History and philosophy of science takes form

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A B S T R A C T

During the past hundred years the strength of the amalgam of history and philosophy of science (HPS) has waxed and waned, while assuming multiple forms and acquiring different imprints. In the 1940s and 1950s, philosopher Gerd Buchdahl and colleagues in Melbourne, Australia, assembled a methodologically powerful version of HPS, drawing on their readings, with general historians, of the philosophical works of R.G. Collingwood and Ludwig Wittgenstein, among others. Buchdahl later tried to export this pioneering conceptualization to Cambridge University, where he came to lead a new department of HPS. To appreciate the qualities and dimensions of the innovative mode of inquiry, it is necessary to understand the ecology of knowledge that promoted its emergence in an out-of-the-way settler colonial society, a productively marginal site where unanticipated filiations and alliances might be licensed to unsettled émigré scholars such as Buchdahl. Accordingly, this essay brushes off a forgotten genealogy of the relations of history and philosophy and science, thereby revealing a neglected past cognitive identity of HPS and suggesting a means to re-imagine its future.

A few years after retiring as reader in history and philosophy of science (HPS) at Cambridge University, Gerd Buchdahl was musing on the strange amalgamation of historical and philosophical studies of science, a disciplinary coupling that he had assisted in bringing together some forty years earlier. "Methodological notions," he wrote, "cannot be appreciated without reference to the historical contexts of science itself, that is to say, to the contexts in which they developed" (Buchdahl, 1987, p. 39). In other words, "the philosophy of science involves essentially a reference to its own history, whilst the significance of that history can be appreciated only when viewed through later spectacles" (p. 41). Moreover, "no history can get off the ground without some, however dimly perceived, presuppositional set of criteria" (p. 45). Therefore, "philosophical reflections on the methodological aspects of science can help us to find our way around the historical panorama" (p. 55). It was this necessary disciplinary dialectic that had led him, with Larry Laudan, to establish in 1968 *Studies in History and Philosophy of Science*, in which authors were "explicitly encouraged to discuss philosophical issues by reference to their historical context, and historical issues in terms of the philosophical framework in which they had occurred" (p. 40). By the 1980s, such interactive critical combinations may have come to seem obvious, even commonplace. But when Buchdahl introduced a course in history and philosophy of science to the University of Melbourne in 1947, previous

"histories of science were largely chronological summaries; and such philosophies as existed were mostly logical compendia" (p. 46). Rarely had the twain met until that moment.

As many have come to question again the peculiar association of "history and philosophy of science"—perhaps especially the conjunction "and" and the preposition "of"—it seems timely to consider what once made the novel intellectual formation so plausible, even compelling.[1] In seeking a workable model for integrating history and philosophy of science, we might profitably attend to earlier efforts to justify their methodological relations. Such an exercise requires us, somewhat surprisingly, to look carefully at the ecology of knowledge in Melbourne in the 1940s, which allowed Buchdahl, a budding philosopher, to find his niche, and the scholarly environment at Cambridge from the late 1950s, which shaped his further development (Mayer, 2000; 2004). As Arnold Thackray and Robert K. Merton (1972, p. 473) observed, it can be "easier to sense than to articulate those characteristic changes in cognitive structure and social function which any field of learning undergoes as its legitimacy is established." Before World War II, history and method of science were occasionally loosely conjugated, but the mode of inquiry remained vague and diffuse—it was left to Buchdahl and a few others after the war to try to assemble a conceptually discrete discipline, to create the "cognitive identity" of HPS. Such discipline building,

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according to Thackray and Merton, "is a matter of personal, sometimes heroic, endeavor by some one or few persons seized with the possibilities of an as-yet-unrecognized, unorganized area of knowledge" (p. 474). They emphasised the "role of the émigré or outsider in catalyzing intellectual and social development" (p. 475). How, then, did Buchdahl, a refugee from Nazi Germany, arriving in Melbourne with a sense of alienation, find the resources and the structures to put together a novel and viable assemblage of HPS, an aggregation that may still have relevance to the framing of contemporary inquiries?[2]

To be sure, others around the same time were moving falteringly in a similar direction. At University College, London (UCL), philosopher Abraham Wolf had established the Department of History and Method of Science as early as 1921. Renamed History and Philosophy of Science in 1938, it came increasingly to concentrate on the history of science and medicine, despite the leadership after World War II of astrophysicist Herbert Dingle, ostensibly a philosopher (McKie, 1952; Smeaton, 1997).[3] Meanwhile, at the London School of Economics, philosophers of science segregated themselves in a thriving Department of Philosophy, Logic and Scientific Method, founded by Karl Popper in 1946.[4] Even after the war, the rare humanities scholar interested in science thus continued to hew either to an historical or a philosophical approach. At Harvard, George Sarton had struggled to insert history of science into the general curriculum (Thackray, 1980; Dennis, 1997); while at Wisconsin, Chauncey D. Leake and others sought to introduce students to the historical drama and thrill of science (Hilts, 1984).[5] A few Oxford philosophers, among them Stephen E. Toulmin, turned their attention to scientific knowledge—but historians there tended to disdain the subject, leaving Frank Sherwood Taylor at the Museum of History of Science to initiate a paltry teaching program. As Alastair C. Crombie, appointed to Oxford as its first historian of science in 1953, bitterly recalled, Oxford historians "exemplified in an extreme form the mental and structural obstacles that have prevented the development of an enduring tradition of intellectual history in England" (Crombie, 1984, p. 28).[6] All the same, Oxford economic historian George N. Clark (1932, p. 273) had once conceded that "science has its context in social conditions and in other departments of thought," and thus might be part of his remit.[7] According to A. Rupert Hall (1984), the study of science elicited at Cambridge far more enthusiasm among historians, a few philosophers, and socially minded, politically radical scientists such as crystallographer John D. Bernal (1939) and biochemist Joseph Needham (1934).[8] During the 1940s, along the Cam, Herbert Butterfield

(1949) was transitioning from constitutional history toward Whiggish history of science, and Richard B. Braithwaite (1953) began offering lectures in the philosophy of science.[9] By the end of that decade, then, the ingredients for a distinctive fusion of history and philosophy of science were separately lodged at a few elite institutions in the English-speaking world—stirred slightly perhaps, but scarcely mixed.

