A Likely Story![*]

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1. *Introduction*

Of all the improbable things that you will come across today, the fact that the letters that make up this sentence occur together in this order is but one, and by no means the most improbable. Yet had I not pointed it out, I doubt you would have given any thought to the unlikelihood of this particular event. After all, it is not as if you think the letters have been selected randomly and just happen to form a coherent sentence. Because they form a meaningful pattern, you presume that they have been placed together by an intentional agent and the improbability of their combined occurrence is not something that will trouble you. What is more, if I told you that I had formed the sentence by pulling letters out of a hat, you would simply not believe me.

The process by which we look for patterns in events in order to dismiss chance as an explanation for them is central to evidentiary reasoning. Suppose that a defendant is charged with burglary and the evidence against him consists of an absence of alibi, a vague eyewitness identification, a string of previous convictions for burglary, and the presence of fibres which match one of his sweaters in the burgled house. That that evidence occurs could, of course, be a coincidence. But the pattern of evidence could also be explained by the defendant's having burgled the house, and the improbability of explaining the evidence through coincidence might be sufficient to persuade you that that is in fact what happened. Here is a real example: Stefan Kiszko was convicted of the rape and murder of a young girl. The principal evidence against him was his confession (now convincingly shown to have been false), but it has recently become known that the Crown also had corroborating evidence. This consisted of a piece of cardboard discovered in Kiszko's car, on which was written the registration number of a car which was known to have been driven past the scene of the crime at about the time the girl was killed. We now know that there was an innocent explanation for this evidence: Kiszko was in the habit of writing down the registration numbers of drivers who annoyed him, and he had argued with the car's previous owner at a petrol station. Commenting on this example, Sir Stephen Sedley has

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remarked that '[c]ircumstantial evidence like this is dangerously seductive, for it downplays the role of chance and [we are] over-ready to interpret coincidence as cause and effect. In other cases–but which ones?–circumstantial evidence can be entirely cogent.'[1]

In *The Design Inference*,[2] William Dembski delivers a detailed analysis of a process by which we can distinguish real coincidences (like the one that appeared to damn Kiszko) from patterns that can only be attributed to design. *The Design Inference* is not a law book—it is published as part of a series on probability, induction, and decision theory—and lawyers will doubtless find the technical sections hard going.[3] Nevertheless, Dembski claims that a broad audience, among them some lawyers, 'has a vital stake'[4] in his results, and one broadly legal example (the case of Nicholas Caputo) recurs throughout the book. My aim in this review is to suggest that Dembski's work is important to evidence scholars by showing how it sheds light on certain evidentiary problems. To this end, I will need to reconstruct much of his argument. By doing so in a largely non-technical manner, I am aware that I will inevitably coarsen some of the more subtle distinctions he draws.

2. *Patterns and Coincidences*

The area I wish to concentrate on is similar fact evidence, and it will be helpful to start with a concrete—and well known—example. In *R* v *Smith*,[5] the 'brides in the bath' case, Smith was convicted of the murder of his 'wife'.[6] To cast doubt on his claim that she had accidentally drowned in the bath, the Crown was permitted to call evidence that two other 'wives' of Smith had also apparently drowned in the bath. In each instance Smith benefited financially from the death. This was certainly powerful evidence. As it was put in argument before the Court of Criminal Appeal:

> If you find an accident which benefits a person and you find that the person has been sufficiently fortunate to have that accident happen to him a number of times, benefiting him each time, you draw a very strong, frequently an irresistible inference, that the occurrence of so many accidents benefiting him is such a coincidence that it cannot have happened unless it was design.[7]

I do not know of anyone who disagrees with this argument; it just seems to be common sense to us that the evidence proves the crime. But it appears to me

[1] S. Sedley, 'This Beats Me' *London Review of Books* (2 April 1998) 3 at 6.
[2] W. A. Dembski, *The Design Inference: Eliminating Chance Through Small Probabilities* (1998) referred to here as *TDI*.
[3] That should not put lawyers off reading it. Dembski writes in an engaging style and much of the discussion is non-technical, replete with vivid examples.
[4] *TDI* at xii.
[5] (1915) 11 Cr App R 229.
[6] Although he had been through a ceremony of marriage with her, this was not valid, Smith already being married.
[7] Above n 5 at 233.

to be worth interrogating our intuitions here, in an attempt to make more explicit the inferences on which we are relying in cases like *Smith*.

