1988

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The RECOVERY of MEANING

HISTORICAL ARCHAEOLOGY IN THE EASTERN UNITED STATES

EDITED BY
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1988

Smithsonian Institution Press
Washington and London

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CHAPTER 13

Steps to an Archaeology of Capitalism

Material Change and Class Analysis

ROBERT PAYNTER

One of the central problems of historical archaeology is understanding why the world's material culture exploded in the 18th, 19th, and 20th centuries into a bewildering array of new forms in vast quantities (Deetz 1973:36–37). In particular, historical archaeologists have concerned themselves with the objects of domestic life, ceramics, food, utensils, houses, and gardens, leaving the realms of work to industrial archaeologists. Among historical archaeologists the changing mentalities and sensibilities associated with the material world of domestic life have been a major research focus (e.g., Deetz 1977; Glassie 1976; Leone 1984). One approach to these past mentalities uses structural analyses to uncover the grammars for constructing senses of individuals, families, and society, coded in the things of everyday life. Another approach studies the emerging ideology of the capitalist mode of production as symbolized in the new physical world of the 18th and 19th centuries. Although these studies of the meaning of the material world of early modern North America, and its transformation to modern North America, have produced novel and intriguing insights, they by and large do not suggest what, if anything, changes in the sensibilities from the realm of capitalist work might have to do with changes in the domestic sphere.

The central focus of this chapter is to present a framework for un-

derstanding the material and organizational changes in production of the 18th and 19th centuries. The framework is general and the intent is to make sense out of the increasing volume and the increasing standardization of material culture encountered in the archaeological record. The framework is one of class analysis, and I focus in particular on the imperatives that led owners to reorganize and industrialize work, especially during the 19th century. In presenting this framework, I discuss how it is useful and provocative for studying the data and theory of historical archaeology.

I am thus concentrating on the ideas, practices, and things of the realm of work. This by no means supercedes understandings of changing ideologies that arise from studies of the material of the domestic realm. In fact, my brief illustrations will draw on these same objects and assemblages. Insights into these domestic assemblages can be gained by remembering that people spent increasing amounts of their lives working under the imperatives of the capitalist wage relation, and that the objects used in the domestic realm were increasingly produced in accordance with these same imperatives. It is my position that understandings of the domestic world might be enhanced by a better understanding of the forces affecting capitalist production. The following is thereby an offer and challenge to conduct class analyses using the data of historical archaeology, not a finished analysis. As a result, points are illustrated with reconsiderations of already familiar analyses; detailed and rich case studies are still premature.

I present my argument in three steps. First, I briefly review the traditional theories of material change and note their limitations for the task. Second I outline some of the characteristics of class models of capitalism, especially where they touch on issues of material culture and its change. Third, I consider some of the contributions historical archaeology can make to choosing between these models and stimulating the development of new ones.

MODELS OF CHANGE IN MATERIAL CULTURE

Three general approaches are used to explain material change in historical archaeology. The first, and most familiar, is the idealist approach. Idealist models consider culture to be the learned norms of a society and material culture to be the concrete manifestation of cultural templates. Change in the material culture results from change in the norms and ideals. Prominent examples of this line of argument are found in Deetz's (1977) and Glassie's (1975) studies of material change.

The second approach popular with historians of technology (e.g.

Habakkuk 1962; Temin 1971; Rosenberg 1972, 1981; Smith 1977, 1981; Ferguson 1981; Mayr and Post 1981) and some historical archaeologists, uses models of markets to account for material change. In particular, the production of material objects is said to follow the dictates of supply and demand. Culture may be reduced to an effect of attempts to maximize return, as in formalist models, or may be considered an externality that constrains the plan of the market forces in substantivist versions. Historical archaeologists (e.g., Adams 1976, 1977; Spencer-Wood 1979) have used the market approach to account for assemblage change associated with the growth and expansion of the national market.

The third approach assumes that class relations are the basis for understanding cultural and material change. Models based on this assumption posit a condition of social inequality between the controllers of access to strategic resources (such as land, tools, food, housing, clothing, and so on) and those who have to give up surplus production to gain access to these strategic resources. Change in material culture, it is argued, results from the dynamic implicit in the interactions between elites and nonelites over the production and extraction of social surplus. The central relationship affecting recent North American culture change is that between capitalists and workers. Historical archaeologists such as South (1972) and Schuyler (1970) have pointed out the importance of examining the workings of capitalism in studying the material record, although as yet only a few analysts have attempted to make detailed use of class models of capitalism (cf. Leary 1980; Leone 1984; Handsman 1985; McGuire 1985; Paynter 1985).

