



Hiromatsu on Mach's Philosophy and Relativity Theory

In his project of going beyond the “modern worldview,” Hiromatsu Wataru attached great importance to Ernst Mach’s philosophical thought and Einstein’s theory of relativity as challenging the premises of modern philosophy, which he characterized as substantialist and bound by the subject/object schema. This paper surveys Hiromatsu’s analysis of Mach’s phenomenalist element-monism, specifically his critique of Mach’s insufficient break with modern philosophy; his inquiry into Einstein’s relativity theory with a focus on its intersubjective cognitive structure; and the way he extends his views on these themes to a general ontological-epistemological theory of the “fourfold structure.” Finally, it examines questions about Hiromatsu’s arguments regarding the tension between the dimensions of synchronic structure and structuring movement.

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HHiromatsu Wataru 廣松渉 (1933–94), one of the leading philosophers in late twentieth-century Japan, describes the basic motif of his work as a systematic critique of the “modern worldview” (*kindaiteki-sekaikan* 近代の世界観). Characterizing modern philosophy in general as ontologically “substantialist” and epistemologically bound by the “subject/object schema,” Hiromatsu strives to replace it with a new philosophical orientation marked by “the primacy of relation” and what he calls the intersubjective “fourfold structure.”¹ This motif has its sources in his two major fields of interest: the thought of Karl Marx and Marxism, on the one hand, and physical-scientific thought, specifically in its historical phase stretching from the work of Ernst Mach to relativity and quantum theories, on the other.

Already as a schoolboy, Hiromatsu took a keen interest in Marxism and engaged in Communist-led political activities, while at the same time he was so attracted to natural science, especially physics, as to aspire to become a professional researcher in the field. These two areas of interest were, however, more or less independent of each other until he seriously faced the apparent conflict between Marxism and Mach’s philosophical thought, as was represented by Lenin’s polemic against the latter in *Materialism and Empirio-Criticism*.² He turned to the field of philosophy to tackle this issue, among others, by investigating Mach’s ideas and the philosophical implications of non-classical physics as well as by critically re-examining orthodox Marxism.³ This effort led the young Hiromatsu to the conviction that the changes in scientific thought introduced by Mach, Einstein, and a number of subsequent physicists have philosophically essential affinities with Marx’s

1. HWC 15: xii–xiii, xvii.

2. LENIN 1909; see HIROMATSU 1995, 5: 289.

3. HIROMATSU 1995, 5: 294–5.

innovations in social-historical thought, which he considered to have led the way in the critique of the modern world and its integral moment, modern philosophy. Renouncing the orthodox or “Russian” version of Marxism as an objectivist misrepresentation of Marx’s thought, he now set out to reconstruct and further develop the ideas of Marx and Engels. At the same time, he elaborated his views on Mach’s philosophy, relativity and quantum theories, making explicit their achievements and their possible limits in challenging the modern philosophical framework. It is precisely where these two lines of endeavor converged that Hiromatsu’s philosophy took form and began to attract a wide audience in Japan during the late 1960’s—a period marked by a surge of popular protest against the established systems of society and knowledge.

This article focuses on Hiromatsu’s analysis of Mach’s philosophy and Einstein’s relativity theory as a key component of his overall philosophical project, without directly entering into the other hemisphere of his scholarship, the study of Marx and Marxism.⁴ I begin, in the first section, by outlining Hiromatsu’s analysis of Mach’s phenomenalist element-monism, specifically his critique of Mach’s insufficient break with modern philosophy. In the second section, I proceed to his philosophical inquiry into relativity theory with a focus on its intersubjective cognitive structure. In the third section, I discuss how his views on these themes are extended to a general ontological-epistemological theory: the theory of the fourfold structure. While largely expository in nature, the present paper does contain critical considerations of my own. Toward the end of each of the first three sections, I point out some remaining questions, which all suggest a tension in Hiromatsu’s thought between the dimensions of synchronic structure and structuring movement. The fourth and final section is devoted to examining this issue, and to this end I will also briefly present my own interpretive approaches to Mach’s philosophy and relativity theory.

4. For an English-language account of Hiromatsu’s work in connection with Mach’s thought, see SANTONE 1992. While Santone’s treatment of Hiromatsu is largely restricted to his views on the relation between Mach and relativity theory, the present study aims to approach the principal body of his philosophy in its aspect concerning physical-scientific knowledge. For a Japanese-language survey of Hiromatsu’s analysis of Mach’s philosophy and twentieth-century physics, see NOÉ 1982.

MACH'S PHENOMENALISM AND ITS APORIAS

As co-translator of Ernst Mach's major work *Die Analyse der Empfindungen* and other writings, the young Hiromatsu, along with the historian of science Hiroshige Tetsu 広重徹, contributed a great deal to a revival of interest in Mach's thought in Japan.⁵ Yet his appraisal of Mach, while in large part positive, contains an incisive criticism—a criticism that essentially differs from the polemical attacks conducted by Lenin and his “orthodox” Marxist followers. Far from condemning Mach for denying objective reality independent of the knowing subject and thus dissolving the modern subject/object dichotomy, Hiromatsu's criticism is directed precisely at the *insufficiency* of his break with the modern philosophical framework.

In Hiromatsu's view, the modern subject/object schema implies, among other notions, what he calls “the interiority of the given.”⁶ All that is immediately given to us is “the content of consciousness belonging to the subject.”⁷ This idea has been presupposed by most positions of modern philosophy, even though they are sharply opposed to one another. Under this premise, the realist “copy theory” proves to be self-contradictory as to the question of the accessibility of objective reality to the subject, whereas “idealism is logically consistent.”⁸ Far from supporting idealism, however, Hiromatsu rejects precisely that shared premise, the interiority of the given. It is against such a background that Hiromatsu turns his particular attention to phenomenalism, above all Ernst Mach's elementonism, which seeks to break with the presuppositions of modern philosophy. He holds that while Mach's philosophy as such is “untenable,” a close reexamination of it will provide “suitable clues to our radically going beyond the horizon of modern philosophy in general.”⁹ He accordingly sets out to analyze Mach's ideas in his 1963 piece, “Mach's Philosophy” [マッハの哲学], written as the co-translator's commentary attached to

5. See NOÉ 1982, 203. The first wave of interest in Mach's thought in modern Japan involved such thinkers as Kuwaki Ayao 桑木彥雄, Ishiwara Jun 石原純, and Tanabe Hajime 田辺元. See TANAKA 1992 and SANTONE 1992.

6. HWC 1: 16.

7. HWC 10: 270.

8. HWC 10: 269.

9. HWC 3: 546, 525.

the Japanese version of *The Analysis of Sensations*, and, with a more critical stance, in a chapter of his 1975 book *Outpost to a Koto-Based Worldview* 『事的世界観への前哨』.¹⁰ Drawing on these texts, let us follow Hiromatsu in reviewing Mach's philosophy and—prior to entering into his critical arguments—survey his positive appraisal thereof.

Hiromatsu focuses first of all on Mach's rejection of “the antithesis of subject and object” or “inside and outside”¹¹—the epistemological framework associated with Cartesian mind/body dualism. It is Mach's basic thesis that the world consists of elements such as colors, sounds, smells, spaces and times, which are usually called “sensations.”¹² Contrary to the conventional notion that there are in the first place the bodily object and the ego, which interact with each other to produce sensations, Mach maintains that it is the sensuous elements which are the primary beings. These elements are connected with one another to form various complexes, and some of them exhibit relatively greater constancy. Bodies are nothing more than “names” for such relatively constant complexes of elements. As Mach puts it, “bodies do not produce sensations, but complexes of elements (complexes of sensations) make up bodies,” and “all bodies are but thought-symbols for complexes of elements.”¹³

For Hiromatsu, it is no less crucial that Mach's elements are not “subjective mental images” formed *within* our consciousness.¹⁴ Elements are, rather, neutral components of the world in the sense that they are “in themselves neither psychical nor physical,”¹⁵ and neither subjective nor objective. In contrast to orthodox Marxists, Hiromatsu sharply demarcates Mach's position from subjective idealism. Whereas the subjective idealist usually starts from the framework of the subject/object dichotomy, seeking merely to reduce the objective to the subjective, Mach, from the outset, dissolves that framework. In Mach's view, what is called the subject or ego is, just like

10. The latter text, entitled “Mach's Phenomenalism and Meaningful Formations” 「マツハの現相主義と意味形象」, is included along with “Mach's Philosophy” in HWC 3: 499–549.

11. MACH 1886, 278/341, 253/310; see HWC 3: 529. Numbers following a forward slash refer to pages in the English translation as given in the concluding bibliography.

