

MATTHEW WHITE RIDLEY, DPHIL, DSc: a conversation with the editor

Matt Ridley, DPhil, DSc (Figure 1), was born on February 7, 1958, in Newcastle upon Tyne. He graduated from Magdalen College of Oxford University with a degree in zoology in 1979 and he received his doctorate at the same university in 1983. From there he joined *The Economist*, initially as a science correspondent and then as the science and technology editor in London. Later, he was their correspondent in Washington, DC, and finally their American editor in London again. In 1992, he left *The Economist* and became a freelance journalist, becoming a regular columnist for the *Sunday Telegraph* and for the *Daily Telegraph* for the next 8 years. During this time, he also wrote many articles for numerous other publications in both the United Kingdom (UK) and the USA. His first book, which was on the US presidential election of 1988, appeared in 1989. Subsequently, he authored *The Red Queen*, *The Origins of Virtue*, the international bestseller *Genome*, and *Nature Via Nurture* (Figure 2). For his work he has received numerous awards, including an honorary doctorate in science from the University of Buckingham in 2003. He honored Baylor University Medical Center with a visit on March 18, 2004. It was a pleasure to visit with this splendid man.



Figure 1. Dr. Matt Ridley during the interview.

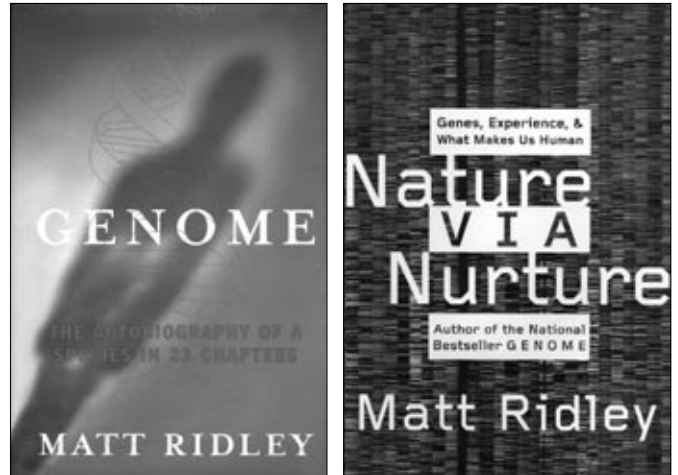


Figure 2. Two of the books Dr. Ridley has published.

William Clifford Roberts, MD (hereafter, WCR): *Dr. Ridley, I appreciate the opportunity to talk to you and therefore for you to talk to the readers of Baylor University Medical Center Proceedings. To begin, could you describe some of your early memories, your parents, and your siblings?*

Matthew White Ridley, DPhil, DSc (hereafter, MWR): It's a great honor to talk to you also. I was born in Newcastle upon Tyne, the city where I still live, in the northeast of England. I had an idyllic childhood. My parents are still living and are enjoying a very active retirement. They live close to where I live now. I went to boarding school in the south of England. Then I went to Oxford University.

WCR: *Boarding school meant from first grade or from eighth grade?*

MWR: We don't talk about grades in the UK so I don't know what they mean. I went to a boarding school from the age of 8. I didn't enjoy it. I wanted to stay at home. By the age of 12, I was

at a different school and I enjoyed that. I was very well educated at those schools. At my secondary school was a great biology teacher, who was fascinated by sailing. He sailed whenever he could. He taught us the exact shape and every part of the *HMS Beagle*, the ship that Charles Darwin sailed in. He gave me a good education in biology.

I was an amateur naturalist as a child. I picked that up from my father, who was a keen bird watcher. He later became a keen botanist and collector of trees in a garden. Originally, my interest was in birds and, later, other things. From a fairly early age, I knew I wanted to do something in natural history. That seemed to mean biology. There's a remarkable phenomenon about how many other biologists got started with birds. James Watson, the discoverer of the double helix, was taught bird watching by his father. I've often talked to him about this observation. (I hasten to add that I am not comparing myself to James Watson.)

WCR: *How long is your bird list?*

MWR: That's a very good question. I'm afraid I haven't kept it up, so I do not know. I wasn't much of what we call a "twitcher," a strange British term meaning someone who really minds about their list. I was almost a twitcher at one point. It becomes an obsession with some bird watchers, and some travel 500 miles because they have heard that an American rarity landed on the west coast of Ireland.

