REVIEWS

William A. Dembski, *The Design Inference*. Cambridge: Cambridge University Press, 1998. pp. 243. $64.95/£37.50 hardback. ISBN:0-5216-2387-1.

William A. Dembski, *Intelligent Design*, Downers Grove, Ilinois: InterVarsity Press, 1999. pp. 302. $15.99 paper. ISBN: 0-8308-1581-3.

William Dembski's books have caused rather more than a ripple of excitement in the world of evolutionary biology, and the establishment and subsequent dissolution of the 'Michael Polanyi Centre' on the campus of Baylor University, ostensibly to explore the relationship between religion and science, allegedly without consultation with the faculties of religion, science or philosophy, caused an uproar. Readers of *Tradition and Discovery* may wonder why Polanyi's name has been associated with it, too. Having read Dembski's two books, the best explanation I can offer from the other side of the Atlantic for this supposed association is that Dembski sees himself as performing an extremely extensive exegesis of Polanyi's remark, '… if we are to identify – as I am about to suggest – the presence of significant order with the operation of an ordering principle, no highly significant order can ever be said to be solely due to an accidental collocation of atoms, and we must conclude therefore that the assumption of an accidental formation of the living species is a logical muddle' (*Personal Knowledge*, 35).

This article review will be concerned with the justification for 'Design Theory' only insofar as it will ask whether it is an academically defensible science, whether Dembski's books are academically reputable, and whether the resulting brouhaha is therefore no more than an example of scientific prejudice against anything that is not mainstream Darwinism. Since two books are involved, I shall refer to the first as *TDI* and to the second as *ID* throughout.

TDI presents itself as a serious scientific analysis of probability theory. The first two or three chapters are not very technical – in fact they are verbose and rather unfocused – and the later chapters contain the meat of the mathematics. Dembski's central thesis is easily stated and unremarkable: two equally probable but unlikely events can be distinguished by virtue of the predesignation (a term borrowed from C.S. Peirce) of a specification of what is to count as significant. Thus, on tossing a fair coin, HHHHHHHHHH is as probable as HTTTHHTHTH (although most people do not think so), but the first strikes us as remarkable whereas the second does not because of our predisposition to think that ten consecutive heads is 'remarkable'. Dembski quite rightly observes that *mere* improbability is useless as a measure of significance because *any* ten consecutive tosses of a fair coin will produce outcomes whose individual probabilities are both very small and all equal to one another. So if I toss a coin repeatedly and obtain a particular sequence of outcomes, nobody would or should be impressed by any such sequence unless it happened to correspond to a sequence that had already drawn itself to our attention as in some sense 'significant'. On the other hand, were I to be in possession of a coin known to be fair, and were I to say 'I will now toss the coin ten times and produce HHTHTTTHHT' and proceed to do so, *that* would be remarkable (although you would doubtless first of all question the fairness of the coin or the tossing process, which is essentially the design hypothesis in a nutshell: something like this cannot just happen by chance). It is this element of *predesignated* significance that is at the heart of Dembski's work. In *ID* he calls it 'specified complexity'. That said, nothing that I have said so far will surprise or excite even a moderately well-educated high school student. So, if

Dembski's work is to be credited as genuinely groundbreaking, we need something more.

Dembski's most interesting early allusion to something significant comes with the reference to Kolmogorov's 1965 specification of *compressibility* as a further criterion that enables us to distinguish such sequences as HHHHHHHHHH from HTTTHHTHTH. Kolmogorov noted that the first sequence can be compressed to 'repeat H ten times' whereas the second probably cannot be compressed – apparently (and this 'apparently' is important in what follows) – to less than its actual length. Gregory Chaitin later introduced *algorithmic compressibility* in the same context. Dembski wants to introduce his own notion of *detachability* further to clarify and elaborate this point. Detachability is intended to be a measure of the extent to which chance and design can be distinguished in any given event, certain conditions obtaining. It is here that my problems with Dembski's thesis begin, although at first they consist of complaints about the difficulty of – or at least *my* difficulty in – understanding him.