What I want to do here is propose another origin story for what became, for a short time, a compelling conceptualization of HPS. In this attempt to recover its antecedents from the dense obscurities of Melbourne in the 1940s and 1950s, I hope to brush off a forgotten genealogy of the relations of history and philosophy and science, thereby suggesting other contours along which HPS futures may be imagined. I want to displace the usual family romance that features North Atlantic luminaries like Alexandre Koyré (1940; 1957) and Sarton (1924), situated in well-insulated European and American salons, arrayed platonically around the idols of scientific revolution and new humanism, talking earnestly about reason and liberalism. Instead, I take this opportunity to draw a critical genealogy, a different intellectual history, tracing the origins of HPS in radical politics, liminal identities, and fervent if sometimes misguided readings of R.G. Collingwood and Ludwig Wittgenstein on the margins, as far from the North Atlantic as one might get. I wish to situate these formative discussions in an out-of-the-way settler colonial institution without the conceptual rigidity and disciplinary ossification so often encountered in the northern hemisphere, a place that operated on a scale and with an informality favouring interdisciplinary connections and strange associations. Debates still could be oriented around North Atlantic luminaries, no doubt, but the supposedly canonical figures were rendered different and more diverse—in such remote and disconcerting circumstances these characters assumed odd shapes and contrived unexpected entanglements or coalitions.

When I came to study HPS at Melbourne in the 1980s, a local cultural cringe meant that the standard family romance had long before prevailed over this richly vernacular story. If Wittgenstein's work were mentioned at all it was in relation to science studies elsewhere, appropriated by the "strong programme" at Edinburgh (Bloor, 1973; Lynch, 1992); and "Collingwood" referred only to the Australian football club. Discussion of historical causation and context was muted; theories were only loosely tethered to their situation. And so, it's taken almost forty years to return to the primal scene, re-imagining and re-capturing a sense of excitement and radical possibility of HPS in a spurned vernacular formation from the immediate post-war period.

1. Theory and method in Melbourne

Growing up in a prosperous Jewish family in Mainz, Germany, after World War I, Gerd Buchdahl drifted into an engineering degree, though he spent any spare time reading René Descartes, Immanuel Kant, and other philosophers. On graduating in 1933, he decided to escape to England with his younger brother Hans, a teenager keen on theoretical physics. In London, Gerd found work as a civil engineer while Hans eventually studied general relativity with Dingle at UCL.[10] But in 1940, the brothers were interned with other refugees from Nazi Germany and deported to Australia on board the *Dunera*. The two thousand or so exiles received an unexpectedly friendly reception when they disembarked at

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[2] In a minor key, this inquiry echoes the historical and cultural contextualization of Ludwig Wittgenstein's thought in Janik and Toulmin (1973).

[3] Wolf previously taught logic and scientific method at the LSE, in addition to his separate historical offerings at UCL: see Wolf (1924). One of the published products of the UCL program was Singer (1921). William Mays (1960) reported that at UCL "the main emphasis [was] on the history of science" (195). Dingle's historicist bent, along with hostility to sociology, is evident in Dingle (1955, p. 348); see also Dingle (1952). By the 1960s, HPS at UCL was in decline: Larry Laudan (1989, p. 9) remembered it during this period as "moribund" in both history and philosophy.

[4] Popper had been a lecturer in philosophy at Canterbury University College, New Zealand, where he wrote the essays that later constituted *The Poverty of Historicism* (Popper, 1957).

[5] The Wisconsin Department of the History of Science was established in 1941; and Harvard's soon after the war, though Sarton had been appointed professor of the history of science in 1940.

[6] Trained in zoology at the University of Melbourne, under Wilfred Agar, a follower of Alfred North Whitehead, and later at Cambridge, Crombie had taught history and philosophy of science at UCL from 1946 before moving to Oxford. See Crombie (1952; 1953).

[7] His pre-war studies (e.g., Clark, 1937) would seem to challenge Crombie's blanket castigation, but it's true that when Clark returned to Oxford in 1947 after a few years in Cambridge, he shed his scientific interests.

[8] Several Cambridge Marxists had been influenced by Boris Hessen (1931). The impact of Robert K. Merton's sociological studies has been extensively described (e.g., Hollinger, 1989).

[9] Additionally, Charles Raven (1942; 1947), at Christ's College, was writing on the English naturalists. Also at Cambridge, the Whipple Museum opened in 1949; A. Rupert Hall was appointed assistant lecturer in history of science in 1950; followed by Norwood Russell Hanson in philosophy of science in 1951 (Bennett, 1997; Hall, 1984; Mayer, 2000).

[10] Dingle was a strong supporter of German refugees in the 1930s. The Buchdahl parents escaped in 1939, first to London, and then to Melbourne. Hans Buchdahl became professor of theoretical physics at the Australian National University, where he did important work in general relativity, thermodynamics, and optics.

Sydney, on their way to an internment camp at Hay in outback New South Wales, and later, in the case of the Buchdahl brothers, onto Tatura in northern Victoria. There, the Buchdahls and others set up an internal "university," contributing to the education of hundreds of similarly "displaced persons"—the "*Dunera* boys" as they were called—who later became intellectual leaders in Australia, North America, and Britain.[11] Within a year or two, Hans was released to teach physics at the University of Tasmania, and Gerd began work as a civil engineer in Melbourne, even as he hastened to enrol in philosophy classes at the university.

