

SURVEY REVIEW

POSTSCRIPTS TO THE CENTENNIAL CELEBRATION
OF EINSTEIN'S *ANNUS MIRABILIS*

Jürgen Neffe, *Einstein: A Biography*, translated by Shelley Frisch. Cambridge, UK: Polity Press, 2007. Pp. x + 461. £25.00 HB.

Jeffrey Crelinsten, *Einstein's Jury: The Race to Test Relativity*.
Princeton and Oxford: Princeton University Press, 2006.
Pp. xxix + 397. US\$35.00 HB.

Silvan S. Schweber, *Einstein & Oppenheimer: The Meaning of
Genius*. Cambridge, MA: Harvard University Press, 2008.
Pp. xiv + 412. £19.95, US\$29.95, €22.50 HB.

Peter L. Galison, Gerald Holton and Silvan S. Schweber
(eds), *Einstein for the 21st Century: His Legacy in Science, Art, and
Modern Culture*. Princeton: Princeton University Press, 2008.
Pp. xx + 363. US\$35.00 HB.

By Naomi Pasachoff

As the four books under present consideration attest, public interest in Einstein is not limited to years that celebrate milestones in his career. Nonetheless, the first and fourth books to be discussed here are directly related to the centennial celebration of Einstein's *annus mirabilis* in 2005, which produced an especially large flurry of studies of Einstein's life and work. The only biographical study among the four, Jürgen Neffe's *Einstein*, is an expanded version of the German original that came out in 2005. The omnibus volume *Einstein for the 21st Century*, edited by Peter Galison, Gerald Holton, and Silvan S. Schweber, is a collection of papers given at the Berlin Einstein Symposium of 2005. Although not directly related to the 2005 anniversary, Jeffrey Crelinsten's *Einstein's Jury* and Schweber's *Einstein & Oppenheimer* pair off nicely with the others. As Crelinsten makes clear in his book (though, surprisingly, not until near its end): "All

major Einstein biographies focus on the British eclipse expeditions and most ignore or pass quickly over other attempts to test light bending before 1919. None deal with attempts after the British success" (p. 321). Whether or not one is prepared to call Neffe's book a 'major' biography of Einstein, his book clearly shares what Crelinsten convincingly argues is a deficiency of all Einstein biographies to date: their failure to make clear the lag between the acceptance of Einstein's theory of general relativity by the general public and its acceptance by the scientific community. By confirming the theory's prediction about the bending of light, Eddington's eclipse work of 1919 may have turned Einstein into a popular scientific icon at home and abroad, but scientific acceptance of the theory lagged; and in the United States, where much of the action of Crelinsten's book is set, it took the best part of a decade before the scientific community wholeheartedly endorsed it. Finally, Schweber's personal contribution to the volume that he co-edited is a slightly altered version of one of the chapters in his book comparing Einstein and Oppenheimer.

To be honest, despite the acclaim that Neffe's biography seems to have garnered in both the German and the English press, I cannot think of it as a biography of enduring value. As the dust jacket indicates, Dr Neffe (whose doctorate is in biochemistry), though now an affiliate of the "Max Planck Institute for Science History" (*sic*), is a veteran journalist, and "a recipient of the Egon Erwin Kisch Award, the most prestigious award for print journalism in Germany". Worthy though Neffe may be of that award, it is precisely its journalistic style that I find most distracting in this book. To my mind, it robs the book of any claim to 'gravitas'. As the author of scientific biographies for teenagers and other general readers, including *Albert Einstein: With Profiles of Isaac Newton and J. Robert Oppenheimer* (Chicago: World Book, 2007), I am well aware of the usefulness of narrative 'hooks' to rivet the attention of one's audience. But the device is so overworked in this book that Neffe's repeated attempts to heighten the drama of his story soon lose all effectiveness.

