

Heslop Harrison elected a Fellow of the Royal Society?

A Rum Affair is very entertaining; it is carefully written for the non-specialist, with many interesting diversions (such as Heslop Harrison's attempts to demonstrate Lamarckian evolution). It becomes uncomfortable (almost voyeuristic) reading as the ageing suspect is cornered and desperate to defend himself. Its appeal will doubtless spread beyond those interested in the natural history of Rhum and history of British botany to those fascinated by the wider issues of scientific fraud and those who enjoy a gripping yarn.

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Confessions of a modern roué

Nazis, Women and Molecular Biology: Memoirs of a Lucky Self-Hater

by Gunther S. Stent
Briones Books: 1998. 388 pp. \$25

Walter Gratzer

Günter Siegmund Stensch was born into a prosperous Jewish family in Berlin during the turbulent days of the Weimar Republic. In later life he cast off the heroic Wagnerian encumbrance of names his parents had wished on him, and as Gunther Stent became a phage geneticist of note and latterly a trenchant commentator on the ways of science. Now in his seventies, he has written this captivating memoir of his early life, to rid himself, perhaps, of the ghosts of a past that has seemingly continued to trouble him. For Stent is clearly a man corroded with guilt — the guilt of an “anti-Semitic Jew”, who tried, like so many of the fervently patriotic, assimilated German Jewish community, to hide his origins, to the extent indeed that he aspired to join the Hitler Youth; guilt, also, at the self-absorbed insouciance that pervaded his personal relationships.

Stent's recollections focus much more on his amorous than his scientific conquests. The young Stent was, by his own confession, a predatory Lothario, who repaid devotion with indifference. He has, it seems, preserved the letters, full of unrequited yearning, from the women with whom he shared his life while he was a member of the Technical Industrial Intelligence Branch; this was a rather futile body set up by the US Department of Commerce to monitor the state of German science and technology in the immediate aftermath of the Second World War. Stent's paramilitary standing allowed him to make a poignant visit to the

New in paperback

The Raptor and the Lamb: Predators and Prey in the Living World

by Christopher McGowan
Penguin, £8.99

“Christopher McGowan clearly loves animals and their adaptations, and this is a thoroughly enjoyable popular account, written for the reader who likes something meatier than a TV wildlife spectacular ... McGowan is at his best with the sheer physicality of hunting: the magnificence of top predators such as falcons, lions, cheetahs and hunting dogs, or the effects of viscosity on motion at the scale of the plankton. In its objectivity and refusal to be emotional, the text becomes very moving — for example, in the account of ‘suicide’ by an African buffalo cornered by five lions.” John R. G. Turner, *Nature* 396, 130–131 (1998)

Cosmology and Controversy: The Historical Development of Two Theories of the Universe

by Helge Kragh
Princeton University Press, \$19.95, £11.95

“The book recounts in often riveting detail how scientific interest in the theory of cosmology was awakened by Einstein nearly 80 years ago and how almost simultaneously the observation of the redshifts of distant galaxies by Slipher ushered in much wider involvement in the subject.” Hermann Bondi, *Nature* 384, 323–324 (1996)

Figments of Reality: The Evolution of the Curious Mind

by Ian Stewart and Jack Cohen
Cambridge University Press, £9.95

“Figments will not appeal to everyone. It will hold few charms for everyone homozygous for the *humourless* mutagene, or without much imagination. But science without humour and imagination seems rather pointless — just like books without pictures or conversation were to

scenes of his childhood. It led also to his encounter with, by his own remorse-laden account, a warm, loyal and selfless young woman, whom, having made pregnant, he deserted.

Stent intersperses his narrative with flashbacks to episodes in his childhood — the suicide of his mother, his early exposure to anti-Semitic malice and his adventures in a militaristic Jewish youth organization of fascist leanings, disbanded by the Gestapo (which favoured instead the Zionist groups that promised to rid the Fatherland of its Jews). When schooling for Jewish children in German schools was proscribed, his father found a place for Stent in a Jewish boarding-school, which offered a liberal education with instruction in languages, in anticipation of an imminent dispersal of the children to France, England, the United States and Palestine. Nearly all escaped, enough of them

Alice. We need imagination to frame hypotheses, to wonder what is around the next corner, to ask “What if ...?”. And anyone without a sense of humour should be a merchant banker, not a scientist — the pay is better, for a start.” Henry Gee, *Nature* 389, 452–453 (1997)

