

book reviews

molecular-orbital theory before sampling the delights of Titian's *Bacchus and Ariadne* and Hiroshige's "One Hundred Famous Views of Edo"? Trimmed of such excesses, this attractive book might gain the popularity that its topic deserves. ■

Philip Ball is a consultant editor at Nature.

Endangered harvest?

Sustainable Use of Hawksbill Turtles: Contemporary Issues in Conservation

by N. Mrosovsky

Key Centre for Tropical Wildlife

Management: 2000. 107 pp. AU\$25 (pbk)

John G. Robinson and John Thorbjarnarson

For the current meeting of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora; 10–20 April) in Nairobi, the Cuban government has submitted proposals to allow a small number of hawksbill turtle shells to be harvested from Cuban waters and exported to Japan. A CITES Appendix I listing has since 1976 banned the trade of this turtle's beautiful shell, which is prized for its use in ornaments and inlays, on the basis that the turtle populations were affected by international trade and that the species was threatened with extinction.

The Cuban proposals argued that hawksbills (*Eretmochelys imbricata*) can be sustainably harvested, and that active international trade would promote the turtle's conservation. These proposals have generated passionate controversy, and a balanced analysis is needed of whether such a strategy might be applied to hawksbills. Mrosovsky's book falls short of fulfilling this need.

The book, timed to influence the CITES debate, is an emotional plea in support of Cuba's position. It argues that there is a general lack of information on wild populations, so that effective conservation management is invariably experimental and adaptive. It also says that available information indicates that hawksbill turtles are not in danger of extinction, and that allowing the turtle trade, provided it is sustainable, is a better conservation strategy than strategies based on protection. Finally, the book states that institutional mechanisms are in place to manage the wild populations and the trade.

Mrosovsky's first point is well developed. Conservation decisions must often be taken without full knowledge of the situation, and sometimes the safest or most 'precautionary' step is bold experimentation. The book's other points, however, are less effectively argued. Mrosovsky's argument that certain

populations of hawksbills are showing recovery does not negate the consensus that the species population is still only a tiny fraction of its historical numbers. The fact that hawksbills do not fit the 'Critically Endangered' category of IUCN, the World Conservation Union, says nothing about their inclusion in CITES Appendix I. Mrosovsky's assertion that sustainable use works for crocodiles, elephants, whales and rhinos does not establish its applicability to hawksbills. His diatribes against protection as a conservation strategy ignore the fact that most recovering populations of hawksbills are those that are being effectively protected. While the Cuban authorities have a well-managed programme, this does not obviate the need for the regional management of this highly migratory species, nor for effective regulation of the trade in Japan.

A fundamental requirement of any sustainable-use programme is that such use promotes conservation. Revenues from the harvest might be used to manage the wild population; local fishing communities might adopt the role of stewards of the resource; and other competing industries might be excluded. Mrosovsky fails to make any of these arguments, and puts forward as the primary benefits of trade only the avoidance of waste from incidental catching of hawksbills, and the use of revenues to construct an education centre in Cuba. These reasons are not compelling.

Argument by analogy and innuendo, disregard for scientific credentials, questioning the pecuniary motives of real and imaginary opponents, and the selective use of scientific data do not make for effective conservation advocacy. Unfortunately, these tactics have characterized both sides of the sustainable-use debate. This book is no exception, and does a disservice to proponents of sustainable use and to our Cuban colleagues. ■

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New in paperback

A History of the Mind: Evolution and the Birth of Consciousness

by Nicholas Humphrey
Copernicus, £7.99

Making Us Crazy: DSM — The Psychiatric Bible and the Creation of Mental Disorders

by Herb Kutchins & Stuart A. Kirk
Constable, £14.99

"This is a serious and well-documented study, which casts serious doubt on the touted scientific status of DSM categories. It is also readable, although Kutchins and Kirk's preoccupation with the day-to-day minutiae of the politics of

Seeds that never grew in Sweden

Linnaeus: Nature and Nation

by Lisbet Koerner

Harvard University Press: 1999. 298 pp.

£24.95, \$39.95

Harriet Ritvo

Linnaeus has long ceased to be a household name, even in scientific circles. During the nineteenth century, the twin enterprises of taxonomy and nomenclature, with which his name is associated, lost the position they had held during the Enlightenment at the cutting edge of botanical and zoological research. Further, as a Swede who published in Latin, Linnaeus lacks a modern constituency of any size. But his steady stream of taxonomic works made him an international scientific celebrity in a period when there was enough distinguished competition to lend enduring interest to his eminence.

Most Linnaeus scholarship has, understandably, focused on the work that inspired this contemporary renown. *Linnaeus: Nature and Nation* offers something different. It is neither a conventional biography nor a reinterpretation of Linnaeus's best-known scientific accomplishments, although it includes elements of both.

Instead, in a series of linked essays, Lisbet Koerner repositions Linnaeus primarily as a Swede rather than as a member of an international intellectual community. She emphasizes his deep family roots in the Swedish church and countryside, rather than his links to the larger world. After all, he spent only a few years of his long life outside his native land. He sent his disciples on dangerous voyages to the remote shores of Australia, Africa and Asia; for his own taste of the exotic, he headed north to Lapland.

Koerner shows that Linnaeus's professional preoccupations focused as much on

naming may dispose some psychiatrists to see in this a case of ancient obsessional disorder. It is certainly sobering to discover just how the terms we take for truth have come into currency." Roy Porter, *Nature* **389**, 805–806 (1997)

Pluto and Charon: Ice Worlds and the Ragged Edge of the Solar System

by Alan Stern & Jacqueline Mitton
Wiley, \$19.95

Mathematical Mysteries: The Beauty and Magic of Numbers

by Calvin C. Clawson
Perseus, \$17

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A Swede in Lapland: Linnaeus's scientific expeditions took him to Finland ...

local politics, academic and otherwise, as on the debates of foreign naturalists. He spent most of his career as a professor at Uppsala University, not far from Stockholm, where he wrote his students' dissertations (evidently an expected service) and revitalized the botanic garden.

