

Scientific Life Stories

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No field of literature has been so poorly cultivated as the autobiography, Herbert Read once wrote, and none so bereft of unquestionable masterpieces.¹ Bereft of masterpieces? Had Read perhaps forgotten Augustine, Montaigne, Rousseau, Goethe, Stendhal and Tolstoy? And what of Casanova, Petrarch, Cellini, Berlioz and Gide? This must surely have been a momentary lapse on Read's part, or had he good reason to pass over such a wealth of good, masterly, writing? In fact, as John Pilling has recently pointed out, Read had no reason at all, or at least offered none.²

Our suspicion is that Herbert Read, never the most synthetic of critics, was baffled and disappointed by the very range of literary autobiography, a range which makes it at once ubiquitous and unclassifiable. Literary criticism has often approached books as Linnaeus did flowers and insects, with a mind to ordering them (that is, in terms familiar to us from Michel Foucault's *Order of Things*, with a will to power). A genre that encompasses such unruly species as Sartre's *Les Mots*, Yeats's *Reveries Over Childhood and Youth*, and Darwin's *Autobiography* is sure to make mockery of any easy schemes of classification. Such books perhaps belong in the literary equivalent of Linnaeus' category 'Chaos' (into which he put amoeba) or perhaps 'Cryptomania' (the home of ferns, mosses and fungi).

Making sense of autobiographies by finding a home for them in some classification, or in the canon, is not, I think, a very useful approach, although it does serve the function of drawing attention to some much-neglected writing. (If Herbert Read has said that no field has been so poorly cultivated as autobiographical criticism, he would have been closer to the truth). What is useful, at least as a first step, is to understand what autobiographies do, what work they perform, and how. In this article we examine three autobiographies written by scientists. Some may be surprised to learn that Charles Darwin, Sigmund Freud and Albert Einstein wrote about themselves at all, still less that they did so interestingly. The reason has been spelt out with his usual forthrightness by the eminent biochemist Erwin Chargaff, who wrote in 1968 that the scientific autobiography belongs to a 'most awkward literary genre', whose practitioners typically lead 'monotonous and uneventful lives' and typically offer 'the account of a career, not of a life'.³ Chargaff added that the career is likely to lack compelling interest because, by contrast to the arts, 'it is not the men that make science; it is the science that makes the men.' Without Milton, in other words, we would have no *Paradise Lost*, but Newton's

celestial mechanics would eventually have been supplied by others.

Chargaff's observations appeared in a review of James D. Watson's *The Double Helix* (a scientist he strongly disliked). Despite Chargaff's antipathy to Watson, we cannot dismiss his comments about the lack of personality in scientific autobiography. Broad, though indirect, support for his views seems to prevail in the work of professional science-watchers. In a review of a book on the psychology and style of science, the physicist and historian of science Gerald Holton enumerates what he calls 'the main features that define scientific style as commonly understood at present':

- 1 In written work, 'the individual traces of the personal self [should] be attenuated as far as that can be done'.
- 2 Scientists should 'be logical, not emotional.... Mere opinions, preferences, emotions, and instincts must be repressed'.
- 3 'Errors or unlikely hypotheses are to be avoided at all costs.'
- 4 'The desired outcome is the simple, not the complex.'
- 5 'As with the content of science itself, the setting in which one does one's science is ideally as removed from interpersonal disputes as possible.'⁴

Holton's five points strongly suggest that science is an activity hostile to the assertion, or the discovery, of a personal self. If the style of science moulds the scientist as a person, that by itself is enough to account for the faults Chargaff finds in scientific autobiography.

How do we recognise the self of an autobiographer? Sometimes the author tells us something personal that we feel is both important and accurate. Often we get cues from omissions, or from discrepancies between the author's expressed feelings about an incident and our own reactions to it. We notice excess, reticence, and inconsistency, just as we do to those qualities in certain works of fiction - with the difference that in fiction their presence is deliberate whereas in autobiography they are mostly unintended. As with fiction, we amass cues in pursuit of a theory of the whole that accords with our sense of the narrator and of the world that the narrator has arranged in the service of self-explanation.

