The Sociology of the *Danwei*

The Chinese Hospital. A Socialist Work Unit. GAIL E. HENDERSON and MYRON S. COHEN. Yale University Press, New Haven, Conn., 1984. xvi, 183 pp., illus. $22.50.

The most important determinant of an individual's identity in urban China is his or her "work unit." Indeed, a stranger in a Chinese city is often asked the name of his or her work unit—in Chinese, *danwei*—before being asked his or her personal name. One's *danwei* is so central to one's life, first, because there is no escaping from it. Most workers in urban China are assigned their jobs by the state, and, once employed, they cannot transfer to another job without the permission of the authorities in their workplace. Although it is possible to move up—or down—within an organization, it is very difficult to get permission to move to a different organization. The trajectory of one's career is thus determined to an extraordinary degree by the internal structure and dynamics of the administrative unit in which one works. One's *danwei* is also central to the quality of one's life because it controls one's access to an immense variety of goods and services. For example, housing, health care, day care, and kindergarten facilities are generally not available on the open market but only through one's work unit. Even getting married is dependent on the approval of a work unit's leaders.

In spite of the overwhelming importance of the *danwei* in urban China (rural Chinese society is organized along different lines), no systematic study of the sociology of the *danwei* has been published by Western scholars until this book. The authors of *The Chinese Hospital*, a sociologist and a physician, were among the first American scholars allowed to live, work, and study in China after the normalization of U.S.-China relations in 1979. The product of five months of careful participant-observation research informed by solid sociological theory, their book is a subtle account of how the Chinese *danwei* controls individual behavior—and of how the individuals within it nonetheless find ways to assert some autonomy against its control. In their analysis, patterns of control and autonomy often seem to be closer to the hierarchical relationships of traditional Chinese society than to those espoused by the egalitarian rhetoric of socialism.

The *danwei*, in the authors' description, is "dependent on a vertical authority reminiscent of a feudal estate." To a profound degree subordinates are personally dependent on superiors, and this dependency is constantly expressed through rituals of deference. Yet the superiors, of course, are dependent on other superiors, and subordinates can sometimes resist local leaders by going over their heads to higher authorities. Resistance to an authority usually takes place through a group so that responsibility for the resistance will be diffused. Although direct conflict is usually avoided, indirect resistance is often successful. A major contribution of this book is its descriptions of the ways in which work unit members can escape in practice from what would appear in theory to be the overwhelming pressure of the *danwei*.

Besides being an important contribution to the microsociology of work unit life, the book is also an important contribution to the comparative sociology of medicine. The *danwei* in which the authors worked was a hospital attached to a provincial medical college. The authors analyze in careful detail how the structure of the *danwei* system affects the relationships of administrators to staff and staff to patients and, within the staff, the relationships among doctors, nurses, and technicians. Even within the hierarchically organized work units of China, doctors retain a significant degree of professional autonomy from administrators because of their monopoly of medical knowledge. Nurses and technicians, though clearly occupying a subordinate position within the hospital, may have significantly more chance for upward mobility than their counterparts in the United States—several nurses in the authors' work unit had become doctors, and several technicians had become medical researchers. Doctor-patient relationships, on the other hand, are more asymmetrical than in the United States, the prevailing belief being that patients should know as little as possible about their treatment.

One of the authors of *The Chinese Hospital* carried out medical as well as sociological research in his *danwei*, and the book contains an invaluable account of Chinese medical practices from an expert's point of view. In contrast to American practice, diagnosis is inclusive rather than exclusive. That is, when making a diagnosis physicians do not order a massive array of expensive tests to eliminate all but one possible diagnosis; rather they make an informed guess based on limited data and allow the diagnosis to be confirmed or rejected by the patient's response to the prescribed treatment. Such a diagnostic practice is necessary because of the lack of testing resources in China—and rendered easier by the lack of opportunities for patients to sue physicians for malpractice. Treat-

"An older woman in our unit sweeps the sidewalk each morning. Officially retired unit members participate in a variety of volunteer activities." [From *The Chinese Hospital: A Socialist Work Unit*]

ment, on the other hand, often involves a "shotgun approach" with many different kinds of drugs being applied even though many of them might not likely be of any benefit. This practice seems to follow from the lack of emphasis on specific diagnosis and from the cultural expectation of Chinese patients that they receive "powerful" drugs when they are in the hospital.

According to this book, medicine in China seems to be practiced quite well, given the economic and technological constraints. However, the authors suggest that the authoritarianism of the *danwei* system may stifle innovation and impede coordination among different sectors of the society, thus in the long run impeding the modernization of medicine in China. Recent changes in Chinese economic policy may lead to a relaxation of the grip of the *danwei* on urban life, but even if this happens *The Chinese Hospital* will remain an important baseline against which to measure the direction of China's economic and political changes.

