combining of Beer’s Law and Faraday’s Law. That a colour forms is qualitative proof that an electron has done something. It also allows for qualitative analysis of the number of those electrons but also the nature of what they have done.

Exploring electrochromism for practical devices

The image below shows a flexible, transparent electrode (it could be a thin layer of indium–tin oxide ITO on a polymer substrate like those used as a screen on some models of smart phone). The electrode evokes an electrochromic response because several electrochromic materials have been deposited on its surface. The intensity of the colours differ so, for example, the different reds vary from vibrant and intense through to insipid and faint. These differences demonstrate the way that more electro-chemical charge generates more or less colour. But the different hues of colour reveal a variety of electrochromes. The colour has been ‘tailored.’

Electrochomic colours can be tailored in many ways. In practice, we tweak the colour of organic electrochromes by changing the substituents and maybe the

composition of the polymer's backbone; we best change the colour of inorganic materials by calculated mixtures which, at a microscopic level, change the separations between the colour centres within the solid-state matrix and therefore the energy needed to excite the electrons. The scope for change is simply vast.

Sacraments and using the language of science in theology

We may remember the definition of a sacrament from the catechism in the 1662 *Book of Common Prayer*. A sacrament is 'An outward and visible sign of an inward and spiritual grace, in us'. That definition is best explored through example.

First the Eucharist. The outward and visible part is eating bread and drinking wine. We need food if we wish to be nourished and thrive. We are what we eat, so good food sponsors good health while an unbalanced diet or food of poor quality is bad for us. To adopt the language of Paul Tillich, the sacrament points beyond itself to a spiritual reality, so the inward and spiritual grace of the Eucharist concerns the Holy Spirit nourishing a soul. Like physical food, the Spirit promotes our spiritual health and prevents spiritual starvation. Like physical food, the Eucharist needs to be repeated. We should not over-analyse the ways in which the Eucharist nourishes a soul so it's important to remember that 'sacrament' is a Latin substitution for the Greek *musterion*, 'mystery.'

The next sacrament is baptism. The outward and visible part involves washing or sprinkling with water. The water cleans the surface of a person's body. The person who has washed looks, feels, smells better. They are less prone to the illnesses of dirt. In much the same way, the inward and spiritual grace of baptism is spiritual cleansing. Baptism ensures the soul is mysteriously no longer prey to spiritual dirt in the way it was previously. The soul is washed, which initiates and facilitates future spiritual growth. Unlike the Eucharist, baptism is a 'one-off' sacrament; a person cannot be baptised then re-baptised again and again. Once is enough.

Jesus commands the sacraments of Eucharist and baptism, thereby explaining why we call them 'dominical' — they are of the Lord. But Holy Church teaches other sacraments of confession, ordination, marriage, etc. Later, de Caussade explored 'the

sacrament of the present moment' and this short study shortly will look at the 'sacrament of love' (as an eisegesis of 'God is love' 1 Jn 4).

The language of science can also inform theology. For example, baptism and ordination are once and for all so (to involve the language of science) they are qualitative: a soul is baptised or it is not. A priest can be unfrocked but cannot be un-ordained. By contrast, confession and the Eucharist are best encountered frequently so, in a sense, there is a quantitative aspect to their theology.

We can use the language of science to describe other Christian concepts. For example, the process of justification is a one-off event. Justification is a binary criterion. As St Paul says in Romans 5:6, 'At just the right time, when we were still powerless, Christ died for the ungodly.' A soul is either saved or it is not. Justification is also a qualitative criterion

Sanctification is different. While no titration can assess the level, amount, or extent of sanctification, St Peter can say, 'Through the precious and wonderful promises of God we may participate in the divine nature' (2 Peter 1:4). This verse sponsors the concept of *theosis* beloved by the Orthodox. It posits the image of a soul well advanced toward Christlikeness and growing into significant holiness. It suggests that sanctification has a quantitative aspect. To paraphrase Wesley, a soul can be 'saved to the uttermost' … but that same soul would have worked hard at its sanctification from soon after its justification when it was very, very far from perfection.

Our analogies can go further. At its most elementary, the scientific method progresses through experiment. It looks for cause and effect:

$$\underbrace{\text{We do something}}_{\text{Cause}} \Rightarrow \underbrace{\text{Something happens}}_{\text{Effect}}$$

Electrochromism lay at the heart of my chemical research: the cause was my deliberate use of an electrochemical charge (electrons flowed and generated a chemical) while the effect was the visible formation of new colour. We cause electrons to move and see a new colour as their effect. It is impossible to see the electrons but we can see their effect.

We see the collective effect of many electrons because the individual electrons (and their effects) are too tiny to discern. That which is visible is a macroscopic manifestation of something microscopic. We must infer an invisible cause after observing a visible effect: electrochromism is an outward and visible sign of something that is inward and invisible.

In the same way, we can do something outward and visible in a Christian life and (somehow) observe the inward and spiritual consequence. A few examples:

- When St Paul said, 'God chose you as first fruits to be saved through the sanctifying work of the Spirit and through belief in the truth' (2 Thessalonians 2:13) he is saying the sanctifying work of the Spirit is a cause and being saved is the effect.

- When Jesus says, ‘Blessed are the pure in heart, for they will see God’ (Matthew 5:8) he clearly lays out a cause and effect. Striving for spiritual purity can enhance spiritual perception.
- When Jesus says, ‘Be perfect as your Father in Heaven is perfect’ (Matthew 5:48) he is saying, in context, that seeking spiritual perfection is a cause that effects the pleasure of God.

The scientific method of cause and effect occurs everywhere in faith. Think of William Temple’s famous aphorism, ‘I pray and coincidences happen; when I don’t pray the coincidences stop’ which posits two different cause and effect scenarios, one positive and the other negative.