If one accepts the definition of self offered by critics of the autobiographical genre, the scientific autobiography not only fails to present such a self but even breaks the cardinal rule of all autobiography, namely to focus attention on the self. After all, it is widely accepted that the autobiography should by its very nature be a subjective, confessional account of the author's experiences. So keen are some commentators on this definition of autobiography that they promptly designate all scientific autobiography 'memoir' and thus dismiss it

entirely.

This is an unfortunate response, in that it defines scientific autobiography according to standards by which it is found lacking. We hope to show that, whilst most scientific autobiographies have indeed sought to efface self, to deaden the subjective impulse, this tendency is the result of a particular set of historical circumstances. Since the conditions that produced self-effacing autobiography no longer prevail, the possibility now exists for scientists to begin writing reflectively, or reminiscing critically on, their role in their work. They may now restore the 'I' in science.

Self-Effacing Autobiography?

The first piece of evidence that the scientific autobiography reflects particular scientific-historical circumstances is that the genre only emerged in the late nineteenth century. The second is that only certain kinds of scientist left any autobiographical trace. Such scientists had often been marginalised by the scientific establishment due to geographical remoteness, class, unorthodox training or subject specialism. As a result, scientific autobiographies have served first and foremost to defend, or at least to voice, a series of territorial, individual and scientific claims. Most often, they were written to show that provincial scientific culture can generate valuable results or that the non-physical sciences can produce valid knowledge. That scientific autobiographies were essentially promotional exercises becomes easier to appreciate when we consider the shape and structure of the early nineteenth century scientific establishment (which was still in place when late nineteenth century autobiographers began their reminiscences).

The prevailing image today is that of a powerful, well-entrenched and well-policed scientific establishment, one that speaks, for the most part, with a united voice. Whether a scientist works in Oxford, New York or Sydney, studying bones, bats, or bacteria, his or her work is assumed to be based on an established scientific method, a groundwork of accepted scientific laws and rigorous procedures for collecting and using evidence. In a word, scientists work in a paradigm, which binds them together into a community, just as other sets of beliefs and modes of behaviour solder people together into religious groups or political parties. But things were not always this way in science: the power and hegemony that science now wields has only recently been established.

Throughout much of the last century, and in some respects well into our own, the so-called scientific community existed only in name: scientists were divided into sects and factions that vied for power, access to eminent journals and research funding. Disputes flared over the very essentials of science, over

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what science was and who could pursue it. Such disputes came to centre on claims to scientific objectivity, and by the end of the nineteenth century, objectivity (defined as a rough-and-ready synonym for rationality, truthfulness and science itself) came to be the prize. For the physical scientist trained at a recognised university, scientific objectivity was a quickly-acquired badge of the profession: in researching the material world, he could claim, he was not only adhering to a well-established tradition reaching back to the days of Newton, Descartes and Boyle, but also abjuring any prejudice and bias. How could interpretations of inert matter - atoms, planets, falling apples - be coloured by metaphysical beliefs or any other ideology? Moreover, the physicist and chemist could, and often did, assert that a university training ensured mastery of the appropriate techniques of observation, theorising and sound reasoning.

On both these counts, the bulk of nineteenth century scientific autobiographers fall short. For one thing, they did not study dead matter but living forms. For another, they were rarely products of the conventional academic mill or metropolitan apprenticeship. For life scientists there was no noble tradition harking back to the golden age of early-modern science, only a history of false leads, failed experiments and patent absurdities. The pressure on these marginal scientists to justify their labours was intense, and when they came to look back on their scientific careers, they felt impelled once again to assert their just claim to the status of objective scientist. This they did in several ways, each of which sheds light on the nature of self in science and the imperatives of scientific conformity.