Neffe seems to stoop all too often to the level of tabloid journalism, as, for example, he does at the outset, where the prologue sets up the unauthorised decapitation of Einstein's corpse by the pathologist at the hospital where the scientist died. Having read Todd Gitlin's 1992 novel *The Murder of Albert Einstein* and reviews of Michael Paterniti's 2000 memoir *Driving Mr. Albert*,

I had known about the unauthorised efforts of pathologist Thomas Harvey, whose hopes to learn something about the nature of Einstein's genius from studying his brain came to naught. Neffe expands the *dramatis personae* of plunderers of Einstein's corpse, but do we really need to know that "Einstein's ophthalmologist and longtime friend Henry Abrams rushed off to the morgue in time to pluck both of Einstein's eyes from their sockets, preserve them in formaldehyde, and place them in a safe deposit box, where they remain to this day" (p. 6)?

In the prologue Neffe makes use of a dateline in what seems to me a heavy-handed way – "Princeton, New Jersey, Monday, April 18, 1955" (p. 3) – to dramatise the grisly hospital death-bed setting. His use of that technique elsewhere in the book seems hackneyed, as, for example, in the opening to Chapter 10, where he portentously introduces the scene of Einstein's banishment to Switzerland of his first wife, Mileva, and their sons: "Berlin, Anhalt Train Station, July 29, 1914, Wednesday evening at about nine o'clock" (p. 168).

Similarly, while a biographer of Einstein perhaps has the obligation to acknowledge the great man's womanising, I find Neffe's focus on gossip about Einstein's affairs and love-children irritating, irrelevant, and excessive. So Einstein had an affair with a dancer in New York City in 1940 and had an illegitimate daughter who was raised by Einstein's son Hans Albert and his wife "as a favor to Einstein" (p. 81)? That may be a titillating tale, but by 1940 he had been a widower for four years, and Evelyn Einstein never proved her allegation. In any case, the story sheds no new light on Einstein's human flaws and certainly does nothing to illuminate his science.

Even aspects of the book that I find otherwise admirable, such as its insistence on relating cutting-edge science today to work Einstein began a century ago, are diminished for me by the journalistic treatment. Chapter 12, for example, with its jazzy title, "Lambda Lives: Einstein, 'Chief Engineer of the Universe'", and its discussion of the work on black holes, dark energy, and dark matter by John Beckman and colleagues at the *Observatorio del Teide* on Tenerife in the Canary Islands, seems to be written for a popular science magazine of ephemeral value rather than for a biography of enduring worth. And interested though I am in the current research described elsewhere in the book – for example, Chapter 13's discussion of the attempts of

Peter Aufmuth and colleagues to detect gravitational waves; Chapter 17's focus on the work by Anton Zeilinger at the Institute for Experimental Physics of at the University of Vienna on "quantum information processing"; and Chapter 18's on the work in loop quantum gravity of Thomas Thiemann at the Perimeter Institute in Waterloo, Canada – each scientific profile seems to me to be diminished rather than enhanced by its 'trendy' treatment. Not to sound too pretentious, as I read I kept thinking of an aphorism of the French poet and philosopher Charles Péguy, a somewhat older contemporary of Einstein who died in battle in the early days of World War I: "*Homère est nouveau ce matin, et rien n'est peut-être aussi vieux que le journal d'aujourd'hui*" ("Homer is new this morning and nothing, perhaps, is so old as today's newspaper"). Einstein himself is for the ages; Neffe's journalistic treatment of Einstein's life, work, and legacy are not.

As Neffe draws his narrative to an end, he sees fit to inform us of recently discovered letters proving that Einstein had an affair with the wife of a Russian sculptor (p. 397) and an even more recently discovered diary kept by Johanna Fantova, whom he calls Einstein's "last girlfriend" (p. 399). A more important recent archival discovery that Neffe reports, however, relates to the history of Einstein's science, specifically to the competition between mathematician David Hilbert and Einstein to work out the field equations for the general theory of relativity. For some time, based on a comparison of the dates of Einstein's presentations of versions of his field equations to his colleagues at the Prussian Academy and the date of Hilbert's submission of his own equations to the Göttingen Society for Sciences, "many researchers contended that Einstein had cribbed from Hilbert" (p. 227). But, as Neffe reports, in 1997 Jürgen Renn of the Max Planck Institute for the History of Science in Berlin, along with John Stachel, the first editor of the Einstein Papers Project, and their colleague Leo Corry, "found the galleys of Hilbert's article, which leave no doubt that... Einstein did not plagiarise; his competitor had amended his text" in December 1915 after hearing Einstein present the correct mathematics on 25 November.