This chance example implies that we can tailor whatever faith we possess to change its effect. The outward and visible bits could be denomination or worship style. It could even include the use and abuse of the sacraments themselves. It could also include the relative extents of life-style and after-life style: ‘If we die before we die, we will not die when we do die.’ Truly, we reap what we sow—another potent example of cause and effect.

We see a new definition of a sacrament emerging, expressed in terms of cause and effect, of tailoring, of qualifying and quantifying, of secret and inward and discernible and outward. The extent of Christlikeness in a soul remains the extent to which God can live in a soul. It’s a free gift and the product of grace, but Jesus would not tell us to be perfect if it did not require our own effort as well.

Having assimilated these insights, we now explore the ways in which Christian growth can be maximised if we are indeed to ‘Be perfect as your Father in Heaven is perfect’.

But first a word of caution: Scripture abounds in choice metaphors and analogies that seek to describe God. God is infinite so it may be wisest to posit an indescribable God circumscribed by a vast number of these metaphors: we surround the cloud of unknowing by that which we do know. Everything remains hidden in the undefinable mystery who is God

Sacramental consequences

The Bible has a lot to say about love. It says that God is not only loving but *is* love (see especially 1 John 4). Love is both a fruit of the Spirit (Galatians 6) and a gift of the Spirit (Romans 12). Love is the best way of discerning if worship is truly God centred or not (1 Corinthians 12 and 13). Everything about God is therefore well described in terms of love.

But if ‘God is love’ then love can be used sacramentally as a means of growth. Stated differently, every act of love can be used as a sacramental likeness because it involves a simulacrum of God. That’s why St John of the Cross could famously said, ‘At the end of our life, we will be judged on our love’: he meant that the extent to which the God who is love is evidenced in a life is seen through the lens of love. The inward and spiritual is God residing in a soul but the outward and visible is love.

And because God is love, and because prayer is a means of talking to God and learning about God, it's perhaps not surprising that many ideas about God centre on both prayer and love. These twin themes coalesce to form a kind of prayer we often called 'prayer of relationship' although 'prayer of love' is perhaps a better description.

Prayer can be described as a loving waiting on God. That 'waiting' can involve our directing our love toward God and, because God is love, that love involves God because the love we direct toward God is God Himself. In effect, the God in us loves the God in Heaven. 'Deep calls to deep.'

Grace is then explained as God Himself taking the initiative. St Augustine says He is the first cause. He sends His love to us and only then do we redirect it back to Him.

Experiments in faith are valid insofar as they lead to God. Those efforts will be accompanied by prayer as well as action. The usual caveats include warning against deceiving self, putting God to the test, submitting to a spiritual director, and so on. A great many saints have investigated in such ways. St Ignatius of Loyola famously read military romances and stories of the saints and analysed his feelings afterwards; Ignatian spirituality tells a soul to imagine itself in a Gospel story and analyse consolations and desolations. Other examples are legion.

Taking these ideas together suggests that experiments in faith can be assessed with the question, 'Does it lead to a greater love?' Within the standard scientific mindset of cause and effect, any discernible changes in love are an outward and visible sign of the inward and spiritual God within us and, to that end, can be called 'sacrament.'

In all these ways, we are drawn closer to God. If we truly love God, then, using the love that is God, we can truly experience God. The central concept of cause and effect remains true because we love because he first loved us (1 John 4:19). We can grow toward the perfection of our perfect Heavenly Father so, eventually, our love for God and the love of God for us become indistinguishable. That's why John of the Cross could employ the striking metaphor 'The iron is in the fire and the fire is in the iron' (from *The Spiritual Canticle*).

Our travels have taken us to a great many foreign lands. This exploration started from a visceral need to see a visible, tangible expression of an electrochemical process: the author pounced on anything that looked like evidence in order to believe that something else had truly happened.

The subsequent exploration looked at the way scientific language overlaps with the language of faith, using fundamentals from the Christian storehouse such as justification and sanctification, inward and outward, grace, and scientific terms like qualitative and quantitative, cause and effect. Then, working backwards, we explored the way electrochromism is an outward and visible sign of an inward and scientific truth. Finally, we explored the use of love as cause and sanctification as effect.

In all these ways, the concept of a sacrament remains a simple but powerful tool

for exploring the inner workings of an invisible and spiritual God in a visible and physical world. Love enables an evocation of God. Outward and visible things such as love can infer the inward and spiritual working of a God who is love. Love is therefore sacramental.

Acknowledgements
I would like to thank my friends in the *Carmelite Companions of the Way* (an Anglican re-exploration of Carmelite truths) for many fruitful discussions.

BOOK REVIEWS BY URSULA SHONE

Inventing the Universe Alister McGrath [Hodder & Stoughton 2016]
The sub-title of this book 'Why we can't stop talking about science, faith and God' will speak to all members of SOSc, I would presume! Alister McGrath joins the company of those known to most of us who have written on this subject, from C.A. Coulson (1955), Arthur Peacocke (our founder), John Polkinghorne and the many who have continued to do so up to the present time.
He writes, "*This book is not about defending either science or Christianity ….(rather)…..to explore how they might intertwine and interconnect…..as we try to depict …..our complex world and live meaningfully within it." (p.181).*
Alister McGrath's exploration began as an atheistic teenager who became fascinated with science from star- gazing to studying plants and cells with a microscope. He was an avid wide-ranging reader. He won a scholarship to study chemistry at Oxford and it was there he came to faith. As he says, "*I experienced a new way of 'seeing things' …. a new mental map"* (p.67) and he found this through Christianity.
The first part of the book considers the topics familiar to SOSc members from other authors and in many a discussion. Thus – theory, evidence and proof; origins and creation; Darwin and evolution; fundamental constants and the anthropic principal – are considered in ways familiar but with new insights and approach.
It is the second part that I found more interesting when he discusses what, if anything, is distinctive about humanity and what it means to speak of a 'soul'. This leads to the discussion of problems such as:
a) genetic reductionism (physics cannot predict biology!);
b) fundamentalism both scientific and religious;
c) the dark side of human nature (sin).
He concludes with thoughts on the future and with questions about 'transhumanism' which thus brings his thinking right up to the present.
I commend this book to SOSc members as it continues in the tradition of the study of relationship of science and faith, and I hope that it will reach a wide readership.

