Time, labor, and social domination

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A reinterpretation of Marx's critical theory

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For my parents, Abraham and Evelyn Postone

Contents

that contradiction provides a point of departure for analyzing, on a very abstract level, the problem of the historical transformation of needs and consciousness as expressed, for example, by different social movements.)

I shall interpret the dynamic of capitalism in terms of a dialectic of labor and time which is rooted in the duality of the structuring social forms of this society. In order to do so, however, I must first examine the abstract form of time associated with socially necessary labor time and consider the social-epistemological implications of my discussion of the temporal dimension of Marx's categories.

Abstract time

In discussing the magnitude of value, I have examined the "social" as well as the "necessary" aspects of socially necessary labor time. But which sort of time are we dealing with? As is well known, notions of time vary culturally and historically—the most commonly expressed distinction being that between cyclical and linear conceptions of time. For example, G. J. Whitrow points out that time understood as a kind of linear progression measured by the clock and calendar generally superseded cyclical conceptions of time in Europe only within the past several centuries.[35] I shall consider various forms of time (as well as various conceptions of time) and distinguish them in another way—namely,

tive," that is, surplus value–producing labor, and concrete labor as "nonproductive" labor. Offe argues that the growth of state and service sectors in late capitalism involves an increase of "concrete labor" that neither produces commodities nor is a commodity. This results in a dualism of capitalist and noncapitalist elements (p. 32). According to Offe, although such forms of "concrete labor" may ultimately be functional for the creation of value, they are not bound to the commodity form and, thus, lead to an erosion of social legitimation based on the exchange of equivalents.

Offe's approach differs from Marx's in several important respects. The Marxian categories of abstract and concrete labor do not refer to two different kinds of labor; moreover, the category of productive labor and that of labor power as a commodity are not identical. Whereas the Marxian dialectic of the two dimensions of labor in capitalism points to the historical possibility of a society based on very different forms of labor, what Offe calls noncapitalist labor does not represent such a qualitatively different form. It seems that Offe's intention is to account for popular dissatisfaction with existing forms of labor by arguing that greater identification with, and importance of, job content characterizes the service sector (p. 47). While this may be true of some very specific parts of that sector, this thesis is questionable as a general explanation in light of the fact that the greatest increases in the service sector apparently have been in the areas of janitorial, cleaning, kitchen, and domestic work (see Harry Braverman, *Labor and Monopoly Capitalism* [New York and London, 1974], p. 372). The main thrust of Offe's argument is that the essential determinant of capitalism and the basis of its social legitimation is the market, which is increasingly undermined with the growth of the state and service sectors. His basic assumption is that the Marxian critique of capitalism can be adequately grasped as a critique of its form of legitimation—and that the basis of that legitimation can be identified with the market.

35. G. J. Whitrow, *The Nature of Time* (Harmondsworth, England, 1975), p. 11.

whether time is a dependent or an independent variable—in order to investigate the relation of the category of socially necessary labor time to the nature of time in modern capitalist society and to the historically dynamic character of that society.

I shall term "concrete" the various sorts of time that are functions of events: They are referred to, and understood through, natural cycles and the periodicities of human life as well as particular tasks or processes, for example, the time required to cook rice or to say one *paternoster.*[36] Before the rise and development of modern, capitalist society in Western Europe, dominant conceptions of time were of various forms of concrete time: time was not an autonomous category, independent of events, hence, it could be determined qualitatively, as good or bad, sacred or profane.[37] Concrete time is a broader category than is cyclical time, for there are linear conceptions of time which are essentially concrete, such as the Jewish notion of history, defined by the Exodus, the Exile, and the coming of the Messiah, or the Christian conception in terms of the Fall, the Crucifixion, and the Second Coming. Concrete time is characterized less by its direction than the fact that it is a dependent variable. In the traditional Jewish and Christian notions of history, for example, the events mentioned do not occur within time, but structure and determine it.

The modes of reckoning associated with concrete time do not depend on a continuous succession of constant temporal units but either are based on events—for example, repetitive natural events such as days, lunar cycles, or seasons—or on temporal units that vary. The latter mode of time reckoning—which probably was first developed in ancient Egypt, spread widely throughout the ancient world, the Far East, the Islamic world, and was dominant in Europe until the fourteenth century—used units of variable length to divide day and night into a fixed number of segments.[38] That is, daily periods of daylight and darkness were each divided equally into twelve "hours" that varied in length with the seasons.[39] Only on the equinoxes was a daylight "hour" equal to a

36. E. P. Thompson, "Time, Work-Discipline and Industrial Capitalism," *Past and Present* 38 (1967), p. 58. Thompson's article, which is rich in ethnographic and historical materials, is an excellent account of the changes in time apprehension, time measure, and the relation of labor and time concomitant with the development of industrial capitalism.

37. Aaron J. Gurevich, "Time as a Problem of Cultural History," in L. Gardet et al., *Cultures and Time* (Paris, 1976), p. 241.

38. Whitrow, *The Nature of Time,* p. 23; Gustav Bilfinger, *Die mittelalterlichen Horen und die modernen Stunden* (Stuttgart, 1892), p. 1.