How did the marginal scientist of living beings deal with this uncomfortable predicament? One way was to pen an autobiography professing honesty and modesty. The formidable T.H. Huxley - Darwin's Bulldog as he was known - offers a case in point. His autobiography is composed around the refrain 'I do not lie and have no reason to err'.⁵ So sternly does Huxley abide by this dictum - that is, wish to be seen to abide by it - that he denies his autobiography is a work of imaginative composition at all. It simply mirrors reality, without artifice or literary conceit. A nice enough rhetorical gesture, but one that wears thin pretty quickly, as do his repeated claims of modesty and common sense. But there is one sense in which Huxley's ploy deserves attention. Though some autobiographers are liars and many misinterpret themselves, it is in their interest to claim to tell the truth. Nevertheless, Huxley offers a reminder that scientific autobiographers do this more insistently than other memoir writers. More importantly, they do so for specific reasons that set them apart from, say, literary autobiographers. Rousseau, for example, promises to tell us in his *Confessions* the 'naked unblushing truth'.⁶ He does so, it is clear, to elevate his own status and our respect for him. When Huxley does

the same, it is not to assure us of his sincerity but to convince us of the validity and correctness of his science. Rousseau wants approbation for himself; Huxley wants it for his science.

In laying claim to objectivity, furthermore, the writer of scientific autobiography purports to abjure all literary conceits, so that the work seems quite without art or artifice. Herbert Spencer reiterates throughout his autobiography how 'plain', hence 'natural', is his work and how little his life has been touched by the reading of novels. He presents himself as a kind of anaesthetic man, inventing nothing, knowing nothing, recording all.⁷

These two methods function in the scientific autobiography to distinguish it from other types of memoir-writing. But it is a third method that most effectively serves the appearance of objectivity and emphasises the dissimilarity between this and other forms of literature: the scientific autobiographer distances himself, as a subject, so fully from his objects of study that he effaces himself totally. Leaving aside for a moment the reasons why he might wish to do this, let us turn first to the question of how he does so. The first procedure is to dissociate the subject from the process of scientific investigation. Sensitive to the criticism that, in examining living beings, one is naturally tempted to bring values, preconceptions and prejudices to the task, the scientist responds by denying his own role in scientific investigation. This denial neatly deflects the second criticism - that the scientist may lack the training to recognise laws and generate hypotheses and to apply the true scientific method. Even eminent nineteenth century life scientists, in other words, seem to be denying their own contributions - the contributions that prompted their autobiographical endeavours in the first place.

Darwin Speaks from the Grave

Charles Darwin, the most renowned biologist of the nineteenth century, left behind an autobiography. Darwin, one might think, had little to fear for his science. With honours upon honours and a worldwide reputation, it seems incredible that Darwin at the end of his life wrote an autobiography clearly intended to minimize his own creative contribution to the process and progress of science.

Many impulses sustained (and were sustained by) such self-effacement. Darwin tells us, for one thing, that he was never very intelligent or far-seeing - mediocre at school and university, generally slightly dull. Other scientific autobiographers also adopt this affectation, even when it is patently false: Francis Galton, for example, even though he did spectacularly well in his early education and at Cambridge. To begin with, we are told that the subject has not applied much intelligence to scientific work. Then we are informed that he has

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not brought much imagination either. Darwin tells us how he gradually lost all aesthetic sense, all enjoyment of poetry and literature, how he became 'like a man who is colour blind'. In fact - and this is the crucial organising device running through his *Autobiography* (1876, first printed in 1887) - Darwin is merely a humble, avid, greedy collector of facts.⁸

Here is the key, it seems, both to how the book is constructed and to the purpose it serves. To stake his claim to scientific objectivity - at a time when the theory of evolution was decried as a law of higgledy-piggledy, a vague hypothesis lacking evidential basis - Darwin wants to present us with a natural world teeming with life, an animated, jumbled confusion of varieties, species, beasts and plants. Darwin portrays himself as approaching this panorama with the emotional blankness of a collector of evidence devoid of expectation, prior knowledge or subjectivity. Working, he says, on pure Baconian principles, 'I collected facts without theory on a wholesale scale', adding that 'my mind has become a kind of machine for grinding general laws out of a large collection of facts'.⁹ The point is that his mind is simply a device to extract theory from fact, without any input of intelligence and imagination, bias or prejudice. He wishes simply to mirror what he has seen. That is the pose Darwin the scientist wants to strike; it is the pose he has to strike to counter accusations of a lack of objectivity.

The very texture and structure of the book assert the same message. Darwin adopts the ultimate defence against charges of authorial subjectivity, which might be termed the defence *ex morte*. Having cast away self from science, he casts it away even from his life story: 'I have attempted', Darwin begins, 'to write the following account of myself as if I *were a dead man* in another world looking back at my own life'.¹⁰ This, I would argue, is not a morbid impulse but a scientific one. The particular historical circumstances in which non-physical scientists approached their autobiography in the nineteenth century prompted them instead to write their own obituaries.

