**REVIEWS**

# Sacred geometry

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TV programmes about space exploration made him famous as the prophet of the space age.

Neufeld discusses the close-knit nature of the German rocket team in the US and comments on its generally conservative attitude to rocket development. The researchers did things in slow, steady steps, testing everything along the way, and they were not particularly receptive to outside ideas. Several US engineers who met them in these early days found Von Braun resistant to innovation and, as Neufeld states, "while the United States was considerably behind German technology in rockets and missiles in 1945, within three or four years German technology had been absorbed and surpassed". It makes one wonder whether, in the long term, US rocketry and space exploration was hindered rather than strengthened by this German team. Would indigenous American engineers have progressed faster without the hero-worship paid to the German rocket engineers led by Von Braun?

Although I would dispute its claim to be the first authoritative biography of Von Braun, Neufeld's book is certainly the most comprehensive. It is extensively researched, with over 90 of its 587 pages being notes and references, and it is also well written. It puts Von Braun's life and achievements in the context of the times and, in my view, deals most fairly with the controversial issue of Von Braun's association with the Nazi regime and his "Faustian pact". It should be compulsory reading for anyone interested in the development of the space age.

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# Between the lines

### Sacred geometry

**Temple teasers**
Uncovering the secrets of Japanese sacred mathematics.

Most Westerners would be surprised to walk into a church and find stained-glass windows covered with equations. Yet in Japan, for over two centuries people decorated their temples and shrines with beautiful geometric problems. These problems were painted on to wooden tablets known as *sangaku*. *Sacred Mathematics: Japanese Temple Geometry* explains the history of this tradition, which flourished between the 17th and 19th centuries when Japan was completely isolated from the West. The book also presents nearly 200 *sangaku* problems and their solutions. Although the underlying mathematics is the same as that taught elsewhere, *sangaku* look quite different to the Greek-inspired designs found in Western geometry books, and the methods used by Japanese geometers to solve such problems often differed significantly from those of their Western counterparts. This fascinating and beautiful book is written by Fukagawa Hidetoshi, one of the foremost experts on *sangaku*, together with the Princeton University cosmologist Tony Rothman.
● 2008 Princeton University Press £19.95/$35.00hb 392pp

### Facts of life
How likely is it that a newly formed planet, with surface conditions that support liquid water, will give rise to life? This is the question posed by chemist George Whitesides in the foreword to *Fitness of the Cosmos for Life*. His answer is that we have no idea, and no convincing way to estimate it. That does not, however, stop scientists from thinking about the problem. This new volume is a collection of 21 essays by distinguished authors from the fields of physics, astronomy, chemistry, biology, philosophy and theology that discuss whether or not the cosmos is "fitted" for life. The book celebrates the 1913 work *The Fitness of the Environment* by chemist Lawrence Henderson, which was first to suggest the idea that as well as living things being fitted to their surroundings, the environment also had to be fitted to life. For example, Owen Gingerich, an astronomer at the Smithsonian Institution in the US, revisits Henderson's work in the context of our modern understanding of nucleosynthesis. The fact that there is no stable element with mass number five, for instance, is essential to our existence since it results in a special abundance of carbon and oxygen in the universe.
● 2008 Cambridge University Press £65.00/$125.00hb 526pp

### Groomed for success
A few years ago, Alex Craik, a mathematician from the University of St Andrews, found an obscure collection of portraits in the Wren Library of Trinity College at Cambridge University. The people depicted all had one thing in common: they had been pupils of the famous 19th-century Cambridge private mathematics tutor William Hopkins. He had taught a group that included George Stokes, William Thomson and James Clerk Maxwell, as well as a host of other less famous but still highly successful scientists. Inspired by this finding, Craik has written *Mr. Hopkins' Men*, which tells the story of Hopkins and his top students. The book provides a fascinating insight into 19th-century Cambridge college life, and charts how the university evolved from an outdated and stagnating institution into the world-renowned centre for mathematical and scientific research it is today. Many of these reforms were, in fact, down to Hopkins and the men he tutored.
● 2007 Springer £25.00/$49.95hb 410pp

### Galaxy quest
The study of galaxies is one of the most interesting topics in astronomy, claims John Gribbin in his new book *Galaxies: A Very Short Introduction*. Doing it justice in just 120 pages is, therefore, not easy, but that is what Gribbin has attempted in this latest instalment of the *Very Short Introductions* series from Oxford University Press – pocket-sized guides that cover everything from geopolitics to the Dead Sea scrolls. Gribbin, who is a UK science writer, starts by discussing the invention of the telescope and how this led to the "Great Debate" about whether the "nebulae" it revealed were inside our galaxy or were separate galaxies in their own right. This section of the book is very thorough, covering all the major contributions – such as Henrietta Leavitt's discovery of Cepheid variables – that led to our current understanding of the size and distribution of nearby galaxies. From that point on however, Gribbin concentrates on the science – which is explained well, although necessarily at a fairly low level – and the close attention to historical detail is abandoned. Nevertheless, with some time and thought devoted to its reading, this book provides a good entrée to this fascinating area of physics.
● 2008 Oxford University Press £6.99/$9.95pb 144pp