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Nobel Savage

Steven Shapin

- *Dancing Naked in the Mind Field* by Kary Mullis

In one of the most celebrated expressions of scientific humility, Isaac Newton said that he felt himself to have been 'only like a boy playing on the seashore . . . whilst the great ocean of truth lay all undiscovered before me'. Kary Mullis approaches the seashore from a different direction. On the day he won the 1993 Nobel Prize for Chemistry, Mullis went surfing. The camera crews tried to follow him down the Southern California coast, 'asking everyone who came out of the water whether he was Kary Mullis'. Mullis was enjoying his new-found anonymity and got a surfer-dude friend to admit to being the great man himself. How does it feel to win the Nobel Prize? The surfer-dude was word-perfect: 'It's like a dream come true.' By the time Mullis had towelled off and chilled out, the paparazzi were laying siege to his house. 'As it turned out,' he writes, 'none of the other Nobel laureates that year were serious about surfing, and "Surfer Wins Nobel Prize" made headlines.'

Dancing Naked's cover artwork is just right. Mullis emerges like Poseidon from the Pacific, his wet-suit dripping, his bare chest and stomach proclaiming vigorous middle-aged health, his massive surf-board thrusting manfully forward from his hip, oozing testosterone from every pore. On the inside-back flap (of the US edition, at least), Mullis is again posed on the beach – this time casually but fully clothed, while the latest of his four wives drapes herself lusciously on his shoulder. The dust-jacket alone tells you that science can be bags of fun – and the smarter you are, the more fun it is. Real science for real boys.

The iconography of scientists hasn't always been like this. Asked to summon up an image of the late modern scientist, most minds' eyes

will probably still see the creased, gentle and infinitely sad face of Albert Einstein – back-lit, his dishevelled white hair glowing like a saintly halo. Or the gaunt stick-figure of Robert Oppenheimer in his last years, hair close-cropped – a starving Buddha, worn down by political persecution and the atomic scientist's 'knowledge of sin'. Even now, the cover of *A Brief History of Time* sets a tiny, and almost literally disembodied, Stephen Hawking against a vast backdrop of the starry heavens. But already by the Sixties and Seventies a new presentation of scientific self began to circulate. James Watson radically confessed that his thoughts strayed to 'popsies' even while working hard on the structure of DNA; Richard Feynman enjoyed having himself photographed playing the bongos, and, like Kary Mullis, broadcast his enthusiasm for topless bars: 'When my calculations didn't work out,' Feynman said, 'I would watch the girls.' Mullis just rides the wave farther than any other modern scientist.

Mullis is having so much fun because he is so smart. He's smart about a lot of things – and his book tells us many things he's smart about – but his claim to fame is the discovery of PCR, the polymerase chain reaction. This is a technique for making all the DNA you want, or, more specifically, all the genes you want. PCR was soon celebrated for having 'democratised the gene sequence'. It was rightly called a democratic revolution because it vastly expanded the number of investigators who could work directly with DNA. In 1989, *Science* magazine proclaimed DNA polymerase 'Molecule of the Year'. Without PCR, modern biotechnology, modern hopes for medical diagnostics – and modern hopes and fears about gene therapy – would be almost unrecognisable: genetic fingerprinting would not be a forensic reality and *Jurassic Park* would have had an even more ludicrous storyline. PCR technology is now a billion-dollar industry.

The first part of Mullis's idea was to use pairs of short, single-stranded DNA pieces as probes to bracket the exact DNA sequence in which you happened to be interested. You could then cleverly employ iterative biochemical processes to get that DNA sequence to 'reproduce the hell out of itself'. You could start with the tiniest samples of even impure DNA and wind up within hours with a test-tube full of whatever gene or DNA sequence you had targeted. 'I

would be famous,' Mullis recalls thinking at the moment of discovery, 'I would get the Nobel Prize.'