39. The Babylonians and the Chinese apparently had a system of subdividing the day into constant temporal units: see Joseph Needham, Wang Ling, and Derek de Solla Price, *Heavenly Clockwork: The Great Astronomical Clocks of Medieval China* (2d ed., Cambridge, England, 1986), p. 199ff.; Gustav Bilfinger, *Die babylonische Doppelstunde: Eine chronologische Untersuchung* (Stuttgart, 1888), pp. 5, 27–30. Nevertheless, as I shall briefly explain later, these constant time units cannot be equated with modern constant hours and do not imply a conception of time as an independent variable.

nocturnal "hour." These variable time units are frequently referred to as "variable" or "temporal" hours.[40] Such a form of time reckoning seems to be related to modes of social life strongly dominated by agrarian, "natural" rhythms of life and work that depend on the cycles of the seasons and of day and night. A relationship exists between the measure of time and the sort of time involved. The fact that the time unit is not constant, but itself varies, indicates that this form of time is a dependent variable, a function of events, occurrences, or actions.

"Abstract time," on the other hand, by which I mean uniform, continuous, homogeneous, "empty" time, is independent of events. The conception of abstract time, which became increasingly dominant in Western Europe between the fourteenth and seventeenth centuries, was expressed most emphatically in Newton's formulation of "absolute, true and mathematical time [which] flows equably without relation to anything external."[41] Abstract time is an independent variable; it constitutes an independent framework within which motion, events, and action occur. Such time is divisible into equal, constant, nonqualitative units.

The conception of time as an independent variable with phenomena as its function was developed only in modern Western Europe, according to Joseph Needham.[42] Such an understanding, which is related to the idea of motion as a change of place functionally dependent on time, did not exist in ancient Greece, the Islamic world, early medieval Europe, India, or China (although constant time units did exist in the latter). The division of time into commensurable, interchangeable segments would have been alien to the world of antiquity and the early Middle Ages.[43] Abstract time, then, is historically unique—but under what conditions did it emerge?

The origins of abstract time should be sought in the prehistory of capitalism, in the late Middle Ages. It can be related to a determinate, structured form of social practice that entailed a transformation of time's social significance in some spheres of European society in the fourteenth century and, by the end of the seventeenth century, was well on its way to becoming socially hegemonic. More specifically, the historical origins of the conception of abstract time should be seen in terms of the constitution of the social reality of such time with the spread of the commodity-determined form of social relations.

40. Whitrow, *The Nature of Time,* p. 23; Bilfinger, *Die mittelalterlichen Horen,* p. 1.
41. Isaac Newton, *Principia,* as quoted in L. R. Heath, *The Concept of Time* (Chicago, 1936), p. 88. Newton did, to be sure, distinguish between absolute time and relative time. He referred to relative time as "some sensible and external . . . measure of duration by the means of motion . . . which is commonly used instead of true time, such as the hour, a day, a month, a year" (ibid.). The fact that he did not distinguish among those units, however, implies that Newton considered relative time to be a mode of sensuous approximation to absolute time, rather than another form of time.
42. Joseph Needham, *Science in Traditional China* (Cambridge, Mass., and Hong Kong, 1981), p. 108.
43. Gurevich, "Time as a Problem of Cultural History," p. 241.

As noted, in medieval Europe until the fourteenth century, as in antiquity, time was not conceptualized as continuous. The year was divided qualitatively according to the seasons and the zodiac—whereby each time period was considered to exert its own particular influence[44]—and the day was divided into the variable hours of antiquity, which served as the basis for the *horae canonicae,* the canonical hours of the Church.[45] To the extent that time was kept in medieval Europe, then, it was the Church's time that was kept.[46] This mode of time reckoning was transformed dramatically in the course of the fourteenth century: according to Gustav Bilfinger, modern, or constant, hours began to appear in European literature in the first half of that century and, by the beginning of the fifteenth century, generally had displaced the variable hours of classical antiquity and the canonical hours.[47] This historical transition from a mode of time reckoning based on variable hours to one based on constant hours implicitly marks the emergence of abstract time, of time as an independent variable.

The transition in time reckoning to a system of commensurable, interchangeable, and invariable hours is very closely related to the development of the mechanical clock in Western Europe in the very late thirteenth century or the early fourteenth century.[48] The clock, in Lewis Mumford's words, "dissociated time from human events."[49] Nevertheless, the emergence of abstract time cannot be accounted for solely with reference to a technical development such as the invention of the mechanical clock. Rather, the appearance of the mechanical clock itself must be understood with reference to a sociocultural process that it, in turn, strongly reinforced.

Many historical examples indicate that the development of a mode of time reckoning based upon such interchangeable and invariable time units must be understood socially and cannot be understood in terms of the effects of technology alone. Until the development of the mechanical clock (and its refinement in the seventeenth century by Christiaan Huygens's invention of the pendulum clock), the most sophisticated widely known form of timekeeper was the clepsydra, or water clock. Various kinds of water clocks were used in Hellenistic

44. Whitrow, *The Nature of Time,* p. 19.
45. David S. Landes, *Revolution in Time* (Cambridge, Mass., and London, 1983), p. 403n15; Bilfinger, *Die mittelalterlichen Horen,* pp. 10–13. According to Bilfinger, the origins of the canonical hours are to be sought in the Romans' division of the day into four watches, which were based on the "temporal" hours and to which an additional two time points were added in the early Middle Ages.
46. Landes, *Revolution in Time,* p. 75; Jacques Le Goff, "Merchant's Time and Church's Time in the Middle Ages," in *Time, Work, and Culture in the Middle Ages,* trans. Arthur Goldhammer (Chicago and London, 1980), pp. 29, 30, 36.
47. Bilfinger, *Die mittelalterlichen Horen,* p. 157.
48. Landes, *Revolution in Time,* pp. 8, 75; Bilfinger, *Die mittelalterlichen Horen,* p. 157; Le Goff, "Labor Time in the 'Crisis' of the Fourteenth Century," in *Time, Work, and Culture in the Middle Ages,* p. 43.
49. Lewis Mumford, *Technics and Civilization* (New York, 1934), p. 15.

