Postscript

As my train to Leicester pulls out of St Pancras station, a startling new building has just risen from the wasteland behind the British Library, its roof like the carapace of a giant insect. This is the Crick Institute. The Crick Institute was established as a complex hothouse of global interdisciplinary teams. As the website says, ‘Its work will help understand why disease develops and find new ways to treat, diagnose and prevent illnesses such as cancer, heart disease and stroke, infections, and neurodegenerative diseases ... by bringing together scientists from all disciplines.’ The hope is that ‘it will not only help to improve people’s lives but will also keep the UK at the forefront of innovation in medical research, attract high-value investment, and strengthen the economy’.1

My mind slips back to 1961 when I first arrived in Bloomsbury, near this spot, and I think about how I understood biology then. Replacing the familiar view of great gasholders, car parks and grimy tenement blocks, a new multi-billion meritocracy is growing up here right in the heart of London. I quickly realised when I arrived in Bloomsbury that something special was going on there, something unexpected and surprising, and full of hope. Is the same happening again with this new building? Right here in Bloomsbury, scientists will find the codes of newly recognised genes.

The biology I learnt in Bloomsbury was startling and fascinating. It was the new molecular biology that had its roots in physics and chemistry. The geology being discovered then, about drifting continents and the ages of extinct and living species, was unexpected too, and just as empirical. These and other avenues of knowledge were made possible by x-ray crystallography, radiometric dating and other techniques perfected during the Second World War.

Francis Crick was born in 1916 near Northampton, where his father had a small boot and shoe factory. At the bottom of his uncle’s garden was a wooden shed where Francis learnt to develop photographic plates and practise glass blowing. He went to grammar school in Northampton, won a scholarship to Mill Hill School in north London in 1930 when he
was fourteen, and studied physics at UCL from 1934. Without Latin, he wasn’t eligible to apply for a place at Oxford or Cambridge, but his experience in Bloomsbury was rich enough for him to avail himself of big opportunities. A German bomb destroyed his x-ray tube in 1941. He was in the process of looking at the structure of protein molecules for a PhD. After the war, he moved on to Cambridge. Although his discovery of the double helical structure of deoxyribose nucleic acid happened in the laboratories of Cambridge, he was essentially a Bloomsbury man.

The development of London life sciences was being driven by sudden advances in technology, new machines that could accurately work out a substance’s chemical composition, magnify the contents of a cell many thousand times and say how many million years ago a piece of rock was formed. Microscopy, spectroscopy, crystallography and new experimental methods had quickly and unexpectedly changed the understanding of cell biology. Together, these technologies allowed insights of the connections highlighted in Julian Huxley’s Modern Synthesis: how genes function, how cells work and how species migrate around the planet. By filling in the details of these three parts of evolutionary studies, Darwin’s theory of adaptation by natural selection was eventually proved beyond reasonable doubt.

This final proof of Darwinism came through the 1960s and 1970s, when I was teaching life sciences in a small London college. The jigsaw of information from the big research laboratories was slowly beginning to fit together. The information showed us that there is just one evolutionary tree for the DNA of all species, one animated migration map for all species across the planet. That principle is now clear and leaves just the details for future generations of biologists to figure out. Even more impressively, that same tree and that map can be traced back through time to the beginning of life, and that life has a beauty comprising art and science. From Leicester, C. P. Snow challenged artists with the second law of thermodynamics: disorder increases in a closed physical system. Now in Bloomsbury, with the rise of information in an open biological system, we know that biological evolution also has a broad scope. The early twentieth-century Bloomsbury biologists and artists had important ideas about evolution within their single culture. It is unscrupulous and opportunistic, never missing a chance to adapt to reproduce more members of the species in the new conditions, giving exuberant purposeless living: no plan, no end, no winners. The play is beautiful and elegant and knows no end.

The acres of rejuvenated space from the old railway lands at King’s Cross and St Pancras are now home to the new University of
the Arts London, King’s Place Concert Hall, offices for the Guardian and Nature magazine, as well as to the Francis Crick Institute and the British Library. They are a northern extension to the Bloomsbury square mile and take off from the cultural achievements made there through the past two centuries.

The fundamental mysteries of evolution’s hereditary mechanisms are now well known, based on an understanding of how DNA codes for particular amino acids, and how the chemical processes of epigenetics sense the environment and turn cell processes on and off. Evolution by natural selection is the mainstay of species diversity, an opportunistic process of self-organised adaptation to environmental change. The questions that were asked by the Bloomsbury scientists a hundred years ago have been amply answered. Galton and Pearson would have been pleased to find that many of the genetically transmitted illnesses they sought to eradicate with eugenics can now be investigated with real insight of their molecular and genetical causes. That is a major task of the Francis Crick Institute.

However, another worry of the nineteenth- and twentieth-century biologists remains: that from the earlier theologian Thomas Robert Malthus, that the natural rate of increase in the human population would reach a level of unsustainability. Now it is the single most important problem facing the natural world and is connected with many others: climate change, biodiversity loss, racial interaction, diminishing natural resources and pollution. The extinctions that result will include that of our own species and is already making other irreversible changes. It is a situation not conceived by the utopians such as H. G. Wells and Aldous Huxley, let alone Darwin. They all knew of Malthus’s warning and were deeply influenced by its challenges, but they all had hope that science would find a solution, as do many of our own contemporaries. We are still hoping.
Notes

Introduction


1 Two funerals, 1882–3

12 Holroyd, *Lytton Strachey*, p. 32.

2 Lankester takes over, 1884–90

4 Olive Schreiner met Ray Lankester at a dinner party in 1881 (Lankester Family Papers).
7 Appendix by Karl Marx to Ray Lankester’s notes on degeneration, perhaps added for a lecture (Lankester Family Papers).