A simple example provides a starting point. Here are two sequences, each recording the result of 100 coin tosses:

(1) HTTTTHTHTTHTHTTHHHHTHTHTHTTHHHTHTTHHHH-
THHTHHHHHTTHHTHTTTTHTHTHHTTHTTTTTHTHTTTTHTT-
TTHTHHTTHTTHHTHTT

(2) HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH-
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH-
HHHHHHHHHHHHHHHHHHHHHHHH

Now (1) looks like a random sequence (and it was, in fact, formed by tossing a coin), whereas (2) just does not. Why is this? Importantly, it has nothing to do with probability: the probability of each occurring is the same (around 1 in 10^{30}). What makes (2) stand out is that it appears to have a pattern, which we could describe as 'heads every time'. But the notion of pattern is not, by itself, enough to distinguish the two sequences. I could perhaps memorize (1) and learn to hum it as if it were a tune. It might then seem that the sequence did form a pattern of a sort, but I doubt that would convince you of anything very much, other than my lack of musical ability. But if I showed you that, by replacing the Hs in (1) for B-flats and the Ts for F-sharps, the sequence matched the tune of an existing piece of music, you would be more than a little surprised. No doubt you would reject my claim that the sequence was formed by coin-tossing, and in rejecting chance as the explanation for (1) you would be attributing it to design.[8] We need, then, to distinguish different types of pattern, which Dembski terms 'fabrications' and 'specifications'. When I claim that (1) forms a pattern because I can learn to hum it, the pattern I produce is fabricated, whereas if I can show that (1) matches an existing piece of music, the pattern is specified.

For our purposes, the core of Dembski's book is his attempt to work out a rigorous definition of specification. The process by which we attribute some events to design rather than to chance—the process of drawing design inferences—is a form of eliminative induction. Chance is always the default option; only if we have good reasons for rejecting chance do we conclude design, and it is in this context that we need to think about specification. Two further points should be tolerably clear from the coin-tossing example. First, assuming that the event occurred by chance, then to say that a pattern is specified is to say that my description of it is independent of the chance process that generated it. When I hum (1) as a bad tune, there is simply no way I could be humming it unless I knew it had occurred when I tossed the coin; the two are not independent of each other. It is as if I had shot an arrow at a wall and then painted a target

[8] It is not easy to give a definition of 'design': basically, design is what chance is not. Dembski suggests 'pattern' or 'blueprint' as definitions (*TDI* at 8) but, given the context of our discussion, we can get away with equating design with intelligent agency. On the distinction between these concepts, see *TDI* at 62–6.

around the point it struck. That would not prove my prowess at archery because the target would be there precisely because the arrow landed there. Secondly, my ability to find a pattern in an event depends on my background knowledge. I would have to know an awful lot about music to see that (1) matched an existing score. Sometimes we will miss patterns simply because we do not have the knowledge that allows us to detect them.

We can build on these insights to give a slightly more formal definition of specification. We start with an event (E) and want to know whether to draw the design inference. We need to know whether we can form a description (D) of E that will be a specified pattern, and in order to form D we also need background information (I). Now the point about independence does not relate to the way we arrive at D. If it were the case that (1) related to a piece of music, it is obvious that there is no way I am going to realize that until I have (1) in front of me. There is nothing illegitimate in simply reading D off E; the independence that must obtain is between I and E, on the assumption that E occurred due to chance.[9] Put another way, if we read D off E, we still need to assure ourselves that we could have come up with D on the basis of I alone. This brings us to the next requirement of specification: that generating D from I not be too difficult. In theory, there is a way to specify (1) without violating the independence requirement. When I toss a coin a 100 times, there is a finite number of sequences of Hs and Ts that may result; I might attempt to list them now and, were I successful, I would have got to D without relying on E. The catch is that, even were I to work with phenomenal speed and live to a ripe old age, I would die before I completed the task. In Dembski's terms, the relationship between D and I must satisfy a tractability condition: given my computational resources, formulating D from I must be a realistic possibility.[10]

Returning to *Smith*, we can put Dembski's account of the design inference to work. The key insight it provides is that what convinces us that Smith was a murderer is *not* simply that the probability of his three wives all accidentally drowning in the bath is extremely low. Improbability, by itself, means very little: 'just about anything that happens is exceedingly improbable once we factor in all the other ways what actually happened might have happened'.[11] What is more, our lives are strewn with odd coincidences, but usually we do not infer design from them. The other vital point about *Smith* is that the pattern (three drownings) is specified. Imagine Smith_2 who, like Smith, marries three times. It turns out that, as children, Smith_2's wives all had pet dogs named Rosencrantz. A startling coincidence, to be sure, and one that may be as improbable as the one in *Smith*, but not one, I would have thought, that would get Smith_2 convicted of anything. There is no background information from which we can construct a specified pattern for this event; therefore we must stick to the default option, chance, as the explanation. Imagine now Smith_3, whose wives, like Smith's, all

[9] Formally, where H is the hypothesis 'occurrence by chance', $P(E|H\&I) = P(E|H)$.
[10] *TDI* at 145–7.
[11] *TDI* at 12.

die in what seem like accidents. The first wife drowns in the bath, the second is electrocuted while wiring a plug, and the third falls under a train, $Smith_3$ each time having the opportunity to drown, electrocute or push undetected. This may arouse our suspicions, but my intuition is that in the case of $Smith_3$ we would not be anything like as quick to infer foul play as we are in *Smith*. Again, we can presume that both events are of similar improbability. Any distinction to be drawn between them depends, I think, on the idea of specification.