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WCR: *When you were out bird watching, could you think of anything else other than trying to spot various birds? Did you think much about the trees they're in or something going on back home?*

MWR: I think it's the nature of obsessive boys that they don't much think about anything except what they are doing. Of course, I did think about other things. I don't do a huge amount of bird watching nowadays. I'm always interested if I get the chance to go somewhere and take my binoculars. I like to look and see what birds are around. I could make the case that bird watching is very good training for a naturalist because it teaches you about systematically using evidence, assessing which species is which, categorizing things, and understanding where things live and how some things live in different habitats than others. I could make that case, but I think I'd be stretching it a bit. It is just a hobby, but it's a pleasant hobby.

WCR: *What else did you do as a boy? You must have enjoyed all animals.*

MWR: I liked the outdoors. We lived on a farm, and there were woods nearby. I disappeared for hours on end. I'm sure I did other things. I always liked to read. I made sure that I read a lot of books just to keep up with my sister. My favorite author as a child (this goes back to the business of being a naturalist) was Gerald Durrell. His brother Lawrence was a famous novelist who wrote *The Alexandria Quartet*. Gerald Durrell became much more of a bestseller through his lighthearted books about his experiences as a young man "catching animals for zoos" in the 1950s, mostly in Africa and South America. He also wrote a very funny book called *My Family and Other Animals*, a book about his childhood on the Island of Corfu off Greece. I was lucky enough to meet Gerald Durrell towards the end of his life, by which time he was something of a legend in the conservation world because he eventually set up his own zoo on the Island of Jersey in the Channel Islands. The zoo was devoted entirely to endangered species and was part of the Jersey Wildlife Preservation Trust, an early conservation organization that he started. He was something of a hero in the conservation movement but became very much disenchanted in later life, as I found out when I met him, with the bureaucratization of the conservation movement. I didn't get involved in biology that had anything to do with medicine for a long time.

WCR: *When you went off to university, did you know what you wanted to do?*

MWR: Yes. Under the British system, as you probably know, students choose their major at the very start of university. In fact, it is the only thing you do. There is not a broad curriculum under the British system. I went to Oxford to read zoology. The first year consisted of a broadly based biological course with an emphasis on animals, but with a certain amount of geology, botany, and mathematic statistics thrown in. There was a little breadth to it but not a lot. I never did any arts of any kind. From the age of 15, I effectively gave up everything except physics, chemistry, and biology. This is amazingly early.

That is the way the system operated in those days. I was disappointed. I really enjoyed English. I enjoyed history and geography. I would have liked to have read a combination of scientific and nonscientific subjects. I didn't much enjoy physics, and I'm not very good at mathematics. My formal education was all science, and my informal education was reading history and novels.

WCR: *Fortunately, you had done a lot of reading earlier in life.*

MWR: I'm not an absurdly voluminous reader, but I don't think there has ever been a time since the age of 8 when I haven't had at least 1 book on the go; sometimes nowadays it's 3 or 4 books somewhere in the house.

WCR: *What was your plan eventually—to teach or to write, or did you know?*

MWR: I had no plan. I was excited about the idea of zoology. I suppose like my hero Gerald Durrell, I wanted to end up doing something with wildlife. I came quite close to doing that at one point, when I spent 3 summers in India and Pakistan working on different wildlife conservation projects. I certainly had no plan to write. I was fairly certain I didn't want to become a physician. I had a blank mind as to what I was going to do after university.

WCR: *Were there any physicians in your extended family?*

MWR: No. I have no relations who were or are physicians.

WCR: *What about other scientists? You said your father was an amateur biologist. What did he do for a living?*

MWR: He did a variety of things. He ran the farm on which we lived initially. Then he got very involved in local political affairs. For most of my youth, he was chairman of the County Council of Northumberland County, the area in which we lived.

WCR: *His interest in animals and birds was simply a hobby?*

MWR: Yes. Earlier in his life, he had published a paper on the exploitation of seabirds in the Seychelles with a professional zoologist, a friend of his. That was the closest he came to being a professional scientist. Although he has a very scientific mind, he was always an amateur.

WCR: *He went to university also?*

MWR: Yes. He had a curious experience of university. He was born in 1925 and joined the army straight from school. He fought in Normandy and Germany at the ages of 19 and 20. When he came out of the army in 1946 or 1947, he had lived more life than most of us would live in a lifetime. The idea of going back and being a student didn't really appeal to him. Then Oxford said that for those who had missed out on university, there was a 2-year course to get a degree. He did a 2-year agricultural degree at Oxford.

WCR: *When was your mother born?*

MWR: In 1929.

WCR: *She's still living?*

MWR: Yes. She was brought up mostly in India. Her father had an important job in the colonial government in Bombay. She was in India up until the middle of World War II. Her family came back to England when she was 12 or 13.

WCR: *The home was a happy home growing up?*

MWR: Yes, my home was extremely happy growing up.

