

New Species Syndrome in Indian Pteridology and the Ferns of Nepal. C. R. Frazer-Jenkins. International Book Distributors, Post Box No. 49/3 Rajpur Road, Dehra Dun 248 001, India. 1997. 362 pp. Price not stated.

The author begins his introduction with comments on the Ph D thesis of one S. S. Singh from Calcutta University¹ on ferns of Tirap, Arunachal Pradesh with particular reference to suggestions in a publication by Panigrahi² concerning a work by Singh and Panigrahi (in prep.). While admitting that Singh's work is generally of good quality he regrets that the thesis is far from being complete in its listing of species being based on the author's collections. Frazer-Jenkins appreciates Singh's criticism of some work which the author³ had done earlier but at the same time he is critical of Singh's 'new species'.

He justly deprecates lack of vetting of papers in Indian journals by proper and knowledgeable referees. In this connection, he particularly mentions Bir's *Indian Fern Journal*. He is likewise critical of the prevalent Indian tendencies to count the number of papers and not their quality and the addition of the supervisor's name among authors even where the credit of the work should go to a student. Frazer-Jenkins has undoubtedly sieved a lot of taxonomic contributions on Indian pteridophytes and workers on pteridophyte taxonomy, particularly in India, will be greatly benefitted by his book. The book also contains some noteworthy episodes which bring out the sad spectacle which classical disciplines like taxonomy face in this country.

The author has exposed some other skeletons from the cupboards of Indian scientists like those who published the work done by other scientists in their own names. Frazer-Jenkins is particularly critical of the poorly researched, erroneous 'new species in parts in Asia' but we find that his remarks on Indian pteridology do not always pertain to Indian pteridophytes but often deviate and aim at those Indians who deal with the subject since they indicate his continuing belief in the superiority of non-Indian, non-Asiatic white European pteridology. He complains about foreigners not being able to work on Indian

plants, especially due to restrictions by the BSI. He talks about 'lack of painstaking and authoritative Indian specialists in particular genera who know their genera throughout most of Asia and are of international repute' and yet he ventures remarks on Indian species of *Isoetes* by those who have done extensive work on plants of that genus growing in different parts of India.

However, this does not invalidate his remarks on the working of BSI and his criticisms seem valid even though they appear to be harsh and sweeping. At the same time we admire the reluctance of Frazer-Jenkins in appreciating the good early work done by Indian scientists. We would like to add that in the present context his remarks tend to be borne out of an inferiority complex.

As Indian scientists concerned mainly with the species of *Isoetes* L. among Indian pteridophytes, we read the comments of Frazer-Jenkins on the classification of Indian *Isoetes* with avid interest. His merger of all Indian species of the genus in *I. coromandelina* amounts to a total disregard of the megaspore characters in dry and wet conditions, etc. Characters of microspores are not considered at all. Indeed by his assertive inclusion of all Indian species in *I. coromandelina*, there is no place for considering other characters like the number of peripheral strands in leaves, the extent of lobing in the rhizomorph, velum, size of micro- and megasporangia and chromosome numbers or karyotypes of the diverse Indian forms. If we stretch his reasoning for merger of diverse Indian species of *Isoetes* a little further we would find it easy to include the South African, Australian and Japanese species in *I. coromandelina*.

It is well known that multicharacter classifications usually tend to be better than single character ones but he does not specify his reasons for merger. Concepts about species vary among different taxonomists but those who merge or split species or genera do so after they have developed a life-long expertise of a taxon or related taxa and the variations which are found therein. One has to remember that different species of a genus and different genera of a family, etc. have arisen during the course of evolution and they continue to arise as evolution proceeds. The species, genera,

families, etc. are not static entities but continue to change by the process of evolution. To begin with, the aberrants would arise in the same population (or 'mats' of Frazer-Jenkins). The genus *Isoetes* occurs all over the world and it goes as far back in geological time as the Cretaceous *Nathorstiana* Richter and perhaps earlier in allied forms called *Pleuromeia* Corda into the Triassic. According to some authors, the clade goes as far back as the Devonian⁴. Frazer-Jenkins can hardly claim any expertise on the genus *Isoetes* except for his views on the merger of different Indian species. He works in the Himalayan kingdom of Nepal, which lies in the Middle Himalayas and is thus a part of the Indian land mass from where no plants of *Isoetes* have been reported so far. At the same time his remarks on the identity of diverse Indian species of *Isoetes* with *I. coromandelina* almost invariably suffixed with a question mark indicate not only lack of confidence but also caution which he himself advocates. As against this, we⁵ and our colleagues (see bibliography in Srivastava⁶) have developed in his own words 'the necessary painstaking and authoritative background in a particular genus' which he has advocated but failed to recognize in our work which we began more than forty years ago and have continued it ever since.

In his 'Afterwards', the author has answered in fair detail five problematical questions raised by Panigrahi² pertaining to nomenclature and distribution besides discussing the question of delimitation of pteridophyte families. In addition, he has raised doubts about the number of Indian species mentioned by Panigrahi.

The major part of the book deals with the genera of Indian ferns and fern-allies and the book ends with 'Appendix-Notes on some ferns of Nepal'. At this point he has emphasized the importance of updating and preparing a comprehensive list of Nepalese pteridophytes with special emphasis on west and east Nepalese collections especially of 'missing SE Asian elements or the ferns recorded from Sikkim/Darjeeling'. This should provide a fuller picture of the hitherto little-known Nepalese ferns.

In the end we would like to add that the criticisms as found in this book are

BOOK REVIEWS

needed for all Indian pteridologists to improve their quality of work.

