

(concurrent) computers to simulate inherent parallel structures such as the brain is dismissed in a mere five lines.

Furthermore, questions of the proper input and output routines crucial to any large-scale simulations of neuronal structures are not even raised. Anybody who has attempted to write a general simulation package for neuronal models has quickly come to realize that a high-level, symbolic language to define and specify channels, dendrites and neuronal types (for example, pyramidal versus stellate cells) is needed. In that manner, very complex neurons or neuronal populations can be constructed using simple elements. Sophisticated programs even use graphical icons (little synapses and cables, for instance) in conjunction with a pointing device such as a mouse to achieve this. The question of how the activity state of thousands of neuronal elements can best be evaluated and displayed must also be addressed (a problem which is shared by experimentalists using multi-electrode

arrays to record from an ever larger number of neurons). Such apparent 'frills' dramatically reduce the time spent writing, debugging and understanding large programs. But for the most part these problems are not easily dealt with in FORTRAN, which lacks such features as dynamic data structures and recursion.

As a methodological handbook, *Neural and Brain Modeling* is not a success. It could serve as a sort of *Who's Who* in modelling, although the references are scattered, by year of publication, in over 60 separate bibliographies spread throughout the book. But the novice modeller would do better to read J. Jack, D. Noble and R. Tsien's seminal *Electric Current Flow in Excitable Cells* (now in its second edition) together with a standard book on numerical techniques, and to start programming in C. □

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## Three down . . .

*C. M. Perrins*

**The Birds of Africa, Vol. III.** Edited by C. Hilary Fry, Stuart Keith and Emil K. Urban. *Academic:1988. Pp. 611. £71.50, \$129.*

*The Birds of Africa* continues to grow. When the first volume appeared, the plan was to cover all the species in four volumes; those who added up the birds dealt with in that volume and looked at the number left were puzzled as to how this was to be achieved. By Vol. II it was conceded that six volumes would be needed; now, in Vol. III, we read that seven will be necessary!

Apart from the fact that it will take longer to complete, and will cost more, there is everything to be gained from this increase in volumes. Knowledge about African birds has rapidly expanded since 1982, when the first volume appeared, and the amount of text space per species is not excessive — some 311 are covered in 556 pages, a little under two pages per species, and this includes a range map which takes up about one-sixth of a page.

This volume completes the non-passerines, an uncomfortable term describing all the birds that do not belong to the enormous Order Passeriformes, or songbirds. Better known to most people will be many of the groups covered: parrots, turacos, cuckoos, owls, nightjars, swifts, mousebirds, trogons, kingfishers, bee-eaters, rollers, hoopoes, woodhoopoes, barbets, honeyguides and woodpeckers. These birds differ from those described in Vols I and II in that many of them are not



*Red and yellow bar-bets, colourful in life and in Martin Woodcock's illustration in The Birds of Africa — spotted and blotched red, yellow, black and white, with diagnostic long reddish bill and red, white and black ear patch — here shown at about half the size of Woodcock's painting.*

migrants, and so never leave Africa. They will thus be familiar only to those who live or travel in the continent. Indeed several of the families are ones that are largely confined to the tropics.

Special mention must be made of the mousebirds (Coliiformes), an odd little order containing just six species; this is the only bird family wholly endemic to Africa and seems to have remained unchanged through the ages. Fossils from 22 million years ago are almost indistinguishable from their living descendants, and recent work using DNA-DNA hybridization indicates that they may have separated from other birds about 100 million years ago (*Archaeopteryx*, the first bird, only appeared about 150 million years ago).

After many years of comparative stability, major changes in bird classification are on their way as a result of new methods of establishing relationships, particularly

the DNA-DNA hybridization techniques pioneered by Sibley and Ahlquist. By no means all the proposed changes are yet accepted, so that it is difficult for editors of a work such as this to know how to respond. They have taken what is, to me, a sensible course, especially considering that they are now well into the series; they have mentioned the changes that have been proposed for the birds in this volume, but have retained the standard, old structure, warts and all. This may be more difficult in future volumes as the new ideas become better established (which many of them surely will).

The layout of this volume is similar to that of the previous ones, and the same subjects are covered: range and status (including migratory habits where relevant), description, field characters, voice, general habits, food and breeding habits. Inevitably, for some birds, especially difficult ones such as swifts and forest dwellers such as owls and turacos, little is known; in some cases no nest has ever been recorded. But what we do know is brought together most usefully in this volume.

As in Vols I and II all the plates have been painted by Martin Woodcock. To say that he improves with time might be taken as a criticism of the earlier paintings, but the colour plates in the current work are very pleasing indeed. It has been necessary to cover many species on each of the 32 plates, but the layout has been effectively constructed. For example, on one of the two plates of nightjars 16 birds are depicted in detail and another 19 shown, to a smaller scale, in flight. Yet I do not find the plate uncomfortably cramped. The publisher and printer also need some compliments for the colour reproduction; for example Plate 3 (of turacos) incorporates many shades of grey and most colours of the rainbow, but is well-balanced over the whole range of them. The names of the birds and cross-references to the relevant text pages are on the opposite pages to the plates. A nice touch which I do not remember having seen in other works is that all birds of the same species (different sexes or sometimes different subspecies) are pulled together by overlaying their names with a grey tint, thus usefully drawing one's eye to this fact. Mention must also be made of the many helpful line drawings in the text by Ian Willis.

So, *The Birds of Africa* continues on its stately publication schedule, on its way to becoming the standard work on African ornithology for the twenty-first century. The next volume is due in 1990, which means that at the current rate of progress ornithologists may have something special to celebrate in the year 1996. □

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