Each of these three approaches has its merits and its problems. A major contribution of the idealist models is the order that they have given to historical material data. Their proponents have developed the basic artifact typologies, noted the salient spatial and temporal trends, and given the discipline significant questions to answer (e.g. Noël Hume 1973; Deetz and Dethlefsen 1965; Glassie 1975; Deetz 1977). Although effective at ordering the data and raising questions, the idealist approach lacks explanatory power. That the numbers of things and their standardization increases is strongly substantiated. Why this trend occurs is generally attributed to the change to a post-Renaissance, post-Imperial, individualized culture order (Deetz 1977; Glassie 1975: 176–93). But why these factors work together, why the material world changes so drastically—these remain open questions.

Market models have been less widely applied to the archaeological record and have had less impact on questions or analytic methods. They are superior to idealist models in that they suggest conditions for technological change. Generally, qualitative and quantitative change is

driven by increasing demand, which in turn arises from an increasing population that is more easily reached because of decreasing transport cost (e.g., Lorrain 1968:35; Baugher-Perlin 1982:282; Gorman 1982; Lewis 1984; Miller and Sullivan 1984:83). Supply-side problems, especially those regarding technical production—such as the use of selenium in glass decolorization (Miller and Pacey 1985:44–45) or the introduction of bottle machines in response to the need for standardized bottles for automatic filling machines (Miller and Sullivan 1984:89)—are seldom used to account for technological change. Finally, a major use of market models has been to study assemblage variation at sites of consumption (rather than production). The results have led to a better understanding of the size and scale of the modern economy (South 1972; Adams 1976, 1977; Elliott 1977; Spencer–Wood 1979; Miller 1980; Baugher-Perlin 1982:280–288; Hill 1982).

It is not so much that market theories are wrong, for in some situations changing demand and the search for optimal returns do account for technical change. Rather, their incompleteness is a problem. Explanations depending upon demand do not explain why demand increases; population growth is exogenous to the market forces, and declining transport costs are usually invoked as teleological tendencies. Production explanations explain technological change in terms of substituting technology for labor and thereby cutting costs. But, as Rosenberg (1976:109) points out, these models are theoretically incapable of explaining why the factor of labor costs, in the equilibrial firm, is the target for cost reduction. Unless this question is answered, the problem is addressed once again through exogenous factors, such as abundant land and mobile labor (Lazonick 1981:492).

In addition, an exclusive focus on the market beclouds the central issue at hand—how did the market expand itself into so many relations of daily life? Or, put another way, why did the inhabitants of North America adopt mass-produced items into their everyday world? Numerous studies by social historians abundantly confirm that other forces along with market forces affected the material life of recent North America (e.g., Merrill 1977; Henretta 1978; Clark 1979; Lemon 1980) and made the recent past different from the present. Understanding the articulation of lineal families, reciprocal communities, and imperial governments with various kinds of markets constitutes a major theoretical and empirical problem (Adams 1977:79, 86–87), one too easily ignored if only the play of supply and demand is considered (e.g., see Godelier 1977:32–51 for a general critique of this approach). In short, market forces played a major role in structuring the recent past, and market models are necessary, but they alone cannot account for the massive changes in our data.

Class models start with an assumption that surprises few anthropologists, namely that the Northwest European–North American society was stratified. Technological change results from the struggle between elites and nonelites over the perpetuation of the stratified social order. These struggles play themselves out in a number of realms, including the economy (Marx 1967), ideology (Schneider 1979; Therborn 1980; Leone 1984; Handsman 1985), politics (Szatmary 1980; Nobles 1983), society (Cott 1977), and space (Lemon 1980; Paynter 1982). As Lazonick (1981a:492) points out in his study of the adoption of self-acting mules, class models do not exclude market forces, but encompass them in a broader understanding of the economy. No widely accepted, distinctive ordering of the data of historical archaeology has emerged from these models (see Paynter 1982 for some attempts with spatial data), nor have their limits been adequately identified. In short, their major drawback is that class models have, by and large, been ignored.

The reason that class models of capitalism have been ignored and that they have recently come into vogue would make an intriguing study in contemporary ideology. In this regard, simply note that the proposition that U.S. society is capitalist is in itself controversial. The word *capitalism* is rarely used in historical archaeology to discuss the system under study, and historical archaeologists are not alone in this regard. Bowles, Gordon, and Weisskopf (1983:33) note that "few used to speak about 'capitalism' during the boom years (of the 1950s and 1960s) because most took 'capitalism' for granted. The word has since been readmitted into polite company. Magazines ask 'Is Capitalism in trouble?' Business executives worry out loud about its future." One might add, historical archaeologists hold symposiums on the subject.