These are some other books which could be of interest to members.

Through a Glass Darkly Alister McGrath [Hodder & Stoughton 2020]
In this book, called 'A Memoir' Alister McGrath tells his personal story of how he moved from atheism in his teenage years to faith while studying sciences at Oxford University. He writes of this as a journey of exploration, one that is still ongoing as over the years he has learned to live with uncertainty and doubt. He is now one of the key figures in

the study of relation of science and faith through his writing, lecturing and teaching internationally. This book adds to his background as given in his other book also reviewed.

On the Origin of Evolution John and Mary Gribbin [William Collins 2020]
The sub-title sums up this book - 'Tracing 'Darwin's dangerous idea' from Aristotle to DNA.' It is co-written by John (astrophysicist and journalist) and Mary (teacher and author) Gribbin and is an enjoyable and well-written read. Together, they give a coherent account of the history and development of the theory of evolution from the Greeks to today. For me it filled in many of the gaps in my understanding of the history of the theory of evolution! It could well prove to be useful as a reference book on the subject.

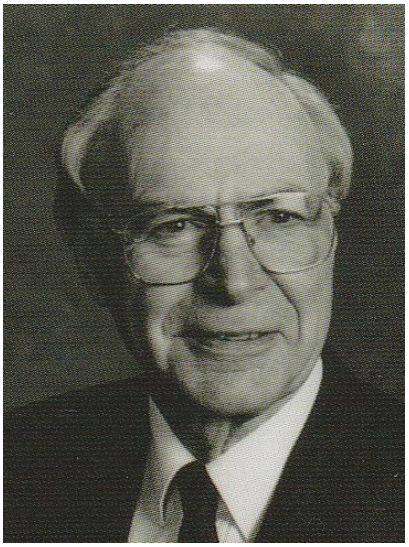
Ancestors Professor Alice Roberts [Simon & Schuster 2021]
This is a fascinating read for those interested in the prehistory of Britain. Alice Roberts, the author, is the Professor of the Public Engagement with Science at the University of Birmingham. She is also well known for her television programmes on biology, archaeology and history. In this book she explores seven burials which have been explored in detail (eg Amesbury Archer) and what can now be learned about that distant past from a wide range of modern investigative techniques. As she discusses the burials she is able to bring the people to life in their context.

The Light Years Seb Falk [Allen Lane 2020]
Most of us have probably been taught to think of the period from after the Romans left Britain until the medieval period as the 'Dark Ages'. owever the title 'The Light Years' gives a very different view of that period. Seb Falk tells of his 'medieval journey of discovery' and how it came about. It was in the 1950's, that a researcher, Derek Price began his work into the history of scientific instruments in Cambridge. He was led to a manuscript which gave instructions of how to make an astrolabe. This was dated 1392 and written in Middle English not Latin. The more remarkable fact was it was written by Chaucer! This research was continued by many others.
This book grew out of this research and it gives a fascinating study of the ways of thinking in that period. Seb Falk imaginatively tells a story woven around a real monk of St. Alban's Abbey called John of Westwick. It is quite a scholarly read but well written and gives much insight into the world of the 14th century focussed on monastic life. I have to admit I found some of the mathematical sections on how the calculations were made, difficult but even to bypass these one is left with an intriguing and unusual story. It had never crossed my mind to wonder how the monastics of the Middle Ages were able to calculate the information for their observances but at least now I have some more idea. A good and interesting read!

An address at Compline, St Mary's, Farleigh on 24 July 2022; part of a series reflecting on Christian leaders.

Dr Arthur Peacocke

a personal appreciation by David Atkinson, Assistant Bishop Diocese of Southwark.



It must be nearly 30 years ago that Arthur Peacocke and I walked round Christ Church Meadow in Oxford. I was Chaplain and Fellow of Corpus Christi College; he was Director of the Ian Ramsey Centre for Science and Religion. My background before I was ordained was in organic chemistry, and I undertook some research at King's College in the Strand. Arthur Peacocke, nearly 20 years older than I, had been a University Lecturer in Biochemistry, here and abroad, and continued some of that work once he also was ordained as a Church of England priest. Arthur had suggested the walk because he wanted to talk to me about something: David, I have been talking to quite a few friends in the science world, and it occurs to me that there are a number of us who have research degrees in science, who are also ordained ministers in the Church. We have been wondering, he said, whether it would be it a good idea to call all of us together? Yes, I said, and so he and I and about 20 others met for a weekend conference, and a new Society - The Society of Ordained Scientists - was born. It now has just under 200 members, mostly here in the UK, but there is a growing group also in North America. We meet every year for an Annual Gathering, which is partly for mutual support, but mainly as a retreat for prayer and learning together. There are local gatherings every now and then around the country. Our first Visitor was John Habgood, then Archbishop of York, and Arthur Peacocke became the first Warden. Our membership has included physicists, chemists, geologists, biologists, psychologists, mathematicians, people who have worked for NASA, people who have worked for Guinness, medical people and so on, and so on. Many are still working as scientists while also being non-stipendiary ministers, some like me started in science and then got ordained to be full-time priests.

