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Gifford Lectures corner

Behind the eye:
Donald M. MacKay and the 1986 Glasgow Gifford Lectures

George M. Coghill

George M. Coghill is an Emeritus Professor of Computing Science at the University of Aberdeen. He specialised in Artificial Intelligence. Since retiring he has been carrying out research in Theology and Science, affiliated to Edinburgh Theological Seminary.

The 1986 Gifford Lectures at Glasgow University were delivered by Donald M. MacKay, Emeritus Professor of Communication and Neuroscience at Keele University. Ten lectures were delivered over a three-week period in October and November of that year because he was suffering from the cancer that would take his life a few months later. The lectures were edited and turned into a book by his widow, Valerie MacKay.[1] Most of his own research had been focused on the visual system of the brain, hence the title of the lecture series and book.

As has been noted in the previous articles in this journal's series on the Giffords,[2] these lectures have a very specific remit. In particular, special revelation is explicitly excluded from being used in any argument presented. Donald MacKay took this requirement very seriously and

[1] Donald M. MacKay, *Behind the Eye* (Oxford: Blackwell, 1991).

[2] Jonathan C. P. Birch, "Imagining the Gifford Lectures: 134 Not Out", *Theology in Scotland* 29, no. 1 (Spring 2022): 55–71, https://doi.org/10.15664/tis.v29i1.2433; and "The Theological House That Jack (Un)built: Halberstam on an Aesthetics of Collapse and Mushrooms Among the Ruins", *Theology in Scotland* 29, no. 2 (Autumn 2022): 60–73, https://doi.org/10.15664/tis.v29i2.2525.

adhered to it meticulously; something that was highlighted by the chair, Neil Spurway, in his closing comments.

In this paper I shall provide a summary of his arguments as they relate to natural theology, along with some critical comments. Because Donald MacKay is not as well known today as he was during his lifetime I shall start with a brief biographical sketch of his life.

1. Biographical sketch

Donald MacKay (1922–1987) was born and brought up in Caithness, a son of the Free Church manse. He studied physics, with a special emphasis on electronics, at St Andrews University during WWII. Upon graduating he worked on the development of radar at the Admiralty Research Establishment. During his time at university, he became disillusioned with Christianity due to a tendency in the early part of the twentieth century to defend Christianity with 'clever arguments to show the limits of science'.[3] But subsequently he returned to the Reformed faith of his youth, albeit with a lifelong distaste for any kind of 'God-of-the-gaps' approach.

After the war he became a lecturer in physics at King's College, London where he carried out research in information theory and what would become known as Artificial Intelligence.[4] As his research developed, he became more interested in the operation of the human brain, and by the early 1950s, he had made the transition to neuroscience. In 1960 he was head-hunted to take up the chair of Communication[5] at the newly formed Keele University, where he remained till his retirement in 1982.

Because of his background in electronics and information theory, MacKay approached neuroscience from an informational perspective.[6]

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[3] Oliver R. Barclay, Foreword to *The Open Mind and Other Essays: A Scientist in God's World*, ed. Melvin Tinker (Leicester: IVP, 1988), 7.

[4] That name was not coined until 1955, by John McCarthy.

[5] Later renamed 'Communication and Neuroscience'.

[6] Something that was commented on by his friend and successor at Keele, Ted Evans: 'In creating the Department, his innovative concept was to use the language of information science as the *lingua franca* for the interdisciplinary research team he assembled of physiologists, psychologists, physicists and engineers investigating the sensory communication systems of the brain': E. F. Evans, "Donald MacCrimmon MacKay, 1922–1987", *Experimental Brain Research* 66, no. 2 (1987): 225–27.

This was manifest in his Gifford lectures. Over his career he received several awards and honours, including the Hermann von Helmholtz Prize for Distinguished Research in the Cognitive Neurosciences; the last such honour he received was the invitation to present the 1986 Gifford lectures.

The content of the lectures was the culmination of forty years of thinking and writing about topics related to science and theology. MacKay was, first and foremost, a scientist; in fact, in his student days he questioned the value of philosophy. Nonetheless, because some of the scientific experiments in which he was engaged gave results that had application in philosophy, he found himself drawn into that discipline. That being the case, a significant portion of the lectures is taken up in describing the science behind the philosophical and theological ideas. These were interesting at the time, but the science has moved on significantly since then,[7] and the lasting value of his contributions, perhaps ironically, lies in his contribution to philosophy, and so that is the aspect of his lectures that I shall mainly focus on.