If we are really to understand Smith and how it differs from $Smith_3$, we need to apply Dembski's concepts a little more precisely. The key is to stipulate the *I* that allows us to form the *D* that delimits *E*. *I* might contain items of information such as:

I_1 Smith is a human being, subject to human passions.
I_2 Smith would like to be rich.
I_3 Men who wish to rid themselves of their wives without being detected will make their wives' deaths appear accidental.
I_4 Smith had the opportunity to kill all three wives.
I_5 Criminals are creatures of habit. Having successfully used a strategy, they are likely to use it again.
I_6 If Smith had not killed his wives, they would be expected to die at a rate comparable to the rest of the population.

Now we can know all these things without knowing that Smith's wives actually drowned; *I* is therefore independent of *E* if *E* occurred due to chance. From *I* it is also possible to work out various ways in which Smith might have killed his wives: pushing them under trains, pushing them down stairs, getting them blind drunk and leaving them in snowdrifts, drowning them in the bath. The *D* (drowning) that actually delimits *E* is tractably derived from *I*, and because *D* has small probability,[12] we can eliminate chance as the explanation for the three deaths and conclude that the wives were killed by design. It is but a small step to conclude that Smith killed them.[13]

Compare an attempt to apply the design inference in the case of $Smith_3$. We can proceed much as before, but I_5 will cause a problem. If $Smith_3$ kills his wives, it is by a different method each time. If a criminal, he is not such a creature of habit as Smith. Since it is problematic, we might simply drop I_5, but that would merely replace one problem with another, for now it would be more difficult to form *D* from *I*. We would be running up against tractability problems. Changing tactics, we might keep I_5, but modify the *D* we derive from *I* to just 'apparently accidental death' rather than 'drowning'. If we take this approach, we will still run into problems further down the line, because the probability

[12] Note that it is *D*, rather than *E*, that has to have small probability.

[13] A small step, but an important one. The design inference rejects chance as an explanation, but, strictly speaking, it does not go any further than that: *TDI* at 9, 227. However, in many cases, having eliminated chance, we will effectively be left with only one possibility, as seems to have been the case in *Smith*. But, if Smith's arch enemy Jones was in town every time a wife died, and also had the opportunity to kill the wives, then we might not conclude that Smith killed them: perhaps Jones framed him.

that an *E* delimited by *D* will occur is now much larger (three apparently accidental deaths are much more likely to occur than three drownings). The point here is not that we absolutely cannot draw a design inference in the case of $Smith_3$. That depends on the tractability and probability thresholds we set. The point, rather, is that it is much more difficult to do so than in *Smith* and that Dembski's work suggests why this is so.

An application of the design inference may also provide us with an insight on the Kiszko evidence. That the man who confessed to the girl's murder should also have written down the number of a car that passed the scene of crime near the time of the murder seems improbable, if it occurred due to chance. But that alone does not allow us to reject chance as an explanation: first we need to fill out *D* and *I* and ensure that the independence and tractability conditions obtain. And that, I think, would prove difficult, just as it would in the case of $Smith_2$.[14] The point is fairly obvious once it is grasped, and we do not need any theoretical baggage to state it: if Kiszko was the murderer, why would he have written the registration number down? But Dembski's concepts help to police our reasoning here, especially when, as Sedley suggests, we are 'over-ready to interpret co-incidence as cause and effect'.[15]

3. *Theories of Similar Fact Evidence: The Role of Propensity*

If I am right that Dembski's elaboration of the design inference is applicable to similar fact cases, it is worth pursuing these issues a little further to see what we can learn about the theory of similar fact evidence. My principal interest here lies in the reasons why similar fact evidence has probative value, rather than the policy reasons for excluding evidence of the defendant's bad character in criminal trials. It turns out, though, that by exploring the former we will gain some insights on the latter. Now the rules governing the admissibility of similar fact evidence are somewhat confused, but one principle appears to form the backbone of the exclusionary rule, and is still taken seriously by the courts.[16] This is that what the exclusionary rule prohibits is a certain form of reasoning, namely, an inference from past wrongdoing to present guilt where that inference depends on attributing to the defendant a propensity to commit crime. This is often referred to as the 'forbidden reasoning'.

In the commentary on similar facts, there is a fair degree of consensus that certain of the cases—which we might term the 'coincidence cases'—avoid relying

[14] In fact, as we now know, there is an explanation for the registration number being there, but it is not one that incriminates Kiszko.

