Alison Bashford

An Intimate History of Evolution

The Story of the Huxley Family

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Penguin
Random House
UK

First published 2022
001

Set in 10.5/14pt Sabon LT Std
Typeset by Jouve (UK), Milton Keynes
Printed and bound in Great Britain by Clays Ltd, Elcograf S.p.A.

The authorized representative in the EEA is Penguin Random House Ireland,
Morrison Chambers, 32 Nassau Street, Dublin D02 YH68

A CIP catalogue record for this book is available from the British Library

ISBN: 978–0–241–43432–1

www.greenpenguin.co.uk

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For
Keith Harvey Bashford, 1934–2022

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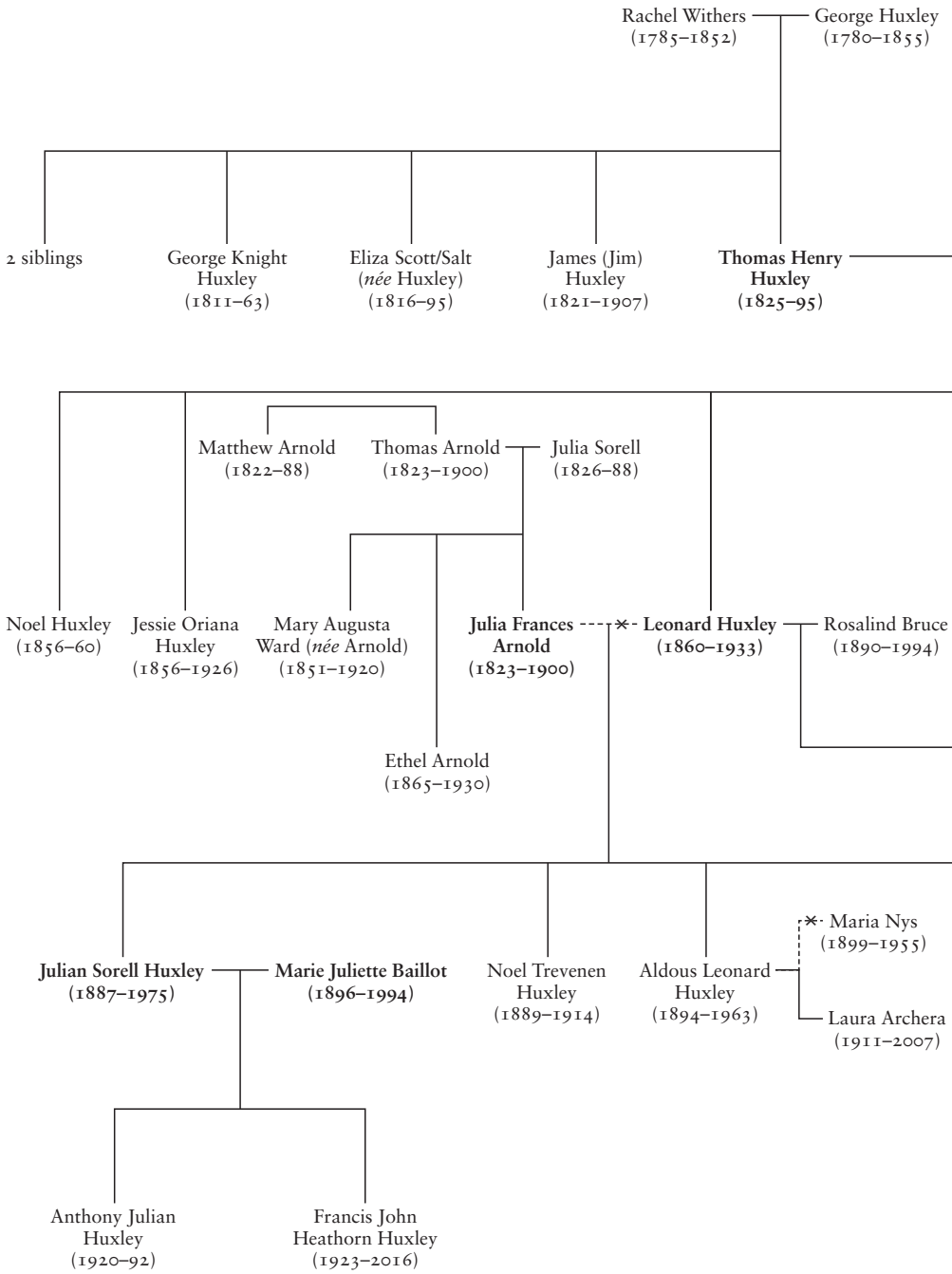
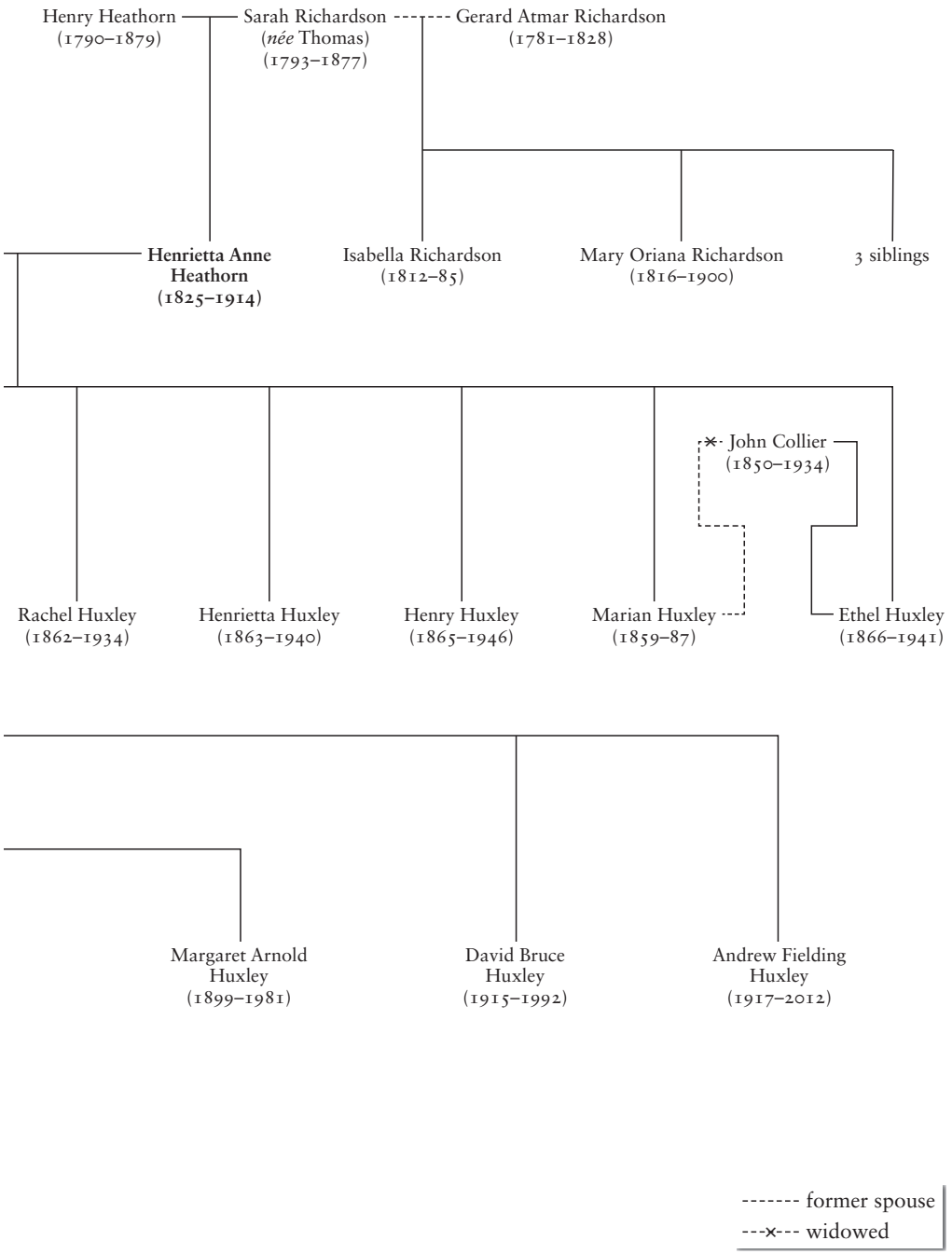
Author's Note on Names

There are many Huxleys in this book. To distinguish between the two on whom I focus most closely, Thomas Henry Huxley and Julian Huxley, I use 'Huxley' for the grandfather and 'Julian' for the grandson.