WCR: *Was dinner at night a big deal?*

MWR: Not particularly. We all got together for a meal in the evening.

WCR: *Did you talk about ideas a lot in your family or mainly what you learned in school or what you were doing or what interested you?*

MWR: My parents were always interested in what we were up to. They were always very careful, particularly my father, never to put any pressure on me. I appreciated that. I think it's the right thing to do.

WCR: *How did university work out? Isn't university 6 years?*

MWR: The undergraduate degree was 3 years at Oxford. I then applied for a PhD grant and permission to work with a

professor in the department where I had been an undergraduate. I did another 3.5 years for my PhD.

WCR: *Your PhD was in what?*

MWR: My PhD was “The Mating System of the Pheasant.” I was still on birds. The zoology department at Oxford had quite a strong team in molecular genetics, but also had a strong whole-organism side. That was the direction I was very interested in, ecology and behavior studies. At Oxford there is in a sense no such thing as university as far as undergraduates are concerned. They are just colleges that are all affiliated with the university. I was a member of Magdalen College, which is one of the oldest colleges and has a very beautiful old set of buildings. My mother’s father had been a student there, and that was probably why I applied for it. My father had been at a different college.

In the college there was a tutor in your subject. There was one professor who had his own research group in the university, but his job was to be a mentor to undergraduates in his subject within the college. In my case it was a man named David Roberts, who was a *Drosophila* geneticist. He was actually working in the biochemistry department in Oxford. It was his job to give me and other zoology undergraduates an hour-long tutorial once a week on some subject as well as all the lectures we went to in zoology. I learned the most just sitting with David Roberts in his lab at Oxford, discussing an essay I had written. He gave us genetics and molecular textbooks to read and made us learn a huge amount of basic molecular biology, DNA science at that time, in my very first year as an undergraduate, much more than normally a first-year undergraduate would get. I really appreciated it because he gave me a grounding, which I would later come back to. It was an exciting time in molecular biology. In 1976, the genetic code was only 10 years old. The whole story of how protein synthesis happened in the cell was all new stuff. It was an incredibly exciting new world to explore. I have a lot of gratitude for David Roberts for opening the world to me. David, by the way, is retiring this year. I see him occasionally still.

When it came time to apply for my PhD, I applied to a professor named Chris Perrins because by then I was interested in the zoology and behavior of animals, the whole story of what determined the way animals behaved and the way ecology works. In particular, I was very interested in the theory of sexual selection, which was undergoing a revival. It was an idea that started with Darwin. A peacock has a brightly colored tail because of female choice. Females must have selected males to have brightly colored tails. This was Darwin’s idea. He had no idea why they should have selected long tails. In 1915, Ronald Fisher put out a theory called “the runaway theory of sexual selection.” If you have a species in which the female is choosing brightly colored males and a female decides she is not interested in doing that, she just wants any old male, then she’s going to have unattractive sons. The females have to do what the other females are doing. Once a preference develops in the females, it becomes a sort of despotic fashion. It’s a lovely idea, mathematically, and you can get a runaway selection resulting in absurd things like peacocks’ tails evolving because females are choosing. The other theory is that females choose brightly colored tails because they indicate the quality of the male; in some sense, the tails are indicators of good genes.

That whole debate was going on. There were some people at Oxford, like John Krebs and Richard Dawkins, who were very

active in this whole argument. It is all part of the selfish-gene revolution, seeing the organism as the plaything of genes, rather than the other way around in evolutionary terms. A lot of that was happening at Oxford. It was a very exciting place to be. Richard Dawkins published his book, *The Selfish Gene*, in 1976, the year I became an undergraduate, and I read it immediately. For my PhD, I was recruited by Chris Perrins to look at sexual selection in pheasants. Pheasants have brightly colored males and dull-colored females, just like peacocks. They are polygamous. It looked like one male had several mates, which is very unusual in birds. I stuck radio transmitters and number plates on pheasants in the countryside so that I could identify them. I plotted their movements, weighed and measured them, and worked out why some males were getting more mates than others. It was because they were bigger and stronger and because they had the best piece of habitat in their territory. That determined where the females were going to build their nests. They weren’t nesting in the territory of the male they mated with. I came very close to discovering a phenomenon that is now big in that field—sperm competition—but I didn’t discover it. After the invention of genetic fingerprinting, it was found that the females in many species deliberately mate with more than one male to be able to get the best genes for their offspring and also get the best parental care. You don’t necessarily get it from the same guy. It was the discovery of much greater promiscuity, particularly in birds, than had been suspected. My research wasn’t an epic piece of work, but it was enough to get me a PhD. I could have stayed on in academia and tried to make a career out of this, but I decided that life was too interesting to study just birds. The bird bug had begun to wane. I also had discovered that I really enjoyed the writing of my PhD thesis so maybe I should be a writer.

