

THIRD INDIAN GEOPHYTOLOGICAL CONFERENCE

PRESIDENTIAL ADDRESS

A. R. RAO

Guru Charana, No. 2, XI Main Road, 3rd Block, East Jainagar, Bangalore

Ladies and Gentlemen,

I am told that it is obligatory for the President of the Palaeobotanical Society to formally address you on this occasion. It is therefore that I make bold to appear before you today and say a few words about Indian Palaeobotany.

As you are all aware, I have not been actively researching in this particular discipline of Palaeobotany for the last few years due to want of necessary facilities. So you will excuse me if I do not place before you in my address any profound research idea or discuss the merits of any interesting fossil find. Though practically out of this branch of Botany, my mind, however, has been hovering on the subject of Indian Palaeobotany all these years, provoking a number of thoughts. You will bear with me if I share some of these thoughts with you today.

We in India have been actively pressing the study of fossil plants and plant microfossils all these years and we may well congratulate ourselves for the considerable amount of work that has been turned out and some of which is quite important and interesting. But still, I feel that there is perhaps a lack of objectivity and direction in our work which has progressed more by spurts than by well considered design. Perhaps it has also been guided more by motives of early publication and the desire for creation of new genera, species, rather than by motives of thoroughness in investigation and accurate reporting. We have also left untouched, particularly in recent years, some of the important and grand problems of Indian Palaeobotany. Nearly fifty years ago Prof. Birbal Sahni on his return to India compared the Southern Fossil floras in a preliminary but very important and interesting paper, on the basis of facts known then. Since then we have no doubt studied various Gondwana fossils in the different countries involved, but have made no serious attempts to fully compare these floras as a whole—the floras of the various Gondwana components. I am sure such a comparison, if properly made, is bound to yield very interesting results—particularly in the light of recent geological and palaeobotanical advances. It may also lead to various new phytogeographical conclusions.

Then there is the very interesting problem of the Middle Gondwanas. It was Feistmantel, who in a sense is the father of Indian palaeobotany, conceived a three fold division of the Gondwanas into lower, upper and middle, on more or less geological grounds. It was Prof. B. Sahni who visualized the middle Gondwanas in a palaeobotanical sense. In the Parsora beds were found several years ago a meagre admixture of Palaeozoic elements like *Glossopteris* and early Mesozoic elements like *Thinnfeldia*, indicating perhaps a transition stage between the Palaeozoic and Mesozoic floras of India. After this interesting observation we have not advanced much in unravelling the middle Gondwana flora—a problem which was very dear to Prof. Sahni. We must devote our attention to this interesting problem, and determine the extent and depth of this transition flora.

Later on it was also found that *Thinnfeldia sahnii* on investigation of its cuticular features was really a *Dicroidium*. This would suggest that perhaps in India also, as in some other Gondwana components, the *Glossopteris* flora was succeeded by the *Dicroidium* flora, which was in turn succeeded by the *Thinnfeldia* flora. It is likely that this *Dicroidium* interlude was a very brief one in India, due to various causes. But whatever it may be, the problem has not been followed up since then. It merits a deep and extensive study. We have to determine the duration and extent of this *Dicroidium* flora of India in time and space.

Amongst the more important Palaeozoic plant fossils *Glossopteris* has been extensively and also intensively studied in the B. S. Institute of Palaeobotany in a very detailed manner with the grid system. I think it has considerably helped to clarify the limits and morphological features of the different members of this interesting *Glossopteris*-complex, and has served to dispel the confusion that prevailed before. I think similar intensive studies should be taken up with the equally interesting genus *Gangamopteris* and also other genera. It is gratifying to note that in recent years Precambrian Palaeobotany has also been studied with very good and promising results.

The Mesozoic flora of India has been studied from the time of Feistmantel himself, but mostly sporadically and not with any set plan. The Indian Mesozoic flora is particularly important because we have a wealth of petrifications of the Jurassic age in the Rajmahals, which no other country has. These two have to be studied according to a definite plan and not described merely for satisfying the demands of any doctoral thesis or paper. Even if this be so under the exigencies of the circumstances, it should not stop there but must be followed up in an intensive and exhaustive way. The palaeobotanical institute has attempted a revision and monographing of the various Rajmahal genera, groupwise. It is indeed a very laudable but time consuming effort, but is very necessary at the same time to clear up the back log of confusion and hurried identifications. I think the Rajmahal flora has to be worked out systematically and in detail even as our distinguished guest Prof. T. M. Harris has so thoroughly worked out the Jurassic Yorkshire flora of the United Kingdom. There is a feeling in some circles that we have already worked out this Rajmahal flora and nothing new will be found there. I personally do not subscribe to this view. It is unbelievable that we have exhausted the fossil treasures of the Rajmahals and that this was confined to just a few new genera and species. As one who has done a little work with these silicified blocks I know what a wealth of plant fragments each block of the Rajmahal cherts contain. One must have the patience to study them in detail and with varied techniques, to find out what exactly these fragments are and how exactly they can be put together. I am sure there must be several more interesting new genera of plants in this flora, but that can only be recognized after careful study of different blocks collected at selected localities. I hope this aspect of the work will be taken up soon. Then there is the fascinating group of the Pentoxyleae instituted by the founder of the Palaeobotanical Society thirty years ago for the reception of three organ genera that combine in their morphology and anatomy belonging to the Pteridosperms, Conifers, Bennettitales and Cycadales. Since then we have not added much to the understanding of this group or its affinities, although a few facts have periodically come to light. I do not believe we have come to the end of our knowledge of this group. A systematic and planned search for the Pentoxyleae in different areas of the Rajmahal and a careful and objective study of their anatomy will, I am sure, reveal a wealth of information of great importance. In fact I may be permitted to give an example. The Rajmahal blocks are littered with leaves that look like *Taeniopteris*

