

The **GOD** Delusion

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unusually for a biological mechanism – it is a spectacularly inefficient one).

Without a word of justification, explanation or amplification, Behe simply *proclaims* the bacterial flagellar motor to be irreducibly complex. Since he offers no argument in favour of his assertion, we may begin by suspecting a failure of his imagination. He further alleges that specialist biological literature has ignored the problem. The falsehood of this allegation was massively and (to Behe) embarrassingly documented in the court of Judge John E. Jones in Pennsylvania in 2005, where Behe was testifying as an expert witness on behalf of a group of creationists who had tried to impose 'intelligent design' creationism on the science curriculum of a local public school – a move of 'breathtaking inanity', to quote Judge Jones (phrase and man surely destined for lasting fame). This wasn't the only embarrassment Behe suffered at the hearing, as we shall see.

The key to demonstrating irreducible complexity is to show that none of the parts could have been useful on its own. They all needed to be in place before any of them could do any good (Behe's favourite analogy is a mousetrap). In fact, molecular biologists have no difficulty in finding parts functioning outside the whole, both for the flagellar motor and for Behe's other alleged examples of irreducible complexity. The point is well put by Kenneth Miller of Brown University, for my money the most persuasive nemesis of 'intelligent design', not least because he is a devout Christian. I frequently recommend Miller's book, *Finding Darwin's God*, to religious people who write to me having been bamboozled by Behe.

In the case of the bacterial rotary engine, Miller calls our attention to a mechanism called the Type Three Secretory System or TTSS.<sup>63</sup> The TTSS is not used for rotatory movement. It is one of several systems used by parasitic bacteria for pumping toxic substances through their cell walls to poison their host organism. On our human scale, we might think of pouring or squirting a liquid through a hole; but, once again, on the bacterial scale things look different. Each molecule of secreted substance is a large protein with a definite, three-dimensional structure on the same scale as the TTSS's own: more like a solid sculpture than a liquid. Each molecule is individually propelled through a carefully shaped mechanism, like an automated slot machine dispensing, say, toys or

can avail us nothing and which man should not wish to learn' (quoted in Freeman 2002).

Another of Behe's favourite alleged examples of 'irreducible complexity' is the immune system. Let Judge Jones himself take up the story:

In fact, on cross-examination, Professor Behe was questioned concerning his 1996 claim that science would never find an evolutionary explanation for the immune system. He was presented with fifty-eight peer-reviewed publications, nine books, and several immunology textbook chapters about the evolution of the immune system; however, he simply insisted that this was still not sufficient evidence of evolution, and that it was not 'good enough.'

Behe, under cross-examination by Eric Rothschild, chief counsel for the plaintiffs, was forced to admit that he hadn't read most of those fifty-eight peer-reviewed papers. Hardly surprising, for immunology is hard work. Less forgivable is that Behe dismissed such research as 'unfruitful'. It certainly is unfruitful if your aim is to make propaganda among gullible laypeople and politicians, rather than to discover important truths about the real world. After listening to Behe, Rothschild eloquently summed up what every honest person in that courtroom must have felt:

Thankfully, there are scientists who do search for answers to the question of the origin of the immune system . . . It's our defense against debilitating and fatal diseases. The scientists who wrote those books and articles toil in obscurity, without book royalties or speaking engagements. Their efforts help us combat and cure serious medical conditions. By contrast, Professor Behe and the entire intelligent design movement are doing nothing to advance scientific or medical knowledge and are telling future generations of scientists, don't bother.<sup>64</sup>

As the American geneticist Jerry Coyne put it in his review of Behe's book: 'If the history of science shows us anything, it is that