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In Memoriam: John Stachel, 1928 -2025 Physicist, Philosopher, Historian, Marxist[1]

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ABSTRACT: This memorial for physicist, philosopher, historian, and Marxist scholar, John Stachel (1928 -2025) provides biographical detail on his life besides assessing his intellectual contributions and overall legacy.

KEYWORDS: History of science, Marxism, memorial, philosophy of science, John Stachel, theory of relativity.

1. Abridged version of this article will also appear in *Capitalism Nature Socialism*.

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Introduction

John Stachel (March 29, 1928–May 9, 2025) passed away earlier this year in Berkeley, California, shortly after celebrating his ninety-seventh birthday. His passing marked the final end of an era during which a group of Marxist scholars helped set the agenda for philosophy and history of science which was emerging as a distinctive subdiscipline within Anglophone philosophy in the 1950s. In the United States, this group first worked together at Boston University's Center for the Philosophy of Science and then influenced philosophy more broadly because of the presence of multiple prominent universities in the greater Boston area. The Boston University Center was founded in 1962 by two Marxists, the physicist Bob Cohen (1923–2017) who soon transitioned to philosophy, and the philosopher Marx Wartofsky (1928–1997). Stachel joined Boston University's Department of Physics in 1964 and became a prominent member of the Center. In later life he appreciated the courage and far-sightedness Boston University had shown in hiring three faculty members who had each drawn the attention of the FBI during the McCarthy era. (These developments predate the appointment of the notorious reactionary, "Long" John Silber, as University President in 1971.)

The Center's annual Boston Colloquium for the Philosophy of Science was internationally the best-known lecture series in the discipline and, over the decades, spawned more than several hundred volumes of the *Boston Studies in the Philosophy of Science* series. Cohen, Wartofsky, and Stachel were soon joined by other prominent scholars, most notably Abner Shimony (1928–2015) in 1968 as Stachel's colleague in the Physics Department, but also a member of the Philosophy Department and, arguably, the most important philosopher of physics of his generation. The Boston Center for the Philosophy of Science tried to keep alive the legacy of the Vienna Circle, especially that of the Austro-Marxist thinker, Otto Neurath (1882–1945), perhaps its most brilliant member (Sarkar 2025). In accomplishing this the Center's mission was aided by Philipp Frank (1884–1966), a former Vienna Circle member who taught at Harvard University during the 1950s and 1960s.

A physicist by training, Stachel was the founding editor of *The Collected Papers of Albert Einstein* and, as such, has left an indelible mark on the history of science. As a prominent physicist, working mostly in relativity theory but also in quantum mechanics, he also made signal contributions to both physics and the philosophy of science. He was known for bringing a unique Marxist perspective to all this work, what

he called a "critical" methodology that embraced the social context of science. Stachel's Marxist analyses were based on a deep reading of Marx's own writings and their critical assessment on the basis of a century of continued capitalist development beyond Marx's working life. Stachel often contrasted Marx with those who followed and interpreted him, including Engels. Part of the goal of this essay in memory of Stachel is to draw attention to features of his Marxism that merit continued attention.

Biographical Sketch

John Jay Stachel was born in 1928 in New York City, then still under the thrall of the Roaring Twenties but heading, unknowingly, into the Great Depression. His family was Jewish, with origins in Eastern Europe. As with many other Jews in New York from that period, the family's politics belonged to the Left. John's father, Jack Stachel (1900–1965) had become a member of the Central Committee of the Communist Party (USA) in 1927 and became a member of the Politburo (Central Executive Committee) in 1928.[2]

His mother, Bertha (*neé* Zunser), was also a Communist Party member. John Stachel's early childhood was dominate by the Depression and what it meant for working class families struggling to make ends meet, often facing eviction and hunger—as he later recalled, there was no better introduction to the social problems produced by Western capitalism: "Anyone who had seen the Hoovervilles near his home, the beggars living in the streets, the frequent evictions signaled by furniture in the streets (and often the fight back, as neighbors moved the furniture right back in) did not need much convincing to agree that the American system of capitalism had broken down." [3]

Given this background, it is perhaps a little surprising that John Stachel only began to read Marx in his late teens, in the 1940s, after buying a copy of *Capital* (Volume 1) with the earnings from his first paid

2. The son was named after two prominent Party leaders, John Pepper (1886 -1938) and Jay Lovestone (1897 -1990). Personal information about the Stachels is from an as yet unpublished autobiographical note by John Stachel, "Looking backward," intended for inclusion in a projected collection of his papers. When there is no other indication of the provenance of facts or quotes, they are from that source. Supplementary materials, duly noted when used, are from the detailed 1963 FBI report, "Who's Who of National Leaders, Communist Party USA, Central Research Matter" (Smith 1963). When there is a discrepancy between this FBI report and John Stachel's autobiographical note (about a few dates, but never for more than a year), I have relied on the latter.

