

disease is small. "The New Genetics" focuses on abnormal genes that cause certain, mostly "staggeringly rare", diseases, which it aims to cure or prevent by changing these genes. In practice, genetics does little and is unlikely to do much more.

Epidemiology, "The Social Theory", emphasizes faulty diet and lifestyles as the cause of commoner diseases. Le Fanu questions the validity of much of this research, for which he is likely to attract criticism. He points out that none of the numerous allegations of environmental threats to health of the past 20 years has been validated. He even challenges the concept of poverty, or rather, modern Western poverty, as a cause of disease. He argues that current theories of epidemiology and genetics are manipulated to enhance the services of doctors and the profits of pharmaceutical companies, whose power and influence often corrupts doctors, and that the modern tendency of governments, or their medical officers, to recommend "safe" (from cancer) levels of various foods such as meat and alcohol is "indistinguishable from quackery".

Le Fanu ponders on the reasons for the unrealistic but pervasive belief in limitless possibilities for medical cures. He argues that the worship of "progress" and novelty in medicine must end if things are to improve, and that we should return to Sir William Osler's principles of observation and reasoning to know the true from the false — to prevent disease, to relieve suffering and to heal the sick through knowledge based on practical experience. Only then will doctors and patients be more satisfied. Unfortunately he makes no suggestions as to how this might be achieved, or even begun. If only one knew...

This is a challenging book. Some of the arguments may be oversimplified, but the message is clear and deserves careful consideration. □

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## Surfing the history of space

### The Pearly Gates of Cyberspace

by Margaret Wertheim  
*Virago/W. W. Norton: 1999. 320 pp.*  
 £14.99/\$24.95

**Owen Gingerich**

One has to admire the audacity of the concept of this book, subtitled *A History of Space from Dante to the Internet*. Science commentator Margaret Wertheim begins with the "soul space" of Dante's Christian geography, leads on to Giotto's emerging use of perspective in the Arena Chapel in Padua, describes the celestial space of Nicolaus Copernicus and Isaac Newton, and finally ends up with the Internet in its present and projected electronics world. Whether the book really holds together is another matter, but the juxtaposition of such varied views of space certainly provides a stimulating journey.

It is easy to develop a love-hate relationship with these essays, strung like pearls on a necklace. There is a fascinating sweep of ideas, with thoughtful research and novel insights. On the other hand, the book needed an editor who could have suppressed such a gratuitous description of Johannes Kepler as

"the weiner from Weil-der-Stadt", and who could have insisted on an index. The book could also have done with a copy editor who could spell "principal" and who could recognize that "millennia" and "phenomena" are plural nouns.

The chapter on relativistic space, which marches swiftly from Immanuel Kant to Edwin Hubble to Albert Einstein to Andrei Linde, actually says rather little about relativity, although it states, incredibly, that "without an understanding of special relativity, for instance, you would not have electric power coming efficiently to your home". It also imputes a curious thought process to Hubble — according to Wertheim, he simply imagined that the further away a nebula was, the faster it might be moving, and hence the more its spectrum might be redshifted. She concludes that the concept of the expanding Universe "was a brilliant imaginative leap, evidence that science does not proceed by logic alone". But surely the process went the other way around, starting with the observations of the high redshifts and correlating these with the faintness, and hence the farness of the nebulae. Hubble was convinced that the correlation existed, but was always somewhat ambivalent about the notion of the expanding Universe.

The final third of Wertheim's book deals with cyberspace, starting with a brief history of the explosive growth of the web, and including the burgeoning number of online fantasy worlds in which people take on elaborate alter egos. From chat rooms to MUDs (multi-user dungeons, laundered to multi-user domains), 'netizens' around the globe are engaging in addictive psychosocial experimentation. Wertheim claims that, after three centuries of physical materialism, "cyberspace helps to make explicit once more some of the *nonphysical* extensions of human beingness". It will, she says, challenge us to make a more nuanced conception both of ourselves and of the world around us.

Was cyber-utopia presaged by the London coffee-houses of Newton's day? Does modern cyberspace include an arena where the vilest sides of human behaviour can effloresce, a parallel to Dante's hell? Cyerpundit Hans Moravec has written that "wholesale resurrection may be possible through the use of immense simulators". Here, indeed, are the pearly gates of virtual reality and cyber immortality! These are some of the intriguing issues Wertheim addresses in her closing chapters.

"Like Copernicus," she writes, "we are privileged to witness the dawning of a new kind of space. What history will make of this space, appropriately enough, only time will tell." □

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## New in paperback

### Life Itself: Exploring the Realm of the Living Cell

by Boyce Rensberger  
*Oxford University Press, £9.99, \$15.95*

"Although some of the descriptions are rather lurid, what cannot be disputed is Rensberger's wonderment and enthusiasm because it literally leaps off the page. ... I am not entirely sure who *Life Itself* is aimed at. Presumably it is not intended to go up against the established cell biology tomes but it is hard to imagine a better way to convey to students the thrill of looking down a microscope at a living cell — and they get a pretty respectable introduction thrown in for good measure." Jeremy Hyams, *Nature* 386, 778 (1997)

### The Calendar: Humanity's Epic Struggle to Determine a True and Accurate Year

by David Ewing Duncan  
*Avon, \$13.50*

"*The Calendar*, although written in too

uncritical a style to be taken seriously as history, has a stronger chronological organization and relies on historical anecdote to keep the narrative moving. Consequently it is easier to read. It tells the story from the Stone Age to the Gregorian reform of the sixteenth century, and then steps nimbly on to conclude with the atomic clock. It offers a romp through history with calendars as the connecting thread." Jim Bennett, *Nature* 396, 328 (1998)

### The Meaning of it All: Thoughts of a Citizen Scientist

by Richard P. Feynman  
*Penguin, £4.99*

"He sets out to tackle science's relations with politics, religion and everyday society. If Feynman was a prophet, I suppose this was his sermon on divine uncertainty — the uncertainty that allows the scientific process to work. Knowledge can progress, says Feynman, only if people have open minds and test their ideas." Stephen Battersby, *Nature* 394, 144 (1998)