The concept of detachability is central and essential to the argument, but when he describes it Dembski's difficulty in expressing himself clearly in ordinary language – a difficulty that recurs in his clumsy description of the nature of statistics as contrasted with probability – makes it far from easy to be sure what he means. The following is therefore my best attempt to interpret what he means and to assess what he argues.

Dembski is right to say that improbable events assume their significance by their agreement with some kind of expectation. He points out that many events – such as sequences from 41 tosses of a fair coin – generate probability spaces all of whose members we could not list in a lifetime. The number of possible sequences, 2^{41}, is about 10^{12}, and there are only about 10^{10} seconds in a lifetime. In other words, in order to distinguish significant from insignificant sequences we have to restrict the sequences that we are ready to grant as significant, and the most natural are those that are most easily recognised by some species with a particular genetic code and evolutionary history. It is not necessary here to speculate about whether 'recognisability' is genetic or learned, but it is nonetheless an interesting question. So, says Dembski, HHHHHHHHHH will be treated as significant, where HTTTHHTHTH will almost certainly not be so treated. I would want to add 'by a species constituted and acculturated as we are'; Dembski would agree.

A pattern is *detachable* in just the case that it can be specified without reference to the actual event that defines it. Dembski – unwisely and misleadingly, in my view – decides to say 'Detachability distinguishes specifications from fabrications' (*TDI* 15) when what he wants to say is that an event that can be specified in advance – plucked, so to speak, from the possibility space as potentially significant – is independent of that event, and so detachable from that particular event. To my mind a 'specification' does not differ from a 'fabrication' in this way, for a fabrication can as easily be specified and understood as a 'making' probably has to be. In fact, that we can repeatedly 'fabricate', say, houses, is exactly what Dembski is trying to say detachability entails: we can give an efficient description of how to make something without just having to wait for it to happen. But I, at least, regard our ability to do this as depending upon our ability to formulate a specification. It does not help – at least, it does not help *me* – that Dembski says 'Specifications are the good patterns, the ones that legitimately warrant eliminating chance, whereas fabrications are the bad patterns, the one that are ad hoc and do not warrant eliminating chance' (TDI 137f). It seems elsewhere that the distinction Dembski is attempting to make is between a fabrication according to some pattern-generator and a specification that simply gives the sequence we are interested in because there is no shorter way of arriving at it, but these two ways of drawing the distinction are not equivalent. And the second seems to make the whole matter isomorphic to Chaitin's distinction between compressible and incompressible sequences. And it is a serious defect of Dembski's books that 'specifi-

cation' is both a central concept and one that seems to be confused in his own usage, for specification as 'independently identifiable pattern' is exactly what we need for a fabrication, and our identification of something as a fabrication depends upon the identification of a specification that seems hopelessly unlikely to have arisen by chance. So how does detachability distinguish specifications from fabrications? I am mystified.

In theory, then, any event can be specified, but, in practice, choosing from among the 2^{41} possible sequences that might result from 41 tosses of a fair coin, we are more likely to choose – and in a strong sense absolutely bound to choose – easily recognisable sequences – to creatures constituted as we are – than others because the *entire* range of outcomes, including those that are incompressible in Chaitin's sense, cannot be listed other than by exhaustively running through them all. (This is of course false if taken literally: a computer could do it if it had enough memory, but we just couldn't read them all in a lifetime. The point stands even if the example doesn't. To make the point literally true, just increase the 41 to, say, 189, when the number of sequences considerably exceeds the number of particles in the universe – generally given as around 10^{82} – so long before your computer has enough memory, you run out of particles to make it from.)

The example of the exhaustive list nonetheless throws up another difficulty. If I can program a computer to produce the list, the important point is not the program that produces the *entire* list, but the impossibility of specifying some members of that list otherwise than by going through it and pointing them out (or just writing one of them down at random).

