



Commission Internationale de
Microflore du Paleozoique

NEWSLETTER 37

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UTRECHT SYMPOSIUM EDITION

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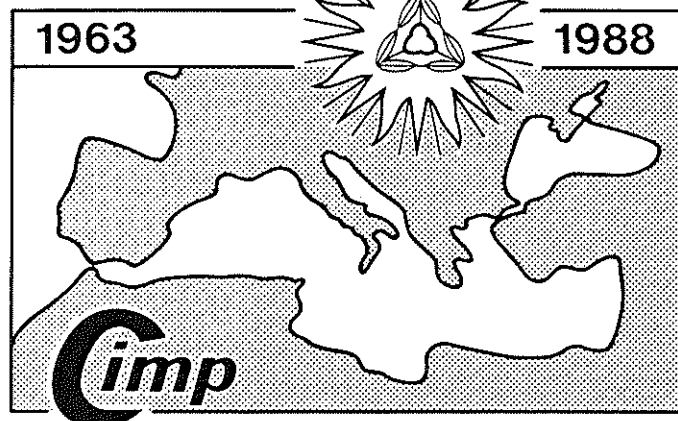
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1 Introduction

This edition of the Newsletter gives at least some of the details of the recent Symposium on Circum-Mediterranean Palynology held in April in Utrecht. Because of space limitations we have had to concentrate on the pre Jurassic part of the programme. The remaining data will probably be included in the next issue. More than 125 participants from 25 countries attended the Symposium which was held at the Dutch National Football Centre at Zeist near Utrecht. A full three day programme of technical sessions and social events was organised and our sincere thanks are extended to Henk Visscher and his team of assistants for a splendid organisational job.

This symposium was held as part of the Silver Jubilee celebrations of the Utrecht Laboratory of Palaeobotany & Palynology. It is 21 years since we held our last CIMP meeting in Utrecht as part of the 2nd International Palynological Conference in Utrecht. We were delighted to be joined at the Symposium Banquet by Professor and Mrs. Jonker who was head of the newly formed Laboratory at that time. The considerable progress that has been made in Utrecht during first the Jonker and later the Visscher eras is documented elsewhere in this issue. We extend our best wishes to the Laboratory and its staff and students in this their Silver Jubilee year.

INTERNATIONAL SYMPOSIUM ON CIRCUM-MEDITERRANEAN PALYNOLOGY



ZEIST, THE NETHERLANDS, APRIL 19-23, 1988

Pre Jurassic Abstracts

PALYNOSTRATIGRAPHY OF THE DOBROUDJA COAL

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Coalbearing sediments of the Carboniferous in the Dobroudja Basin, widespread in North-Eastern Bulgaria, were studied. Bore hole investigations were carried out. The material used was obtained from 40 bore holes, including different stratigraphic levels of the Carboniferous profile in the basin. The following concurrent range-zone types were identified:

- 1 *Rotaspora knoxi* - Tripartites: Upper Visean, Namurian A ages;
- 2 *Densosporites anulatus* - Reticulatisporites: Namurian C;
- 3 *Radiolzonates aligerens*: Westphalian A age
- 4 *Dictyotriletes bireticulatus*: lower part of Westphalian B age;
- 5 *Florinites junior*: upper part of Westphalian B age;

6 *Torispora securis*: Lower Westphalian C age;

7 *Cadiospora* - *Cadiospora magna*: Upper Westphalian C age;

8 *Thymospora thissenii*: Westphalian D age.

Depending on the vertical occurrence of the spores and pollen species, where ever possible the subzone division was applied. The biostratigraphical subdivision is provincial in essence and mirrors the succession of the fossil microflora from the Dobroudja Coal Basin.

PALEOBIOGEOGRAPHIE DES CHITINOZOAIRES ORDOVICIENS

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Les essais de corrélations stratigraphiques basées sur les microfaunes de chitinozoaires entre les régions péri-méditerranéennes et celles de la Baltique ou de l'Est de l'Amérique du Nord se sont toujours avérés difficiles. Bien que certains auteurs aient très tôt évoqué l'existence d'un provincialisme, les différences de composition des assemblages pouvaient également refléter une insuffisance de données sur des niveaux vraiment synchrones.