Ideological Underpinnings

In examining the status of the scientific memoir in the nineteenth century, it may be useful to consider the social and ideological contexts of biography in this period. Gareth Stedman Jones, in a passage of considerable insight, sheds light on the biographical emphasis in historical writing during the Victorian era:

At this time [in the 1860s] the main defining characteristic of academic history was devout liberalism buttressed by a positivist methodology. The task of the historian, in Ranke's much quoted dictum, was 'simply to show how it really

was' - in other words to ascertain the facts... In place of dangerously speculative and scientifically unfounded general laws, the British historians substituted magisterial moral judgements.... 'Facts' were events, and events resulted from the actions of individuals producing them through the framework of institutions. All these were verifiable empirical realities, and once they had been established and confirmed, it was the task and duty of the historian to judge them. It was probably for this reason that so much history was focussed upon the Constitution and upon 'great men'. For non-sensible realities like class, mode of production or politically and culturally determined patterns of behaviour were not empirically verifiable. They could not simply be uncovered by the study of documents, and they did not afford the same straightforward criterion of moral pronouncement. Thus history was more conveniently interpreted as the interaction between great men and the institutions they created, modified, or resisted.¹¹

In Britain, this viewpoint was most influentially proclaimed and practised by Thomas Carlyle, whose dictum 'The history of the world is but the biography of great men' became a Victorian platitude. In America, Emerson was saying virtually the same thing - but for different reasons. The importance of 'great men' in England was hero-worship, whereas Emerson and the American transcendentalists sought a 'democratic cult of greatness' celebrating great men as representatives of the masses. Both were versions of romanticism offering reassurance in the face of industrialization which tended to erase individuality and individual control of personal destiny.

The concept of biography as an instrument of edification was pervasive. Once again religious narratives became popular, as did 'prudential' utilitarian examples of the 'literature of success', which recounted how the new industrial bourgeoisie had got where they were. These books served as a powerful propaganda machine for Victorian middle-class principles. Samuel Smiles, in his *Self Help*, (published in 1859), refers to them like this:

British biography is studded over, as 'with patines of bright gold', with illustrious examples of the power of self-help, of patient purpose, resolute working and steadfast integrity, issuing in the formation of truly noble and manly character: exhibiting, in language not to be misunderstood, that it is in the power of each to accomplish for himself; and illustrating the efficacy of self-respect and self-reliance in enabling men of even the humblest rank to work out for themselves an honourable competency and a solid reputation.¹²

Less explicitly bound up with the aims of religious parties or social classes was a third kind of popular biography, inspirational in a different way: biographies that stressed the heroism of overcoming handicaps rather than actual attainment of fame or fortune.

Biography was increasingly expected to serve as an alternative popular entertainment to novel-reading, considered immoral in some quarters, particu-

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larly before mid-century. In America too the struggle to develop an indigenous literature encouraged a focus on individual, national heroes, both in fiction and in popular biography. Narrative biographies, though 'truthful' (as opposed to the 'untruthfulness' of imaginative literature), used such fictional devices as suspense, dramatic scenes and poetically described backgrounds, and sought to provide the same vicarious pleasures as fiction while illustrating morality through specific cases. Biography in America was also an instrument for 'democratic' self-improvement.

In the nineteenth century, then, biography was at its apex as an ideological instrument in the service of liberal historiography, with its beliefs in the uniqueness of events, in the free will and moral responsibility of individuals, in historical progress and its reliance on the role and testimony of individual men and women. The emergence of developed capitalism, with its characteristic economic relations whereby individual men and women are 'free' to sell their own labour power or to buy that of others, required a philosophical definition of men and women as separate and autonomous individuals, a philosophy reinforced and fortified by the promotion of popular biography.

By and large, the autobiographies of two very different scientists, Sigmund Freud and Albert Einstein, bear out these observations.