Even in this case, however, I prefer the more sober tone of Renn's own presentation of the episode in his contribution to the volume edited by Galison et al. Renn's essay ("Learning from Einstein: Innovation in Science"), which not only includes a reproduction of the first page of Hilbert's proofs, but also gives this

succinct summary of the matter: “[t]he alleged priority of the mathematician David Hilbert in having formulated the gravitational field equation before Einstein – albeit without giving it a detailed physical interpretation –... moldered under the evidence of the proofs of Hilbert’s first paper, which showed that his key insight into the possibility of a general covariant gravitational field equation came only after having seen Einstein’s publication” (pp. 244–245).

A final quibble about Neffe’s book is the assertion toward the end that Oppenheimer was Einstein’s “close friend in Princeton” (p. 399). As a reviewer in this journal of several recent biographies of Oppenheimer, I feel confident that this assessment is inaccurate. And as Schweber points out in “Einstein, Oppenheimer, and the Meaning of Community” – Chapter 6 of his comparative study – in a lecture at a UNESCO colloquium in Paris on 13 December, 1965, Oppenheimer noted “that he had known Einstein for over thirty years and that after he became the director of the Institute for Advanced Study in 1947 they ‘were close colleagues and something of friends’” (pp. 276–277).

The first chapter of Neffe’s book is called “His Second Birth: The Fateful Year 1919”. It describes Einstein’s transformation, in the wake of newspaper coverage that autumn of the confirmation of one of the predictions of Einstein’s general theory, into “the first global pop star of science” (p. 9). As Neffe notes, newspaper readers in England and the United States were first to learn that Eddington’s data from the total solar eclipse the previous summer had confirmed Einstein’s prediction of gravitational light-bending. More than ten days separated the breathless 7 November report in *The Times*, which described Einstein’s theory as “one of the most momentous, if not the most momentous, pronouncements of human thought” and the first German newspaper coverage “a somewhat dull account of Einstein’s breakthrough”, and not until mid-December did the German media begin to present Einstein as “A New Celebrity in World History” (p. 15). For Neffe, “[t]he year 1919, with November 7 as its apex, divides the course of Einstein’s life like a watershed”, marking his divorce from Mileva and marriage to his cousin Elsa. Despite noting the slight lag between the English-speaking world’s lionising of Einstein as the new Newton and German realisation “that a living Copernicus was moving in our midst” (p. 16), Neffe, like other biographers of Einstein, seems

unaware of what Crelinsten calls our attention to, namely that Eddington's 1919 confirmation marked only a shaky beginning for the endorsement of Einstein's general theory among scientists. As Crelinsten notes near the end of his book, "[i]t took roughly two decades for Einstein's jury of astronomers to pass judgment on his theory of relativity" and that only during the "latter half of the 1920s", did the astronomy community shift "from being Einstein's jury into witnesses on his behalf" (p. 314).

(It is far from usual for arguments about data reduction to continue for 90 years, but an important and long-awaited evaluation of Eddington's 1919 data, by Daniel Kennefick of the University of Arkansas at Fayetteville, in the March 2009 *Physics Today*, reveals that even today not everyone is convinced that Eddington's data proved the case. In response to allegations that the data-analysis was biased in favor of Einstein's theory, Kennefick shows that the data reduction was largely by the Astronomer Royal, Frank Watson Dyson, without interference by Eddington, and that its conclusions in favor of Einstein's relativistic prediction were reasonable and fair.)

Of the four books under consideration in this review, Crelinsten's is the one I most enjoyed reading. He is a good writer, who, without repeating himself, periodically sums up his discussion and sets things up for the next section so that we always know what to look forward to and are reminded of what we have just learned. Crelinsten also knows how to make telling use of charming details. For example, he describes the visit that Max Planck and Walther Nernst made to Einstein in Zurich in July 1913, when they offered him a professorship without any teaching obligations at the University of Berlin, along with directorship of a not-as-yet-built physics institute. "The deal had taken months to put together, and Einstein took a day to think about it. In the meantime, Planck and Nernst went for a hike in the Alps. The three men had decided that when Einstein would meet them at the station on their return, he would be carrying white flowers if he declined their offer, and red flowers if he accepted. When the two Berliners pulled into the station, they were pleased to see red ones" (pp. 78–79).