This chapter is not an attempt to elaborate an anthropology of historical archaeology. In the following I argue for the role of class models as competing explanatory approaches. They should have this status because they meet two criteria of potential scientific propositions—relevance and provocativeness. By relevance I mean that class models are tightly linked to the phenomena under study, or material culture. By provocativeness I mean that there is considerable room to apply this model to material culture and that by doing so, historical archaeologists will be able to refine class models. Class models fit this scientific bill, not only an ideological one.

In sum, the full range of interpretive approaches available to social scientists and historians is not found in historical archaeology, where idealist models and diffusionist explanations are the dominant, almost exclusive means of discourse, despite the logical problems and empirical oversights implicit in their application. Market models have a greater

potential for explaining the ever-growing number of objects and variations in forms, although they too easily project the relevance of market forces into the past. The least used approach identifies capitalist class relations at the heart of recent cultural and material change. Since class models have received little attention, they are difficult to assess. Nonetheless, class models are relevant to historical archaeology, as discussed in the next section. Their provocativeness is examined later in the chapter. By arguing for the logical attraction of class models, I hope to provide grounds for their use in empirical analysis in the future. Only then will it be possible to fully assess the utility of class models.

CAPITAL AND MATERIAL CULTURE

An attractive aspect of class models for historical archaeologists is the central position accorded material culture. In other theories, the material world is derivative from other, more significant aspects of culture: For structural models material culture is an imperfect replica of deep mental templates; for market-based models, material culture is a correlate of optimizing behavior. In class models, particularly of capitalism, the material world figures as specific moments in the process of accumulating social surpluses. A brief presentation of the fundamental concepts of class analysis discloses the ontological significance of the material world.

A number of different class relations may shed light on a particular society. For example, the relations between masters and slaves, between serfs and lords, and between capitalists and workers may indicate how surpluses are extracted and why society changes (Marx 1964, 1973). In each of these instances, the elite follow distinctive strategies to extract surplus from the nonelite and the nonelite use distinctive strategies to resist the extraction of surplus (Resnick and Wolf 1979). By considering domination and resistance, the analyst is able to understand the construction of ideologies, social organizations, political-economic struggles, and for our purposes, material worlds characteristic of a particular amalgam of class relations.

Of immediate interest is the relation between capitalists and workers that underlies the capitalist mode of production. This relation and the resultant model of production will help to explain how the model of capitalist relations generates a material world of ever-increasing numbers and more standardized forms of things.

Capitalists own the means of production—raw materials, tools, factories, machines—but need to hire workers to produce objects. Workers, not owning the means of production, have to sell their ability

to work—labor power—to the capitalist. The capitalist pays the worker a wage, and in return the worker produces commodities that are owned by the capitalist. The capitalist sells these commodities—pearlware tea sets, gravestones, patent medicine, houses—for a profit.

The exchange of labor power for wage, the production of commodities and profits, constitutes the circulation of capital. As Harvey (1982:20) notes, "Capital . . . should be defined as a process rather than a thing. The material manifestation of this process exists as a transformation from money into commodities back into money plus profit: M-C-(M+M')." Thus, capital takes on different forms at different moments of production. First, it is money in the hands of the capitalist. Next it is the labor power of the workers, raw material (e.g., clay, wood), and tools (e.g., kilns, wheels, molds). Next, the commodities (e.g., tea sets, pans, creamers) produced by the labor power. Finally, the circuit closes as money to cover the investment plus a profit returns to the hands of the capitalist (Mendel 1962; Marx 1967:146–76; Harvey 1982:39–74; Desai 1983:64).

The logical relevance of Marx's model of capitalism for studying the material world is fairly obvious. Capital, the process implicit in the relation between workers and owners, at times takes the form of material objects. Changes in the circuit of capital necessarily change the material world. Thus, the class model of capitalism is logically applicable to the data of historical archaeology.

Insights into why material culture increases in volume and changes in form will become apparent if one considers some of the problems encountered by the capitalist. The capitalist's main goal is to realize a profit. As Marx discovered, the origin of profit is the difference between what the capitalist pays the laborer for a wage and what the product brings when sold (Godelier 1977:23; Harvey 1982:24). In short, the capitalist may pay a very low wage, because many people seek work or because mechanization has replaced workers, and then sell the commodity at a high price and realize a large profit.

However, realizing a profit is no sure thing. Two groups, in particular, stand in any individual capitalist's path: competitors and workers. Other competitors are constantly trying to cut into our capitalist's market. If they do, our capitalist is left with unsold creamers, for instance, and therefore unrealized profits. The other source of trouble is the workers, who, upon noting the discrepancy between their wage and the price their labor receives as a commodity, try to increase their wage, thereby decreasing the capitalist's profit.