3. Hoovervilles were shanty towns and slums built during the Great Depression by the homeless in the United States. They were named after Herbert Hoover, who was President of the United States during the onset of the Depression.

job (as a mathematics tutor while still in high school). During his early life he was strongly influenced by the Spanish Civil War and the work of the Lincoln Brigade in the fight against fascism. Stachel started attending City College in New York in 1944 where he was active in the Young Progressives of America. He participated in the student protests and strikes of 1948 and 1949. He also formally joined the Communist Party. In 1949 his father, Jack Stachel, was one of eleven Communist Party members convicted under the Smith Act of 1940 which criminalized advocating the overthrow of the United States government by force or violence. According to the U.S. government, mere membership in the Party was sufficient for prosecution under this Act because the Party was supposedly committed to the overthrow of the government by force. Jack Stachel was also accused of entering the United States illegally which he denied. He would spend three years and eight months in federal prison in Danbury, Connecticut.

After Jack Stachel began serving his sentence in 1951, his son dropped out of college, partly to help support his family. He first worked in a factory, and then for the *Daily Worker*, the unofficial (for legal reasons) organ of the Communist Party (USA). He eventually began to write a much-reproduced science column for the newspaper; his inspirations included the popular writings of the renowned biologist, J. B. S. Haldane, who had also been a member of the Communist Party (of Great Britain) and had for years written a science column for the *Daily Worker* from London. Stachel was also involved in the Labor Youth League, founded in 1949 and intended as a successor to the dissolved Communist Youth League. He taught his first course on Marxism for the leadership cadre of this group. From 1954 to 1956, he also taught a course on nineteenth-century American literature at the Jefferson School of Social Science, an adult education initiative of the Communist party that was popular for many years.

Stachel married Party member, Evelyn Wasserman, in 1953 and returned to City College in 1954 to attend night school and get a degree in physics in early 1956. Marriage and the prospect of a family led him to focus on a future career with sufficient and stable income.

(The Stachels remained happily married until Evelyn Stachel's death in 2011; they had three children.) It is testimony to Stachel's remarkable academic abilities that, after graduation, he was able immediately to begin graduate research in physics at the Stevens Institute of

Technology in Hoboken, New Jersey. This intellectual trajectory was rather unique for a Communist night school graduate during the McCarthy era.

However, Stachel quietly left the Communist Party after the Krushchev Report of February 1956 documented Stalin's crimes, which was soon followed by the Polish October and Soviet invasion of Hungary in November (He was later embarrassed of having written a glowing obituary of Stalin before the exposure of his crimes). While Stachel visited Poland and the Soviet Union in 1962, he never returned to the fold.

It is a testimony to his intellectual abilities that he soon became an instructor in physics in 1959 at Lehigh University in Bethlehem, Pennsylvania, where he began a fruitful collaboration with Peter Havas. He next became an instructor at the University of Pittsburgh in 1961 from where he moved to the permanent position he held at Boston University until his retirement in 1996. From the beginning of his career as a physicist, to the end, Stachel's major scientific focus was on space-time physics which led to a deep familiarity and appreciation of Einstein's work in relativity. During his long tenure at Boston University he founded the Center for Einstein Studies in 1985.

History of Science

Stachel's interest in the history of physics dates back to his early years and initial interest in physics itself. As will be discussed in the next section, he viewed science (as both a set of doctrines and practices, and as an institution) as being intimately intertwined with the rise of capitalism (Stachel 1994b). Few scholars were as familiar as Stachel with the history of physics during the last three hundred years. He was the foremost historian of general relativity of his generation. It is widely acknowledged that his contribution to Einstein scholarship remains unsurpassed even today (Janssen 2025).

From 1976 to 1989 Stachel directed the Einstein Papers Project at Princeton University Press during which period he became the founding editor of the *Collected Works of Albert Einstein*. It was a time not only of remarkable achievement but many difficulties.[4]

When Einstein died in 1955 he left the control of his papers to two Trustees, his secretary Helen Dukas and his close associate, the economist Otto Nathan, with the latter being named the Executor. Herbert Smith Bailey, the Director of Princeton University Press was interested

4. Further detail can be found in Stachel (1987b) and Bailey (1989). I have also relied on my own conversations with John Stachel.

in publishing Einstein's papers (including unpublished manuscripts and correspondence) and, eventually, the Trustees agreed to go ahead.