12. MACH 1886, 17–8/22.

13. MACH 1886, 2/2, 23/29.

14. HWC 3: 500.

15. MACH 1886, 51/62.

the bodily object, nothing more than a relatively stable complex of interconnected elements. He states that “what is primary is not the ego, but the elements (sensations),” and that “the elements constitute the I.”¹⁶ Thus, in desubstantializing both the bodily object and the ego, Mach breaks with objective realism as well as subjective idealism.¹⁷

As Hiromatsu notes, Mach classifies the complexes of elements into several groups: the “complexes of colors, sounds, and so forth, commonly called bodies” (ABC...), “the complex known as our own body” (KLM...), and “the complex composed of volitions, memory-images, and the rest” ($\alpha\beta\gamma\dots$).¹⁸ Mach’s grouping does not, however, uniquely determine the boundary between the ego and the “world of bodies.” Furthermore, the distinction between the above groups is not at all substantial, but thoroughly functional. That is, not only are the elements of different groups dependent on each other, but also one and the same element—for instance, green—can appear as either physical or psychical, depending on the way in which it is considered in relation to other elements. This is the sense in which Mach claims that “there is but one kind of elements,” and that one has to deal only with the connections of elements.¹⁹

Mach, as Hiromatsu stresses, thus attaches great importance to the mutual dependence or “functional relations” of elements, in a sense even more than to elements themselves.²⁰ This suggests that, although advocating element-monism, he is not an elementalists in the ordinary sense. Bound up with the above rejection of the subject/object dichotomy, this relationist

16. MACH 1886, 19/23.

17. Hiromatsu acknowledges that Mach’s texts retain some remnants of the idealist influences he underwent in his early years (see HWC3: 544). Nevertheless—and this is his point—it is mistaken to regard Mach’s philosophy as a version of idealism. It may be noted in passing that Einstein, in 1916, also spoke against characterizing Mach as “a philosophical idealist and solipsist” (CPE 6: 281/145).

18. In his text, Mach first introduces KLM... as a subgroup of ABC..., and subsequently—in apparent inconsistency with this—treats the two groups as if they were juxtaposed. Hiromatsu seems to follow the latter procedure.

19. MACH 1886, 253/310. Here and elsewhere the translations cited in this article have been modified.

20. MACH 1886, 28/35; see HWC 3: 502. With regard to visual experience, for example, Mach notes: “It is not the elements of the complex, but the whole physiologico-optical complex that is of importance” (1886, 170/208).

tendency, in a manner anticipating Ernst Cassirer's work, guides all his "anti-metaphysical" arguments. This is manifest not least in his critical analysis of classical physics, particularly of Newtonian mechanics.

In Hiromatsu's view, Mach's critique of Newtonian mechanics deserves all the more attention because it paved the way for Einstein's relativity theory. Newtonian physics had, as Hiromatsu succinctly puts it, generally rested on the notion that "bodies as [material] substances, residing in absolute space and time, exercise causal effects on one another" to produce a variety of phenomena.²¹ In contrast, he continues, Mach deprives space and time, matter and force, and other physical beings of their self-contained character, and reconceives them as relations of phenomena or, ultimately, of sensuous elements. This implies, in the methodological dimension, the necessity of defining physical concepts through coordinating physical phenomena to one another, that is, through operational procedures. Specifically, Mach rejects the notions of absolute space and absolute time, maintaining that mechanics can only deal with the "relative positions and motions of bodies."²² He also criticizes the Newtonian notion of inertial mass as "quantity of matter," redefining it operationally in terms of "dynamical relations of bodies."²³ He further suggests that the inertia of a physical body is due to its interaction with the rest of the universe. As for causality, he seeks to replace the concept of cause with the concept of "the dependence of the characteristics of phenomena on one another," and hence with "the mathematical concept of function."²⁴ In sum, Mach maintains that the task of physical science is to describe "the functional dependence of sensuous elements on one another," which amounts to setting up "equations of the form $F(A, B, C, \dots) = 0$."²⁵ With this conceptual orientation, his views of physical science, as we will see in the next section, mark a crucial step toward Einstein's theory of relativity.

Hiromatsu also favors, though only provisionally, Mach's general approach to knowledge or cognition. "When he discusses knowledge,"

21. HWC 3: 536.

22. MACH 1883, 223/280.

23. MACH 1883, 210/265, 239/300; see HWC 3: 420.

24. MACH 1886, 74/89.

25. MACH 1886, 301/369, 37/45; see HWC 3: 519.

Hiromatsu remarks, Mach might “seem to return from monism to a naive dualism and even to adopt the conventional copy theory.” Yet, he continues, this is no more than a “superficial impression.”²⁶ While characterizing cognition as a form of biological adaptation through “copying” (*Abbildung*)—reproduction or anticipation—of facts in thought, Mach does not mean by “copying” a subjective representation of the objective, but a representation of sensuous elements by *other* sensuous elements (of the group $\alpha\beta\gamma\dots$). This enables him to avoid “the aporia of the copy theory,” which is rooted in the subject/object dichotomy.²⁷ As Hiromatsu also notes, although he belongs to the empiricist camp, Mach breaks with the traditional view of concept formation as a process of induction or abstraction.²⁸ According to Mach, a concept is nothing other than an impulse to perform sensuous activity, which “produces new sensuous elements.”²⁹ In conceptual processes, “partially observed facts” are thus supplemented by representations and thoughts.³⁰ Specifically, judgment consists in “a supplementation (*Ergänzung*) of sensuous presentations (*Vorstellungen*) by other sensuous presentations”—a circumstance that makes possible the “economical description” of facts.³¹ Moreover, such a process of supplementation is at work not only in highly conceptual thought, but rather in all modes of cognition, including perception. Thus, while characterized as a copying of facts, cognition is for Mach not a simple reception of already existing data, but in a sense a “constructive” activity.³²

So far we have followed Hiromatsu in surveying Mach’s philosophical views with a focus on the points he considers particularly important. To be sure, Hiromatsu does not ignore the significance of such ideas of Mach as the descriptionist view of scientific laws or the biological conception of the “economy of thought.” Yet these ideas are, as he sees it, no more than secondary to, and derivative from, Mach’s basic tenet that the world consists of

26. HWC 3: 508.

27. HWC 3: 510.

28. Elsewhere Hiromatsu elaborates his own critique of this abstraction theory (HWC 15: 263ff.).

29. MACH 1886, 264/323.

30. MACH 1905, 3/2.

31. MACH 1886, 259/317–8, 40/49.

32. HWC 3: 510.

“functionally interconnected sensuous elements.”³³ He highly evaluates this basic view of Mach insofar as it implies a departure from the substantialism and subject/object dichotomy of modern philosophy.

Nevertheless, Hiromatsu is in no way an adherent of Mach. For all his positive appraisal up to this point, he in due course turns his critical gaze on what he calls “the aporias of Mach’s philosophy.” He starts by asking: Are the complexes and relations of elements, which Mach regards as so important, “themselves elements, sensations?”³⁴ While Mach leaves this question unanswered, Hiromatsu maintains that the relations of sensuous elements are themselves not purely sensuous, and that, without introducing such a non-sensuous moment into phenomena, Mach could not “fill up the gap between the actual world and the aggregation of elements.” However, precisely this introduction of something that is non-sensuous and yet constitutive of the phenomenal world may “lead to a self-destruction of the Machian monism of sensuous elements.”³⁵

Hiromatsu further argues that Mach’s sensuous elements themselves prove to be no more purely sensuous than their relations. In his classification of elements into the three groups $ABC\dots$, $KLM\dots$, and $\alpha\beta\gamma\dots$, Mach, when necessary, also introduces the following subgroups of elements: “the bodies of other persons” $K'L'M'\dots$, $K''L''M''\dots$ and their contents of consciousness $\alpha'\beta'\gamma'\dots$, $\alpha''\beta''\gamma''\dots$.³⁶ As Hiromatsu points out, however, as regards $ABC\dots$, Mach “considers that they appear to other persons just as they are, and does not allow of subgroups with primes.” That is to say, for instance, the red color of an apple as I see it constitutes a basic element for other persons as well. In other words, what Mach calls red is something valid to different persons, hence already “endowed with the meaning ‘redness’” which counts as the same despite its different perspectival appearances.³⁷ Thus, Hiromatsu contends:

33. HWC 3: 542–3.

34. HWC 3: 502. See a parallel question posed by neo-Kantian philosopher Richard Högnigswald (1903, 20).

35. HWC 3: 543.

36. MACH 1886, 12/9.

37. On this point, some qualifying comments may be in order. Mach’s failure to introduce the notations of $A'B'C'\dots$, $A''B''C''\dots$ does not immediately mean that he altogether ignores perspectival differences concerning $ABC\dots$. Rather, he argues that “ $ABC\dots$ are always dependent

We must point out as Mach's self-deception affecting the very basis of his worldview that... with regard to the elements ABC... as givens which are sharable with other persons, he actually posits them, not as mere sensuous elements, but as *meaningful formations* preconceived as intersubjectively identical.³⁸

Mach is unaware of his *de facto* introduction of such non-sensuous meanings, which in reality are constitutive of the phenomenal world. While Mach rightly rejects the traditional hypostatization or, in Hiromatsu's terminology, "reification" of meaning into essence or substance, he fails to grasp the "ideal meaningful moments" of phenomena.³⁹

Summing up his critical argument so far, Hiromatsu restates that Mach's element-monism—contrary to its own basic claims—rests on an unwitting introduction not only of the non-sensuous relations of elements, but also of the non-sensuous, intersubjectively identical meanings as integral moments of elements themselves. His criticism is, however, not only directed at internal inconsistencies of Mach's thought. Rather, Hiromatsu further argues that precisely Mach's presupposition of these transpersonal meanings prevents him from considering the way in which meanings are formed through "linguistic intercourse" between individuals.⁴⁰ Consequently, Mach supposes the elements ABC... not to be formed through communicative processes, but to "subsist trans-historically, independently of human activities." Correlatively, he takes for granted an "original isomorphism of knowing subjects," overlooking the way in which they *become* isomorphic. In short, he misses the essentially "historical and social" dimension of the

on KLM...", and that this is the reason why in physics we need to remove "the accidental influence of the variations of KLM... etc." in order to attain "the pure dependence of ABC... on one another" (MACH 1886, 281). Yet, for Mach, the dependence of ABC... on KLM... no more than *modifies* ABC..., and the self-identity of ABC... is assumed prior to comparison between their different perspectival appearances. To this extent, Hiromatsu's critical observation seems valid.

