Neither in influencing public policy nor even in assuaging professional anxieties did the ideology of "engineering progressivism" seem to have a significant or lasting impact.

The contrast with the medical profession's use of ideology is instructive. The physician's formal invocation of a somehow transcendent and appropriate autonomy is one of those self-serving formulations which become and enforce reality. But it can do so only because it is based upon certain realities—most important, the control of decision making in medical matters by physicians and the introduction of all knowledge and technique at some ultimate point into the doctor-patient relationship, upon which society must necessarily place a high value. The physician in 20th-century America has benefited from massive inputs of new knowledge—and by implication status—and through his control of its application has remained in control of his professional destiny. The contrast with the engineer's situation is apparent.

In this connection another strand of engineering progressivism becomes, to return to Layton's argument, particularly suggestive. This is F. W. Taylor's scientific management. Layton sees a desire for the establishment of professional autonomy within the large-scale enterprise as a central motivation in Taylor's formulation. For scientific management implied the possibility of changing the engineer's real circumstances within the corporate organism. Unlike the efforts of others concerned with asserting the engineer's status, Taylor's concept of management would —by creating a new decision-making apparatus—have actually refashioned the engineer's role in industry's administrative hierarchy. Thus, Layton argues, the traditional autonomy of the independent, frequently genteel, mechanical-engineer entrepreneur or consultant might be preserved. The very zealousness of Taylor and his immediate followers' endorsement of an extreme version of the engineering ideology confirms the essential validity of this interpretation. Yet by demanding complete control of production by the engineer in charge, Taylor's system meant inevitable conflict with existing procedures and prerogatives. The outcome of the conflict was never in doubt, however; Taylorism was nowhere widely adopted in the form its founder envisioned. Taylor's ideas were, as Layton notes, adopted piecemeal; they were treated not as a grand and inclusive analytic system but as a grab bag of management techniques. There was, in fact, no one best way—only a set of options defined by social, economic, and bureaucratic considerations. And among them unalloyed Taylorism held little appeal.

The "message" implicit in Layton's study is both clear and dispiriting. The great majority among even a professional group are essentially prisoners of their defined role, of their place in the configuration of needs, relationships, and power which make up the large corporate entity. Unable through values and training to question the ultimate rightness of that entity, they can but endorse it in the very texture of their lives. Attempts to rally scientists and engineers around a higher responsibility to society, to humane values and human life, have borne little fruit; it has indeed not been until comparatively recent times that such a commitment has been voiced with any semblance of clarity and programmatic insistence. And though many engineering progressives envisioned autonomy, morality, and social responsibility as somehow organically related—a moral gradient Layton tends in a sense to endorse—the history of other professions in America demonstrates convincingly that autonomy need not imply either morality or social responsibility.

I wish in conclusion that Layton had written a rather different book. (A familiar cant admonition warns reviewers against charging authors with having written the "wrong" book; but such hypothetical suggestions are, after all, often the most useful form in which to cast constructive criticism.) A study of any one of the engineering specialties—or perhaps two for the sake of comparison—taking into account such factors as recruitment and distribution of practitioners, education, subdivision of work and specialty, and their relation to pure science on the one hand and corporate structure on the other would—I think—have been more illuminating than the present study, suggestive and conscientious as it is. As the author points out himself in a brief survey of recent developments in engineering, change has resulted from an altered relationship to basic science and the impact of that relationship on the functional realities of the engineer's work and the structure of the enterprises employing him, rather than from the endorsement of any formal ideology or the efforts of any reformers. Layton describes in detail the engineer's attempt to steer Leviathan from within, but does not really explain how he was originally ingested, or the nature of the symbiosis through which he survives, or the reasons why he has been generally unable even to think systematically about trying to emerge.

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Early Urban Forms

The Pivot of the Four Quarters. A Preliminary Enquiry into the Origins and Character of the Ancient Chinese City. PAUL WHEATLEY. Aldine, Chicago, 1971. xx, 604 pp., illus. $17.50.

Urbanists generally define the city as a concentration of people within specific limits and dominated by the bourgeoisie. It generates its own aspirations and cultivates a set of ethics and ethos which alienate it from the countryside. Its population is socially differentiated and occupationally specialized. Within its limits, it enjoys a large degree of autonomy. On the basis of this modern definition, urbanists tend to direct their enquiry into the origins of the city to early urban forms which demonstrated characteristics that can be regarded as direct antecedents of the modern city. By this approach the basis of urban life cannot be traced back to urban forms earlier than those found in the Hellenistic world. The book at hand provides a corrective to this approach.