Freud's Professional Life

The circumstances of an autobiography's composition often suggest something of the author's purpose in writing it, and therefore of what we may expect to find. Our expectations are important, because they are part of the ground against which we search for figures of significance. *An Autobiographical Study* was first published in 1925, when Freud was almost 70, in a series of short works intended 'to give a picture of the present state of medicine as revealed in the autobiographies of its leaders'.¹³ The circumstances, then, are clearly professional, and the work follows suit. After a few short and relatively matter-of-fact pages on his birth and family background, Freud begins the history of psychoanalysis that occupies the rest of the narrative.

An Autobiographical Study gives us a comprehensive history of Freud's work, thought processes, and promotion of his ideas. It is a masterful job - clear, condensed, and entirely accessible to the non-medical reader - but completely devoted to his professional life. What little Freud tells us about his youth is pre-professional in nature, focused on the events and personal traits that led him to his life's work. He tells us, for instance, that the experience of anti-Semitism increased his independence of judgment, and that his curiosity was 'directed more towards human concerns than towards natural objects'¹⁴ - prefiguring his later professional move from physiology to psychology.

Aside from what it leaves out, we find the most interesting aspect of the autobiography to be the postscript Freud added to the second American edition in 1935. The ostensible purpose of this seven-page note is to summarise his own work and other developments in psychoanalysis in the decade since publication of the first edition. This Freud does with his usual clarity and conciseness. First, however, he makes several strong but ambiguous comments on the relation between life and career in the body of the autobiography:

Two themes run through these pages: the story of my life and the history of psycho-analysis. They are intimately interwoven. This Autobiographical Study shows how psycho-analysis came to be the whole content of my life and rightly assumes that no personal experiences of mine are of any interest in comparison to my relations with that science.¹⁵

It is far from clear what Freud is saying about his personal life in these three statements. When he tells us that the story of his life and the history of psychoanalysis are 'intimately interwoven', he seems to mean his professional life; there is virtually no personal life in the book. His second observation, however, changes the metaphor, and sheds doubt on the natural interpretation of the first: 'Psychoanalysis came to be the whole content of my life'. Psychoanalysis *displaced* everything else, apparently, but was its 'container' the professional life or the whole life? Freud's third remark furthers the confusion. His reference to 'personal experience' suggests that in the second sentence too he was referring to his whole life - in other words, that his whole life consisted of psychoanalysis. It is not possible to untangle the threads of truth and self-justification (and evasiveness?) in such a remark. Taken at face value, it could exemplify either the confusion of life with professional role that Nietzsche deplored as an outgrowth of industrialization, or the rejection of personal life that Holton attributed to the style of science.

Several pages later Freud abruptly breaks away from his task to address once more the question of the personal life:

And here I may be allowed to break off these autobiographical notes. The public has no claim to learn any more of my personal affairs - of my struggles, my disappointments, and my successes. I have in any case been more open and frank in some of my writings (such as *The Interpretation of Dreams* and *The Psychopathology of Everyday Life*) than people usually are who describe their lives for contemporaries or for posterity. I have had small thanks for it, and from my experience I cannot recommend anyone to follow my example.¹⁶

Freud thus shuts the door on public curiosity about his personal life - not because he had none, but because earlier revelations had brought him grief. The world had been eager, naturally enough, to learn the secrets of the man who invented psychoanalysis, but Freud had discovered that readers were less

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understanding than analysts. The tension one feels behind Freud's testiness may have contributed to the uncharacteristic confusion of his earlier remarks.

In a more generic statement on writing about lives, Freud's style is more energetic and his assertions more dogmatic:

Whoever undertakes to write a biography binds himself to lying, to concealment, to flummery, and even to hiding his own lack of understanding, since biographical material is not to be had, and if it were it could not be used. Truth is not accessible; mankind does not deserve it, and wasn't Prince Hamlet right when he asked who would escape a whipping if he had his deserts?¹⁷

The truth cannot be known; the world is not good enough for it, and besides, the truth is bad: a strange, even defensive, series of statements from the father of psychoanalysis. As Lewis Mumford notes, with reference to the above passage, psychoanalysis is 'nothing less than the act of autobiography' carried to an exhaustive and painful extreme for the sake of self-knowledge. Freud left the world a fine professional autobiography; a combination of editorial expectations and his own exacerbated desire for privacy apparently discouraged him from incorporating into it the history of his wider life, his self, in Freudian or any other style.