The Society of Ordained Scientists is noted in the Church of England's list of societies; it has a website, and it has its own prayer, which Archbishop John Habgood wrote. I shall use the prayer at the end of my talk.

This Society, and all it stands for in seeking to make the conversation between the world of science and the Christian faith better known, was very much inspired by Arthur Peacocke.

Arthur died in 2006, aged 81, and I am glad to have known him as a friend and worked with him. Back in the late 1980s, we together set up a seminar in Oxford called 'Science and Theology', which ran for some terms, I do not know whether it still does. He wrote numerous papers in journals, and published 12 books. It is through his published writings that he is best known, and for which he was awarded the prestigious Templeton Prize in 2001 as a mark of the contribution he made to the science and religion conversation.

Arthur even gets a mention in that rather careless pot-boiler from Richard Dawkins *The God Delusion (2006)*, where Dawkins maintains, rather mockingly, that he has only heard of three scientists in the UK who are religious believers - John Polkinghorne, Russell Stannard, and Arthur Peacocke. It is an unexpected thing, which perhaps Richard Dawkins does not know, that quite frequently in Christian societies in universities, there are more science students than arts students. And, as I said, there are just under 200 members of the Society of Ordained Scientists, research scientists who are also members of the clergy. So, I do not know which world Richard Dawkins was living in when we wrote that he had only heard of three scientists who are Christians!
I want to spend the rest of my time to tell you about a few of Arthur Peacocke's books. I have chosen six in particular.

1. As long ago as 1971, Arthur Peacocke, when he was a university science teacher, wrote a book called *Science and the Christian Experiment* (1971).
He said that he thought of the world as one world, and that all truth is God's truth, so there can be no contradiction between the findings of science and being a Christian believer. Arthur was aware of course of the view that science and religion are at war with each other. There was even a book, published over 100 years ago, which was titled 'The Warfare between Science and Religion' and lots of contemporary journalists still seem to hold that view. Not Arthur! One of the themes of his books starts here - with the scientific view of the world, from rocks and chemicals, and to living matter, and then evolving to mammals and eventually to human beings. He talks about God's creation; about the features of our humanness, and how the Christian understanding of what it means to be fully human is seen most clearly in Jesus Christ. He describes what he calls a 'Christian humanism' celebrating the importance of human beings in God's world.

One section from that book which made a big impression on me was this:
"Why *should* science work at all? That it does so points strongly to a principle of rationality - to an interpretation of the cosmos in terms of mind as its most significant feature... There is clearly a kinship between our minds and the cosmos which is real." (p. 133f.).

We could put this in biblical terms by speaking of human beings made in God's image - and the way the rational ordering of our human minds somehow corresponds to the rational ordering of God's creation. As Ecclesiastes puts it 'God has put eternity into our minds'.

2 and 3. The second and third books I am going to mention are more heavyweight and academic. The first was his Bampton Lectures in Oxford in 1978. These lectures were expanded into a book called *Creation and the World of Science*, and it is a major achievement, and is widely regarded as a classic work in theology. A great deal has moved on in modern physics since 1978, but Arthur's approach to what he called (following some of the early scientists) the 'Two Books '- the 'Book of Nature' and the 'Book of God's Word' - shows how a Christian understanding of the world as God's Creation provides intelligibility and personal meaning in a world which is so dominated by scientific understandings.

The other major book *Theology for a Scientific Age* was published first in 1990, and then again in 1993 when it included his prestigious Gifford Lectures given in the University of Aberdeen. It is another major academic piece of work, which is still widely quoted in the conversations between science and Christian faith.

4. The fourth book I'm looking at was an early one. Arthur Peacocke sharpened up some of his thoughts in cooperation with the then very well-known psychiatrist Jack Dominian. They called the book that they wrote together *From Cosmos to Love* (1976). Their subtitle was *'The Meaning of Human Life*.'
This book is the text of four talks, two by Arthur Peacocke, two by Jack Dominion, given in the winter of 1976 at the University Church of Great St Mary's in Cambridge. Arthur, the biochemist, tried to spell out from the point of view of biological evolution, what it means to be human. He sees the evolutionary processes as being ways of exploring all the potentialities within God's creation. Over such a very long time, out of the nuclear furnaces we call the stars, emerged the possibility of carbon-based creatures which we call alive, and amongst these emerged human beings with a brain and consciousness and the capacity to know ourselves. More than that, God expressed God's own self through the created order. And that leads Arthur to the first chapter of John's Gospel: 'The Word became flesh and dwelt among us'. In the birth and life and teaching and death and resurrection of Jesus, Christians believe that we see the True Human Being - what authentic human life is intended to be.
Then Jack Dominian, from his psychiatrist's perspective, looked at the world of human relationships. He called his first talk 'Love of Self', describing how, for good relationships with others, we need to know and love and care for ourselves. He then moves on to a talk called 'Loving our Neighbour', which looks at the ways mature relationships can be healed and sustained and grow creatively.
These two authors together provide insights into God's purposes for the whole world: to move - as their title put it 'From Cosmos to Love.' The book takes us from God's creative love in the beginning of the cosmos, through to the possibilities of human loving relationships, understood - for the Christian - in terms of God's relationship with us through Christ. The purpose of the cosmos is love, and that all things shall be healed by being kept in the love of God. And this ultimately is the main thing Arthur wants to say in all his writings: The whole creation is born from God's love, and it is meant to lead us all into the welcome of being enfolded in God's love.