The discovery of PCR is here presented as a great American epiphany – its recipient struck by a flash of inspiration on the road, not to Damascus, but to Mendocino. Sometimes Mullis says the creative spirit came on an evening in April of 1983, sometimes in May. Anyway, the buckeyes were in bloom; Mullis's little silver Honda Civic was purring through the vineyards and redwoods of the Anderson Valley; and his mind wandered. Life is sweet, he thought: 'I am a big kid with a new car and a full tank of gas. I have shoes that fit. I have a woman sleeping next to me and an exciting problem, a big one.' At mile-marker 46.58 on Highway 128 – he had both the presence of mind and the sense of history to note the exact spot, if not the month – the epiphany arrives. 'Holy shit,' Mullis cries out, and his girlfriend almost, but not quite, wakes up. He pulls the Honda to the side of the road to write down his ideas and check his calculations. Within feverish minutes, the problem is solved, and Mullis is left with the mop-up operation of getting PCR actually to work. This takes almost two years, and the original report was famously rejected by both *Nature* and *Science*. Mullis was not fazed: '"Fuck them," I said.'

That's Mullis's version. He's been taking it on the road for many years now, and it mixes the charm of heroic and crusty individualism with hoary cultural convention: Archimedes alone in the bath, Newton alone in the garden, Kekulé alone in his dreams, Galileo unappreciated and persecuted. Never mind that Paul Rabinow's fine book *Making PCR* makes a persuasive case that many people at the Cetus Corporation in Emeryville, California, where Mullis then worked, had a hand in it, and that the discovery of PCR might be more plausibly referred to a corporate ethos (and a team of talented technicians) than to an individual flash of insight. Lone genius tends to make better copy, especially when it is spiced with smouldering resentment. Mullis repeatedly asserts that he was ripped off financially by the greedy confederacy of dunces who were his colleagues at Cetus. He got a $10,000 bonus, and Cetus cleared $300 million when the patent rights to PCR were sold to Hoffman-LaRoche

– possibly the most ever paid for a patent. The wound continues to fester: 'Screw Cetus.'

Not the mega-millionaire he had hoped to be, Mullis was nevertheless comfortably off, and in 1986 he left Cetus, becoming director of molecular biology at a La Jolla biotech company, and latterly striking out on his own as freelance DNA consultant and itinerating scientific shock-jock, a polymathic lecturer guaranteed to leave audiences either choking with anger or heaving with laughter. His entrepreneurial instincts remain sharp: a few years ago he started up a company – GeneStones – that would copy the DNA in hair or skin samples of famous people, multiply it by PCR, and then implant it in artificial gemstones, where it would appear as 'a white, ethereal cloud'. Depending on the setting and production-run, $75 to $200 would get you John F. Kennedy, Napoleon or Marilyn Monroe on your finger.

Dancing Naked is partly an autobiography, mostly an explosive voiding of rheum on the idiocies of contemporary science and culture. Mullis presents himself as a professional eccentric, a voice crying in the wilderness, a free-booting individualist. 'Because of the Nobel Prize, I am a free agent. I don't owe anything specifically to anybody.' So he's going to give us all a piece of his magical mind, and he doesn't give a toss what anybody thinks.

Kary Mullis on the human sciences: 'Psychology is practised by a bunch of well-paid incompetents'; sociology is a 'boring and worthless science'; and 'present-day mental health professionals have their heads firmly inserted in their asses.' A case for judicious scepticism about the nature of expertise in these fields can certainly be made, but rarely on Mullis's grounds: 'How can somebody call himself a student of human behaviour and hang out a shingle offering to help humans solve their problems without at least studying astrology?' Mullis is a Capricorn. Starting in the Sixties, three people, complete strangers, quite independently went up to him and told him he was a Capricorn, so he thought he would look into the matter. (Actually, that kind of thing happened quite a lot in the Sixties in the Bay Area, and I can't swear it didn't happen to me, too.) 'Being a scientist, the important thing to me was the long odds,' and, after

checking it out carefully, Mullis decided that astrology 'could be a valuable tool for understanding human beings if serious students of behaviour would lower themselves to examine it'.