38. HWC 3: 545.

39. HWC 3: 546.

40. As was suggested above, Mach does not entirely fail to consider the process through which phenomena are intersubjectified. As Hiromatsu mentions (see HWC 3: 517), Mach at times discusses the way in which "experiences of many persons" become integrated through communication in accordance with the economy of thought (MACH 1896, 228; cf. 1905, 128/93). Nevertheless—and this is the point of Hiromatsu's critique—Mach conceives the basic components of experiences, namely sensuous elements, as prior to any intersubjective mediation.

phenomenal world. These flaws, Hiromatsu concludes, in the final analysis prevents Mach's thought from fully going beyond "the horizon of modern philosophy."⁴¹

We can see that Hiromatsu's critique of Mach as traced so far has gone through at least two consecutive phases of argumentation. First, and for the greater part, his criticism is—more or less similarly to neo-Kantian and Husserlian critiques—aimed at Mach's empiricist disregard of non-sensuous, intersubjectively valid meanings, with which he cannot in fact dispense. While proceeding in what might be called a "deconstructive" strategy in which Mach's philosophy is set against itself, this phase of the critique is largely restricted to the dimension of the synchronic structure of phenomena. Second, Hiromatsu goes on to point out that Mach—perhaps like most other philosophers up until his time—neglects the manner in which phenomena are endowed with intersubjective meanings through *processes* of human intercourse. This criticism, which is as such methodologically rather external, is concerned with the dynamic dimension in which phenomena are structured.

It should be noted, however, that these two phases of the critique are not explicitly distinguished by Hiromatsu himself, their relationship thus being left unspecified. Here there may arise the question: Does not speaking of the formation of intersubjectively identical meanings imply that there are circumstances in which such meanings have not yet been formed and, correlatively, the knowing subjects not yet made isomorphic? Does it not follow, then, that the first phase of his critique is concerned solely with, and valid only for, the limited case in which the process of intersubjectification has already been completed? We will see later that this kind of tension between the two dimensions, synchronic structure and structuring process, recurs—beyond the thematic concerning Mach's thought—in different forms throughout Hiromatsu's philosophical work. For the moment, however, let us leave this issue on one side and turn to his analysis of relativity theory, a theory which, in his view, moves further than Mach's thought in breaking with the modern philosophical framework.

41. HWC 3: 548–9.

RELATIVITY THEORY AND INTERSUBJECTIVITY

In his project of going beyond the modern worldview and specifically of surpassing the limits of Mach's philosophy, Hiromatsu attaches great importance to Albert Einstein's theory of relativity. He gained from this theory—in a sense more than from quantum mechanics⁴²—a crucial insight into the problems of meaning and intersubjectivity, the very issues around which his critique of Mach was seen to revolve. Among many natural-scientific theories, it is arguably this theory of Einstein that played the most important role for Hiromatsu's overall philosophical project. In what follows, let us survey his philosophical analysis of relativity theory as it is presented in a section of the book *Outpost to a Koto-Based Worldview* and more elaborately in *The Philosophy of Relativity Theory* 『相対性理論の哲学』.⁴³

Hiromatsu begins with the methodological aspect of relativity theory, specifying both its affinities with and departures from Mach's ideas. Einstein, argues Hiromatsu, largely follows Mach in the “individual procedures” of concept formation, which rest on the view that “concepts and conceptual systems are made legitimate only by their serving for the overview of complexes of experiences.”⁴⁴ He thus starts from the Machian critique of the Newtonian notions of absolute space and absolute time as well as of mass as the inner substance of the body, and, more generally, proceeds with the operational definition of physical concepts as it had been advocated by Mach.⁴⁵ This is exemplified by his definition, in special relativity, of the simultaneity of spatially distant events. Einstein's debt to Mach in this respect is thus not only attested to by his autobiographical remarks, but can also be ascertained through analysis of his scientific work. In other words, there is indeed a sense in which Mach's views on physical science served as “a direct forerunner of relativity theory.”⁴⁶

42. Hiromatsu's philosophical analysis of quantum physics is in HWC 3: 137–230, 290–343.

43. These texts are included in HWC 3: 277–90, 361–416. It is also worth noting that the first edition of *The Philosophy of Relativity Theory* was co-authored with Itagaki Ryōichi 板垣良一, who wrote the third chapter.

44. CPE 7: 2/2; see also HWC, 3: 435.

45. Analyzing each of Mach's concepts of mass, space, time, and mechanical laws, Hiromatsu examines how they, combined together, prefigure Einstein's view of nature in relativity theory (HWC 3: 417–46).

46. HWC 3: 417.

However, Einstein's method is not altogether Machian. According to Hiromatsu, Einstein diverges from Mach in the overall methodology of theory construction. That is, while Mach aims at an abridged description of sensuous phenomena, Einstein prefers a deductive path starting from basic principles. This difference between the two thinkers, while growing larger in Einstein's later years, "can be perceived consistently" from the beginning of his scientific career. In certain respects, Hiromatsu continues, Einstein's method may even be linked to Kantian philosophy. His derivation of the Lorentz transformation, in particular, can in a sense be characterized as a quasi-Kantian determination of the "conditions of possibility" of the experimental facts expressed by the two basic principles—the principle of relativity and the principle of the constancy of the velocity of light.⁴⁷ This being the case, relativity theory cannot uniquely be associated with either Machian or Kantian philosophy. This is not at all to say, however, that the theory is philosophically eclectic. Rather, Hiromatsu suggests the possibility that relativity theory goes beyond the very "horizon" within which Machian empiricism and Kantian transcendentalism, among other doctrines, are opposed to each other.⁴⁸ To examine this possibility, he subsequently focuses on the ontological, and then on the epistemological dimension of the theory.

The ontological dimension of relativity theory, Hiromatsu argues, is concerned with its rejection of substantialist notions underlying classical physics. As is well known, in the special theory of relativity, space and time are shown to be dependent on each other, as expressed quantitatively by the Lorentz transformation, and the mass of the body dependent on the velocity of motion relative to the system of reference. Yet space-time in special relativity, while conditioning the motion of material bodies, is not itself conditioned by matter. A new situation arises in general relativity, however, where gravitation, equivalent to the acceleration of the reference system, is not simply an action on bodies *in* space-time, but is itself just another expression for the properties of space-time. In consequence, space-time is no longer independent of matter, but is conditioned by matter via the gravitational field.⁴⁹ We can thus see how space and time in special relativity, and then

47. HWC 3: 371–2.

48. HWC 3: 373.

49. See HWC 3: 281.

space-time and matter in general relativity, are each no longer conceived as self-contained in character, but are reformulated as interdependent terms of functional relations.

Here it is crucial to Hiromatsu that these functional relations are not secondary or external to the terms related. In Newtonian mechanics, space, time, matter, and force had been treated as if each of them were a “primary entity,” the relations between them remaining external. In relativity theory, however, relation is prior to, and constitutive of, the terms related. As regards special relativity, “it is not that there are in the first place two *things*, space and time, which *post factum* enter into a relation to each other, but that their relation is the primary, basic being.”⁵⁰ This relationist interpretation by Hiromatsu might seem to resemble mathematician Herman Minkowski’s ontological account of his four-dimensional reformulation of special relativity.⁵¹ When, however, Minkowski remarks that “space for itself (*für sich*) and time for itself are to sink completely into shadows, and only a kind of union of the two is to preserve independence,”⁵² he tends to hypostatize space-time as a whole. Hiromatsu’s departure from this Minkowskian interpretation is not explicitly stated by himself, yet implied in his general philosophical orientation. That is, rejecting the hypostatization of the whole as a version of substantialism, he underlines “the primacy of relation” itself.⁵³ It is, in Hiromatsu’s view, with this “relationist world picture” that relativity theory represents a significant shift in the history of physical-scientific thought.

This ontological innovation alone, however, would not render relativity theory fully revolutionary. As mentioned earlier, Mach had already criticized the hypostatized notions of space, time, matter, and force, and reinter-

50. HWC 3: 388.

51. Shortly after Einstein presented special relativity, Minkowski developed a mathematical reformulation of the theory in which time is treated as formally equivalent to the space coordinates and the Lorentz transformation is represented as a kind of geometrical rotation in four-dimensional space-time. Einstein was initially unimpressed by this Minkowskian interpretation, but came to adopt its four-dimensional formalism in the course of generalizing relativity theory. This does not mean, however, that Einstein’s understanding of relativity theory came to accord philosophically with Minkowski’s. See KATSUMORI 1992, 570–1.