Material culture plays important roles in capitalists' attempts to fend off competitors and discipline workers. One way to deal with competitors is to find a market that has no competitors. For example,

one might trade previously made commodities (such as glass beads) into previously untapped markets (among Native Americans), or one might develop new commodities (such as vacuum cleaners) for people already in the market (middle-class households). This solution is reflected in the appearance of new types of material culture in archaeological deposits. The problem with this solution is that competitors may find their way into these new markets, a prospect that gives rise to a second solution for fending off competitors.

The second solution is to produce large quantities of items that are less expensive. These flood the market and take business away from competitors who are producing relatively more expensive commodities. The competitors face a crisis, as their commodities are not being transformed to money plus profit. If the competitors cannot realize a profit, they go bankrupt and leave our first capitalist without any competition. From an archaeological perspective, this solution increases the volume of objects in the material world.

One important way that the capitalist can produce cheaper commodities is to make the workers produce more. Important tactics to increase worker productivity are to divide up the work so that each worker carries out a repetitive task and to mechanize production (Braverman 1974). Mechanizing production and dividing the labor serve to increase productivity by (1) making it possible to produce more objects per worker per day and (2) standardizing the labor process so that virtually anybody can do the job. The former helps the capitalist to capture markets by increasing the volume of commodities. The latter increases the potential pool of workers, threatening the employed workers with unemployment and thereby enabling the capitalist to temper workers' demands for higher wages. Thus, mechanizing production may simultaneously defeat competitors' and labors' demands on profit. In the archaeological record mechanization and division of labor are reflected in the machinery and factories of production and the standardized commodities produced for consumption.

By penetrating new markets and producing many cheap commodities with a mechanized production process, our capitalist may achieve success, but it will only be temporary. In the world of capital, some competitor is always trying to innovate and thereby capture the market, and the work force is always looking for ways to gain a larger share of the pie. They both create a constant pressure on the capitalist to find new machinery that produces ever more commodities and increasingly disciplines the work force. The result is only temporary success and can result in a material world that virtually explodes with objects produced in standardized forms.

In sum, class models using capitalist-worker relations are logically

relevant for historical archaeology. Material culture, defined as commodities produced and the means of production, is the central component of models of capitalism in that the social relations of these models alter material culture. The result is an increasing volume and changing form, which are distinctive features of the record studied by historical archaeologists.

POTENTIAL FOR A HISTORICAL ARCHAEOLOGY OF CAPITALISM

Another important reason to consider models of capitalist class relations is their provocativeness: Do they help organize our data and are our data likely to refine the models? Several benefits can be gained from studying the historical material world with class models. One of these has to do with the presence and operation of temporal processes, which are a major concern of historical archaeologists, whose task is to discover temporal processes in changing types of artifacts, in changing frequencies of types, and in changing assemblage patterns. They use such processes to interpret cultural history. Class theorists are also interested in temporal processes, as predicted by their theories of capitalist crises and studied with statistics on production and prices. The temporal trajectories of archaeologists offer information on new aspects of the political economy for evaluating class theories of the ebb and flow of capitalism. In turn, theory offers some alternative explanations for change to the limited ones presently in use.

These potential contributions can be better understood by matching some temporal patterns discussed in historical archaeology with class theories of capitalist expansion. Various periodizations have been developed by class theorists to describe capitalist growth (e.g. Research Working Group 1979; Gordon 1980; Gordon, Edwards, and Reich, 1983; Wallerstein 1984). These periodizations are usually analyzed as cyclical processes of varying duration, which makes it possible to classify them into three groups. Some, such as business cycles, last a relatively short period, on the order of 1–15 years, and are associated with overproduction that is cleared without seriously transforming the political economy. Cycles that fall in the middle range are called Kondratieffs and last about 50 years, which is long enough to see the development of new tactics for extracting and resisting the extraction of social surplus. The third group—logistics, or trend seculaire—comprises cycles on the order of 200–300 years. During these periods the dominant class relations are rearranged as are the concomitant social, political, and ideological structures supporting the class relations.

The empirical and theoretical aspects of these cycles have been studied by class theorists and neoclassical economists alike (e.g., Mandel 1975:122–39; Barr 1979; Pomian 1979; Research Working Group 1979:490–92). Many earlier theorists (e.g., Luxemburg 1951; Kondratieff 1979) hypothesized that single, economic factors are the cause of these cycles, whereas empirical workers searched for a set of symmetrical cycles, each with a uniform amplitude and period. More recent class theorists (e.g., Mandel 1975:145; Research Working Group 1979; Gordon 1980; Gordon, Edwards, and Reich 1982:26–47) still see economic factors as the driving force behind business cycles, but they posit that a variety of other factors (including demographic growth and immigration, exploration, war and political hegemony, and ethnicity and enculturation) also affect Kondratieff and logistic cycles (Held 1983; Shaikh 1983). There is generally less interest in symmetrical cycles now, as analysts are instead searching for asymmetrical periods of expansion and contraction on roughly the scales of the business, Kondratieff, and logistic cycles.