WCR: *Was your thesis ever published?*

MWR: A couple of papers were published from it with other authors. I got 3 peer-reviewed publications out of it and a couple of smaller notes. I discovered I liked writing. A lot of my colleagues seemed to hate writing their theses. I really enjoyed it. It was very late to discover this kind of thing. I should have discovered it as an undergraduate. I’d always enjoyed writing essays as an undergraduate. I had written a couple of articles for *New Scientist* magazine by the time I’d finished my PhD, including “How the Peacock Got Its Tail.” I started applying for jobs in the media. I was interviewed by the BBC and was turned down. After being turned down for another couple of jobs, somebody told me that the science editor on *The Economist* had died and that there might be a vacancy in science writing there. I wrote to them and they said, “Well, we have a new science editor, but why don’t you write us a couple of pieces and we’ll see whether we might take you on as an intern?” I wrote a couple of pieces for them, one of which ended up being published as a cover story for *The Economist*. This again was about sexual selection. I figured I’d stick to what I knew at first. Then they gave me a 3-month internship at the end of which I got a full-time job as a science correspondent.

WCR: *This was in 1983? You were 25 years old.*

MWR: Yes. Within a year of getting my full-time employment, the next science editor had also died. It was a tragic period for them. The man who started the science section of *The Economist* was Richard Casement. He was a very good journalist

and was brilliant. He started a whole new genre. He had a heart attack and died. It was a terrible shock. His successor was a woman named Alice Barrass, and I was effectively her deputy, her sidekick. I was the science correspondent, and she was the science editor. She gave me my assignments and would edit them. She was a very good writer, a very accomplished user of the English language. She trained me. Within a year, tragically, she too had died, of cancer, and I became science editor. By now I was part of *The Economist* family, a wonderful place to work. With few exceptions, every article is anonymous.

WCR: *The office is in London?*

MWR: Yes. Every member of the editorial staff crowds into the editor's office every Monday morning, which is not a very big room, and argues about every issue.

WCR: *The upcoming week's issue?*

MWR: Yes, about the subjects that are going into the next one. It was a remarkably democratic system. You were allowed to pipe up if you had a strong view. It was a good place to learn about politics, economics, business, and everything that was going on. We learned how to formulate our ideas and present them. If you strongly felt that there should be an editorial on some subject, you could say so. After a bit, I was writing editorials about political issues like AIDS or acid rain or whatever was going on at that time. It was a great time to be around.

Science journalism is licensed curiosity. You get to leaf through the scientific journals, find the most interesting stories, and call up the authors to ask about having a chat on the phone, or in person if the author is close, about the article. If it was interesting enough, I'd follow it up with a couple of conversations and call some other people elsewhere in the world. This was the way we operated in the 1980s. This was long before the Internet. If it took your fancy, you followed it up; if it didn't, chances are it wasn't going to take the readers' fancy either. I regarded it as a chance to write on esoteric interesting stuff going on in academic science (medical, biological, physical, chemical). I covered physics, astronomy, and all kinds of things. I didn't much like writing about technology or the political end of science (what should be done about acid rain or nuclear power, for example).

I completely missed, and shouldn't have missed, stories about the emergence of the Internet and the mobile phone, incredible changes just under my nose. Other journalists missed them, too. I was talking to a colleague the other day who said that she wrote a 15-page survey of the telecommunications industry in 1988. It was supposed to cover all the issues in telecommunications. Neither the Internet nor the mobile telephone was mentioned. She said, "It just reminds you how the future takes us by surprise." It wasn't just us. If you talk to telecommunications executives, they were forecasting in the early 1990s a total global mobile phone market of 4 million and thought that was crazy. How many are there now? Probably 4 billion.

I was a scientific journalist for 3 years, and then the editor of *The Economist* called me in and said, "I think you'd make a good foreign correspondent. I want to send you to Washington, DC." What the editor did very cleverly was say, "Go and live in America for 4 months doing your current job. With faxes you can just about do it. (I had to approve proofs and things as well as write science articles.) Do it from America and learn about America while you are there. Read about its politics. After 4 months, move

to Washington, DC, and take up political reporting." I went. Here I was—deeply unqualified because of being a zoologist—plunged into Washington, DC, and told to write articles about the budget deficit or the Jack Kemp campaign or whatever. It was wonderful. It was great fun. I did that for 3 years. Then the editor called me up and said, "I want you to come back to London and be the American editor and write editorials on American issues." That meant I would be the person in London who commissioned all the stuff that appears in the American section (from New York, Washington, DC, Los Angeles, and stringers all over the USA). I did that job for 2 years.