52. MINKOWSKI 1909, 104/75.

53. HWC 3: 359. Elsewhere Hiromatsu develops his critique of the hypostatization of the whole in contexts outside physical science (see HWC 10: 525ff., 16: 282).

preted them as relations of sensuous phenomena, anticipating, in particular, Einstein's general-relativistic conception of space-time as what Hiromatsu calls "material space or spatial matter."⁵⁴ Furthermore, among Einstein's contemporaries, such thinkers as Machian philosopher Joseph Petzoldt and, to a greater extent, neo-Kantian Ernst Cassirer thematized and favorably assessed the way in which relativity theory had replaced the Newtonian substance-concepts with concepts of functional relations. The relationist tendency of relativity theory was thus, in one way or another, accommodated to Machism and to a version of neo-Kantianism, neither of which, in Hiromatsu's view, fully goes beyond the modern philosophical framework.

It is rather, Hiromatsu holds, by virtue of its epistemological relevance that the relationist mode of thought of relativity theory gains its novelty. This epistemological dimension centers around what he calls "the problem of observation." In other words, not only the relation between objects is at issue, but the relation between, and involving, observing subjects as well. In special relativity, as Einstein shows, "two events that are simultaneous when viewed from a particular coordinate system can no longer be considered as simultaneous events when viewed from a system that is moving relatively to that system."⁵⁵

Similar to the notion of simultaneity, such quantities as length, time interval, and mass also prove to be no longer invariable, but relative to the state of motion of the observing system. By this relativity, however, it is not merely meant that the result of measurement is dependent on the observing system, but also, and more importantly, that the results obtained in different systems are all equally legitimate, none of them being privileged over the others.⁵⁶ Yet, as Hiromatsu stresses, this in no way leads to a "sheer relativism." What is crucial is, rather, that two (or more) different observers, while obtaining different results of measurement, come to view them synthetically in a common meaning. In Hiromatsu's terminology, the observers each

54. HWC 3: 392.

55. CPE 2: 282/145.

56. For provisional convenience, Hiromatsu here presupposes the identity of the observed object for different observers. This issue of the intersubjective identity of the object constitutes, however, a theme of his later discussions in the *Outpost to a Koto-Based Worldview*, where he reconceives the identical object as an intersubjective construct which is formed in the framework of the fourfold structure (see HWC 3: 307–14).

grasp the “phenomenon-for-the-self” and “phenomenon-for-the-other” in just one and the same intersubjective meaning.⁵⁷

Such a structure of intersubjectivity is, as Hiromatsu notes, already constitutive of knowledge in Newtonian physics and also of our everyday experience—as, for instance, when we take what is a triangle for me and a circle for another to be different perspectival appearances (*Abschattungen*) of one and the same cone. Yet this state of affairs had traditionally been more or less concealed by the notion of independent objective reality and that of a privileged subjective standpoint (such as that of the absolutely resting system) from which that reality can be correctly grasped. To be sure, as we saw in the previous section, Mach had rejected this subject/object dichotomy, conceiving the phenomenal world instead as consisting of neutral sensuous elements. Nevertheless, to repeat Hiromatsu’s criticism, he had failed to recognize the intersubjectivity of meaning as an integral moment of phenomena. Rather than thematizing the question of intersubjectivity, Mach had unwittingly presupposed an intersubjective unity of experiences prior to their perspectival differences. For example, about the geocentric and the heliocentric systems of the universe, Mach notes that “the universe is not *twice* given, with an earth at rest and an earth in motion; but only *once*, with its *relative* motions, alone determinable.”⁵⁸ This remark, not cited by Hiromatsu, could serve as a succinct illustration of the differences at issue between the orientations of Mach and Einstein. Unlike Mach’s line of thought, relativity theory focuses precisely on the way in which the different experiences of different observers are intersubjectified. It is in this sense, Hiromatsu holds, that, with relativity theory, the question of intersubjectivity has first been made manifest in the history of physical science.⁵⁹

Hiromatsu qualifies this point, however, by saying that the above epistemological dimension of relativity theory is an implication found by *us*, and does not coincide with Einstein’s own understanding of the matter. Einstein himself, in Hiromatsu’s account, embraced more traditional philosophical ideas, and was not fully free, in particular, of the notion of objective reality independent of the subject. When comparing various results of measure-

57. HWC 3: 284.

58. MACH 1883, 226/284.

59. HWC 3: 284.

ment obtained in different reference systems, “he was inclined to regard as real the states of affairs corresponding to the observations made from the system to which the object belongs.”⁶⁰ Einstein was thus not fully aware of what his theory actually achieved in the philosophical dimension. Stated otherwise, Hiromatsu’s account of relativity theory in terms of intersubjectivity is a reconstructive work from his own philosophical point of view, not from Einstein’s.

It appears to me, however, that Einstein himself, in a certain phase of his career, came closer to the Hiromatsuan notion of intersubjectivity—with regard to relativity theory as well as in a more general epistemological context. This is attested to by the opening passages of his 1921 Princeton lectures (published in 1922 as *Vier Vorlesungen über Relativitätstheorie*), which Hiromatsu could have cited in support of his interpretation. Einstein begins by pointing out that any experience at first belongs to the individual, and is thus subjective.⁶¹ A step toward scientific cognition is taken, however, when, with the aid of language, different persons compare their experiences. What is crucial here is that “to those sensuous experiences [of different persons] which correspond to each other and are therefore in a sense transpersonal (*überpersönlich*), one attributes in thought a reality.”⁶² This is the way in which one forms the concept of the physical body and other concepts referring to experiences that allow mutual correspondence between individuals. In special relativity, Einstein continues, the definition of simultaneity posits a unique time valid to all observers in a single inertial system, thus endowing

60. HWC 3: 412. This remark by Hiromatsu seems to be questionable in light of Einstein’s debate in 1911 with mathematician V. Varičak on the contraction of moving bodies. While Varičak (1911, 169) maintained that, in Einstein’s theory, the contraction is “an apparent, subjective phenomenon,” Einstein rejected this interpretation by saying that “the question of whether the Lorentz contraction *really* (*wirklich*) exists or not is misleading.” The contraction, he continues, “does not ‘really’ exist insofar as it does not exist for an observer moving with the body,” while “it does ‘really’ exist—that is, in such a way that it could in principle be demonstrated by physical means—for an observer not moving with the body” (CPE 3: 482–3). We can thus see that as far as the Lorentz contraction is concerned, Einstein considered the different results of measurement obtained by different observers to be equally real (see PAIS 1982, 144).

61. On this point, Hiromatsu would not agree with Einstein, holding instead that there is from the outset a structure of intersubjectivity or, to put it more dynamically, that the process of intersubjectification has always already begun.

62. Einstein 1922, 1/2 (CPE 7: 500).

the result of the space-time measurement with some “physically real” meaning.⁶³ Proceeding to the situation that concerns the relations between different inertial systems, however, one must seek physical reality in the validity of the concepts for all those systems. What is now considered real is therefore no longer the point in space or the instant in time at which an event occurs, but rather the event itself, or the corresponding space-time point, which is invariant with respect to the choice of the system.⁶⁴ This Einsteinian notion of “transpersonal” validity as constitutive of knowledge in general and of concept formation in special relativity in particular—a view that would largely disappear in the later Einstein—prefigures to some extent the notion of intersubjectivity around which Hiromatsu’s interpretation revolves. Conversely speaking, Hiromatsu’s epistemological understanding of relativity theory proves to be more in line with Einstein’s own at the time than Hiromatsu himself supposes.

With this consideration in mind, let us look somewhat more closely at Hiromatsu’s analysis which primarily refers to special relativity and yet, in his view, also applies to general relativity. Restricting himself to the relation of *two* observers who belong to different systems, Hiromatsu gives a preliminary warning: It would be misguided to suppose that only one of the observers needs to perform actual measurement, and that, by the use of the transformation equations, we can indirectly obtain the possible results of measurement for the other observer as well, thus rendering their (possible) experiences intersubjective. This contains a *petitio principii*, for the coordinate transformation is available not prior to, but as a result of, the very process through which knowledge is intersubjectified. This being the case, it must be that both observers begin by carrying out measurement, then report their results to each other. Only thus is it possible for the observers to proceed through “communication and mutual understanding,” and finally to set up the coordinate transformation.⁶⁵

Hiromatsu goes on to argue that the observers, each aware of a pair of phenomena, the “phenomenon-for-the-self” and the “phenomenon-for-the-other”—or linguistic representations thereof—recognize not only the

63. Einstein 1922, 19/29 (CPE 7: 518).

64. Einstein 1922, 20/30 (CPE 7: 519).

65. HWC 3: 288.

difference between the two phenomena, but also the fact that the manner in which they differ for one of the observers is “conjugate” with that for the other.⁶⁶ This knowledge is gained through each observer’s assuming in thought the other’s observational standpoint, while at the same time retaining her/his own. This leads, as we saw earlier in a preliminary account, to the following situation:

The two observers, who have as givens the immediate phenomenon-for-the-self and the phenomenon-for-the-other..., each posit these two givens in an intersubjectively identical meaning, and thereby conceive them as perspectival appearances of an intersubjectively unitary given....⁶⁷

This “identical meaning” corresponds mathematically to the coordinate transformation equations. Here we can see, stresses Hiromatsu, that each of the phenomena appears to the observers, not simply as an immediate given, but *as* something more or something else, something *meaningful*. Thus the “known” side of the phenomena is of a twofold character, which is to say that it consists of both a phenomenal and a meaningful moment. While the meaningful moment may be called “objective,” it is not that it is free from subjective factors, but that it is intersubjectively valid precisely by virtue of its internal relation to the observing subjects or “knowers.”