[15] Above n 1. Our tendency to see design, rather than chance, as the explanation for coincidences is fairly well established. Even pigeons, it seems, are prone to it: see R. Dawkins, *Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder* (1998) at 162–5, 172–9.

[16] See, for example, *Wright* (1990) 90 Cr App R 325; *B (RA)* [1997] 2 Cr App R 88.

on the forbidden reasoning.[17] *Smith* is one example; *Makin*,[18] in which the defendants were charged with the murder of a child found buried on their property and evidence was admitted that the bodies of many other children had been discovered at properties where they had lived, is another. I would add *Harris*[19] to the list, although in that case the House of Lords held that evidence of the synchronism of Harris's patrols of a market with a series of thefts from a stall there should have been excluded. The argument is that in these cases we can get to the conclusion of guilt without relying on the propensity inference. Instead, it is suggested, we can rely on the laws of chance.[20] If propensity enters the picture, it is as the conclusion, rather than the conduit, of our reasoning.[21] The most rigorous defence of this argument has been put forward by Stephen Fienberg and David Kaye, who offer a statistical proof that it is correct.[22]

Drawing on Dembski, we can see that propensity does in fact play a role in the coincidence cases. In *Smith*, *Makin*, and *Harris* there is certainly an improbable coincidence: the occurrence of the deaths or the thefts and their links to the accused. But improbability is not enough, by itself, to lead us to reject the hypothesis that the events occurred by chance (cf. Smith_2). We need also to check that the events form a specified pattern. I would suggest that any attempt to do this will involve something similar to I_5 in our worked-through example based on *Smith*. That I_5 is crucial to similar facts reasoning is actually fairly obvious. Without the assumption that criminals stick to various *modi operandi* (broadly conceived) there would be no similar fact cases.[23]

A slightly fuller discussion of Fienberg and Kaye's analysis will help to clarify a few points. The authors discuss cases where a number of cardiac arrests in intensive care units, correlating with the duty rotas of particular nurses, provides evidence that the nurses deliberately caused the arrests. They are right that the

[17] See, for example, P. B. Carter, 'Forbidden Reasoning Permissible: Similar Fact Evidence a Decade After *Boardman*' (1985) 48 *MLR* 29 at 31; R. Nair, 'Weighing Similar Fact and Avoiding Prejudice' (1996) 112 *LQR* 262 at 279; T. R. S. Allan, 'Similar Fact Evidence and Disposition: Law, Discretion and Admissibility' (1985) 48 *MLR* 253 at 258; L. H. Hoffmann, 'Similar Facts After *Boardman*' (1975) 91 *LQR* 193 at 199.

[18] *Makin* v *Attorney General for New South Wales* [1894] AC 57.

[19] *Harris* v *DPP* [1952] AC 694.

[20] In the United States, the coincidence theory is actually known as 'the doctrine of chances'. See, generally, E. J. Imwinkelried, 'The Evolution of the Use of the Doctrine of Chances as Theory of Admissibility for Similar Fact Evidence' (1993) 22 *Anglo Am L Rev* 73.

[21] As Hoffmann, above n 17 at 199, puts it: 'any view about the characters of the Makins is derived from a conclusion that they were guilty and not vice versa'. As some commentators point out, this might lead to the fact-finder employing forbidden reasoning in *Makin*. She might use the extrinsic act evidence to draw the propensity conclusion, and reason from this to the Makins having murdered the one child whose killing they are charged with. But if this is thought to be a significant problem, it could be dealt with by an instruction to the fact-finder to draw a conclusion about all the deaths at the same time. C. Tapper, *Cross and Tapper on Evidence* (8th edn, 1995) at 373–4, argues that a conclusion about the one child can *only* be drawn through the reasoning process just described, because the accidental death of that child remains a possibility. This argument seems to me to rest on a confusion between the base rate for accidental death and its posterior probability. Given the circumstances in which the body was found, it appears possible to apply the design inference to reach a conclusion that it is highly probable that all the children were murdered.

[22] S. E. Fienberg and D. H. Kaye, 'Legal and Statistical Aspects of Some Mysterious Clusters' (1991) 154 *J R Stat Soc (A)* 61.

[23] This point is grasped by Acorn, who observes that 'reasoning from similar fact evidence to a conclusion of guilt is always in some way dependent on an assumption of constancy or uniformity of action and, in that sense, necessarily involves reasoning from propensity'. A. E. Acorn, 'Similar Fact Evidence and the Principle of Inductive Reasoning: Makin Sense' (1991) 11 *OJLS* 63 at 65.

more similar events there are, the better the evidence that the nurses are guilty. Concluding that the inferential process here works without relying on 'the forbidden "propensity" logic', they state that their proof:

> is in accord with the legal argument that the occurrence of events similar to those at issue in the litigation increases the probability that the accused is guilty in a manner other than the forbidden 'because D committed acts X_1, X_2, ... X_k, D committed act X_0'.[24]

This too is correct, but my argument is that their proof does not avoid propensity altogether. The proof relies on an assumption that the events to be explained are 'similar' and, as I see it, similarity here must be established through a propensity concept such as I_5. If the only similarity were that all the patients who died while in the nurses' care had the same middle name (which the nurses could not have known about), we would be loath to conclude that the probability of guilt had been increased.