There is an apparent paradox here that is worth noting. If you tell me to produce a finite sequence of any length, it is an easy task to program a computer to produce all conceivable sequences of that length that use a finite set of symbols. But unless you specify the length, it is *not* true that a computer – or the fabled infinite set of monkeys sitting at typewriters – will necessarily produce every such finite sequence as a subset of what they type (not even the complete works of Shakespeare, which is the usual example in question). So you cannot write a computer program that will be *guaranteed* to produce this review; to do that you need – heaven help you – a complete specification of my brain. To see this, consider this utterly persuasive example, which I owe to one of my pupils, Andrew Fisher, who produced it to persuade another pupil of the falsehood of the monkey case when I had not had much success:

Monkey one could type: a b a b a b a b a b a b …
Monkey two could type: aa bb aa bb aa bb aa bb …
Monkey three could type: aaa bbb aaa bbb aaa bbb …

And so on. No monkey ever types *anything* intelligible, however many monkeys there are. *A fortiori*, no program can be guaranteed to generate any particular sequence unless that sequence is specified (that ambiguous word again) in advance (by, for example, knowing my brain and how it is going to churn out these words, or telling the computer the works of Shakespeare in their entirety).

So, granted this unlistable number of sequences, we need to be able to fabricate the ones we are interested in using a pattern-generator. Dembski later calls this 'side information'. Thus, as Dembski also says, while it is possible to show that a pattern is detachable from an event – one can specify the HHHHHHHHHH and so make that pattern detachable – it is not possible to prove non-detachability because you cannot prove that there is no conceivable pattern that will generate a sequence: the detachability may be demonstrated later by the discovery of an underlying pattern-generator. In particular – and this is where we start to see where the argument is leading, and the connection with the quote from Polanyi at the start of this piece – what seems like a non-detachable sequence or event to which we are led to attribute random emergence, could become detachable under a suitably ambitious and imaginative pattern-generating conceptual scheme. This is a *design*.

I feel drawn to 'cut a long story short'. Dembski wants to try to argue that it is possible to say 'after the event' whether an event was significant by ascertaining its [prior] detachability. This requires him to be able to 'get in front of the event from behind it' and state what the prior probabilities were. Much of his argument, for all the mathematical dressing, therefore boils down to an argument about whether, say, the evolution of life was specifiable as significant in advance – a highly improbable event in a sea of possibilities that could only be picked out because of its intrinsic order, akin to the differences between our two sequences of tosses, but much more so – and whether therefore the patterns that constitute life are detachable. If he can achieve this, then he can say that the patterns constituting life were predesignated and so designed. He can then move from design to intelligent agency.

I am not at all sure that I have understood 'detachability' properly, and it is a pity that so central a concept does not receive a clearer treatment. But let me try once again to say what I think Dembski means by it. Looking forward from a universe before life had emerged, I think he would say, the number of possible futures is so vast that it is impossible to pick out any particular future as significant unless that significance can be predesignated by appealing to some recognisable distinguishing features, features such as life exhibits. The trouble is, I just don't know what one can do with this point, true as it is. And the analogy with coin-tossing is misleading in a way that is philosophically *deep*: just because each sequence is equally probable, each sequence is equally dull; but life as contrasted with non-life is *not* dull, so the analogy isn't that successful. Dembski more or less makes this point in *TDI* 56f discussing the question whether 'LIFE' is 'specified' (that word again) in Richard Dawkins' treatment. One ends up by saying 'life evolved; how remarkable' and then throwing up one's hands when asked 'Why?' I do not think that Dembski has a better explanation – scientifically and mathematically speaking – than the age-old suggestion that perhaps the hand of God was involved. But so what? We could make that suggestion anyway. What he does do, with some success, is to isolate the kinds of argument that are employed by evolutionists and others to block 'the design inference' (*TDI* pp61ff), including Stuart Kauffman's attribution of *regularity* to explain life, i.e., the argument that life is a natural and abundant emergent property of the way the universe is. 'Whereas creationists accept all six premises of the design inference, evolutionary biologists, to block the conclusion of the design inference, block premises 3 and 5' (*TDI*, 61). One wonders whether this tells us where Dembski is coming from (*pace* all his denials). I hope not, because creationism is not the only way to read or see the good points of the design inference.