These observers, Hiromatsu continues, in positing the common meaning, transform themselves into intersubjectively isomorphic knowers. Each of them is “no longer a mere being-for-oneself, but a being-for-oneself as being-for-another or a being-for-another as being-for-oneself,” thus exhibiting a “twofold structure of self-dividing unity.” In this way, not only the known side, but also the knowing side of phenomena proves to be twofold. We now see, as Hiromatsu concludes, that these two sides are bound up with each other to form a “fourfold structural relation”: The observed given is valid as something more (or something else) for the observer as someone more (or someone else).⁶⁸ This is Hiromatsu’s final formulation of the cognitive structure of relativity theory, and it constitutes a particular and typical

66. HWC 3: 401.

67. HWC 3: 403. The original Japanese for “meaning” here is 意味の所知, which might literally be rendered as “the meaningful known.” In Hiromatsu’s later work, represented by *Being and Meaning*, this term is renamed 意味の所識, as we shall see in the following section.

68. HWC 3: 403.

case of the general fourfold structure of phenomena, which will be the main subject of the next section.

Having surveyed Hiromatsu's philosophical analysis of relativity theory, we can see, on the one hand, that this analysis is not entirely restricted to the framework of synchronic structure, but at times refers to the process through which phenomena are intersubjectively structured. Specifically, as opposed to the Machian presupposition of the intersubjective unity of experiences and to the possible misconception of relativity theory that begs the question of how knowledge is intersubjectified, Hiromatsu emphasizes the indispensability of the process of "mutual understanding" of the observers.

On the other hand, it seems to me that his epistemological analysis tends to be reducible to an account of the very result of the communicative process. After mentioning the situation in which the two observers imaginatively take each other's standpoint, Hiromatsu passes on directly (with apparent smoothness) to the final state in which the observers as intersubjective knowers share a single meaning. Focusing on this final state, he leaves the transition from the former to the latter largely unspecified. Here we encounter the same kind of issue pointed out earlier with regard to his critique of Mach's thought. As I will suggest later, this issue is also bound up with the fact that Hiromatsu appears to underestimate the differences in philosophical conception between the two theories of relativity as well as the differences between Einstein's earlier and later philosophical thinking. Before returning to these questions, however, I wish to sketch out Hiromatsu's general philosophical framework, which will provide a proper perspective on what we have seen so far in this article.

THE THEORY OF THE FOURFOLD STRUCTURE

Hiromatsu's overall philosophical project revolves around the theory of what he calls the fourfold structure (四肢構造), which he developed in his 1972 book *The Intersubjective Being-Structure of the World* 『世界の共同主観的存在構造』 and several subsequent works, most elaborately in *Being and Meaning* 『存在と意味』 (1982, 1993). In this theory, he sets himself the task of a primarily "synchronic" structural analysis of the phenom-

enal world as it unfolds in both cognitive and practical dimensions.⁶⁹ Since the present study is mostly concerned with cognitive issues, we will largely restrict ourselves to his account of the “cognitive world,” that is, the world “in a provisional abstraction from such moments as practical significance or value significance.”⁷⁰

Hiromatsu rejects the subject/object schema underlying modern philosophy in general, and, like Mach, conceives phenomena as neither simply subjective nor purely objective, but prior to the very division of subject and object. Yet, as we have seen earlier, he breaks with Machian phenomenalism to the extent that Mach remains unaware of the “meaningful moment” of phenomena. Rather, in a manner reminiscent of phenomenology, Hiromatsu stresses that all phenomena bear meaning. His basic claim is as follows:

The phenomenon always already appears in itself *as something* more than a mere ‘sensuous’ given. The sound that is just heard appears intuitively *as* a car horn, and what is seen outside the window, *as* a pine tree.⁷¹

This applies not only to perceptions, but to all kinds of phenomena including representations and linguistically mediated judgments. All these phenomena appear as something more or something other than “the phenomenal given” (現相の所与). In other words, the phenomenon is such that, “in showing itself..., it always already shows something else.” Hiromatsu designates this something more or something else as “the meaningful cognized” (意味の所識) or simply the “meaning.”⁷² Any phenomenon thus consists of these two factors, given and meaning, linked to each other in such a way that the former appears *as* the latter. If we denote the phenomenal given by *p* and the meaningful cognized by [*p*], the mode of being of phenomena may thus be expressed as: *p* as [*p*]. This *as*-connection constitutes “the fun-

69. The first and the second volumes of *Being and Meaning* are devoted to an analysis of the cognitive and the practical dimensions, respectively.

70. HWC 15: 5. Far from granting a fundamental priority to the cognitive over the practical, Hiromatsu notes that “the cognitive world is nothing more than a structural moment or perspectival cross-section of the practical world” (HWC 15: xvii). Yet, in order to confront squarely the modern philosophical tradition, which has primarily been concerned with the cognitive dimension, he finds it convenient to start with this dimension.

71. HWC 1: 33.

72. HWC 15: 39, I: 34.

damental unity of ‘otherness’ (difference) and ‘sameness’ (identity)” of the two factors.⁷³

This twofold or dual structure of phenomena, Hiromatsu continues, is “manifest most typically in the case of signs,” such as a series of sounds or ink stains appearing as a meaningful word. Yet this twofoldness is not unique to what are commonly called signs, but, conversely, all phenomena are, in a sense, “of a signitive (symbolic) character.”⁷⁴ It is precisely by virtue of this general character of phenomena that signs in the narrow sense can function as signs. From this point of view, Hiromatsu renames the phenomenal given the “signifier” and the meaningful cognized the “signified,” and characterizes their as-connection as a “symbolic combination.”⁷⁵

While breaking with Machian monism and emphasizing the twofold character of phenomena, Hiromatsu in no way maintains a *dualism* of mutually independent terms. On the contrary, he seeks to de-substantialize the two moments of phenomena by what may, in a sense, be characterized as an extension of the Saussurian view of signs to all phenomena. First, he argues that not only are all phenomena meaningful, but also any meaning (or signified) exists only to the extent that it is tied to, or, as it were, “incarnated” in a phenomenal given (or signifier).⁷⁶ In other words, far from being self-contained entities, both the given and the meaning can be what they are only in their interrelation. Second, Hiromatsu points to the differential character of meaning: It is not that the meaning A is distinguished from non-A because of A’s independent self-identity, but that “A is taken... as self-identical insofar as it is distinguished from non-A.”⁷⁷ In this way, with regard both to the relation between given and meaning and to the relation between different meanings, he offers a radically “relationist” account, rejecting the reifying notion of meaning as self-contained.

Hiromatsu goes on to determine more closely the character of the mean-

73. Here I have drawn on Hiromatsu’s notation employed elsewhere for Karl Marx’s concepts of use-value and value of commodities, which, in his reading, exemplify two factors of the phenomenon in the practical domain, corresponding respectively to given and meaning under discussion here (see HWC 12: 148, 13: 255).

74. HWC 1: 34.

75. HWC 15: 149.

76. HWC 1: 36.

77. HWC 15: 26.

ingful cognized. Meaning is neither a “real object” referred to, nor a “mental image” associated with the phenomenal given. For what are called real objects as well as mental images are themselves phenomena, already consisting of the two moments of given and meaning. Rather, meaning is, if considered as such, marked by its “ideal” character. The meaning (e.g. tree), *as* which a series of phenomenal givens (that pine, this cedar, etc.) equally appear, exhibits a “universal, trans-spatial, and invariable,” in short, “ideal” character, whereas the given is “individual, local, and variable,” that is, “real.”⁷⁸ It is crucial to note, however, that this ideality of meaning holds only insofar as one attempts in thought to “isolate” the meaning from the whole phenomenon and to “treat it as if it were an independent term.” In other words, as Hiromatsu admits, his characterization of meaning as ideal contains a kind of “reification”—a critical and self-critical insight that marks his decisive break with Husserlian phenomenology.⁷⁹ In an effort to avoid this reification, Hiromatsu reformulates the meaning as “functional,” in the sense of the mathematical function into which specific values—corresponding to phenomenal givens—are each time inserted.⁸⁰ He holds this analogy to be appropriate insofar as the function is not considered in separation from the specific values it takes.