What the Fienberg/Kaye analysis helps to show is that much depends on the exact type of propensity inference that is forbidden. I_5 contains a general observation about criminals rather than one about the defendant himself. By itself this does not appear to be the sort of forbidden reasoning outlawed by Lord Herschell's famous *dictum* in *Makin*.[25] Nevertheless, *I* is used to form the *D* (killing by drowning) that matches the pattern of observed events and this involves ascribing to Smith (if only hypothetically) what amounts to a propensity to kill. This is still different from assuming that Smith's commission of one crime makes it more likely that he has committed another. Is the latter, but not the former, objectionable? There are certainly reasons for objecting to the latter inference that do not attach to the former: knowing that the defendant has been convicted of one crime, the fact-finder may feel fewer qualms at convicting him of another crime that she is not sure he has committed. In the long run, the police may rely on this tendency of fact-finders as a means of gaining convictions, and therefore 'round up the usual suspect' rather than looking for cogent evidence against him. It may also be that one of the tenets of desert theory—that past crimes should not aggravate a current sentence—has an analogue in evidence law, in the form of a (counterfactual) presumption that past convictions do not show present propensity.[26] These policy grounds may provide a sound basis for carving out the coincidence cases as an exception to the similar fact rule; but

[24] Above n 22 at 72–3. The final part of this quotation might be paraphrased in the following manner: 'because the defendant committed the similar acts, he also committed the act with which he is charged'.

[25] 'It is undoubtedly not competent for the prosecution to adduce evidence tending to show that the accused has been guilty of criminal acts other than those covered by the indictment, for the purpose of leading to the conclusion that the accused is a person likely from his criminal conduct or character to have committed the offence for which he is being tried.' Above n 18 at 65.

[26] For a thorough review of the reasons for excluding similar fact evidence, see Law Commission, *Evidence in Criminal Proceedings: Previous Misconduct of a Defendant*, Consultation Paper No. 141 (1996) 122–33; R. C. Park, 'Character Evidence Issues in the O.J. Simpson Case–Or, Rationales of the Character Evidence Ban, with Illustrations from the Simpson Case' (1996) 67 *U Colorado L Rev* 747 at 767–76. On desert and prior convictions, cf. A. von Hirsch, 'Desert and Previous Convictions' in A. von Hirsch and A. Ashworth (eds), *Principled Sentencing: Readings in Theory and Policy* (1998).

note that what cannot easily justify the exception is the common fear that the fact-finder will give the bad character evidence more weight than it really deserves. If the generalization about criminal *modi operandi* is not warranted, then both the application of the design inference and the forbidden reasoning are subject to the criticism, 'garbage in, garbage out'.[27]

In recent times, there have been attempts to extend the coincidence theory of similar facts beyond cases such as *Smith* and *Makin* to provide a general theory of the admissibility of similar fact evidence. On this theory, the test for the admissibility of similar fact evidence should be whether the coexistence of the 'similar' evidence and the undisputed facts is 'inexplicable on the basis of coincidence'. If the answer is 'yes' the evidence is admitted. This test was applied, for example, in *R* v *Groves*,[28] where the defendant, who had turned up at a rendezvous for imported cannabis, was found to have cannabis on his person and at his house. The High Court of Australia has adopted it as the admissibility test for similar fact evidence,[29] and the Canadian Supreme Court has also held that '[i]t is the unlikelihood of coincidence that gives [similar fact] evidence its probative force'.[30] To the courts, the advantage of the coincidence theory seems to be that it allows admissibility to be justified without mentioning propensity; it makes it seem, therefore, that the forbidden reasoning is not being relied on. We have seen that, in *Smith* and *Makin*, the concept of coincidence needs to be supplemented with the concept of a specified pattern before the conclusion of guilt can be drawn from the evidence. In *Groves*, a similar process reveals that what really is being relied on is propensity reasoning: and here we cannot defend its use through the caveats we applied to the use of propensity reasoning in *Makin*. The coincidence in *Groves* is only damaging (rather than innocuous, like the one in the case of $Smith_2$) if we approach it on the assumption that cannabis users have a propensity to import cannabis, and *all* of the reasons for objecting to propensity reasoning that we canvassed earlier apply.[31] If we value intellectual honesty, therefore, we should stop talking about similar facts cases—other than those like *Smith* and *Makin* where there is no direct evidence that the

