

LEWIS PYENSON: *The Young Einstein. The Advent of Relativity*. Bristol, Boston: Adam Hilger, 1985.

In this collection of nine autonomously organised studies, all but one separately published between 1977 and 1983 in scholarly journals, Pyenson approaches the figure of Einstein, its background and the early reception of the theory of relativity in terms of what he himself calls "social history of ideas". In programmatic contrast to the enumerable studies about the person of Einstein and his scientific work, Pyenson's focus lies on the *context* of the apparent main-figure. It is exactly in a book about Einstein, that Pyenson dares to ask: "To understand the development of scientific ideas, is it sufficient to focus on the key thinkers who conceived them? To describe the reception of scientific ideas, is it enough to study small circles of scientific power brokers who transmitted them to selected men of learning?" (p. 158). The themes selected by Pyenson should all contribute to this "thick description" (in Geertz/Elkana's terms) of what Pyenson calls "late Wilhelmian Germany".

A first perspective is given by his study of the conditions for business dealing with the fast evolving electrotechnology in the late 19<sup>th</sup> century. This subject, apparently belonging to the history of economics, relates to Einstein via his father and uncle operating one of the very few Munich factories producing dynamos and appurtenances between 1880 and 1894. A remainder of the technological ambitions of his relatives, who took out six patents during their Munich years, Pyenson argues, must have been the establishing of an "environment or a frame of mind" (p. 41) for Einstein's intellectual development.

A second topic concerns educational concepts, especially the so called 'Schulkrieg' between the neohumanist proponents of classical values and languages and supporters of instruction of modern languages and natural sciences with the corresponding split between 'Gymnasien' and 'Realanstalten' (see p. 1, and 159 ff.), both relevant for Einstein in so far as he received his secondary school education first at Luitpold Gymnasium, Munich, then at the reformist cantonal school at Aarau (see p. 3 f. and 9 f.). Another case study in that field is Pyenson's survey of the development in the climate of mathematical education (p. 159 f.), for him a spot light on the mechanism, by which "pressures from below" (here the often catastrophic situation of school teachers in mathematics, trained to do research but not to educate) "have interacted with the interests, prejudices and unconscious actions of men at the top" (here Felix Klein's educational manoeuvres towards a new unification of thought in pure and applied mathematics; see p. 173 and 178 ff.).

Thirdly, Pyenson pursues the consequences of the "Göttingen offensive" for the changing attitude of Göttingen mathematical professors towards physics, nicely summarised in Hilbert's statement that physics is too important to be left to the physicists. The first instance for this superelevated self-confidence of Göttingen mathematicians is given in Pyenson's study of a seminar about the electron-theory given in Göttingen in 1905 by the four seminar's leaders Emil Wiechert, David Hilbert, Gustav Herglotz and Hermann Minkowski, whose syllabus and programme Pyenson reviews extensively. Why did this Göttingen colloquium of mathematicians not arrive at something similar to Einstein's theory of relativity? Pyenson hints on the complete ignorance or blindness concerning physical constraints, questions of meaningfulness or conditions of measurability in Göttingen, which stood at the very core of Einstein's reasoning at the same time (see p. 129 f.).

This clash of incompatible norms (elegant, completely general, axiomatic, quasi-geometric versus simple, plausible, arguing from physical premisses, preferably in ordinary language) becomes even more obvious in the later reception of Einstein's theory of relativity by the above mentioned mathematicians. While some participants (*i.e.* Wiechert) stuck to their premisses and tried to argue against Einstein in terms of the ether, others tried to reformulate Einstein's theory in terms of 'pure' mathematics, as *e.g.* Minkowski (p. 81 f.) and Hilbert (p. 95, p. 184). It is the culmination in Pyenson's collection when he argues that it was just his 'philosophical' (metatheoretical) premise about the pre-established harmony between mathematics and nature that drove the Göttingen mathematicians and their enthusiastic followers into a misunderstanding of the spirit of relativity. The concept of ether, Einstein was happy to have been able to prove of being superfluous in his theory of relativity, reappeared in the theory of absoluta of Minkowski, who believed to have improved the physical studies of some lazy student with limited mathematical abilities (see esp. p. 81).

