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ADVANCES IN PALAEOBOTANY AND ALLIED SCIENCES IN BRAZIL:

Contributions to the December 1977 *Meeting of Palaeobotanists and Palynologists** in São Paulo, Brazil, sponsored by the "Departamento de Paleontologia e Estratigrafia, Instituto de Geociências, Universidade de São Paulo"

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* Organizing Committee: O. Rösler (Chairman), T. Fairchild, M. E. C. Bernardes de Oliveira, M. R. de Lima and D. Mussa.

ADVANCES IN BRAZILIAN PALAEOBOTANY AND ALLIED SCIENCES – INTRODUCTION

OSCAR RÖSLER

(Departamento de Paleontologia e Estratigrafia)

Palaeobotany and Palynology in Brazil have shown considerable progress during the last few years. Some of the more recent results were presented at the 1977 Meeting of Palaeobotanists and Palynologists in São Paulo. Seventeen of the twenty-three papers presented at the Meeting are published in this volume. They deal with a wide range of topics from Precambriam microfossils to Neopalynology.

PRECAMBRIAN AND EOPALAEOZOIC MICROFOSSILS

Precambrian rocks crop out in about 50% of the South American continent and are widely exposed in Brazilian territory. Diverse stromatolitic structures have been reported at many localities in Precambrian limestones and dolostones in Brazil since F.F.M. ALMEIDA first reported them in 1944. More recently, some probable Precambrian microfossils also have been recorded. However, well-preserved, morphological diverse microfossils from indisputably Precambrian rocks (ca. between 1350 to 650 M.a. old) are reported for the first time in Brazil by FAIRCHILD & DARDENNE (this volume). These microfossils, including solitary, colonial and filamentous forms, occur in stromatolites near Unaí (16° 23' S; 46° 50' W) Minas Gerais State, and in silicified dolostones near São Gabriel (15° 12' S, 47° 34 W) Goiás State. With this study, a new line of research in Brazil is now established. We now can hopefully look forward to further Brazilian contributions to the early evolution of the algae as well as to the improvement of Precambrian biostratigraphic schemes.

Vestiges of probable microfossils are also reported for the first time from the La Tinta Formation from a locality near Olavarria (36° 55' S; 60° 20' S), Argentina, by FAIRCHILD (this volume). This formation has been considered as probably of Late Precambrian age (AMOS et alii, 1971). The filamentous microfossils, together with spheroidal and ellipsoidal forms, seem to be at least consistent with this age. According to FAIRCHILD (op. cit.), their size supports the hypothesis that the La Tinta Formation may be younger than the Paraopeba Formation (Brazil) dealt with in the above-mentioned paper by FAIRCHILD & DARDENNE.

Another contribution to our growing palaeobiologic understanding of pre-Silurian Brazilian sedimentary sequences that lack "conventional" fossils was presented by FAIRCHILD, BARBOUR & HARALYI (this volume). It describes spheroidal to flask-shaped microfossils of possible protozoan affinity that occur in carbonate clasts of the arkosic Urucum Formation, at Urucum. Very rare, filamentous, algal or bacterial microfossils with iron-oxide-replaced walls, from the overlying, jaspilitic Santa Cruz Formation are also described. This interesting study suggests a relatively young age for the banded iron-formation of the Santa Cruz Formation and furnishes additional data for the discussion of the stratigraphic position and provenance of the Jacadigo Group.

MIDDLE PALAEOZOIC MICROFOSSILS

The genus *Maranhites* (Acritarcha) was proposed by BRITO in 1965. Since then, its importance as an Upper Devonian index fossil has grown. It has been shown to occur in all Brazilian Palaeozoic basins, as well as outside Brazil, for exemple, in Southern Ghana and in the Algerian Sahara. BRITO (this volume) furnishes the descriptions of all species now included in this genus and points out its stratigraphic importance for Devonian marine sediments.

LOWER GONDWANA FLORA

From an informal "gondwanocentric" point of view, it is possible to recognize two large Permian palaeofloristic units in Brazil: Gondwanic Floras (restricted to the Paraná Basin) and Extragondwanic Floras (mainly in the large Parnaíba and Amazon sedimentary Basins). The Permian strata of the Paraná Basin are richly fossiliferous. Soon after first reports on their fossil plants, (RENAULT, 1890; ZEILLER, 1895a, 1895b; and WHITE, 1908), the importance of this flora was recognized. Since then, a great number of papers have been published on it. During the 1977 Meeting of Palaeobotanists and Palynologists in São Paulo, no less than twelve contributions dealing with this flora were presented, nine of which are published in this volume.

A general view of the sucession of fossil plant assemblages in Brazilian Lower Gondwana is given by RÖSLER (this volume).

Glossopteris is the most characteristic and morphologically diverse genus of lower Gondwanic floras. The phylogenetic relationships among the forms of glossopteridophytes are not yet well understood. Nevertheless, some peculiarities of the distribution of species throughout the stratigraphic sequences in several Gondwanic basins are apparent and have been pointed out by some authors. BERNARDES-DE-OLIVEIRA here proposes an evolutionary sequences of forms for glossopteridophytes based on the morphographic characters of their leaves.