Briefly, Wheatley's thesis is that the rise of the ceremonial center or complex represents a major stage in urban genesis. This occurred in seven centers of ancient civilization, namely, Mesopotamia, Egypt, the Indus valley, the North China Plain, Mesoamerica, the central Andes, and the Yoruba territories of southwestern Nigeria. These Wheatley calls "regions of primary urban generation," where archeological excavations reveal the existence of massive ceremonial complexes. In North China, which is the author's main concern, and where archeological finds are the richest, the ceremonial center appeared rather abruptly in the Shang dynasty (?1766–?1122 B.C.). Without question, Shang society had already

reached a high degree of social differentiation, to which burial habits, human sacrifices, and the presence of large-scale mausoleums attest. That the ceremonial center served as an administrative and religious focus and performed an economic redistributive function for nearby villages and hamlets is evidenced by the existence of storage pits, archives of oracle bones, and bronze and other ceremonial utensils as well as the dwellings of the craftsmen who produced them. Invariably, these complexes assumed a square or rectangular form with a north-south orientation, and available evidence suggests that the structures within them corresponded to heavenly constellations, underscoring their cosmic relationship and their orthogenic role and centripetal character on earth.

The Western Chou period (?1122–770 B.C.) saw a significant areal extension of these "dispersed" ceremonial centers, but it was not until the Spring and Autumn period (722–481 B.C.) that the "compact city" emerged. The dense population and workshops which had gathered around the walls of the ceremonial complex were now enclosed by an outer wall without causing serious distortion to the cardinal bearing of the urban settlement as a whole. During the Warring States period (403–221 B.C.), the number of these compact cities grew rapidly owing to disunity and intense strife. Under these conditions, the city enjoyed far more autonomy than it previously had, but it is important to note that this autonomy was ephemeral, for the city lacked ideological, political, or legal basis as an independent entity. Social stratification within the city, except for the presence of royal clans, aristocracy, and priests, was still the same as that found in the society at large. City and countryside shared similar tempo of life, value system, and mores; the wide gap between the two, so typical of modern urbanism, had not yet emerged, even though a certain degree of secularization of the ceremonial center had taken place over this period of time.

Drawing detailed examples from all seven regions of primary urban generation as well as regions of secondary urban generation, Wheatley finds much validity in the assertion that the ceremonial center, despite cultural differences, is "essentially urban in character," not so much in terms of the characteristics of the Western city as in terms of organizing and regionalizing principles, effective use of space, and its integrating function for the social, political, and economic sectors of human activities.

The author thus maintains that religion was the pervasive, though by no means the exclusive or an entirely independent, factor in the genesis of urbanism. Extracultural factors such as technology (there were no major technological innovations in Shang or early Chou that brought noticeable changes in the method of production), population pressure, commerce, large-scale irrigation (à la Wittfogel), and warfare are merely parametric conditions. Some of these probably contributed indirectly to the process which produced the ceremonial complex; however, they were more important in the transformation of the ecotype which provided the milieu for their validation. While reminding us that the ceremonial center is not a necessary stage in the development of a city, Wheatley argues that "it is likely to prove to have been a functional and developmental phase in the evolution of urban forms in general."

The present study is the first systematic analysis of the origins of the city with special reference to North China. Wheatley makes extensive use of archeological reports on recent excavations which serve as a corrective to the ideological bias of the Chinese classics written in Chou and later times. Though thought-provoking, Wheatley tends to overstate his thesis, and his conclusions are bound to be tentative, not simply because of the pioneering nature of the book but also because of the fact that archeological evidence is biased toward static forms and therefore ill-suited to the processual approach. Furthermore, now that the dust of the Cultural Revolution has settled the Chinese have revived a vigorous interest in their ancient world, and future archeological findings promise to be rich.

Finally, sociological concepts (along with the jargon) are widely used in the book, and when combined with the author's somewhat repetitive style render the book difficult for untrained readers. Occasionally, an inconsistency also creeps in. But these are minor blemishes in an essentially interesting work which should be read by all seriously interested in urban studies.

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