Explaining Large-Scale Historical Change[*]

Daniel Little
Bucknell University

Is large-scale historical explanation possible? Examples of large-scale historical change include epochal change (feudalism to capitalism); the development of modern states in Europe; scientific and technological revolutions; evolution of institutional rules and systems of law; longterm demographic transition; and other noteworthy examples. An important historiographic theme in the past two decades has been a movement toward narrative interpretation of singular historical processes—e.g. Simon Schama, Michael Kammen, or Robert Darnton—and away from causal, structural, or systemic explanation of large-scale processes and outcomes. Some historians and philosophers have expressed deep skepticism about the bare possibility of large-scale structural, dynamic, or systemic explanations of historical processes.

It is certainly true that there are well-known examples of not-very-good large-scale historical explanations. Recall, for example, the thesis of hydraulic despotism in Asia advanced by Karl Wittfogel (1957), according to which the need for central control of water resources was responsible for the rise of an all-powerful Oriental despotism. To this bad example we might add simplistic versions of Malthus, Smith, Weber, or Marx as various determinisms in history (population, markets, power, or class). The central deficiencies of such explanations are a tendency toward single factor explanations, a tendency toward deterministic explanations, and a tendency to ignore contingency and the multiplicity of possible pathways. Grand theories offer universalistic explanatory hypotheses; and they turn out all too often to obscure rather than to illuminate the course of events under study. However, it is important not to draw over-strong conclusions from bad examples. The turn away from "macro-history" and toward narrative interpretation of singular cases raises the serious danger that historians will be led to ignore real, historically significant structures and processes which have genuine historical effects and which are amenable to rigorous scrutiny and explanation. And the workings of such processes cannot be explained through narrowly drawn localistic accounts; rather, it is necessary to provide higher-level causal explanations of such structures, drawing on the findings of well-confirmed social theories. It is important, therefore, to consider once more the extent to which large-scale historical explanation is possible, and what cautions ought to be raised in the pursuit of such explanations.

Fortunately there are signs of change along these lines within the disciplines of history and historical sociology; not all contemporary historical research

[*] The author wishes to gratefully acknowledge comments and criticisms provided by James Bohman, Paul Roth, and especially Alison Wylie.

abjures large structures and processes. There is a body of work in history and historical sociology in which it is possible to identify the strands of a new paradigm of historical inquiry—what might be called "meso-history." This work provides examples of strong, innovative macro-explanations today that give more compelling and nuanced expression to this approach to historiography than past macro-history. In what follows I will examine several such works in some detail in order to extract the underlying assumptions about the scope and limits of historical explanations of large-scale processes and structures. I find that there is a reasonably coherent historiography that can be discerned in these works which points the way to a more adequate understanding of historical process.

I characterize this paradigm as "conjunctural contingent meso-history" (CCM), and I will argue that this approach allows for a middle way between grand theory and excessively particularistic narrative. The paradigm recognizes historical contingency—at any given juncture there are multiple outcomes which might have occurred. It recognizes the role of agency—leaders, inventors, engineers, activists, and philosophers are able to influence the course of development in particular historical contexts. It recognizes the multiplicity of causes that are at work in almost all historical settings—thereby avoiding the mono-causal assumptions of much previous macro-history. And it recognizes, finally, that there are discernible structures, processes, and constraints that recur in various historical settings and that play a causal role in the direction and pace of change. It is therefore an important part of the historian's task to identify these structures and trace out the ways in which they constrain and motivate individuals in particular settings, leading to outcomes that can be explained as contingent results of conjunctural historical settings. This approach recognizes an important role for social theory within the historian's practice, while at the same time emphasizing that the notion of historical inquiry as no more than applied social theory is one that trivializes the problems of explanation and interpretation that confront the working historian.[1]

Once the ground is cleared along these lines—emphasizing both the importance for the historian of the particular contingencies of a specific historical context and the causal efficacy of the broad structures and processes that are in play—the challenge for the historian of large processes is more apparent. It is to seek out the specific institutions, structures, and processes that

[1] There is an important relationship between my arguments here and the "structure-agency" debates that have played such an important role in current discussions of social science methodology. The CCM approach maintains that neither structure nor agent is decisively primary; rather, historical outcomes inextricably involve both, and it is the task of the historian to disentangle the threads of structure and agency that are decisive in particular conjunctions.

are embodied in a given historical setting; to identify the possibilities and constraints that these structures create for agents within those settings; and to construct explanations of outcomes that link the causal properties of those structures to the processes of development that are found in the historical record. Finally, it is imperative that the historian of large processes explore the space of "what might have been"—the space of contingent alternative developments that were equally consistent with the configuration of large structures and particular circumstances at a given time.

The bulk of the discussion that follows takes the form of an analysis of several instances of interesting contemporary large-scale history. I will examine an important instance of comparative history—Bin Wong's sustained effort to provide a comparative history of Chinese and European political and economic development. I will analyze an innovative approach to the study of the development of modern economies—Charles Sabel's analysis of alternative forms of industrial organization. And I will survey an important instance of meso-level history of technology—Thomas Hughes's structural narrative of the development of electric power in North America and Europe. These instances have some elements in common. But most important, they illustrate a series of important points about good historical explanation of large-scale processes. I will draw these points together in the form of the paradigm of "conjunctural contingent meso-level" historical explanation.[2]

Large-scale historical explanations

Charles Tilly's work embodies a particularly effective voice for the scope and value of macro-history. Tilly puts the problem of large-scale history this way in terms: "How can we improve our understanding of the large-scale structures and processes that were transforming the world of the nineteenth century and those that are transforming our world today?" (Tilly 1984:2). The presupposition here is evident: there are large-scale structures and processes which persist, recur, and causally interact in such ways as can be understood to "transform the world." The point can be extended to Asia and other great

[2] It is important as well to note that the logic of explanation under consideration here—explanation of a sequence of events within a causal scheme—is only one part of the historian's craft. It is what we might call "structural narrative" (structural, because it emphasizes the causal significance of institutions and structures; and narrative, because it attempts to identify a temporal sequence of causes leading up to the event to be explained). But not all historical research takes this approach. At least as important in much historical scholarship is what might be called "synchronic history"—research aimed at exploring the texture and inter-relatedness of persons, practices, and institutions of a given time.

historical examples, in which case the macro-historian is looking to identify large-scale structures that transform complex socio-economic formations and bring about "typical" outcomes. The examples Tilly offers of large-scale processes and structures include national states, capitalist organization, urbanization, and industrialization. Other large factors commonly invoked in macro-history include population, prices, technological innovations, religion, and class.