The Heavens on Fire: The Great Leonid Meteor Storms

by Mark Littmann
Cambridge University Press, £15.95, \$19.95

“Littmann tells his story with real flair, and expansively enough to teach a great deal of meteor, comet and meteorite astronomy in the process. There is considerable technical detail, mostly in side-bars, so the book is altogether satisfying both as a quick, informative read and also as a reference source.” Owen Gingerich, *Nature* 397, 33 (1999)

Nature Wars: People vs. Pests

by Mark L. Winston
Harvard University Press, \$15.95, £9.95

“In an articulate and accessible writing style, Winston explains the pesticide dilemma, the threat that our reliance on synthetic pesticides poses to both human health and safety and to the preservation of what is left of the natural environment ... Winston's discussion of these controversial issues ... will be helpful to anyone who hopes to develop an informed opinion about our continuing war with nature.” Lawrence M. Hanks, *Nature* 390, 573 (1997)

The Search for the Giant Squid

by Richard Ellis
Penguin, \$14.95

“A gold-mine of fact and fantasy, for we scientists who work on cephalopods and for all of us who love monsters.” Martin Wells, *Nature* 396, 641–642 (1998)

to America for a grand postwar reunion in New York with several of their teachers. Stent's father, brother and sister got away to England, leaving Stent himself and his new stepmother to join them after a hazardous last-minute exit by way of Holland. He did not linger long in London, but went on to Chicago, where his beloved sister and her husband were already settled.

The war and his tour of paramilitary duty in Germany over, Stent returned to the United States to complete his PhD in physical chemistry. But his studies gave him little satisfaction and he soon began to look for a more fulfilling career. He found what he was after in the austere but magnetic personality of another German emigré, Max Delbrück, the Pope of the new genetics. Delbrück at first rebuffed Stent's overtures, but relented when his young admirer reappeared with the highly coveted Merck fellowship in his pocket.

Stent paints a nostalgic picture of science and comradeship in Delbrück's research group in the postwar years, and at the Cold Spring Harbor Laboratory, where the geneticists met each summer and where Stent embarked on yet another ill-starred romance.

He does not dwell much on his work in phage genetics, which was then at the forefront of genetic research. He became a prominent figure in the field, although in the words of one of his friends, "Gunther is almost always wrong, but he is always interesting" (as he was in his widely read book, *The Coming of the Golden Age*, in which he asserted that molecular biology had passed its zenith and was now entering a state of stasis and tranquil satiety). In this, as in much else, he was a true follower of his adored patron Delbrück, who seems to have been repeatedly wrong in his scientific judgements, but whose rigorous and ascetic scepticism exerted an influence on genetics that led him eventually to a Nobel prize (which he shared with Salvador Luria and, according to Stent, accepted only after a struggle with his conscience).

Stent owns that he was never driven by any lofty urge to lay bare the secrets of nature. He enjoyed science for what Robert Oppenheimer called "the life it brings" — for the companionship and the give-and-take of debate that can be such a felicitous part of daily life in the laboratory. Were he alone on a desert island, he tells us, he would not bother with research. He is an astute observer of human foibles, and his concluding chapters are rich in anecdotes and vignettes of the great, the merely famous and the infamous; and over all hovers the brooding shade of Saint Max.

The most remarkable feature of Stent's book, aside from an engaging style, a pleasant wit, an amiable line in self-deprecation and an acute sense of history, is his extraordinary candour about his love affairs, his moral failures and the prosaic motives behind his science. Why has he so bared his soul to public view? I can only surmise that this is his way of exorcizing demons that have gnawed at his conscience since the days of his profligate youth. Stent introduces himself as a widower in his seventies and he draws a veil over his life after 1950, when his narrative ends. One must hope that he eventually found in his family life the serenity of mind that had for so long eluded him. ■

