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As a result of the shift in interest from *Grundrisse der Kritik der politischen Ökonomie* to *Zur Kritik der politischen Ökonomie (Manuskript 1861-1863)* that has taken place in studies in the formation of *Capital* both inside and outside Japan in the past decade, a number of attempts have been made at a comprehensive and systematic view of the various arguments of this period. Yoshida's monograph is one such attempt that merits serious attention.

Capitalist production as a historically defined mode of production is characterized above all by the development of large factories based on machinery. It is not necessary to refer to *Economic-Philosophical Manuscript* or *Communist Manifesto* to know that Marx recognized this from the very beginning, when he became interested in economics in the 1840s. It was not until the section "γ) *Maschinerie*" in the *Manuskript 1861-1863*, however, that Marx dealt with the large-scale mechanized factory system as a part of his theory of surplus value, analyzing its nature in detail by tracing its peculiarities back to its technological characteristics, which provided the direct link with his technological analysis of machinery in *Capital*. This concept did not appear either in the 1840s or in the *Grundrisse*, in which his criticism of economics was systematized for the time being.

What position, then, does "γ) *Maschinerie*" occupy in the entire *Manuskript*, and what is the basic motif that runs through this section? What preceding theories did Marx take into consideration when he treated the technological attributes of machinery in this section and consequently in Chapter 15, "Machinery and Modern Industry", of Volume 1 of *Capital*? For the determination of the significance and limitations of Marx's theory of machinery, these are necessary and pertinent questions, to which sufficient attention has not always been given either in Japan or abroad.

Yoshida's monograph consists of two parts. The first part "The Formation of the Theory of Labor Process and the Chapter on 'Machinery and Modern Industry' in *Capital*" covers the first question mentioned above and the second part, "Origins of the Chapter on 'Machinery and Modern Industry' in *Capital*" the second question. His viewpoint, however, can be distinguished from other works of this sort in two important respects. First, arguing from his own examination of the original manuscripts, he claims that the new MEGA version is unreliable. Secondly, he looks with some detail at the writings of scientists and engineers like Ure, Babbage, Willis, Poppe, and in the anonymous *The Industry of Nations*. Consideration of these long neglected works constitutes an important part of his research.

The section, "γ) *Maschinerie*" of the *Manuskript 1861-1863* appears in notebook V (pp. 190-219) and in notebooks from XIX to XX, and "*Theorien über den Mehrwert*" comes between them (notebooks VI-XV, XVII-XVIII). The major part of *Theorien* was written around the summer of 1862, a quotation from *The Times*, 26 November 1862 appearing on page 211 of notebook V. Consequently, it is clear that writing of notebook V was suspended around this part. On the other hand, the editors of MEGA, on the basis of the correspondence between Marx's letter to Engels dated 6 March 1862 and page 191 of notebook V and between two excerpts from *Bengal*

Hurkaru and Bombay Chamber of Commerce Report for 1859-1860 of page 208 of excerpt parts of notebook VII, which belongs to *Grundrisse der Kritik der politischen Ökonomie*, and page 209 of notebook V, concluded that the suspension occurred around page 211 and that “ γ) *Maschinerie*” was written in two stages, before and after *Theorien*; in March 1862 and after January 1863. Their edition divides the notebook into two parts, putting the first part before and the second after *Theorien*. In their interpretation, in the first part, machinery is treated from the viewpoint of the theory of value and surplus value. In the latter part, it is dealt with both in terms of its use value and from technological aspects.

Detailed examinations of the *Manuskript* have revealed, however, that the discussion of machinery in terms of its use value does not become the main focus until p.1159 of notebook XIX, not around p.211 of notebook V, as the editors claimed. We cannot find any noticeable shift of subject matter around page 211. For instance, in notebook V, both substance of p.212 and the quotation from Stewart on page 210 reappeared in Section 5 “The Strife between Workman and Machinery” of Chapter 15 of *Capital* almost unchanged. It is therefore difficult to subscribe to the hypothesis that there was one year’s lapse between them.

Yoshida believes that Marx’s writing was suspended around page 189, between “ γ) *Maschinerie*” and “b) *Arbeitsteilung*” and insists that the former was written uninterruptedly after January 1863 when he completed *Theorien*. Having carefully examined Marx’s original manuscript at IISG, the author concludes (1) that it is not necessary to speculate that two excerpts from *Bengal Hurkaru and Bombay Chamber of Commerce Report for 1869-1860* of p.208 of excerpt parts of notebook VII were made use of in March 1862, (2) that Marx’s letter to Engels dated March 1862 is correspondent to page 175 of “b) *Arbeitsteilung*.”