Introduction

How are humans animal and how are we not? What is the nature of time and how old is the Earth itself? What might the planet look like – with or without humans – 10,000 years hence? More modestly, who asks such questions for a living, and who thinks they have the answers?

Thomas Henry Huxley and his grandson Julian Huxley did. In 1947 they featured in *Life* magazine, one dead, one living. At the photo shoot in his Hampstead library, Julian self-consciously arranged himself in front of a portrait of his grandfather (figure 0.1). In the foreground, a well-known mid-twentieth-century science writer, zoologist, conservationist. In the background, a mid-nineteenth-century scientific naturalist – Charles Darwin's most outspoken spokesman. Julian was displaying his scholarly bloodline over one shoulder and the authority and expertise inherited from the library over the other, many of them his grandfather's own books. Well might he do so. Over the nineteenth and twentieth centuries, these two men of science, these self-appointed cosmologists, communicated to the world the great story of evolution, including the birth, death and rebirth of the idea of natural selection. They were 'trustees of evolution', a phrase that Julian often used to describe all of humankind, but which in truth applies more neatly to the Huxleys themselves.[1]

The younger man constantly fashioned himself after his Victorian grandfather, pursuing those signature Huxley knowledge-quests, some profound, others simply grandiose. They were both remarkable and both, on occasion, tortured. Writing these natural scientists together permits a kind of time-lapse over the nineteenth and twentieth centuries, precisely because they were so similar. We might even think of

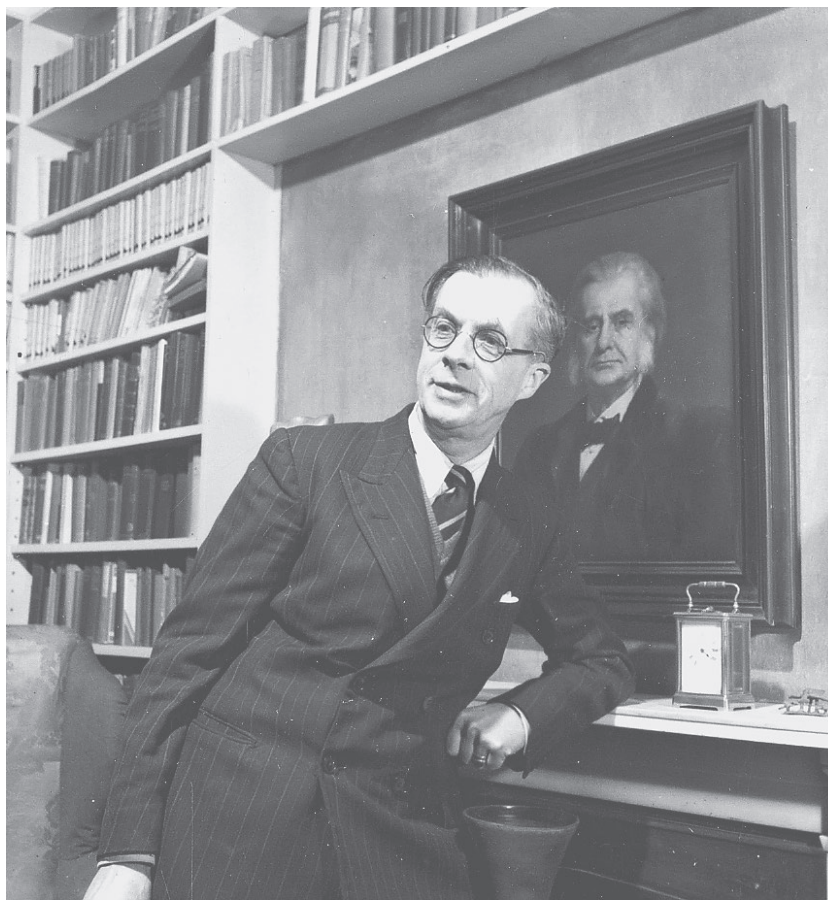


Figure 0.1: Julian and Thomas Henry Huxley,
trustees of evolution: *Life* magazine photo shoot, 1947.

them as one very long-lived man, 1825–1975, whose vital dates bookended the colossal shifts in world history from the age of sail to the space age; from colonial wars to world wars to the Cold War; from a time when the Earth was 6,000 years old according to Genesis, to a time when it was 4.5 billion years old, according to rock samples returned from the Apollo missions.

Two other portraits help us understand these trustees of evolution, and how they were keen players in the great modern effort to comprehend and fix 'nature' and 'culture'. The likenesses are windows into their very different scientific souls, but we need not look into their eyes, rather at what they hold.

Julian holds 'culture', an Igbo wooden sculpture from Nigeria, bought on the cheap in his West African travels in 1943 (figure 0.2). It was, he tells us, a sacred object, a 'small idol . . . destined for household shrines'. Instead it ended up on a Hampstead shrine of a very different order.[2] He was self-fashioning his curiosity and his cosmopolitanism, as well as his scientific inheritance. Student and lover of nature, inheritor of agnostics, brother of Aldous, believer in evolution by natural selection, and (his own invention) evolutionary humanism, Julian was from the beginning inclined to culture. Even as a zoologist, he was foundational to 'ethology', the study of animals' behaviour, how they and we act, think and even feel. Yet culture was itself part of evolution and technically so, not just loosely or illustratively. Human minds are unique in evolutionary terms, Julian always insisted, precisely because we can comprehend just that.

T. H. Huxley, by contrast, holds nature (figure 0.3). Like a sovereign holding an orb, Huxley claims the skull-of-everyman. The representative of God's dominion on earth is transformed into secular trustee of all humankind. His most famous likeness was captured in heavy Victorian oils by the celebrated portraitist John Collier, as it happens Thomas Henry Huxley's son-in-law, Julian's uncle. The patriarch of one idiosyncratic family announces himself not just as patriarch of science, but also of what he called the Man Family, *Homo sapiens*, including its pre-human ancestors. This cranium was highly symbolic, as the family artist well knew, a sign of Huxley's ascendancy over British natural sciences, and a secular talisman of his great intervention: 'evidence as to man's place in nature'.[3]

Figure 0.2: Julian Huxley and Culture: *Life* magazine photo shoot, 1947.

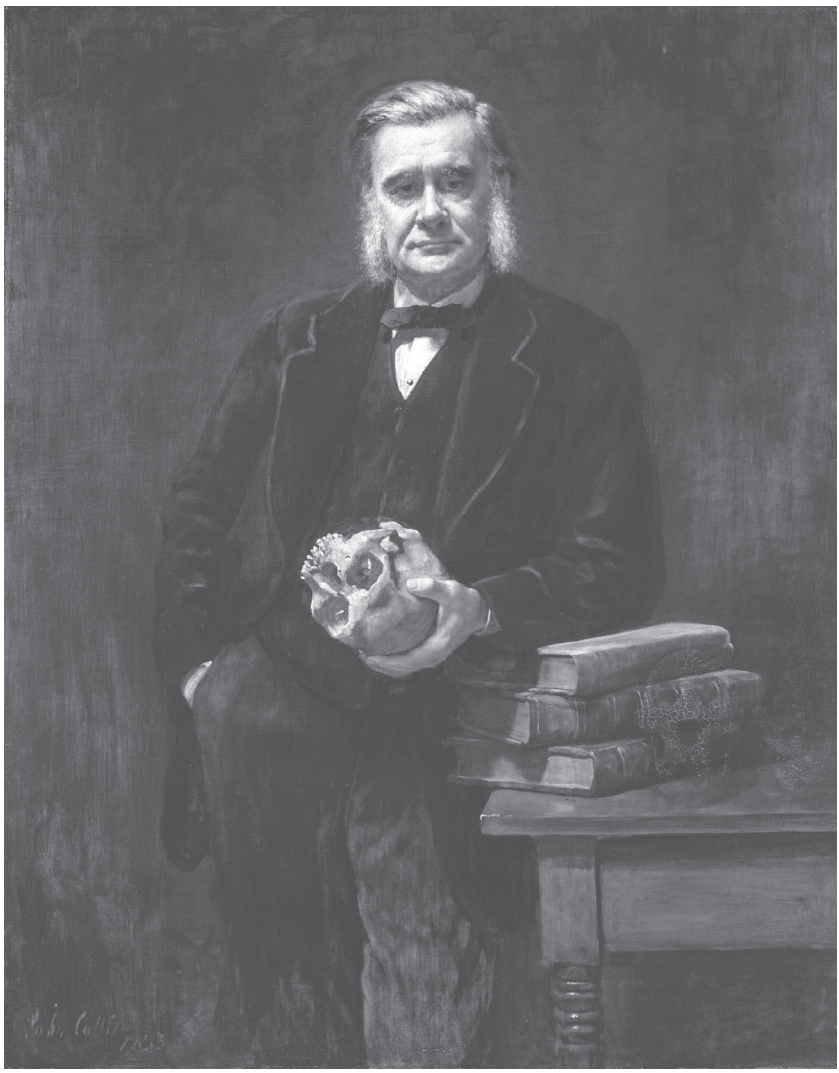


Figure 0.3: Thomas Henry Huxley and Nature:
oil by John Collier, 1883.