The Kondratieff and logistic cycles are particularly relevant to historical archaeology. They result from a substantial reorganization of social relations, which, when realigned generate significantly different production and consumption practices. These systemic changes in production and consumption altered the material world. Data from archaeological contexts might be analyzed with and thereby affect models explaining Kondratieff and logistic cycles. Some brief examples point to the potential for more detailed studies.

Of these two cycles, Kondratieff cycles have received the most theoretical and empirical attention. Most class theorists agree that the rise in the rate of profit signals a period of expansion (an A phase) and that decline in the rate of profit indicates a period of contraction (a B phase). Two economic forces are usually implicated in the cyclical expansions and contractions: (1) the squeeze that workers can put on profits and (2) the stagnating effects of unbridled capitalist competition (Gordon 1980:13; Gordon, Edwards, and Reich, 1982:34; Shaikh 1983). Profit-squeeze theories have been used to study the former, and overproduction/underconsumption theories to study the latter.

As noted in the preceding section, workers can demand higher wages and back up their demands with collective bargaining and strikes, thereby creating a squeeze on profits (Bowles, Gordon, and Weisskopf 1983:62–97, 122–33; Shaikh 1983:137–43). Workers can have their greatest impact during times of economic expansion and full employment for in a period of boom capitalists are unable to bring the threat of unemployment to bear on their negotiations with workers. As times get better, the capitalists' ability to realize a profit may erode,

economic booms may turn into busts, and the Kondratieff cycle continues.

Overproduction/underconsumption theories are crisis theories that emphasize relations between capitalists (Sweezy 1942:133–236; Shaikh 1983:137–143;Harvey 1982:190–203). According to these theories, when capitalists compete for markets, they are forced to produce commodities. Competition is said to be a more compelling factor than consumer demand alone in driving capitalists to expand production. Since supply is driven by more than demand, it is possible to saturate the market and still have capitalists turning out more and more in their efforts to outcompete one another. The general tendency, then, will be to overproduce commodities. However, because of the relative excess of commodities, not all of them will be sold, and commodities will sit on shelves. This means the same level of production need not be maintained; as a result workers will be laid off, excess money will look for scarce investments, factories will be empty, and capitalists will fail to realize a profit. Capitalists can use various tactics to improve their situation in periods of economic decline. For example, they can slow down production and wait for inventories to clear, or they can eliminate inefficient producers by buying them out (and thus devaluing their inventory), bring new cheap laborers into wage labor (as this devalues labor and provides demand for labors' reproduction, a process also known as deepening capitalist penetration), reorganize the workplace to increase productivity, or penetrate new markets (Gordon, Edwards, and Reich 1982:19–20; Harvey 1982:190–203).

These theories on Kondratieff cycles have been used to periodize American history. One such study by Gordon, Edwards and Reich (1982:9) offers the following pattern for periods of expansion and contraction:

Expansion	Contraction	
1790	1820	Mid-1840s
Mid-1840s	ca. 1873	Late 1890s
Late 1890s	World War I	World War II
World War II	Early 1970s	?

Gordon, Edwards, and Reich (1982) suggest that the crises in these cycles were resolved by altering the nature of capitalist work. Looking at the contraction periods, the crisis of the second quarter of the 19th century, for example, was resolved by reorganizing the work force into factory production. The crisis of the late 19th century was resolved by homogenizing labor, which entailed disciplining workers and mechanizing production. The segmentation of the labor market into well-

paid, unionized, white men and poorly paid, nonunion, nonwhite men and women was instrumental in solving the crisis of the 1930s and generating the postwar prosperity.

Two tactics for resolving Kondratieff crises—reorganizing the workplace and penetrating new markets—often involve changes in the material world. Braverman (1974:184–235) offers an extensive treatment of how technology was used to de-skill and thereby control workers in factories. The variety of forms of factory organization have clear spatial as well as technical implications, as presented in Clawson's (1980:54–70) analysis of the internal organization of factories. Studies such as these usually rely on accounts of technical and spatial relations, or on the occasionally well-preserved tool or worksite. Undoubtedly, documents and well-preserved objects reflect biases of observers' interests and preservation. Archaeological studies of workplaces, technology, and wasters should supplement these studies to disclose the variation in owners' use of objects to enforce production discipline as well as assessments of the efficacy of these tactics.

Penetrating new markets is also an important tactic for resolving overproduction/underconsumption crises. As already mentioned, this means finding whole new areas of the world in which to sell goods (i.e., expanding the market) or finding new realms of life that can make use of commodities (i.e., deepening the market). An example of the expansionary process is the export of British ceramics, textiles, and metal goods to the colonies in the 18th century. An example of the deepening process is the introduction of technology into middle- and upper-class households in the late 19th century (Hayden 1981).