and in Roman society and were widespread in both Europe and Asia.[50] What is significant for our purposes is the fact that, although water clocks operated on the basis of a roughly uniform process—the flow of water—they were used to indicate variable hours.[51] This generally was effected by constructing those parts of the clock that indicated the time in such a way that, although the rate of the water's flow remained constant, the indicator varied with the seasons. Less frequently, a complicated mechanism was devised that allowed the flow of water itself to be varied seasonally. On this basis, complex water clocks that marked the (variable) hours with ringing bells were constructed. (Such a clock apparently was sent as a gift by Caliph Haroun al-Rashid to Charlemagne in 807.)[52] In either case, it would have been technically simpler to mark constant uniform hours with water clocks. That variable hours were marked was, therefore, clearly not because of technical constraints. Rather, the grounds seems to have been social and cultural: variable hours apparently were significant, whereas equal hours were not.

The example of China clearly indicates that the problem of the emergence of abstract time and the mechanical clock is a social and cultural one, and not merely a matter of technical ability or of the existence of any sort of constant time units. In many respects, the level of technological development in China was higher than that of medieval Europe prior to the fourteenth century. Indeed, some Chinese innovations such as paper and gunpowder were seized upon by the West, with important consequences.[53] Yet the Chinese did not develop the mechanical clock or any other timekeeping device that both marked equal hours *and* was used primarily for that purpose in organizing social life. This seems particularly puzzling inasmuch as the older system of variable hours, which had been in use after about 1270 B.C. in China, had been superseded by a system of constant hours: one system of time reckoning used in China after the second century B.C. was the Babylonian system of dividing the full day into twelve equal, constant "double hours."[54] Moreover, the Chinese developed the technical ability to measure such constant hours. Between A.D. 1088 and 1094, Su Sung, a diplomat and administrator, coordinated and planned the construction of a gigantic water-driven astronomical "clocktower" for the Chinese emperor.[55] This "clock" was perhaps the most sophisticated of various clockwork drive mechanisms developed in China between the second and the fifteenth

50. Landes, *Revolution in Time,* p. 9.
51. Bilfinger, *Die mittelalterlichen Horen,* p. 146; Landes, *Revolution in Time,* pp. 8, 9.
52. Bilfinger, *Die mittelalterlichen Horen,* pp. 146, 158–59; Landes, *Revolution in Time,* fig. 2 (following p. 236).
53. Needham, *Science in Traditional China,* p. 122.
54. See Needham et al., *Heavenly Clockwork,* pp. 199–203; Bilfinger, *Die babylonische Doppelstunde,* pp. 45–52. (I am indebted to Rick Biernacki for drawing my attention to the problem of the constant hours used in China.)
55. Landes, *Revolution in Time,* pp. 17–18; Needham et al., *Heavenly Clockwork,* pp. 1–59.

centuries.[56] It was primarily a mechanism for displaying and studying the movements of the heavenly bodies, but it also showed constant hours and "quarters" (*k'o*).[57] Nevertheless, neither this device nor its marking of equal hours seems to have had much social effect. No such devices—not even smaller and modified versions—were produced on a large scale and used to regulate daily life. Neither a lack of technological sophistication nor ignorance of constant hours, then, can account for the fact that the mechanical clock was not invented in China. What seems more important is that the constant "double hours" were apparently not significant in terms of the organization of social life.

According to David Landes, there was little social need in China for time expressed in constant units, such as hours or minutes. Life in the countryside and in the cities was regulated by the diurnal round of natural events and chores, and the notion of productivity, in the sense of output per unit time, was unknown.[58] Moreover, to the extent that urban timekeeping was regulated from above, it seems to have been with reference to the five "night watches," which were variable time periods.[59]

If this was the case, what was the significance of the constant "double hours" used in China? Although a full discussion of this problem lies beyond the bounds of this work, it is significant that those time units were not numbered serially, but bore names.[60] This not only meant that there were no unambiguous ways to announce each hour (for example, by drum or gong), but suggests that those time units, although equal, were not abstract—that is, commensurable and interchangeable. This impression is reinforced by the fact that the twelve "double hours" were linked in a one-to-one correspondence with the astronomical succession of signs of the zodiac, which are certainly not interchangeable units.[61] There was a conscious paralleling of the daily and yearly course of the sun, with the "months" and the "hours" bearing the same names.[62] Together, this system of signs designated a harmonious, symmetrical cosmic system.

It seems, however, that this "cosmic system" did not serve to organize what we would regard as the "practical" realm of everyday life. We have already seen that the Chinese waterwheel towers were intended not primarily as clocks but as astronomical devices. Hence, as Landes notes, their accuracy was checked "not by comparing the time with the heavens, but a copy of the heavens with the heavens."[63] This apparent separation between that aspect of the cosmic system inscribed in the Chinese clockwork mechanisms and the "practical"

56. Needham et al., *Heavenly Clockwork,* pp. 60–169.
57. Landes, *Revolution in Time,* pp. 18, 29–30.
58. Ibid., p. 25.
59. Ibid., p. 26, p. 396n24; Needham et. al., *Heavenly Clockwork,* pp. 199, 203–5.
60. Landes, *Revolution in Time,* p. 27.
61. Needham et al., *Heavenly Clockwork,* p. 200.
62. Bilfinger, *Die babylonische Doppelstunde,* pp. 38–43.
63. Landes, *Revolution in Time,* p. 30.

realm is also suggested by the fact that, although the Chinese measured the solar year, they used a lunar calendar to coordinate social life.[64] They also did not use the twelve "houses" of their "Babylonian" zodiac to locate the position of heavenly bodies, but used a twenty-eight-part "moon-zodiac" to that end.[65] Finally, as already noted, the constant "double hours" used in China apparently did not serve to organize everyday social life; that Su Sung's technical device made no difference in this regard suggests, therefore, that the constant "Babylonian" time units used in China were not the same sorts of constant time units as those associated with the mechanical clock. They were not really units of abstract time, of time as an independent variable with phenomena as its function; rather, they might best be understood as units of "heavenly" concrete time.