[27] It is here that I part company with Acorn's insightful analysis of the similar fact rule (above n 23). Acorn suggests that the exclusionary rule catches reasoning which relies on a premise similar to I_5. I fail to see what is objectionable about this. Where Acorn goes wrong, I think, is that, while purporting to discuss induction, he expresses his inductive arguments in deductive form. This gives them an inexorable quality which propensity arguments in real life do not have: they are expressions of probability, not certainty. As long as the fact that D committed a crime in the past makes it more probable that he will do so in the future, propensity arguments are sound. Once this is understood, it seems to me that Acorn's scheme collapses into the exercise of balancing probative value against prejudicial effect, and that this undermines his defence of *Makin*.

[28] [1998] Crim LR 200. In cases like *Groves*, the English courts appear to be using the coincidence theory as one of the *Makin* categories of admissibility.

[29] *Hoch* v *R* (1988) 165 CLR 292. The test was approved in *Pfennig* v *R* (1994) 182 CLR 461, although Toohey J was rather circumspect about it. As with many similar fact cases, it is difficult to follow the reasoning in these decisions, but the judges give the impression that they believe that the coincidence theory avoids the forbidden reasoning (Toohey J again being an exception).

[30] *R* v *Arp* (1998) 166 DLR (4th) 296 at para 64.

[31] To put the point another way: in *Groves* (and in the majority of similar fact cases, including the Australian and Canadian ones cited above), instead of relying on I_5–a general observation about criminals–we rely on a propensity inference specific to the defendant: that Groves has a propensity to import cannabis. This is obviously 'forbidden reasoning'. I discuss the inferences involved in some of these cases in a little more detail in 'Drugs, Money and Relevance: *R* v *Yalman* and *R* v *Guney*' (1999) 3 *E & P* 128.

defendant has committed any crime—in terms of coincidence. Instead, we should directly ask the questions: How much probative value does the similar fact evidence have? Is this probative value outweighed by the prejudicial effect of the evidence?[32]

The approach to coincidence we have developed from our scrutiny of the design inference also suggests that one of T. R. S. Allan's 'fallacies about similar facts' may itself be fallacious.[33] Allan claims that in *DPP* v *Boardman*[34] the evidence—of two boys, who made similar claims about being involved in separate acts of buggery with the defendant—'did not derive its cogency from use of the forbidden reasoning'.[35] The testimony of each boy obviously has probative force by itself to prove the act alleged by that boy. But even though they are testifying about different events, each boy's story also supports the other's. There is added probative force in the combination of the stories. Allan seeks to explain this on the ground that 'it was most unlikely that each boy had independently made up a similar false story'.[36] But just why is that unlikely? Suppose we believed that people do not tend to have stable sexual inclinations. Then the similarity of the stories would strike us as being a meaningless coincidence, much as it is a meaningless coincidence when I take a seat on a train next to someone who turns out to be an old school friend.[37] The added probative force comes from relying on a generalization about propensity. The less we believe that someone who gets a schoolboy to bugger him on one occasion (the allegation in *Boardman*) will want to repeat the experience with another schoolboy, the less added probative force the combined testimony has.

Propensity, then, is the glue that holds the *Boardman* allegations together. Is it *forbidden* propensity reasoning, though? It is more specific than the general propensity reasoning inherent in I_5, but a little less specific than what is usually identified as being the forbidden reasoning. It may be that, as in the coincidence cases, there are reasons for making an exception to the exclusionary rule in multiple allegation cases such as *Boardman*. But it seems to me that that would involve making unduly narrow distinctions between different types of propensity reasoning when it is not really clear that some forms of propensity reasoning are more objectionable than others. Perhaps the lesson to be drawn from this analysis of *Boardman* is that the concept of forbidden reasoning is sufficiently indeterminate that it is best dropped altogether.

4. *Probability*

To this point, there is one aspect of Dembski's theory that I have given little attention to. This is the requirement that the description of the event we are

[32] The test in *DPP* v *P* [1991] 2 AC 447.
[33] T. R. S. Allan, 'Some Favourite Fallacies About Similar Facts' (1988) 8 *LS* 35.
[34] [1975] AC 421.
[35] Above n 33 at 39.
[36] Ibid.
[37] In fact, in *Boardman* the coincidence might have been meaningful for another reason, because from it we might draw the design inference that one boy had copied the other's story.

attempting to attribute to design have low probability. We did note that this was one of the things that made it difficult to draw a design inference in the case of $Smith_3$, but we did not answer the question: How low a probability must *D* have before we attribute *E* to design? Dembski's answer is that the probability must be small 'in relation to a set of probabilistic resources'.[38] This obviously requires some explanation.

