

More Fun Than Fun: The Joys and Burdens of Our Heroes

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An iconic photo of Konrad Lorenz with his favourite geese. Photo: Willamette Biology, CC BY-SA 2.0



This article is part of the [‘More Fun Than Fun’](#) column by Prof Raghavendra Gadagkar. He will explore interesting research papers or books and, while placing them in context, make them accessible to a wide readership.

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Among the books I read as a teenager, two completely changed my life. One was [The Double Helix](#) by Nobel laureate James D. Watson. This book was inspiring at many levels and instantly got me addicted to molecular biology. The other was [King Solomon’s Ring](#) by Konrad Lorenz, soon to be a Nobel laureate. The study of animal behaviour so charmingly and unforgettably described by Lorenz kindled in me an eternal love for the subject.

The circumstances in which I read these two books are etched in my mind and may have partly contributed to my enthusiasm for them and their subjects. *The Double Helix* was first published in London in 1968 when I was a pre-university student (equivalent to 11th grade) at St Joseph’s college in Bangalore and was planning to apply for the prestigious National Science Talent Search Scholarship. By then, I had heard of the discovery of the double-helical structure of DNA and its profound implications. I was also tickled that this momentous discovery was made in 1953, the year of my birth.

I saw the announcement of Watson’s book on the notice board in the British Council Library, one of my frequent haunts. Reading the conspicuous blurb on the front cover by C.P. Snow – “Like nothing else in literature, it gives one the feel of how creative science really happens. It opens a new world for the general non-scientific reader” – I was struck as if by lightning. But the book was nowhere on the shelves, not even on the ‘New Arrivals’ shelf. I went up to the head librarian and demanded the book. He made some inquiries and said that the first copy had just arrived in the Madras (now

Chennai) branch of the library and did not know if and when a copy would be available in the Bangalore branch. I told him that I must read it immediately.

At the age of 15, I must have made an impression on the head librarian; he said he would do for me something that had never been done before. True to his word, he got the book transferred to Bangalore from the Madras branch through an inter-library loan even before anyone in Madras had read it. I like to think that I was the first person in India to read it!



L-R: R.A. Mashelkar, former director-general of CSIR, James Watson and the author, during Watson's visit to the Indian Academy of Sciences, Bangalore. Photo: R.G. Lab Collection

Watson's book truly blew my mind. Growing up in the strictly hierarchical Indian society and studying in the even more hierarchical Indian educational system, I had not imagined that science could be done with such irreverence and written about with such candidness.

The Double Helix sent me on a romp through the [history of molecular biology](#) and through many libraries. I read with almost bated breath about how the Swiss doctor Friedrich Miescher had extracted DNA from pus-soaked bandages in 1868 and how an English bacteriologist Fred Griffith had shown in 1928 that dead virulent pneumococcus bacteria could transform living avirulent ones into virulent forms like themselves. I savoured the long saga of how three American bacteriologists, Oswald Avery, Colin MacLeod and Maclyn McCarty, at the Rockefeller University, after much self-doubt, had finally nailed the identity of Griffith's transforming principle [as DNA](#) in 1944.

The last sentence of the original [Watson-Crick paper](#) describing the double-helical structure of DNA: "It has not escaped our notice that the specific pairing mechanism we have postulated immediately suggests a possible copying mechanism for the genetic material." was straight from a fairy tale. The confirmation of this semi-conservative replication of DNA by the American biochemists Matthew Meselson and Franklin Stahl by a clever experiment using radio-labelled DNA was the icing on the cake.

How do you translate the four-letter language of DNA into a 20-letter language of proteins? Obviously, one or two DNA letters (nucleotides) at a time are insufficient to specify the 20 protein letters (amino acids). Three nucleotides would be more than adequate, and four would be far too many. So, it must be three at a time – the 64 possible nucleotide triplets must specify the 20 amino acids, leaving several codons to spare, which may be used for punctuation marks and to provide some

redundancy. That this child's fanciful calculation was indeed the most fundamental truth of all life, as demonstrated by the elegant experiments of Marshall Nirenberg and Har Gobind Khorana (yes, his being an Indian by birth made a huge difference), kept me awake at night, in disbelief. Really? I would ask myself.