One winter's evening in 1867, T. H. Huxley delivered a lecture on ethnology, the science of man, to working men in the Mechanics' Institute in Chancery Lane and was enjoined to take a collection to relieve distress in the East End. Huxley said he 'would simply place his own subscription in one of the skulls on the table', and others could follow if they wished. A human skull served as a receptacle for the collection; the strangest secular offertory box. The entire lecture hall fell in with this mixed choreography of ethnology, self-help, poor relief and almsgiving.[4] Many would then, as now, rightly consider human remains to be somehow sacred, certainly as sacred as the effigy Julian held. Yet Huxley the grandfather comprehended nothing of the sort. Skulls were workaday material objects, fascinating, but in no sense sacrosanct. Neither in death nor in life was the human body the receptacle of a soul, at least we can never show that to be the case, Huxley the agnostic insisted. He battled his whole life for nature, and for a strictly scientific method to understand it.

The modernization of natural sciences of which Huxley was a key player, even dramaturge, challenged the magical and the supernatural. It heralded the death of the divine, 'disenchantment' as the sociologist Weber had it, the death of God according to the philosopher Nietzsche. In different ways they were both responding to the ascendance of scientific naturalism that T. H. Huxley spearheaded, and in a German scholarly tradition in which Huxley was deeply learned – self-taught, of course. There are no spirits, no Creator, no divine, at least none of which we can be sure. Wonderful! Huxley would have exclaimed had he lived long enough to read the great scholarly debates that unfolded on secularization and disenchantment over the twentieth century. And yet he might also have questioned why, then, his biologist grandson Julian was so drawn to sacred idols, studied parapsychology and wondered occasionally about ghosts; why his literary grandson Aldous sought radically other perceptions and doors into them; not to mention his anthropologist great-grandson, Francis Huxley, who became so immersed in the magical and the mystical, in voodoo and in rituals of sacralization, as to become himself a kind of animist.

One trajectory of this intimate history of evolution, according to the thesis of disenchantment, *should* be a history of secularization, a

victory of T. H. Huxley's rational agnostics in a dynasty of scientists. In fact, it is a story of Huxley re-enchantment. Over three and four generations of modernity, the Huxleys searched proactively for something to put in the place of religion, compatible with Grandfather's scientific naturalism but somehow exceeding it. Julian ended up a kind of neo-Romantic naturalist, complete with visions and poetry, closer in some ways to the early nineteenth-century *Naturphilosophie* that his grandfather had railed against. In short, these Huxleys travelled over the modern period, symbolically *from* the disenchanted skull-object of nature *to* the enchanted, carved, sacred object of culture, not the reverse. Julian sometimes even imagined himself as a kind of Creator who bestowed his own Word on humankind: evolutionary humanism. Or perhaps, like Moses, he authored this new scientific religion for the world, Truth certainly not acquired from heaven, but instead from Earth, from nature itself.

The cranium that Thomas Henry Huxley holds with such propriety, almost defiance, stands for the species *Homo sapiens*. But we know that a particular human used to be 'in' it, used to *be* it. It once held a brain, a mind, a consciousness, a human (or perhaps a pre-human) *being*, even if, for Huxley, a soul-less one. But agnosticism about a soul did not mean that Huxley wasn't interested in 'feeling'. On the contrary, consciousness and perception, sense and sensation were all fascinating to him as a physiologist and a learned philosopher of mind, not just a comparative anatomist. He was a relentless inquirer into how the brain and mind inside a human skull senses, thinks, perceives, feels and does so similarly to or differently from other animals, radically extending ancient debates about human reason and animal instinct. Well known as a founder of British anthropology, he was part of the beginning of psychology too. By his grandson Julian's early adulthood, this particular Huxley family inquiry had evolved from studies of consciousness and unconsciousness – mesmerism, hypnotism, anaesthesia, reflex – to the analysis of a twentieth-century phenomenon called the unconscious. Julian consumed Freud. And by the 1950s and 1960s, the Huxley brothers, Julian and Aldous, were actively wondering about altering consciousness, through telepathy, through *Vedanta,* through mescalin and LSD. The brother who lived in safe and cosy Hampstead was a *philosopher* of new kinds of human

perception, at one remove. The brother who lived in edgy California was a *practitioner*, fully immersed in new experiential perception.

The material relationship between a skull, a brain, a mind and individual human consciousness turned out to be intergenerational Huxley business. It turned out to be intergenerational Huxley suffering as well. Here, the history of evolutionary ideas becomes as intimate as it is possible to be. The Huxleys were a family deeply afflicted by mental illness *and* they were a brilliant and inquiring family. They both embodied and thought through genius and melancholy as these states had been imagined and put together over the nineteenth century in science and letters, and in the twentieth century by psychoanalysis, behavioural psychology and psychopharmacology. A Huxley collective depression was only matched by the family capacity to think about it in highly curious ways, to be intrigued by the mysterious relationship between mind and body via the brain that sat inside those skulls.

The grandfather and grandson looked often to outer worlds and sometimes to other worlds. They were cosmologists of sorts. Over their lifespans, 1825–1975, time got longer and longer, the past deeper and deeper, not just the prehistory of humans, but also the geohistory of the Earth. This was a phenomenal conceptual revolution. Yet this one long-lived man was Janus-faced with regard to the time revolution, the Victorian Huxley looking backwards to a receding past, while Julian the modern was enchanted by the temporal beyond. Julian's compelling non-fiction essays about the future of humankind, and even of the planet, were perhaps offset by his second-rate science fiction attempts, shadows of his brother's brilliance. Yet in the twentieth century, Julian and Aldous Huxley shared visions of all kinds of possible new worlds, an intellectual and fraternal intimacy of a profound order.[5]

As often as they looked to outer or future or nether worlds, the Huxleys looked inwards, into their very selves. Such introspections were sometimes public in the form of poetry books and unrestrained memoirs, or else were entwined in essays on religion, on ethics, on philosophies of knowing and ways of being. For neither Thomas Henry nor Julian Huxley were their depressions ever fully hidden or sequestered. And this introspection rarely manifested as withdrawal

from the world. Thomas Henry Huxley was hardly retiring. He was both self-made and self-satisfied, especially over his fights with the world. He was a big personality, bold and fractious. Yet he nurtured honest, emotional and not infrequently confessional intimacies with his many close friends, men of science and men of God. Victorian masculinity was so much more forgiving and enabling than its caricature of repression. Thomas Henry Huxley needed it to be; his struggle with melancholy was relieved in meaningful ways by his tight scientific circle.

Thomas Henry Huxley's character booms through the records, but what was Julian Huxley like? There is no lack of description, since his circle included as many poets and writers as biologists, observers good with their words and sharp with their insight. It puts him at an unfair disadvantage, biographically speaking. One author who married into the wider family, Elspeth Huxley, found him rude, vain and selfish.[6] Another writer – who knew him well – thought him 'brilliant, charming, idealistic, gregarious', but also 'unstable, full of self-doubt, and a raging egotist'. After Julian's death in 1975, the distinguished American poet May Sarton wrote to his wife Juliette, diagnosing without mercy; 'a very spoiled baby person'.[7] This 'intimate history' is more sympathetic to Julian. Partially hidden to such poet-observers but known too painfully by his long-suffering wife, who had her own elegant and honest words to put to her life-partner, was Julian's paralysing depression. On occasion his mind and body slowed almost to a standstill, his soul all but too heavy to bear, his affliction dreaded and terrible. An accomplished poet himself, when Julian was unable to gather words coherently to describe anything let alone such pain, he reached for those of others, confessing publicly how his mind and soul were tortured, how he lived Walt Whitman's 'terrible words': 'Hell under the skull-bones; Death under the breast-bones'.[8] The family's most famous wordsmith, Aldous, reintroduced to the twentieth century another term, 'accidie'. Chaucer's Middle English described the condition that 'forsloweth and forsluggeth' a man.[9] This was what was passed from Thomas Henry Huxley to his grandson, and what was inherited here and there across the wider Huxley family.