Archaeological middens bear witness to the use of these two tactics, as shown in studies of the spatial distribution of the appearance of commodities (e.g., Adams 1976, 1977; Spencer-Wood 1979; Schuyler 1980). However, these studies could be expanded upon in two important ways. First, changing assemblage patterns could be linked to the existence and resolution of overproduction crises. Such studies would have to examine the timing of the replacement of folk-manufactured items by commodities and its correlation to overproduction/underconsumption crises. Second, these studies could include areas outside North America. Similar analyses could be conducted abroad (e.g., Thorbahn 1979) to investigate such questions as When do European ceramics and metal objects appear in East and West Africa, in South and East Asia? Is the initial penetration a trickle of the same "colonizing" types of artifacts, or do entire assemblages suddenly replace old objects?

There is just as much potential for archaeology to contribute to the study of the tactic of reorganizing the workplace. Marx (1967:436), for

instance, notes that "it would be possible to write quite a history of the inventions, made since 1830, for the sole purpose of supplying capital with weapons against the revolts of the working-class." This could be supported with preliminary analyses of class-related changes in power generation, textile manufacture, and glass production.

Marx's suggestions have only recently gained attention in the work of historians of technology, who have applied them in systematic studies of early industrialization. For instance, Bruland's (1982) studies of the textile industry demonstrate how capitalists used technology to undermine the position of workers. Strikes often were the immediate impetus for these developments, as Richard Roberts, developer of the first effective self-acting mule noted (cited in Bruland 1982:103): "The self-acting mule was made in consequence of a turnout of spinners at Hyde [in 1824], which had lasted three months, when a deputation of masters waited upon me, and requested me to turn my attention to spinning, with the view of making the mule self-acting."

Similar profit squeezes—in the form of strikes, sabotage, and low productivity by the strong early 19th-century Union of Block Printers and the Wool Combers Union—led to the development of cylindrical calico printers and mechanized wool combing machines, respectively (Bruland 1982:110–11, 115–16). Lazonick (1981a,b,c), who has also studied the textile industry notes that the United States adopted spinning much faster than Britain. He attributes this difference to the differences in the relations between labor and management in the two countries (Lazonick 1981a:514–15, 1981b), although this interpretation is at odds with some other class theorists (1981c). In an exemplary study, MacKenzie (1984) offers an excellent review of class theories of machines along with case studies. Like the textile examples, the development of the Fourdrinier paper-making machine and moulding machines at the McCormick works can be traced to capitalists' attempts to avoid worker-generated profit squeezes (see also Rosenberg 1976; Winner 1980).

Archaeological investigations could contribute to such studies in a number of ways. For example, investigations of production sites classically describe industrialization trajectories (e.g., Rutsch and Rutsch 1975; Starbuck 1983:49,60). By carefully dating these trajectories and setting them in their labor contexts, archaeologists could shed light on the forces surrounding innovation and adoption. Similarly, the temporal redesign of factories and changing character of wastes should provide data on attempts by capitalists to reorganize the work process (Thompson 1967) and attempts by workers to resist through low productivity and sabotage (e.g., Slater 1980).

The detailed temporal trajectories that have been established in his-

torical archaeology—such as Noël Hume's work on a variety of materials (1969), especially on ceramics (e.g., 1973); Lorrain's (1968) seminal glass trajectory; Anderson's (1968) shoe study; and so on—provide another important contribution to historical archaeology. Rarely are these trajectories explained, and yet the increasing use of molds and machines that create the temporally diagnostic attributes raise the possibility that capitalist-worker conflicts may underlie these innovations as well.

A particularly telling example comes from the North American glass industry. Historical archaeologists make use of glass, particularly bottles, in dating sites. Attributes on glass, particularly seams from molds, are evidence of the process used to produce the objects (e.g., Lorrain 1968). Three basic processes are responsible for the bulk of glass containers: free-blowing, in which human labor gathers the molten glass, mechanically forces the rough shaping of glass to its initial form, and fine finishing of the shape to its final hardened form; automatic production, in which machines gather, shape and finish the forms; and, processes that mix human labor and machine actions, exemplified by the use of molds and pressing machines. Bottles produced prior to the 19th century were predominantly made by free-blowing, and the bulk of the 20th century bottles were produced in automatic machines. The 19th century saw the development of molds, semiautomatic machines, and eventually, in the early 20th century, fully automatic machines. The fine details of these production shifts, and their traces on glassware are the subject of considerable research (e.g., Lorrain 1968; Miller and Sullivan 1984; Miller and Pacey 1985).