ID is essentially a reworking of *TDI*, seems on occasion to quote it verbatim, and in some respects is clearer to the layman because less mathematical. The detachability condition (*ID* 135ff) can now be stated in terms of two other conditions: the *conditional independence* of a pattern of the information needed to generate that pattern – what Dembski calls the 'side information' – and the *tractability* of that side information, its capacity to generate the required pattern at all. The conditional independence of two events *A* and *B* simply means that the probability of some other event *C* depending on *A* and *B* is the same as the probability of *C* depending on *A*.

The structure of Dembski's argument seems to be as follows. First he argues according to the following sequence of points:

1.The space of all possibilities is very large.
2.Something has to happen.
3.The probability of any given event happening is vanishingly small.
4.Whatever happens therefore looks unlikely 'after the event'.

Second he says something a little different:

1.It is possible, notwithstanding the size of the space of possibilities, to

'detach' certain possibilities as having unusual significance. (This is essentially the point that I just made about life being more interesting than non-life in a way that is quite different from two equally improbable sequences of 41 tosses of a coin.)
2. It may be possible to calculate the prior probabilities of such events, in other words to say that they were of unusual significance even before they occurred.
3. If something of vanishingly small probability is identifiable as having had unusual significance prior to its occurrence, and yet nevertheless occurs …
4. … then we may say that it arose by design rather than by chance.

If this is the substance of Dembski's argument, then it is either vacuous or fallacious, depending upon how one construes it. Everything hinges upon our ability after the event to identify the prior significance of something that has occurred as it would have appeared before it occurred. But this is an argument of the following form:

· Something unlikely has happened
· If I had predicted that it would happen before it happened, and it still happened …
· That would be remarkable, and not attributable solely to chance
· But the something that has happened was quite obviously of significance before it happened because it seems significant now after it has happened
· Therefore it was or could have been the result of design rather than a chance event

This is so obviously a fallacy that it is hard to believe that it can be what Dembski means, but it does seem to be what he means, so I must be the stupid one here. And I acknowledge that Dembski is himself very generous in noting fallacious examples of his own argument and showing that they are fallacious. I am just less convinced than he is about the remnant arguments that he does not think fallacious.

Where Dembski is obviously right is in saying that rejection of design by an *ex cathedra* pronouncement that everything that has happened can be explained by chance is also unwarranted. That something significantly ordered occurred from 41 tosses of a coin conceived to have operated independently is remarkable, that it occurred on the one and only occasion on which the experiment was performed, and that its prior probability was low compared with the space of disordered outcomes is certainly *accounted for* by chance because it is *possible* that it occurred by chance, but it is scarcely *explained* by it. To think otherwise is just a *petitio principii*. So evolutionary biologists who want to argue that life was improbable but that nonetheless 'something had to happen and it was lucky for us that it did' are essentially like those who, playing a game where you have to throw six consecutive sixes to win a car, do so on the first go, and then say 'Hey that was lucky'. It was certainly always *possible* that would happen, but, other than by an appeal to brute chance, the evolution of life probably requires more by way of *explanation*. In short, that something that was always highly improbable nonetheless occurs does seem remarkable to any reasonable human being, and does seem to require more by way of explanation than current mainstream neo-Darwinian evolutionary biology offers.

However, we did not really need Dembski to tell us this, and we certainly did not need the paraphernalia of detachability and so forth to obscure the basic argument. Moreover, Dembski's argument presupposes that the prior probabilities can be calculated, and this is just what is in dispute. Some have argued, with some force, although controversially, that the outcomes we think significant were not as unlikely as Dembski supposes, and that the events involved were not random or independent. Some such as Stuart Kauffman, as Dembski acknowledges, even go so far

as to say that the emergence of life was virtually inevitable. But that in its turn only leaves us with explaining why it was inevitable, which reduces us to the question of the fundamental constants of physics – the 'Anthropic Principle' – and why they and the underlying structures governing atomic behaviour are as they are. Which leaves us more or less where we started.

