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**Nancy Wilmsen Thornhill** (ed.). 1993. *The Natural History of Inbreeding and Outbreeding: Theoretical and Empirical Perspectives*. The University of Chicago Press, Chicago and London. viii+575 p. Price US \$ 37.50 (Paper). (ISBN 0-226-79855-0).

Man's obsession with the question of who can and who cannot marry whom has been an ancient and abiding one. Taboos against incest are universal across virtually all human cultures (Wilson 1978). The laws of *Manu*, which have provided the basis of social mores and customs of Hindus for centuries, make some of the most surprisingly explicit recommendations in this regard. In particular, there is very specific advise on how many generations should elapse before the descendants of a single person can marry each other (Narasimhamurthy 1968). The high point of the distinguished anthropologist, Irawati Karve's study of kinship organization in India is her interpretation of the relatively greater prevalence of marriage among cousins and other close relatives in Southern India and the relative rarity of such a custom in Northern India as being based on their contrasting agricultural and pastoral economies respectively (Karve 1965). Of the 2753 relatively homogeneous

communities in India, identified by the Anthropological Survey of India, uncle-niece marriage is permitted in 20.2% of the communities but forbidden in the rest (Singh 1991).

What about animals and plants? At least among animals, the traditional wisdom of biologists tells us that inbreeding is both bad and rare and that there is a plethora of mechanisms to prevent it. A somewhat more recent addition to this traditional wisdom is that "too much" outbreeding is also bad and that there is probably an optimal amount of inbreeding or outbreeding. Even plants that are hermaphroditic are often self-incompatible and hence avoid close inbreeding or selfing. The book under review clearly shows that unfortunately all of this traditional wisdom is far too naive to be of much use today. Some even more sophisticated viewpoints such as, that differential dispersal of one of the sexes in birds and mammals is meant to avoid inbreeding and that inbreeding promotes social behaviour, fall by the wayside, at least in the views of some of the authors in this book. *The Natural History of Inbreeding and Outbreeding* is an impressive collection of 18 chapters all written by one or more of today's leading geneticists and evolutionary biologists. The book does well to begin with a general introduction to the subject and to the book by N.M. Waser (and not by the editor, I was surprised to find out). This chapter is well worth reading twice, once in the beginning and once again after reading all the others, as I did. This seemed necessary to me not only because Waser does an excellent job in clarifying the jargon and the basic concepts but also because some of the other chapters came pretty close to undoing the precarious clarity that Waser had helped me generate in my mind!

All chapters in the section on *Theoretical Perspectives* are well written and not as difficult as I had feared; I strongly encourage even those biologists who generally take theoretical papers "as read" without reading them, to actually read them! I suspect that a very partial and rather unsatisfactory perspective might emerge by reading only the chapters in the next *Empirical Perspectives* section. J.B. Mitton takes us through a guided tour of the idea of heterozygote superiority and J.H. Werren provides a fascinating discussion of the special case of haplodiploidy and how inbreeding creates different amounts of genetic loads on females and males under haplodiploidy. M.K. Uyenoyama discusses her intriguing hypothesis that self-incompatibility systems, be they mating types in fungi or MHC induced maternal-fetal incompatibility in mammals, serve to help parents to invest differentially in better offspring, or to use her phrase, they serve as a *eugenic mechanism*. R.E. Michod discusses the relationship between inbreeding and social behaviour. His conclusion seems to be that inbreeding may promote social behaviour or may not do so, it may promote evolution of social behaviour through kin selection and also may be through group selection and perhaps social behaviour promotes inbreeding too... It's not his fault that life is so complicated but one would wish he had devoted more space to clarifying his conclusion, even if at the expense of stating, in such great detail, how these conclusions were arrived at. D.M. Waller and D.J. Howard provide fresh perspectives on evolution of mating systems and role of inbreeding in speciation respectively. W.M. Shields provides a good account of the causes and consequences of inbreeding and outbreeding preceded by a

somewhat unnecessarily long tirade against colleagues erring on the matter of discipline in using terms or those criticizing his own definitions.

In the section on *Empirical Perspectives*, there are individual chapters presenting data on angiosperms, marine invertebrates, lower vertebrates, spiders, birds, small and large mammals, lions and primates. Insects and humans are inexplicably missing - shocking isn't it? These chapters are enormously variable in how they combine review of literature, original data, and in their breadth of scope and perspective. My own favorite is the chapter on Spiders by Reiechert and Roeloffs which is a fine example of the utility of combining natural history, behaviour, molecular data and attempts at hypothesis testing. On the whole, the weakest part in our understanding of inbreeding and outbreeding is the ecological aspect. It is most instructive to recall Irawati Karve's interpretation on the one hand, of the link between pastoral economy (with the associated utility of external alliances) and outbreeding in North India and on the other hand, of the link between agricultural economy (with the associated utility of internal consolidation) and inbreeding in South India. Clearly, the final outcome will be a compromise between what is genetically good and what is ecologically wise, but in dealing with animals we have concentrated heavily on the genetic costs and benefits of inbreeding and outbreeding.

The book ends with a charmingly rambling chapter by W.D. Hamilton which may be read before, after or during (as I could not resist doing!) reading the other chapters or just by itself, if you have time only for one. I will not spill the beans and will let you read it all for yourself but I will whet your appetite by telling you that Hamilton illustrates his claim of an inverse relationship between body size and inbreeding "with some examples chosen from among my own earliest experiences of entomology" - it's hard to resist, let me tell you that he really means *earliest experiences* - indeed he begins with his life in the cradle!

I most certainly enjoyed reading this book and would whole heartedly recommend it to specialists in genetics and evolutionary biology but I am not so sure about recommending it to graduate students - there is not as much of a unifying and clarifying common thread as one would have liked. To put it more bluntly, not that much is gained by having put all these chapters under one cover - they read far too much like independent reviews. At the very least, I would say that the opportunity for providing a unifying theme provided by bringing all these chapters together has not been adequately exploited by the editor. I am not claiming for one moment that editors should prevent the expression of author-specific idiosyncrasies such as that of Waser presenting his own family pedigree and saying that "it approximates those expected in many plant populations" or of Hamilton telling us what his mother told him about the insects that visited him in his cradle and his giving us his hypothesis for why horned scarabs and female academics are not as keen to start breeding as Pharaoh's ant queens seem to be! These idiosyncrasies add charm to any book. But I do feel that the chapters could have been better cross-referenced and equally important, the authors should have been persuaded to write summaries that are longer and better standardized in their form and length.

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