Although changing glass attributes are significant for addressing issues of chronology, they also raise questions about the causes of technological change. When historical archaeologists have probed this issue, they have generally relied on market explanations. For instance, Lorrain (1968:35) attributes the growing popularity of techniques, such as the use of molds in the 19th century, to "the development of mass transportation systems which opened new markets among the ever expanding and growing population." The adoption of machinery in bottle production is variously attributed to demand-side factors, such as "the increasing market for glass containers" (Miller and Sullivan 1984:83) or the need to produce standardized forms for automatic filling machines (Miller and Sullivan 1984:86), and supply-side factors, such as the high cost of labor (Miller and Sullivan 1984:89).

A strikingly different perspective is offered by Marx (1967:436). He notes that " 'The relation of the master and the men in the blown-flint bottle trades amounts to a chronic strike.' Hence the impetus given to the manufacture of pressed glass, in which the chief operations are

done by machinery." The extent of labor struggles is not well documented in the literature of historical archaeology, but it could be.

For instance, there are suggestions in Miller and Sullivan's (1984) innovative, detailed, and intriguing study of the adoption and effects of semiautomatic and automatic bottle machines in North America that class processes affected the adoption of this technology. For instance, they note that the semiautomatic machines patented by Abrogast and Ashley in the 1880s met with resistance from the glassblower's unions. It took over 10 years from the time Abrogast's machine was patented for it to be used in mass production, notably, in a nonunion shop (Miller and Sullivan 1984:85). The history of the Dominion Glass Company's adoption of fully automatic machines also suggests the play of class processes. The Dominion Glass Company, formed in 1913, was the dominant glass-producing firm in Canada with a "practical monopoly" on glass production (Miller and Sullivan 1984:92). Glassware was produced by hand and by automatic machines—an unexplained mix since, as Miller and Sullivan note (1984:92), the replacement of labor by machine production for this monopoly company was not driven by the intense competition seen in the United States. This raises the possibility that the motive for adopting automatic bottle machines was to control the skilled work force. Further evidence of the uneasy relation between the glassblowers and management is the lengthy strike in the 1930s, a strike that was broken and that contributed to the demise of hand glassblowing (Miller and Sullivan 1984:92).

These examples are suggestions. Obviously, they do not substitute for a full analysis of labor relations in the glass industry. It would be important to know, for example, if mechanization was a response to the control of a recalcitrant, skilled work force at the Dominion works. It would also be important to understand labor relations at glass manufactories in the United States. Furthermore, the history of labor relations at the smaller early 19th-century glassworks needs to be probed to understand the circumstances surrounding the adoption of molds and pressing machines. Detailed studies that combine documentary research and artifact analyses, such as those by Miller and his coauthors (Miller and Pacey 1985; Miller and Sullivan 1984), clearly point the way.

Other class-related lines of production are equally intriguing, although less well studied. For instance, one might investigate the increasing use of molded ceramics (Myers 1980:32) with respect to labor relations, as well as the role of the strong shoe unions (Dawley 1976) in the changes in shoe manufacture (e.g., Mulligan 1981; Anderson 1968). These and many other chronological trajectories call attention to major

changes in lines of production that have not yet been studied by class theorists. An understanding of these changes would provide an independent basis for evaluating the effect of worker-generated profit squeezes and economic crises on material change.

Kondratieff cycles are understood as the restructuring of social and political relations within capitalist relations of production. In all-encompassing crises, the reordering must extend to the manner in which surplus is produced and extracted, as in the shift from feudalism to capitalism in the Early Modern Era. The cycle associated with these general crises and their resolution is the 200–300 year logistic. It, too, is amenable to archaeological interpretation.

Various periodizations have been offered for logistics, such as the following, which was developed by researchers at the Braudel Center (Research Working Group 1979:488; Wallerstein 1979:74):

Rise	Decline	
900	1100	1450
1450	1600	1750
1750	1950	?

Feudal relations in Europe are thought to have reached their peak between roughly 1100 and 1300. The crisis of feudalism beginning in the 14th century was resolved with the development of agricultural-capitalist relations, according to some observers (e.g., Wallerstein 1974, 1980), or by the domination of mercantile relations within feudal relations, according to others (e.g., Wolf 1982; more generally see Hilton 1976; de Vries 1976; Cipolla 1976). A period of European expansion often referred to as the long 16th century is followed by a period of contraction, the long 17th century (Braudel and Spooner 1967; Frank 1978:25–102; Wallerstein 1979:74, 1980:13–34). The origins of the Industrial Revolution and the establishment of British hegemony in the mid to late 18th century mark the beginnings of the present logistic (Wallerstein 1980).