By now I had married, which complicated things. While in America I had met my wife, Anya Hurlbert, who was from Houston, Texas. At the time she was doing an MD/PhD, the MD at Harvard and the PhD at the Massachusetts Institute of Technology. I actually met her when I interviewed her supervisor for an article I was writing. She has more degrees than a thermometer. She also had a second BA from Cambridge, and her first degree was from Princeton. We married in 1989 just before I was called back to London.

Anya started applying for jobs in England. She did her postdoctorate at Oxford for a year. Anya was offered a lectureship at Newcastle University and took it up in 1992. In that year we moved from London to Newcastle, and I gave up my job at *The Economist*.

WCR: *That must have been a hard thing to do.*

MWR: It was and it wasn't. As I said, *The Economist* is entirely anonymous. If you try to make a living as a writer, to get commissions and freelance articles, etc., you have to get your name out there. Nobody knew who I was when I started freelancing. I started writing regular articles. I soon had a regular column in the *Daily Telegraph*, a British newspaper, mainly on environmental and scientific issues. I soon found that I had more work than I could fulfill doing articles for publication. I always knew I wanted to write popular science books, which were then undergoing something of a boom.

WCR: *Since you've studied mating and sex and choosing mates, what were the characteristics of your wife that attracted you so much to her?*

MWR: I think the same things that attract anyone to anyone. Anya was highly intelligent, beautiful, funny, and nice. By then my first book called *The Red Queen* was about sex and human nature. It came in 2 parts. The first part was a discussion of a then very live debate in biology about the origin of sex, why sex had evolved in the first place. The answer that I favored is that sex was invented as a mechanism for changing genetic combinations to prevent parasites from getting ecological domination of the species. By constantly changing the locks, as it were, parasites would always get the wrong key. The species that don't indulge in sex tend to be decimated by infectious diseases. There are quite a lot of asexual species, but they tend to be small, fast expanding, and fast collapsing and don't have to worry about disease because it never catches up with them. They are like a disease themselves. It's a very interesting thesis. The second half of the book was about sexual selection in human beings and about why men choose beautiful young women and why women choose rich men and other such theories as that.

WCR: *You were born in Newcastle upon Tyne. You were working in London. Then suddenly you were in Washington, DC. Then, you went to Boston for a story and by happenstance . . .*

MWR: It didn't quite work out that way. The 4 months that I lived in America, before I went to Washington, DC, I was in Boston. That was when I got to know her.

WCR: *You had 4 months to get to know one another a bit?*

MWR: Yes.

WCR: *How long did it take until you got married?*

MWR: About 3 years after we first started going out.

WCR: *What did Anya think about going back to Newcastle upon Tyne?*

MWR: She had her doubts and concerns, but she knew England. She had lived in Cambridge.

WCR: *Your wife grew up in Houston?*

MWR: Yes. Her mother was from Latvia, and her father was from Nebraska.

WCR: *You started writing books when you went back to Newcastle upon Tyne?*

MWR: That's right.

WCR: *What kind of setup do you have at home? Do you have a study sort of isolated in the house? How did you do it?*

MWR: Exactly that. I have a study and I also have an office where the farm office is, which enables me to go and do administrative work somewhere else. When I'm in my study, I'm writing or thinking.

WCR: *Do you take care of the farm too?*

MWR: No. I employ a contractor to do that. I don't know one end of a cow from another.

WCR: *And your wife is working too?*

MWR: She's full-time at the university. She has a huge teaching load, but she also has her own research group and some administrative responsibilities. She's the one with the full-time job.

WCR: *You have 2 children?*

MWR: We have 2 children, a boy who is 10 and a girl who is 6.

WCR: *You have written how many books now?*

MWR: I've written 5 full-scale books. It's actually quite hard to define a book. I've written some pamphlets for think tanks. I was commissioned to write a 15,000-word minibook once. It was for sale in bookshops, etc. I have written 5 proper, full-length books. The first one nobody knows about, and that's just as well.

WCR: *Which one is that?*

MWR: It's called *Warts and All*. It was published in 1989, and it's an account of the US presidential election campaign of 1988 from a very personal point of view.

WCR: *This was a nonbiological book?*

MWR: It had nothing to do with biology. It's a "boys on the bus" book. It's a lighthearted account of what goes on during presidential campaigns.

WCR: *I'd love to read it.*

MWR: I haven't had the courage to look at it now for at least 10 years, so I can't tell you if it's a good book or not. I enjoyed writing it.