What is "large-scale history" or macro-history? It is perhaps arbitrary to begin with a definition; but we need, after all, to be able to fix our attention on a specific set of intellectual ambitions. Let us say, then, that large-scale history is historical inquiry that possesses some or all of the following characteristics:

- The inquiry defines its scope over a **long time period** and/or a **large geographical range**;
- the inquiry undertakes to account for large structural characteristics, processes, and conditions as historical **outcomes**;
- the inquiry singles out large structural characteristics within the social order as central **causes** leading to the observed historical outcomes;
- the inquiry aspires to some form of **comparative generality** across historical contexts, both in its diagnosis of causes and its attribution of patterns of stability and development.

In other words, large-scale history defines its scope in large terms; defines the outcomes to be studied in large terms; and hypothesizes that some of the causes of these outcomes are themselves large structures. We may distinguish different species of macro-history depending on different interpretations of scale[3]:

[3] The issue of scale turns out to be a central difficulty within the historian's art. Historical inquiries are couched with many conceptions of scale and definition of the boundaries of the historical phenomenon. But the definition of scope and explanatory unity is notoriously problematic. Too long a time period—e.g., the Warring States to Qing Dynasty in Chinese history—may be suspect to some historians, on the ground that there is a reasonable basis for skepticism that similar processes or social realities perdure throughout such long stretches of historical time. And too large a definition of geographical scope may be suspect as well; some historians may argue that regional or sub-regional studies are more historically meaningful than fully national or continental studies. "China" may be too large a social construct to have historical reality; rather, the various regions of China may be thought to be the historically salient level of analysis. These are important questions, and a full treatment of large-

- History of the "long durée"—accounts of the development of the large-scale features of a particular region, nation, or civilization, including population history, economic history, political history, war and peace, cultural formations, and religion (Ladurie 1974, Fairbank 1992).
- Comparative history—a comparative account, grounded in a particular set of questions, of the similarities and contrasts of related institutions or circumstances in separated contexts. E.g. states, economic institutions, patterns of agriculture, property systems, bureaucracies. The objective is to discover causal regularities, test existing social theories, and formulate new social theories (Skocpol 1976, Jones 1988).
- World history—accounts of the major civilizations of the world and their histories of internal development and inter-related contact and development (Wallerstein 1974, Braudel 1984).

In addition to these features of scope, large-scale history has often been associated with sweeping explanatory ambitions; in particular, the intention to identify—

- unique patterns of development (e.g., European industrial development);
- inevitable historical processes (e.g., Malthusian population crises);
- single factors with explanatory primacy (e.g., technology, population increase, disease, nutrition).

In a stylized way, we may convey all these forms of uniqueness in a single large-scale hypothesis: "In the final analysis, population increase drives economic development and technological innovation, giving rise to a transition from agrarian society to handicraft production to modern industrial production." I put these latter features forward, however, in order to discredit them; for it is these ambitions which have most often driven macro-history into speculative history. Consideration below of several important examples of contemporary historical inquiry will show that macro-history ought not seek unique trajectories, single causes, or deterministic outcomes.

Anti-structural historiography

The aspirations and presuppositions represented by macro-history have been profoundly criticized in the past several decades. A leading critic of structural approaches to history is Simon Schama. Schama expresses doubt about "macro-history" in his treatment of the French Revolution:

---

scale historical explanation will need to address them. I will touch on them only tangentially here, however.

> In the fifty years since the sesquicentennial, there has been a serious loss of confidence in this approach [structural causes of the revolution]. The drastic social changes imputed to the Revolution seem less-clear-cut or actually not apparent at all. The "bourgeoisie" said in the classic Marxist accounts to have been the authors and beneficiaries of the event have become social zombies, the product of historiographical obsessions rather than historical realities. Other alterations in the modernization of French society and institutions seem to have been anticipated by the reform of the "old regime." Continuities seem as marked as discontinuities. . . . Nor does the Revolution seem any longer to conform to a grand historical design, preordained by inexorable forces of social change. Instead it seems a thing of contingencies and unforeseen consequences.… An abundance of fine provincial studies has shown that instead of a single Revolution imposed by Paris on the rest of a homogeneous France, it was as often determined by local passions and interests… For as the imperatives of "structure" have weakened, those of individual agency, and especially of revolutionary utterance, have become correspondingly more important. [Schama, 1989, p. xiv]

So for Schama, the question of macro-history (at least as we can extract it from this passage), is the validity or historical legitimacy of explaining outcomes on the basis of large-scale structures.[4]

An important impulse underlying skepticism about large-scale structural historical inquiry is the influence of ethnography on historiography, emphasizing the importance of "local knowledge" and particular understandings of specific circumstances (Geertz 1971a). Anti-structural accounts often proceed on the basis of an "anything-can-influence-anything" assumption, according to which the challenge for the historian is to identify the singular and historically accidental events which occurred, bringing about the event to be explained. Thus the anti-structural paradigm emphasizes the singular, the personal, the idiosyncratic, the accidental. Robert Darnton's "great cat massacre" (1984) is an instance of an historical investigation designed to undercut the search for grand causes and to stimulate historical interest in the idiosyncratic and the singular. Michael Kammen's treatment of the values and ideas following the American Civil War (1987) emphasizes the uniqueness and non-determined course that a system of mentalities can take.

[4] Schama's case is chiefly directed at historians of the French Revolution who offer a class-based interpretation of the revolution; for example, Albert Soboul (1975).

Case studies

So, again—is large-scale historical explanation possible? I will take it that the best way of discussing historical methodology is through reference to some examples of strong current works of historical inquiry. If we find compelling contemporary instances of large-scale historical inquiry, we can then piece together the methodology and conceptual frameworks that may serve to guide good historical practice. I will therefore approach this problem on the basis of scrutiny of some compelling examples of contemporary research that embodies the ambitions of macro-history, or at least "meso-history"—historical analysis of events, structures, and changes at a reasonably high level of social theory and historical resolution.