Imagine a lottery which sells ten million tickets every week, and where each week there is a winner, the draw being made from the stubs of the tickets sold. Jones has won the lottery three times. Do we draw the design inference, or attribute this to chance? Initially, this looks like an extremely improbable event. But we need to remind ourselves that there is nothing special about Jones; we would have been just as amazed had any player won three times. Further, the lottery is played every week, increasing the amount of chances each player has of winning. It may also be that each player buys several tickets every week, which also increases the number of chances each one has of winning. And just as there is nothing special about Jones, so there is nothing special about this lottery; there may be hundreds of other lotteries the three-time winners of which we would get to hear about. Bearing all these things in mind, we should be rather less ready to jump to the conclusion that something fishy is going on.[39] As Dembski would put it: viewed against the relevant probabilistic resources, the probability of Jones winning thrice is not as small as it first seemed. Dembski distinguishes two types of probabilistic resource: replicational resources, which relate to the number of chances there are for an event to happen (here the number of lottery draws); and specificational resources, which relate to the number of ways in which a specified event could happen (here the number of players, the number of tickets they buy, and so on).

It is apparent that the bounds of the probabilistic resources we might take into account in the lottery example are unclear. When considering the number of draws, what time frame do we consider? Our lifetimes? Or the history of the universe between the first and last ever lotteries? How many lotteries do we consider? Just those we have heard of? Or all those that might ever exist? There are no clear answers here; Dembski suggests that it largely depends on how keen we are to avoid a false positive.[40] If we are especially keen to avoid attributing an event to design when it has occurred by chance, we will take into account all of the probabilistic resources we can think of when calculating its probability.[41]

Returning, again, to *Smith*, we can put the concept of probabilistic resources to use. What is the probability that Smith's three wives should all drown in the bath due to chance? Suppose we know that, each year, the probability that a

[38] *TDI* at 198.

[39] See D. J. Bennett, *Randomness* (1998) at 72–7; P. Diaconis and F. Mosteller, 'Methods for Studying Coincidences' (1989) 84 *J Am Stat Assn* 853 at 859.

[40] *TDI* at 191. Only largely, because the probabilistic resources taken into account must also be relevant: *TDI* at 214–17.

[41] Dembski provides a limit to this process: the universal probability bound, or 'smallest probability we'll ever need', based on the largest possible number of specifiable events in the universe. This is $1/2 \times 10^{150}$. If an event is less probable than this, we need not worry about working out the relevant probabilistic resources: *TDI* at 207–12.

particular person will drown in the bath is 1 in 50 million. To calculate the probability that, due to chance, Smith will marry three wives who drown we need to take into account the length of time he is married to each wife: the longer the marriage, the more likely it is that the wife will accidentally drown in the bath. Even having factored this in, the probability of his three wives drowning is still tiny. At this point we need to start thinking in terms of probabilistic resources. Thinking in the widest possible terms—what is the probability that this will ever happen to someone somewhere?—the probability is massively increased. If world history continues for long enough, some poor soul is actually quite likely to find himself in Smith's position through chance alone.[42] Nevertheless, given the legal context in which we are considering *Smith*, there does seem to be one sensible limit we can place on our probabilistic resources. We are only interested, I think, in the probability of the event occurring in the jurisdiction in which the case is heard (rather than in the whole world). This is because the fact-finder's concern is probably to minimize false positives within the criminal justice system in which she sits, rather than within all criminal justice systems.

At this point I think that Dembski's work has taken us just about as far as it can in our analysis of similar fact cases. The criminal justice system has the standard of proof it applies to criminal cases determined by a desire to strike an appropriate balance between convictions of the innocent and acquittals of the guilty, and it is not easy to relate the notion of 'small probability relative to the relevant probabilistic resources' to this. But, while we may not be able to use it in any very precise manner, there is a valuable insight to be gained from the concept of probabilistic resources, because it prompts us to look at selection effects, such as the way the defendant came to the attention of the police in the first place. If Smith was originally suspected simply because he had three wives who drowned in the bath, and there were no independent grounds for suspicion, we do need to think in terms of large probabilistic resources. If you can end up in court simply on the basis of having three wives die in what appear to be accidents, then sooner or later an innocent Smith will be convicted. It may be that this point has been grasped intuitively by the courts. In *Smith* there was other evidence—such as the insurance policies Smith took out on his wives shortly before their deaths, the lengths he went to get them to have baths—that pointed the finger of suspicion at Smith even without the coincidence of the deaths. In *Makin* it was possible that the Makins were just very unlucky in their choice of rented property; but this explanation was belied by evidence of the impractically small sums the Makins accepted for taking on the children they agreed to raise, and of John Makin's confession to a fellow prisoner. In *Harris*,[43] however, it was held that evidence of the previous thefts should have been excluded. This seems to have been on the ground that there was insufficient

[42] Diaconis and Mosteller, above n 39 at 859, express this in terms of the 'law of truly large numbers': '[w]ith a large enough sample, any outrageous thing is likely to happen'.