The origin of abstract time, then, seems to be related to the organization of social time. Abstract time, apparently, cannot be understood solely in terms of invariable time units any more than its origins can be attributed to technical devices. Just as the Chinese waterwheel towers effected no change in the temporal organization of social life, the introduction of mechanical clocks into China in the late sixteenth century by the Jesuit missionary Matteo Ricci was without effect in this regard. Large numbers of European clocks were imported into China for members of the Imperial Court and other high-ranking persons, and inferior copies even were produced there. However, they apparently were regarded and used essentially as toys; they seem not to have acquired practical social significance.[66] Neither life nor work in China had been organized on the basis of constant time units or became so organized because of the introduction of the mechanical clock.[67] The mechanical clock, then, does not, in and of itself, necessarily give rise to abstract time.

This conclusion is further reinforced by the example of Japan. There, the older, variable hours were retained after the mechanical clock was adopted from the Europeans in the sixteenth century. The Japanese even modified the mechanical clock by constructing movable numerals on the dials of their clocks, which were adjusted to indicate the traditional variable hours.[68] When constant hours were adopted in Japan in the latter third of the nineteenth century, it was not as a result of the introduction of the mechanical clock, but as part of the program of economic, social, and scientific adjustment to the capitalist world which marked the Meiji Restoration.[69]

One final example from Europe should suffice to demonstrate that the historical emergence of constant hours of abstract time should be understood in terms

64. Bilfinger, *Die babylonische Doppelstunde,* pp. 33, 38.
65. Ibid., p. 46.
66. Landes, *Revolution in Time,* pp. 37–52; Carlo M. Cipolla, *Clocks and Culture, 1300–1700* (London, 1967), p. 89.
67. Landes, *Revolution in Time,* p. 44.
68. Ibid., p. 77.
69. Ibid., p. 409n13; Wilhelm Brandes, *Alte japanische Uhren* (Munich, 1984), pp. 4–5.

of their social significance. The *Libros del Saber de Astronomia,* a book prepared for King Alfonso X of Castile in 1276, describes a clock that was to be driven by a weight attached to a wheel internally divided into compartments partially filled with mercury, which would act as an inertial brake.[70] Although the mechanism was such that this clock could have shown invariable hours, the dial was to be constructed to indicate variable hours.[71] And although the bells that were to be attached to this clock would, because of the nature of the mechanism, have struck regular hours, the book's author did not see these as meaningful time units.[72]

The dual problem of the origins of time understood as an independent variable and of the development of the mechanical clock should, then, be examined in terms of the circumstances under which constant invariable hours became meaningful forms of the organization of social life.

Two institutionalized contexts of social life in medieval Europe were characterized by a heightened concern with time and its measurement: monasteries and the urban centers. In the monastic orders in the West, prayer services had been temporally ordered and bound to the variable hours by the Benedictine rule in the sixth century.[73] This ordering of the monastic day became established more firmly, and the importance of time discipline became emphasized more strongly in the eleventh, twelfth, and thirteenth centuries. This was particularly true of the Cistercian order, founded at the beginning of the twelfth century, which undertook relatively large-scale agricultural, manufacturing, and mining projects, and which emphasized time discipline in the organization of work as much as in the organization of prayer, eating, and sleeping.[74] Time periods were marked off for the monks by bells, which were rung by hand. There seems to have been a relation between this increased emphasis on time and an increased demand for, and improvements in, water clocks in the twelfth and thirteenth centuries. The water clocks presumably were needed in order to ascertain more accurately when the (variable) hours should be struck. In addition, crude forms of "timers," outfitted with bells, which may have been mechanically driven, were used to awaken the monks who rang the bells for the night service.[75]

In spite of the monastic emphasis on time discipline and the improvements of timekeeping mechanisms associated with it, however, the transition from a system of variable hours to one of constant hours, and the development of the mechanical clock, apparently did not originate in the monasteries, but in the urban centers of the late Middle Ages.[76] Why was this the case? By the begin-

70. Landes, *Revolution in Time,* p. 10.
71. Bilfinger, *Die mittlelalterlichen Horen,* p. 159.
72. Ibid., p. 160.
73. Landes, *Revolution in Time,* p. 61.
74. Ibid., pp. 62, 69.
75. Ibid., pp. 63, 67–69.
76. Ibid., pp. 71–76; Bilfinger, *Die mittelalterlichen Horen,* pp. 160–65; Le Goff, "Labor Time in the 'Crisis,' " pp. 44–52.

ning of the fourteenth century, the urban communes of Western Europe, which had grown and benefited greatly from the economic expansion of the previous centuries, began using a variety of striking bells to regulate their activities. City life was increasingly marked by the pealings of a broad array of bells that signaled the opening and closing of various markets, indicated the beginning and end of the workday, heralded various assemblies, marked the curfew and the time after which alcohol no longer could be served, and warned of fire or danger, and so on.[77] Like the monasteries, the towns, then, had developed a need for greater time regulation.