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History of Mathematics

Number Theory. An Approach through History. From Hammurapi to Legendre. ANDRÉ WEIL. Birkhäuser, Boston, 1984. xxii, 375 pp., illus. $24.95.

André Weil has prepared an incisive and well-written account of the development of number theory. His book is divided into four chapters and 11 appendixes. The chapters are (i) a quick trip through the ancient world, with particular attention to the contributions of the Mesopotamians, Greeks, and Indians; (ii) a visit with Fermat (1601–1665); (iii) an extended stay with Euler (1707–1783); and (iv) brief stops to see Lagrange (1736–1813) and Legendre (1752–1833). Weil's account ends short of Gauss's monumental *Disquisitiones Arithmeticae* of 1801, though note is taken of the development of various themes in the hands of Gauss. The appendixes are devoted to technical matters, some detailed proofs, and accounts of the further development of some of the subjects.

The term "number theory" is used by Weil in the vernacular sense, namely to refer to the study of properties of integers. It is worth noting that this definition in fact omits many topics—for example diophantine approximation—that appear under "Number Theory" in the table of contents of *Mathematical Reviews*.

Let us view briefly two of Weil's principal personae, Fermat and Euler. Fermat was the first European since the Greeks to contribute significantly to number theory. A translation of the *Arithmetic* of Diophantus served as Fermat's inspiration and notebook. His contributions include methods of solving diophantine equations and criteria for representing numbers as sums of squares.

In addition, Fermat raised such important questions as his famous "last theorem" that the equation $x^n + y^n = z^n$ has no nontrivial solutions in integers x,y,z for any integer n exceeding 2. Weil considers this assertion to be outside the scope of the book and devotes little space to it. He describes the "last theorem" as the "one ill-fated occasion [when Fermat mentioned] a curve of higher genus" and notes with irony that it is the foundation upon which Fermat's "reputation in the eyes of the ignorant came to rest." Fermat established the case $n = 4$ by his method of descent, and he claimed also to have treated other cases as well, but no details are known about this or most of Fermat's other work. He failed to attract any worthy successors, and his subject became dormant with his passing.

Weil next describes how number theory was revived by the universal and prolific Euler. Euler's first venture into number theory was to disprove a conjecture of Fermat's that all numbers of the form $2^{2^n} + 1$ are prime. He proceeded to give proofs of most of Fermat's assertions. In fact, Weil uses these very arguments in the chapter on Fermat, "on the plausible but unproved assumption that [Fermat's proofs] could not have differed much from those later obtained by Euler." Euler went on to extend number theory into several new areas. Weil shows Euler struggling with quadratic reciprocity, launching the theory of partitions, and discovering remarkable properties of what is today called Riemann's zeta function.

The book offers an interesting picture of the progress of mathematics between the times of Fermat and Euler. Euler had employment as a mathematician; Fermat did not. Fermat had little algebra at his command; Euler's algebraic manipulations were impressive even by today's standards. We know of Fermat's work only through surviving letters, his personal notes in *Diophantus*, and one anonymously published paper. Euler, in contrast, published everything he regarded as serious work—70 volumes' worth!

The notation used in the book is generally modern, which greatly facilitates reading the mathematical details. As an example of early writing, consider Fermat's formulation of the so-called "Pell equation" (a misnomer due to Euler!): "Given any number not a square, then there are an infinite number of squares which, when multiplied by the given number, make a square when unity is added" (quoted from D. J. Struik, *A Source Book in Mathematics, 1200–1800*). Weil has also presented the material from a modern point of view, focusing attention on ideas that have proved fruitful. A very simple example is the interpretation of the algebraic identity

$$(x^2 + y^2)(z^2 + t^2) = (xz \pm yt)^2 + (xt \mp yz)^2$$

in terms of the norm of a complex number.

Weil's book is not light reading in the vein of E. T. Bell's *Men of Mathematics*. It does, however, present such a wealth of material so well that it should have appeal to people with varying degrees of interest in number theory, and its appearance is to be warmly applauded.

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Allometry

Scaling. Why Is Animal Size So Important? KNUT SCHMIDT-NIELSEN. Cambridge University Press, New York, 1984. xii, 241 pp., illus. $29.95; paper, $9.95.

Size, Function, and Life History. WILLIAM A. CALDER III. Harvard University Press, Cambridge, Mass., 1984. xiv, 431 pp., illus. $32.50.

Body size influences many structural, physiological, and ecological relations of animals, ranging from mitochondrial volumes and enzyme activities of different tissues to home range areas and rates of population growth. It is common practice to express these mass-influenced relationships with the power equation $Y = aM^b$, where Y is the predicted variable, M is body mass, and a and b are the empirically fitted coefficient and exponent. Some of these factors vary ("scale") proportionally with body mass (that is, $b = 1.0$), but most do not. Consequently this analysis is often termed "allometry," indicating non-isometric scaling of variables with body size. Size-dependent analysis has become increas-