Les nouvelles études sur les chitinozoaires ordoviciens du Sahara et les récentes données sur les microfaunes de l'Est de l'Amérique du Nord, si elles ont permis de distinguer quelques taxons autorisant des corrélations à grandes distances, ont également révélé de nettes différences entre les assemblages des séquences péri-gondwaniennes et ceux de même âge provenant de régions situées sous les basses latitudes ordoviciennes. Globalement, on peut remarquer que durant l'Ordovicien inférieur et moyen les microfaunes des hautes latitudes sont caractérisées par des espèces de chitinozoaires de la famille des *Eremochitinae* Paris, 1981 (e.g. genres *Eremochitina*, *Velatichitina* et *Siphonochitina*). Ces genres sont inconnus en Baltoscandinavie, au Québec, au Spitzberg et en Australie. Les assemblages aréniens de ces régions sont constitués de chitinozoaires de grande taille et de forme simple appartenant aux genres *Conochitina* ou *Fustichitina*. Durant l'Ordovicien supérieur, une distinction encore très nette semble exister entre les assemblages nord-africains contenant des représentants des genres *Calpichitina*, *Armoricochitina* et *Jenkinochitina* et les microfaunes nord-américaines caractérisées par les différentes espèces du genre *Hercochitina*.

Ces différenciations bien qu'illustrées à partir d'un nombre restreint d'espèces n'en sont pas moins représentatives puisqu'elles concernent des taxons importants tant du point de vue quantitatif que qualitatif. Elles se superposent d'autre part très bien au provincialisme observé chez d'autres groupes de fossiles ordoviciens.

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The Index of Triassic Palynomorphs lists formally proposed palynomorph taxa at and below the generic rank (including new combinations) which have been originally described from Triassic or supposedly Triassic strata. It reflects the present state of knowledge of the Laboratory of Palaeobotany and Palynology, State University of Utrecht, The Netherlands.

The Index follows the approach advocated by Lentini and Williams (1985) in their "Fossil Dinoflagellates: Index to Genera and Species". However, in this first edition taxonomic decisions have not yet been made.

With regard to nomenclature it has been attempted to strictly follow the rules of the International Code of Botanical Nomenclature (1978 edition), even if this results in unsatisfactory decisions about invalidity, illegitimacy, synonymy or homonymy of taxa.

The Index project is based on collaboration between Norsk Hydro (Bergen, Norway) and the Laboratory of Palaeobotany and Palynology, State University of Utrecht, The Netherlands.

DEVONIAN MIOspore STRATIGRAPHY IN LIBYA AND SURROUNDING AREAS COMPARED WITH RELATED FAUNAL AND FLORAL DATA

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Recent miospore stratigraphic results from Cyrenaica (Streekl, Paris, Riegel & Vanguestaine, in press), Illizi (Boumendjel, Loboziak, Paris, Steemans & Streekl, in press) and Ghadamis (Loboziak & Streekl, in press) basins allow the authors to reevaluate the Devonian palynostratigraphy of Libya and surrounding areas by comparison with the Ardennes-Rhine reference biozonation (Streekl, Higgs, Loboziak, Riegel & Steemans, 1987).

In the Cyrenaica basin, the relative thickness of the Eifelian compared to the combined Givetian and Frasnian deposits is emphasized as well as the poor development of Famennian sediments. Active Famennian tectonic movements in the northern part of the basin are suggested.

In the Illizi basin, comparison of palynological data from Taourine and Tihert regions obviously demonstrates the importance of various sedimentological gaps within the Devonian time.

In the Ghadamis basin, the Eifelian Stage is represented by a much thicker sequence of sediment than is the Givetian Stage. Other miospore data compared with the published faunal data challenge the time significance of the local lithostratigraphy. This has some importance when evaluating the age of the "arborescent lycopod flora" observed on the margins of the Ghadamis and Murzuk basins.

EARLY PALAEOZOIC ACRITARCH DATING IN THE BASEMENTS OF THE EASTERN PART OF THE ALPINE BELT (BULGARIA AND NORTH-EAST ITALY)

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Acritarchs were used to date previously unfossiliferous or poorly fossiliferous low-grade metamorphic rocks in two regions belonging to the Alpine Belt.

- 1) In Italy the study was confined to the Eastern Alps between Trento and Beluno, acritarchs being found only in a single exposure of metapelites in the Agordo area. The assemblage, whose age is in the range of Late Cambrian to Tremadoc (about 500 Ma), is the first fossil proof of the age of deposition in the Southern-Alpine basement of the Eastern Alps and of the widespread acid volcanics known as the "Rhyolitic Plateau" (Sassi et al., 1984; Kalvacheva et al., 1986). This is the second find of Cambrian fossils throughout the Alps where until several years ago the oldest known fossils (conodonts) were of Late Ordovician age. The assemblage consists of hundreds of small (5-15 µm) oomorph acritarchs known to be abundant in the Cambrian of the Russian Platform and found in the Cambro-Ordovician of other regions in Europe.
- 2) In Bulgaria the basement of the Alpine structures has been studied in selected outcrops throughout the country. Samples from the Western Balkan and Western Sredna Gora Mts. yielded positive results. The acritarchs found belong to the Early Ordovician (Arenig) - Early Silurian (Kalvacheva, 1978, 1982, 1986). The datings extend our knowledge about the Ordovician System on the Balkan Peninsula and date a number of important events during the Caledonian history of the Balkan-Carpathian Arc basement. There is evidence that the assemblages are related to those from Bohemia, South of France, Sardinia, the North-Africa Craton and other areas of the Mediterranean Palaeoplankton Province.

