

# DNA and the meaning of life

Simon Mawer



The twentieth century history of genetics has a pleasing symmetry about it: it opened with the discovery of Mendel's work on the genetics of the garden pea and closed with the publication of the first draft sequence of the complete human genome. It was, of course, neatly bisected by Crick and Watson's publication in *Nature* of the structure of DNA. Despite a now famous photo call for a magazine, their momentous discovery remained largely hidden from the general public for some years: even the Nobel Prize took almost a decade to arrive. But we realize today that the pause was just an incubation period. Like a genetically manipulated virus, DNA has now escaped the laboratory and infected the whole world. We are in the midst of a pandemic.

Virus seems an apt metaphor: there is the same reproductive capacity, the same ability to lie dormant within the body politic and break out when least expected, the same disturbing tendency to mutate. Take, for example, the latest comic book hero to hit the screen, Spiderman. In the original Marvel stories it was the bite of a radioactive spider that started Peter Parker's mutation into the arachno-hero, but the film version addresses newer fears. In the new millennium the spider that bites Parker has, of course, been genetically manipulated. And such is our familiarity with the famous double helix that we are treated to a Hollywood view of the whole strange phenomenon—Parker's DNA twisting and turning, breaking and recombining into its new, hybrid form. The audience gets the point. What will have escaped most people, however, is a more subtle mutation: all of Parker's DNA is left-handed. I don't mean that it is Z-DNA; no, the nascent Spiderman's DNA is a left-handed version of B-DNA (see <http://www.spiderman.sonypictures.com> and see also <http://www.lecb.ncicrf.gov/~toms/Leftyear2002.html>). It is a mirror image of the real thing. We are in Looking-glass Land here, and Lewis Carroll would have loved it. "Perhaps Looking-glass milk isn't good to drink," mused Alice. I wonder what she'd have thought about Looking-glass DNA.

Just as the double helix, right-turning or left, has insinuated itself into the visual imagery of the last half century, so the acronym has become embedded into the genome of the language. 'DNA' has acquired semantic power. Quite what it means is not so clear, but its significance is all: it is the secret of life, the blueprint, the instruction manual. It is both hip and profound. It is a disco in San Francisco (and yes, the DNA in their logo is left-handed), a mobile phone company in Finland ("everyone is unique"), a publisher of science fiction magazines, a graphics company creating cartoon characters, a gay magazine, a market-

ing and design company and a firm that manufactures skateboards. It is also the Dermatology Nurses Association, although this may be mere coincidence.

There is such an easy, accessible quality to the molecule. The man in the street can understand it. A protein just looks a mess, a ball of knitting wool, a haystack without a needle. But DNA has simplicity. It is iconic; it is the snake in the Garden of Eden, tempting man to the knowledge of Good and Evil. It is spiral staircase, a twisted ladder leading upwards to heaven or downwards to the pit of materialism. And it has a message, those mysterious fricatives and plosives in decipherable juxtaposition:

TTCATCTTTACTTATTACGAGGCAAGAAGT

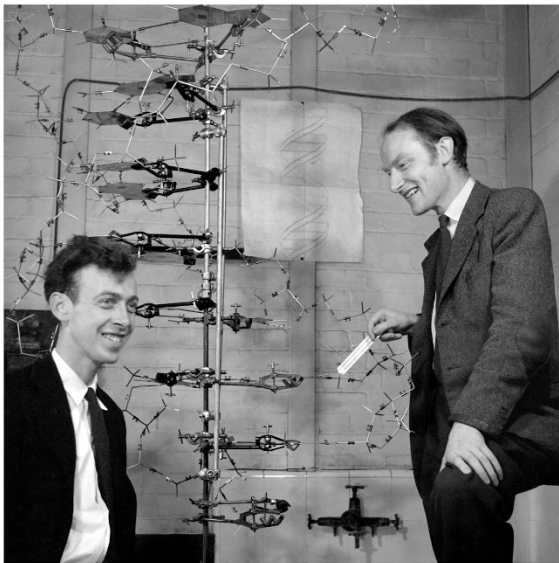
We love codes. There are those who have found and deciphered codes in the Bible. Others (or maybe these are the same people) have descried significant shapes—faces, star maps—on the surface of Mars. Still others read crop circles or receive messages from UFOs. The slightly more normal among us create working replicas of the Enigma cipher machine or solve the *Times* crossword in five minutes. And here, in DNA, we have the code of life. No wonder that those who decipher it are viewed as priests reading the runes. And the debate over the significance of the DNA message is almost theological, complete with fundamentalists like Richard Dawkins, who sees us as the hapless victims of our selfish genes, and liberals like Richard Lewontin or the late Stephen Gould, who argue for a looser role of DNA in the molding of humanity.