In the 1940s, the University of Melbourne was still a place "for the children of the rich," according to Marxist journalist Gott (1961, p. 23). The Debating Society and the Labour Club, split into Fabian and communist factions, were active; and a cadre of students belonging to the Communist Party of Australia met "conspiratorially" (p. 24) a few blocks from campus. The politically ambiguous, though staunchly anti-communist, Catholic poet Vincent Buckley (1983) found most of the teaching in Arts "amateurish and remote," and he condemned the "primitive togetherness" (p. 58) of the dominant coteries of left activists. Buckley deplored the "nostalgic myth" that Melbourne in the 1940s had been "a hot bed of progressive, probing constructive intelligence. It was not so, really …" (p. 59). But the Department of Philosophy fascinated the young student of English literature. Led by a succession of charismatic Wittgensteinians, the philosophers appeared "complexly professional and professionally complex," (p. 63) with "feline suppleness" and an extravagant "ego-quotient" (p. 58). Among philosophy students, the grit and determination of veterans of the *Dunera* particularly impressed Buckley.

Buchdahl was immediately attracted into the orbit of George A. Paul, one of those disciples of Wittgenstein, who had arrived in Melbourne in 1939 with his wife Margaret, an economist whose philosopher brother Frank P. Ramsey inspired Wittgenstein to return to England from Austria in 1929, and whose father had been president of Magdalene College, Cambridge.[12] Historian Manning Clark felt George Paul "WITTGENISED the philosophy department in Melbourne." Dymphna Lodewyckx Clark liked George's "loud, booming voice" and thick Scottish accent; she also became close to Margaret because she was so unlike other Melbourne academics who "spoke in hushed tones and I don't like the hush."[13] "Stooped, prognathous, and rarely without a bundle of leaflets under her arm," Margaret was soon "the grey eminence of the left in this period" (Gott, 1961, p. 24). The year Buchdahl turned up on campus, she founded the Australian Student Labour Federation, a communist front organisation.[14] Meanwhile, Gott (1961) remembered George Paul "expounding with an all-conquering charm the linguistic approach to philosophy which had derived from the work of Wittgenstein," his guru (p. 24). The "exposition was subtle, sophisticated and wildly exciting," and in the opinion of many students, Paul's "effect on university thinking has probably never been paralleled

by any other teacher" (p. 24).[15] As Stephen Toulmin (1993, p. 143) observed, Paul and the former *Dunera* internees made sure that in Melbourne during the 1940s philosophy was "the focus of a vigorous conversation and a great place to be drawn into the traditions of philosophical literature and debate."

Long obsessed with the possible scientific basis of history, R.M. "Max" Crawford and Kathleen Fitzpatrick invited Paul to lead the Department of History's "theory and method" seminar. Crawford painted a portrait of Paul, and Fitzpatrick came to dote on him. As Barbara Donagan (1993, p. 152) recalled, "historians and philosophers—students as well as faculty—talked to each other, went to each other's meetings, and were part of the same community" at Melbourne. It was a small and tightly knit Antipodean form of life. According to Gott (1961), "historians began to have doubts about the concept of causation in history and to wonder whether the use of such words as 'imperialism' and 'democracy' was valid (after all, what did they mean? What role did they play in language?)" (p. 24). The annual seminar on theory and method in history, which Buchdahl briefly took over in 1945, would become the intellectual linchpin for HPS at Melbourne.[16]

When Crawford initiated the theory and method seminar in 1939, a couple of years after his arrival from Sydney, he meant it as a vehicle to explore the scientific status of historical reasoning and writing. Despite training with idealist historian George Arnold Wood, well aware of his teacher's emphasis on sympathy and engagement with historical actors, Crawford found it hard to shake off a lingering scientism and positivism (Crawford, 1975; Macintyre & McPhee 2000).[17] He was much taken with philosopher Carl G. Hempel's study of "the theoretical function of general laws in scientific historical research," and impressed with the potential of "subsuming the phenomena in question under a scientific explanation" (Hempel, 1942, pp. 35, 45)—rather than simply resorting to conventional description, to plodding narrative, which seemed to Crawford the obvious alternative. Hempel's theories rested "on the assumption of universal hypotheses which connect certain characteristics of individual and group life with others" (p. 41), an assumption that proved difficult to

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[11] As a result of the *Dunera*, the transformational impact of German refugees on post-war Australian universities may have been greater than their imprint elsewhere (Inglis, Gammage, Spark, & Winter 2020; Pearl, 1983).

[12] Frank Ramsey was also a friend of the Cambridge philosopher of science Richard Braithwaite (Paul, 2012). Margaret Paul's other brother, Michael Ramsey, became Archbishop of Canterbury.

[13] C.M.H. Clark, Diary, 30 April 1989, series 2, box 32, C.M.H Clark papers MS7550, National Library of Australia; elsewhere Clark expresses resentment that George Paul "treated me as a person with nothing to offer … and my immediate response was rather like that of a spoilt child (inner turmoil and outer self-assertiveness)" (Diary, 18 December 1949, series 2, box 28, Clark papers). Dymphna Clark, interview with Jan Nicholas, 29 November 1995, in the possession of Mark McKenna (see McKenna, 2012).

[14] There is no evidence that Gerd Buchdahl joined the Communist Party of Australia, though his brother Hans certainly fell under suspicion for his associations in Hobart, Tasmania. Pam Buchdahl, Hans's wife, remembers that her sister Nancy, Gerd's wife, was politically radical, but a "fellow traveller" rather than a member of the Party (interview with author, 25 October 2019, Adelaide).