However, the fact that a system of *constant* hours arose in the towns but not in the monasteries indicates a significant difference. That difference, according to Bilfinger, was rooted in the very different interests involved with regard to maintaining the older system of time reckoning. At issue was the relation of the definition and social control of time to social domination. Bilfinger argues that the Church may have been interested in measuring time, but was not at all interested in changing the old system of variable hours (the *horae canonicae*), which had become closely tied to its dominant position in European society.[78] The towns, on the other hand, had no such interest in maintaining that system and, therefore, were able to exploit fully the invention of the mechanical clock in introducing a new system of hours.[79] The development of constant hours, then, was rooted in the transition from a churchly division of time to a secular one, according to Bilfinger, and was related to the flowering of the urban bourgeoisie.[80] This argument, in my opinion, is underspecified. Bilfinger focuses on the factors that hindered the Church's adoption of a system of constant hours, and notes the lack of such constraints among the urban bourgeoisie. This implies that the system of constant hours resulted from a technical innovation in the absence of social constraints. As I have indicated, however, the technical means for measuring constant hours existed long before the fourteenth century. Moreover, the mere absence of reasons not to adopt constant hours does not seem sufficient to explain why they were adopted.

David Landes has suggested that the system of constant hours was rooted in the temporal organization of the "man-made" day of town dwellers, which differed from that of the "natural" day of peasants.[81] However, the differences between an urban and a rural environment, and between the sorts of work done in each, are an insufficient explanation: after all, large cities existed in many parts of the world long before the rise of a system of constant hours in Western European cities. Landes himself notes of China, that the pattern of life and work in the cities and the countryside were regulated by the same diurnal round of

77. Bilfinger, *Die mittelalterlichen Horen,* pp. 163–65.
78. Ibid., pp. 158–60.
79. Ibid., p. 163.
80. Ibid., p. 158.
81. Landes, *Revolution in Time,* p. 72.

natural events.[82] Moreover, the urban workday in medieval European towns until the fourteenth century—which was marked off approximately by the *horae canonicae*—was also defined in terms of variable "natural" time, from sunrise until sunset.[83]

The transition from variable to constant time units in the European urban centers in the fourteenth century cannot, then, be understood adequately in terms of the nature of town life *per se.* Rather, a more specific reason, one that can ground this transition socially, is needed. The different relationship to time implied by the two systems is not only a matter of whether or not time discipline plays an important role in structuring the daily course of life and work; such discipline, as we have seen, was very much a feature of monastic life. Rather, the difference between a system of variable hours and one of constant hours also is expressed in two different sorts of time discipline. Although the form of life developed in the medieval monasteries was regulated strictly by time, this regulation was effected in terms of a series of time points, which marked when various activities were to be done. This form of time discipline does not demand, imply, or depend upon constant time units; it is quite distinct from a form of time discipline in which time units serve as the *measure* of activity. As I shall show, the transition to constant time units should be further specified in terms of a new form of social relations, a new social form that cannot be grasped fully in terms of sociological categories such as "peasant life" and "urban life," and that is bound to abstract time.

Jacques Le Goff, in his investigation of this transition—which he describes as the transition from Church's time to merchants' time,[84] or from medieval time to modern time[85]—focuses on the proliferation of various sorts of bells in medieval European towns, especially the work bells, which appeared and spread quickly in the cloth-producing towns of the fourteenth century.[86] On the basis of Le Goff's discussion, I shall briefly suggest how the work bells might have played an important role in the emergence of a system of constant time units and, relatedly, of the mechanical clock. The work bells themselves were an expression of a new social form that had begun to emerge, particularly within the medieval cloth-making industry. This industry did not produce primarily for the local market, like most medieval "industries," but, along with the metal industry, was the first that engaged in large-scale production for export.[87] The craftsmen of most other industries sold what they produced, but in the textile industry there was a strict separation between the cloth merchants, who distrib-

82. Ibid., p. 25.
83. Le Goff, "Labor Time in the 'Crisis,' " p. 44.
84. Le Goff, "Merchant's Time," pp. 29–42.
85. Le Goff, "Labor Time in the 'Crisis,' " pp. 43–52.
86. Ibid., pp. 47–48. David Landes also focuses on the significance of the work bells: See *Revolution in Time,* pp. 72–76.
87. Henri Pirenne, *Belgian Democracy,* trans. J. V. Saunders (Manchester, 1915), p. 92.

uted the wool to the workers, collected the finished cloth from them and sold it, and the workers, many of whom were "pure" wage earners, possessing only their labor power. The work generally was done in small workrooms that belonged to master weavers, fullers, dyers, and shearmen, who owned or rented the equipment, such as the looms, received the raw material as well as the wages from the cloth merchants, and supervised the hired workers.[88] The organizing principle of the medieval cloth industry, in other words, was an early form of the capital–wage labor relationship. It was a form of relatively large-scale, privately controlled production for exchange (that is, for profit) based upon wage labor, and it both presupposed and contributed to the growing monetarization of some sectors of medieval society. Implicit in this form of production is the importance of productivity. The merchants' goal, profit, depended in part on the difference between the worth of the cloth produced and the wages they paid—that is, on the productivity of the labor they had hired. Thus, productivity—which, according to Landes, had been an unknown category in China (as opposed to "busyness")[89]—was constituted, at least implicitly, as an important social category in the textile industry of medieval Western Europe.