[43] Above n 19.

connection between those thefts and the defendant. As far as the extrinsic acts were concerned, there was only the coincidence to incriminate Harris, and this was what had brought him under suspicion in the first place. Knowing this, it is more difficult to dismiss the thought that Harris was just unlucky than it is that Smith or the Makins were: if we diligently searched for correlations between people and possible crimes, how many patterns might we discover?[44]

5. *Conclusion*

In this review I have suggested that Dembski's articulation of the design inference clarifies the inferential processes employed in similar fact cases. My focus has therefore been on a relatively narrow field of evidence doctrine. In concluding, however, it is worth speculating on the wider implications of Dembski's work for evidence theory. The 'coincidence' similar fact cases confront us with relatively pure applications of the design inference. But, once one has grasped what the design inference is, and how it works, one starts to see forms of it at work in less obvious places too. Dembski suggests that detectives and forensic scientists employ design inferences,[45] and, in the blurb on the back of the book, William Wimsatt remarks that 'beyond a reasonable doubt' arguments in criminal cases instantiate the design inference. Obviously, the design inference in its pure form cannot be employed in all criminal cases: if the defendant claims that he was framed, or confessed falsely, then, rather than design being set against chance, two design arguments compete against each other.

Despite these difficulties, the general form of the design inference sheds some interesting light on theories of forensic proof. That form is eliminative induction.[46] Now it would be possible to analyse design arguments in Bayesian terms (Bayesianism is a type of *ampliative* induction) which would leave us, not with chance either eliminated or not, but with posterior probabilities for chance and design. For Dembski, its eliminative form is 'a huge advantage of the design inference. Posterior probabilities can typically be established only via prior probabilities, and prior probabilities are often impossible to justify.'[47] Prior probabilities certainly pose a significant problem for the Bayesian analysis of forensic proof;[48] it is therefore encouraging to see in Dembski's work a rigorous illustration of how a sound conclusion can be drawn from evidence without relying on them. It might be possible to model a general theory of proof on the inferential process we see in the design inference. But I am increasingly attracted

[44] Cf. Fienberg and Kaye, above n 22 at 70: 'what would happen if we looked at all the nurses and doctors in the country[?] How many of them would be associated with clusters of unusual deaths in a given year? What is the probability that a nurse or doctor will have one or more such clusters over the course of a career? Essentially, the question is whether the probative value of the evidence of a cluster depends on how it is collected. We believe that the answer is clearly yes [sic].'

[45] *TDI* at xi, 20, 22–4.

[46] On which see, generally, D. Schum, *Evidential Foundations of Probabilistic Reasoning* (1994) at 243–61.

[47] *TDI* at 68.

[48] See M. Redmayne, 'Bayesianism and Proof' in M. Freeman and H. Reece (eds), *Science in Court* (1998) at 67–8.

to the idea that there is no single theory of forensic proof out there waiting to be discovered. It may be that our inferential processes are sufficiently flexible that it is better to adopt different forms of reasoning for the various fact situations, forms of evidence, and degrees of complexity that confront us. In cases where probabilistic evidence is used to prove identity, prior probabilities (based on the 'suspect population') may not be too difficult to arrive at, and Bayesian inference may be a good bet.[49] In cases where the issue is not identity, and the evidence is complex, explanatory-based decision-making probably offers a better approach.[50] But in cases like *Smith* and *Makin*, rare though they are, the eliminative induction of the design inference must surely lead the field.

Sedley's remarks on the Kiszko case, quoted in the introduction to this review, continue as follows: 'in spite of the pressure of scholars like William Twining, the interpretation of evidence has barely begun to be recognized as a subject of true academic concern'.[51] Of the many reasons for this, one is that the process of drawing inferences from evidence is thought to be a matter of common sense, about which little of interest can be written; rather paradoxically, another is that the subject is thought to be too difficult.[52] Evidence scholars are in Dembski's debt, for he has delivered an important analysis of the inferential processes central to similar fact cases; one, moreover, that suggests that some common assumptions about those cases are mistaken. His book has also arrived at an opportune time, because the Law Commission is now reviewing the law governing similar fact evidence. But that is probably just a coincidence.

[49] See M. Redmayne, 'Presenting Probabilities in Court: The DNA Experience' (1997) 1 *E & P* 187.
[50] See N. Pennington and R. Hastie, 'The Story Model for Jury Decision Making' in R. Hastie (ed.), *Inside the Jury* (1993).
[51] Above n 1.
[52] See W. Twining, 'Taking Facts Seriously' in *Rethinking Evidence: Exploratory Essays* (1994) at 20–6.