Furthermore, he finds a close correlation between Marx’s letter of 28 January 1863 and page 192 of the *Manuskript*. He argues that the extent of the completion of various arguments on pages 190-211 presupposes that Marx had already written *Theorien*. The assumption of the reverse order will obscure Marx’s basic motif in “ γ) *Maschinerie*” that the technological attributes of machinery as distinguished from tools lie as a material basis behind the formation of not only relative surplus value but also absolute surplus value by reason of the extension of the working day.

The first section, “Development of Machinery” of Chapter 15 of *Capital* discusses the fundamental differences between machine production and tool based manufacture, which form the foundation of the entire chapter. This chapter, particularly this section, is distinguished from other parts of *Capital* by the abundance of reference to scientists and engineers, which indicates that Marx was deeply influenced by their views.

In Yoshida’s opinion, however, close analysis of this chapter and “ γ) *Maschinerie*” reveals that Marx was not merely influenced by such views, but rather that he reinterpreted them in the historical context of the hostile relationship between capital and wage labor.

For instance, Marx argued in this section of *Capital* that the most important attribute of machinery was that it was operated and controlled by a mechanism that was independent of the worker, not by the worker’s hands like tools. Such a definition was given by Willis, and *The Industry of Nations*, in particular, draws upon Babbage’s criticism of Adam Smith’s theory of the division of labor with regard to the origins of machinery. Furthermore, Babbage’s theory of the social depreciation of machinery became the starting point of Marx’s theory of the inevitability of the extension of the

work day in a large-scale mechanized factory system. Ure also distinguished the organization of the laborer in manufactures from that in the factory system, and realistically described the miserable conditions of the handicraft laborers when they met with competition from mechanization. Ure's opinion thus became an important source for Marx's notion that saw fruition in Chapter 15 of *Capital* and had been developed in the discussions in " γ) *Maschinerie*." As for Poppe's *History of Technology*, it provides the basic material for Marx's theory of the division of labor and for his division of the development of the large-scale mechanized factory system into historical periods. Together with Darwin's *Origin of Species*, it became a crucial element in the debate on technology that originated from Footnote 89 of part IV, "Production of Relative Surplus-Value" of *Capital*.

Yoshida argues, however, that almost all of Marx's knowledge about machinery, as developed in the *Manuskript* as well as in the section "The Development of Machinery" of *Capital*, with a few exceptions, depends upon *The Industry of Nations*. The limitations of this book also became the limitations of Marx's analysis of machinery. For instance, the description of automation in machinery or of machine chain reactions in *Capital* was modeled on the simple machinery used in the textile and paper factories. Application of these concepts to the contemporary world would require careful research considering the development of machinery since Marx's period.

This is a short summary of the main points developed in this book. The author's view on the dating of " γ) *Maschinerie*" has already been introduced by the editors of MEGA as a major version in their journals (see *Beiträge zur Marx-Engels-Forschung*, Heft 16, 1984), and more than twenty articles have been written on this question. But Yoshida's view has now become an authoritative opinion that has to be seriously examined by anyone who attempts to analyze this question.

I basically support Yoshida's conclusion on this point, but feel that he needs to demonstrate more concretely how what he believes to be Marx's basic motif in " γ) *Maschinerie*" remained the same throughout his analysis of the technological attributes of machinery as distinguished from tools. In that case, the section at issue will have to be dealt with in relation to the theory, "*Formelle und reale Subsumtion der Arbeit unter das Capital*," which comes after this section, to the fact that the section of "*Kampf um den normalen Arbeitstag*" was, for the first time, included into the plan for part I of *Capital*, as well as to *Theorien* as a whole.

Seiji Nakamura, an authority in Japan on industrial technology, has commented that "this book has no rival in the world for its extensive, detailed, and creative interpretation of past debates." I, too, believe that there is no other book that deals with the origins of Marx's concept of machinery so comprehensively and rigorously.

Marx's notion of capitalism has been traditionally considered in connection with the classical economic thoughts of Adam Smith and David Ricardo or with other socialist thoughts. With the appearance of this book, the relationship between Marx's ideas and the views presented by scientists and engineers has been examined for the first time. Furthermore, concretely and definitely identifying the sources of Marx's theory of machinery, this book makes it possible for other specialists to attempt to clarify the criteria for his criticism and reception of such views, thus laying an important first step for the further development of the scientific theory of industrial technology.

Finally Yoshida adds another chapter in the end, and lists a series of tasks that have to be performed in order to examine the development of the theory of industrial technology after *Capital* from the point of view of economics. I hope that the author

will tackle these tasks with the same keen awareness of contemporary problems shown in his previous work, *Kankyo to Gijutsuno Keizaigaku* [*Economics of Environment and Technology*] (Tokyo: Aoki Shoten, 1980).

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