After a protracted search a committee that included the best-known historians of physics of that period selected Stachel as the chief Editor because he was the sole candidate with the requisite linguistic skills (fluency in German), scientific expertise (in physics), and familiarity with contemporary history and philosophy of science (Bailey 1989). The project began at Princeton but soon moved to Boston University. Right at the outset Stachel made two crucial decisions. The first was that Einstein's scientific and other (more personal) materials would be published in tandem. Second, he decided to present Einstein as the papers documented him rather than in a sanitized version that, for instance, avoided mention of his many romantic liaisons. (It is an interesting question how these choices was fit into his generally Marxist perspective on Einstein's science—see Stachel (2005b) for more on the latter).

The Trustees would have preferred the sanitized version that preserved Einstein as a saintly figure devoid of human frailties. There was protracted litigation between the Press and the Trustees who tried to get Stachel dismissed; Bailey (1979) interpreted the Trustees as trying to derail the project. Eventually the courts decided in favor of the Press but the conflict did not leave Stachel unscathed. Meanwhile he had assembled a gifted team of scholars and the two first volumes of the *Collected Papers* were meticulously annotated for publication (Stachel 1987a; 1989)—these annotations have themselves become seminal secondary sources for the history of twentieth-century physics.

Almost half of Volume 1 consisted of previously unpublished documents. These included the newly discovered "love letters" between Einstein and his first wife, Mileva Marić (Janssen 2025). It exemplified Stachel's decision to present Einstein's scientific work and more personal documents simultaneously in proper temporal sequence. The second volume included the papers from 1905, Einstein's "miraculous year" (Stachel 2005a), that included his path-breaking papers on the quantum theory of the photoelectric effect (that won him the 1921 Nobel Prize), the special theory of relativity, and Brownian motion that finally allowed the existence of atoms and molecules to be tested in the laboratory.

Because of the care taken in the annotation, progress was slow and some in the Press were not satisfied with the pace at which publication was proceeding. Some members of Stachel's team also undermined his authority and, in 1988, he resigned to return full time to research and

teaching at Boston University. Publication of the *Collected Papers* continued at the Press with new distinguished editors. The volumes that came after Stachel's departure were very well edited but, at least to me, they only occasionally had the depth of the first two volumes. Arguably, the history of physics and, especially, Einstein scholarship would perhaps have been better served under Stachel's continued editorship.

Evidence in favor of the last judgment comes from Stachel's groundbreaking contributions to the history of general relativity (which is the outcome of Einstein's attempt after 1905 to generalize the special theory to include motion under gravitation). Technical issues related to this work are beyond the scope of this piece but two of Stachel's contributions deserve special mention.

The first was his clarification (beginning in 1980) of what lay behind Einstein's apparent mistake in temporarily rejecting general covariance (the physical equivalence of all reference frames, accelerated or not) between 1913 and 1915 as he sought to integrate gravitation with the special theory of relativity (Stachel 2014). Stachel pointed out that Einstein's mistaken turn occurred because he assumed (as is true of classical physics and the special theory of relativity) that space-time points can be individuated independent of the system's dynamics. Once that assumption was abandoned (and in rejecting it, he was helped by Moritz Schlick, the physicist-turned-philosopher who late became the center of the Vienna Circle (Sarkar 2025), general relativity could be formulated in its canonical covariant form. Einstein's mistaken "hole argument" continues to be of interest in the philosophy of physics today because its analysis leads to a new interpretation of space-time structure called dynamic structural realism that is an alternative to both traditional absolutist and relational interpretations of space that go back to a dispute between Newton and Leibniz (Stachel 2014; Janssen 2025). Meanwhile Stachel's remarks from the early 1980s led Norton (1984) to provide the first compelling historical reconstruction of Einstein's struggles with the formulation of general relativity.

Second, by the 1980s, it had become clear that a notebook from Einstein's time in Zurich (probably from late 1912 or early 1913) was critical to the story of his formulation of general relativity (Norton 1984). That notebook became a focus of a research group at the newly-minted Max-Planck-Institut für Wissenschaftsgeschichte (Max Planck Institute for the History of Science) in Berlin in the *Abteilung* directed by Jűrgen Renn, who had been on Stachel's team in the Einstein Papers and, later, briefly a colleague at Boston University. One crucial page of

Einstein's Zurich journal remained undeciphered until, as legend has it, Stachel finally solved the problem during one "sleepless night" in Berlin, showing exactly how Einstein came upon the final form of the equations of general relativity.