And then I read about bacterial viruses or bacteriophages. I was especially taken in by the so-called lysogenic bacteriophage lambda, which made copies of itself and killed its host bacterium if the going was good. But if the host was in bad shape, it lay dormant, even helped fatten it up, and waited for an opportune moment to make progeny and kill the host.



Maclyn McCarty with Francis Crick and James D. Watson. Photo: Marjorie McCarty, CC BY 3.0

I devoured these stories as fast as I could lay my hands on the literature, not unlike today's kids waiting for the next Harry Potter book to become available.

In 1969 I secured admission to the BSc (Hons) programme in Zoology in Central College (now Bangalore University). For all its faults, Central College had an excellent library and outstanding librarians. The library became my home, and the librarians my closest friends for the next five years. I soon discovered *King Solomon's Ring* by the soon to be Nobel Laureate, Konrad Lorenz. Julien Huxley's words on the front cover inspired me: "A classic nature book by one of the world's outstanding scientists. An absorbing and beautiful book".

I checked out the book from the library, put it in my bag, which I secured firmly (or so I thought) to my bicycle and rode home in anticipation of a good read. I was crestfallen on reaching home as my bag had disappeared. Two agonising days later, a kindly old man came looking for me with my bag on his shoulder and told me that he had found it on the roadside and could trace me from its contents. I thanked him profusely, but not before ascertaining that *King Solomon's Ring* was still in the bag. There was a renewed thrill in reading this lost and found treasure.

King Solomon's Ring sent me similarly rollicking through the [history of animal behaviour](#). I read all I could lay my hands on – about the German biologist Jacob von Uexküll and his concept of 'umwelt' to describe each animal's unique window to the outside world. Uexküll used the life cycle of the tick to illustrate his principle. The tick sequentially becomes sensitive to light that leads her out of the ground, then to smell that helps her find a mammalian host and finally to temperature, which lets her partake of a blood meal, drop to the ground, lay eggs and die. I read with envy about Douglas

Spalding, the private tutor to Bertrand Russell. In his spare time, Spalding put little vision-distorting hoods on new-born chicks to prove that their ability to peck accurately at grains was instinctive and not learned by trial and error.

I read with equal envy about [Tinbergen's experiments](#), in which he placed pinecones around wasp nests and showed that local, visual landmarks guided the wasps to their nests. Karl von Frisch's deciphering of the [honey bee dance language](#) had a very special place in my heart. One bee can tell another bee about the distance and direction to food by dancing. Really? Lorenz's own discovery of imprinting in birds which he flamboyantly demonstrated by having his geese imprint on himself and follow him around, was the stuff of folklore – not just in Altenberg in Austria but spread across continents to reach Bangalore. The American psychologist [Eckhard Hess](#) reconfirmed Lorenz's mechanism of imprinting by having ducklings imprinted on an artificial model of their mother. Hess was able to measure the strength of imprinting by seeing how long the ducklings followed their 'mother', who was perpetually in motion on a circular toy train. Now, how cool is that as a scientific experiment?

With interest in animal behaviour, when you have no books, you turn to animals, and when there are no animals around, you can turn to books – there's always much fun to be had.



Niko Tinbergen painting eggs to test the function of egg colouration. Photo: Willamette Biology, CC BY-SA 2.0

In 1974 I joined the Indian Institute of Science, Bangalore, to pursue a PhD on my favourite lysogenic bacteriophages, our own [Indian variety](#), isolated by CV Sunderraj at the Microbiology and Pharmacology Laboratory. While I studied bacteria and phages during the week, I pursued my favourite paper wasps over the weekends as an [absorbing hobby](#).