The collection closes with two studies also related to aspects of the reception of Einstein's thought – one of the best documented parts of the whole book is Pyenson's report on Max Planck's activities as one of the editors of *Die Annalen der Physik* in the years 1906-1918, which Pyenson himself summarizes with a paradox similar to L.P. William's *bon mot* "the most reluctant revolutionary of all time" (compare p. 195). His last study is about Einstein's early scientific collaborators: Jakob Laub, Walther Ritz and Erwin Freundlich.

There are grave problems inherent in Pyenson's programme: What about the relative (un)importance of the various trends which are discussed (omitted) in his studies? Biographical evidence for the decisiveness of these influences is often lacking or not stressed enough in Pyenson's treatment. What could be the rank of such documents (if available) in Pyenson's *social* history of ideas which defocuses from the individual's mere personal? And, to ask the other way round, what is the justification for the presence of exactly such anecdotes on Einstein's idiosyncrasies (see, *e.g.*, p. 79, and annotation 45)?

A general observation is that Pyenson has failed to integrate references to new and pertinent secondary literature: in context of the "independence" of Einstein's thought and his self-definition as 'Einspänner' it would have been important to mention Pais' similar observations<sup>1</sup> on 'apartness'; in the sections dealing with electromagnetic theory and electron theory before Einstein, A.I. Miller's lucid exposition<sup>2</sup> is a useful supplement to Pyenson's informal treatment. Concerning the reception of Einstein's special theory of relativity, Pyenson narrows

<sup>1</sup> See, *f.i.*, A. Pais, "Einstein and Quantum Theory", *Rev.Mod.Phys.*, 51 (1979), 863-914.

<sup>2</sup> A.I. Miller: *A. Einstein's Special Theory of Relativity, Emergence (1905) and Early Interpretation (1905-1911)*. Reading, Mass., 1981.

the perspective too much by only discussing the Göttingen mathematicians and Planck as *Annalen*-editor, which are both only a small group competing with the reactions of many other philosophical schools and outsiders. There are some serious blunders in Pyenson's collection: he has not been able to identify several of the participants of the Göttingen electron seminar, one of which clearly is Gustav Jaumann (1863-1924) who has worked on problems of electromagnetism in moving bodies around 1905 within an alternative model<sup>3</sup>. Pyenson is completely mistaken in supposing that Heinrich Hertz' famous concept of representation at the beginning of his *Mechanics* grounds on a notion of pre-established harmony (compare p. 141).

In conclusion, Pyenson's book does not keep what its title promises. One often feels bombarded with lots of material in weakest connection to Einstein; important stages in his development as e.g. his philosophical studies just before the emergence of the special theory of relativity are either omitted (in the case of Hume) or superficially touched upon (Einstein's imputed admiration of Mach's iconoclasm, see p. 75, 237), while other points (e.g. the 'Göttingen offensive') are disproportionately blown up (see p. 83 f., 95, 109, 129 f.). Nevertheless, there is a lot of useful material about sociohistorical trends around the turn of the century in Germany, ranging from employment situation (p. 37, 70), birthplace and professions of Jews residing in Munich (p. 68), salaries of professors (p. 55), 'class-structure' of Dr. phil-recipients in all sciences (p. 163), educational trends (p. 1 f., 165-177), to short biographies of Einstein's teachers. The practical usefulness of this collection for such diverse purposes is restricted by the incompleteness of the index, not including important subjects (as e.g. 'ether', 'force', 'Jews', etc.) and names only mentioned in the annotations.

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<sup>3</sup> See, f.i., G. Jaumann, "Elektromagnetische Vorgänge in bewegten Medien", *Sitzungsberichte der k.k. Akademie der Wissenschaften*. Wien, Abt. IIa, Vol. 114, pp. 1635-1684 and Vol. 115, pp. 337-390 (1905/1906).