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-