Over his career MacKay made several contributions to the dialogue between science and religion, but his two major ideas, which were the main features of his Gifford lectures, are 'comprehensive realism' (hereafter CR)[8] and 'logical indeterminism' (hereafter LI). The former of these enabled him to argue for the unity of the human person on the basis of a complementary relation between mind and body; by means of the latter he posited that humans are truly free even if the universe turns out to be rigidly deterministic.

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[7] Even in 1986 some of his contentions were starting to look dated. For example, in computing MacKay favoured the analogue variety. One reason being that he did not think that digital rule-based systems would cut the mustard with regard to the stochastic nature of intelligent real-world reasoning for artificial intelligence. But even at that time, uncertainty reasoning was starting to be incorporated into rule-based expert systems.

[8] MacKay originally called this *complementarity*: MacKay, "Complementarity II", *Proceedings of the Aristotelian Society*, suppl. vol. XXXII (1958): 105–22; "Complementarity in Scientific and Theological Thinking", *Zygon* 9, no. 3 (1974): 225–44. However, possibly because of the reaction and confusion this name caused in relation to its use in quantum mechanics he latterly changed it. The term 'complementarity' does not appear anywhere in MacKay's *Behind the Eye*.

2. Comprehensive realism

MacKay's earliest philosophical contribution arose from experiments he carried out in the 1940s on high frequency electronics, when he noticed that certain variables formed complementary pairs.[9] Reflecting on this led to his views on the relation between brain and mind that formed a major aspect of the lectures. Here he identifies a duality between the two that does not require any form of dualism,[10] nor does it reduce to materialism. He referred to this as 'Duality without Dualism' and it enabled him to talk about two perspectives: the I-story (for 'Inside' or' 'I') and the O-story (for 'Outside' or 'Observer'). In this way MacKay did not need to posit any causal relation between the brain and the mind: it is a correlation not a cause. Here however he did view the relation as hierarchical: it is persons who think, not brains.

One way that MacKay supported his idea of CR was by considering a very simple communication system: an electric doorbell. In that system the information flows from the switch at the door (when a visitor presses it) to the bell (somewhere in the house). If the power source is in the house near the bell, then the flow of energy will go from the bell to the switch. That is, the information and energy flow in opposite directions.

He would often illustrate the precise relation by reference to an electric sign in which the message was embodied in a set of electric bulbs. The message in the sign can be described completely without any reference to its physical embodiment, and conversely, an engineer could, in principle, give a complete description of the physics of the sign without making any reference to the message it contained – that is, there is a duality between the sign and the thing signified. Here the two perspectives together provide the 'comprehensive' of CR. The hierarchy between the informational and physical complements is manifested, according to MacKay, by the fact that one cannot change the message without also changing the form of the physical embodiment, whereas one may change the physical situation without necessarily changing the message, e.g. if some bulbs were to fail.

[9] MacKay, *Information, Mechanism and Meaning* (Cambridge, MA: MIT Press, 1969), 4.

[10] In contrast to Karl Popper and John C. Eccles, *The Self and its Brain* (London: Routledge, 1984). MacKay did not consider the interactionism posited by Popper and Eccles to be in any way incoherent, but he did consider it to be unnecessary.

For MacKay this general hierarchical relation between the informational and physical, when applied to neuroscience, demonstrates the unity of human persons.

An example of how he applied this view of the unity of a human person was in his reporting of an experiment, done with his wife, to test the proposal of the Nobel Prize winner Roger Sperry regarding 'split brain syndrome'. Sperry suggested that when the *corpus callosum* (the set of nerves joining the left and right hemispheres of the brain) is severed, as a treatment for epilepsy, one ends up with 'two persons inhabiting one cranial space'. If this were true then these 'two persons' should be able to compete with one another. The MacKays set up a set an experiment to test this. What they found was that while it was indeed possible to get the two halves to compete, this could only be taken so far, and eventually they would come back together as a unity. This suggested to the MacKays that, while not absolutely conclusive, it supports the hypothesis that there is indeed a hierarchy in play here.[11]

One curious aspect of this is that during the question time at the end of the lectures, no one commented on the similarity between CR and supervenience[12] as proposed by the celebrated American philosopher Donald Davidson.[13] This may be indicative that supervenience did not yet at that time have the caché that it currently does. Nonetheless, a fuller exploration of the relation between the two would certainly be worthwhile.

