

long before the boy became an observer and student of birds, eventually taking over his father's work and publishing it in the present form.

The death of Svend Frisch in 1969 prevented the illustration of species such as humming birds and terns, which are not included in Vol. I. Volume II will deal with various aspects of ornithology, such as migration patterns, bird feeding habits, the adaptation of Brazilian birds to European agriculture, and their ecology. At this stage Johan Dalgas Frisch is the premier ornithologist and conservationist of Brazil.

The *Aves Brasileiras* begins with a preface by Amador Aguiar, President of the Association for the Preservation of Nature. This is followed by an identification guide based on the classic work of R. M. de Schauensee (1966). The vernacular nomenclature presented even greater difficulties. Some of these names are in Portuguese but many others derive from Tupi, an Indian language. A further part of the text is devoted to the distribution of the various bird species, showing where each species is found in Brazil proper or on the boundaries of the neighbouring countries. Another chapter is devoted to the characteristics of the various bird groups.

Very important is the arrangement of the beautiful bird illustrations in colour by Svend Frisch. We find the bird illustrations on one page and on the page opposite the scientific and vernacular names and also their general Brazilian distribution.

The final chapter of this handsome book is devoted to field ornithology: choosing binoculars and their use in the field, bird photography and recording bird songs. An index of Portuguese vernacular bird names makes finding a particular bird species and its illustration easy.

The *Addendum* in English is important as it allows the study of *Aves Brasileiras* to those who have no knowledge of the Portuguese language.

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The Phylogeny and Relationships of the Ratite Birds as Indicated by DNA-DNA Hybridization by Charles G. Sibley and Jon E. Ahlquist. In: *Evolution Today*, G. G. E. Scudder & J. L. Reveal (eds). Proceedings of the Second International Congress of Systematic and Evolutionary Biology, pp. 301-335. 1981.

This paper begins with a useful general introduction, which reviews the various ideas that have been held, over the last century or so, on the relationships of the ratites — beginning with Huxley (1867), who believed that the family was monophyletic in origin and then Furbringer (1886) who considered it to be diphyletic. The ensuing controversy, which began by using comparative morphology, especially of the palate, has continued to the present day, using such disciplines as behaviour, genetics and biochemistry on the way.

Sibley and Ahlquist in their paper use the technique of DNA-DNA hybridisation for their study. The rationale, technique and modes of analysis are fully and clearly explained, and the authors discuss the molecular evolution of DNA and calculate the rate at which it has occurred. They conclude that "the average rate of nucleotide substitution is the same in all lineages of birds." If this view is correct, DNA hybridisation values should be proportional to the absolute time that has elapsed since the various lineages have diverged.

The authors' experimental results are then tied in with the accepted history of Gondwanaland; and Cracraft's (1974) "character analysis of primitive derived sequences" of morphological characters (the cladistic approach) are compared with the results obtained from the hybridisation experiments.

Finally, Sibley and Ahlquist offer their classification of the ratites and tinamous. "The Neotropical tinamous (Tinamidae) are the nearest relatives to the ratites and the entire assemblage is a monophyletic taxon. . . . The results indicate that the tinamous branched first from the ancestral stem, probably in the Lower or Middle Cretaceous. In the late Cretaceous (about 80 million years ago), when the southern continents drifted apart, two branching events gave rise to three lineages, one leading to the modern ostriches, a second to the rheas and the third to the Australasian ratites. The latter subdivided in the Eocene when the New Zealand and Australo-Papuan forms became fully isolated."

The whole paper is very stimulating, but it remains to be seen what the relevant experts think of the required archipelagic connection between north-east Australia and north-west New Zealand, possibly via New Caledonia, which is supposed to have persisted into the Eocene with a density of islands such as to permit crossings by strong swimmers and weak fliers. Such a connection would leave unsolved the problem of the non-arrival of marsupials.

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