Instead of relying on overused journalistic techniques to dramatise his narrative, Crelinsten manages to imply a lot in his own subtle way. His description of the first meeting between Einstein and the young astronomer Erwin Finlay-Freundlich is a case in point. In late

August 1913, Einstein wrote to Freundlich, with whom he had been corresponding about the astronomical consequences of relativity since summer 1911, to tell him that he was now more or less convinced that gravitational light-bending was a certainty and that he hoped Freundlich would carry out experiments to test the prediction at the following summer's eclipse. Freundlich, letting professional excitement take precedence over marital etiquette, contrived to include in his honeymoon in the Alps a detour to a meeting of the Swiss Society of Natural Sciences, where Einstein was giving a talk with Marcel Grossmann on their latest version of relativity theory. "Einstein and Freundlich discussed gravitation all the way back to Zurich while the new Frau Freundlich admired the scenery" (pp. 78–79).

Crelinsten also draws delightful portraits of a number of scientists, most notably Thomas Jefferson Jackson See and Charles Lane Poor, whose attempts to topple Einstein from his pillar turn them into villains of the piece. By the time See began to occupy himself with this goal, he already "had a reputation among astronomers on both sides of the Atlantic". Fired from both the Yerkes Observatory and the Lowell Observatory for disruptive behaviour characteristic "of an immoral egomaniac" (p. 98), See found employment in 1898 with the U.S. Naval Observatory post on Mare Island in northern California, where he was put in charge of the isolated time station. Before the first decade of the twentieth century was out, See became known as a plagiarist who tried to pass off as his own the theories of others working on problems of the origin of the universe and the solar system. While See was one of the principal inveighers against relativity theory, most serious scientists dismissed his claims, which were based on misinformation. "His tirades against relativity helped create a crackpot aura around the antirelativity group" (p. 269). By contrast, Poor, a professor of celestial mechanics at Columbia University, "viewed general relativity as a threat to his own status as expert" (pp. 322–323). While he continued to hold forth against Einstein's theory as late as October 1929, when "the antirelativity forces organised a symposium designed to knock down the observational underpinnings of relativity" (p. 307), he ultimately lost credibility. "His eventual decline among his peers was due to his breaking certain codes of behavior – deceptive presentation of others' results, publicity tactics – and his commit-

ting technical errors in the course of his ubiquitous attacks” (p. 323).

If See and Poor are among the villains of this interesting story, among the heroes was American astronomer W. W. Campbell, the director of the Lick Observatory from 1900 to 1930, and the director of several solar eclipse expeditions to test the hypothesis of gravitational light bending. In 1911 Einstein suggested how astronomers could determine whether the Sun’s gravity in fact bent light, and shortly thereafter Campbell added the ‘Einstein problem’ to the list of projects that the Lick solar eclipse expeditions would investigate. One should not infer from this, however, that Lick astronomers believed that Einstein’s prediction would be confirmed. According to a February 1920 letter from astronomer Keivin Burns; “[o]f course no one at Lick believes in the Einstein effect, it being contrary to philosophy, judgement [*sic*], and horse sense. But since so much is being said on the subject it is necessary to be interested. It may take a long while to show the error of the ways of the English astronomers” (p. 152). Only after careful analysis of his data from the 1922 eclipse did Campbell announce the validation of Einstein’s prediction. *The New York Times* quoted Campbell: “the agreement of our observed value with the predicted value is so satisfactory that the Lick Observatory does not plan to repeat the Einstein test at the total solar eclipse” of September 1923 (p. 209). Despite Campbell’s joining the camp of relativists, however, the anti-relativity movement in American remained active for the rest of the decade.