In the psychoanalytically intense 1920s, Julian disclosed to the world the crippling melancholy he shared with his grandfather – that

is to say, crucially and technically, that he knew he had *inherited*. His public honesty in early adulthood makes the child's hand in this early studio portrait softly covering – claiming, seeking – his grandfather's poignant and painful (figure 0.4). It holds a truth. These men of science were privately tied together by their suffering. Publicly and professionally they were tied together by Julian's own hand, by his work and will, as he actively grafted himself onto his grandfather's lineage.

T. H. Huxley (1825–1895) was one of the Victorian world's best-known zoologists and comparative anatomists, doggedly promoting and defending Charles Darwin in the earliest public dispute over the theory of evolution by natural selection. Huxley was up for the fight. He sought it, enjoyed it, won it. In the process he challenged Britain's established power structures, most especially the Church of England. Raised outside London and then in the Chartist Midlands in an educated but struggling and socially declining family, Huxley was not simply granted his position as professor of palaeontology and natural history at the Royal School of Mines, what had started as the Museum of Economic Geology and became Imperial College London. Rather, he fought for it, retaining a lifelong belief in merit-based rewards and effort-based achievement over inherited authority and position. This stance was explicit and political, sometimes bitter and always antagonistic. It rocket-fuelled his battles against conventions, against authorities and against orthodoxies. The explosive idea of evolution by natural selection was as suited to Huxley's character as it was a paralysing ill match for Charles Darwin. Together, and with a close circle of like-minded friends, they drove a new scientific naturalism in the middle of the nineteenth century, contesting any explanation of nature, old or new, that relied on a beyond-natural or supernatural force or origin.

Victorian science and letters were conjoined when Huxley's son Leonard married Julia Arnold of the literary family – Thomas Arnold, Matthew Arnold, Mary Arnold (Mrs Humphry Ward). Julian was their first surviving child, born in 1887 and crossing vital dates with his famous grandfather for eight important years. The eldest of four siblings, with Noel Trevenen (1889–1914), Aldous Leonard (1894–1963) and Margaret Arnold (1899–1981), his pastoral Surrey childhood was spent in birdwatching, verse lessons and German induction. Julian was

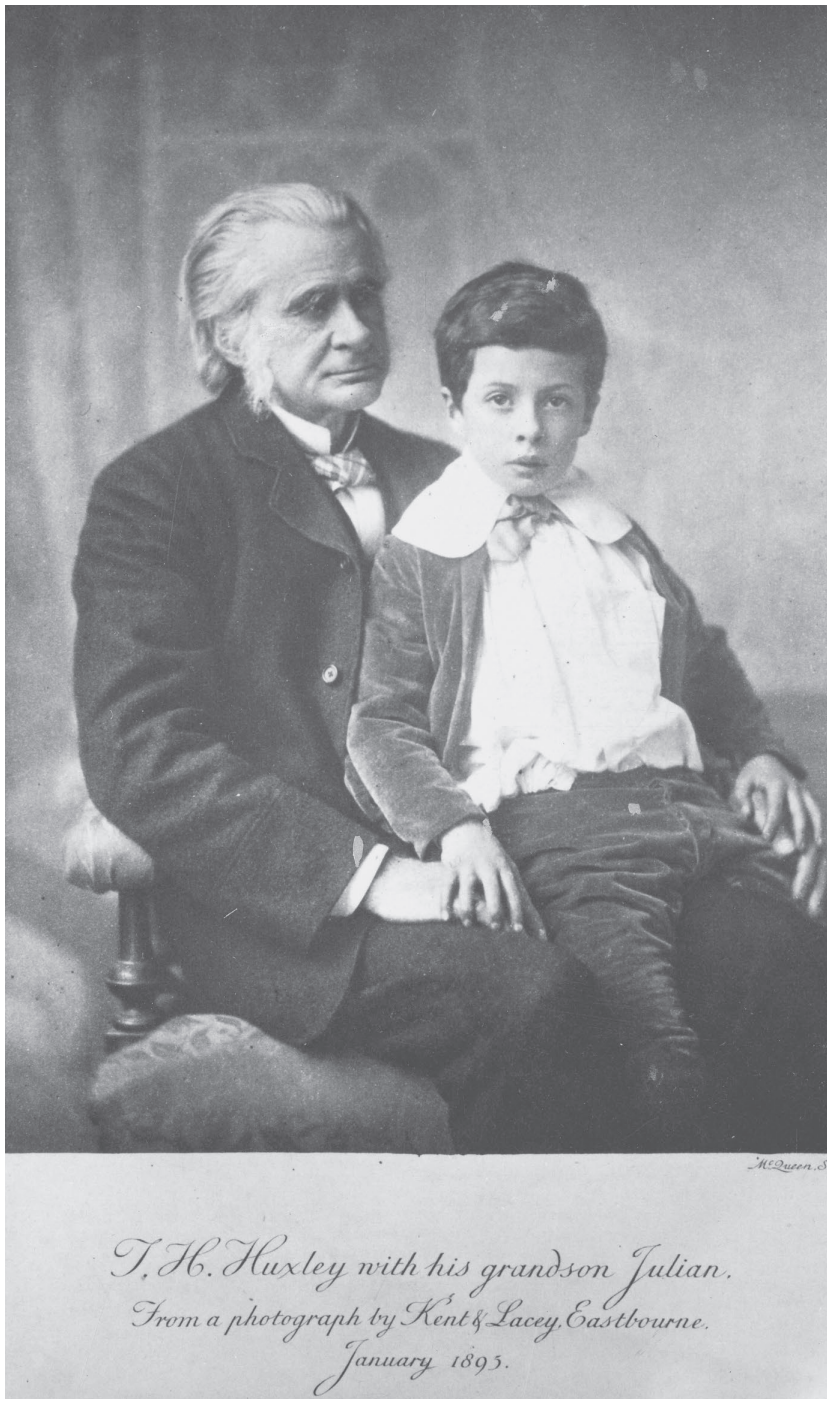


Figure 0.4: Thomas Henry and Julian Huxley, 1895.

a beneficiary of his grandfather's fights in scientific and educational fields. A great rise in family fortunes saw him a student at Eton and then Balliol College, Oxford, from 1906. There, natural sciences had completely transformed from his grandfather's era. Julian learned evolutionary theory as a matter of course, not as a matter of controversy. But he also studied the then-strong critique among scientific discontents about natural selection specifically. A technical problem with Darwinian natural selection was something that Julian helped communicate and resolve in the 1930s and 1940s, what he called 'the modern synthesis' of Mendelism and Darwinism, genetics and evolution.

In a remarkable turnaround – one that we can put down to larger-than-life H. G. Wells – Julian traded in an academic career in zoology for what we would now call science communication. He went on to become an adventurous communicator in media unimaginable to his grandfather; in broadcasting, in film and eventually in early television. He even won an Oscar. In so many ways, Julian Huxley was David Attenborough's antecedent. More than that, in the early 1950s, Julian Huxley was in front of the camera, with a young David Attenborough, producer, behind it. Along the way – and in between paralysing depressions – Julian was controversial secretary of the London Zoo in the late 1930s and equally controversial director-general of Unesco in the late 1940s. He was an A-list international speaker on population control in the 1950s and 1960s, the catastrophic era when the end of the world seemed imminent. Ours is not the first generation to think so.

The grandfather invented the term 'agnostic'. The grandson followed through, inventing the term 'transhumanism', the idea that both individual humans and the species as a whole can be radically enhanced and improved, mentally and physically. Highly political in a remarkable era when many natural scientists were just that, Julian offered key public statements about the human species and its variations. He was an anti-fascist signatory to the so-called Geneticists' Manifesto (1939) that opposed Nazi racial dogma and early driver of Unesco's anti-racist 'Statements on Race' for the new world after fascism and after the Holocaust. He was also post-war president of the British Eugenics Society, an apparent contradiction that in fact was perfectly reconcilable in his own intellectual ecosystem. We shall see

how and why. As an elderly man Julian put his name to the Humanist Manifesto (1973), carrying signature Huxley rationalism into the age of Aquarius.