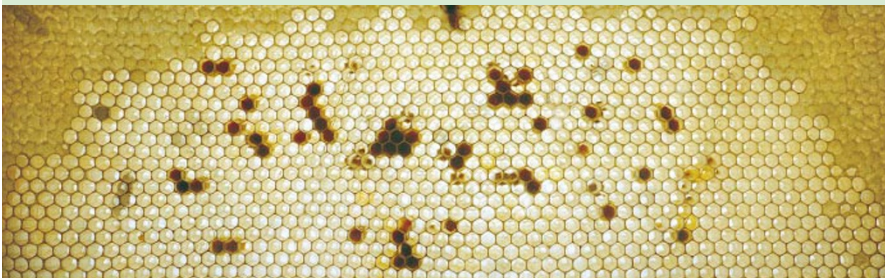
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Other memoirs

The Angry Genie: One Man's Walk through the Nuclear Age

by Karl Z. Morgan and Ken M. Peterson
University of Oklahoma Press, \$24.95

Science in culture



Animal arts

Martin Kemp

As soon as ancient philosophers attempted to differentiate human from animal intelligence, a few celebrated cases of 'animal geometers' attracted avid attention. The webs of spiders, the honeycombs of bees and the spiral shells of molluscs are the classic examples, to stand alongside the six-cornered snowflake and phyllotaxis. They testified to what Johannes Kepler called "Nature's formative virtue", the "*facultas formatrix*", through which God insinuated "world-building figures" into matter.

The building bee is eulogized in Kepler's *The Six-Cornered Snowflake* (1611): "the architecture is such that any cell shares not only six walls with the six cells in the same row, but also three plane surfaces on the base with three other cells from the contrary row". He compares this symmetrical packing to the seeds in a pomegranate, and attributes it to the same necessity as operates when pellets are systematically compressed in a round vessel.

The outline of the basic solution to the geometry of the walls was proposed by the fourth-century Greek mathematician Pappus of Alexandria. The preface to Book V of his *Collection* is devoted to "the Sagacity of Bees", to introduce "a problem of wider extent, namely that, in all equilateral and equiangular plane figures having an equal perimeter, that which has the greater number of angles is always greater". While bees are not accorded the reason needed to formulate such a general case, God has "granted that each of them should, by virtue of a certain natural instinct, obtain just so much as is needful to support life". Thus the bees "would necessarily think that the figures must be ... contiguous with each other ... in order that no foreign matter could enter ... and defile the purity of their produce".

Pappus knew that only three rectilinear, equiangular figures would fill the space: the triangle, the square and the hexagon. For their part, the bees, "by reason of their instinctive wisdom chose ... the figure which has the most angles because they conceived it would contain more honey".

But despite sustained attention from Kepler's successors, the full proof of why the hexagon delivers the maximum area for the minimum perimeter, compared to all other possible combinations of packed figures, remained elusive. The bees seemed to know more about the

isoperimetric problem than did mathematicians, including Sir Christopher Wren. The conundrum still warranted a substantial historical review by D'Arcy Wentworth Thompson in *On Growth and Form* in 1917 (Cambridge Univ. Press, 1992). Most recently, a proof of mighty dimensions, occupying 19 pages on the web, has been offered by Thomas Hales of the University of Michigan, an expert in geometrical packing (see www.math.lsa.umich.edu/~hales).

The effort needed to emulate the humble bee, brings us back to the question of animal intelligence with even greater force. To express the problem in modern terms, are the architectural bees obeying a genetic predisposition, or is the regularity the outcome of the self-organizing principles of packing? The wonderfully precise assembly of the thin cell walls at 60°-angles from tiny pellets of wax, to minute tolerances of 0.002 mm, excludes self-organization as the immediate mechanism. However, geometrical packing, like that of bubbles in foam, is as much a 'cause' of the configuration as genetic predisposition.

We can now see how Kepler's "formative virtue" elided two distinct but complementary processes. One is the kind of physical self-organization he observed in snowflakes, while the other is the instinctual programme that permits the bees to carry out such symmetrical acts of waxy engineering within the physical parameters of their world. It seems to me that the relative weights accorded to either of the interlocked processes in each complex instance of animal and vegetable artistry need to be argued case-by-case, even if the roles of geometry and genes now seem to be susceptible to clear definition in the long-running case of the honeycomb.

It is hardly surprising that such wondrous masterpieces of design have inspired artists and architects, no less than mathematicians. For Susan Derges, whose work is illustrated here — and can be seen in the book *Susan Derges, Liquid Form* (Michael Hue-Williams, 1999) — the honeycomb not only embodies the principles of natural order, but also encodes patterns of thought as the bees weave the tapestry of their industrious motions across the geometrical network. ■

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