Discovering and examining acritarchs from the Alpine Belt metamorphic basement is a difficult task, acritarch datings are few, so that much remains to be done. Nevertheless, the present study furnishes data indicating that the Lower Palaeozoic acritarchs are a group which may be very useful for general biostratigraphical purposes. It permits dating of rocks affected by multiple orogeny as well as their correlation to marine deposits from different tectonic units on either side of the Alpine Belt.

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The borehole KH5/1 is located approximately 60 km north of Rutba City. It was drilled as a part of a hydrogeological investigation programme in the western Iraqi desert. The well penetrated 1600 m of sedimentary rocks in which two lithological units were recognized.

The Gaara Formation (0-726 m), which crops out in the Gaara depression, is composed of varicoloured to mainly reddish clastics (mostly sandstone). The other unit, the newly named Suffi Formation (726-1600 m) is conformably overlain by the Gaara Formation and is largely composed of alternations of sandstone, siltstone, marl, and shale with thin beds of dolomite or dolomitic limestone.

Core samples from the 750-1160 m interval of the borehole were studied palynologically. Miospore assemblages have been obtained from eight samples. Extremely varied and well preserved miospore assemblages were recovered from samples at depths 1157 m and 890 m. These assemblages are assigned to the *Vallatisporites vallatus* - *Retusotriletes incohatus* (VI) subzone of the *Verrucosiporites nitidus* - *Vallatisporites vallatus* (NV) miospore zone.

The samples at depths 838 m, 812 m, 772 m, and 754 m yielded varied and well preserved assemblages representative of *Spelaotriletes pretiosus* - *Raistrickia clavata* (PC) miospore zone which is considered to be equivalent to Tn2 - early Tn3 (Middle Tournaisian) age of these rocks.

Miospore assemblages of the subsurface Suffi Formation are compared closely with the miospores recovered from the Horton Group in Canada (Macquebard 1957, Playford 1964, and Verma 1969), the Caledon Low Borehole in England (Welsh and Owens 1983), the Kiltorcan Formation at Portlaoigh in Ireland (Keegan and Fenny 1978), and the Maesbury Formation in the eastern Mendips of England (Higgs and Clayton 1984). Australian Tournaisian microflora described by Playford (1971) in the Bonaparte Gulf Basin have in common with their Iraqi counterparts: *Verrucosiporites nitidus*, *Auroraspora macro*, and *Spinozonotriletes uncatius*.

Thirty-three determinable spore types have been described of which one represents a new species *Anapiculatisporites suffius* and one new combination.

MICROFLORA (ALGAE, SPORES AND POLLEN) FROM WADI ARABA (EASTERN DESERT, EGYPT)

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Marine microfloras have been detected from the fossiliferous beds intercalating W. Arabia section. These microfossils, which range in age from Late Carboniferous to Jurassic, comprise twenty-one species of spores and pollen, and nine species of fossil calcareous algae.

On the basis of these microfloral assemblages, marine Permian and Jurassic, not known before, have been recorded in Wadi Arabia.

Microfossil elements, particularly algae, suggest a shallow marine environment of deposition, ranging from inner to outer shelf areas.

PALYNOLOGIE COMPAREE DU PERMIEN NIGERIE ET CIRCUM- MEDITERRANEE

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Une microflore de caractères nettement permien a pu être mise en évidence dans la séquence supérieure de la formation du Tarat (région d'Arlit, Niger septentrional). Cette formation était considérée dans sa totalité comme Carbonifère. C'est donc sur la base d'études sédimentologiques (Elhamet 1983), paléobotaniques (Bourlon de Rouvre 1985) et palynologiques que cette séquence supérieure a pu être attribuée au Permien.

L'association, de conservation remarquable, est dominée par les grains de pollen bisaccates (84%), elle est très proche des microflore décrites par Balme (1970) dans le Permien moyen/supérieur du Salt Range au Pakistan.