What agonized Julian Huxley personally fascinated him intellectually: what do we inherit and what inheres in us? What happens over and between generations of living beings? How are similarity and variation carried forwards over time, measured in the generational years of a family tree; in the tens of thousands of years in 'the tree of man'; or even more expansively in the great geological epochs in the 'tree of life'? What do we really know about breeding, whether of peas, pigeons, horses or humans? The family history of the Huxleys doubles as an account of evolving ideas about generations and genealogy, genes and eugenics.

Evolution on the one hand and inheritance on the other are two very different natural phenomena, both revolutionized by and through Charles Darwin and Alfred Russel Wallace's idea: natural selection. Evolution was T. H. Huxley's intellectual business in the nineteenth century, while genetic inheritance was Julian's in the twentieth. Combinations and recombinations of Huxleys and Darwins routinely drew down on their shared intellectual legacy, sometimes looking to their own ancestry, eventually to consider how selective breeding might be brought to humans, as individuals, as families, as societies, as a species. They began to connect the idea of improved inheritance and the possibility of social interventions into the reproduction of mental and physical states. Generations of twentieth-century Darwins and Huxleys crossed paths in and around the Eugenics Society in London, rebooting an idea born from Charles Darwin's interest in artificial selection and folding it into Mendelian genetics on the one hand and modernist futurism, even progressivism, on the other. Thomas Henry Huxley was not so sure about this ambition to improve future humans. Julian Huxley was 100 per cent sure.

For decades now, historical and political analysis of eugenics has rightly bedded down a wide-ranging critique of its ambitions as a race-oriented programme, linked to genocide. It is difficult to comprehend how, for some post-war actors like Julian Huxley, eugenics and *opposition* to biological racism were compatible. For Julian, the Nazi

version of eugenics was just that – a dangerous, misplaced, expedient programme, egregious in its racist implementation. Strange to say, for him, eugenics needed rescuing, not abandoning. At one level, this is explained by the fact that British eugenics was in the first instance about mental health and ill-health, fitness and unfitness in early twentieth-century language, rather more than an intervention into race difference, race policy or racial reproduction of various kinds. Implicitly and occasionally explicitly, British eugenicists discussed 'the race', by which they sometimes meant the nation, sometimes the species, *Homo sapiens*. Occasionally they did mean 'white' or 'Caucasian', 'Negro' or 'Asian' or 'Aryan', or a hundred other spurious divisions of humankind. Herein lies a history of the very idea of 'race', the actual term, as its meaning changed from species differentiation to intra-human difference. Thomas Henry Huxley generally disavowed the term 'race' with regard to humans, preferring 'stocks', while his grandson influentially argued from population genetics that there was no such biological thing as 'race', installing instead the idea of cultural 'ethnicity' as part of his active mid-twentieth-century anti-racism.

The age of evolution recast key components of the age of revolution, not least the fundamental question: 'Are men born free and equal?' This was an Enlightenment proposition over which battles were fought and lives were lost, over which republics were born and liberal democracies reformed. It turned into a biological question in the nineteenth century, not only, but not least, by the hand of Thomas Henry Huxley.[10] He penned the essay 'Emancipation – Black and White' in the 1860s, in the context of the Civil War on one side of the Atlantic and the women's movement for civic and educational equality on the other. Julian, by contrast, considered political in/equality in an age when human rights were being codified. A high internationalist, he himself was on the outer edge of the new United Nations that rendered the recognition of equality between all humans aspirationally universal.

Confusingly, even shockingly, both Huxleys' biological answer to the modern political question 'Are men born free and equal?' was categorically no. Over and again, just when the Huxleys seem to redeem themselves by our measures, they incriminate themselves again. The reverse is also true. Just when their bigotry, racism and sexism were at

their most blatant, cracks appear in our judgement from the present, usually because someone else from *their* present steps in to present a more complex picture. T. H. Huxley's insistence on a singular human species, for example – not multiple kinds of biological humans as some others thought – was adopted by anti-slavery emancipationists to further their cause. Julian, to take another example, wrote an egregious suite of articles on 'The Negro Problem' and a ridiculously colonial and superior book on his African travels, and yet this prompted the sociologist W. E. B. Du Bois to respectfully invite a Huxley contribution to his *Encyclopedia Africana*, the great African-American ambition to offset the *Encyclopedia Britannica*. In 1946 Julian made *Man – One Family* with the Jewish communist filmmaker Ivor Montagu, pressing for an anti-racist and (what we would later call) multicultural post-war world.[11] In the very same year, he wrote eugenics into his manifesto for Unesco and declared therein that humans are not born equal. Herein, we try to understand these flawed Huxleys less through our own imperfect measures, and more through the measures and responses of their own changing times. In many ways, it is harder to do so. The positioned and politicized Huxleys are a good measure of the complexities of these matters over two centuries.

Determining, fixing, substantiating 'man's place in nature' was the most enduring Huxley project of all. And yet that required as much focus on non-human animals as on *Homo sapiens* and earlier versions thereof. Both the grandfather and the grandson were zoologists before they were human scientists of various nineteenth- and twentieth-century orders, enchanted by accumulating knowledge about creatures of the sea, of the land, of the sky.

T. H. Huxley's journey to the Pacific in the 1840s was his one major experience as a zoologist 'in the field', even though he was commissioned to the Royal Navy's HMS *Rattlesnake* as assistant surgeon, not as a naturalist. From Rio to New Guinea, up and down the east coast of Australia, the *Rattlesnake*'s voyage ranged for Huxley from becalmed boredom and deep melancholy, to an almost unbearable love-sickness for his Sydney-based beloved, Henrietta Heathorn, who became his long-lived wife. Along the way he saw dugongs and starfish, marsupials and tropical birds of colours and sizes never to be

adequately caught by his watercolour on parchment. It was analysis of the unlikely jellyfish and sea anemone that earned him a precocious fellowship of the Royal Society. He scooped them out of the warm waters, cut them apart and studied them minutely – often with great maritime difficulty – under his microscope. Thereafter, his zoological expertise turned to vertebrates, famously primates. And while as a physiologist he was interested in living responses, he learned most from dead animals and bits of them: from those skulls; from the fossils that gradually revealed the link between dinosaurs and birds; and from so-called 'soft anatomy', nerves or brains or spinal cords that could be dissected. In his museum and laboratory in Jermyn Street and later in South Kensington, Huxley collected, researched and taught for decades from fossils and skeletons and pickled embryos. The most recently animate things around him were the pinned bugs and beetles in the entomology collections and the preserved mammalian, reptilian and avian trophies suspended in taxidermic life.

Julian's world as a zoologist was vital and animate, not lifeless. For him, animals were best observed alive in wonderful interaction with each other. Far from his grandfather's zoological method that relied on dead beasts, some of them so old as to be stone, 'fossilized', Julian observed behaviour and even 'emotional' relationships between living creatures, an ethnographer of the animal world. His first and enduring love was with birds. Julian's best-known zoological work remains, to this day, 'The Courtship Habits of the Great Crested Grebe' (1914), drawn from fieldwork observations in Hertfordshire undertaken in 1912 with his brother Trevenen.[12] It is a much-cited classic in ethology, the foundation for his study of rituals, those enchanting 'dances' between the grebes. Importantly, also, it was a challenge to Charles Darwin's other theory, that of sexual selection. These water birds, unlike Darwin's peacocks, were minimally sexually dimorphous. It was difficult to distinguish between the female and the male. How then did sexual selection work?

Julian's animals were not always wild or even faux wild, but he definitely preferred them alive. If Thomas Henry Huxley inhabited a museum, Julian Huxley inhabited a zoo, for much of the late 1930s and the war years living in an apartment inside London Zoological Gardens. In his later life, however, it was not Regent's Park but Africa

that provided him the opportunity to serve as ecologically responsible trustee to animals. The conservation of African wildlife in situ became his mission. For his grandfather, 'Africa' was only to be found in the Athenaeum Club or the British Museum libraries, and that special African primate, the gorilla, he only ever saw as a drawing or as a skeleton. Julian, by contrast, was captivated by, we might well say in love with, London Zoo's most famous gorilla, Guy. He was, in this regard, more the intellectual grandson of Charles Darwin than of Thomas Henry Huxley, the great evolutionist a century earlier climbing into some of those very same primate cages in Regent's Park to observe the expression of animal emotion.[13]

Part of the great modern ambition to distinguish culture from nature *was* the project of distinguishing humans from animals, a drive which has run through philosophy, science and art for most of the 200 years of late modernity and which drew down on the entire classical, ecclesiastical and humanist canon before that. What does it mean to be human? Where does humanity end and animal begin? Historian Joanna Bourke suggests that 'Darwinian arguments may have contributed to the deconstruction of the radical differences imagined between humans and animals, but humanism survived this attack.'[14] This is precisely where the Huxleys sat intellectually, performing the dual work of modernity that both affirmed us as animal, part of evolution, and that in the end found ways clearly to separate humans from brutes.