In telling the story of the Lick solar eclipse expeditions, Crelinsten refers to information found in the diary of Campbell’s wife, an expedition participant. Campbell had arranged to collaborate with Freundlich at the eclipse of 1914. When war broke out that August, placing Germany and Russia on opposing sides, the Russian authorities seized Freundlich as a prisoner of war and confiscated his equipment. The American team was unaffected, but Mrs Campbell’s diary indicates that even had Freundlich’s equipment been available for the light-bending test, weather would have prevented useful data collection. She tersely summarises the eclipse effort: “Total failure. Thick gray cloud at eclipse time and lovely clear sunshine afterward” (p. 83).

Much as I enjoyed *Einstein’s Jury*, I feel duty-bound to mention some of the errors that I noted. A review by Jürgen Ehlers in *Clas-*

sical and Quantum Gravity (v. 24, 2007, p. 5313), for example, points out that Crelinsten has the Andromeda Nebula's spectrum shifting toward the red instead of the blue (p. 12), and mistakenly gives Eddington's limb deflection as 0.61" instead of 1.61" (p. 144). While typos are virtually inevitable, the consistent mis-spelling of J. J. Thomson's name indicates not a typo but an ignorant error. These and other glitches notwithstanding, I strongly recommend this book to anyone interested in how revolutionary scientific ideas find acceptance within the scientific community.

Comparisons may be odious, but if asked which of the four books being considered here a busy reader could most readily ignore, I would have to say Schweber's *Einstein & Oppenheimer: The Meaning of Genius*. The title itself troubles me, since Schweber identifies in the preface as one of the book's goals "to banish the term *genius* when referring to these two extraordinary individuals by emphasizing", among other things, "how they created their science and made use of the cognitive and intellectual resources of their community" (p. ix). If he wants to banish the term, why use it in the title? Also, since the book consists of two chapters focused primarily on Einstein and two primarily on Oppenheimer, the first 238 pages of the book don't contribute much to the putative comparative theme. In fact, since the preface also indicates that "this book should not be seen as an endeavor to compare Oppenheimer and Einstein" (p. xi), it's not really clear to me what the point of the book is. If Schweber's main aim is to address the question "How did Einstein and Oppenheimer try to remain relevant after they had made their singular contributions?" (p. xi), it's not clear to me that he succeeds.

Schweber himself seems uncertain about the point of his book. He says: "[a] possible justification for the present volume is that it explores aspects of the lives and personalities of Einstein and of Oppenheimer that have received less attention", including "their link to Buddhist thought" and especially "how they coped with their lives after having climbed to summits that are unreachable to almost everyone else" (p. ix). So are we comparing the two subjects or aren't we? Schweber makes lots of specific comparisons himself, opining that "Oppenheimer's philosophy could be characterized as more Bohrian than that of Niels Bohr himself – and thus very different from Einstein's" (p. 302), that "Einstein did not need, nor did he seek, the approval of either the scientific community or that

of the public at large. Oppenheimer did” (p. 307), and that “Oppenheimer was less certain and confident about himself and the world than Einstein” (p. 312). Even in a chapter nominally focused on Oppenheimer alone – Chapter 4, “J. Robert Oppenheimer and American Pragmatism” – Schweber notes Einstein’s commitment to the idea “that the task of the physicist was to arrive at fundamental laws from which the cosmos can be reconstructed”, while after World War II Oppenheimer left physics behind to become a public intellectual, “a champion of antifoundationalism, multiculturalism, and a form of neo-pragmatism” (p. 201).

Nonetheless, confused though I remain as to what the book is aiming to achieve, it did bring to my attention some interesting, if ultimately trivial, points. For example, it is common knowledge that Einstein completed his high school education at the Aarau Cantonal School, and that while a student there, he boarded with the family of one of the teachers, Jost Winteler. It is also common knowledge that Oppenheimer was educated at the Ethical Culture School in New York City. We learn from Schweber, however, that Winteler, along with Einstein family friend Gustav Maier, was a cofounder of the Swiss Ethical Culture Society. Despite Schweber’s mistaken use of the word “Cultural” instead of “Culture” to describe both the Society and its School (p. 284), I am glad to know that Einstein accepted an invitation to write a message to be read at the January 1951 celebration of the seventy-fifth anniversary of the Society’s founding.