I now have my final two books to refer to briefly.
5. The first, called *Intimations of Reality* (1983), was the text of two lectures given at an American University in 1983. The first lecture covers aspects of philosophy of science. The second lecture is an exploration of God's action within this world. I want just to highlight two of the many strands of this book.
Arthur Peacocke points out, as others have done, that there are various features of our world which are constant: the speed of light; the strength of forces within the nucleus of an atom; gravity. If these features were different in some way, this would be a very different world. It seems that the physical structure of the universe is precisely what is necessary for the development of carbon-based life - which means us. Change any of these features, and we would not be here. As someone said: 'it is almost as though the universe knew we were coming.' Is that a pointer to the creative purposes of God?
The other feature of this book is that Arthur Peacocke sees reality as many-levelled. There is the level of atoms and molecules; of minerals and rocks; of simple life forms evolving eventually into people like you and me; in other words, there is a level of physics, of chemistry, of biology. We could then think of our inner lives - our psychology; our social lives - sociology; our values. and so on. From a Christian point of view, it is God who holds all these levels together. Each level is dependent on lower levels, but not reducible to them. So, we cannot reduce our biology to just physics and chemistry; we cannot reduce our values to just evolution. On this view, the incarnation of Jesus, God's Word made flesh, is the intersecting vertical coordinate giving meaning to each level.

6. Throughout all these books, Arthur Peacocke is writing both as an accomplished research scientist, and as a Christian believer. He says we need both worlds working together for us to understand reality. Indeed, in the last book I am going to mention, he illustrates various *Paths from Science towards God* (2001). This was his last book, and says that it is an account of an exploration from the world of science towards God.

Arthur's writings leave you with a sense of God as creator, who wonderfully and mysteriously combines what we think of as 'chance' in evolution, with the ordered world of physical and chemical laws. He speaks of the suffering God, who suffers with the creation, and with suffering people, when the storms of life break over us. He speaks of a God who makes God's own self known, not only through the created order, but especially and personally in the birth and life, death and resurrection of Jesus. He write of God who has made us to be God's own image - reflecting something of God's nature, and capable of coming to know God's love in our own hearts.

Arthur was a respected scientist, a humble pioneer, a man with a mission: to demonstrate the necessary and fruitful conversation between science and Christian faith. I think he was a great man, for whom we can thank God.

In 2006 Arthur wrote to members of the Society of Ordained Scientists to say that he had been diagnosed with cancer, and that he did not have much longer to live. He wrote about his faith - and that all the heavy science and theology that he had written over the years now seemed very small in the light of what he was to discover through his death. He said, memorably, that he was ready for death. I am going to end my talk, my appreciation of Arthur Peacocke, with some words he wrote in a letter just before

his death. I hope they lift your spirits as they lifted mine. He wrote of his death: "I am ready to be enfolded in Love."

This is the Collect for the Society of Ordained Scientists:
ALMIGHTY GOD, Creator and Redeemer of all that is, source and foundation of time and space, matter and energy, life and consciousness: Grant us in this Society and all who study the mysteries of your creation, grace to be true witnesses to your glory and faithful stewards of your gifts; through Jesus Christ our Lord. Amen.

A SCIENTIST LOOKS AT EASTER:
a letter written by Tom Broadbent.

The famous humourist author, Mark Twain ["*The Adventures of Huckleberry Finn*" (1884) and "*Tom Sawyer Abroad*", (1894)] wrote: *'Man is the only animal who's got the true religion – several of them!' and 'The other animals have no religion, you know. Don't be left out!'*

In this way he publicised the 19th century doubts about the truth of Christian claims. Since then, the idea has got abroad that Science has made religion obsolete – every schoolboy seems to know it. [I'm not sure about girls.]

An influential book I've just read, "Sapiens: A Brief history of Humankind" [500 pages – not that brief!] by Yuval Noah Harari, pre-supposes that faiths are entirely human constructions to control societies – with no objective basis.

Where do I sit as a scientist-priest, of whom there are hundred in the Society of Ordained Scientists mainly in the Commonwealth and United States, although one corresponds from the presently troubles country of Ukraine?

Despite an interest in other great world faiths [I was for several years, Chairman of the Manchester Council of Christian and Jews, the largest community of British Jews outside London] I obviously still want to commend Christianity as the best way that I know of living and believing.

It has survived the most searching critique of secularism and atheism for hundreds of years now, although it has obviously come down in the world – but as Monica Furlong has written, 'down in the world is where it ought to be.'

This is not to deny that a scientific age has come up with powerful arguments about some of the claims of orthodox Christianity, as happened in the 17th Century, when Galileo maintained against the Catholic Church that the earth was not the unmoving centre of the Universe and in the 19th Century when the majority of the Church of England opposed Charles Darwin's Theory of Evolution: strongly suggesting that man was not created in one day by God but evolved over millions of years.

Nevertheless, we can believe God created the <u>potential</u> for our wonderful and threated world to come to be.

And how about the great festivals of the Church? I enjoy Christmas but find Easter more problematic. If Jesus could be resurrected, why not our loved ones? Our own resurrection is a future hope: our Easter is, I suggest, not yet. Resurrection of the body is problematic anyway. At the point of death, irreversible decomposition has already begun. Jesus invited Thomas the Apostle to feel his hands and his side, [although there is no evidence that he actually did] and yet his body could apparently pass through locked doors [John 20 : 19], unlike ours. Tim Ellis, lately Bishop of Grantham, was uncertain how the resurrection happened, but that it had happened he firmly believed.