Comparative histories of Europe and China

Macro-history often involves efforts to compare and interpret processes of change in large historically unified but distinct social orders; commonly, Europe and "elsewhere". A particularly important such comparison is that between the economic, political, and social histories of early modern Europe and imperial China. Both were regimes with complex and reasonably effective states; agricultural systems that successfully provisioned mass populations; a cultural context which supported advancing levels of scientific understanding of nature (with the associated promise of technological innovation); and some level of mass manufacture (textiles, ceramics, metals). The impulse exists, then, to compare and contrast the large-scale processes of development and change that are to be found in those historical formations. Was there an impulse of state formation that can be discerned in Europe and applied to China? Were there similar population dynamics at work? Did market forces elicit a process of "proto-industrialization" in Europe and China?[5]

In *China Transformed* R. Bin Wong (1997) offers an historically informed approach to the problem of comparison across Europe and China. Wong believes that such comparisons are legitimate and fruitful; but he offers a powerful set of cautions about the conceptual and theoretical presuppositions which we bring to such an effort. His central point is a crucial one: we must not make the mistake of assuming that European developments and characteristics are the paradigm for history, and that Chinese developments will either reproduce this general template, or will be regarded as "a-typical." He writes,

[5] The proto-industrialization literature has provided a powerful stimulus to recent research on the early character of economic transformation in Europe. Franklin Mendels describes this concept in these terms: "'Proto-industrialization'—a period of rural industrialization with simultaneous bifurcation between areas of subsistence farming with cottage industry and areas of commercial farming without it" (Mendels 1981:176).

"This book too aims to dislodge European state making and capitalism from their privileged positions as universalizing themes in world history, but it offers a new approach: comparison with the dynamics of economic and political change in a major non-Western civilization" (Wong 1997:2). Against the general approach of taking European developments as paradigmatic—demographic transition, capitalist development, state formation—he argues that the comparativist needs to be prepared to identify large processes in any of the great civilizations as potentially insightful in application or contrast to the experience of others. He puts the point this way: "For historical trajectories to matter, there must be more than one. Western social theory has generally analyzed only that created by the twin processes of European state formation and capitalism. Western states and economies have histories that matter to the formation of the modern world. Other parts of the globe, according to the research strategies employed in most social science research, had no histories of comparable significance before Western contacts began to transform them" (Wong 1997:3).

Rather than finding a "natural" process of economic development in the sequence, agricultural revolution => proto-industrialization => industrialization, we should be prepared to recognize and analyze a process that involves agricultural stagnation and advanced technology applications in different regions or sectors of the Chinese economy. Likewise, rather than presuming that the general logic of state formation "should" approximate that described in the rise of the absolutist state in Europe, we must be open to the discovery that the underlying dynamics of the Chinese state, military, and revenue system are functionally distinct. And indeed, Wong's account of the institutional setting of Chinese politics makes apparent why we should expect dramatically different polities in the two civilizations. Europe's politics were characterized by a polarity between the state and powerful non-political elite organizations; whereas China's imperial and Confucian system embodied a much more continuous and interrelated association between the state and elites. (Wong uses the intriguing concept of "self-similarity at many scales" from fractal theory to describe the structure of Chinese politics; Wong 1997:121.)

The purpose of *China Transformed* is thus to attempt to discern China's own dynamic of transformation, its own historical trajectory and historical formations, with the aid of appropriate social theory. And Wong aims to illuminate European history by detailed consideration of an alternative historical course of development.

What is "appropriate social theory"? The skeptical social interpreter answers the question in a minimalist way: social theory is ineluctably associated with the paradigms of historical European development; even concepts like "state," "market," and "demographic regime" are unavoidably grounded in the European experience, so there is no legitimate basis for articulating a social theory that is truly cross-cultural and trans-historical. Wong does not accept this

point, however. Rather, he aspires to a middle-level articulation of theory, identifying a set of processes which can be theorized and observed in very different social contexts. Population dynamics follow from the institutional setting of reproduction; it is therefore appropriate to theorize the consequences of several different "demographic regimes." Individuals make calculating choices about costs and benefits of various options which they confront; therefore it is appropriate to theorize the consequences of prudent decision-making within several institutional settings. "Economic principles have a powerful capacity to order diverse economic experiences even as they prove inadequate to explain the multiple paths of Eurasian economic history and development" (Wong 1997:11). Note the strategy here: one that involves dropping from the stylized outcome (capitalist development) by focusing on the circumstances of human life and choice that drive multiple comprehensible paths and outcomes.

We can take a first step at clarifying this approach by suggesting that comparative social research can discover some common middle-level processes that recur in different settings—economic behavior, family and reproductive behavior, incentives and opportunities presented to the wielders of monopoly coercive power—and that different institutional settings can lead these processes to radically different outcomes. Moreover, there are interaction effects among the institutions that regulate the various common processes; thus the particulars of a given set of political institutions (designed, perhaps, to impede the ability of military commanders to challenge the emperor; Kuhn 1980) may impede development of effective financial institutions, and therefore impede the development of large-scale enterprises with large geographical scope. Peasant production—smallholding and tenant farming—may place a limit on improvements in agricultural productivity that constrain the state's fiscal capacity—and hence its ability to finance military or commercial infrastructure. Large-scale commercialization of a product sector—e.g. cotton textiles—may be so successful at producing large quantities at low price, that technological innovation is discouraged (Elvin 1973). And so forth; the general point is that institutions matter, and that institutional arrangements in different sectors may impose limits (or sometimes opportunities) that discourage or favor some pathways of development over others. Instead of an expectation of one grand course of development, we ought to expect a congeries of contingent, fluctuating path-dependent processes.

The upshot of Wong's approach is this. Let us consider China's historical development—economic, agricultural, political, social, military—in its own terms, but informed by the best available social theoretical insights and concepts; let us identify China's own "paradigms" of development, its own pathways of political development and economic change; and let us use those new-found paradigms to inflect our understanding of the processes of other parts of the

world.[6] Finally, let us recognize that the stuff of social theory takes us a ways down the road of being able to explain particular pathways of historical development in a variety of contexts; but it does not permit us to make confident predictions about uniquely determined outcomes. In place of the overtones of inevitability—population increase, technological change, improvement in agricultural productivity—we get the sub-harmonics of diversity and contingency, and the recognition that historical outcomes are under-determined by any particular and limited set of causal factors. And in fact, Wong argues that careful comparative study of the economic histories of different regions of Eurasia will establish this plasticity of outcome. For example, Wong carefully assesses the literature on proto-industrialization in Europe; finds that very similar processes of rural manufacture are present in both Europe and China; and argues that the causes of European "breakthrough" must therefore be sought elsewhere. More generally, he argues that similar processes of commercialization and population dynamics are associated with very different paths to (or away from) industrialization (Wong 1997:46, 47).