3. Logical indeterminism

The second of MacKay's main contributions is LI. He developed this from

[11] This does not require nor suggest dualist 'interactionism' because, while the main information highway between the two halves of the brain has been severed, there are other nervous pathways in the body that joins them.

[12] Supervenience is a relation between properties, or facts, of different types. 'Properties of type *A* are supervenient on properties of type *B* if and only if two objects cannot differ with respect to their *A*-properties without also differing with respect to their *B*-properties': Terence E. Horgan, "Supervenience", in Robert Audi, ed., *The Cambridge Dictionary of Philosophy*, 2nd edition (Cambridge: Cambridge University Press, 1999): 891–92; 891.

[13] See Donald Davidson, "Mental Events", in Lawrence Foster and J. W. Swanson, eds., *Experience and Theory* (Amherst, MA: University of Massachusetts Press, 1970): 79–101.

a thought experiment in which he considered a device that he called a 'cerebroscope' that would allow complete observation of a person's brain, to any desired degree of precision and accuracy. It turns out that while this would provide a complete specification of a subject's brain state for an external observer (a 'super-scientist', say), that specification would not exist for the subject themselves. That is, no person could use the cerebroscope to obtain a complete picture of their own brain state. A rough analogy is the 'howl' one gets when a microphone is placed in front of a loudspeaker that it is connected to it through an amp. This creates a positive feedback loop because the sound from the loudspeaker is picked up by the microphone and amplified further. This situation cannot settle and the howl will simply get louder and louder until the maximum output capacity of the amp/loudspeaker is reached. From this MacKay went on to consider what would happen if hard determinism were the case in the world. He presented a scenario in which the super-scientist could utilise the cerebroscope to gain a complete specification of a subject's brain state (B), such that from this and the laws of physics they could predict what the subject was going to do in their immediate future (A). (Remember that because of CR there is a strong correlation between brain and mind: assumed to be one-to-one in this case.) MacKay then asked whether, under these conditions, free will would be eliminated. The paradoxical answer was, MacKay argued, that it would not. The reason for this arises directly from the fact, discussed above, that one cannot have a complete specification of one's own brain state. While the super-scientist's prediction may have a claim to the assent of nearly everyone in a deterministic world, there is one person for whom it would not have such a claim, and that is the person being observed. That is, the super-scientist could inform anyone else of the prediction and they would be correct to believe it; but if they told it to the subject, that would change their brain state in such a way as to make the prediction obsolete.[14] Or to put it another way: for any scenario, the subject could say to the observer 'Tell me what I am going to do', and the observer would not be able to tell them! From this MacKay concluded

[14] It should be noted that it is not just any interaction that would change things relevantly. It is the communication of the prediction that changes things. Interacting to say something like 'It's nice weather again' would have no real effect.

that for the subject the future remains (logically) open, and hence they are genuinely free.[15]

During the lectures MacKay commented that he has been defending CR and LI for nearly forty years, and that they have stood up to criticism all that time. With respect to CR, much of the criticism was, as noted above, focused on how it was not 'in line' with Niels Bohr's use of the term (and much of MacKay's responses were taken up with dealing with that issue).[16] On the other hand LI was much more contentious, and an idea that people found harder to grasp. It is certainly true that many of the criticisms levelled against it missed the mark, and that is perhaps why MacKay does not really engage with them during the lectures. However, there was one previous exchange with Wiliam Hasker,[17] in which Hasker comes close to identifying what is the fundamental flaw in MacKay's argument.[18] When one looks closely at MacKay's argument one can see that it is guilty of the modal fallacy.[19] This arises because, as MacKay presents it, what is deemed to be inevitable is the outcome of the prediction, A. However, even for the super-scientist, the prediction is conditioned on the observed brain state, B. Hence what, if anything, is inevitable is the complete conditional scenario: if B then A. And it turns out that, contra MacKay, this has a claim to the assent of everyone,

[15] MacKay presents this as 'logical' to distinguish it from 'physical' determinism (or indeterminism). He acknowledged during the lectures, and in the book, that it may not be the best term. During the question time, he insisted that the argument is a logical one, but at one point he slips into physical discourse by referring to the energy exchange that must take place in communication. Unfortunately, that tends to undermine his argument because it applies to all communication, not just the significant instances required for the argument to work.