Another tidbit Schweber offers has to do with a characteristic hand pose favoured by Einstein, which Schweber has detected in Solvay Congress photos from 1911, 1913, and 1927. As author of a biography of Marie Curie, I have looked countless times at the 1911 photograph (where she is the only woman in attendance) and never noticed what I will now never ignore: the way Einstein holds his thumb and index finger together. According to Schweber, “It is the same way that both Vishnu and, later, the Buddha are represented in many of the sculptures of them: their thumb and forefinger are joined, in what is called the *vitarka* gesture, the sign for compassionate teaching. In a later Bhuddist [*sic*] tradition, the joining of the thumb and forefinger also symbolizes the uniting of method and wisdom” (p. 288). Schweber seems not to consider, however, that perhaps Einstein simply had a habit of holding his

hand in that fashion, and that it had no particular philosophical meaning.

A lot of what Schweber asserts, however, fails to convince me. For example, I find it highly questionable that “Perhaps the greatest tragedy of Oppenheimer’s life was not the ordeal he went through over the issue of his loyalty but his failure to make the Institute for Advanced Study the intellectual community he had envisaged” (p. 187). Elsewhere Schweber says he believes that Oppenheimer “thought that losing his security clearance would damage his country.... And damage his country it did” (p. 313). How could this not be a greater tragedy than whatever personal disillusionment he may have felt over his failure to create “a rich and harmonious fellowship of the mind” at the Institute (p. 304)?

I am also unconvinced by Schweber’s choice of Proteus as the most appropriate Greek god with whom to compare Oppenheimer, as opposed to the choice that Kai Bird and Martin Sherwin made for their magisterial 2005 biography, *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer*. Proteus, a sea god who could change shape to avoid having to tell the future, loaned his name to the adjective ‘protean’, which connotes flexibility, adaptability, and the capability of assuming many shapes. Schweber’s point, too rooted for my taste in pop psychology, is that “what stands out is the absence of a lifelong project that could have given coherence to the tasks he undertook” (p. 188). Schweber returns to this point in Chapter 6, where he asserts that “Oppenheimer could never fashion a sense of self for himself” (p. 301).

While I endorse Bird and Sherwin’s choice of Greek god over Schweber’s, a footnote in the latter’s book seems to lay the blame on them for a group of annoying errors plaguing his discussion of Oppenheimer’s spring 1957 William James lectures at Harvard. Mistakes (including the date of Senator Joseph McCarthy’s death) and inconsistencies (including the number of lectures and their titles) abound in the mere handful of pages covering this topic, primarily in Chapter Four. Footnote 58 (p. 367) indicates that Schweber relied on Bird and Sherwin as his source for this treatment, though that doesn’t absolve him of the responsibility of checking their information. In general, a careful editor’s eye, if not the author’s own, might have improved Schweber’s book by catching, among other things, several incorrect renderings of Bohr’s

name (his first name appears incorrectly in the index and elsewhere, though not everywhere, as “Neils”, and the plural possessive form of his last name is botched in a reference to the time Niels and his son Aage spent at Los Alamos as “the Bohr’s stay” [p. 171]).

Einstein for the 21st Century, the book Schweber co-edited with his Harvard University colleagues Peter Galison and Gerald Holton, has much more to recommend it than his solo venture, and not only because it has fewer typos than perhaps any other book I have ever read. This volume – whose “guiding question” is “How is it that Einstein, a physicist of the early twentieth century, remains such a figure of fascination for so many fields of work, from the sciences to the humanities?” (p. x) – truly has something for everyone, scientist and lay reader alike. The book is divided into three sections: solitude and world, which explores various aspects of Einstein’s identity; art and world, devoted to Einstein’s artistic and musical legacy; and science and world, a discussion of the new avenues of research that Einstein’s scientific work continues to stimulate. While I found virtually every essay in the volume had something novel to say, I will limit myself to comments on just a few contributions from each section.