Kary Mullis on the history of science: 'Science appeared in the 17th century.' Things really began to take off when 'Sir Robert Boyle and his Royal Society' invented the scientific method. A bluff, straightforward fellow – a bit like Mullis himself – Boyle shot straight from the methodological hip: he made a vacuum pump and showed he could put out a candle by pumping the air out. Let's call that a vacuum, 'Sir Robert' said. 'Whether God was in there or not was not something Boyle addressed.' Quite wisely, because Boyle wasn't going to let himself be concerned with what he couldn't measure and 'he didn't know how to measure the existence of God.' This seriously pissed off the Catholics: 'They had documents which clearly stated that God was everywhere. Even some garbage from mistranslations of Aristotle that said "Nature abhorred a vacuum" was taken to mean that Nature just fucking wouldn't allow one at all and that Boyle was an idiot.' But 'Sir Robert' and his mates ignored the Catholics, and that was truly a Good Thing.

Kary Mullis on global warming and the ozone layer: all pseudo-scientific criers of doom 'could take a lesson from Sir Robert'. You have to understand that 'science is a method whereby a notion proffered by anyone must be supported by experimental data.' But there just aren't any convincing data to support predictions of environmental disaster. It's all conjectural, and even if environmental change is on the cards, 'What's the trouble with something being out of balance if the natural state of that thing is change?' So-called scientific advisers and media mavens cry up imminent disaster because it's easier to get funding that way. Watch out: these people are manipulating you. And some of the worst of the gloom merchants aren't even proper scientists: 'They are parasites with degrees in economics or sociology who couldn't get a good job in the legitimate advertising industry.'

Kary Mullis on the O. J. Simpson trial: he knows a lot about the Trial of the Century because he was almost a witness for the defence. The Dream Team sent emissaries to La Jolla to size up Mullis as an expert

witness, and Mullis was more than willing, having established a track-record in deconstructing PCR-DNA work for defendants in other homicide trials. When the inventor of PCR says that the testing protocols are lousy, it tends to carry conviction. The Dream Team told Mullis that the Los Angeles police had botched the DNA work, and Mullis agreed: the people doing the work 'didn't know the chaff from the wheat, or their ass from a hole in the ground'.

Waiting to be called as a witness, Mullis attended the trial, where O.J. graciously asked him about his famous fridge-door gallery of soft-core porn (as featured in *Esquire* magazine), and Mullis, in turn, scribbled a note asking for the phone-number of one of O.J.'s ex-girlfriends. 'Throughout the trial,' Mullis writes, 'O.J. maintained this level of playful charm and humanity.' Mullis was really looking forward to his testimony and reckoned he'd be effective: he knew he had 'a rare talent for cutting through the garbage to the issue'. Unfortunately, he never got his chance. The Dream Team was worried that the prosecution might quiz Mullis about his LSD use (and maybe his encounters with aliens), so they decided not to risk it. Just as well, since he allowed himself to be photographed at a Los Angeles strip-joint on his way out of town.

Kary Mullis on HIV and Aids: another epiphany on the road. He was driving one night from Berkeley to La Jolla, listening to an interview with the Berkeley virologist Peter Duesberg on the car radio. Duesberg famously disbelieves the scientific orthodoxy identifying HIV as the cause of Aids, and Mullis was so transfixed by what Duesberg was saying that he pulled the car over to the side of the road to savour every word. Just like environmental doom-mongering, and nutritional panic-peddling, the HIV-Aids connection was down to pure careerism. Ronald Reagan had decided that 'enough homosexuals picketing the White House was enough,' so (Mullis says) Robert Gallo at the National Institutes of Health sensed a marketing opportunity: he 'suavely pulled off his wraparound sunglasses and announced to the world press, "Gentlemen, we have found the cause of Aids!"' HIV didn't pop out of the African jungle: 'It just popped into Bob Gallo's hands at a time when he needed a new career.' Taxpayers arise! All the 'professional jackals' pulling down

their NIH grants to work on HIV 'are still making payments on their new BMWs out of your pocket'.