[15] See Paul (1936; 1938; 1956): for a critique of the *Analysis* paper (Paul, 1938), see Bloor (1971). Among Paul's other students were former *Dunera* internees Peter Herbst (later professor of philosophy, ANU) and Kurt Baier (later professor of philosophy, Pittsburgh); as well as Austrian émigré E. Paul (Eisenstein) Edwards (fond of Rosa Luxemburg and Leon Trotsky, founder of the Freethought Society at Melbourne in 1942, later professor of philosophy, Columbia) and Alan Donagan (later professor of philosophy, Chicago). Before coming to Melbourne, Paul had taught A.C. "Camo" Jackson (whom J.J.C. Smart called the "gnomic Wittgensteinian") at Cambridge: Jackson along with another Wittgenstein student Douglas Gasking succeeded Paul at Melbourne. Among their students were Buchdahl (for his M.A.) and Michael Scriven (later professor of philosophy at Indiana, Berkeley, and elsewhere). Gasking's wife, Elizabeth "Betty" Gasking, became a lecturer in HPS at Melbourne in the 1950s and 1960s (Gasking, 1967).

[16] In 1945, the Pauls took up positions at Oxford, George at University College and Margaret at Lady Margaret Hall, where both sank into obscurity. After visiting the Pauls in 1947, Fitzpatrick wrote to Crawford: "George has changed since coming home, and not for the better." He seemed thin and pale, less radical, and too immersed in college business (15 September 1947, folder D, box 16, R.M. Crawford papers 1991.0113, University of Melbourne Archives). A few years later, he wrote to Crawford: "I long for Australia, even more than I thought I would!" (3 February 1949, folder P, box 18, Crawford papers). George died in 1962 in a suspicious boating accident on Coniston Water; while Margaret later wrote a little on development economics. As Smart (1989, p. 36) recalled, "Paul was impressive at Oxford, indeed he was one of my philosophical heroes, but his Melbourne period seems to have been when he was at his peak." John R. Searle (2015, p. 174) also noted that Paul "made an impression" on him at Oxford, though eclipsed by other celebrities in the field.

[17] Manning Clark (1962, p. 21) later claimed that when Crawford arrived in Melbourne, as a student he "knew at once that those days of unleavened bread were over …. We were introduced imaginatively and sympathetically into the minds of the mighty dead."

sustain.[18] Paul expressed his scepticism and insisted the historians read Collingwood's recently published *Autobiography* (1939).[19] Gradually Crawford shifted ground, retreating as delicately as he could. For a few years, he tried to salvage the notion that history might be a science since through "empathic understanding" and the "practical wisdom of accumulated experience," historians were "discerning and describing regularities in human behaviour" (Crawford, 1945, pp. 157, 159).[20] An historical explanation was really a "tentative explanation sketch" (p. 170), which blurred the dividing line between historians and sociologists, all of them committed to "the study of whole situations in all their complexity" (p. 173). Influenced by discussions in the theory and method seminar, Crawford came to believe that "scientific" history just meant "looking critically at our main assumptions or presuppositions" (p. 174). A few years later, he admitted that his argument for history as a science "was tired work, written in those flat years after the war"—it turned out he was "flogging a dead horse" (Crawford, 1962, p. 11).

Under Paul's guidance, the seminar in theory and method was organised around the question: "How are philosophy and history combined with each other?" Eager historians and philosophers, including Buchdahl, wanted to know what it might mean to "explain" an historical event (Dare, 2006; Poynter, 2006). According to historian Paul Bourke (1998, p. 425), the seminar was "for about a decade one of the most lively and focussed scenes of debate about the logic of explanation, narrative, moral judgement and causality in history to be found anywhere in the English-speaking world."[21] As Crawford (1962, p. 10) recalled, "what Paul offered us from Philosophy was not mystery but clarity …. 'What do you do?' was his repeated question, a genuine one, for he wanted to know; and it was a question which made us look at our practice with a closer, if somewhat anxious, scrutiny." In effect, the philosopher was performing what later came to be called "ethnomethodology," in keeping with his teacher Wittgenstein's precepts. By the mid-1940s, the syllabus included Hempel (by then a straw man), Popper (becoming a companion straw man), Collingwood, and philosopher David Hume. Paul kept insisting on the question, "What does being the *cause* of a historical event consist in?" He wanted historians to challenge assumptions of laws and regularities or to show him what a universal rule could possibly look like in history.[22] Like the later Wittgenstein, Paul believed that rules and applications existed only in social or institutional practices, which might be revealed ethnographically, through ordinary language. "The danger here," as Wittgenstein put it in the late 1930s, "is one of giving a justification of our procedure where there is no such thing as a justification and we ought simply to have said: *that's how we do it*" (Wittgenstein, 1956, II: section 74). Or, according to Collingwood (2013), "historical knowledge is the re-enactment in the historian's mind of the thought whose history he is studying" (p. 112). That is, "we study history in order to see more clearly into the situation in which we are called upon to act" (p. 114).[23]

Appreciating the complexity of "practice" and its "situation" seemed crucial for Buchdahl and others in the 1940s.

Not all were impressed. The less intellectually secure historians at Melbourne, such as Manning Clark, shunned the theory and method seminar. "Having withstood the temptation to become sceptics and mockers," Clark (1962, p. 22) recollected from his subsequent Canberra fastness, "they, the students, found themselves confronted with the enormous temptation to seek recognition for their subject from the philosophers. This was … a most terrible mistake." Paul had always made Clark feel inadequate and anxious. "In the battle for recognition they, the students, sometimes succumbed to the darker temptation to talk about what it would be like to write history, supposing one were to write history, rather than to write history" (p. 22). With high camp sarcasm, Clark took to muttering, "so many colonial societies, so many kinds of intellectual history" (p. 17).