In Part 1, I found Hanoch Gutfreund’s essay on “Einstein’s Jewish Identity” particularly suggestive. Although Gutfreund himself doesn’t himself draw these comparisons, his argument made me realise for the first time the affinities Einstein shared with Ahad Ha’am, the father of cultural Zionism (as opposed to Herzl’s political Zionism), as well as with Mordecai Kaplan, the founder of Reconstructionist Judaism. According to Gutfreund, Einstein “did not identify with Judaism as a religion, but as a cultural heritage”, and what he valued most in Judaism were two “fundamental values”, namely “the democratic ideal of social justice and the high respect for intellectual striving” (p. 31). In his 1934 work, *Judaism as a Civilization: Toward the Reconstruction of American-Jewish Life*, Kaplan defined Judaism as an evolving religious civilisation. He argued that the Jewish people, not God, needed to be at the centre of a reconstructed Judaism, and that Jewish ethical teachings, which promote a just social order, and not supernatural concepts like ‘the chosen people’, are at the heart of Jewish civilisation. Gutfreund also asserts that before accepting the idea of political Zionism, Einstein “advocated the establishment in Palestine of a national home for the Jewish people in the form of a cultural-

spiritual center, rather than a state with borders and an army” (p. 31). This view was in total harmony with the thinking of Kaplan, who, drawing on Ahad Ha’am’s writings, promoted ‘Diaspora Zionism’, in which Zion is a spiritual centre for Jews around the world. To Kaplan, a Jewish government would have to be grounded in Jewish ethical teachings or it would run the risk of being nothing more than just another country.

Having recently visited Einstein’s summer house in Caputh, a suburb of Potsdam, Germany, which is run by the Einstein Forum, I was interested to read the essay by the Forum’s director, Susan Neiman. “Subversive Einstein” begins with the surprising revelation that Neiman had no particular interest in and “didn’t even *like* Einstein” when she assumed the directorship in 2000. “I didn’t choose him; you might say he chose me when I took over the direction of an institute founded to nourish Einstein’s heritage as a public intellectual”. She eventually figured out what underlay her hostility: her misperception that Einstein was a *Luftmensch* – in Yiddish, “someone who keeps his head in the clouds and lets someone else worry about putting food on the table” (p. 59). As she learned more about Einstein, she discovered his commitment as a public intellectual “to speak truth to power”. As she learned more about the policies he advocated – “against war, against political repression, against racism, and in favor of socialism” (p. 62) – her admiration grew: “what’s astonishing is how often he was right” (p. 68). Although admittedly with “at least a shiver of trepidation”, she concludes that “there’s only one important question where I think he turned out to be wrong” – his conviction that “the Germans would never be able to reject the militarism and authoritarianism that led them, and the world, into its greatest war” (p. 69). Neiman asserts that “[e]mpiricist that he was, I believe Einstein would have been impressed by the strength of contemporary German democracy, and by the depths of its attempts to come to terms with the moral ruins that once made up its landscape”. Were he still alive, “he might even have agreed to an appearance” at the festivities his native land mounted in his honour (p. 70). Of course, it is debatable how much credence we can put in Neiman’s speculation about what Einstein might or might not have thought.

Not knowing anything about the subject before reading Part II of this volume, I was interested in Linda Dalrymple Henderson’s essay, which describes ways in which artists have been inspired by Einstein’s ideas. She begins by describing how in the 1940s art historians began

mistakenly to identify Einstein's ideas with Picasso's Cubism, but at the Einstein symposium held in Jerusalem in 1979, the centennial of Einstein's birth, Columbia art historian Meyer Schapiro punctured this claim. In focusing on a spatial fourth dimension, Cubist painters were working not from the four-dimensional space-time continuum connected with relativity theory but rather from a tradition inspired by E. A. Abbott's 1884 *Flatland: A Romance of Many Dimensions by a Square*. Henderson expands on Schapiro's argument by adding that the Cubists *were* inspired by ideas in physics, but not by relativity; they were reacting instead to the "exhilarating discoveries of the 1890s redefining the layperson's understanding of matter and space (e.g., X-rays, radioactivity, the electron, and the Hertzian waves of wireless telegraphy)" (p. 103). She points to architect Erich Mendelsohn's 'Einstein Tower' (another destination on my recent visit to Berlin and environs) as the first artistic effort rooted in relativity theory. An acquaintance of astronomer Freundlich, Mendelsohn sought "to express the new awareness of the energies inherent in mass" (p. 107). After surveying a number of twentieth-century artists who specifically reacted to relativity theory, she concludes that the artistic "romance of many dimensions" has entered the twenty-first century "augmented by more recent issues in physics", including not only string theorists' eleven-dimensional universes and branes, but also "time travel, dark energy, and dark matter" (p. 129).