This motif of criticizing reification further leads Hiromatsu into a certain relativization of the given/cognized distinction itself. He points to the possibility of the “manifold process” or “multi-layered structure” in which “the given-cognized formation at one level... stands in the position of a given in relation to a higher-level meaningful cognized.”⁸¹ Stated conversely, the phenomenal given at any level can be a twofold formation at a lower level. In the series of such different levels, he continues, “there is no fixed, unique lowest-level given.”⁸² For, as soon as one is conscious of the phenomenal given as such, this can no longer be a pure given, but is already known *as* something. This last point may serve as a crucial argument against the adequacy of Machian phenomenalism, since it gives the essential reason why Machian

78. HWC 15: 21.

79. HWC 15: 17.

80. HWC 15: 22.

81. HWC 1: 45, 15: 7.

82. HWC 15: 8.

sensuous elements—as well as what positivists call “sense data”—are not an ultimate given, but already assume the duality of given and meaning.⁸³

So far, Hiromatsu has restricted himself to the “known” side of phenomena in a provisional abstraction from the subjective or “knowing” side. Yet, as he points out, a phenomenon is every time a phenomenon “for someone,”⁸⁴ and this someone—the “knower” (能知)—is, like “the known” (所知), also twofold in character.⁸⁵ In the previous section, we focused on Hiromatsu’s account of how, in relativity theory, two observers assume in thought each other’s observational standpoint, thus each of them being in a state of “self-dividing unity.” He now gives another example: When “a child sees a cow and says ‘doggie,’” it is indeed to the child, not to me, that the phenomenon appears as a “doggie.” Yet, “without in a sense taking a cow as a dog, I could not even know that the child has ‘mistaken’ it for a dog.”⁸⁶ Here we see, again, the “self-dividing unity” of “oneself as oneself” and “oneself as (playing the role of) another.”⁸⁷ While this is most manifestly seen in linguistic communication, the twofoldness of “someone as someone (else)” can be recognized generally in phenomenal consciousness. The latter someone, “initially a concrete individual,” tends, through human intercourse, to be depersonalized into “the one” (ヒト) or what Heidegger calls *das Man*,⁸⁸ so that the knower takes on the form of “someone as the one.” Insofar as the known is attributed to this someone as the one, Hiromatsu designates the someone as the “knowing someone” (能知的誰某), and the one as the “cognizing Someone” (能識的或者), formulating the twofoldness of the knower: P as [P]. Just like the meaningful cognized, the cognizing Someone, if considered separately from the “real” knowing someone, exhibits a universal, invariable, and trans-spatial, that is, “ideal” character.⁸⁹ Thus structured in

83. HWC 1: 47.

84. HWC 1: 38/973. The second page number refers to the English translation (HIROMATSU 2011).

85. HWC 15: 87.

86. HWC 1: 38–9/973–4.

87. HWC 15: 133–4.

88. HWC 15: 134, 1:44/977.

89. HWC 15: 135.

parallel with the known, the knower “exists as the cognizing Someone who is more than the knowing someone.”⁹⁰

It might appear to the reader that Hiromatsu is simply calling subject and object by other names—knower and known, respectively—and dividing each of them into two factors. Yet, Hiromatsu emphasizes, unlike the traditional notions of subject and object, knower and known are not “ontically separate,” but are just the two non-fixed aspects of a “state of union.” This internal link between knower and known is further specified as follows. First, the phenomenal given and the knowing someone are necessarily connected in such a way that the former is “each time perspectively given” to the latter.⁹¹ Second, and more importantly, the formation of a meaning is correlative with the process through which different knowers make themselves intersubjectively isomorphic to become a cognizing Someone. This is once more suitably illustrated by the cognitive structure of relativity theory: As we have seen earlier, the two observers posit a common meaning in correlation with the process through which they transform themselves into a general knower that corresponds to Einstein’s standpoint as a theorist. It thus follows, according to Hiromatsu, that “intersubjectivity” (*kanshukansei* 間主観性 or *kyōdōshukansei* 共同主観性) serves as the essential link between meaning and Someone. Intersubjectivity lies in the fact that “while I and the other have as givens different perspectival phenomena,” we can share one and the same meaning.⁹²

We can now see how the twofold structures of both knower and known are combined to form a fourfold structure: “a given presents itself as something to someone as Someone,” or, in fully technical terms, “a phenomenal given is valid as a meaningful cognized for a knowing someone as a cognizing Someone” (p as [p] for P as [P]).⁹³ For instance, something outside the window appears as a tree to me as a “one” (general knower); and the sound “*ki*” bears the meaning “tree” to me as a Japanese speaker. These four moments of the phenomenon, as Hiromatsu repeatedly stresses, are not self-contained elements that subsequently enter into a relation to one

90. HWC 15: 132.

91. HWC 15: 185.

92. HWC 15: 189.

93. HWC 15: 198.

another, but themselves “can subsist only as factors of the [fourfold] functional relationship.”⁹⁴ Moreover, as is seen from our discussion so far, a fourfold-structured phenomenon itself is “not closed in on itself as a four-term relation,” but exists only in relation to other phenomena, that is, to other fourfold formations.⁹⁵ Insofar as the phenomenon is thus relationally structured, Hiromatsu names it the *koto* (事)—a Japanese term that defies simple translation but may roughly be rendered as “state of affairs” or *Sachverhalt*.⁹⁶ He counterposes this *koto* to the *mono* (物), namely, the thing (*Ding, res*) that is taken as substantial or self-contained.

It is in terms of this contrast between *koto* and *mono* that Hiromatsu defines the term “reification” (物象化), broadening Karl Marx’s concept of reification (*Verdinglichung, Versachlichung*)—the reification of the social relation between humans—into a concept that covers the whole phenomenal world. By reification he means mistaking a *koto* for a *mono*, that is, a misconception of the fourfold structural relation such that one or more terms of the relation are taken as independent of the other terms or of the whole relationship. More strictly, in terms of the quasi-Hegelian we/it perspectival difference, reification is defined as the circumstance that “a *koto*, which is determined relationally from the point of view of scholarly reflection (*für uns*), appears as a *mono* to the immediate consciousness involved (*für es*).”⁹⁷ While the hypostatization of meaning constitutes the most typical mode of reification, Hiromatsu is, as we have seen, no less critical of the Machian or other modes of reification of the phenomenal given, or of the reification of the known or knower as a whole. A continual uncovering and overcoming of reification in this manner thus constitutes the leading motif of his theory of the fourfold structure.

Hiromatsu’s philosophical approach as outlined so far is, in his own characterization, primarily a “synchronic” structural analysis of the phenomenal world.⁹⁸ It has indeed culminated in the formulation of the synchronic fourfold structure, in terms of which his key concept of reification, in particular,

94. HWC 1: 45.

95. HWC 13: 260.

96. HWC 15: 199.

97. HWC 13: 245.

98. HWC 1: 29.

is defined. At the same time, however, his arguments contain some lines of thought that cannot be confined within the synchronic framework. In fact, with regard to the knowing side of phenomena, we saw Hiromatsu start from the twofoldness of “someone as someone (else)” where, like the former someone, the latter is also a “concrete individual,” which has not yet been depersonalized into the one or cognizing Someone.⁹⁹ He subsequently laid emphasis on the process through which the meaning and cognizing Someone correlatively form themselves. Thus Hiromatsu’s philosophy—and this is quite natural in view of his commitment to Marxian dialectics—at least partly opens itself to the dimension of “structural change” that is concerned not so much with the merely diachronic transition of already structured systems, but rather with the very process through which phenomena are structured. Nevertheless, as was the case in his analysis of Mach and relativity theory, he does not fully make explicit this dynamic dimension in its distinction from, and its interrelation with, the dimension of synchronic structure. Rather, his dynamic conceptions largely stand in latent tension with his generally synchronic framework. In the following and final section, I will focus on this conceptual tension and also, from that perspective, offer critical suggestions on Hiromatsu’s readings of Mach’s philosophy and relativity theory.

A CRITICAL ANALYSIS: BEYOND SYNCHRONIC STRUCTURE

Some important clues for understanding Hiromatsu’s dynamic conceptions may be found in some minute details of his texts rather than in the major lines of argument. Let us recall his phrase “in itself” (*an sich*) as in the statement, cited earlier, that a phenomenon appears in itself as something more than a mere sensuous given. By this qualification “in itself,” Hiromatsu means that the knower is not always actually—but in many cases

99. It is not essential here, however, to take the *individual* as the starting point. For, according to Hiromatsu, the personal individual is not a primary being any more than the one, but derives from the division of pre-personal phenomena into self and other (HWC 15: 112). What is important, rather, may best be suggested by Hiromatsu’s remarks that the twofoldness of the knower holds “except for the latent ‘knowing subject’ in the genetically initial phase,” and that some kinds of mental illness may be characterized as a “disintegration” of the cognizing Someone (HWC 15: 148, 2: 453). These remarks imply his acknowledgement that there *are* phases or cases in which the cognizing Someone is either not yet established or has already collapsed.

only potentially—conscious of the twofoldness of phenomena. According to Hiromatsu, “in the *immediate* consciousness of the subject involved,” the phenomenon is commonly a full unity of given and meaning. “In *reflective* consciousness,” however, it is readily “bifurcated” into the two moments.¹⁰⁰ This indicates the essential relevance of reflection on phenomena to the twofold character (of the known side) of phenomena themselves.

Furthermore, Hiromatsu continues, as soon as one is conscious of the phenomenal given in distinction to the meaning, this given is no longer a given as such, but is itself dualized into a given and a meaning.

For instance, when one is aware of a “comma” [in a written text] and then tries to make explicit “the given” of which one has just been aware *as a comma*, one is now aware of that moment as, say, a *black spot*. That is, one is aware of the given anew in a twofold structure, *as a cognized “black spot,”* which is different from the initially cognized “comma.”¹⁰¹

This argument, seen earlier in outline, is meant to prove the non-presence of the phenomenal given “purified” of meaning. In my view, however, what is more important here lies in the course of the argument itself. That is to say, reflective consciousness not only makes explicit the twofoldness of the phenomenon (p as [p]), but at the same time produces a new twofold formation (p’ as [p’]). Reflection on a phenomenon, itself involved in the phenomenal world, cannot simply be to see the phenomenon just as it is, but necessarily redetermines it in meaning. In other words, a phenomenon, as soon as it is reflected upon, undergoes a change or displacement in meaning.