2. From the science of history to History and Philosophy of Science

As a child, Collingwood (2013, p. 2) had learnt that even "the natural sciences have a history of their own." Science is like "an organism which in the course of its history undergoes more or less continuous alteration in every part" (p. 2). The philosopher realised that what matters is whatever scientists, or any other historical actors, meant at the time, not whether their beliefs were true. The historian therefore needs to know what questions their subjects were asking to understand the meaning of their answers. In contrast, realists, those looking for correspondence to some "reality" or foundational logic, were "only building card-houses out of a pack of lies" (p. 52). A proper historical sensibility "meant getting inside other people's heads, looking at their situation through their eyes, and thinking for yourself whether the way in which they tackled it was the right way" (p. 58). Rather than invent a science of history, one might try to imagine a history of science—indeed, Collingwood noted that he had been "addicted from childhood to the history of science" (p. 65). He believed that the "question of what presuppositions underlie the 'physics' or natural science of a certain people at a certain time is as purely historical a question as what kind of clothes they wear" (p. 66). Moreover, "the alleged distinction between the historical question and the philosophical must be false, because it presupposes the permanence of philosophical problems" (p. 69). Collingwood regarded his life's work as "an attempt to bring about a *rapprochement* between philosophy and history" (p. 77). It was for him "a question of making good a defect in current theories of 'scientific' method by attending to an element in 'scientific' knowledge about which there seems to be a conspiracy of silence, namely the historical element" (p. 87). A more explicit statement of an agenda for combining the history of science and its philosophy—and not simply displacing one by the other—is difficult to imagine.

Evidently, Buchdahl was reading and teaching Collingwood with both care and alacrity. In 1948, conversations with Melbourne philosophers and historians stimulated him to ask the question, "How can there be historical knowledge?" While Hempel argued that historians might discover general laws or at least "explanation sketches," Collingwood focused on "the constructive account of the historian," the creative yet necessary tracing of internal relations and connections, which might "loosen the facts from a solid background" (Buchdahl, 1948, pp. 94, 96). According to Buchdahl (1948, p. 108), both "want explanations which more or less necessarily connect the alleged historical facts. But whereas Hempel looks for a universal, for a law, for some sort of regularity, which is to serve as a major premise in an historical argument, Collingwood seems to look in principle for a unique situation (a *picture*), which is to do all the work of connection." Though not inclined to endorse Hempel's aspirational rule making, Buchdahl was fastidious enough not to swallow Collingwood whole. "Collingwood," he wrote, "manifests a very fine feeling for some of the more practical and artistic aspects of historical writing. But these merits are severely offset by what I consider an important defect: the playing down of the importance of the discovery of

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[18] A refugee from Nazi Germany, Hempel regarded himself as a "logical empiricist"; he taught philosophy at Yale, Princeton, and Pittsburgh.

[19] A philosopher, archaeologist, and historian, Collingwood was active at Oxford before World War II. In 1943, he died at Coniston, where his father had lived as John Ruskin's secretary.

[20] This was a critical reflection on his hastily written *Study of History* (Crawford, 1939).

[21] Even a sour Vin Buckley (1983, p. 65) thought these historians "were perhaps the most impressive group of intellectuals" at the university. On the lack of interest in philosophical debates—and patchy commitment to engagement with social sciences—among most mainstream U.S. historians during this period, see Novick (1998).

[22] G.A. Paul, Theory and Method Notes [1945], in box 39, Crawford papers, original emphasis. Crawford's notes are in the same box.

[23] E.E. Evans-Prichard (1937) exercised considerable influence on Collingwood—so too did Benedetto Croce, F.H. Bradley, and G.W.F. Hegel. Crawford (1962, p. 4) would later claim that "I found myself growing more and more interested in the early thirties in the analysis of the 'situation' in the broadest sense."

generalisations for the purpose of understanding history, even its particular situations" (p. 113).[24] Not laws, then, but perhaps family resemblances. A decade later, Buchdahl (1958) still was reflecting on the necessary reconstructions of historical studies, the touchstone of which was "the coherence and continuity of the picture," not the "evidence."[25] The history and philosophy of science thus turned into a hermeneutic exercise (Jardine, 2003).

Paul and Crawford stimulated a Collingwood industry among philosophers and historians at Melbourne. Another student of Wittgenstein, Douglas Gasking, who took the place of Paul and Buchdahl co-teaching the theory and method seminar with Crawford, insisted along with Collingwood that history resembled a craft more than a science. Historians did not seek empirical laws, rather they learned through practice to get a sense of the "gestalt," creating a "general guiding picture," bringing together a "recipe for framing hypotheses" (Gasking, 1950, pp. 115, 122, 123).[26] Arthur L. Burns, a Melbourne history student from the 1940s who would lead the seminar in the 1950s, argued that historical explanation "precludes" universal laws and statistical generalisations, relying instead on the "concurrent judgement of trained historians." Burns likened this to "a talent for catching the drift of a conversation from a word or so; or giving a complete stranger to the city useful directions" (Burns, 1951, pp. 327, 339).[27] Alan Donagan, a former student of Paul and Gasking, also became obsessed with what should count as an historical explanation. Discounting Hempel's claims for laws and rules, the young philosopher believed, like Collingwood, in closely observing the complex and ambiguous practices of historical studies—and of science. "Historians," he wrote, "often explain the actions of men by referring to their plans, schemes, and intentions …. Within limits, some things a man does, or even believes, may be explained by referring to his character." Their aim is "to assert warranted singular statements about the occurrences and interrelations of specific actions." Thus, any regularities they discerned would depend on the time and place, on context, and not be universally applicable (Donagan, 1957, pp. 155, 149; see also Donagan, 1962; 1964). Michael Scriven, a philosophy student at Melbourne at the start of the 1950s, also entered the debate, again challenging Hempel's idea of general laws in history, arguing instead that "the justification of an explanation is a context-dependent inductive procedure." Scriven asserted that the "simple fact must be faced that certain evidence is adequate to guarantee certain explanations without the benefit of deductions from laws." He felt the "most interesting analogy of all, perhaps, is to be found between explanatory narrative in history and the development of the dramatic plot in a play or novel." He recommended the "criterion of dramatic inevitability" and the "necessity for plausibility in depth," based on truisms about human behaviour (Scriven, 1959, pp. 458, 456, 470).[28] Despite minor differences, it had become clear to these Melbourne historians and philosophers—Buchdahl among them—that human thought and reasoning, including science, would provide ample material for convergent critical historical and philosophical reflection, focussed on granular analysis of practice and situation.