Alternative forms of industrial organization

Turn now to a second important example of contemporary macro-history: research by Charles Sabel and others on alternative modes of industrial organization in European economic history. There is a conventional line of thought in economic history that emphasizes the inevitability of certain broad characteristics of economic change and institutional organization in any pre-modern economy.[7] It is the libretto of industrial revolution in Western Europe. Rising agricultural productivity stimulated population growth and permitted the increase of non-agricultural population. Demand for consumption goods increased as a result of this population increase—leading to rising prices for common consumption goods. These price changes stimulated more extensive production for the market; they also created an incentive for technological innovation (resulting in rising productivity of labor). Machine production was a

[6] Paul Cohen argued effectively along these lines in his call for a "China-centered" history of China in *Discovering History in China* (Cohen 1984).

[7] There has been lively work on the issue of the nature and causes of economic development in the early modern European economy in the past twenty years. Especially central is the question of the causal origins of self-sustaining growth in the early modern period of European development. Early expressions of work in this area include Deane (1979), Feinstein (1981), Deane and Cole (1967), and M. M. Postan (1975). Important contributions to the more recent literature include Crafts (1985), Jones (1987), Floud and McCloskey, eds. (1981), and O'Brien and Keyder (1978).

predictable response to these commercial and financial changes, eliciting innovations in power technology and leading to an increase in the scale of production (from workshop to factory). Factory production elicits greater technological innovation, greater division of labor, and a rising capital-labor ratio; these changes in turn require expansion in the scope of production. Mass production based on low-skill labor, extensive use of specialized machines, and extensive use of non-biological sources of power follow.[8] This is the narrative of Marx's *Capital* (1977), and also underlies the Fordist interpretation of the American industrial system.

However, recent work in economic history suggests strongly that this story is significantly too monochromatic. Population, prices, and technology are all highly pertinent to the economic pathway experienced by Western Europe; but they do not determine either the institutions through which economic activity takes place or the outcome of economic development. And the stylized history of western Europe's economic transformation that the story represents is deficient in failing to recognize the very great degree of variation there was in basic economic institutional arrangements. Contingency rather than necessity, and diversity rather than uniformity, appear to be the dominant features of much recent economic history—even in Europe and North America.

In "Historical Alternatives to Mass Production" Sabel and Zeitlin (1985) argue that the thesis of the historical inevitability of mass manufacture is erroneous, both theoretically and empirically. They argue that historically feasible alternatives exist—in particular, the alternative of flexible production, short runs, specialized products, flexible machinery, and skilled artisanal and engineering labor. The argument in this essay is that political and class factors produced the imperative toward mass manufacture—not the technical characteristics of new technologies, or the efficiencies and cost structures of the various alternatives. Mass production techniques in textiles spelled the doom of the weavers in the 1820s; this is an instance of a clear efficiency-based explanation for the dominance of one system over another. But there were historically feasible alternatives to factory production in many industries—glass, silk, watches, metal working, machine goods—where the de-skilling and mass production system was selected because of the political advantages this alternative created for the owners of capital. In *Worlds of Possibility* (1997) they expand this point by demonstrating even broader "strategic" variability within existing forms of industrial organization—substantial levels of hedging on the part of managers, and substantial effort to influence the competitive environment.

[8] Deane and Cole (1967) provide a representative narrative along these lines.

Sabel and Zeitlin, then, emphasize contingency and agency within the process of economic development and institution-building: there were historically feasible alternatives in the organization of production with modern technologies; and in fact, managers, workers, and planners exploited these contingencies so that the alternative forms in fact prospered in various settings. They emphatically contest the sense of iron necessity in outcomes of economic processes, relative to the standard approach to the history of industrialization of Europe and America.

Sabel and Zeitlin's case is important for several reasons. First, it offers a striking and persuasive alternative to the standard view of European economic history—that traditional techniques of production and modes of economic organization based on skilled labor, small manufacture, and traditional techniques, were inevitably replaced by factory production, the application of specialized tools and machinery, and the de-skilling of industrial labor. Proletarians replaced artisans, and factories replaced specialized shops. And second, more generically, it significantly challenges a dominant paradigm of understanding large-scale historical change—as a cumulative and sweeping process through which one form comprehensively replaces another, based on the technical or economic superiority of the successor. Sabel and Zeitlin argue instead for a conception of social change that emphasizes flexibility and multiplicity of forms—factories, specialized machine shops, large-scale rigid units and small, flexible operations—governed by strategic decision-makers who deliberately chose a range of options well-designed to secure their interests. At any given time, a number of alternative economic institutions are in use (types of firms, for example, with types of technology and forms of labor skill), and very significantly different forms may be viable simultaneously and indefinitely. An ecological metaphor, in which many different organisms exploit different niches within one environment, fits this picture better than the notion of economic competition and the inevitable success of one particular type. This portrait is important, because it may lead us to doubt, or at least inspect with newly critical eyes, the blanket statements that we sometimes find about "feudal institutions" or "traditional agriculture" or "early capitalism."

The detailed scrutiny of these forms of contingency and diversity within European economic history is highly productive. It leads us to recognize the multiplicity of forms of adaptation that are available in many (all?) historical cases; and at the same time, it serves to identify some of the structural factors that impel the process of change in one direction rather than another.

History of technology: electric power

A final important example of large-scale historical explanation is the history of technology. The example is important, first, because technological change is itself a complex social process, involving the influence of many social factors

(economic, scientific, political, organizational, educational). And second, technological change is itself often invoked as one of the large causal factors that account for, or influence, other important large social outcomes—population increase, the incidence of war and peace, or environmental change.

Let us canvass, to start, how the history of technology intersects with macro-history. It does so in several ways:

- Technology constitutes a large "structural force or condition" commonly invoked in macro-historical accounts (e.g., Lynn White's analysis of the stirrup [1962] or Marc Bloch's analysis of the wheeled plow [1966]).
- Technological change is itself a complex historical process, invoking other large-scale structural factors, such as population, education, market circumstances (e.g., Ester Boserup's argument that technological change derives from rising population density and consequent pressure on natural and biological resources; Boserup 1981).
- Technological changes are often said to have important meso-level social consequences, distinct from their primary purposes (e.g., extension of a transport technology into new periurban areas may stimulate a distinctive pattern of population growth and settlement patterns; Warner, 1978; Skinner, 1964-65).