Einstein: The 'I' in Science?

Albert Einstein's *Autobiographical Notes*, published in 1949 when Einstein was 70, also came into being through the persuasion of an editor - 'quite some persuasion' according to the editor, in his preface to the 1979 anniversary edition. The book was to be an intellectual autobiography for the Library of Living Philosophers series. If the editor had been looking for more, he might have been discouraged by a short piece entitled 'Self-Portrait,' written in 1936, in which Einstein declared his lack of interest in the emotional tangle of self-knowledge:

Of what is significant in one's own existence one is hardly aware, and it certainly should not bother the other fellow. What does a fish know about the water in which he swims all his life?

The bitter and the sweet come from the outside, the hard from within, from one's own efforts. For the most part I do the thing which my own nature drives me to do. It is embarrassing to earn so much respect and love for it. Arrows of hate have been shot at me too; but they never hit me, because somehow they belonged to another world, with which I have no connection whatsoever.

I live in that solitude which is painful in youth, but delicious in the years of maturity.¹⁸

Unsurprisingly, most of *Autobiographical Notes* has to do with physics. In

fact, with the exception of an occasional sentence or two, all but the first seven pages of the 44-page work are virtually inscrutable to the non-mathematical reader. Yet Einstein writes tellingly on certain personal themes in the opening pages. We learn, in summary fashion, of his precocious disillusionment with 'the hopes and strivings that chase most men restlessly through life,' and of the 'deep religiousness' which was a temporary balm for that disappointment. His reading of popular scientific books led to a loss of religious faith and a 'positively fanatic [orgy of] freethinking,' and finally to a life-long 'sceptical attitude toward the convictions that were alive in any specific social environment' - an attitude that may well have contributed to the originality of Einstein's scientific work.

Here and later, Einstein identifies as the major goal of his life escape from the transitory into the realm of abstractions and dependable relations. Of his first religious yearnings, he says: 'it is quite clear to me that the religious paradise of youth, which was thus lost [at age 12], was a first attempt to free myself from the chains of the "merely-personal", from an existence dominated by wishes, hopes and primitive feelings.' The young Einstein had noticed that 'many a man whom I had learned to esteem and to admire had found inner freedom and security' in the pursuit of the 'great, eternal riddle' of nature. The men who had sought this freedom 'were the friends who could not be lost.' Einstein broadly defines his self as intellectual, rather than emotional or experiential: 'The essential being of a man of my type lies precisely in what he thinks and how he thinks, not in what he does or suffers.'¹⁹

Einstein's closing statement, the last sentence of *Autobiographical Notes*, expresses his awareness that readers of autobiographies expect comprehensiveness and coherence in the presentation of a life:

This exposition has fulfilled its purpose if it shows the reader how the efforts of a life hang together and why they have led to expectations of a definite form.²⁰

Indeed, Einstein fulfills his purpose extraordinarily well, considering how little space he devotes to personal matters. Better than either Darwin or Freud, Einstein gives us a portrait of his essential self, of the central drive of his life and of how, in the broadest terms, it was played out in his scientific career. Thus, while Einstein is no more inclined than Darwin or Freud to give us intimate details from his personal life, reticence seems richer in Einstein because he has explicitly linked that quality with the essence of his self.

Einstein's refusal to tell us more about himself has a flavour entirely different to Freud's. While Freud seems to be struggling with issues of self, Einstein appears above it all, having transcended the self. We are tempted to say that Einstein offers his readers the bare bones of a 'transpersonal' self, a personality that found fulfilment in a realm of thinking located outside the

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traditional literary (or Freudian) personality. The term transpersonal is normally used to refer to a spiritual experience of union with a suprapersonal reality. Einstein's immersion in the contemplative realm of theoretical physics, especially when combined with his essentially religious reverence for the order of the cosmos, makes a surprisingly good fit.

Concluding Remarks

When the topic is as idiosyncratic as that of autobiography, and the sample is small, it is probably best to restrict one's closing remarks to observations about individual works.