1. Singh, S. S., Ph D thesis, Calcutta University, 1992.
2. Panigrahi, G., *Indian Fern J.*, 1994, 11, 173-188.
3. Fraser-Jenkins, C. R., *Aspects Plant Sci.*, 1991, 13, 249-287.
4. Sewart, W. N. and Rothwell, G. W., *Palaeobotany and the Evolution of Plants*, Cambridge University Press, 1993.
5. Pant, D. D. and Srivastava, G. K., *Proc. Natl. Inst. Sci. India, Part B*, 1962, 28, 242-280.
6. Srivastava, G. K., *Indian Fern. J.*, 1998, 15 165-177.

D. D. PANT
G. K. SRIVASTAVA

Botany Department,
Allahabad University,
Allahabad 211 002, India

The Indian Subcontinent and Gondwana: A Palaeomagnetic and Rock Magnetic Perspective (Mem. 44). T. Radhakrishna and J. D. A. Piper (eds), Geological Society of India, P.B. No. 1922, Gavipuram P.O., Bangalore 560 019, India. 270 pp. Price: Rs 500/\$50.

Palaeomagnetic studies have had their waxing and waning periods over many decades more or less synchronizing with the ups and downs of the hypothesis of continental drift/plate tectonics. The geological postulations on the occurrence of a Meso-Neo-Proterozoic supercontinent Rodinia and its subsequent break-up into a number of cratons, some of which reassembled to form the Gondwana supercontinent, opened a new thrust to palaeomagnetic studies in the recent years. Models on the reconstructions of Rodinia and the timings and stages of its break-up differ. One model considers that the supercontinent Laurentia is at the core of Rodinia with other continental cratons surrounding it. Rodinia broke up at 720 Ma, passed through a hypothetical and geologically ephemeral Pannotia supercontinent stage at 550 Ma and finally gave the well-known Gondwana supercontinent at 510 Ma. Further, the Gondwana is divided into east Gondwana (comprising India, Australia and East Antarctica)

and west Gondwana (comprising South America, Africa and Arabia). The east and west Gondwanas were postulated to have joined along the Mozambique belt, which is still a topic of debate. So also, the possible location of Laurentia in such a setting is yet to be established. Interest in palaeomagnetic studies was revived in an attempt to unravel the patterns of assembly and break-up of supercontinents. Palaeomagnetic studies are also being taken up in recent years to identify microdynamics of cratonic blocks, analysing magnetic anisotropy of deformed terrain, magnetostratigraphy and environmental changes, which in turn can provide corroborative evidences to the geological postulations. The memoir under review is an attempt to provide the state-of-the-art of Indian palaeomagnetism and rock magnetism, and their contributions in understanding the geodynamics of the Indian Plate. T. Radhakrishna and J. D. A. Piper have successfully brought out this memoir sponsored by Geological Society of India.

The book is prefaced by Chris Klotwijk, who provides brief summaries of all the articles appearing in the memoir and their relevance to the main theme. His information on the status of palaeomagnetic work in India is authentic and he could narrate with ease the story of birth, growth and near extinction of palaeomagnetic research in India.

Out of the fifteen articles included in this memoir, ten are original in the sense that they present results of ongoing research of the respective authors, although preliminary in nature in most cases. The other five are review articles analysing and comparing available data sets and drawing inferences on the amalgamation of Gondwanaland. Three articles are focused on the timing of the Gondwana assembly and the earlier supercontinental configurations of Rodinia and Pannotia. It is projected that India and Australia merged with each other by 1200 Ma or between 1000 and 750 Ma, and that the east and west Gondwanas existed as a coherent entity until 550 Ma. Two papers report the results of palaeomagnetic investigations of rocks of Vindhyan Super Group and Gondwana Super Group, fixing the age at 1200 Ma in one article, and predicting in the other movement of India to

higher southerly latitudes by the mid Cretaceous, before it moved rapidly northwards during late Cretaceous. An exhaustive summary of the apparent polar wander of India during Cretaceous and the associated regional tectonic implications are provided by Gray D. Acton. He reports the rates of apparent polar wander and brings its abrupt decrease at 57 Ma, corresponding to collision of India with Eurasia. Two papers report the first ever results of palaeomagnetic studies from the Himalayan region. Three phases of collisional history are inferred in the Himalaya-Karakoram region. The Ramnagar Formation of the Upper Siwalik Subgroup in Kumaun Himalaya is correlated to the Upper Pinjor Formation, and the Garjiya Formation to the Boulder Conglomerate Formation.

The memoir also includes two papers reporting the magnetic anisotropic studies of rocks of the Aravalli mountain belt, while two other papers report preliminary investigations on the utility of magnetic techniques to identify environmental changes. One paper reports a lower geomagnetic field during the Cretaceous through palaeointensity measurements of a swarm of dolerite dykes. The opening paper reviews the anomalous pole positions from Bushveld Complex in South Africa.

The title of the book rises an expectation that the papers are focused on palaeomagnetic and rock magnetic studies in India that contributed to our knowledge on amalgamation and breaking up Gondwana and northward convergence of India towards Asia. Out of the 8 papers projecting this objective, the majority concentrate on Neoproterozoic palaeomagnetic records. India pioneered the palaeomagnetic research in the sixties and seventies, with the TIFR, CEG in Osmania University and NGRI vying with each other under the leadership of C. Radhakrishna Murthy, V. L. S. Bhimasankaram and R. K. Verma, respectively. Their work was not convincingly reviewed or referred. A wide gap in the coverage of Indian palaeomagnetic data is clearly visible in the memoir by omission of their work on the consideration that Deccan Trap palaeomagnetism was adequately reported in the recent literature. The editors claim that the topics of the articles are so wide and diverse that they defied