Let us examine an important recent work in the history of technology: Thomas Hughes's groundbreaking book, *Networks of Power: Electrification in Western Society, 1880-1930* (1983).[9] Hughes has done much in the past twenty years to provide a new foundation for the history of technology, and this work on the history of electric power is among his most important contributions. Hughes constructs a complex narrative that leads from the important scientific discoveries and inventions in the 1880s which created the possibility of using electricity for power and light; through the creation of complex organizations by such systems builders as Thomas Edison and Elmer Sprague to solve the many technical problems which stood in the way of successful implementation of these technical possibilities; to the establishment of even larger social, political, and financial systems through which systems builders implemented the legal, financial, and physical infrastructure through which electricity could be adopted by large cities and regions.

[9] The history of technology as a discipline has been particularly fruitful in the past twenty years. Historians in this field have moved substantially beyond the conception of technological change as a series of stages of technical design and implementation, to focus on the social constitution of the process of technological change. Thomas Hughes has played a central role in this revival, as has the journal *Technology and Culture*.

Along the way Hughes demolishes several important misconceptions about the history of technology. He refutes, first, the notion that there was an **inevitable logic** to the development of electric power. At various points in the story he tells, there are choices available which do not have unique technical solutions. The battle of the systems (direct versus alternating current) is one such example; Edison's work proceeded on the basis of a technology of direct current, whereas the industry eventually adopted the technology of alternating current. Each choice posed technical hurdles which required solution; but there is good reason to believe that the alternative not taken could have been adopted with suitable breakthroughs along the other path. The path chosen depends on a set of social factors—popular opinion, the press, the orientation of professional engineering schools, the availability of financing, and the intensity of intellectual resources brought to bear on the technical problems that arise by the research community.

Second, Hughes establishes that, even when the basic technology was settled, the **social implementation of the technology**, including the pace of adoption, was profoundly influenced by non-technical factors. Most graphically, by comparing the proliferation of power stations and power grids in London, Paris, and Chicago, Hughes demonstrates that differences in political structure (e.g. jurisdiction and local autonomy) and differences in cultural attitudes elicited markedly different patterns of implementation. Chicago shows a pattern of a few large power stations in the central city; London shows a pattern of myriad small stations throughout the metropolitan area; and Paris shows a pattern of a few large stations along the Seine in the peri-urban areas of the city. Moreover, these differences in styles of implementation can have major differences in other sorts of social outcomes; for example, the failure of London to implement a large-scale and rational system of electric power distribution meant that its industrial development was impeded; whereas Chicago's industrial output increased rapidly during the same time period.

Third, Hughes sheds deep light on the social and individual characteristics of **invention and refinement** that occur internal to the process of technological change. He describes a world of inventors and businesses which was highly attuned to the current challenges that stood in the way of further progress for the technology at any given time. Major hurdles to further development constituted "reverse salients" which then received extensive attention from researchers, inventors, and businesses. The designs of generators, dynamos, transformers, light bulbs, and motors each presented critical, difficult problems that stood in the way of the next step; and the concentrated but independent energies of many inventors and scientists led frequently to independent and simultaneous solutions to these problems.

Fourth, Hughes makes the point that, in the instance of this technology at least, the development of the technology was inseparable from the establishment

of "massive, extensive, vertically **integrated production systems**," including banks, factories, and electric power companies (Hughes 1983:5). "The rationale for undertaking this study of electric power systems was the assumption that the history of all large-scale technology—not only power systems—can be studied effectively as a history of systems" (7). The technology does not drive itself; and it is not driven (exclusively) by the technical discoveries of the inventor and scientist. Rather, the eventual course of development and implementation is the complex result of social pulls and constraints, as well as the inherent possibilities of the scientific and technical material.

Finally, Hughes introduces the important concept of "**technological momentum**". By this concept he means to identify the point that a large technology—transportation, communication, power production—once implemented on a wide scale, acquires an inertia that is difficult to displace. Engineers and designers have acquired specialized knowledge and ways of approaching problems in the field; factories have been established to build the specialized machines and parts needed for the technology; and investors and banks have embedded their fortunes in the physical implementation of the technology. "Business concerns, government agencies, professional societies, educational institutions, and other organizations that shape and are shaped by the technical core of the system also add to the momentum" (15).

Hughes demonstrates several important lessons for large-scale historical explanation. First, through his detailed account of a complex fifty-year international process of design and implementation, he shows that large-scale events can be explained, and that a variety of large-scale structural factors are pertinent to the outcomes. Second, he demonstrates the important scope of agency and choice within this story. Outcomes are contingent, and individuals and local agents are able to influence the stream of events at every point. And finally, through his concept of technological momentum he provides a constructive way of thinking about the social influence of technology itself within the fabric of historical change—not as an ultimate determinant of outcomes, but as constraining and impelling set of limitations and opportunities within the context of which individuals strategize and choose.

The new "meso-history"

What we can extract from the examples

The examples presented here are rich in numerous dimensions. Here I will draw out several central maxims from each, as the beginnings of a historiography for "meso-history." Several important methodological points emerge from Wong's comparative study of Europe and China. First is a point about the role of social theory in historical inquiry. Wong recognizes that reliance on current social theory is inescapable in historical analysis (what else would provide the

analytical basis for comparison and hypothesis?), but he emphasizes the importance of doing so with care and critical intelligence. As Susanne Rudolph puts the point, "At this stage we need fragile theoretical templates, made of soft clay rather than hard steel, that adapt to the variety of evidence and break when they do not fit" (Rudolph 1987:738). Crucially, Wong insists on the point that the researcher must be critical in extending ideal-typical concepts of structures and processes from the European context to an Asian context. More acutely, we need to find new ideal-typical configurations of institutions and processes in Asia (and other world civilizations), to add depth to our understanding of European history. Finally, Wong, like both other scholars whose work we have considered, emphasizes the plasticity of large historical developments. There are result of multiple contingent factors involved in any large historical process, and there is room for choice by agents at all points along the way.