Philosophy and Science

Stachel brought a unique Marxist perspective to the philosophy of science (and to philosophy more generally). Even as a young Communist Party member in the early 1950s, he was already skeptical of the doctrinaire *diamat* (*dia*lectical *mat*erialism) of Soviet-style communism. In the first course he taught on Marxism, the syllabus did not include Stalin's (1940) "Dialectical and Historical Materialism;" instead it included the "Letter from Marx to Editor of the *Otecestvenniye Zapisky*" in which Marx (1877) denies the inevitability of any fixed sequence of stages of historical change and emphasizes the role of contingent context in the course of human history. While later admitting the influence of several earlier theorists, especially Gramsci and Althusser starting in the 1960s, Stachel always denied any deterministic interpretation Marx's theory of history, whether it be social history or the history of science. Stachel (1994b) criticized Engels, among others, for introducing the "myth" that Marx posited a determinate sequence of historical stages leading to capitalism. In spite of a long friendship with Etienne Balibar, one of Althusser's closest early collaborators, Stachel remained skeptical of Althusser's concept of a process without a subject. (A planned meeting with Althusser in the 1970s failed to materialize because of one of the latter's periodic mental breakdowns.)

Three features of Stachel's philosophical views deserve continued attention and elaboration:

First, in what he called "Marx's critical conception of science" (Stachel 1994b), Stachel emphasized the interconnectedness of science and capitalism. Stressing the continuity between technology and science (a well-known view within Marxism that goes back to Hessen [1931]), following Marx, Stachel argued capitalist expansion relied on scientific progress, as indicated by Marx's analysis (in the first volume of *Capital*) of the transition from manufacture to the factory mode of production. Science was thus central to how Marx critiqued capitalism; indeed, any critique of the latter was also a critique of the former, both as an intellectual appropriation of the non-social world and as a social institution (Stachel 1994b, 5).

In enabling the expansion of capitalism, science both expands human needs and human powers in order to try to satisfy those needs (Stachel

1994b). But herein lies the possibility of subversion: the content and results of science did not follow determinately from its economic base. Science had the ability to generate needs that could not be satisfied within the capitalist model of development thus creating a context for radical political change. Stachel concluded that in science there remain an "essential liberatory potential . . .well hidden within the present forms of science and labor, a potential waiting to be made real if and when workers—individually and as a class—reclaim their alienated powers. May an understanding of the real basis tor Marx's vision spur us on to become the men and women who help to bring about its realization!" (1994b, 86).

Second, Stachel emphasized what should be obvious but is often forgotten in the philosophy of physics, that physics is about the physical world, that is to say, the material world of physics. Mathematics, from this perspective is a tool to be used; it would be a mistake to say that the laws of physics are written in the language of mathematics and, thus, mathematics captures the most fundamental structures to the world. As he put it in 1994:

> "We invent physical theories to enable us to better comprehend and cope with the world, or rather with limited portions of the world. We employ mathematics as a vital tool in such attempts. Mathematical structures help us to correctly encode numerous, often extremely complicated, relations among physical concepts . . . If these structures have been judiciously chosen, they do more than encode the relations that led to their introduction: formal manipulation of the structures leads to the discovery of new relations that can then be tested successfully." (Stachel 1994a, 148)

From this perspective it is possible that different theories will be applicable at different spatial scales. It did not bother Stachel that the mathematical formalism of quantum mechanics, designed to represent the behavior of particles at the atomic and smaller scales, falls apart when confronted with the behavior of macroscopic objects of the everyday world. Behind this view is a deep rejection of any global reductionism, epistemological or ontological, which is hardly surprising from a Marxist perspective.

Third, this position leads Stachel to warn physicists and philosophers to avoid a pernicious "fetishism of mathematics" that had become common in the philosophy of physics. The passage just quoted continues:

> "However, there are almost always redundant elements in the mathematical structure that have no obvious correspondents in the physical theory—and

> perhaps indeed no relevance at all to the physical content of the theory. What is more, all-too-often there comes a point at which the mathematical structure leads to predictions that fail the test of experiment . . . Then we may say that the mathematical structure and/or the physical theory, has reached its limits of validity. But before such a limit is reached, there is often a tendency to forget that the mathematical structure was introduced originally as a tool to help us encode known and discover new relations among physical concepts . . . Instead, the mathematical structure is considered to be (or to represent) a more fundamental level of reality, the properties of which entail the concepts and relations of the physical theory—and indeed those of the phenomenal world. Drawing on the language of Marx, who speaks of 'the fetishism of commodities,' I designate as 'the fetishism of mathematics' this tendency to endow the mathematical constructs of the human brain with an independent life and power of their own." (Stachel 1994a, 148)

Stachel regarded drawing attention to the fetishism of mathematics as one of his most important contributions to the philosophy of science. Skepticism about mathematical fetishism marked his systematic and encyclopedic critical analysis of extreme forms of quantum logic (Stachel 1996).