Any scientist with guts enough to stand up to the HIV-Aids establishment is taking a major risk. So be it; Mullis is man enough to take that risk. And, again, the confederacy of dunces leagued against him proves only one thing: 'Science as it is practised today in the world is largely not science at all. What people call science is probably very similar to what was called science in 1634.' If Gallo and the rest of the orthodox want to play Cardinal Bellarmine, then Mullis is happy to play Galileo. Interviewed in 1994, he said that he was willing to confront Gallo on TV, 'to chase the little bastard from his car to his office and say, "This is Kary Mullis trying to ask you a goddamn simple question," and let the cameras follow.' 'I don't care about making an ass of myself because most people realise I am one.' After all, Mullis knows that he's not quite as vulnerable as Galileo: 'They can't pooh-pooh me now, because of who I am.' This Nobel savage has immunity.

For all the apparent loopiness of his opinions, and for all his in-your-face aggression, there is something reassuringly traditional about Mullis's presentation of scientific self. There is nothing at all new in portraying the scientific genius as rugged individualist, nor in coupling genius and eccentricity, even madness. Truth has widely been supposed more solitary than social, and Mullis's current plans for an Institute of Further Study in Mendocino look a bit like a PCR-enhanced New Age Walden. Solitude and loopiness generate each other. Eccentric individualism contracts the idea of genuine science to a social vanishing point while, at the same time, it vastly expands the range of stupidity and fashionable nonsense that has to be combated in the name of Truth. That's to say, to be Kary Mullis is to oppose just about everything that everyone else accepts and to believe just about the opposite of whatever anyone else believes. Just as he announces that practically all contemporary science is fraudulent careerism or the dedicated following of fashion, so he constitutes Kary Mullis as almost the only mouthpiece for Scientific Truth and Scientific Method. It's hard work, but somebody's got to do it. And what emerges from Mullis's exercise in heroic individualism is

a weird species of Hyper-Science, where the more bizarre the belief, the more its Truth is supported by references to an unambiguous and traditionally established rational Method.

Does it matter? In the larger scheme of things, probably not. Virologists' belief in HIV as the cause of Aids, and sociologists' unwillingness to believe in astrology, are almost certainly too durable to be shaken by Mullis and his groupies. And it doesn't do to get too high-handed and sanctimonious about a bit of heterodox criticism. On the whole and for the most part, it's useful to have someone around to make orthodoxy slightly uncomfortable. A trickster doesn't have to be right to perform his mythic function: he just has to unsettle you and make sure you don't get too complacent or too certain you really know what's going on. Just because you'd rather Kary Mullis didn't take up residence in your scientific backyard, or marry your daughters, doesn't mean he's got to be shut up. And – who knows? – if someone takes up enough unfashionable positions, he'll turn out to be right about something. (In fact, Mullis's scepticism about food-faddism looks in danger of becoming fashionable itself.)

Mullis's hedonism and materialism are relatively new features of the scientific persona, and we may come to see a lot more of them as scientific research increasingly moves out of the academy – which in Mullis's and my part of the world ceased to be an Ivory Tower many years ago – and into thrusting entrepreneurial business settings. Why should the entrepreneurial scientist not want whatever the CEO of his company wants? And why should he not now covet his neighbour's ox, ass, house, wife or stock-options? No longer an other-worldly and humble ascetic, the new-style scientist is finally free to be human, all too human. ('Is Kary Mullis God?' an interviewer asks: no, he's just a Good Ole Boy with a beachfront apartment and a Nobel Prize.) He can declare that his discovery of PCR was not motivated by a desire to advance truth or to benefit humankind but by a longing to impress his girlfriend Jennifer and make her fall back in love with him. He can tell magazine reporters about the 'very, very wonderful sex' he and Jennifer had together. He can propose to the interviewer that she, too, can have that sex – right now – if she'd like. He can wonder

why it was that Jennifer walked out on him even after he'd discovered PCR. He can have *fun*. And one hopes – despite the rip-current of manic late-middle-aged desperation that runs through his book – that Kary Mullis is having fun.

Steven Shapin teaches at Harvard and has written several books on the history of early modern science. His next will be *The Life of Science: A Moral History of a Late Modern Vocation*.

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