Sabel and Zeitlin lead us to amplify several of these points. Most importantly, Sabel and Zeitlin demonstrate that there were multiple feasible modes of economic organization involving different configurations of labor, capital, machinery, tools, product design, and business organization. Sabel and Zeitlin demonstrate that the stylized assumption that modernization entails mass manufacture, rigidly specialized machines and tools, and de-skilled labor is incorrect. It is therefore crucial for historians to resist the impulse toward an expectation of unique outcomes. More generally, this case alerts us to the significant degree of choice that exists at every historical moment. Agents choose among multiple feasible strategies, and competing strategies may co-exist for long periods of time. This means that the large-scale outcome is under-determined by the structural configuration in place at a given time. At the same time, however, Sabel and Zeitlin demonstrate the significant power for constraining and impelling that is exerted by existing institutions. Available systems of finance and insurance influence the choices that manufacturers make about maintenance (Reynard 1999); the political imperative of constraining naval costs impelled the early modern British Admiralty to adopt new architectural approaches to design and construction of ships of war (McGee 1999); and the advent of the telegraph significantly altered the United States' ability to respond diplomatically to the Franco-Prussian War, in comparison to the equally serious French political crisis of 1848 (Nickles 1999). The point of flexibility, then, is not that there are no powerful structural influences on the course of history at a given moment; it is rather that these forces are not ultimately determinative of the outcomes. But good explanation will unavoidably need to provide nuanced and theoretically informed analysis of these forces.

Finally, Thomas Hughes takes the point of plasticity of history's course a step further by demonstrating the sensitivity of the course of technology development to the social and political environment. Technological possibilities

and constraints do not by themselves determine historical outcomes—even the narrow case of a particular course of the development of a particular cluster of technologies. The technical and scientific setting of a particular invention serves to constrain but not to determine the ultimate course of development that the invention takes. A broad range of technical outcomes are accessible in the medium term. In place of a technological determinism, however, Hughes argues for technological momentum. Once a technology/social system is embodied on the ground, other paths of development are significantly more difficult to reach. Thus there are technological imperatives once a new set of technical possibilities come on the scene; but the development of these possibilities is sensitive to non-technical environmental influences (e.g. the scope of local political jurisdiction, as we saw in the comparison of British, French, and American power systems).[10]

These insights suggest a series of negative maxims as well—historiographic blunders that large-scale history ought to avoid:

- Avoid single-factor explanations (e.g. technological determinism; Wittfogel and hydraulic despotism).
- Be suspicious of grand schemes of paradigmatic development (e.g. capitalist development, typical population transition).
- Be cautious in applying uncritically the paradigms and schemata of the European experience to other historical experiences (capitalism, the modernizing state).
- Recognize that historical junctures generally present a range of possible outcomes, depending on the choices of actors; so avoid explanations that impute "historical inevitability" to a particular outcome.[11]

Conjunctural contingent meso-level explanation (CCM)

Where do these maxims take us? Do they lead us to abandon the aspirations of large-scale history? Or do they suggest a "meso-history" which attributes causal importance to social structures, while at the same time recognizing the cautions which we have surfaced? I believe that the latter is the case. The conception of large-scale historical change that is worth defending is what I will call "conjunctural, contingent, meso-level explanation". **Conjunctural**, because at every point there are a range of independent factors present that are salient to the choices and outcomes which will take place—each of which has its own history of emergence, contingency, and reproduction. **Contingent**, both because

[10] Essays in *Does Technology Drive History?* shed important new light on the topic of technological determinism (Smith and Marx, eds. 1994).

[11] For a recent and powerful case for the contingency of a great event of the twentieth century, see Niall Ferguson's analysis of the origins of World War I (Ferguson 1999).

a given structural configuration still leaves room for strategic choice by actors, and because particular conjunctions of factors are not themselves historically determined. And **meso-level**, in that the most useful explanatory causal factors are those that fall at an intermediate level of generality and specificity—not "capitalism" but "market relations," not "the modernizing state" but the polity.

Putting these three features together brings us to an important qualification on the possible reach of large-scale history: compelling, rigorous large-scale historical explanation will never resemble Laplacean mechanics or Marxist historical materialism, with predictable and inevitable outcomes. And good meso-historical explanations will not take the form of single-variable explanations of any sort ("forces and relations of production in the last instance" or technological determinism). Finally, large-scale historical explanation will unavoidably need to be responsive to local circumstance and contingency. The presence of certain large-scale factors which are commonly associated with outcome X will **not** guarantee that X occurs in this circumstance too. Rather, a compelling large-scale explanation will be local in its analysis of circumstance, and large-scale in its recognition of the common workings of certain general factors (population increase, extension of markets, technological change, etc.).

At the same time, the CCM view postulates a firm rebuttal to the subjectivist historiography that implicitly asserts the full plasticity of historical process. Given the conjunction of factors in place at a certain time, certain futures are more likely than others, and certain pathways of development are inaccessible. The challenge for the large-scale historian is to uncover the sometimes obscure ways in which structural conditions make certain futures likely and others entirely inaccessible. Charles Sabel, Robert Brenner, and Marc Bloch all provide concrete explanations of specific large-scale historical transitions that were contingent and conjunctural. As we have seen, Sabel particularly emphasizes the contingency and variability of economic organization. Robert Brenner (1976) emphasizes the conjunctural character of agricultural revolution in England (new agricultural technology, specific property relations, specific local relations of power).[12] Marc Bloch (1966) emphasizes the utility of explanations of agricultural change in medieval France based on middle-level concepts and analyses (soil types, forms of peasant community, plow technology).

This approach thus suggests large-scale history in the middle range—hence "meso-history." Here we may think of examples of causal hypotheses that link one type of familiar structure, common across many or all societies, with another familiar form. For example, consider the discovery that population and settlement follows the structure of the system of transportation, and more generally, that the imperatives of central place theory explain patterns of

[12] For a discussion of the Brenner debate see Little 1998.

settlement in many or all societies. This observation is a valid meso-level historical generalization, and one which will find expression in different ways in differing social contexts.[13]

Basis for expecting common institutions and structures

The approach to meso-history indicated here depends heavily on the notion that there are common social structures with similar causal properties in different historical settings. This assumption depends upon the availability of appropriate social theory to indicate the causal mechanisms that give rise to such structures and through which the effects of these structures flow. Is there a compelling theoretical basis for this assumption? Can we bring forward convincing reasons for expecting that there will be sufficient similarity in structure and function among institutions and structures that have evolved in separate social contexts, to give rise to the possibility of significant similarities of causal profile? There is, in the form of a weak form of materialism and an account of common features of the human condition. Consider the logic that underlies the *German Ideology* (Marx and Engels 1970). Human beings have material needs (food, clothing, shelter); and they have certain common capacities—a capacity for labor, a capacity for prudent decision-making, a capacity for discerning and projecting the observable causal regularities of the environment within which they live, and a capacity for creating the instruments of social cooperation.