Around the edges of the debate there are others, the scientists just doing their job, the gawping onlookers wondering what it is all about, the entrepreneurs, the artists, the storytellers. An early one was Ira Levin, whose novel *The Boys from Brazil* was published the very same year as *The Selfish Gene*. In a previous work (*Rosemary's Baby*) Levin had merely dealt with the Devil spawning a child, but by 1976 his concept of sinister procreation had deepened and developed and become human cloning (Adolf Hitler, naturally) at a time when biologists such as John Gurdon (then Dawkins' colleague at Oxford University) couldn't manage anything better than amphibians. Today, of course, we are much further on. Today fiction is hybridizing with fact so perfectly that it's difficult to see the splice. As I write, Clonaid, the scientific arm of the Raëlian movement, has announced that it has cloned a human being. Is this merely an absurd piece of science fiction or hard fact; is it religion or science? The leader of the Raëlians certainly looks as though he's playing a part in Star Wars, and a visit to the Clonaid website (<http://www.clonaid.com>) will provide hours of seemingly harmless entertainment. There you can learn

**"A protein looks a mess, a ball of knitting wool, a haystack without a needle. But DNA has simplicity. It is iconic..."**

## Discovery of the DNA double helix

50th ANNIVERSARY 1953-2003



**THE MODEL** The structure of DNA was first proposed by James Watson and Francis Crick in 1953. Their model was based on the work of Rosalind Franklin and Maurice Wilkins, who had discovered the X-ray diffraction pattern of DNA. The model was a major breakthrough in understanding the structure of DNA and the mechanism of heredity.

DNA takes its first bow—and almost no one noticed. This special anniversary poster of Antony Barrington Brown's famous photo is courtesy of Science Photo Gallery (<http://www.sciencephotogallery.com>).

about INSURACLONE, OVULAID and CLONAPET and how mankind was cloned from space. And, with that frisson of delight that always accompanies true revelation, the discerning visitor will gather from the jacket of Raël's book (*Yes to Human Cloning, Eternal Life Thanks to Science*) that Clonaid DNA is left-handed, just like Spiderman's. But a glance at their invitation to prospective investors and the size of Raël's lecture fee (\$100,000) both suggest that all this is actually in deadly earnest, even if the current clone turns out to be a turkey.

With reality like this around, who needs Ira Levin's fantasy? And who can blame the gawping public if they think the whole thing is getting out of hand? There is incomprehension, apprehension and the vague feeling that someone is messing around with the very stuff of which we are made, that someone is playing God. Thousands of parentless embryos sit in the deep freeze waiting for... what? The day of resurrection? The day of judgment? Maybe some of them are called HUGO.

Readers of *Nature Genetics* may protest, and with good reason. They are just getting on with their research, pushing back the frontiers of human knowledge, solving one of the most fascinating and significant problems in nature. And in all probability they are doing

it in the name of medical research. We are not mad scientists, they protest. We're not the Green Goblin. We're not Raëlian bishops. We're not even novelists hoping to make a few thousand bucks out of a good story or film producers hoping to make a few million. We're just ordinary people pursuing a pretty extraordinary goal: to unpick, and thereby understand, the fabric of life. And, on the way, perhaps we can create a test that'll stop children being born with a genetic defect, enable an infertile couple to conceive a child, create a higher yield crop plant, cure a mutation that is already there (it's coming) or have pigs expressing human DNA for transplant material... the list seems endless. What's wrong with all that? I have to admit, almost nothing at all. And therein lies the problem. The road to hell is paved with good intentions, and the hell of *A Brave New World* was forecast long before the role of DNA was understood. Even the sequel essay collection, *A Brave New World Revisited*, came before the solving of the genetic code, never mind the subsequent reading of the whole message. Yet who can doubt what Aldous Huxley, scion of that famous biological family, would have felt about what has happened since? The term 'genetic engineering' has never found much favor outside the popular press, but that is really what Huxley predicted and that is what we look to be heading for. Soon we will be able to select many of our children's genes, later we will be able to 'repair' them. The question is, what will we do with such powers?

In the days when creeds dictated our thinking, the danger was that genetics might get into the hands of political bigots. Indeed, in the 1930s, that is precisely what happened, and we ended up with the eugenics policies of Nazi Germany. Today we may celebrate the fact that DNA analysis of different human racial groups has shown that there aren't any human races at all—there just isn't enough genetic variation in the species to justify such a classification—but don't let that disguise the fact that people still believe in genetic superiority. Race may be no more than a social construct, but pale skin can still be perceived as desirable, as can blonde hair, tall stature or higher intelligence. The basic prejudices of eugenics are with us still. Paradoxically, what worries me is that we no longer have any real creed to guide us in how we deal with all this—nothing, that is, beyond the law of the market place. So the next fifty years of the history of DNA looks set to be consumer-driven. You'll be able to choose your children if you can afford it, and of course you'll choose according to fashion. Spiderman? Adolf Hitler? Nothing so outrageously out of the ordinary. We won't want eccentricity for our kids. We won't want them to have difficulties at school, with girlfriends or boyfriends or with prospective employers. We won't want anything more than modest artistic talent—just look at the personal problems all those creative people had. No, we won't want a D.H. Lawrence, a Virginia Woolf, a Van Gogh or a Jackson Pollock. And we won't want them to be too clever—they might become academics rather than lawyers or accountants. What we will demand is the typical and the desirable, upgraded just a shade with whatever it takes to succeed in the market.

Judging by current taste they'll all end up like Barbie and Ken. But intelligent. □

*Editor's Note: Simon Mawer is the author of seven books, including the novels Mendel's Dwarf, the Gospel of Judas and, most recently, The Fall.*