La palynologie du Niger présente la particularité d'associer:

- des formes caractéristiques du Permien supérieur européen: *Lueckisporites virkkiae*, *Klausipollenites schaubergeri*, *Protophloxypinus microcorpus*, *Corisaccites alatus*,
- des éléments gondwaniens, plutôt rares: *Densipollenites* sp., *Parasaccites* sp.;
- des pollens qui, en Europe occidentale sont caractéristiques du Permien inférieur: *Potonisporites novicus*, *Vittatina ovata*, *Hamiapollenites*.

Il en ressort donc qu'alors que les associations floristiques connues dans des niveaux plus anciens de cette région (Carbonifère) sont franchement gondwaniennes, des influences euraméricaines se manifestent nettement au Permien. Ce changement est d'autant plus affirmé que la macroflore associée est dominée par des éléments euraméricains (*Callipteris conferta*, *Walchia* spp.) réputés permien inférieur en Europe.

On sait maintenant qu'au Trias, la région méditerranéenne renferme un mélange de flore septentrionale et méridionale (Visser 1981). La découverte de cette microflore au Niger et sa comparaison avec des associations permienues déjà décrites ou en cours d'étude: Lodève, Espagne de SW, Maroc, Algérie, Lybie, Pakistan, Brésil du Nord...montrent que des échanges ont existé entre les domaines gondwaniens et euraméricains dès le Permien inférieur.

Ces données nouvelles nous permettent de proposer une interprétation des processus de mise en place des flores post-carbonifères du domaine méditerranéen en relation avec les modifications paléogéographiques.

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L'accumulation des données sur les Chitinozoaires permet actuellement de mieux cerner les particularités de la distribution géographique de ces microfossiles exclusivement marins. Ainsi, pour des niveaux contemporains et par rapport à d'autres grands domaines paléogéographiques, une certaine unité des assemblages de Chitinozoaires nord-gondwaniens apparaît de plus en plus clairement. On notera toutefois que les marques de ce provincialisme, qui reste malgré tout relatif et fluctuant au cours des temps géologiques, sont localement obscurcies par d'autres facteurs, notamment la bathymétrie qui exerce un contrôle sur la fréquence relative de certains taxons. En dépit de ces restrictions, un premier essai de biozonation de l'ensemble des Chitinozoaires nord-gondwaniens peut être proposé. Il paraît applicable à un domaine de près de vingt millions de kilomètres carrés, entourant l'actuelle Méditerranée.

La zonation que nous proposons s'appuie sur l'analyse de plusieurs milliers d'échantillons prélevés par sondage ou dans des affleurements, notamment dans les stratotypes du Silurien supérieur et du Dévonien. Ce matériel reflète la grande diversité des faciès pris en compte, des dépôts terrigènes très littoraux aux carbonates pélagiques distaux. L'échantillonnage porte sur les formations ordoviciennes, siluriennes et dévoniennes du Nord de l'Afrique (Maroc, Algérie, Tunisie, Libye, Niger), du Moyen Orient (Arabie, Syrie, Turquie) et de l'Europe méridionale (Portugal, Espagne, France, Tchécoslovaquie, Autriche, Roumanie). Les données de la Floride sont également intégrées à cet ensemble dans la mesure où, durant le Paléozoïque, cette région faisait partie intégrante du Domaine nord-gondwanien.

Chaque biozone est définie par la zone d'extension où la zone de coexistence d'espèces index. Ces taxons sont sélectionnés pour leur abondance, leur grande répartition géographique et leur morphologie discriminante, facilitant leur identification. Malgré le soin apporté à l'échantillonnage (coupes continues, prélèvements denses, souvent banc par banc), les biozones ne sont pas toujours parfaitement jointives. Ceci implique que de nouvelles biozones viendront vraisemblablement s'intercaler dans la zonation que nous proposons, à la faveur de coupes plus adaptées ou d'études plus détaillées. En conséquence, nous avons préféré nommer les biozones par des espèces index plutôt que d'utiliser des chiffres, moins adaptés à des modifications ultérieures.

Actuellement cinquante biozones de Chitinozoaires sont retenues pour le Domaine nord-gondwanien, depuis l'apparition du groupe au Tremadoc jusqu'à son extinction au Famennien supérieur. Parmi ces biozones, certaines sont directement applicables à d'autres domaines paléogéographiques. Avec le progrès des recherches dans les régions actuellement peu étudiées, on peut donc espérer l'élaboration d'une zonation globale des Chitinozoaires.

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Miospore investigations of the Carboniferous deposits in the Abadla Basin, SW Oran, Algeria were carried out in the 1982-1983 years. They covered three regions of the basin: Sfala, Mennouna and Zekakat. 119 samples from 35 boreholes and from two field exposures were analysed. These are the samples from coal beds found in these boreholes and from the thoroughly sampled profile of the borehole Me 31s.