WCR: *That's when you were the head dog in Washington, DC. What was your second book?*

MWR: Right. My second book was *The Red Queen*, the one about sex. *The Red Queen* did rather well. It had good reviews and

it started to sell, not spectacularly, but in a slow fashion through the bookshops. It got quite a reputation for being an interesting book and did quite well in paperback. It was published in the USA as well as in Britain. It started getting foreign editions. I've never made a huge amount of money from it. Occasionally, I get a small royalty check, but it's still in print.

WCR: *It came out in what year?*

MWR: In 1993. It's been in print continuously. A new edition was brought out in 2003 by HarperCollins, who bought the rights to it from Penguin. My next book was *The Origins of Virtue*, a book about evolution and about economics. It's about how cooperation came to evolve in the animal kingdom and how it originates in human societies as well. It argues that there are cooperative instincts in human beings that are there for very good and interesting reasons. It's not all learned. There's an element of genetic origin in those instincts. I explored the paradox of how animal societies came about. This is a subject of great interest to biologists. There's a lot in there about the genetics of kin selection. That again was a popular book. It was written as something people would buy in an airport and read.

WCR: *How did you pick the word "virtue"?*

MWR: It was an odd word to choose. I picked it because I thought it was a provocative and intriguing word. A lot of people misunderstood and thought I was writing about morality as opposed to cooperation. But I argue that the essence of almost all virtues is social cooperation, and the essence of almost all vices is selfishness.

WCR: *What year did this book come out? Did it have a subtitle?*

MWR: In 1996. In the USA its subtitle is "Human Instincts and the Evolution of Cooperation."

WCR: *That really describes the book better. What was your next book?*

MWR: The next one was *Genome*. It came about for an almost accidental reason. In 1996, Alastair Balls, head of a development agency in Newcastle, came to see me. I had known him slightly. His agency was charged with reviving the rundown parts of the city, particularly along the river. There was a new government fund called the Millennium Fund, funded by lottery, which was funding spectacular new projects. He wanted to create a science center, and I suggested a focus on genetics because the human genome project was coming to fruition in the next few years. Genes were going to be big news; people were going to want to understand them. He got exactly the same advice from John Burn, the professor of genetics at Newcastle University. Eventually the 3 of us plus a lot of other people sat around a table and turned this idea into a real plan. We received a lot of funding from the European Union and some from the Wellcome Trust. Before we knew where we were, 10 of us, including the leader of the city council and the vice chancellor of the university, announced, "We're going to build a £70 million (\$100 million) site in the middle of Newcastle. We've got the site, and we can get the money. We are able to do this. We've got to know what we are doing." I became chairman of the board (unpaid); Alastair, chief executive. The eventual plan was a brilliant one—his idea entirely, not mine. We would build a visitors' center and an education center, which would lose money. The other half would be a science park occupied by the university, the local health clinics,

biotech companies, and other tenants, who would pay rent. The rent would subsidize the education and visitors' center. We'd be a nonprofit institution that would break even. Our goals would be education and public discussion about science. It's worked out almost exactly like that. A science festival is going on there this week. We put 30,000 school kids through courses in basic DNA science last year.

I ended up retiring from the chairmanship last year after 7 years. But in the meantime the project had got me reading about the genome, and at a certain point, the idea occurred to me to write a book about the genome and to do it in time for the release of the human genome project. It was a pretty obvious idea. *Genome* came out in 1999, just before the publication of the human genome project in 2000. That was semideliberate. The completion of the human genome project was originally scheduled for 2003, but they kept bringing the date forward. First it was 2001, and then Craig Venter got involved and the project was brought forward to the announcement by Tony Blair and Bill Clinton of the first draft in 2000. I was incredibly lucky because my book had just appeared.

More than any of my other books, this one was driven by a unique idea about how to write the book. The idea was that I would write a chapter for each chromosome. It solved the problem of what to leave out. The problem was that the knowledge about human genes was expanding all the time. I wanted to write about Huntington's disease or about cystic fibrosis or about all those genes that were being discovered and all these new ideas that were coming out. How do you organize that material? Where do you start? Where do you stop? Because I had this ridiculously constraining structure that I had drawn, I wrote 23 different little essays. I knew what I wanted to do: start with the origin of life and end with free will. I had to navigate through the chromosomes, telling one story from each chromosome that would suit it. At the time only a few human genes were known. It was still the early days. For some chromosomes, it was hard to find anything to write about at all. Chapter 8 of the book, based on chromosome 8, is a story about genetic fingerprinting and how it came about. There's no particular reason for writing about this subject on chromosome 8; there's junk DNA in all the chromosomes, and there is some in chromosome 8 too.