With respect to the work of long-term cycles, I have noted (Paynter 1985) that the changes in broad realms of material culture identified by Deetz (1977)—the yeoman, folk, and Georgian periods—coincide with economic declines of the long 17th century and the economic rise of the long 18th century. In particular, the close of Deetz's yeoman period, ca. 1650, not only coincides with the English Revolution and a change in the climate of religious dissent, but is just about the time that the 17th-century depression penetrated Northwestern Europe, and England in particular (Wallerstein 1980:18–25). The English spun their colonies into the Atlantic economy at an unfortunate

time, just about one generation before economic conditions would decline in England, so that little control could be exercised there and little surplus extracted. The ensuing century, Deetz's folk period, was one of competition in the core of the European world system between England, Holland, and France for political and economic hegemony in the world system. However, relative isolation of North American elites allowed them to accumulate surpluses outside of the tight supervision of the central authorities in England. The resolution of the core struggles in favor of England, along with industrialization, allowed and necessitated a renewed interest in using the colonies as a source of raw material and as a market for manufactured commodities (e.g., Frank 1978:167–80, 190–208; Wallerstein 1980:236–41). The period in which Britain was able to turn to the colonies coincides with Deetz's Georgian period. Elites in the colonies who could benefit by a strengthened connection to England—exporters of raw materials and agricultural products (dependency elites)—were set against those whose ability to accumulate surpluses would decline in the face of English control—such as shipbuilders, some merchants, early industrialists, and indebted planters (development elites) (Schneider, Schneider, and Hansen 1972; Frank 1978:203,208; Nash 1979; Chase-Dunn 1980; Paynter 1985).

This rough correlation leads to more specific questions about the connection between these political economic changes and the material changes observed in the record. For instance, what is the amount of European material culture relative to "folk" items in the folk period? How does this vary by region and class? What was the impact of North American elites on the material record (see Carson and others 1981 on housing) during this period, and can the dependency and development strategies be seen in changing domestic consumption patterns (e.g., Mrozowski and Schmidt 1985)? Are the material changes of the Georgian world—symmetrically designed housing, full standardized table services, and so on—responses to labor-control problems that had been forming in the preceding period in England? Or can these changes be better explained by models that rely less on capitalism and more on household, lineal family, community, and feudal modes of production (e.g., Clark 1979; Henretta 1978; Weiss 1982)? These are as yet unanswered questions, but ones that would not have been asked within the theoretical paradigm of changing mind-sets. When answers to these class-related issues can be found, they might help explain why people made a different sense of the world after 1650 and 1750 (e.g., Leone 1984).

A mutual concern for temporal processes clearly points to a provocative relation between class theory and historical archaeology. I suspect that when the material record is interpreted with the notions of lo-

gistics and Kondratieff cycles, the overall results will support the general trends of class theory, namely that human labor tends to be replaced by machinery and that commodities tend to expand into more and more realms of life. Moreover, such interpretations will give a richer understanding to historical archaeology's culture histories.

I also suspect that the use of archaeological material will significantly alter some important aspects of class theories. These changes will be due to the fact that what people recorded is not necessarily what they did (e.g., Bowen 1975; Schuyler 1977). We will find that the plans for projects differ from their execution (e.g., Wilson 1976), that what people owned differs from what they ate (Bowen 1975; Garrison 1985), and that generally things are more different from their images than is presently acknowledged. Historical archaeology will also challenge class theories to look at industries that have not received much attention from economic historians, but that make up the archaeological record: the ubiquitous ceramics, glass, and architectural complex. It is important to know if crises occur in these industries at the same time that they occur in the better-studied realms of textiles, small arms production, and commerce. What may be accomplished by addressing these questions with the data of historical archaeology is what has so far eluded our grasp—a reasoned evaluation of the efficacy of class models for accounting for change in the material world. A better understanding of this issue would further both historical archaeology and class theoretical approaches.

CONCLUSION

Considering the United States as a capitalist society seems a project worth taking up, in spite of the high cost of learning yet another jargon. This approach puts a set of relevant ideas on the agenda and offers explanations for change in the record that are new and provocative. The fact that it has seldom been used is not due to scientific reasons but rather to ideological ones; the use I am advocating is based on its scientific potential—its relevance and provocativeness. I fully expect that, because of the differences in the material record and the documentary record, theories of capitalism, when applied to our record, will need to be refined. Our contributions to theories of change and resultant refinements in these theories will be in the best tradition of historical archaeology—which, according to Deetz (1977), is like trying to understand where today came from.

ACKNOWLEDGMENTS

Thanks to Art Keene, Randy McGuire, Dena Dincauze, Rick Gumaer, Russ Handsman, Mark Leone, Rita Reinke, Ellen Savulis, Daniel Walkowitz, and especially Martin Wobst and Patricia Mangan. A version of this paper was read at the 1984 Annual Meeting of the Council for Northeast Historical Archaeology.

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