I will illustrate the importance of Stachel's diagnosis of fetishism with the example of a philosophical argument on which we collaborated while I was still his colleague at Boston University (Sarkar and Stachel 1999). In 1905, when he published the special theory of relativity, Einstein considered the question of when two events seen by spatially separated observers, A and B, should be described as being simultaneous (that is, happening at the same time). Suppose B is moving with a constant velocity with respect to A. (Of course, this means that, from B's perspective, A is moving with constant velocity.) Einstein pointed out that two events that appear to be simultaneous to A would not appear as such to B. This is known as the *relativity* of simultaneity (and is not controversial).

Next, Einstein returned to the situation when A and B are spatially separated. Suppose some event e occurs in A's experience. He asked what event at B should be regarded by A as happening at the same time as e. He pointed out (as had Poincaré before him) that an element of stipulation entered into such a decision; in this sense distant simultaneity can only be established in part by *convention*. Einstein and Poincaré both showed that a particularly simple convention for many circumstances (the "Einstein-Poincaré convention" or "standard simultaneity") would be the following: A bounces back a light signal off B and takes as simultaneous to the bounce at B the midpoint of the elapsed

time (between sending and receiving back the signal) for *A*. Einstein observed that several other choices were possible; in philosophical language there is no fact of the matter about simultaneity.

Nevertheless, philosophers such as Malament (1977) argued that the Einstein-Poincaré convention is unique and privileged provided some additional assumptions were imposed; in that sense, simultaneity is supposed not to be conventional. Two of Malament's assumptions were that there is no direction of time and that simultaneity must be a "first-order definable" relation, that is to say, "being simultaneous" must have a particular logical form. (The details do not matter for the point being made here.) Stachel (and I) showed that, without these additional requirements, Einstein's old observation of the multiplicity of choices for a simultaneity stipulation remained valid (Sarkar and Stachel 1999).

According to Stachel (and me) our physical world has a direction of time. Malament was apparently concerned with a possible world posited by the special theory of relativity alone with no direction of time; in contrast, we were concerned with the intended domain of that theory, that is, what happened in our physical world at high velocities but with a very weak gravitational field. As for first-order definability, no working physicist every encounters it—it is a textbook example of the fetishism of mathematics (for an extreme example, see Stein 2009). What we have here are two incompatible visions of what science is, and what philosophy of science should be. Returning to the disputed example, what mattered most to Stachel is that non-standard simultaneity is useful to coordinate experiments in practice, for instance, recently in a set of experiments with gravitational wave detectors (Reinhardt et al. 2025).

Our colleague at Boston University, Abner Shimony, also practiced philosophy while remaining entrenched in the empirical world, calling his program of research "experimental metaphysics." For all of us, philosophy was to be practiced in continuity with science. Together, we offered what was then a unique perspective on the philosophy of physics. Shimony, in particular, was instrumental in getting researchers in the foundations of physics to focus on quantum entanglement that eventually led to Alain Aspect, John Clauser, and Anton Zeilinger sharing the 2022 Nobel Prize for Physics. Had Shimony still been living, he might well have been a leading candidate for that award.

When Stachel and I jointly taught a graduate course on the foundations of space-time physics in 1993, our audience consisted entirely of Boston University physics graduate students except for Simon Saunders, a philosophy faculty member and Sherri Roush, graduate student

from Harvard University. Class discussions seamlessly straddled the boundary between science and philosophy, a method of teaching that I have continued to try to emulate to this day.

Final Remarks

Recording Stachel's political and intellectual achievements does not do full justice to the person whom have lost. Besides a redoubtable integrity, he had a warmth and empathy towards that have become rare today. He had many interests beyond academic research and the political arena. He had a deep knowledge of theater (especially that of Brecht) and of cinema (especially the French New Wave). In his autobiographical note he records how important the cinema had been to him throughout his adult life. One of the places where this love shows itself is in his seminal analysis of quantum logic mentioned earlier (Stachel 1986). I recall many memorable nights at the opera in Berlin, episodically, over decades.

As Janssen (2025) has duly noted with many examples, Stachel had a remarkable, indeed wicked, sense of humor. I will end with one of my favorite Stachelisms: of a prominent historian of science, whose work did not meet his exacting standards: "He is very famous . . . for being well-known."

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Biography

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