WCR: *This book has been a big seller?*

MWR: That was my breakthrough book in terms of really making some money out of it, getting a big audience, and getting recognition. Warren Buffett, Rudolph Giuliani, and Bill Clinton have all recommended it. It has sold over half a million copies now. It sold >250,000 in paperback in the USA alone. It sold nearly 100,000 in hardback. It sold >100,000 in the UK in hardback and paperback. These aren't ridiculous numbers by novelists' standards, but for a popular science book, it's one of the 10 or 12 popular science books that has really hit the big time, like Jim Gleick's *Chaos*, Steven Hawking's *Brief History of Time*, or Richard Dawkins' *Selfish Gene*. I've been very lucky. I saw it as a literary endeavor, not as an aid to scientists. It's entertainment.

WCR: *The book has changed your life with invitations from here and yonder and elsewhere?*

MWR: Exactly. I want to keep writing. I have to ration the invitations I accept so I can get back to my writing.

WCR: *How many trips do you go on now a year?*

MWR: It's hard to put a figure on it because when I first finish a book I do a lot of traveling. When I'm writing, I don't travel. In 2003, when my new book, *Nature via Nurture*, came out in the USA, I did an 11-city book tour for its launch. At the moment I'm fending off invitations to India, Australia, and Italy. I would love to do all of these, but I have other things to do.

WCR: *Tell me about your latest book.*

MWR: *Nature via Nurture* is about the nature and nurture debate. I've always wanted to write about the whole argument over nature and nurture. Again, I tried to give myself an interesting structure as I had in *Genome* by forcing myself to write about a historical figure in this debate in each chapter.

WCR: *What is your work cycle when you're home and writing? Do you write in the mornings or nights? What time do you get up? How do you do it?*

MWR: I find that I write much better in the morning than later in the day. What I like to do when I'm working on a book is compose text in the morning and have lunch and deal with correspondence. Then in the afternoon and into the evening, I research (read, look things up, take notes). It doesn't always work out like that.

WCR: *How much of your "library work" now comes from the Internet?*

MWR: A huge amount; actually most of it now. With *Genome*, I spent a lot of time in the library reading journals and books. Nowadays, if I want to look up the latest article on some gene, I get it by e-mail from the author. When I wanted to look up an Elizabethan schoolmaster's book in which the words "nature" and "nurture" first appear together, I thought I would have to go to the library. But, no. Some guy in California has put the whole book on the Web. When researching *Nature via Nurture*, I probably visited a library only 3 or 4 times.

WCR: *Do you think your interest in biology developed initially because you liked the outdoors so much?*

MWR: Yes.

WCR: *But then you became an indoor person when you started writing. Until you started writing books, you were moving around getting stories on this or that topic. What's your house like?*

MWR: A mess!

WCR: *What is your next book?*

MWR: I don't know. I'm reluctant to talk about ideas I've got for publication because somebody might get there first. Another idea is still genetic but tilted toward the agricultural. I haven't yet submitted a proposal to my publisher. I submit a chapter breakdown and proposal for each book. Then my agent negotiates a contract for it. I've got a proposal in the works, but it's not yet finished. I'm running a bit behind schedule.

WCR: *What are you going to talk about this evening here at Baylor?*

MWR: I'm going to talk about two things. One is "genes and the future of medicine" and the other is "genes and the nature/nurture argument." The world changed when the human genome was sequenced because we became the first species on the planet in 4 billion years to read our own recipe. That is going to have a huge impact on self-knowledge and philosophy and also on application and technology in medicine.

Knowledge of human genetics has already changed the terms of the nature/nurture debate in an interesting way. We used to

think of genes as causes of behavior or anatomy; we now know that genes can be consequences of our actions as well as causes. What I mean by that is obviously not that we can change the sequence of our genes by, say, exercising, but we can change which genes are switched on in our body or our brain. In fact, learning is a very good example of that because we now know that memory is basically a genetic process in the sense that genes have to be switched on and off in the brain to express the proteins that change the connections between cells. The switching on and off of those genes is something that is under the influence of environmental factors, including extrinsic things, but also what you decide to do. If you decide to remember something, you've actually achieved that by changing which gene is switched on and off in parts of your brain. That is a really interesting discovery that has crept up on us slowly. Some of this has been known since the 1960s and 1970s, but it's only when scientists started finding memory mutants in fruit flies that it received much attention.