Having in 2004 attended a major exhibition of his work at MASS MoCA, one of my neighbourhood museums, I was interested to read Matthew Ritchie's "Into the Bleed; Einstein and 21st-Century Art". Described in the introduction as one of "the present generation of artists who invoke Einstein explicitly or implicitly" (p. xiii), Ritchie talks about the challenges of constructing "a genuine, if personal, investigation of time and space", operating within conceptual models influenced largely by Einstein, which "have radically redefined our conceptions of order, space, and time and that converge in contemporary art" (p. 154). A commission at MIT to produce "a visual representation of the space-time continuum", led Ritchie to ponder "the labyrinth of unresolved questions and eerie theories that spin out from Einstein's legacy", including "[e]ntanglement and quantum teleportation, dark matter and negative pressure" (p. 157). Ritchie concludes with the tantalising idea that "if everything is information, then information can be understood as having a direct physical effect on the universe... so perhaps

emblems that represent pure information, like paintings, are more powerful than we could ever imagine" (p. 159).

Following up on a footnote to "Einstein and Music", Leon Botstein's extremely interesting essay (p. 331), I learned that Lise Meitner once attended a musical evening at Max Planck's Berlin home, which featured a performance of Beethoven's Piano Trio in B-flat major ('The Archduke'), with Einstein on the violin, Planck on the piano, and a professional cellist. Meitner later recalled the joy radiating from the faces of both amateurs, and the pleasure the audience took in the performance "despite a couple of unimportant slips from Einstein". Two points Botstein makes are especially provocative: "in contradistinction to a work by Mozart, the breakthroughs represented by Einstein's work might ultimately have been realized by others, though perhaps later and in a less elegant and remarkable fashion" (p. 165) and "Einstein's musical preferences were akin to his resistance to the idea that the statistical nature of quantum mechanics as outlined by Bohr and Heisenberg might be the last word" (p. 168).

As a biographer and educator, out of the eight essays that comprise the third and final section of the book, two in particular excited me. Where the generally ignored aspects of Einstein's life on which Schweber's book focuses seem essentially unimportant, the story "not usually heard in the canon of Einsteiniana" (p. 185), with which Peter Galison's "The Assassin of Relativity" deals, expands our understanding of Einstein and his world. Before reading Galison's study of the friendship between Einstein and Friedrich Adler, I had no idea that among Einstein's schoolmates at the ETH was the assassin of the prime minister of Austria; nor would I have guessed that Einstein willingly "set aside some of the most productive work of his life, on a generally relativistic cosmology" (p. 188) to write to the emperor to appeal for a pardon for his friend. Adler, who outlived Einstein by nearly five years, rejected Einstein's "claims to a truly relativistic concept of time" (p. xv) but shared with him a commitment to political activism.

Like Dudley Herschbach, I believe that it can be heartening for students beginning their scientific training today to know "that it was rough even for Einstein, despite his immense talent and passion for science" (p. 217). Among the cautionary remarks Herschbach's "Einstein as a Student" addresses to twenty-first-century educators is that "[t]oday, a child with such unusual speech and

antisocial behavior might have to contend with therapists and be put on drugs in order to attend preschool or kindergarten” (p. 219), “if a new Einstein were to appear as a graduate student and try to publish in a major journal anything as audacious as most of his early papers, the student would surely be squelched by a withering gauntlet of reviewers” (p. 234), and someone like Einstein today would in all likelihood “not try for a Ph.D., unless perhaps in mathematics” (p. 237). While I share Herschbach’s concerns, it is true that Einstein’s name is co-opted by all sorts of ‘reformers’ as a foil for their own agendas. Herschbach concludes his essay with some suggestions for reforms in graduate school education. I, in turn, conclude this review with a hearty endorsement of the books by Crelinsten and Galison et al. if not of those by Neffe or Schweber.

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