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MAIOCCHI ON DUHEM, HOWARD ON DUHEM AND EINSTEIN: HISTORIOGRAPHICAL COMMENTS

ABSTRACT. These comments center on the methodological stance that Howard and Maiocchi recommend to us when we are doing history of philosophy. If Howard and Maiocchi are right, both Duhem and Einstein developed closely related versions of conventionalism and realism, and in both of their philosophies the conventionalist and realist moments were mutually compatible. Duhem's holism and, arguably, Einstein's as well, denies the need for across-the-board literalism, and both of them had important reasons for denying that convergence was required or even desirable for realism. Thus, for those who are caught up in the current disputes, serious consideration of the discrepancies between the standard current versions of realism and conventionalism and the positions that contextualist analyses reveal to have been advocated by Duhem and Einstein may uncover some of the tacit assumptions that impede the resolution or advancement of our disputes.

It is some fifteen years since I read both Duhem and Einstein seriously, the latter with particular attention to his arguments regarding the conventional character of spatio-temporal metrics. Since then, my professional preoccupations have been directed elswhere. The texts of the masters are, therefore, not freshly in my mind. These comments, accordingly, center on the methodological stance that Howard and Maiocchi recommend to us when we are doing history of philosophy rather than the interpretation of the particular texts they discuss. I shall point out some of the virtues of their historiographical styles and provide some extensions and corroborations of the general approach to the texts that they both support.

To begin, let me characterize the similarities in the historical methodologies manifested in the papers of Maiocchi and Howard. They both maintain that the proper understanding of philosophical texts and controversies requires a rather full understanding of the intellectual situation and cultural setting of the protagonists in question, most especially of the specific content and character of the positions which they inherited, debated, and/or opposed. Thus the position of Duhem is not that of Quine, and it will not be properly understood through the eyes of those of us who are familiar with Quine but not with Deville, Rankine, Mach, Poincaré, and Le Roy. Similarly, although Einstein's response to

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turn-of-the-century positivism and the neo-Kantianism of the Marburg School blends components of what we would call conventionalism and what we would call realism, precisely because it was directed to specific issues raised in that setting, the resultant doctrine cannot be mapped onto any current version of conventionalism or realism.

Howard and Maiocchi, in short, insist on a sort of historicity that is seldom found in standard histories of philosophy and relatively infrequent even in specialized treatments by historians of philosophy of the major figures in the grand tradition. Their attention to the historical setting greatly enriches our understanding of Duhem, of Einstein, and of the devious pathways by means of which the former's influence spread, particularly into corners of the German-speaking world during a period when many have thought it relatively uninfluential. Both papers produce some surprising findings – e.g., about the special importance of theoretical coherence in the thought of Duhem and about Duhem's influence on Einstein. These findings rest on close attention to the scientific and the philosophical preoccupations of Duhem and Einstein. They demonstrate the value of the contextualist historiographical approach.

Let us explore some advantages of the historiographical stance I am attributing to Howard and Maiocchi. It seems obvious, and hardly needs to be said in the context of this symposium, that it offers better hope than the usual methods of historians of philosophy for understanding the work of our philosophical ancestors. I shall argue that, in addition, it can sometimes shed useful, if indirect, light on current disputes when the usual methods are not much help. But I shall also complicate matters a bit by trying to refine the historiography of our speakers a bit, going slightly beyond what can be safely justified by a literal reading of their texts.

For these purposes, it is expedient to articulate the historical methodology in question more clearly than I have as yet. To a first approximation, it distinguishes at least two ways in which one might interpret a figure whose philosophical views are of interest. The first is very natural to us, living as we do in an ahistorical culture, especially if, like many philosophers and contemporary historians of philosophy, we believe in some form of perennial philosophy. From such a starting point, it is all too easy to trust our own formulations of a standard philosophical problem or position and ask of a great (or not so great) figure's texts what light they shed on the issues as thus conceived. This

is what I call the standard method of history of philosophy. It is by such a route that we often come to quarrel about, for example, how best to understand Einstein's realism or conventionalism, or that we come to see Duhem's holism as so allied to Quine's that their two rather different problematics are melted together under the misleading label of 'the Quine–Duhem problem'.

The standard approach mines the work of the ages for positions and for insights bearing on *our* problems – surely a useful and constructive task, but surely also a way to fall prey to easy misunderstandings of the positions of our predecessors and the issues that preoccupied them. Real history, according to our speakers (and they are surely right) is far more interesting and far more revealing philosophically – though it often speaks less directly than we might wish to the philosophical difficulties that tie us and our contemporaries in knots.