spatulata. I am certain they are a *complex* of fronds belonging to different groups. They have to be studied intensively for their cuticular characters, anatomy and search made for their organic connection to parent parts. Employing statistical methods if necessary, this complex has to be resolved into various natural genera. This would involve systematic collection from select localities, intensive observation and critical study. In fact it is the work for a team of workers.

There are a number of ferns in the fossil flora of the Rajmahals. Our knowledge of the anatomy and affinities of these ferns is rather meagre and vague. These fossil ferns will have to be studied carefully and compared with living ones for determining their systematic position. It would not be difficult if some of the pteridologists interested in palaeobotany concentrate their efforts on this problem.

Coming to the Tertiary flora our prize possession is, of course, the Deccan Intertrappean flora—rich, well preserved and extensive. This too has been investigated in parts and several very interesting types like *Azolla intertrappea*, *Rodeites dakshini* and numerous angiosperms including *Cyclanthodendron sahnii*, *Enigmocarpon parijai*, etc. have come to light. The angiosperms which dominate the flora are engaging the attention of several workers. Amongst the interesting groups which have been studied but not yet fully and satisfactorily are the Charophytes with a very large number of oogonia of different types being in evidence. But curiously enough so far no antheridia have been found. It is indeed intriguing to find that while other delicate plant tissues are preserved in these Deccan traps, Charophyte antheridia are not preserved. It may be that we have not searched carefully for them. It is also possible that our investigation technique has to be modified.

Another group of fossil plant remains found in abundance in the Deccan Intertrappean flora are the palms. A very large number of palm woods and some petioles and fruits have been described. The numerous 'Palmoxylons' may not necessarily represent definite distinct genera. They may represent different parts of just a few petrified palms variously preserved in the matrix. Prof. Sahnii's monograph on the Deccan Intertrappean palms illustrates their large number. In recent years several more palm remains have been added to this list. But what is now required is a careful and critical study of these petrified palm remains to resolve them into natural genera on the basis of various anatomical characters and comparison with the corresponding characters of the living palms. In one of his earlier papers Prof. Sahnii suggested that these palms found *in situ* in the Deccan trap probably mark the southern border of the Tethys sea. Attempts must be made to plot this border clearly and accurately with the help of these *in situ* fossil palms.

Other Tertiary vegetations studied in detail are from Assam, Rajasthan and South India. They have brought to light a number of interesting types, too numerous to be mentioned here. Amongst the lower groups of plants may perhaps be mentioned the fungal group Microthyriaceae which seem to have been in abundance in the Eocene period suggesting a warm humid climate at the time. But a critical study of the lower groups of plant-life in these fossiliferous beds has still to be made. In fact, in all these mixed floral studies the lower groups do not receive much attention unless they have some phylogenetic or stratigraphical significance.

The post-Tertiary plant fossils—particularly the microfossils like pollen and spores, have been studied extensively in connection with stratigraphical geology, biostratigraphy, coal and oil palynology and ethnobotany. They have yielded interesting results and have probably cleared up long standing age problems. I am not competent to comment upon them. But you will permit me to make one observation and that is this. What

strikes one when one surveys these fossil pollen and spores is their remarkably large number of genera and more so of species? This number is simply bewildering. It appears as though we are soon facing a population explosion in this field of botany. I think some kind of population control is indicated. May it not be better that our palynologists take note of this and see that genera and species are not differentiated on minor characters. They must impose an effective control on indiscriminate creation of genera and species.

Lastly I would like to draw your attention to a rather important matter. At present, quite a large number of persons in different callings are working on Indian Palaeobotany. We never come to know of the problems they are working on, unless we are favoured with a reprint of their published papers. I would strongly suggest a central abstracting journal issued by the Palaeobotanical Society. It might even be a cyclostyled bulletin like the old "Palaeobotany in India". A very brief abstract or summary of the work in hand by every worker would be very enlightening. If the publication of this bulletin is not possible at least some of the existing journals could throw open a few pages of their journal for this important purpose.

I am sorry I have taken up much of your valuable time. But I have done so hoping that what I have said so far will be pondered over by you—particularly the younger workers—at your leisure.

I thank you for listening to me patiently.