On the most general level of description, we can view the history of a particular civilization as the development, modification, refinement, and transformation of institutions through which individuals and groups pursue their purposes and satisfy their needs. There are two broad avenues of institutional innovation: invention and borrowing (diffusion). Once an institutional arrangement is in place, it is immediately subject to pressures leading to change. From that point forward, institutions evolve through a series of minor adaptations (similar, perhaps, to the refinement of a large system of computer code over time; for example, the air traffic control software system).

Consider the example of sharecropping as an institution governing access to the land and division of the risks and revenues created by cultivation. This is an institution of property relations in land that has emerged in many separate historical contexts (Netting 1993). And it is an arrangement that is directly salient to participants, given the circumstances of risk, need, and interest that affect the powerful and the cultivator, on the one hand, and the circumstances of traditional agriculture and technology, on the other. Therefore it is not surprising that this institution has been re-invented in countless contexts.

---

[13] Consider Skinner (1964-65), Cronon (1991), and Warner (1978) for powerful applications of this insight to rural China, nineteenth-century Chicago, and early twentieth-century Boston respectively.

We can therefore predict that existing societies will possess a range of institutions that serve a handful of functions—

- Economic—production, exchange, income generation, savings and investment
- Political—regulation of public order, enforcement of agreements, establishment of the conditions of economic activity (currency, banking and credit, standards of health and safety in products), collection of revenues, establishment of public infrastructure (water, roads)
- Social—educational institutions, institutions of social solidarity (religion, associations)

Social institutions thus emerge as the result of individuals striving (sometimes cooperatively, sometimes competitively) to solve existential problems. And as institutions emerge, they are often "captured" by opportunistic individuals and groups who can exploit them for their own purposes. Social institutions thus have a deep potential for "morphing" into new shapes and configurations (another reason, however, for doubting the strongest variants of technological, materialist, or cultural determinism).[14]

We can further predict that these various institutions will be subject to specific forms of pressure and erosion. For example, given that institutions work through specific agents and given that these agents have private purposes as well as role-defined purposes, we can predict that there will be a tendency toward "rent seeking," corruption, and capture. Likewise, "principal-agent" problems are predictable, in which subordinates within an institution make use of their powers for purposes other than those intended by the superior. But likewise, because other agents can anticipate these consequences, we can predict the emergence of preventive checks on the use of position and power for personal ends.

This blend of rational choice theory and materialism takes us to the point of being able to assert the likelihood of the development of similar institutions in different societies. But it does not take us the whole way to an ability to predict (or explain on first principles alone) the course of a given historical period. The reason for this has ultimately to do with human agency. Historical change proceeds through agents' interests and needs. Institutions and structures exist at particular points in time as the cumulative evolved result of agents' previous efforts to satisfy their needs and interests. Institutions are therefore more like artifacts than natural kinds; they are the result of many individuals' purposive actions and unintended effects. To the extent there are common features of

[14] See North (1990) and Ostrom (1990) for rational choice constructions of the development of institutions.

institutions this derives from "parallel evolution"—a particular feature is a commonly accessible solution to a common existential problem—or the result of diffusion of organizational themes and ideas (transmission of governing styles and strategies).

Once a stock of institutions exist in a particular setting, they constrain the future choices open to agents; so they become part of the causal field within which historical change proceeds. But it would be misleading to attribute primacy to the institutions; rather, institutions are themselves the artifact of the agents (collectively over extended sweep of time). So we can generalize Hughes's point above concerning technological momentum to speak of "institutional momentum": institutional configuration is plastic in its development and relatively sticky in operation. This analysis can be understood as the social contract argument writ large. The general approach is to identify a common existential situation for a group of agents within the material circumstances of human life; identify a salient and accessible solution; and infer that this institutional arrangement will recur again and again.

It is also important to bear in mind that, at any given time, agents are presented with a repertoire of available institutions and variants (along the lines of Charles Tilly's point about a repertoire of strategies of collective action; Tilly 1986). The contents of the institutional repertoire is historically specific, reflecting the examples that are currently available and those that are available through historical memory. This highlights one of the reasons for the institutional differences that Wong identifies between the political histories of Europe and China; the repertoire of institutional choices for Chinese decision makers was significantly different from that available in early modern Europe.

In what sense is CCM a theory of large-scale historical explanation?

Is CCM really a theory of large-scale historical explanation at all? I believe that it is, in this sense: that it invokes general theories of commonly important historical factors—technology, population, trade and market institutions, urbanization, state institutions—for which we can identify "typical" patterns of causal development. At the same time, CCM urges us to anticipate multiple pathways and perhaps even to inventory likely alternatives. This discussion suggests, then, that skepticism about "bad macro-history" ought not poison the well of "good meso-history." We should be receptive to nuanced accounts of the interplay of structural factors in particular circumstances.

Where does CCM stand on the question of historical inevitability or historical necessity? CCM implies directedness and intelligibility within historical process, without inevitability or uniqueness. Given that a new water transport option becomes available, trade should increase along this pathway. But other factors may intervene—from banditry to limitations on demand. So

we can make only qualified predictions about the direction of future developments.

Finally, the most basic question: are there great structures? Yes and no. Yes—in that there are effective institutions of politics, economics, and social life that are real and effectual within given historical settings, and we have a principled reason for expecting some degree of commonality of structure among these institutions, given the existential situation of human beings. But no—all social structures are historically rooted; so there is no "essential" state or economy which recurs in different settings. Instead, political and economic structures may be expected to evolve in different historical settings. And a central task of "meso-history" is to discover both the unifying dynamics and the differentiating expressions which these abstract processes take in different historical settings.

Bibliography

Bloch, Marc. 1966. *French Rural History*. Berkeley: University of California Press.

Boserup, Ester. 1981. *Population and Technological Change: A Study of Long-Term Trends*. Chicago: University of Chicago.

Braudel, Fernand. 1984. *The Perspective of the World*. New York: Harper & Row.

Brenner, Robert. 1976. Agrarian Class Structure and Economic Development in Pre-Industrial Europe. *Past and Present* 70:30-75.

Crafts, N. F. R. 1981. The eighteenth century: a survey. In *The Economic History of Britain Since 1700 1. 1700-1860*, edited by R. Floud and D. McCloskey.