The second mode of doing the history of philosophy, in contrast, looks to the local context in which a thinker was working – i.e., to the positions taken by those with whom he or she was engaged, the distinctions employed at the time, the specifics of the disputes in which the thinker was embroiled. It is this context that gives slippery technical terms and concepts their proper meaning. Knowledge of this context helps us to understand what has gone wrong when, employing current labels in their current acceptation, the thought of the individuals being studied seems, at least occasionally, to run skew or even counter to our expectations. Thus it is that, if we employ such terminology with current meanings, Duhem and Einstein are both misdescribed as 'realists' or 'conventionalists'. The subtle shifts since their day in the content of the doctrines and the meanings of the labels involved account for the fact that it was possible, perhaps even easy, for them to be *both* realists and conventionalists, a constellation that is very difficult, if not conceptually incoherent, today. If Duhem and Einstein combined realism and conventionalism in their philosophies, and our speakers are very persuasive in arguing that they did, the likelihood of arriving at a satisfactory understanding of their positions by means of the standard method of the history of philosophy is very small indeed. What is needed in order to properly grasp the philosophies here investigated is a sound understanding of what Duhem and Einstein opposed, of the issues they had to solve in developing their views. And those issues are not the issues or our day.

Lest you think I am misascribing a foreign method to our speakers,

let me quote from a related paper by Professor Howard on 'Einstein's Conventionalism'.

> We cannot do justice to the philosophical opinions of a thinker like Einstein if [we] go to him looking for answers to our questions. What is required, instead, is a genuinely historical approach, that takes account of all available resources, and that subjects those sources to the kind of critical scrutiny practised in other areas in the history of ideas. (Howard 1987, p. 44)

It is obvious that Professor Maiocchi, who insists that a proper understanding of Duhem rests on setting his views into the context of his disagreements with Mach, Poincaré, Le Roy, D'Adhemar, Milhaud, and others, shares this stance with Professor Howard.

The time has come to complicate matters a bit. Both Duhem and Einstein were engaged in scientific as well as philosophical controversies. While it would be a mistake to draw a hard-and-fast line between science and philosophy – indeed, contextualism requires that we recognize that any such line changes with time and place – it is important to recognize that the philosophical positions that our protagonists took up were colored at least as much by their scientific as by their philosophical concerns. Professor Howard claims, in the reading version of his paper, that the case of Einstein shows that "the philosophy of science is essential to good science, but only if it places the problems of the scientist in the forefront, not if it attempts to impose its own agenda, not if it pretends to instruct the scientist". It seems clear that this portrays Einstein's own view and practice correctly, for reasons that Howard develops in that paper. Like Howard, I would like to believe that this claim is true of philosophy of science quite generally. But it is not clear how widely such a position has been held by those who have written what we would count as the philosophy of science from the nineteenth century on, and it is not clear whether a parallel claim about Duhem will withstand serious scrutiny.

Einstein's conventionalism was won, in part, by hard wrestling with the interpretation of coordinates assigned to empty space, i.e., to places occupied by no objects and in which no light rays or objects traversing geodesic paths actually interested – and it solved the problem of interpreting the seemingly conflicting curvatures of space that result from different coordinatizations of such empty regions. Duhem's conventionalism (reinforced by Maiocchi, if I understand him rightly), played a less internal role in his science. Rather, it provides external philosophical arguments opposing the initially discredited, but later ascendant,

atomism against which he sought to secure his own brand of nonpositivist energeticism. To quote Duhem's *Titres et Travaux*, "it would be irrational to work towards the progress or physical theory [in light of the difficulty of directing experimental refutations against isolated theoretical claims] if that theory were not the increasingly clear and precise reflection of a metaphysics. The belief in an order transcending physics is the sole reason for the existence of physical theory" (Duhem 1917, p. 156, as translated in this volume). Thus metaphysics served Duhem as an external constraint on the proper outcome of scientific reasoning as, I believe, it did not for Einstein.

Whether this interpretation can be sustained in detail or not, it illustrates the point that as long as there is a useful working distinction in the relevant context between science and philosophy, it is necessary for contextualist historians of the philosophy of science to work out the interplay of the scientific and the philosophical influences on the positions in which they are interested – for the aims and the content of an individual's philosophy will, at least sometimes, be crucially affected by whether it is directed in the first instance to a scientific or to a philosophical question. Indeed, in at least some cases (perhaps, for one, in Einstein's) there will be nothing like a coherent closed philosophy to be uncovered precisely because philosophical considerations were pursued only as far as was needed to deal with the scientific problems in hand, without great concern for the coherence of the resulting philosophical fragments. There need not be anything wrong with such an eclectic use of philosophy in spite of the fact that it often results in a misuse of philosophy as a rhetorical club employed in special pleading in favor of whichever theory it is that one prefers. In any case, the fact that such eclectic uses and misuses of philosophy are quite common makes the contextualist's task of reconstructing philosophical views of many particular figures extremely difficult.