The productivity of labor depended, of course, on the degree to which it could be disciplined and coordinated in a regularized fashion. This, according to Le Goff, became an increasingly contentious issue between textile workers and employers as a result of the economic crisis of the late thirteenth century, which strongly affected the cloth-making industry.[90] Because workers were paid by the day, conflict became focused on the length and definition of the work day.[91] It seems that it was the workers who, at the beginning of the fourteenth century, demanded initially that the work day be lengthened in order to increase their wages, which had declined in real value as a result of the crisis. Very quickly, however, the merchants seized upon the issue of the length of the work day and tried to turn it to their advantage by regulating it more closely.[92] It was in this period, according to Le Goff, that work bells, which publicly marked the beginning and end of the work day, as well as the intervals for meals, spread throughout the textile-producing towns of Europe.[93] One of their primary functions was to coordinate the working time of large numbers of workers. The cloth-producing towns of Flanders of the time were like large factories. Their streets were filled in the morning with thousands of workers on their way to the workshops, where they began and ended their work to the stroke of the municipal work bell.[94]

88. Ibid., pp. 92, 96, 97.
89. Landes, *Revolution in Time,* p. 25.
90. Le Goff, "Labor Time in the 'Crisis,' " pp. 45–46.
91. Landes, *Revolution in Time,* pp. 73–74.
92. Le Goff, "Labor Time in the 'Crisis,' " p. 45.
93. Ibid.
94. Eleanora Carus-Wilson, "The Woolen Industry," in M. Postan and E. E. Rich, eds., *The Cambridge Economic History of Europe* (Cambridge, 1952), vol. 2, p. 386.

Equally important, the work bells marked a time period—the work day—that previously had been determined "naturally," by sunrise and sunset. The workers' demands for a longer work day (that is, longer than the daylight period), already implied a loosening of the tie to "natural" time and the emergence of a different measure of duration. To be sure, this did not mean that a system of standard, equal hours was introduced immediately; there was a transition period during which it is not clear whether the hours of the working day continued to be the older variable hours, which changed with the seasons, or were standardized initially at a summer length and a winter length.[95] Nevertheless, it could be argued that the move toward equal time units was potentially present once a regularized and standardized work day no longer bound directly to the diurnal cycle was constituted historically. The work day had come to be defined in terms of a temporality that was not a dependent variable of the seasonal variations in the length of daylight and darkness. This is the significance of the fact that the focal issue of workers' struggles in the 14th century was the duration of the work day.[96] The length of the work day is not an issue when it is determined "naturally," by sunrise and sunset; that it became an issue and was determined by the outcome of struggle rather than by tradition implies a transformation in the social character of temporality. The struggle over the length of the work day not only is, as Anthony Giddens notes, "the most direct expression of class conflict in the capitalist economy,"[97] but it also expresses and contributes to the social constitution of time as an abstract measure of activity.

Temporality as a measure of activity is different from a temporality measured by events. It implicitly is a uniform sort of time. The system of work bells, as we have seen, developed within the context of large-scale production for exchange, based upon wage labor. It expressed the historical emergence of a de facto social relationship between the level of wages and labor output as measured temporally—which, in turn, implied the notion of productivity, of labor output per unit time. In other words, with the rise of early capitalist forms of social relations in the cloth-producing urban communes of Western Europe, a form of time emerged that was a measure of, and eventually a compelling norm for, activity. Such a time is divisible into constant units; and within a social framework constituted by the emerging commodity form, such units also are socially meaningful.

I am suggesting, then, that the emergence of such a new form of time was related to the development of the commodity form of social relations. It was rooted not only in the sphere of commodity production but in that of commodity circulation as well. With the organization of commercial networks in the Med-

95. Sylvia Thrupp, "Medieval Industry 1000–1500," in Carlo M. Cipolla, ed., *The Fontana Economic History of Europe* (Glasgow, 1972), vol. 1, p. 255.

96. Le Goff, "Labor Time in the 'Crisis,'" p. 47.

97. Anthony Giddens, *A Contemporary Critique of Historical Materialism* (London and Basingstoke, 1981), p. 120.

iterranean and the region dominated by the Hanseatic League, increased emphasis was placed on time as a measure. This occurred because of the crucial question of the duration of labor in production, and because factors such as the duration of a commercial voyage or the fluctuation of prices in the course of a commercial transaction became increasingly important objects of measurement.[98]

It was within this social context that mechanical clocks were developed in Western Europe. The introduction of striking clocks placed on towers and owned by the municipalities (not the Church) occurred shortly after the system of work bells had been introduced, and spread very rapidly throughout the major urbanized areas of Europe in the second quarter of the fourteenth century.[99] Mechanical clocks certainly did contribute to the spread of a system of constant hours; by the end of the fourteenth century the sixty-minute hour was firmly established in the major urbanized areas of Western Europe, replacing the day as the fundamental unit of labor time.[100] This account has suggested, however, that the origins of such a temporal system and the eventual emergence of a conception of abstract mathematical time cannot be attributed to the invention and spread of the mechanical clock. Rather, this technical invention itself, as well as the conception of abstract time, must be understood in terms of the "practical" constitution of such time, that is, with reference to an emergent form of social relations that gave rise to constant time units and, hence, abstract time, as socially "real" and meaningful.[101] As A. C. Crombie notes, "By the time Henri de Vick's mechanical clock, divided into 24 equal hours, had been set up on the Palais Royale in Paris in 1370, the time of practical life was on the way to becoming abstract mathematical time of units on a scale that belongs to the world of science."[102]

Although abstract time arose socially in the late Middle Ages, it did not become generalized until much later. Not only did rural life continue to be governed by the rhythms of the seasons, but even in the towns, abstract time impinged directly upon only the lives of merchants and the relatively small number of wage earners. Moreover, abstract time remained local time for centuries; that large areas share the same time is a very recent development.[103] Even