The Victorian grandfather insisted on natural humanity, eroding a theologically endorsed human uniqueness offered by that other 'Origin' book Genesis. Most natural scientists by the mid-nineteenth century did not need Thomas Henry Huxley's mocking of the special creation of man then woman on the sixth day, after the creation of fowls, creeping things, fishes and beasts of burden, to question Genesis. Not for several generations had most naturalists read Genesis literally. And yet as a rule they stuck one way or another to the idea of humans as special, by reason, by language, by capacity to conceptualize an afterlife and, more modestly, by an opposable thumb. Julian knew far more profoundly, technically and fully than his grandfather, even than Charles Darwin, that evolution by natural selection acted on everybody, everything and always, yet he was the one who

maintained, even extended, this tradition of insisting that humans *were* special: we evolved that way. One extraordinary effect of the long evolutionary history of *Homo sapiens*, of 'man's place in nature', was that culture and knowledge itself could be inherited, a story of evolution from a happenstantial opposable thumb to a particular kind of mind. For Julian, this set humans apart entirely.

These Huxleys dealt with life on Earth on every scale imaginable, from the solar system to the soul, in orders massive and minute. They were masters at communicating how the smallest matter of nature fitted into a whole, and the bigger the whole the better. Evolution, and human knowledge of it, was everything, Julian proposing in the mid-1960s that evolutionary science 'has its roots in cosmology and its flowering in human history'.[15] Yet between the atomic bomb and the population bomb, modern humanity was poised to obliterate itself. As Julian would often put it, this threatened to extinguish all the evolutionary work that had produced humankind itself over thousands of previous generations. The response was a political one: 'The threat of the atomic bomb is simple – unite or perish.'[16] In a post-war catastrophic register, species unity recommended global organizational unity, and more to his point, global organizational unity would save the species *Homo sapiens* from itself.

The grandfather had compiled *Evidence as to Man's Place in Nature* (1863), looking backwards to an evolutionary past that was becoming older before his eyes with every palaeontological discovery. One century later, his grandson considered 'The Future of Man – Evolutionary Aspects' (1963), and looked forwards from his present, 'a crucial moment in the cosmic story'.[17] Julian was so far 'in' nature as to be in charge of it, to have dominion over it: 'Man's destiny is to be the sole agent for the future evolution of this planet'.[18] They – we – stand alone as trustees of evolution since we alone can comprehend it, whether we like it or not carrying the responsibility of the 'business of evolution on behalf of the earth and the rest of its inhabitants'.[19] On the one hand, this was a new kind of dominion 'over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth'.[20] On the other, this is Julian Huxley as commentator and theorist of an imperilled global ecology. The resonance with our Anthropocene is a true one.

For both of them, evolution was cosmological because it linked all matter in all time. Even non-organic and organic matter are connected: 'Evolution, from cosmic star-dust to human society,' wrote Julian, 'is a comprehensive and continuous process.'[21] His grandfather had said more or less the same thing in 1894:

> not merely the world of plants, but that of animals; not merely living things, but the whole fabric of the earth; not merely our planet, but the whole solar system; not merely our star and its satellites, but the millions of similar bodies which bear witness to the order which pervades boundless space, and has endured through boundless times; are all working out their predestined courses of evolution.[22]

These evolutionists, 1825–1975, not only showed us, but also actively gave us, models to pursue and to avoid: for thinking humanity and nature together; for placing the species into deep pasts and distant futures; for tracking a repetitive human tendency to dominion and for considering the Earth with and without *Homo sapiens*, the apparent trustees of evolution.

PART I

Genealogies

1

Generations: The Huxleys, 1825–1975

The Inheritor

BABY mine, how strange to see
Other faces blent in thine,
Other greatness touching thee,
Baby mine.

Something in a curve or line
Here revives thine ancestry:
Each on thee has laid his sign.

And thyself? Ah! thou for me
Shall this heritage enshrine;
All I was not, thou shalt be
Baby mine!

Leonard Huxley, 'The Inheritor', in *Anniversaries and Other Poems* (London: John Murray, 1920), 54.[1]

The night that Leonard Huxley became a father, he transformed the wonder into poetry. For no one but himself, he penned 'The Inheritor' to mark the birth of Julian Sorell Huxley in 1887. The awe and the worry of reproduction and family lines, of descent, breeding, inheritance and heritage were on Leonard Huxley's mind. In the baby's face ancestors were reborn: perhaps Leonard's own father Thomas Henry; perhaps the other grandfather, the doctrinally troubled Tom Arnold; perhaps the baby's great-grandfather, headmaster, historian, Thomas

Figure 1.1: Thomas Henry, Leonard, Julian Huxley, 1895.

Arnold. 'Other greatness' from the Huxleys and the Arnolds had been revived with the miracle that was grown by Julia Arnold Huxley and birthed that summer night, 1887. None of it was yet thought of as 'genetics', let alone 'Mendelian inheritance', but it soon would be: the newborn would be one of the key actors in that reworking of 'breeding', and of 'pedigree'.

Over these three generations – the Victorian, the Edwardian and the Modern – the Huxley fortunes rose, and their legacies flourished, publicly and privately. Yet Leonard Huxley was long subject to Thomas Henry Huxley's oppressive greatness. So too his beautiful newborn Julian would grow up, then step up and into the spectacular scientific position that Thomas Henry Huxley had single-handedly conjured, if not out of thin air, certainly out of not much. Julian did inherit a good visage from his Huxley and Arnold families, just as he inherited their inclination to reading and writing poetry (figure 1.1). But Julian the Inheritor also absorbed and carried forward his father's self-recrimination vis-à-vis Thomas Henry: 'all I was not'. On the night of his birth, even as he came out of his mother and into the world, Julian Sorell Huxley had the expectations of his line bestowed upon him. Leonard's private longing was to become his own weight to bear.

VICTORIANS: THOMAS HENRY HUXLEY AND HENRIETTA HEATHORN

Thomas Henry Huxley, unlike his son Leonard, was not inclined towards his familial forebears. Rather he tended to distance himself from them, even cut himself off. He found little satisfaction in either looking or going backwards in most matters. At the height of his career, his interest in the past lay more in the pedigree of *Homo sapiens* than in the Huxleys. Looking forward, however, he willed himself to be patriarch of a new dynasty, as well as a new science. And he was.[2]

When Huxley did look back, it was not far, and it was to his mother, not his father. 'Physically and mentally I am the son of my mother so completely . . . that I can hardly find any trace of my father in myself.' Rachel was London-born and had five surviving children before Thomas Henry was born in May 1825, in Ealing. She was forty, unusually old to

be bearing children in the 1820s. He wrote of her wit and her quickness. From his mother, by Huxley's own account, he acquired 'piercing black eyes', 'rapidity of thought', 'excellent mental capacity' and very little modesty.[3] He was devoted to her. Less so to his father George Huxley, who was a teacher. The Ealing School was on the decline even as George Huxley taught there between 1807 and 1835 and certainly in the brief time that his son was a student. Thomas Henry enrolled when he was eight, in 1833, and left two years later, the worst society he had ever known, he recalled.[4] Remarkably – especially given how entwined the Huxleys were to become with education – this was his sole experience of school. Huxley finances spiralled down along with Ealing School's, and eventually George resigned and took his wife and children to Coventry, where his family had originated.

