shortcoming because it would have allowed to compare conditions under which potential conflicts become real conflicts (e.g. the conflict over sex ratio) and those where they don't (e.g. conflict over queen rearing) — a crucial criterion for the superorganism.

The final chapters are devoted to the Ponerine ants — a subfamily characterized by its staggering diversity and by its primitive social organization — and to the leafcutter ants, which exhibit the most elaborate division of labour seen in the social insects. Can the superorganism be found amongst them? The answer is most certainly 'no' for the Ponerine ants, in which competition between colony members is overt — workers of many species are still able to mate and compete for reproduction with the queen or other mated workers by forming dominance hierarchies. The constant conflict in Ponerine ants contrasts with the apparent harmony of leafcutter ant colonies in which all intra-colonial conflicts seem to be repressed: Hundreds of thousands of sterile workers are part of a size- and age-based caste system, with each caste following its own specific task. Leaves are collected to cultivate fungus gardens, which feed the colony. Enormous underground nests and tunnels are built and the waste is managed in an elaborate fashion. It seems as if leaf-cutter ant colonies come closest to what can be considered a superorganism — individual animals behaving as a single adaptive agent that acts to maximise its own fitness.

As these examples illustrate, the book provides a fascinating and detailed record of the natural history of the social insects, these superb organisms; — surely a treasure for any reader with even a remote interest in biology. But the theoretical concept of the superorganism and social evolution theory in general is mostly confusing and erroneous. At least as an evolutionary biologist with an interest in the evolution of eusociality, one is left wondering whether the authors would not have done better by shortening the title to 'The Beauty, Elegance and Strangeness of Insect Societies' and dispensing with the 'superorganism' altogether.

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Sea dive

The latest survey data on a once-common penguin species that inhabits remote southern islands and was one of the most characteristic residents of Tristan da Cunha now appears to be in dramatic decline.

Researchers have found that numbers of the northern rockhopper penguin (*Eudyptes moseleyi*) at Tristan da Cunha and Gough Island have been disappearing at the rate of 100 birds per day.

The islands, which are 370 kilometres apart, are the penguin's stronghold, with more than 80 per cent of their population found there. The northern rockhopper penguin was only recently considered a separate species from the more widely distributed southern rockhopper penguin, which also appears in decline.

Trevor Glass, a conservation officer on Tristan da Cunha, said that the northern rockhoppers were one of islands' most charismatic birds. "We are used to seeing them in good numbers on all the islands," he said. "These unexplained declines are really worrying and we'll do everything we can to understand what is going on."

Climate change and overfishing are two of the prime suspects, but the rate of decline has alarmed even the most pessimistic observers.

Richard Cuthbert of the UK's Royal Society for the Protection of Birds (RSPB), and an author of the latest report on the northern rockhopper's status, writes that it is one of four penguin species now considered endangered. "With more than half the world's penguins facing varying degrees of extinction, it is imperative that we establish the exact reason." Geoff Hilton, a conservation biologist, said: "We really don't understand the causes, but we suspect that a major change is taking place in the marine ecosystem."

Nigel Williams

On the rocks: Numbers of one rockhopper penguin species of the Southern Ocean appear to be in drastic decline. (Photo: Alamy.)