A particularly interesting issue posed by Duhem's and Einstein's philosophies of science, especially as they were presented by our symposiasts, is what to make of the notion of a natural classification, of the notion that even though "two different peoples" would come up with quite different descriptions of the events underlying the surface of some domain of phenomena, nonetheless for the working scientist "the world of perceptions determines the theoretical system unambiguously" (Einstein's Festrede for Planck, Einstein 1918, p. 31, as quoted by Howard). The problem in question is quite general in the sciences and by no

means restricted to physics. Thus in my own work in history and philosophy of biology, I encounter parallel issues and intuitions regarding the conflicts between Darwinian and anti-Darwinian interpretations of evolution around the turn of the century and regarding instrumentalistic versus realistic interpretations of Mendelian genetics from 1900 clear through to the 1950s. What is of particular interest is the importance of coherence of theories, which Maiocchi describes as a central Duhemian obsession, crucial to his argument against the English-style use of models and to his argument that physics sought and might reasonably expect to approach something like a natural classification.

To illustrate the point that parallel considerations play a crucial role in the evaluation of work in other sciences than those with which Duhem and Einstein were concerned, consider the gulf between embryology and genetics from the twenties through (at least) the fifties of this century: all higher organisms have the same genes in virtually all of their cells. Yet some system of hereditary controls causes the cells to differentiate systematically (in the right places and at the right times) into nerve, muscle, bone, liver, and kidney cells. Mendelian models could not explain how the same cells could yield such different results and embryological models and descriptions could not provide a serious ous account of an extra-Mendelian system of heredity. Within fairly circumscribed limits, both Mendelian genetics and descriptive/experimental embryology were in pretty good shape. But as soon as one posed Duhemian questions about theoretical coherence, about the natural classification for the hereditary controls governing what an embryo would become, the situation looked unsatisfactory indeed. As it happens, this complex of issues was taken particularly seriously in France, where the debate over the status of Mendelism on these grounds was particularly lively (Burian, Gayon, and Zallen, 1988). I have no idea at this point whether there was any indirect influence of Duhem on these debates, but it surely is a matter worth further exploration.

The complications that I have introduced can be summarized rather neatly. There are at least four perspectives which a contextualist historian of philosophy of science may employ in working out the views of a particular figure. These concern

1. the philosophical setting and disputes in which she or he was engaged,
2. the scientific issues to which the philosophical considerations were primarily addressed and the interpretation of those considerations

within the scientific as well as the philosophical context of the day,

3. the application of those philosophical considerations in novel settings, scientific as well as philosophical, including the pathways by which they became influential, and
4. the application of those philosophical considerations in later philosophical contexts.

Let us turn, to close these comments, to the last perspective on my list. One particularly valuable philosophical use of the products of contextualist studies of first-rank figures is to be found here. If Howard and Maiocchi are right, both Duhem and Einstein developed closely related versions of conventionalism and realism, and in both of their philosophies the conventionalist and realist moments were mutually compatible. If I am right, current versions of conventionalism and realism are mutually incompatible. Most contemporary realisms have been saddled with one or both of two commitments foreign to Duhem and Einstein. These concern the need for science to converge on the one true theory or, perhaps, the one true account of the phenomena in a particular domain, and the need to be able to provide a literal semantics across the board for the individual terms and concepts of a true theory. Duhem's holism and, arguably, Einstein's as well, denies the need for across-the-board literalism, and both of them had important reasons for denying that convergence was required or even desirable for realism. Thus, for those who are caught up in the current disputes, serious consideration of the discrepancies between the standard current versions of realism and conventionalism and the positions that contextualist analyses reveal to have been advocated by Duhem and Einstein may uncover some of the tacit assumptions that impede the resolution or advancement of our disputes.

Contextual studies of the sort that Maiocchi and Howard have executed here may not provide an Archimedean fulcrum for resolving philosophical disputes, but they certainly offer a rich panoply of alternatives. In so doing, they provide us not only with vastly improved understanding of our philosophical predecessors, but also with significant leverage for making progress in our own disputes as well. For these reasons, we should be grateful to them and, indeed, to many of the other contributors to this conference.

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