That was in 1835, a Midlands time and place foundational to Huxley's political and philosophical inclinations.[5] We might imagine an industrializing town, nestled up to Birmingham. Yet this was not a factory town, even though, or really because, Coventry was the home of silk weavers and manufacturers of ribbons. Several steam looms were introduced in the 1830s, but the town's masters, journeymen and apprentices were cautious, independent craftsmen more troubled than enabled by the great industrial changes sweeping across the Midlands. Coventry battled poverty and inequity and it did so partly through a long tradition of dissenting politics. T. H. Huxley's signature opposition to establishment authority started here. It was a town where privilege and convention were questioned, almost as a matter of course. In Coventry over the 1830s and 1840s, there were Chartists, there were freethinkers and secularists, and there were phrenologists. There was the socialism of second-generation Owenism, especially championed by Charles Bray, a Coventry ribbon manufacturer, busy publishing on new mechanisms for working-class education and improvement, on a new kind of social science, and on *The Education of the Body: An Address to the Working Classes* (1836). For young Thomas Henry Huxley, this Coventry culture was a primer in the critique of orthodoxy. He set himself determined rituals of self-instruction, monumental by any measure, consuming a whole range of political philosophies that grounded his later actions, and indeed formed his very self.

For a boy born into both class and financial decline, reading was worthy and, as it turned out, a good investment over many long nights, but it brought no income. Not working-class, but financially struggling to fit into a lower middle class, Huxley pursued his own 'education of the body' as a young medical apprentice.[6] His two sisters happened to each marry medical men in 1839, and this set a course both for himself and for his elder brother James (Jim). His long-favoured sister, Lizzie, married John Salt, who apprenticed Jim. And Huxley was apprenticed to the other brother-in-law, John Cooke, at just thirteen. In 1841 Huxley followed this half of the family to London – the two sisters, his medical brothers-in-law and brother Jim. There, he was re-apprenticed to Thomas Chandler in the miserable Docklands. Over his lifetime and through dogged hard work, Huxley was to extract himself and his wider suite of semi-hopeless siblings from family financial and social decline. But at this point, he was indebted to his brothers-in-law and his elder brother George, who funded much of his medical education in London. With University College initially out of reach, Huxley first attended Sydenham College, surrounded by medical radicals. With Jim he later gained enrolment at Charing Cross medical school in September 1842, both as 'free scholars'. Huxley had something to prove. By 1845 he took University College's Part I Bachelor of Medicine examination and won a gold medal for anatomy and physiology. He was ambitious and he was all-in.

It heralded a bright future, but what income was to be had? He needed to work – and quickly – to repay debts for his medical education and training. In 1846 Huxley was commissioned to the Royal Navy's HMS *Rattlesnake* as assistant surgeon. Under Captain Owen Stanley's command, the instructions were to explore New Guinea, and the Torres Strait, north of Australia, and to chart the Louisiade Archipelago as yet unexplored by the British Navy. For the twenty-one-year-old, this was to be life-changing, his own Melanesian coming-of-age. Even before departure, Huxley was catapulted into a whole new company: erratic Stanley introduced Huxley to Richard Owen, the great comparative anatomist of the era who a decade later was to become Huxley's intellectual nemesis. He met John MacGillivray, the *Rattlesnake*'s naturalist, Oswald Brierly, the expedition's

artist, and the surgeon John Thompson. Thomas Henry Huxley was poised between medicine and natural science, and for years he could have gone either way.

The ship departed after a long preparation for what ended up a four-year voyage. Sailing in chilly December 1846 from Portsmouth, HMS *Rattlesnake* returned to Chatham in November 1850. Sydney was the base for the expedition's numerous cruises north to Cape York, to the Torres Strait and to the islands of Melanesia. And while poor Captain Stanley fell ill and died in Sydney – in young Huxley's arms – Huxley himself fell into other arms. He met the woman with whom he was to reproduce a scientific dynasty, and through whom he could become the patriarch he aspired to be, looking forwards not backwards in time.

Long-lived Henrietta Heathorn (1825–1914) came from an altogether more complex family than Huxley, daughter of Kent brewer and sometime merchant seaman Henry Heathorn and Caribbean-born Sarah Richardson. Sarah was in fact married to someone else at the time, a man with whom she had (at least) two children already, Oriana and Isabel (or Isabella). Henrietta's place of birth is unclear but may have been in the West Indies, possibly Jamaica given Sarah Richardson's pre-existing connections. But there are no birth records for Henrietta Heathorn because she was illegitimate, Sarah having eloped with Henry Heathorn, a difficult fact that Henrietta was shocked to discover late in life.[7]

Born in 1825, Henrietta was the same age as Huxley, but as a young person was far more travelled than he, and more formally educated. If Huxley moved from London to Coventry and back to London in his childhood and youth, Henrietta Heathorn travelled much further in her early years, following her father's multiple and mostly unsuccessful business ventures from the West Indies to England and then to the Australian colonies. She was fortunate to spend late-childhood years in Kent with an aunt, Catherine Heathorn, through whose initiative she received thorough if unconventional schooling. Catherine Heathorn happened to be a subscriber to the London Association for Moravian Missions, and through contacts and family funding secured Henrietta's enrolment in a boarding school, the Moravian Settlement, in Neuwied on the Rhine near Koblenz. Henrietta was educated there

between the ages of fifteen and seventeen, over 1840–42, the years when Thomas Henry was apprenticed in Coventry and then London. Their contexts could not have been more different. While Huxley was miserably dissecting and dispensing by day and teaching himself German and Ancient Greek by night, Henrietta was being taught basic natural sciences, arithmetic, Latin, German and French by the Moravian sisters, the as-yet-unmarried women of the community. The Moravians endorsed significant mental as well as physical education for girls as well as boys; in 1841 there were seventy boys and around fifty girls.[8] Henrietta was also absorbing a particular form of Protestantism, even as young Huxley was being led away from God altogether by Coventry secularists, pan-theists and a-theists, and by Sydenham radicals. Yet the Moravians were tolerant of denominational differences – ecumenical – and stressed personal piety and the intimate experience of faith, all significant for Henrietta's future life with Huxley. Tolerance for his agnosticism was perhaps seeded in her German boarding school.

In 1843 Henrietta moved to New South Wales, where her father had just taken on the Woodstock Mills in Jamberoo, a remote hamlet, barely that, in the coastal hinterlands south of Sydney. He was milling rainforest timber in what was still – but only just – a penal colony built on convict labour. Jamberoo was a difficult place to live – snake-infested and frontier – and when her half-sister Oriana married merchant William Fanning, Henrietta moved into their comfortable house in Newtown, Sydney. But she kept the house as much as lived in it, sometimes imagining herself as Cinderella, the obedient servant-relative.

> She was the last of sisters three,
> Fair, golden-haired, a merry maid . . .
> She journeyed to a distant land,
> With waters blue, and sunshine bright,
> Where lofty columned palm-trees stand,
> And moonbeams make a day of night.

But Cinderella – as she titled this poem – had a higher destiny. And there he was on the deck of the *Rattlesnake*, the brooding and melancholy prince.

Twelve moons had waned, there came a youth
Fate wafted to this self-same shore
A princely soul who sought for truth
And honour too – but truth still more.[9]

The prince (whom she called 'Hal') and Henrietta (whom he cast less as Cinderella and more as Jane Eyre)[10] met at a Sydney government-house ball, where they fell hopelessly and instantly in love. They danced on the deck of the *Rattlesnake*, they picnicked on sparkling Sydney harbour foreshores, and Huxley became the favoured visitor at the Fannings' house. For Huxley – perhaps for both of them – there followed a love-sickness, for just as they discovered one another, the *Rattlesnake* departed for yet another long northern cruise. Young and stricken with love, he gifted a portrait locket of himself to Henrietta. She was rapturous in gratitude at the token, but little did she know that this image was to substitute for his own vital self, and for too long.[11] As letters slowed from the *Rattlesnake*, the treasured portrait-locket was all that was left of him, like a relic. Theirs was a long and tortured engagement, intimacy deferred by his naval obligations, the interminable *Rattlesnake* cruises, and his return journey to England.

Back in London, Huxley was as committed to the Royal Navy as he was to Henrietta. He was also committed to the Malthusian-derived cultural convention that prospective husbands defer marriage until they are able to provide adequately. As things stood, he could not, and it took him five further years over the early 1850s – he in London, she in Sydney – to secure an income adequate to his own expectations.