3. The beginnings of HPS at Melbourne and Cambridge

Notwithstanding various "stresses and strains," Buchdahl in the late 1940s decided to try "to bring into being 'history and philosophy of science' as an independent and sovereign subject of study" at Melbourne (Buchdahl, 1989, p. 5). Across the faculties, there was growing unease about narrow specialisation and the unmet need for "general education" of students. In 1945, the university had recruited Squadron Leader Clarence E. Palmer, a founder of tropical meteorology, as the sole teacher in the new Department of General Science, intended to instruct students in the virtues of the scientific method. But Palmer soon decamped to the Institute of Geophysics at UCLA, leaving Buchdahl to take over in 1947. Eager to sharpen the critical edge of the curriculum, Buchdahl (1989, p. 6) began "to introduce science via its historical and philosophical aspects."[29] At first, he struggled to find suitable books to include in the syllabus, relying on older studies by William Whewell, Ernst Mach, and Charles Singer, among a few others, but by the end of the decade he could add James B. Conant's *On Understanding Science* (Conant, 1947) and *Harvard Case Studies in Experimental Science* (Conant, 1950), as well as Butterfield's *Origins of Modern Science* (1949). He appreciated particularly Conant's emphasis on "conceptual schemes" (Buchdahl, 1987, p. 46; see also Kuhn, 1962). Buchdahl drew his students attention to philosophical enquiries by Collingwood and Alfred North Whitehead, suggesting they ask themselves "what sort of questions a particular age was interested in and in what sort of way it was natural for it to answer them."[30] The dean of medicine, R. Douglas "Pansy" Wright asked Buchdahl also to lecture medical students in the "principles of science and medicine." In those post-war years, the refugee scholar flew to the desert oasis of Mildura, where the first-year students in the medical course were temporarily located, to address (while wearing a bowtie) the "hard-headed returned servicemen," incurious about history and philosophy. On one occasion they drove a flock of sheep through the lecture hall, just for a laugh (Buchdahl, 1988, p. 10).

In 1950, a young physiologist, Diana "Ding" Dyason, joined Buchdahl in the Department of History and Methods of Science, valiantly taking over the teaching of recalcitrant medical students. Happier playing hockey and skiing, Dyason was the daughter of wealthy stockbroker and well-connected intellectual Edward C.E. Dyason, and a niece of Ernest Scott, Crawford's predecessor as professor of history. Full of pluck, forceful and outspoken, and a great networker, she ensured the new department survived the 1950s, even if she claimed in a typically self-deprecating way never to have quite understood the fine distinctions that Buchdahl and his comrades appeared to be making. "Although a science student," she later wrote, "I was swept off to philosophy meetings to hear George Paul … and others, who were creating quite a stir and certainly turned on superb performances, but left me uncertain as to what they were 'really on about'" (Dyason, 1983, p. 96).[31] The young physiologist, however, was up for a challenge. In 1952, she ventured to Britain

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[24] Through the 1950s, Buchdahl would continue to draw on Collingwood and Wittgenstein to criticise notions of scientific models and laws: see, for example, Buchdahl (1957). See also Power (1988).

[25] See also Buchdahl (1993), which connects these arguments to the work of Thomas Kuhn and Ludwik Fleck. For his account of affinities with Kuhn's work, see Buchdahl (1965).

[26] In this article, Gasking anticipated the idea of tacit knowledge as developed by Polanyi in his 1951-52 Gifford Lectures (Polanyi, 1958). Gasking was later Boyce Gibson professor of philosophy at Melbourne.

[27] This echoes a remark of Wittgenstein's: "In teaching you philosophy I'm like a guide showing you how to find your way around London" (quoted in Gasking & Jackson [1951]). Surprisingly, Burns had been a student of Popper at the LSE; he later became a professor of political science at the ANU and a staunch anti-communist.

[28] The idea was developed further by Hayden White (1973; 1984). By the 1960s, much of the historiographic debate was taking place in the journal *History and Theory*, an offshoot of the Melbourne seminar in theory and method, founded by the enigmatic George Nadel, another former *Dunera* internee and history student at Melbourne in the 1940s, and an early supporter of White.

[29] Harvard's president J.B. Conant had been advocating a program in general education since 1943, but it was not instituted until 1949. The Department of General Science at Melbourne was renamed History and Methods of Science in 1950, then HPS in 1955. Buchdahl (1989) recalled that the professor of psychology, Oscar Oeser, had insisted that "methods" be plural, while the Department of Philosophy for years refused to countenance "philosophy" in an alternative name.

[30] Buchdahl, History and Methods of Science 1952, folder 150, box 1, Gerd Buchdahl papers, Whipple Library, Cambridge.