To begin with, there is that Pandora's Box of autobiographical criticism, the nature of self. Does one take only what the narrator offers, and that at face value? Interpretation seems unavoidable, but it introduces major uncertainties. What is it, in either case, that we are searching for? A Freudian self? (That would certainly doom poor Darwin to naiveté!) A behaviourist self (whatever that might be)? Jungian? How should we decide? We have treated the question of self in this article quite simply, perhaps simplistically at times, since we have been trying to explore another set of questions.

In examining works of intrinsic interest, by writers with lives of uncharacteristically great interest, we now see that we have no hope of testing Chargaff's claim that scientific autobiographies are dull because scientists' lives are uninteresting. What we may do is to consider afresh our earlier claim that self-effacing scientific autobiography is the product of a particular era. The three autobiographies discussed in this article represent different periods, and it might be justifiable to suggest — with suitable caveats about their fields of study — that their different motivations for self-effacement indicate a gradual weakening of the original rationales for avoiding the personal. In other words, Darwin's motivation resembles Huxley's — not to undermine, or draw attention away from, the science. Freud's motivation was similar, and his uncharacteristic confusion and ambivalence probably arose from the inherent contradiction that his work asserted the supremacy of the personal life. Thus a rationale similar to Darwin's was particularly weak and tortured coming from him. A quarter of a century later, with Einstein, it was no longer a question of tainting the science with the personal; instead, the pursuit of science was explained as a method of transcending the merely personal. This is an essentially personal way of avoiding the personal, and leaves plenty of room for other scientists with different psychologies to write more reflectively or reminisce critically.

Darwin wrote his life for his family; Freud and Einstein wrote theirs for series whose slants were professional or intellectual. If life stories written

under such auspices lack personal interest, that facet is attributable to the values of the profession rather than to suppression or confusion on the part of the individual scientist - even if there is overlap between the dispositions of the profession and the scientist trained in it. Freud's harried ambivalence seems to bear out the point. He stiffly denies us his personal life in his professional autobiography, but informs us in an aside where we can go to find what he had left out.

About the existence of a 'scientific self', we are reluctant to generalise. Einstein's withdrawn or transpersonal self, Darwin's post-mortem, and Freud's public self, each match one or other of Holton's specifications for scientific style, and would seem to be good starting-points for further study.

Notes

- 1 Herbert Read, in Paul Nash, *Outline: an Autobiography and Other Writings*, London, 1949, p. 14.
- 2 John Pilling, *Autobiography and Imagination: Studies in Self-Scrutiny*, London, 1981, p. 1.
- 3 Erwin Chargaff's review appeared in *Science*, 1959, pp.1448-49, and is quoted in his own autobiography, *Heraclitean Fire*, New York, 1978, pp.61-62.
- 4 Gerald Holton, *The Scientific Imagination*, Cambridge, 1978, pp.237-38.
- 5 *Charles Darwin and T.H. Huxley, Autobiographies*, ed. Gavin de Beer, London, 1974, p.100.
- 6 Jean-Jacques Rousseau, *The Confessions*, Harmondsworth, 1973; see also Huntington Williams, *Rousseau and Romantic Autobiography*, Oxford, 1984.
- 7 Herbert Spencer, *An Autobiography*, 2 volumes, London, 1904.
- 8 *Autobiographies*, p.24.
- 9 *Autobiographies*, p.68.
- 10 *Autobiographies*, p.8.
- 11 Gareth Stedman Jones, 'History: The Poverty of Empiricism,' *New Left Review*, 106, 1977, p.82.
- 12 Samuel Smiles, *Self Help*, London, 1859, p.251.
- 13 Sigmund Freud, *An Autobiographical Study*, in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, London, 1959, pp. xx, 7-74.
- 14 *An Autobiographical Study*, p. 8.
- 15 *An Autobiographical Study*, p. 71.
- 16 *An Autobiographical Study*, p. 77.
- 17 Freud to Arnold Zweig, 31 May 1936, in *The Letters of Sigmund Freud to Arnold Zweig*, ed. Ernst L. Freud, London, 1970, p. 426.
- 18 Albert Einstein, *Autobiographical Notes* in *Albert Einstein: Philosopher Scientist*, ed. Paul Arthur Schipp, Evanston, 1949, 3-95, p. 5.
- 19 *Autobiographical Notes*, p. 17.
- 20 *Autobiographical Notes*, p. 95.