As I have [recounted elsewhere](#), “At the end of my PhD, I was in a serious dilemma, being equally in love with both Molecular Biology and Animal Behaviour, owing largely to the joy of admiring my two heroes – James Watson and Konrad Lorenz. However, the difficulty, or should I say impossibility, of doing cutting-edge research in molecular biology under Indian conditions was brought home painfully to me every day of my PhD. If I were to continue with molecular biology, it would have to be in the USA or some such developed country. But if I could swap animal behaviour into my profession and molecular biology into a hobby, then, of course, I could stay in India and spend the rest of my life doing low-cost research on the Indian paper wasp *R. marginata*. I chose the latter option... and I have never regretted my decision”.

I have now spent decades having enormous fun practising animal behaviour and keeping abreast of the spectacular advances in molecular biology. But as I have never recounted before, I must confess that there has sometimes been reason to spoil the fun and put me in a melancholy mood.

James Watson’s racism

As if Watson’s attitude towards Rosalind Franklin was not bad enough, he has since repeatedly and deliberately behaved in a shameful manner. His callous and insensitive racist remarks, including his claim that Africans are less intelligent than Westerners, his suspension from all administrative responsibilities of the Cold Spring Harbor Laboratory, the revocation of his honorary titles, his half-hearted and belated apologies, all make me cringe.

My most recent reminder of Watson’s embarrassing behaviour came while reading David Reich in [Who Are We and How We Got Here](#) (2018):

“I saw Watson at Cold Spring Harbor, he leaned over and whispered to me and to the geneticist Beth Shapiro, who was sitting next to me, something to the effect of “When are you guys going to figure out why it is that you Jews are so much smarter than everyone else?” He then said that Jews and Indian Brahmins were both high achievers because of genetic advantages conferred by thousands of years of natural selection to be scholars. He went on to whisper that Indians in his experience were also servile, much like he thought they had been under British colonialism, and he speculated that this trait had come about because of selection under the caste system. He also talked about how East Asian students tended to be conformist, because of selection for conformity in ancient Chinese society.”

Reich adds:

“The pleasure Watson takes in challenging establishment views is legendary. His obstreperousness may have been important to his success as a scientist. But now as an eighty-two-year-old man, his intellectual rigor was gone, and what remained was a willingness to vent his gut impressions without subjecting them to any of the testing that characterised his scientific work on DNA.”

How could I not shed a tear?

Konrad Lorenz’s Nazi connections

Over the years, Konrad Lorenz’s Nazi past has come more and more to light, perhaps one should say, has begun to sink in, as his charm and fame have begun to lose their sheen. [Lorenz wrote](#) on the occasion of his Nobel Prize ceremony:

“I was frightened – as I still am – by the thought that analogous genetical processes of deterioration may be at work with civilised humanity. Moved by this fear, I did a very ill-advised thing soon after the Germans had invaded Austria: I wrote about the dangers of domestication and, in order to be understood, I couched my writing in the worst of Nazi terminology. I do not want to extenuate this action. I did, indeed, believe that some good might come of the new rulers. The precedent narrow-minded catholic regime in Austria induced better and more intelligent men than I was to cherish this naive hope. Practically all

my friends and teachers did so, including my own father who certainly was a kindly and humane man. None of us as much as suspected that the word ‘selection’, when used by these rulers, meant murder. I regret those writings not so much for the undeniable discredit they reflect on my person as for their effect of hampering the future recognition of the dangers of domestication.”

Despite Lorenz’s claim of caring less for his reputation and more for the future of his science, historians, including [historians of ethology](#) – the ‘objectivistic’ study of animal behaviour as Lorenz was fond of describing it – have piled up pretty damning evidence that Lorenz willingly and [knowingly collaborated](#) with the National Socialists, and lent a helping hand, an authoritative scientific hand, to justify Nazi-style racism.