[31] Like many pioneering women in the university, Dyason found self-deprecation a helpful protective strategy. Her later expertise was in the history of public health in Britain and the empire. See also Dyason (1977), which fails to mention Buchdahl at all.

to see what courses in history and philosophy of science were available at Edinburgh, Oxford, and Cambridge. Though occasionally distracted by social and cultural activities in London, she began auditing classes in the subject at UCL and the LSE. "Come on, old girl," Buchdahl wrote to her in September 1952, "let's know whether you're still alive."[32] She quickly sent him some London syllabi, which he deemed inferior to what was offered at Melbourne.[33] Dyason found Dingle's lectures terribly boring and basic; after listening to him expatiate on the philosophy of science, she wrote: "The man is plain God-damned dangerous! He makes the most outrageously inaccurate statements …. Frankly, I have at times felt like Matilda's aunt—you may remember she tried to believe Matilda and 'the effort very nearly killed her!'" Incensed, she continued: "I think this is something that we ought to regard as a point of warning … not that I think we are likely to degenerate to the extent of the UCL crowd." Dyason went on to report that Crombie had ideas, "but is unfortunately constitutionally incapable of giving a lecture."[34] She realised that she and others in Melbourne would have little to learn from any British programmes, so spent the remaining months "on the Continent entirely in frivolity."[35]

Undaunted by Dyason's criticisms of nascent British commitments to integrating history and philosophy of science, Buchdahl arranged in 1954 to swap jobs for a year with philosopher Stephen Toulmin at Oxford. He and Toulmin had corresponded for several years, and they came to respect each other. A former student of Braithwaite at Cambridge, devoted to Ramsey and Wittgenstein, Toulmin increasingly was fascinated by "processes of historical change out of which the basic concepts, theories, and methods of science have emerged" (Toulmin, 1977, p. 148). Yet, he recalled, "approaching the history of science with philosophical questions in mind seemed as heretical to professional historians of science in the 1950s as approaching the philosophy of science with historical questions in mind did to most of their philosophical colleagues" (p. 148). In Buchdahl, he found someone refreshingly open to interdisciplinary study, free from such limitations. "I began to take a close first-hand interest in the history of science," Toulmin wrote, "during an exchange visit to Melbourne University, Australia, in 1954–55" (p. 148; see also Toulmin, 1953; 1958; 1972). The Melbourne department intrigued him as it was, "to the best of my knowledge, unique in the British Commonwealth."[36] He realised that historians of science study "the evolution of the concepts, presuppositions and methods of thought fundamental for our interpretation of the natural world," inquiries surely relevant to any creditable philosophy of science (Toulmin, 1964, p. 225). With Buchdahl, he discussed Collingwood, whose philosophy of history would come to preoccupy him from the late 1950s. "You must dig down and find out what the people are really up to and why certain things are perceived as difficulties and others are glossed over," Toulmin told Gary A. Olson, "that's part of reinserting the activity of science within the humane world" (Olson, 1993, p. 308; see also Toulmin, 1982). While Toulmin owed to Wittgenstein his anthropological distrust of rule-making and algorithms, an appreciation of the contingencies of language, he received from Collingwood and Buchdahl an interest in the historically changing character of argument forms and concepts. Toulmin thus aspired to go further than Wittgenstein and pursue "the functional

considerations underlying the *historical* development of our rational methods and modes of thought, in different fields of life or inquiry" (Janik & Toulmin, 1973, p. 261). On his return to England, Melbourne's allure lingered. He wrote to Dyason from Leeds in 1956, asking if there was "any point in continuing to day-dream about the place."[37] She had been trying to get the university to use her father's bequest to support a chair in history and philosophy of science, to no avail. The vice-chancellor, she responded, "slithers more than ever and bends even before the breezes blow."[38]

Toward the end of 1957, Cambridge approached Buchdahl, proposing that he build up a programme there in history and philosophy of science "similar" to the Melbourne "model" (Buchdahl, 1989, p. 7). Prospects in Australia seemed ever more limited as his friendship with Dyason frayed. Norwood Russell Hanson, an American philosopher of science at Cambridge was leaving for Indiana, and Rupert Hall, the historian of science, soon would follow. Devoted to Wittgenstein and ally of Toulmin, Hanson promoted the value of philosophy to the history of science, since it enhanced conceptual clarity, even as he questioned the applicability of history, with its "chaotic diffuseness," to the philosophy of science, which required attention to logical cogency. Hanson worried that "scholars sometimes dull the scalpels of philosophy by burying them in the historical gravel" (Hanson, 1971, pp. 287, 286; see also; Hanson, 1958). Despite a few gestures toward reconciliation, history of science and philosophy of science still carried on separately at Cambridge before Buchdahl's arrival. Indeed, soon after he turned up both Butterfield and Braithwaite urged him to stick only to philosophy of science, advice he blithely ignored. Instead, Buchdahl (1962, p. 64) insisted, as he had at Melbourne, that "a critical approach to the history of science will do well to avail itself of the results of philosophical scholarship; and on the other side, a study of philosophical concepts, particularly those appertaining to the field of science, must needs see their development in the concrete contexts of historical reality." Gradually, Buchdahl developed an HPS programme at Cambridge, fostering its growth into a department in 1972, before retiring in 1981 (Woolhouse, 1988).

4. Conclusion

Though apparently indifferent to history and philosophy of science, refugee historian Fritz Stern, based at Columbia University, observed: "The tragic experiences of the 1930s and 1940s have had a profoundly unsettling effect on historiography, and some of the basic presuppositions and categories of explanation of an earlier period no longer seem adequate today" (Stern, 1956, p. 24). Stern and Buchdahl were prominent among those émigrés or outsiders—those Jewish Europeans at the end of European civilisation—who catalysed intellectual development after World War II and the Holocaust. Thus, with considerable audacity, Buchdahl in the 1940s and 1950s had tried to re-frame the presuppositions and categories of explanation in his intellectual field, to re-imagine the methods and conceptual practices of science in terms of the problems, ideas, and technological matrix of their times, to bring together, with a critical inflection, histories of science and philosophies of science. Drawing on the later thought of Wittgenstein and a serendipitous reading of Collingwood—which his odd situation in Melbourne made possible—he came to question any

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[32] Buchdahl to Dyason, 15 September 1952, box 96, Diana Dyason papers, 1973.0016, 1984.0123, 1990.0018, University of Melbourne Archives. John Clendinnen and Betty Gasking had taken over Dyason's teaching at Melbourne. Buchdahl also recommended Dyason visit Toulmin at Oxford but warned that Popper would be a waste of time.