98. Le Goff, "Merchant's Time," p. 35; Kazimierz Piesowicz, "Lebensrhythmus und Zeitrechnung in der vorindustriellen und in der industriellen Gesellschaft," *Geschichte in Wissenschaft und Unterricht* 31, no. 8 (1980), p. 477.
99. Le Goff, "Labor Time in the 'Crisis,' " p. 49.
100. Ibid.
101. David Landes, for example, seems to have grounded the change in the units of time in the mechanical clock itself: see *Revolution in Time*, pp. 75–78.
102. A. C. Crombie, "Quantification in Medieval Physics," in Sylvia Thrupp, ed., *Change in Medieval Society* (New York, 1964), p. 201. E. P. Thompson also notes that the timing of work preceded the diffusion of the clock: see "Time, Work-Discipline, and Industrial Capitalism," p. 61.
103. Le Goff, "Labor Time in the 'Crisis,' " p. 49.

the zero hour, the beginning of the day, varied widely after the spread of the mechanical clock, until it finally was standardized at midnight, that is, at an "abstract" time point independent of the perceptible transitions of sunrise and sunset. It was the standardization of this abstract zero hour which completed the creation of what Bilfinger calls the "bourgeois day."[104]

The "progress" of abstract time as a dominant form of time is closely tied to the "progress" of capitalism as a form of life. It became increasingly prevalent as the commodity form slowly became the dominant structuring form of social life in the course of the following centuries. It was only in the seventeenth century that Huygens's invention of the pendulum clock made the mechanical clock into a reliable measuring instrument, and that the notion of abstract mathematical time was formulated explicitly. Nevertheless, the changes in the early fourteenth century that I have outlined did have important ramifications then. The equality and divisibility of constant time units abstracted from the sensuous reality of light, darkness, and the seasons became a feature of everyday urban life (even if it did not affect all town dwellers equally), as did the related equality and divisibility of value, expressed in the money form, which is abstracted from the sensuous reality of various products. These moments in the growing abstraction and quantification of everyday objects—indeed, of various aspects of everyday life itself—probably played an important role in changing social consciousness. This is suggested, for example, by the new significance accorded time, the increased importance of arithmetic in fourteenth-century Europe,[105] and

104. G. Bilfinger, *Der bürgerliche Tag* (Stuttgart, 1888), pp. 226–31, cited in Kazimierz Piesowicz, "Lebensrhythmus und Zeitrechnung in der vorindustriellen und in der industriellen Gesellschaft," p. 479.

105. Landes makes this point but concentrates only on the equality of time, which he grounds in the mechanical clock itself (see *Revolution in Time*, pp. 77–78). He thereby overlooks the other dimensions of the emerging commodity form. I have suggested some other implications of Marx's categorial analysis for a sociohistorical theory of knowledge. Consideration of the relationship between forms of social relations and forms of subjectivity need not be limited to forms of thought; it can be extended to other dimensions of subjectivity and to historical changes in modes of subjectivity. The effects of the processes of abstraction and abstract quantification as everyday processes, and of the related forms of rationality that became prevalent with the growing domination of the commodity form, could also, for example, be examined with reference to the form of schooling and the changed determinations of childhood which emerged in the early modern period (see Philippe Ariès, *Centuries of Childhood* [New York, 1962]). Additional dimensions of historical changes in subjectivity that could be examined with reference to a categorial analysis of capitalist civilization include the psychic and social-habitual changes in the same period, such as the lowering of the threshold of shame, described by Norbert Elias in *The Civilizing Process* (New York, 1982), or those encompassed by Marcuse's thesis that the performance principle is the specific historical form of the reality principle in capitalist society (*Eros and Civilization* [New York, 1962]). In general, it seems to me that a theory of social forms could be useful in approaching the social and historical constitution of subjectivity on the level of psychic structures and tacit ways of being in the world, as well as of forms of thought.

the beginnings of the modern science of mechanics, with the development of the impetus theory by the Paris School.[106]

The abstract form of time associated with the new structure of social relations also expressed a new form of domination. The new time proclaimed by the clocktowers—which frequently were erected opposite the church belltowers—was the time associated with a new social order, dominated by the bourgeoisie, who not only controlled the cities politically and socially but also had begun to wrest cultural hegemony away from the Church.[107] Unlike the concrete time of the Church, a form of temporality controlled overtly by a social institution, abstract time, like other aspects of domination in capitalist society, is "objective." It would, however, be mistaken to regard this "objectivity" as no more than a veil that disguises the concrete particularistic interests of the bourgeoisie. As with the other categorial social forms investigated in this work, abstract time is a form that emerged historically with the development of the domination of the bourgeoisie and has served the interests of that class; but it has also helped to constitute those interests historically (indeed, the very category of "interests"), and it expresses a form of domination beyond that of the dominating class. The temporal social forms, as I shall show, have a life of their own, and are compelling for all members of capitalist society—even if in a way that benefits the bourgeois class materially. Although constituted socially, time in capitalism exerts an abstract form of compulsion. As Aaron Gurevich puts it:

> The town had become master of its own time . . . in the sense that time had been wrestled from the control of the Church. But it is also true that it was precisely in the town that man ceased to be master of time, for time, being now free to pass by independently of man and events, established its tyranny, to which men are constrained to submit.[108]

The tyranny of time in capitalist society is a central dimension of the Marxian categorial analysis. In my consideration of the category of socially necessary labor time thus far, I have shown that it does not simply describe the time expended in the production of a particular commodity; rather, it is a category that, by virtue of a process of general social mediation, determines the amount of time that producers *must* expend if they are to receive the full value of their labor time. In other words, as a result of general social mediation, labor time expenditure is transformed into a temporal norm that not only is abstracted from, but also stands above and determines, individual action. Just as labor is transformed from an action of individuals to the alienated general principle of the totality under which the individuals are subsumed, time expenditure is trans-