Critical realism [which I espouse] suggests things are not exactly as naive as a Christian theology might claim, but nevertheless “it works” for people. This is Christian Existentialism, particularly associated with the Scottish theologian John Macquarrie. There must be some truth that lies behind such Christian claims as Easter hope.
Clearly church attendance in Bardney seems to have been undermined somehow – way below the national average. If you thought it was boring, irrelevant or simply incredible, why not give us another chance? Be assured, you won’t have to hang up your brain at the door. Contrary to popular view, Christians are not people who believe up to 5 impossible things before breakfast.

A Happy Easter to you all.

The prodigal climate crisis

Mark Siddall, Diocese of Bristol, UK

Abstract

The parable of the prodigal son is examined in the context of its physical setting within creation and its scriptural setting within the Lucan Gospel kerygma (Acts 2.38–39), revealing the integral ecology of the parable. Broken relationships among people and the land in the parable correlate with the contemporary human broken relationship with creation, which is causing the climate crisis. The brothers categorize the family farm in terms of either possession or merit. Neither possession nor merit are correct; the correct categories in which to view both the family farm and creation are the gospel categories of faithfulness and grace.

Keywords

climate, creation care, crisis, ecology, integral ecology, Laudato Si’, prodigal son

Theology 2022, Vol. 125(3) 197–204

"*DON'T BREAK YOUR HEART LOOKING FOR STANDARDS THAT DON'T EXIST*"?

Roger Pullin[i]

Back to School

On May 11 2022, Wolverhampton Grammar School (WGS), held a memorial event for a teacher who had been a great mentor to me. John Anthony ('Tony') Stocks, known affectionately to pupils and some fellow staff as 'Jasper', taught History, Latin and Religious Education. He went on from WGS to become Headmaster at St. Thomas Rich's School, Gloucester, where he was also a Methodist preacher. He returned to WGS in 1973 as Headmaster and steered it through some turbulent years.

When I was about 13, Jasper took me aside and asked me to describe my perfect career. I was already hooked on biology and said that I would like to direct a marine biological institute. He asked where that might be? I had just watched the film 'Battle of the River Plate' and chose the River Plate estuary. He was very kind and assured me that I could achieve whatever I sought. Then he added: "*But don't break your heart looking for standards that don't exist*."

I became a Lecturer at Liverpool University's Port Erin Marine Biology Laboratory (PEML) on the Isle of Man and then joined the International Center for Living Aquatic Resources Management (ICLARM), Manila, where I led international research programmes to support aquaculture in tropical developing countries. At the PEML and ICLARM, I was part of small, highly competent and friendly teams, contributing to science and its applications to benefit humanity. My dream came true, but Jasper's caveat was prophetic. The PEML and ICLARM both came to sad ends through bad governance.

Standards?

I define the kind of standards that Jasper meant as prescriptions for furthering truth, love and goodness, consonant with the will of God. Opposing prescriptions that further the cause of evil are not standards. They are all lies in various guises. Standards are fostered by good guidance from God and fellow humans, as truthful information. Standards are opposed by misguidance from the spiritual force for evil and fellow humans, through a web of lies. Our free-willed decisions and consequent behaviour serve the cause of one side or the other. Standards are threatened through wider acceptance of non-compliance and attempts to lessen their rigour.

Some standards seem innate as well as learned, even in some animals. Chicks in a nest clamouring to be fed are entirely selfish, but some of our fellow primates and other animals exhibit what appear to be empathy and consolation, reciprocity and aversion to unfairness, and marked prosocial tendencies.[ii] Altruistic behaviour in animals always has expectations and/or potentials for reciprocal benefits to the altruist and/or the altruist's group. I hold that *genuine* altruism, with no expectation and/or potential for reciprocal benefits, is found only in humans.[iii]

Each human self recognizes, at any point in life beyond infancy, a compendium of standards, including: some that are innate, as an evolutionary legacy; others, implanted by God in the soul early in life; and others that are learned as life proceeds.

We cannot disentangle this mix, but we can see that standards, for compliance or non-compliance, really do exist in many contexts including, for example: animal and human welfare; care for nature; human rights; interpersonal relations, and professional conduct in government, medicine, science, teaching etc.

Christ's Sermon on the Mount[iv] and His endorsement of the two summary commandments[v] are arguably the highest standards given to us. C.S. Lewis[vi] argued for Christianity based on what he called the "*Law of Nature*", which is felt, known and also transgressed across all humanity. Kent Keith's "*Universal Moral Code*"[vii]and the Golden Rule 'do as you would be done by' and its biblical forms[viii] all concur. Compliance is bedevilled through the 'us-and-them' perspectives that pervade humanity and are always based on lies. Jasper was warning me to expect human failures in complying with the moral standards that God alone can follow perfectly.

Don't Break Your Heart?

Throughout Scripture and for present purposes, the term 'heart' means a human self's soul or spirit. Scripture warns us against hardening our hearts,[ix] and endorses the empathy that makes our hearts fragile. Having a broken heart from time to time is part of what makes us human. Some animals also get their hearts broken; for example, by the death of a fellow in a kinship group and for pets by the loss of an owner.

Most human hearts get broken, a little or a lot, for long or short periods, by abuse, betrayal, injustice and violence, or by seeing others suffering the same. Horror shows such as the Holocaust and the ongoing Russian war crimes in Ukraine must break the hearts of all who seek a world of peace and love, based on truth not lies. God calls us to rend our hearts over evil happenings[x] and becomes especially close to those with broken hearts.[xi] And hearts can get mended, even after the worst of times.

I had the pleasure of working in Côte d'Ivoire with a Cambodian scientist who had survived the killing fields. He had escaped to France and become an expert on aquaculture in developing countries. Outside work, we shared a love of jazz guitar and Asian cuisines. I asked him how after all his experiences and losses he had become so contented? He said: "*When the heart is broken - find another heart.*" In other words, mend your own broken heart and make new connections with the hearts of others. God can heal any broken heart, directly and through moving fellow humans to connect with, console and encourage the broken hearted.