Hiromatsu’s other passages further suggest that displacing movements occur not only with reflection on a phenomenon, but are already contained in a “single” phenomenon. To see this point, we must pay attention to a subtle difference between the following two ways in which he formulates the duality of given and meaning. On the one hand, Hiromatsu states that a phenomenon appears as something “more than a mere ‘sensible’ given,” or something other than a phenomenal given. This type of formulation readily leads to the synchronic frame in which the phenomenon consists of the two factors of given and meaning. On the other hand, Hiromatsu also maintains

100. HWC I: 348.

101. HWC I: 348.

that the phenomenon is such that, “in showing itself..., it always already shows something else.” This mode of expression implies that the phenomenon contains in itself a movement of becoming *other than itself* or a displacement of itself. It is without doubt this latter formulation that is relevant to the dynamic dimension, which is rendered invisible in the first formulation.

These considerations of the processes through which phenomena are structured, however, appear to stand in a rather ambivalent relation to Hiromatsu’s primarily synchronic or static framework. On the one hand, they serve as “an auxiliary means for the theory of the structure of being,”¹⁰² as is illustrated by the previous argument for the non-presence of the pure given. Yet, on the other hand, those dynamic considerations could undermine the synchronic framework by questioning the general validity of the formulation of the fourfold structure. If there are phases or cases in which the twofoldness of the known as well as the knower is not yet established, and if any such twofold formation, even once established, is subject to incessant displacement, then the twofold—and hence the fourfold—structure may be reconceived as a static projection of the de- and restructuring of phenomena.

I have elsewhere thematized this issue, through following Hiromatsu’s dynamic conceptions further than he himself does, eventually to suggest the possibility that his synchronic formulation of the fourfold structure may itself be viewed as reifying.¹⁰³ Here, however, instead of directly pursuing this issue, let us take a kind of detour: Returning to the questions concerning Mach’s philosophy and Einstein’s relativity theory, I wish to sketch out my own reading thereof—with attention to some comparable tensions in their thought—so as to shed critical sidelights on Hiromatsu’s philosophy and his interpretive approaches to the physicists’ thought. As we saw in the first two sections, Hiromatsu’s readings of Mach’s philosophy and relativity theory do not entirely limit themselves to the dimension of synchronic structure, but contain some references to the dynamic dimension in which phenomena are structured. With regard to Mach, Hiromatsu critically argues that his philosophy neglects the process through which phenomena are endowed with ideal and intersubjective meanings; his analysis of relativity theory is also concerned with the process through which different phe-

102. HWC 15: 36.

103. KATSUMORI 1993 and Chapter 1 of KATSUMORI 2009.

nomena are grasped in a single meaning. Nevertheless, in these analyses (no less than in his general theory of the fourfold structure), Hiromatsu leaves the two dimensions—synchronic structure and structuring movement—largely in latent tension without elaborating on how they are related to each other. In what follows, focusing precisely on this relation between the two dimensions, I will briefly present an alternative reading of Mach’s philosophy, and then of relativity theory.

In Mach’s philosophy, just as in Hiromatsu’s, there seem to be two different lines of thinking that are hardly in accord with each other. *On the one hand*, Mach’s critique of “metaphysical” notions, including the hypostatization of mind and body, rests on the contrast between direct experience and “thought symbols” or “things of thought.” Specifically, in his critique of Newtonian physics, Mach rejects absolute space and absolute motion as “mere things of thought (*Gedankendinge*) that cannot be shown in experience.”¹⁰⁴ To be sure, some things of thought—“certain mathematical functions,” for example—may or even need to be used as “auxiliary representations” or “provisional aids” for economical descriptions of phenomena.¹⁰⁵ Yet—and this is crucial to Mach—they have nothing to do with the phenomena themselves. We must “distinguish sharply between concept and law on one side and fact on the other.”¹⁰⁶ Physics, in particular, should restrict itself to “the expression of the factual, without constructing hypotheses behind it” and “without imagining... anything other than physical characteristics... directly or indirectly given by observation.”¹⁰⁷

This line of argument in Mach’s work adopts a series of binary oppositions such as experience/thought, fact/concept, and phenomenon/representation, which, though not strictly equivalent, are closely associated with one another.¹⁰⁸ While what he calls metaphysics has generally privi-

104. MACH 1883, 222–3/280. Mach remarks similarly on “spaces of more than three dimensions” as well as “atoms” (MACH 1883, 466–7/588–9).

105. MACH 1883, 466–7/589.

106. MACH 1905, 456/356.

107. MACH 1883, 473/597.

108. Elsewhere in his work, we can locate further parallel pairs of terms: sensation/understanding (*Verstand*), sensuous/intellectual, real/ideal, natural/artificial, and so forth (see MACH 1886, 19, 87; 1896, 600). To which one of the opposing sides Mach classifies non-conceptual representation (*Vorstellung*) is not unambiguous, but seems to depend on the context.

leged and hypostatized the second term of each opposition, Mach seeks to overturn this hierarchy, giving priority to the first term, namely, fact, experience, or the sensuous phenomenon. That is to say, he still remains *within* the binary framework, while simply reversing the order of value. He upholds the opposition between empirical fact, which is originally present, and conceptual thought, which secondarily represents it—or, in other words, between supposedly self-sufficient experience and its mere “supplementation” in thought. This being the case, Mach’s philosophy does have a dualistic aspect, contrary to Hiromatsu’s assessment that it only “superficially” seems so. While rejecting mind-matter dualism and the separation of subject and object, Mach maintains the hierarchical binary of experience and its conceptual representation, and to this extent his philosophy remains an inverted system of metaphysics.¹⁰⁹

On the other hand, Mach does not restrict himself to such a simple inversion of metaphysics. In another important aspect, his philosophy denies—rather than devalues—anything in the world that is not sensuous or phenomenal. He maintains, as we have seen earlier, that, in cognition, the connection of sensuous elements is represented by other sensuous elements ($\alpha\beta\gamma\dots$). That is to say, just as fact consists of sensuous elements, so also does what represents fact. Moreover, since all elements are homogenous and of equal value, empirical facts and its conceptual representations are of the same kind and the same rank as to their components. This being the case, there can be no fundamental opposition between experience and thought, and no primacy of the one over the other. It is in this sense that, as Mach repeatedly stresses, “we ourselves, with our thoughts, are just a part of nature.”¹¹⁰ To be sure, the homogeneity of all elements as such does not necessarily prevent their complexes from being classified into immediate givens and their representations. Such a distinction, however, cannot be concerned with the ontic status of the complexes of elements. Mach’s remark, for example, that “even the wildest dream is a fact as much as any other” implies that

109. Einstein seems to have interpreted Mach along this line. In 1922, he notes that “for Mach, there are two points to distinguish: On the one hand, there are the immediate data of experience, things we cannot change; on the other hand, there are concepts which we can modify” (CPW 13: 248).

110. MACH 1883, 217/273.

no complexes whatever have priority over the others.¹¹¹ We can thus see that the binary system of metaphysics is not inverted, but *dissolved*.

In this context, Mach's concept of "supplementation" takes on a different connotation. Contrary to privileging empirical facts, he now holds that the given facts by themselves may be "incomplete," and that incomplete facts are rendered complete by being supplemented with representations or thoughts. Put succinctly, by virtue of supplementation, facts become "more to us" than what they are as such.¹¹² We can see that supplementation here no longer means simple addition to self-sufficient facts, but is reconceived as an integral moment of the phenomena as they cognitively appear to us. Further, according to Mach, there are cases in which our thoughts or representations not so much complete the facts, but rather "replace" (*ersetzen*) them.¹¹³ In other words, the dynamics of supplementation may take the form of a substitution of thought or intellect for experience. Since thoughts themselves also consist of elements, it follows that supplementation or substitution brings about "new sensuous elements," which then become part of the phenomenal world. Being as it is a representation of facts, cognition thus alters and displaces what is represented. That is, cognition is not merely a "transformation of thought," but also a transformation and restructuring of the phenomenal world itself.¹¹⁴

We have differentiated between two aspects of Mach's thought, which are intermingled in his texts and yet seem to be in disparity with each other. The first aspect, characterized as an inverted metaphysics, rests on the static opposition of experience / thought, while the second is oriented to the dynamic process of supplementation which tends to dissolve that opposition.¹¹⁵ In other words, along the first line of thought, one describes nature as

111. MACH 1886, 9/11.

112. MACH 1886, 163/198, 273/334.

113. MACH 1883, 457/577.

114. MACH 1896, 255.

115. These two conflicting aspects of Mach's thought may be reminiscent of Jacques Derrida's account of the "double gesture" of deconstruction: an "overturning" and a "general displacement" of the system of hierarchical binary oppositions (DERRIDA 1972, 392/329). In this connection, what I have suggested as the double meaning of Mach's concept of supplementation could also be compared with Derrida's deconstructive analysis of the notion of the "supplement" (see DERRIDA 1967, 203ff./141ff.).