It's only in the last few years that it's really dawned on us what this means: when we say nature or nurture, it's a meaning that's questioned often because one person may have a nature that makes him or her more susceptible to a certain kind of nurture than another person. Nature often works through making a person susceptible to nurture. A very good example is language. We clearly have an instinct, as other species don't, to learn language. It's not an instinct for language; it's an instinct to learn language. It doesn't express itself unless you hear other individuals speaking when you are young. That's the gist of my nature/nurture argument.

In medicine, we have to ask ourselves some terribly important questions about how we are going to use genetic diagnosis, who is at risk of certain inherited disease, and who is at risk of being susceptible to certain environmental diseases, like heart disease and Alzheimer's disease. We also have to be aware that a lot of things that medicine deals with work by affecting which genes are switched on or off. Memory might be one. Cancer is another. In cancer, genes are switched on in the wrong places or switched off when they shouldn't be switched off, like tumor suppressors.

The future of medicine in the light of the new genomics just got subtler and a lot more difficult. We are not always clear if we are dealing with genes as cause or consequence. If you look at the brains of people with schizophrenia, you find consistent differences in which genes are expressed compared with normal brains. Until recently, we thought that some of those would prove to be the candidates for the cause of schizophrenia, a genetic predisposition for schizophrenia. We just don't know how to sort cause from effect.

WCR: *What diseases or therapies do you think we are going to look back on even 25 years from now and say, "How could they have done those stupid things?"*

MWR: That's a very good question. I'm interested in your views on that. There are cases where we've clearly been barking up the wrong tree for a while and we've managed to stop. The discovery of the pathogenic cause of stomach ulcers is an interesting case in point. Many efforts in the war on cancer in the 1970s and 1980s went into very misguided directions. The immunotherapy direction never worked. It's a bit presumptuous of me to predict specifically what diseases we're getting wrong at the moment because I'm not a practicing medic. I'm not even

very close to a lot of medicine. I'm coming at it from the other end saying, "This is how genes work. I'm sure you guys need to know this," rather than from the medical aspect. What do you think we are getting wrong? Do you think we're getting heart disease wrong? Diabetes wrong?

WCR: *I expect there is going to be something around the corner to keep us all from gaining weight, and diabetes mellitus will vanish. There is something already to knock our cholesterol levels down sufficiently that we don't have to worry about atherosclerosis. One of my boys is a cardiovascular surgeon who does lots of bypass operations. That's like fixing the wreck after the crash rather than preventing the crash. Blowing up balloons in arteries or putting wires in arteries to keep them expanded would not be necessary if everybody kept their cholesterol levels way down. How many people can planet earth accommodate?*

MWR: I have an answer to that. The increase in longevity is not having much effect on population trends, but 2 other factors are having a huge impact. First, the declining birth rate. It has halved now in Bangladesh. This surprises people. The other factor is having children late. Fifteen years ago, the United Nations projected that the population in 2050 would be 15 billion people. Now, those projections have fallen to 9 billion. The population of the planet in 2050 will be 9 billion and falling! The developing world is going through the demographic transition that we in Britain went through in the 1900s and Sweden went through in the 1800s. It seems to be a human trait that when infant mortality falls, people have fewer children. It's a wonderful piece of luck. I'm not in the least worried about an overpopulated globe. We've just seen the last doubling. The population will never double again. It has doubled 10 or 12 times since the Middle Ages. We're not going to see 12 billion people on the planet at this rate.

WCR: *What do you see to replace fossil fuels?*

MWR: Hydrogen is the short answer.

WCR: *Hydrogen takes a lot of energy to make.*

MWR: Indeed. Made from water and nuclear electricity, hopefully it will be cheap. I think that nuclear energy will play a big role. I don't think we will ever quite replace fossil fuels. What we'll do is push up the price of fossil fuels to the point where new reserves become feasible. There are pretty unlimited amounts of coal, and liquid fuels can be made from them but at a price. It's all a matter of price. If you get to the price where it pays to get oil out of the tar shales or coal, then I suspect that at that price it'll pay to get electricity out of whatever it takes instead. I suspect that we'll see an increase in renewables.

WCR: *How much do you read a day now, or a week, to get the information you need for your livelihood?*

MWR: It's very hard to say. I couldn't even begin to estimate it. Some days I read a lot; some days, very little. There's a terrible tendency these days to read e-mails instead of articles or books, which I'm struggling with. I sit down at my desk, and on a slow day I'll say, "I think I'll check my e-mails." Before I know it, 30 minutes has gone by and I've replied to a couple of trivial messages that I should have just ignored.

WCR: *Is there anything you'd like to discuss that we haven't?*

MWR: I don't think so.

WCR: *Thank you for sharing information about your life and books with me and the readers of Baylor University Medical Center Proceedings.*