Closing Doors

When precious and productive workplaces close, many hearts are broken; as was mine and those of many colleagues, alumni and friends with the closures of the PEML and ICLARM.

The PEML closed in 2006, after 130 years[xii] of contributions to marine biology, including: hatchery technology for aquaculture; long time series datasets on seawater parameters and plankton; pioneering the use of protected areas to revive and sustain fisheries; and teaching students from the U.K. and around the world. Located at the centre of the Irish Sea marine ecosystem, the PEML had immense value for understanding and confronting climate change. The University failed to find ways to sustain it and sold it for £1 to the Manx Government. Its ruins and land are now owned

by a company that plans to build flats with additional amenities. The 1902 spawning ponds, where I kept fish, were filled in and are currently used as a car park.

ICLARM was the 'fish' centre among the 16 international centres of the Consultative Group on International Agricultural Research (CGIAR), which covered specific food commodities (rice, wheat and maize, livestock etc.) and forestry. Working at ICLARM was wonderful until serious management problems arose. I was one of a small group of whistle-blowers who informed the ICLARM Board; in confidence, but the word got out.

The Board took the view that the matter was a loss of discipline and that they had to be tough to reassure ICLARM's donors. In truth, there was no loss of discipline. We were working as normal, with partners all around the world. Rather than seeking constructive solutions, the Board issued reprimands, demoted a Program Leader, and fired the Senior Scientist in the Program that I directed, whom they had tagged (wrongly) as ringleader. He was hospitalized with the stress. We took them to court and won his reinstatement, against all the lies.[xiii]

The Board Chair and Director General resigned. We were vindicated, but our former blissful scene could not return. The new Board and management wanted things to look new. They closed down the ICLARM that used to be and set up the World Fish Centre in Penang. Almost all of ICLARM's astonishingly productive, loyal and friendly Filipino staff lost their jobs. The whistle-blowers were also eased out. I was given an absolutely final 3-year, part-time contract and entered the unpredictable world of freelance consulting, where other doors opened.

I write songs sometimes about the ups and downs of life. "*Close the Door*"[xiv] was written for the ICLARM debacle, but fits as well for the PEML's demise and for the loss of any precious relationship or organization. It echoes Jasper's "*Don't break your heart…*"

Something is dying here, as we close the door
But don't waste time crying here, not for the times before
Nothing worth buying here; don't waste time crying here
Something is dying here; so just close the door…

There was such magic here, not so long ago
But don't get so tragic here; that's just the way things go
Don't get nostalgic here; don't get so tragic here
But there was such magic here, not so long ago…

When it's gone, let it go; just leave it all behind
When it's gone, just let it go; freedom is what you'll find…

Conclusions

Jasper's advice to me was perfect for an ambitious and idealistic lad, who wanted and expected life and work to be plain sailing. He did not say never break your heart, or that there were no standards. He warned to expect failed standards at work and implied that heartbreak was more appropriate to other circumstances. We all fail to uphold standards in various ways. We all have our hearts broken and we all break the

hearts of others to various extents. The abiding message is to help broken hearts to heal and to do our best to uphold standards, through God's help. I thank God for Jasper and for all my teachers.

Memorial for John Anthony 'Tony' ('Jasper') Stocks, Wolverhampton Grammar School

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[1][i] pullin.roger@gmail.com

[ii] See for examples: 1. De Waal, F. 2009. *The Age of Empathy: Nature's Solutions for a Kinder Society*. Harmony Books, NY. 2. De Waal, F. 2009. *Moral Behaviour in Animals.* TED Talk; available on www.youtube.com. 3. De Waal, F. 2013. *The Bonobo and the Atheist: In Search of Humanism Among the Primates*. W.W. Norton and Company, NY.

[iii] Pullin, R. 2014. *Free Thought, Faith and Science: Finding Unity Through Seeking Truth*. Outskirts Press, Denver CO. pp. 212-217.

[iv] Matthew 5: 3-48

[v] Luke 10: 27

[vi] Lewis, C.S. 1952. *Mere Christianity.*

[vii] www.universalmoralcode.com

[viii] Matthew 7:12 and Luke 6:31

[ix] Psalm 95:8, Proverbs 28:14, Hebrews 3:13

[x] Joel 2: 13

[xi] Psalms 34:18 and 51:17

[xii] There was an exhibition about the history of the Port Erin Marine Laboratory at St. Catherine's Church Hall, Port Erin, September 1-25, 2022, *The Winkle Pickers, Port Erin: A World Leader in Marine Biology (1892-2006),* with an accompanying booklet; available from the Rushen Heritage Trust (www.rushenheritage.org)

[xiii] David Grémillet (2021) included vivid descriptions of ICLARM's heyday, decline and fall in his biography of Daniel Pauly. *The Ocean's Whistleblower: The Remarkable Life and Work of Daniel Pauly.* Translated from the original French by Georgia Lyon Froman. Greystone Books: Vancouver. 349p.

[xiv] Pullin, R. 1999. *Close the Door*: words and music; home recording (mp3) available on request.