The gondwanic wood genera have some peculiar anatomical details in their primary vascular wood body. According to MUSSA (this volume), the ontogenetic laws of CHAUVEAU could provide the best key to understanding such details and the evolutionary stage of many genera.

The Itararé Subgroup (Tubarão Group Paraná Basin) shows complex lithologies and includes tillites as well as other evidence of the Late Palaeozoic glaciation. Plant megafossils are known only from a few localities. Thus, the description (BERNARDES-DE-OLIVEIRA et alii, this volume) of a small collection of fossil plants from a new ocurrence in the basal part of the Itararé Subgroup, near Salto (23° 12' S; 47° 17' W) São Paulo State, holds special interest. This collection represents the lowest described occurrence of Late Palaeozoic plants in the northern part of the Paraná Basin and could be considered as part of Taphoflora A, probably related to the pre-*Glossopteris* Flora.

Cuticular studies of several taxa ocurring in the Permian Rio Bonito Formation (Tubarão Group; post-glacial sequence) are now in progress. FITTIPALDI & RÖSLER (this volume) present here the first results of the cuticular study of *Paranocladus? fallax* FLORIN, a conifer very common in Taphoflora B.

Overlying the Tubarão Group is the Irati Formation (Passa Dois Group) which is specially well known for its fossil reptiles *Mesosaurus* and *Stereosternum*. However it is also rich in fossil wood. Based on the study of wood samples collected near Piracicaba (22° 45' S, 47° 30' W) from this formation, MUSSA here describes two new genera, *Brasilestiloxylon* e *Solenobrasioxylon*.

Also from the Irati Formation, MUSSA et alii (this volume) report the occurrence of a pith cast resembling *Artisia* for the first time in Brazil. These authors suggest that this fossil may be related to the genus *Solenoxylon* KRÄUSEL, which was first registred in southwestern Africa but which is also known in the Permian of Brazil.

The Rio do Rasto Formation is the uppermost unit of the Passa Dois Group. It contains the youngest known *Glossopteris* assemblages in South America, all of them

discovered very recently. ROSLER (this volume) gives an account of these ocurrences.

Lycopsids were also important elements in the Late Palaezoic flora of Brazil. The full description of the varied forms is in progress, but their comparison with Northern Hemisphere lycopsids is still difficult. According to Dr. B. BOHLIN who examined our collections at the University of São Paulo, some forms of Brazilian lycopsids have the same peculiarities observed by him in Canadian samples. Bohlin's observation, at least concerning his Canadian material, is that lycopsidean characters are only generally apparent and are not confirmed under closer examination. BOHLIN'S paper, read at the Meeting of Paleobotanists and Palynologists in São Paulo, is here included.

CRETACEOUS PALYNOLOGY

Many Mesozoic strata in Brazil are richly fossiliferous. In spite of their importance, published palynological studies are still scarce. Among them the most important ones are based on material collected by PETROBRÁS and related mainly to Upper Jurassic and Cretaceous sequences.

Two new contributions to Cretaceous palynology by M. R. LIMA are presented in this volume. The first deals with the palynological content and depositional environment of a bituminous shale of probable Neocomian age outcroping near Crato (7° 10' S; 39° 35' W), Ceará State. In the second paper, M. R. LIMA summarizes the major features of the palynological assemblages of Albian sediments of Brazil based on available literature and presents some suggestions for defining the Albian in Brazil. This is particularly important because the palynological characterization of the limits of this stage has been difficult due to the occurrence of many long-ranging species.

NEOPALYNOLOGY

The study of pollen grains of the recent Brazilian flora is receiving remarkable treatment by T. S. MELHEM and collaborators. Two of their more recent contributions were presented at the Meeting of Palaeobotanists and Palynologists and are published in this volume. The first is a preliminary note that deals with the palynotaxonomy of *Guettarda*, a genus of Rubiaceae represented by 25 species in Brazil, 13 of which have already been studied palynologically. According to MELHEM (this volume) the recognition of the species of this genus is possible by analysis of morphological characters of the pollen grains. The second paper (MELHEM & MAKINO) describes pollen grains of 8 allergenic species, identified in a study of air-borne pollen grains in the City of São Paulo during twelve-month period.

FINAL COMMENTS

As previously mentioned, the papers published here represent contributions to a single meeting and thus give only a very limited idea of the amount and variety of the more recent contributions to Palaeobotany and Palynology in Brazil. Without a doubt, these fields of science have shown considerable progress in recent years not only in Brazil, but in several other Latin American countries as well. One important aspect of this progress, clearly evident in the São Paulo meeting, is the effort to eliminate the artificial barriers between closely allied disciplines.

It is hoped that this volume will prove to be useful to readers interested in Brazilian Palaeobotany and that this first effort will stimulate the organization of further similar meetings.

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