“it is only once there,”¹¹⁶ while the second suggests that cognition each time alters the phenomenal world. We could say that the former mode of thought constitutes Mach’s positivist and scientific aspect, which would find enthusiastic followers not least in the group known as the Vienna Circle, whereas the latter comes close to Mach’s contemporary Friedrich Nietzsche’s more radical critique of knowledge.¹¹⁷

It now appears that this conflict in Mach’s philosophy is not only left untouched by Hiromatsu, but also is highly parallel to what we have seen as a tension within Hiromatsu’s philosophy itself, the tension between synchronic structure and structuring movement. Admittedly, from the Hiromatsuan point of view, the above conflict in Mach’s thought could as such be resolved by the twofoldness of given and meaning. That is, the distinction between sensuous and non-sensuous (or real and ideal) would not be abandoned, but reformulated as two inseparable moments of phenomena. Mach’s criticism of metaphysics would then be remodeled into a critique of the reification of meaning, and his ideas of supplementation and substitution could be viewed as modes of the as-connection—say, corresponding to “something more” and “something else,” respectively. Such a critical appropriation of Mach’s ideas into Hiromatsu’s philosophy, however, will not leave intact the latter’s synchronic setting. Rather, it may lead to an explicitly dynamic reformulation of the as-connection and thus to a critical reexamination of Hiromatsu’s general theoretical framework.

Let us now proceed to Einstein’s relativity theory and accordingly extend our scope of analysis to include explicitly what Hiromatsu calls the knowing side of phenomena. Most relevant to our issue here seem to be the differences between the special and the general theories of relativity. As mentioned in the second section, Hiromatsu does not essentially distinguish between the two theories in their philosophical dimension, even as he points to a difference in the *extent* to which substantial notions are replaced by relational ones. It seems to me, however, that, between the two

116. MACH 1883, 459/580.

117. A radicalization of Mach’s ideas of supplementation and substitution may lead to the Nietzschean view that all facts are perspectival interpretations. Common features to be found between Mach’s and Nietzsche’s thought are addressed, for example, by HELLER 1964, 69–71, and BLACKMORE 1972, 123.

theories, there is a qualitative difference in the philosophical orientation—a difference that revolves around the distinction between the movement of intersubjective structuring and the synchronic structure of intersubjectivity. Since I have elsewhere analyzed this issue,¹¹⁸ it will suffice here to reproduce the main points.

Einstein's special relativity, in its pre-Minkowskian form and notably in the form presented in his first relativity paper of 1905, "On the Electrodynamics of Moving Bodies," is marked by its methodology consistently resting on the situation in which observation and measurement are carried out. In it, Einstein develops a series of thought experiments, where the procedure of measurement by means of rigid rods and/or clocks as well as the standpoint from which (*von ... aus*) the phenomena are observed is each time specified.¹¹⁹ Starting from the individual results of measurement, which are relative to the observational standpoints, Einstein seeks to combine them into a set of functional relations. He advances this process by alternately assuming in thought two observational standpoints belonging to different inertial systems in such a way that both standpoints, and potentially the standpoints of all inertial systems, are on an equal footing *de jure*. This is the procedure by which communication between observers is imaginatively carried out as a series of substitutions of their standpoints for each other. The principle of relativity, applied in this process, is not simply treated as a mathematical requirement of covariance, but is conceived primarily as a requirement for the equal legitimacy of all observational standpoints, which is meaningful and applicable only within the context of observation and measurement. It is thus crucial to special relativity that its conceptual system is intersubjectified within the observational context and in accordance with the demand for the equal legitimacy of observational standpoints. As we have seen earlier, the relevance of this process of intersubjectification was discussed explicitly by Einstein himself in the 1921 Princeton lectures, in an extended context of scientific cognition in general.

Einstein's methodological orientation, however, underwent a considerable change with the development of general relativity. In his 1916 paper, "The Foundation of the General Theory of Relativity," Einstein initially

118. See KATSUMORI 1992, esp. 564–7, 577–8, 585ff.

119. See CPE 2: 297ff./142ff.

seems to follow his 1905 approach resting on observational situations, when he devises several thought experiments involving mutually accelerated systems. In parallel with the counterpart in special relativity, the general principle of relativity here serves as a demand for the equal legitimacy of all possible observational standpoints. However, this methodology then quickly encounters a serious difficulty: Since the scales for space-time measurement, namely, rigid rods and clocks, prove to be dependent on the gravitational field or, equivalently, on the metrical property of space-time, Euclidean geometry is no longer valid and thus the coordinates of space and time cannot retain their “direct physical meaning.”¹²⁰ From this breakdown of the immediate correspondence between the results of measurement and the space-time coordinates, it follows that one can no longer start directly from individual measuring acts, and thus no longer directly apply the basic principles in the observational context. Accordingly, Einstein “translates” the general principle of relativity mathematically into the principle of general *covariance*. The latter principle is formulated without reference to observational situations and, as he puts it, “takes away from space and time the last remnant of physical objectivity (*Gegenständlichkeit*).”¹²¹ At this juncture, there occurs a crucial conceptual shift from the equal legitimacy of the observational standpoints to the isomorphism of the formulations of physical laws with respect to these standpoints.

Thus detaching himself from the observational context (except for the reference to local Lorentz systems), Einstein goes over to a deductive construction of the theory with the aid of tensor calculus. The importance of tensors lies in the fact that once a tensor equation holds in one system, an equation of the same form holds in any other system whatsoever. That is, if a physical law is expressed in tensor form, this form itself ensures the general covariance of the law.¹²² The tensor formulation already incorporates in itself the demand for the equal legitimacy of all possible observational standpoints, and thereby guarantees in advance the intersubjective validity of the law to these standpoints. This allows Einstein to replace his earlier procedure of intersubjectifying physical concepts, carried out by alternately

120. CPE 6: 288/151.

121. CPE 6: 291/153.

122. CPE 6: 780/121.

assuming different observational standpoints, with a purely mathematical procedure of forming tensor equations.

We can now see that Einstein's general relativity is not simply a consistent extension of special relativity, but that it contains philosophically different conceptions from the latter. While it is crucial to the special theory to develop a conceptual system through intersubjective structuring of phenomena, the general theory relieves itself of this task by virtue of a mathematical guarantee of the structure of intersubjectivity. This conceptual orientation of general relativity tends toward the notion that the intersubjective agreement of the observers holds well prior to any act of observation and measurement, and further that the concept formation is carried out, as it were, by a higher-level knower—equivalent to a theorizing subject—transcending the individual observational standpoints. Admittedly, the methodological features of general relativity cannot automatically be carried over into the epistemological or ontological level. Yet a close inspection of Einstein's later philosophical texts will suggest a crucial link that connects the above mode of thought of general relativity with Einstein's general philosophical ideas.

In a 1936 essay entitled "Physics and Reality," Einstein offers a general account of our cognition, starting with the way in which the concept of the body is formed. Out of the multitude of experiences, he maintains, one takes certain repeated sense complexes "partly together with sense impressions interpreted as signs for sense experiences of neighbors (*Mitmenschen*)," and attributes to them the concept of the bodily object.¹²³ This, in an important respect, makes a sharp contrast with the account presented earlier in the Princeton lectures. That is, experiences of different individuals are here not to be coordinated through their linguistic communication, but already given as part of *my* experiences. Instead of focusing on the process of intersubjectification of experiences, Einstein adopts the framework in which intersubjectivity is in advance tacitly embedded and the concept formation is carried out by a single knowing subject. This framework, we can now see, precisely accords with the above conceptual setting of general relativity. Einstein's philosophical turn, characterized by himself as one from

123. EINSTEIN 1979, 64/60.

a pro-Machian empiricism to a kind of rationalism,¹²⁴ proves to be a process through which the dimension of intersubjectification is concealed—a process that seems to have its source in the formulation of general relativity.¹²⁵

This implies that the relation between relativity theory and Einstein's philosophical ideas poses more complex issues than Hiromatsu supposed. We cannot simply contrast the “revolutionary” philosophical implications of the theory itself and the “conservatism” of Einstein's philosophical position. Up until the early 1920's, Einstein was well aware of the dimension of intersubjectification as it was consistently at work in special relativity. General relativity, however, set up a conceptual scheme that made the intersubjective structure seem to be pre-established, which led to an unwitting concealment of the process of intersubjectification, and eventually to a reinstatement of the traditional subject/object schema. Thus, what appears as Einstein's return to the philosophical tradition occurred not so much despite, but rather because of—and in structural accordance with—the development of relativity theory. If his later philosophical thought is subject to a critique of reification, then this critique must trace back to philosophical conceptions internal to relativity theory.

Our consideration so far in this final section enables us to see that the conflictual relation between synchronic structure and structuring movement in Mach's philosophy as well as relativity theory is not only largely overlooked by Hiromatsu, but also is essentially parallel with a problematic confronting Hiromatsu's philosophy itself. This makes it all the more necessary to review critically his interpretations of Mach's thought and relativity theory as bound up with his general theory of the fourfold structure. Our study offers further critical suggestions on Hiromatsu's general attitude toward modern physical science. As we have seen, he highly evaluates the novel philosophical orientation of twentieth-century physics, which, he holds, potentially goes beyond the modern worldview. Notwithstanding his break with orthodox Marxism, which he labels as objectivist and “scientific,” and although his philosophical work was developed within a cultural milieu that was highly critical of contemporary science and technology,¹²⁶

124. See a letter from Einstein to C. Lanczos (January 24, 1938), cited in HOLTON 1973, 241.

125. See KATSUMORI 1992, 590.

126. See, for example, NOÉ 1982, 198–203.

Hiromatsu largely restricts the targets of his criticism to *classical* modern science and—as far as non-classical science is concerned—to the insufficient philosophical *self-understanding* of working scientists. If, however, non-classical physics is philosophically more complex and raises such issues as those addressed above, his positive appraisal of it may be subject to critical review.

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