In London, Huxley took leave from the navy to write up various findings, committed to pursuing not the medical practice of his naval appointment, but the by-product, natural science. His work in marine biology was fairly swiftly published in the *Transactions of the Royal Society*, and he wrote to Henrietta in February 1851 that 'FRS . . . is nearer than one might think – to my no small surprise'.[12] He was indeed elected into a precocious Fellowship of the Royal Society that year, followed by its medal in physiology (1852). His star was rising, but no job with it. Despite his publishing success and affirmation by the Royal Society, Huxley was passed over for a sequence of positions any one of which would have offered a decent salary. In a sequence of minor

humiliations, he failed to secure a position at the universities of Toronto, Aberdeen, Cork and Kings College, London (where his grandson Julian was to pick up a professorship seventy years later, with notable ease). The prospect of a professorship in natural history at the new University of Sydney also came to naught. Henrietta was getting word from other members of the family that her Hal was 'anxious and depressed'.[13] He was. But finally, in a rush, it all fell into place. In July 1854, he secured a lectureship in natural history at the Government (later Royal) School of Mines associated with the Geological Survey in London. His offer was 'Paleontologist and Lecturer on Natural History', and although he later said he refused the first element of the title, imagining himself uninterested in fossils, in fact he held this post for thirty-one years.[14] At long last, Huxley had a good salary intact, strongly supplemented by external lecturing and by writing. His state of indebtedness was over, and he gradually became the Huxley to whom others turned for financial support, even rescue. He was ready to marry, and Henrietta sailed from Sydney at the end of 1854, arriving in May 1855.

Thomas Henry and Henrietta Ann wed on 21 July 1855 in the Anglican All Saints Church, Finchley Road. For all her own complex heritage, the match provided a fresh starting point for a new dynasty. Malthus had instructed young men to delay marriage – which Huxley had – and thereby to reproduce fewer children – which he did not. Henrietta bore eight. The firstborn came on New Year's Eve 1856, at midnight recalled Henrietta: 'coming at Christmas I named him Noel'.[15] Then came Jessie Oriana, artist Marian – Mady – who was to marry the celebrated portraitist John Collier, Leonard, father of Julian, Rachel, singer Henrietta, doctor Henry and the youngest, Ethel, who – scandalously and illegally so far as English law and conventions were concerned – also married John Collier after the untimely death of her older sister.

For Huxley and Henrietta, Marian's death in 1887 (the year that Julian was born) was the second great family tragedy, since firstborn Noel had long before died from scarlet fever in December 1860, four years old. Mortality might have been commonplace for the Victorians, but Henrietta mourned deeply and for years. A great friend, the Rev. Charles Kingsley, gave her a book of his sermons for contemplation, and it is clear that Henrietta's faith did console. At the same time,

Huxley's soon-to-be-named 'agnosticism' was hardened in conversation with Kingsley, and literally at the graveside as the tiny coffin was being lowered. He was honest with his grief – there was no 'Victorian' suppression of emotion – yet Huxley managed to get on with things. Henrietta's grief, however, was disabling. One stint at recovery was at the home of new friends, the Charles Darwins. 'Ah! life's music fled with him!' Henrietta mourned in her poem 'Now and Then, 1860'.[16]

This mid-Victorian generation of Huxley children grew up in St John's Wood. After Noel's death they moved to 26 Abbey Place and then in 1872 purchased 4 Marlborough Place. Their neighbourhood boasted any number of mid-Victorian intellectual and literary celebrities, especially importantly for Huxley the philosopher Herbert Spencer.[17] They were neighbours also with 'George Eliot' and George Lewes. Huxley visited the unmarried couple and the exciting philosophical and literary circle around their home, but disapproving Henrietta did not.[18] In St John's Wood, as the Huxley children grew up, the Victorian couple hosted well-known Sunday 'tall teas', welcoming all kinds of literary and scientific Londoners and international visitors to their own home. But Huxley's health was not good, and in 1891, when their children were all married – or had died in untimely ways – Henrietta and Huxley retired to Eastbourne, to a house that son-in-law Frederick Waller had designed. Huxley died there, not an old man, in 1895, Henrietta in 1914.

EDWARDIANS: LEONARD HUXLEY AND JULIA ARNOLD

Thomas Henry left a line of Huxleys with more opportunity, more money and more institutional education than he had ever received from his own socially and financially declining forebears. Huxley had almost no schooling, and had presented himself for medical examinations and qualifications through an apprenticeship and sheer hard work. His children, by contrast, were highly and formally educated. The sons, and as it turned out grandsons, studied at Oxford. The girls studied at the Slade School of Fine Art. It all signalled a stunning

middle-class leap from Huxley's Coventry and London-based medical apprenticeship and nocturnal self-instruction.

Leonard Huxley was the middle child and the eldest surviving son, granted his name because it 'held our lost Noel's'.[19] Poor Leonard had the parents' grief written into his very newborn self. Psychoanalytically literate Julian was later horrified. Leonard's own childhood – and especially his educational path – was as different from his father's self-instruction as it was possible to be. His was the generation which benefited from, rather than duplicated, the patriarch's rise, but which also had to endure expectations of new standards and of more conventional advancement. Leonard attended University College School, Gower Street, part of the nonconformist educational structure and culture of University College London, which aligned with Huxley's anti-authoritarian politics and his opposition to the Established Church. Leonard then studied at St Andrew's University and finally graduated from Balliol College, Oxford, at a time when its Broad Church affiliation was affirmed by the Master, Benjamin Jowett.[20] While there was no scientist within Leonard, there was a man of letters – of classics, of poetry and of literature. He became assistant master at the grand Charterhouse School in Godalming, Surrey, teaching classics. Later he worked in publishing as assistant editor of *Cornhill* magazine from 1901, and as its editor from 1916. *Cornhill* was a literary magazine whose initial success was the serialization of distinguished Victorian authors: Elizabeth Gaskell, Anthony Trollope and Henry James, for example. It had also published *Culture and Anarchy* in the late 1860s, a series of essays by the renowned poet Matthew Arnold.

Thomas Henry Huxley and Matthew Arnold were well acquainted. Over the 1870s, they exchanged books – their own and others'. Matthew Arnold expressed sympathy with a range of Huxley's views, predicting an imminent religious revolution as significant as the Reformation.[21] They discussed Spinoza. They discussed 'the character of Christ'. They discussed Hume, as well as Huxley's *Hume*.[22] Yet through all this, little did they know that the Huxley and Arnold families would be joined in matrimony, a match that grafted two rising dynasties of Victorian science and letters.

When Leonard was at Oxford he met smart Julia Arnold (1862–1908) one of the first students at the new Somerville College for women.

Granddaughter of Thomas Arnold of Rugby, daughter of Tom Arnold, sometime chair of English literature in Dublin, niece of Matthew Arnold, she was, naturally, reading English literature. Her sister was the learned novelist Mary Arnold, later Mary Augusta Ward, who published with stratospheric success under the unlikely name Mrs Humphry Ward.

Leonard and Julia married in 1885, and after she had borne all their children – Julian Sorell (1887), Noel Trevenen (Trev) (1889), Aldous Leonard (1894), Margaret Arnold (1899) – Julia Huxley continued the educational endeavours of her father and grandfather, but in a completely different manner, method and style. In 1902, she took an alternative educationist's path and started her own progressive school for girls in Surrey, calling it Prior's Field. This was no Rugby and no Charterhouse, from which Leonard resigned in 1901. It was certainly no Moravian boarding school. It was liberal and non-sectarian. It was progressive and adventurous, both for Julia and her boarding girls. Julian, Trev and especially the younger Aldous and Margaret grew up in rural Surrey alongside the Prior's Field girls, in the splendid modern Arts & Crafts house and school designed by C. F. A. Voysey. The young Huxleys shared their mother, and much of their familial and domestic space, with multiplying boarders and a few day girls, some of them Huxley cousins (figure 1.2).

Leonard and Julia Huxley led active and pastoral lives with their four children and their many domestic animals. By all their accounts, it was easy and pleasant: they walked, swam, cycled, rode and read. Leonard, Julia and their four children took long summer holidays with both sets of extended families. They visited Huxley and Henrietta – Pater and Gran'moo – in Eastbourne. Leonard took Julian and Trev mountaineering in France and Switzerland – they were skilled and athletic. And they summered with Julia's sisters, especially Mary Augusta Ward in her grand Hertfordshire home, Stocks. And from those summers, the English novel-reading public enjoyed versions of the Huxley children, the Julian-inspired character 'Sandy', for example, in Mrs Humphry Ward's *The History of David Grieve*; 'a most delightful imp', grandfather Huxley wrote to her.[23] The three Huxley boys were wide-eyed and pretty, impossibly so. There was nothing yet inherited of Thomas Henry Huxley's signature scowl (figure 1.3).

Figure 1.2: Prior's Field School, *c.* 1909.

Figure 1.3: Trevenen, Aldous and Julian Huxley, *c.* 1897.