He cut an eccentric and sometimes extravagant figure on the local scene. He led groups of up to 300 people — auditors as well as students, women as well as men — on collecting expeditions in the Uppsala countryside. These excursions were ultimately stopped by the university rector, who objected to them as both distracting and militaristic (Linnaeus imposed formal discipline and required participants to wear a uniform of his own devising). He supervised the careers of his former students, often finding them positions at home if they were fortunate enough to return from their travels — though, according to Koerner, Linnaeus was a difficult mentor and these efforts seldom led to mature professional friendships. He arranged for his son and namesake to inherit his own chair at Uppsala.

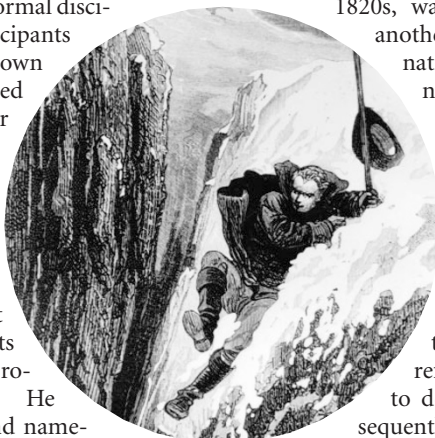
National issues also engaged Linnaeus, a

fact that Koerner emphasizes by using Swedish historical references (for example, to “the Great Northern Wars with Russia” and “the Era of Freedom”). She argues that some activities normally understood simply as part of Linnaeus's research gain significance when interpreted in the light of his ambitions for the emerging modern nation of Sweden. He wished to compensate for Sweden's limited ability to participate in European global expansion by naturalizing or domesticating some of the beneficial things found in other parts of the globe. He supported, along with many of his countrymen, cameralist economics (already old-fashioned in the world of Adam Smith) which aimed at national commercial isolation and self-sufficiency.

He particularly feared the haemorrhage of Swedish treasure to pay for tropical luxuries. Thus he looked for ways to supply consumer desires by more imaginative and efficient exploitation of native resources. As Koerner puts it, “He hoped to ride elks, write with swan feathers, and read by the light of seal-fat lamps”. And if there were desires that could not be fulfilled in this way, Linnaeus hoped to persuade valuable tropical plants to adapt to his cold northern climate. He optimistically asserted that most Mediterranean plants could be acclimatized in Scandinavia, and that, if moved very gradually, perhaps over a century, even the fruits of India might be harvested in Uppsala. Guided by this theory he attempted to grow such crops as cacao, rice, coffee, sugar cane and pistachios in his botanic garden, although the results were invariably disappointing.

Perhaps because these failures had a political or economic dimension, Linnaeus' reputation suffered its swiftest decline in Sweden. Elsewhere, he dwindled gradually into a figurehead, the object of mechanical respect which he retains to this day. But in Sweden, where he was known as more than a systematist, things have been more volatile. If his post-mortem eclipse reflected his national political activities, his re-emergence as a Swedish hero, beginning in the

1820s, was due to politics of another kind. Romantic nationalists made Linnaeus the object of cult worship, which ultimately became associated with racist ideologies. By the 1920s, Linnaeus had become so closely identified with conservative politics that Swedish socialists refused to have anything to do with him. He consequently suffered a second



... where he came close to falling into a crevasse.

eclipse, at least in popular esteem. A glance at Koerner's bibliography suggests that a substantial proportion of scholarly work on Linnaeus continues to be published in Swedish, a fact that corroborates one of her central assertions. If all politics is local, all science is, too.

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An uncertainty principle for geometry

The Symbolic Universe: Geometry and Physics 1890–1930
 edited by Jeremy Gray
Oxford University Press: 1999. 304 pp. \$105
Peter T. Landsberg

While physicists regard mathematics as a superb investigative tool, for the mathematician it is an end in itself. If, as in this book, the investigation is restricted to the relationship between geometry and physics, the situation is the same, except that a considerable variety of geometries exists: Euclidean, Riemannian, affine, and so on. So is there anything more of interest to be said about the relationship between geometry and physics?

The answer is a resounding ‘yes’, for Euclidean geometry was long regarded as the only possible geometry. However, around 1823, Nikolay Lobachevsky and János Bolyai dispensed with Euclid's axiom about parallel lines, so that in their geometry the angles of a triangle sum to less than 180 degrees. These new geometries suggested that Euclidean geometry was not ‘obviously’ the geometry of the Universe. In fact, this is a rather superficial view, as Einstein noted in his 1936 paper “Physik und Realitat”. Here he implied that centuries of Earth-bound measurements in agriculture and elsewhere made people think, wrongly, that Euclidean geometry was the only possible geometry.

If we are to rid ourselves of the Euclidean preconception, we must adopt a more philosophical approach and scrutinize the assumptions that had become quietly integrated into physics. Someone who dealt with just this problem was Hermann von Helmholtz. He remarked in one of his popular lectures, delivered in Heidelberg in 1870: “If it were useful for any purpose, we might with perfect consistency look upon the space in which we live as the apparent space behind a convex mirror with its shortened and contracted background ... Only then we should have to ascribe to the bodies which appear to us to be solid ... corresponding distensions and contractions, and we should have to change our system of mechanical principles entirely; for even the proposition that every

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