[16] MacKay, "Complementarity II" and "Complementarity in Scientific and Theological Thinking".

[17] William Hasker, "MacKay on Being a Responsible Mechanism: Freedom in a Clockwork Universe", *Christian Scholar's Review* 8 (1978): 130–40; MacKay, "Responsible Mechanism or Responsible Agent? A Reply to William Hasker", *Christian Scholar's Review* 8 (1978): 141–48; Hasker, "Reply to Donald MacKay", *Christian Scholar's Review* 8 (1978): 149–52.

[18] There is an extent to which MacKay and Hasker talk past one another in the dialogue.

[19] The modal fallacy arises, when talking about necessity and conditionals, if one misattributes necessity to the consequent, when it really applies to the consequence.

including the person being observed. One useful feature of a fallacy is that the conclusion is not necessarily false, it simply is not supported by the premises. That being the case there is scope to reframe the argument in order to make it more robust. One such attempt, by the present author, presents the argument in a modal form based on the possible worlds interpretation.[20] The finding is that MacKay's argument can be improved such that the future remains open for the subject in a world where they are informed of the prediction, but determined in the world where they are not. That is, in these terms, even in a universe where hard determinism reigns, the prediction is not a necessary outcome because it is not true in all possible worlds.[21]

Having provided an argument for the freedom of the individual, MacKay goes on to examine how that might apply to multiple agents in dialogue. Here again his background in electronics and information theory played a part: he recognised that such dialogical situations form a single system. In the hypothetical case wherein each agent has the abilities of a super-scientist with a cerebroscope, one would have the situation in which each agent would seek to have a complete picture of the other's brain state. However, in such a case, each agent would end up attempting to get a picture of their own brain state (albeit indirectly) since it is part of the other's brain state, which, as we have seen, is impossible. Here again though, an external agent who is not engaged in the dialogue would be able to obtain the complete picture.

From this MacKay argued that if God were to enter into dialogue with His creatures, in particular if He were to enter into the narrative, then the logic of the dialogical situation would apply to Him as well (on pain of contradiction). That being the case, if God the creator is to maintain His upholding of all things, and knowledge of all things, in His creation, He could not be the same person as God in dialogue with His creation. Therefore, whatever else God must be He must be multi-personal. There are a number of things that can be said about this. First, if there is any merit in MacKay's argument here, then it suggests that creation is the way it is

[20] See Saul Kripke, *Naming and Necessity* (Oxford: Blackwell, 1981).

[21] George M. Coghill, "A Critical Analysis of Donald M. MacKay's Contribution to Theology and Science" (Master's thesis, Edinburgh Theological Seminary & University of Glasgow, 2023).

because Godself is the way He is. Second, this account, dealing as it does with the Trinity's relation to creation, provides some insight into what is often called the 'Economic Trinity', but also it suggests a direction for exploring the nature of the 'Ontological Trinity'.

4. And in the end …

These Gifford lectures were MacKay's final contribution to natural theology as it is manifested in the relation of science and theology. Unfortunately, and perhaps surprisingly, very little has been done to take his ideas forward in the period since his death. One could speculate on the reasons for this, but there is no obvious reason why it has not happened. No doubt he had hoped that by giving the Gifford lectures this would have inspired further engagement, whether by way of criticism or development. Despite the hiatus there is still scope for this to happen, and in my opinion there is ongoing value in the contribution he made. One clear message that comes through loud and clear in these lectures, albeit implicitly, is that MacKay's science, and his philosophy and theology were well integrated. There was no tension between them.

Those who attended the 1986 Gifford lectures, of whom I was one, were presented with state-of-the-art neuroscience alongside a clear exposition of how reflection on the sciences can give rise to proposals for solutions to, or at least contributions to, ongoing philosophical and theological debates. This is natural theology in the best sense of that term, and a contribution with which Lord Gifford would have been pleased.