Crafts, N. F. R. 1985. *British Economic Growth during the Industrial Revolution*. Oxford: Oxford University Press.

Cronon, William. 1991. *Nature's Metropolis: Chicago and the Great West*. New York: W. W. Norton.

Darnton, Robert. 1984. *The Great Cat Massacre and Other Episodes in French Cultural History*. New York: Basic Books.

Deane, Phyllis. 1979. *The First Industrial Revolution*. Second ed. Cambridge: Cambridge University Press.

Deane, Phyllis, and W. A. Cole. 1967. *British Economic Growth, 1688-1959. Trends and Structure*. Second ed. Cambridge: Cambridge University Press.

Elvin, Mark. 1973. *The Pattern of the Chinese Past*. Stanford: Stanford University Press.

Fairbank, John King. 1992. *China: A New History*. Cambridge: Harvard University Press.

Feinstein, C. H. 1981. Capital Accumulation and the Industrial Revolution. In *The Economic History of Britain Since 1700 1. 1700-1860*, edited by R. Floud and D. McCloskey.

Ferguson, Niall. 1999. *The Pity of War: Explaining World War I*. New York: Basic Books.

Floud, Roderick, and Donald McCloskey, eds. 1981. *The Economic History of Britain Since 1700 1. 1700-1860*. Cambridge: Cambridge University Press.

Geertz, Clifford. 1971a. Thick Description: Toward an Interpretive Theory of Culture. In *The Interpretation of Cultures*, edited by Clifford Geertz.

Geertz, Clifford. 1971b. *The Interpretation of Cultures*. New York: Basic Books.

Hughes, Thomas Parke. 1983. *Networks of Power: Electrification in Western Society, 1880-1930*. Baltimore: Johns Hopkins University Press.

Jones, E. L. 1987 [1981]. *The European Miracle: Environments, Economies and Geopolitics in the History of Europe and Asia*. Second ed. Cambridge: Cambridge University Press.

Jones, E. L. 1988. *Growth Recurring: Economic Change in World History*. Oxford: Oxford University Press.

Kammen, Michael G. 1991. *Mystic Chords of Memory: The Transformation of Tradition in American Culture*. 1st ed. New York: Knopf.

Kriedte, Peter, Hans Medick, and Jurgen Schlumbohm. 1981. *Industrialization before Industrialization Rural Industry in the Genesis of Capitalism*. Cambridge: Cambridge University Press .

Kuhn, Philip A. 1980. *Rebellion and Its Enemies in Late Imperial China: Militarization and Social Structure, 1796-1864.* paperback ed. Cambridge: Harvard University Press.

Ladurie, Emmanuel Le Roy. 1974. *The Peasants of Languedoc* . Urbana, IL: University of Illinois Press.

Little, Daniel. 1998. *Microfoundations, Method and Causation: On the Philosophy of the Social Sciences*. New Brunswick, New Jersey: Transaction Publishers.

Marx, Karl. 1977 [1867]. *Capital*. Vol. 1. New York: Vintage.

Marx, Karl, and Frederick Engels. 1970. *The German Ideology*. New York : International Publishers.

McGee, David. 1999. From Craftsmanship to Draftsmanship: Naval Architecture and the Three Traditions of Early Modern Design. *Technology and Culture* 40 (2):209-36.

McNeill, William. 1976. *Plagues and Peoples*. Garden City: Doubleday.

Mendels, Franklin F. 1981. Agriculture and peasant industry in eighteenth-century Flanders. In Kriedte, Medick, and Schlumbohm (1981).

Netting, Robert McC. 1993. *Smallholders, Householders: Farm Families and the Ecology of Intensive, Sustainable Agriculture*. Stanford: Stanford University Press.

North, Douglass C. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.

O'Brien, P. K., and C. Keyder. 1978. *Economic Growth in Britain and France, 1780-1914* . London: Allen and Unwin.

Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Postan, M. M. 1975. *The Medieval Economy and Society: an economic history of Britain in the Middle Ages*. Harmondsworth: Penguin.

Reynard, Pierre Claude. 1999. Maintenance Practices in Early Modern Papermaking. *Technology and Culture* 40 (2):237-62.

Rudolph, Susanne Hoeber. 1987. State Formation in Asia. *Journal of Asian Studies* 46 (4):731-746.

Sabel, Charles F. and Jonathan Zeitlin. 1985. Historical Alternatives to Mass Production: Politics, Markets and Technology in 19th Century Industrialization. *Past & Present* 108:133-176.

Sabel, Charles F., and Jonathan Zeitlin, eds. 1997. *Worlds of possibility : flexibility and mass production in western industrialization, Studies in modern capitalism*. New York: Cambridge University Press.

Schama, Simon. 1989. *Citizens: A Chronicle of the French Revolution.* New York: Knopf.

Skinner, G. William. 1964-65. Marketing and Social Structure in Rural China. *Journal of Asian Studies* 24 (1-3).

Skocpol, Theda. 1979. *States and Social Revolutions*. Cambridge: Cambridge University Press.

Smith, Meritt Roe, and Leo Marx, eds. 1994. *Does Technology Drive History? The Dilemma of Technological Determinism*. Cambridge, MA: MIT Press.

Soboul, Albert. 1975. *The French Revolution 1787-1799: From the Storming of the Bastille to Napoleon*. New York: Vintage.

Tilly, Charles. 1984. *Big Structures, Large Processes, Huge Comparisons* . New York : Russell Sage Foundation.

Tilly, Charles. 1986. *The Contentious French: Four Centuries of Popular Struggle*. Cambridge: Harvard University Press.

Wallerstein, Immanuel. 1974. *The Modern World-System I. Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York.

Warner, Jr., Sam Bass. 1978 [1962]. *Streetcar Suburbs: The Process of Growth in Boston (1870-1900)*. Second ed: Cambridge, Mass.: Harvard University Press.

Watts, Sheldon. 1997. *Epidemics and History: Disease, Power and Imperialism*. New Haven: Yale University Press.

White, Lynn. 1962. *Medieval Technology and Social Change*. Oxford: Oxford University.

Wittfogel, Karl. 1957. *Oriental Despotism: A Comparative Study of Total Power*. New Haven: Yale University Press.

Wong, Roy Bin. 1997. *China transformed: Historical Change and the Limits of European Experience*. Ithaca: Cornell University Press.