In sum, we are left in this position. If life emerged as one among a huge number of low-probability outcomes of the structure of the universe, then it could have done so by pure chance, but that seems scarcely to be a satisfactory explanation even if it is plausible given life's significance. If, on the other hand, the emergence of life was virtually inevitable (Kauffman), then the universe seems to have been predisposed to its emergence, and that needs explanation too. In both cases the design hypothesis can be invoked if we imagine that it is more satisfactory than an argument from chance. That is a choice many make. So do I. But I do not see that Dembski has obviously advanced the argument by clothing it in a lot of mathematical sophistication, although I do think (with Michael Behe, *ID* 10) that the terminology he introduces – if made sharper, clearer, and used more scrupulously – does offer opportunities to clarify the issues. In the end, however, despite the fact that I am broadly sympathetic to the attempt to find some middle ground between creationism and evolutionary totalitarianism, I am suspicious of the motives that drive these books. It is well known that the US constitution forbids the use of the educational system to pursue religious objectives. Could this be why Dembski spends considerable time trying to dissociate intelligent design theory from any religious presuppositions, presenting it as a competitor in a *purely* scientific arena (*ID* 247-252, from Inter-Varsity Press)?

Design theory is a slippery beast. When he addresses directly the question of its religious and scientific significance, Dembski makes a strong case for its completely value-free status vis-à-vis religion (*ID* 247ff *et al.*), but this is at variance with some of the earlier rhetoric. For example, 'Naturalism is the *disease*. Intelligent design is the *cure*. Intelligent design is a two-pronged approach for *eradicating* naturalism. … Virtually every discipline and endeavour is presently under a naturalistic pall. To lift that pall will require a new generation of scholars and professionals who *explicitly reject* naturalism and consciously seek to understand the design that *God* has placed in the world. … Intelligent design is a golden opportunity for a new generation of *theistic* scholars' (*ID*, 120-121, my emphasis). But when someone can think, let alone write down and then publish an assertion such as, 'Of course cells don't have "Made by Yahweh" inscribed on them, but that's not the point. The point is that we wouldn't know this unless we actually looked at cells under the microscope' (*ID* 125), am I completely crazy to wonder quite where on the spectrum of intellectual achievement these books should be located?

In sum: there is merit in reopening the design debate; Dembski introduces some conceptual distinctions that may prove important in doing so; but I am not sure that I know what Dembski really means by what he says, or that I would endorse it if I did.

John Puddefoot
j.puddefoot@etoncollege.org.uk

John E. Gedo, *The Evolution of Psychoanalysis: Contemporary Theory and Practice*. New York: The Other Press, 1999. pp. xvi, 246. $25.00 paper. ISBN: 1-892746-27-1.

[Reviewer's note: I must disclose that I have known John Gedo and his work for about thirty years. I should perhaps add that Polanyi, Gedo, and I are each of Hungarian ancestry, though reports of an actual Hungarian "mafia" are much exaggerated.]

John Gedo has produced a concise review of sixty major monographs on psychoanalysis written in the twenty-five years after 1973. This book will interest members of the Polanyi Society for three reasons: First, it begins its discussion with Polanyi's

Scientific Thought and Social Reality, a book that Gedo credits with breaking an epistemological "log-jam," an imperviousness to new evidence defended by exclusive reliance on inductivism for the legitimacy of scientific inquiry. Second, he provides an insider's guide to the recent history of a clinical and intellectual discipline, in part showing how it responded to the invalidation of Freud's century-old metapsychology (contrary to Popper's view that psychoanalysis is a pseudo-science because its discoveries could not be falsified!). Finally, he suggests the outline of a growing consensus within psychoanalysis around the idea of self-organization, based in the natural sciences (e.g. cognitive science, developmental psychology, neurophysiology, systems theory) but aware of the full repertoire of human capabilities including the highest creativity. He shows how this model is supported by a confluence of theory and evidence from clinical and therapeutic practice, infant observation, creativity studies, and neurobiological research.

The book is organized into two parts: topical and historical. The larger, topical part contains reviews of individual monographs, discussing first the conceptual background, then the turning point produced by new evidence and new theoretical insights, the cognate disciplines, the individual schools, and finally the emergence of a new therapeutic, technical, and theoretical consensus. The historical summaries consider theoretical innovation and recent discourse about clinical practice. In his conclusion Gedo argues for his own view of the future of psychoanalysis as a natural science, based on the need for a rationale for deciding between competing explanations, in a sense affirming a faith in science much like Polanyi's.

