

World in the Balance: The Historic Quest for an Absolute System of Measurement
ROBERT P. CREASE
W. W. Norton: 2011.
288 pp. £20

Adams favoured the first option; but his report to Congress plumped for the second, and recommended retaining the existing system. Metrication, said Adams, would “affect the well-being of every man, woman and child”. The change would be too radical. The physicist and polymath Thomas Young, surprisingly omitted by Crease, gave the same advice to the British Parliament in the 1820s.

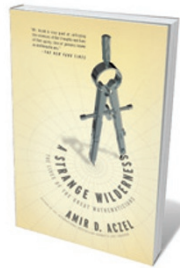
The most original section of the book concerns ancient China. Writing with the help of Chinese metrologists, Crease describes how the 12-note harmonic scale used in ritualized music helped to define the measurement system used at the imperial court. The ritual scale, known as the *lülü*, was supposedly devised by China’s first emperor, Huang Di, in the third millennium BC. He sent a minister to the mountains to procure bamboo of a species revered for its regularity in length and thickness. From a piece 3.9 *cun* in length — the *cun* was the width of a thumb knuckle, or one-tenth of a *chi*, the ‘Chinese foot’ — Huang Di made a one-note flute, whose pitch became the lowest in the scale, known as the *huangzhong*. Eleven more bamboo flutes created the *lülü*.

Whatever the truth of this legend — the evidence suggests that the 12-note scale was actually introduced much later, some time before 400 BC — 12 pitch regulators were made in cast metal; the lengths were specified by regulation in *chi*, linking the basic unit of length with musical pitch. This system endured for more than 2,000 years and was not replaced until the 1920s, with the adoption of the metric system. In 1984, the country defined the *chi* to be one-third of a metre.

As a physicist, Crease is drawn to the drive for quantification, uniformity and precision in measurement — the main concern of his book. As a philosopher, he understands that there is more to quantification than these scientific virtues. The value of education and of scientific research, for example, cannot be measured wholly by examination results and citation indices. Nor can the fitting of clothes be entirely mechanized, as Crease concludes, after trying out various body scanners used by US retailers. Science cannot proceed without precise measurement, yet successful measuring systems cannot be divorced from everyday human dimensions. ■

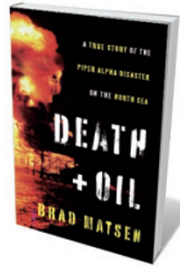
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Books in brief



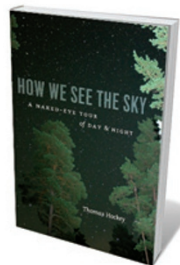
A Strange Wilderness: The Lives of the Great Mathematicians
Amir D. Aczel STERLING 304 pp. \$24.95 (2011)

A poet-mystic; a swordsman clad in green taffeta; a 12-year-old who mastered ancient Greek. Omar Khayyam, René Descartes and Gottfried Leibniz are just three of the mathematical greats in Amir Aczel’s trot through theorems and the lives behind them. Aczel, author of *Fermat’s Last Theorem* (1996), begins with the Greeks; ponders the geniuses of India, Arabia and China; frolics in the hotbed of the Italian Renaissance; examines the founders of calculus and the wunderkinder of the Napoleonic age; and skids to a halt with Alexander Grothendieck, who learnt maths in a Nazi internment camp.



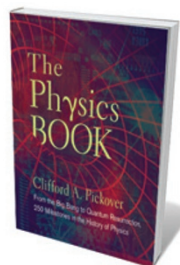
Death and Oil: A True Story of the Piper Alpha Disaster on the North Sea
Brad Matsen PANTHEON 224 pp. \$25.95 (2011)

More than two decades before the Deepwater Horizon oil spill, the Piper Alpha oil rig exploded in the North Sea, killing 162 men. Writer Brad Matsen has packed in two years of research, during which he has interviewed survivors, managers, rescue teams and government officials. Matsen is thorough in laying out the scientific, technological, industrial and political context. This is a deftly told tale of human error, technological glitches and corporate reluctance that highlights the high cost of our thirst for crude.



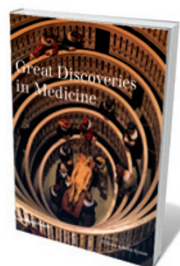
How We See the Sky: A Naked-Eye Tour of Day and Night

Thomas Hockey UNIVERSITY OF CHICAGO PRESS 224 pp. \$60 (2011)
Images of the Horsehead Nebula from the Hubble Space Telescope are more familiar to most of us than the sight of the sky above our heads. So argues astronomer Thomas Hockey, who urges us to gaze unaided at the Universe. Starting with a scan of the horizon, Hockey takes us through the science as well as a host of cultural references, from Pink Floyd to the Pyramids of Giza in Egypt. He explores the astronomical sky, the 88 constellations and the Milky Way; orientation through azimuth to zenith; lunar and solar motion, solstices and eclipses. A heavenly and often humorous journey.



The Physics Book: From the Big Bang to Quantum Resurrection, 250 Milestones in the History of Physics

Clifford A. Pickover STERLING 528 pp. \$29.95 (2011)
Molecular biophysicist and inventor Clifford Pickover follows his 2009 volume *The Math Book* with this energizing look at 250 discoveries in physics. Bookended by the Big Bang and the ‘quantum resurrection’, the landmark events run from Archimedes’ burning mirrors, Isaac Newton’s prism, the Higgs boson and the Doppler effect to dark energy, Wolfgang Pauli’s exclusion principle and rogue waves. Luminaries from Archimedes to Fritz Zwicky get their due, and it is gorgeously illustrated throughout.



Great Discoveries in Medicine

Edited by William Bynum and Helen Bynum THAMES & HUDSON
304 pp. £24.95 (2011)
Dazzling images adorn this crisply written chronicle of ‘eureka’ moments in medicine, covering our emergent knowledge of the body, diseases, drugs and surgery. A drawing of a Caesarean section in Hermann Friedrich Kilian’s nineteenth-century *Geburtschüfflicher Atlas* has the delicacy of Flemish Renaissance art. Other marvels include the first X-ray (of Mrs Röntgen’s ringed hand), a photograph of serotonin crystals and computer-generated images of viruses.