Eric Albone writes an Obituary for his wife Kumyul:

KUMYUL SONG ALBONE 1941-2021

My wife of 52 years, Kumyul, died following a tragic accident in our garden, on 5 November last year. She fell from a ladder while pruning roses, hit her head on paving stones, and suffered fractures of her skull and massive bleeding in her brain. I am grateful I could hold her hand as she was dying. Born in Korea, we married in the US. She was very healthy and her loss has been devastating. She was extremely happy in the UK, was an active, much-loved member of Cotham Church in Bristol, and greatly valued being an Associate Member of SOSc. When she retired from her career in science, she also found to her surprise fulfilment serving the community as a magistrate on the Bristol bench. The best I can do here is to share my love for her is to relate the words I spoke at her funeral in Cotham Church. Eric

Kumyul, dear Kumyul, you experienced much joy and overcame so many challenges in your journey through this life, a life lived with courageous openness to the new. Your modesty, your not wanting to be the centre of attention, veiled from many your wide ranging talents, your strong no-nonsense personality and your lively humour. Laughter was never far from you. Your greatest joy was our family, and particularly Mike, Lu and Paul, in whom you took such pride. That you are a very warm, caring person shone through to everyone.

From your birth in Pyongyang in 1941 in Japanese occupied Korea, through fleeing to Seoul from the Russian communist occupation in 1945, then suffering again through the Korean war, and enduring life as an impoverished refugee family from the age of 9 in Busan on the south eastern tip of the Korean peninsula, these experiences shaped much of what you became. Your experience of war means that people and particularly family mean so much to you, as does your faith, just as you detest vain boasting of wealth and status. You saw how little these things mean when the world dissolves; in the war your family lost everything apart from each other.

After the Korean war, through hard work you gained a scholarship to Ewha Girls' High School, a top girls' school in Seoul, and then a degree with distinction in pharmacy in Seoul National University - you had wanted to become a medical doctor, but your uncle, a distinguished orthopaedic surgeon, advised strongly against this as at that time in Korea life would be very tough for a woman entering that profession.

We met when you came to the State University of New York at Stony Brook in 1966. You came from Korea as a graduate student to join Ed Kosower's research group in chemistry and I, myself as a post doc fresh from England; for each of us our first taste of the US. I was the first Englishman you had ever met, you said. Despite coming from the ends of the earth and from very different backgrounds we found we had so much in common and we found our differences fascinating.

You came with me when I took a final year in the US with an exciting new group at Washington University in St Louis, Missouri, and you obtained a research post in the medical school there. We were married in a Korean Church in St Louis in the summer of 1969 using a service we devised in English and in Korean with the pastor incorporating elements of the Prayer Book service with Korean elements. It was a wonderful service.
We married at a time when it was still illegal for people of different races in many US States to marry, and although the university was fine, people in general peered at us from behind their curtains as if we were from outer space. Even before this you encountered racism by being turned down flat when seeking rented accommodation in New York City. You found this racism odd and hurtful, but as the furious Nechama Kosower the straight-talking Jewish biochemist you worked with in Yeshiva University in the Bronx shouted "if they don't want you, you don't want them either", words which have echoed with you ever since.

On November 5, 1969 we entered the UK as man and wife. Kumyul, you placed a great faith in me as you stepped into another unknown world. For my part I am so privileged to have shared these past 52 years of marriage with you as a wonderful wife and mother, enjoying many joys and facing many challenges together. I am so grateful to have been welcomed into your Korean family with open arms, as you have into mine. Ties with your Korean family remain strong, and it is so good to have 5 family members from California with us today. In particular your older sister, YoonYool, in New York, who is not able to travel, will miss you greatly. You have been in daily Skype contact sharing news with much laughter for many months and it was she who was totally bowled over when you turned up as a surprise guest at her 80th birthday celebration a few years ago.

Kumyul, it is so difficult to say goodbye. You are everywhere here, you will be in our hearts and lives for ever, but say goodbye to you in this world we must. You were always clear that everything ends and moves on and you were adamant that we must not cling onto the past, but look to the new.

Rather, your take on life was that of profound gratitude for the time we are given in this wonderful world. Such a gift so easily squandered!

Here I quote from the closing paragraph from your own reflections on your life, a private autobiography you wrote in 2013 for close family. You wrote-

Our earthly life is often referred to as a Journey. I would not hesitate to describe my life in this way too, since I came to Britain as an extended holiday with a one-way ticket and have settled down well here. I don't think I will ever return to my native country again. I have become too greatly distanced from the way of life in Korea, a way of life

which has for so long been embedded in archaic Confucian traditions and customs, and still is, manifest both in family (although definitely not in your own family Kumyul) as well in social life. I find it quite intolerable the way people in Korea intervene in the lives of others as if they know best how to live other people's lives. I am very grateful that I am far away from such interference.

One word is sufficient to sum up my overwhelming sentiment when I look back on my life over seventy years. That word is thankfulness. I am thankful to my parents for my life in this world. I am thankful for the good education I received in Korea, in the United States and in Britain. I am thankful to Eric for my life in this country where I have experienced goodness in humanity and excellence in human endeavour. Above all, I am thankful for the love and support of my friends and my family without whom I would have no meaning in this world.

CHANTRY LIST TO SEPTEMBER 2022

Kumyul	Albone	2021
Peter	Arvedson	
Michael	Benton	2013
Sjoerd	Bonting	
Robert	Buckley	2014
Mary	Catterall	2015
Peter	Fulljames	2020
Tim	Gouldstone	2006
+John	Habgood	2019
Richard	Hills	2019
Jack	Hird	
Eric	Jenkins	2006
Lucius	Johnson	2020
Hubert	Makin	2008
Philip	McPherson	
Michael	Meredith	2014
David	Moore	2018
James	Moran	
Rowland	Moss	1993
John	O'Hearne	2017
Arthur	Peacocke	2006
John	Polkinghorne	2021
Michael	Pragnell	2020
Barbara	Pursey	2014
Michael	Ranken	2003
Robert	Semeonoff	2009
James	Skehan	2020
Helen	Stacey	2013
Bill	Stoeger	
George	Tolley	2015
Frank	Topham	
+David	Young	2008