106. Le Goff, "Labor Time in the 'Crisis,' " p. 50.
107. Le Goff, ibid., p. 46; Bilfinger, *Die mittelalterlichen Horen*, pp. 142, 160–63; Gurevich, "Time as a Problem of Cultural History," p. 241.
108. Gurevich, "Time as a Problem of Cultural History," p. 242. See also Guy Debord, *Society of the Spectacle* (Detroit, 1983).

formed from a result *of* activity into a normative measure *for* activity. Although, as we shall see, the magnitude of socially necessary labor time is a dependent variable of society as a whole, it is an independent variable with regard to individual activity. This process, whereby a concrete, dependent variable of human activity becomes an abstract, independent variable governing this activity, is real and not illusory. It is intrinsic to the process of alienated social constitution effected by labor.

I have suggested that this form of temporal alienation involves a transformation of the nature of time itself. Not only is socially necessary labor time constituted as an "objective" temporal norm, which exerts an external compulsion on the producers, but time itself has been constituted as absolute and abstract. The amount of time that determines a single commodity's magnitude of value is a dependent variable. The time itself, however, has become independent of activity—whether individual, social, or natural. It has become an independent variable, measured in constant, continuous, commensurable, and interchangeable conventional units (hours, minutes, seconds), which serves as an absolute measure of motion and of labor qua expenditure. Events and action in general, labor and production in particular, now take place within and are determined by time—a time that has become abstract, absolute, and homogeneous.[109]

The temporal domination constituted by the forms of the commodity and capital is not restricted to the process of production but extends into all areas of life. Giddens writes:

> The commodification of time . . . holds the key to the deepest transformations of day-to-day social life that are brought about by the emergence of capitalism. These relate both to the central phenomenon of the organization of production processes, and to the "workplace", and also the intimate textures of how daily social life is experienced.[110]

I shall not, in the present work, address the effects of this temporal domination on the texture of experience in everyday life.[111] Instead, I shall discuss some of

109. Lukács also analyzes abstract time as a product of capitalist society. He considers such time to be essentially spatial in character: "Thus time sheds its qualitative, variable, flowing nature; it freezes into an exactly delimited, quantifiable continuum filled with quantifiable 'things' . . . in short, it becomes space" (*History and Class Consciousness*, trans. Rodney Livingstone [London, 1971], p. 90). The problem with Lukács's analysis is that he opposes the static quality of abstract time to historical process, as if the latter, in and of itself, represents a noncapitalist social reality. However, as I shall discuss in Part III, capitalism is characterized not only by unchanging abstract time but also by a historical dynamic beyond human control. Historical process as such cannot be opposed to capitalism. Lukács's position indicates the degree to which his understanding of the category of capital is inadequate and is related to his identification of Hegel's identical subject-object with the proletariat.

110. Giddens, *A Contemporary Critique*, p. 131.

111. David Gross, following Lukács in some respects, considers the effects of abstract time on everyday life in terms of the "spatialization of thought and experience," by which he means

the social-epistemological implications of our investigation of temporality thus far; then, in Part III, I shall return to the question of the social constitution of time in capitalist society by investigating the temporal dualism of the underlying social forms of capitalism and, on that basis, outlining the conception of history implied by Marx's categorial theory.

The opposition between abstract and concrete time overlaps, but is not fully identical, with the opposition between time in capitalist society and time in precapitalist societies. The rise of capitalism does, to be sure, entail the supersession of earlier forms of concrete time by abstract time. E. P. Thompson, for example, describes the domination of a task-oriented notation of time in preindustrial societies, and its supersession by the timing of labor with the development of industrial capitalism.[112] In the former case, time is measured by labor, whereas in the latter it measures labor. I have chosen to speak of concrete and abstract time in order to emphasize that two different sorts of time are involved rather than merely two different modes of measuring time. Moreover, as I shall elaborate in Chapter Eight, abstract time is not the only form of time that is constituted in capitalist society; a peculiar form of concrete time is constituted as well. We shall see that the dialectic of capitalist development is, on one level, a dialectic of the two sorts of time constituted in capitalist society and, therefore, cannot be understood adequately in terms of the supersession by abstract time of all forms of concrete time.

Forms of social mediation and forms of consciousness

Marx's determination of the magnitude of value, in my interpretation, implies that time as an independent variable, the homogeneous, absolute mathematical time that has come to organize much of social life in our society, has been constituted socially. This attempt to relate abstract mathematical time as well as its concept to the commodity-determined form of social relations is an instance of the sociohistorical theory of knowledge and subjectivity presented in this

"the tendency to condense time relations . . . into space relations" ("Space, Time, and Modern Culture," *Telos* 50 [Winter 1981–82], p. 59). Gross regards the social consequences of this "spatialization" as extremely negative, entailing the loss of historical memory and the progressive destruction of the possibilities of social critique in contemporary society (pp. 65–71). Gross's critical description is illuminating, but he does not ground the historical constitution of "spatialization" in the forms of social relations characteristic of capitalism. Instead, because he understands these relations only as class relations, he attempts to ground spatialization in the development of urbanization and technology per se (p. 65), and in the interests of controlling elites (p. 72). However, as I have sought to show, consideration of the former alone, without reference to forms of social relations, does not suffice; it cannot, for example, account adequately for the origins of abstract time. Moreover, recourse to considerations of the interests of the ruling strata cannot explain the genesis, nature, and social efficacy of forms that may very well constitute and serve those interests.

112. Thompson, "Time, Work-Discipline, and Industrial Capitalism," pp. 58–61.