When heroes fall from grace

I reread *The Double Helix* and *King Solomon’s Ring* in preparation for writing this essay. In both cases, I experienced the same thrill as I did the first time. I am not surprised, even in retrospect, that these books changed my life. They have that power and will change many more lives. And yet, the behaviour of my two heroes, James Watson and Konrad Lorenz, is now an acute source of embarrassment. How does one deal with this conundrum which has been gnawing at my conscience? Should I disown them? Can I disown them?

If [Niko Tinbergen](#), Lorenz’s co-laureate and a former resistance fighter “on the other side of the fence,” chose to forgive him and “put the experience of the war behind them, and get on with the scientific work that the war had interrupted”, who am I to do otherwise? If Frans de Waal, in his [Are We Smart Enough to Know How Smart Animals Are?](#), quotes Lorenz in favourable, even endearing terms, no fewer than 30 times, how should I behave?



Niko Tinbergen and Konrad Lorenz after the war. Photo: Max Planck Gesellschaft, CC BY-SA 3.0

And yet, it continues to trouble me. It is too late for me to acquire new heroes; I must live with old ones or in solitude. Few have written so poignantly on this predicament than the literature Nobel laureate [Kazuo Ishiguro](#). In his [The Remains of the Day](#), for example, Steven, the butler, laments that he may have unknowingly spent his whole life serving a Nazi sympathiser: “I gave my best to Lord Darlington. I gave him the very best I had to give, and now – well – I find I do not have a great deal more left to give.”

T.S. Eliot

While Niko Tinbergen, Frans de Waal and Kazuo Ishiguro have helped me marinate my thoughts, it is T.S. Eliot who has come closest to helping me begin to resolve my dilemma. You might be forgiven for thinking that a verse by the great poet was the source of my inspiration. Perhaps poetry is a higher form of art than prose; after all, we praise a prosaist by saying that she writes like a poet. But it is the prose of the great poet that inspired me.

At the age of 30, working as a clerk in the Lloyds Bank in London, T.S. Eliot wrote his celebrated essay '[Traditions and the Individual Talent](#)', which has been called a manifesto. In this essay, Eliot made a distinction between 'the man who suffers' and 'the mind that creates'. Although post-modernists like Michel Foucault ([What is an Author?](#)) and especially Roland Barthes ([The Death of the Author](#)) have taken the argument to what may be an unreasonable extreme, Eliot's more nuanced distinction between the author and her works is more appealing. [Kevin Dettmar](#), professor of English and the director of the Humanities Studio, Pomona College, California, tells us, "The pedagogical strategy of 'close reading' that evolved in Eliot's wake, wherein students are taught to focus exclusively on the words on the page – and taught that the 'I' of 'I wandered lonely as a cloud' is not Wordsworth but the poem's speaker, a literary character – these are the starting points of every consequential contemporary literary-critical argument."



T.S. Eliot photographed by Lady Ottoline Morrell in 1923. Photo: Public domain

If such a distinction can be made between the artist and her creation, can a distinction not be made between a scientific truth and the moral proclivity of its discoverer? If we can appreciate the beauty of a verse or a painting in spite of our knowledge of the artist's personality, can we not savour the double-helical structure of DNA and the phenomenon of imprinting in birds, in spite of being abhorred by Watson's racism and Lorenz's Nazi sympathies?

It is a [disturbing irony](#) that the legacy of T.S. Eliot himself, who was not innocent of anti-Semitism and belated apologies, is in need of the [therapeutic powers](#) of his idea of the separation of 'the man who suffers' and 'the mind that creates'!

I have no final answers, no final resolution. My thoughts on this are a work in progress, as all thoughts on everything ought to be. But we must all keep thinking and reflecting, and coming to our individual conclusions, however tentative, even as more heroes [fall by the wayside](#), fuelled by the #MeToo movement and other long-overdue measures for restoring social justice.

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