[33] Buchdahl to Dyason, 2 October 1952, box 96, Dyason papers.

[34] Dyason to Buchdahl, 24 February 1953, box 96, Dyason papers. The reference to Matilda is to the 1907 Hilaire Belloc poem.

[35] Dyason to Buchdahl, 26 January 1954, box 96, Dyason papers.

[36] S.E. Toulmin, Report on a Visit to Melbourne University, 1955/1141 Toulmin, University of Melbourne Archives, p. 2. This is the basis for Toulmin (1956). Or as Manchester philosopher Wolfe Mays (1960, p. 197) put it, "The Australian universities seem to be well ahead in this subject."

[37] Toulmin to Dyason, 29 September 1956, box 96, Dyason papers.

[38] Dyason to Toulmin, 15 December 1956, box 96, Dyason papers. On his return, Toulmin helped set up the Leeds HPS Department along Melbourne lines. Later, he was professor of philosophy at Columbia, Stanford, Chicago, Brandeis, and Santa Cruz. One of his sons returned to Melbourne to live. The Melbourne HPS Department appointed its only professor, R.W. Home, an Indiana graduate, in 1975 but it went into decline in the 1990s. Home was not replaced when he retired in 2002, and HPS lost departmental status. On the delayed establishment and subsequent development of HPS, along a different model, at the University of Sydney, see Turtle (1987).

decontextualised positivism or logical analysis and to discount facile chronologies of scientific progress. As Collingwood (2013, p. 58) had noted in the 1930s, this meant "getting inside other people's heads, looking at their situation though their eyes, and thinking for yourself whether the way in which they tackled it was the right way." It meant a combined ethnomethodological and historical approach, in effect, prefiguring some less deterministic versions of science and technology studies—or as Buchdahl (1982, p. 299) called it, a feigned "internalism" that "expresses itself via a more sophisticated methodology of considerable complexity." It opened a space, or at least offered the potential, for more sociologically contextualized and ethnographically practicable—and less philosophically categorical or peremptory—relational accounts of science. "We must work our ways into a circle of meaning," Ian Hacking (1995, p. 301) echoed. "We must become hermeneutical." As a marginal man, Buchdahl unexpectedly had found opportunity and even encouragement in an out-of-the-way settler colonial society, a small-scale and isolated intellectual community favouring the generalist, where all kinds of unanticipated filiations and alliances might be licensed—for up-and-coming white men, at least. A place where one might proclaim: "take care of the conjunctions and the nouns will take care of themselves" (Geertz, 1995, p. 261). Had he not been deported, sent to the "colonies," would Buchdahl have found such favourable conditions in England in the 1940s and 1950s to think so creatively about amalgamating the historical and philosophical situations of science?

Whether Buchdahl and the programs he created lived up to these great expectations will be open to contestation, of course. Others can attempt to check the congruence of his own scholarly work and the discourse of Cambridge HPS with the high ideals of the 1940s and 1950s.[39] Certainly, divisions between history of science and philosophy of science—and of both with sociology of science—often widened as the field expanded in Europe, North America, and Australasia from the beginning of the sixties. Historians like Butterfield (1959) continued to lament the "unhistorical" character of most philosophy of science. While philosopher J.J.C. Smart confided to Paul Feyerabend in 1968: "I do suspect that much history of science is of antiquarian interest only, and that some philosophers of science spend time on history which I'd rather see them devoting to philosophy."[40] "The distance between mainstream history of science and the philosophy of science," observed Larry Laudan (1989, p. 12), "is probably greater now than it has ever been, notwithstanding that many historians of science still take philosophical issues seriously." Even those sympathetic to a critical assemblage of history and philosophy of science have had to contend with the constantly fissiparous tendencies of their colleagues and erstwhile collaborators. But although some may say that Buchdahl's project never really succeeded—or is yet to take place—it still demands attention as a distinctive effort, prompted by the enmeshing of Collingwood and Wittgenstein, to imagine what HPS could be and to rethink what it might become. If nothing else, it suggests a plausible response to Peter Galison's question: "Is it possible to write a history and philosophy of science with no day pass from history, one where the philosophy enters the stage *with* the history, not *before* the account begins?" (Galison, 2008, p. 123).

When I think back to young Gerd Buchdahl in the 1940s and 1950s, settling down in Melbourne to explore a new intellectual formation of HPS, I'm reminded naturally of W.G. Sebald's melancholy book, *The Emigrants*: "And so they are ever returning to us, the dead," he wrote. "At times they come back from the ice more than seven decades later and are found at the edge of the moraine, a few polished bones and a pair of hobnailed boots" (Sebald, 1997, p. 23).

Acknowledgements

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[39] Buchdahl's key works on Kant mostly did not appear until the 1960s: see Buchdahl (1969). For appraisals of his later research, see Jardine (2003) and Woolhouse (1988). It seems likely that the Cambridge HPS Department was later shaped at least as much by Michael Hoskin and Mary Hesse as by Buchdahl (Hoskin, 1990). Robert M. Young describes Buchdahl as one of "the people who had most to do with my learning to think at all" (Young, 1985a, p. 163), and refers to his "rich and allusive studies [in the 1960s] of the metaphysics of science from Descartes to Kant," but Young also discounts the breadth of his understanding of context, deeming it insufficiently Marxist (Young, 1985b, pp. 171–2).

[40] Smart to Feyerabend, 7 May 1968, box 1, J.J.C. Smart papers, MS 7740, National Library of Australia, Canberra.

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