Gedo's own contributions during the period are not included, except in the bibliography. His psychoanalytic books propose and elaborate a hierarchical model of mental functioning. In this schema there are five distinguishable modes within the human repertoire, ranging from inborn motivations to learned requirements of adequate adaptation. The same model is used to classify various psychoanalytic explanations and various developmental phases, since each applies to, or corresponds to, a particular mode. Further this model suggests therapeutic innovations ("beyond interpretation") focused on overcoming the patient's cognitive deficits and maladaptations, "apraxias" and "dyspraxias". Outside psychoanalysis proper, Gedo has also written extensively on creativity; in his *The Artist and the Emotional World* (1996) he discusses the importance of enduring predispositions of personality for creative endeavor. In both areas, his contributions investigate what Polanyi called the tacit dimension, first in the sense that the investigator uses his self-understanding to attend to the subject, but also in the sense that we gain new knowledge about human capabilities that lie beyond what we articulate. Gedo has produced a rich and diverse chart of this territory, applying it here in a guide to the recent literature.

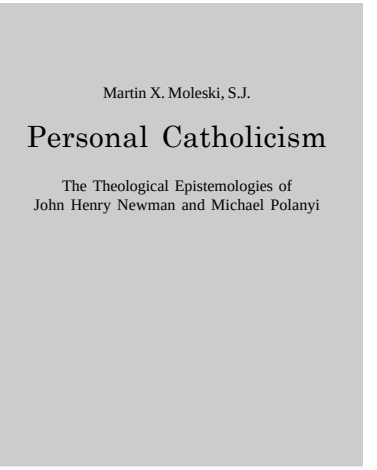
John Gedo is a man who holds to standards having their source in ancient Roman virtues. He practiced the greatest possible empathy for patients, but he could also make other professionals uncomfortable – as one can see from his memoir *Spleen and Nostalgia, A Life and Work in Psychoanalysis* (1997). By reviewing monographs of the past quarter century in his retirement, he has taken pains to explicate and teach, repairing the inattention of many of us to the transformative efforts of the vanguard in his profession, while at the same time suggesting that we can read the current fragmentation of psychoanalysis positively as leading to the emergence of a new model for the scientific investigation of human self-organization. In these efforts, he exhibits introspective adaptation, renunciation, and creativity, the hallmarks of the highest mode of functioning in his own hierarchical model.

Richard Henry Schmitt
rschmitt@uchicago.edu

Personal catholicism

The Theological Epistemologies of John Henry Newman and Michael Polanyi

Martin X. Moleski, S.J.



In *Personal Catholicism,* Fr. Martin X. Moleski argues that Catholic doctrine rests on the foundation of personal knowledge. The first part of the book maintains that there is a very striking similarity in the epistemologies of John Henry Newman, a convert to Catholicism from the nineteenth century, and Michael Polanyi, a scientist-turned-philosopher from the twentieth. By mapping each man's work in turn, the author shows that both men recognized the same key features of the life of the mind, although they used different terminology to develop similar insights. Newman spoke of the illative sense, by which the mind guides itself in all concrete reasoning, while Polanyi focused on the tacit dimension of personal knowledge.

The second part of the book explores some of the theological implications of the epistemology of personal knowledge. Because "all knowledge is tacit or rooted in tacit knowledge" (Polanyi), all of Catholicism, to the extent that it may be construed as a body of knowledge, is "tacit or rooted in tacit knowledge."

The book is intended to serve as a foundation for post-critical theology. Newman and Polanyi provide an antidote to the skepticism generated by empiricism, positivism, objectivism, and rationalism. The ground which Newman and Polanyi have in common should prove a fruitful resource for doing systematic theology less systematically and for defending dogma non-dogmatically.

Martin X. Moleski, S.J., is associate professor of religious studies at Canisius College.

"Both Newman and Polanyi rank high among the pioneers in the history of the post-critical movement in epistemology. . . . The systems of these two authors are exceptionally useful for dealing with the major issues that trouble the theological climate today."

AVERY DULLES, S.J.

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