Palynological investigations covered: 1. analysis of miospore assemblages, 2. detailed miospore characteristics of the particular coal beds, 3. palynological identification and correlation of the coal beds in the boreholes and between the particular regions of the Abadla Basin, 4. floristic analysis of the coal forming complexes in the coal beds, 5. palynostratigraphical subdivision of Carboniferous deposits in the profile of the borehole Me 31s. The results of the palynostratigraphical investigations of Carboniferous deposits in the Abadla Basin were compared with other regions: Western and Eastern Europe and North America.

The miospore assemblage in the examined samples consisted of 261 species belonging to 73 genera. The age of the examined deposits was determined as Westphalian C and D or Stephanian. A Late Carboniferous microflora, apart from numerous long-living taxa, predominates in this assemblage. It can be proved by an abundance of *Monoletes* spores, among which the genera *Laevigatosporites*, *Punctatosporites* and *Latosporites* reach the maximum in the Upper Westphalian and Stephanian, and *Torispora*, *Thymospora*, *Spinisporites*, *Speciososporites* which appear in the Upper Westphalian.

Westphalian C/SL Miospore Zone of the West European Carboniferous is characterized by numerous taxa appearing in the Lower Carboniferous substages, which decline in these deposits. Simultaneously, *Vestispora fenestrata*, *Torispora* spp., quite numerous *Monoletes*, particularly *Punctatosporites*, and other taxa characteristic of the Upper Westphalian, appear in the deposits.

Miospore assemblages of Westphalian D/OT Miospore Zone are characterized by predominance of *Punctatosporites* in the *Monoletes* group, occurrence of numerous *Endosporites*, *Triquitrites* and *Torispora* and appearance of *Thymospora*, *Speciososporites*, *Cadiospora* and others.

The Stephanian /ST Miospore Zone, eventually with the highest part of the OT Spore Zone are distinguished by occurrence of *Angulisporites splendidus* and numerous *Cadiospora magna*.

The assemblage of the coal forming flora in the coal beds consists, in 50-80%, of arborescent *Lycopside/Lycospora*, *Crassispora*, *Endosporites* and *Sphenopsida* 5-10%. *Lycopside* predominate in the lower beds/lower part of the Upper Westphalian C, the numbers of *Filicinae* together with *Pteridospermopsida* distinctly increases, while *Lycopside* is in decrease. In the Westphalian D beds the proportions of these two groups become even. The tendency to increase the number of *Filicinae* and *Pteridospermopsida* can still be observed in Stephanian. *Sphenopsida* keep their important and equal value through the whole profile, however their contribution is not high.

MICROFOSSILS FROM THE HAMMAMAT GROUP (LATE PROTEROZOIC) OF THE EASTERN DESERT, EGYPT

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Microfossils are described from the Hammamat Group (Late Proterozoic) cropping out in Wadi Igla and Wadi Semna, Eastern Desert of Egypt. They include algal microflora comprising seven species related to the phylum Cyanophyta and one species of the phylum Pyrrophyta. Microphytolites (oncolites) of cyanobacterial growth and other unnamed forms of probably algal affinities have also been reported. Moreover, few specimens of Archaeocyathids have been identified from the siltstone of W. Semna.

The identified microfossil assemblages including the Archaeocyathids suggest an age ranging from the uppermost Proterozoic (Late Riphean-Early Vendian) to the Early Cambrian at least to Wadi Semna clastics related to the Hammamat Group.

The occurrence of marine fossil micro-organisms, together with the mineral chamosite within the Hammamat sequence, confirm the existence of marine intercalations in what was previously thought to be exclusively non-marine, which implies marine incursion or incursions in the non-marine Hammamat sediments.

PALYNOSTRATIGRAPHY OF THE LOWER PALAEOZOIC, CAMBRIAN TO SILURIAN, SEDIMENTS OF THE HASHEMITE KINGDOM OF JORDAN

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The thick Lower Palaeozoic sequences present in the petroleum exploration wells of the Hashemite Kingdom of Jordan have been examined for their palynological content. These sediments range in age from Cambrian to Late Silurian and are predominantly continental sandstones throughout the Cambrian. In the younger part of the sequence they consist mainly of marine shales and sandstones. Rich assemblages of acritarchs have been recorded throughout. These are associated with chitinozoa in the Silurian and Ordovician together with miospores in the upper part of the sequence (Silurian). A scheme of biozones is proposed, which is correlated with similar schemes established across North Africa and elsewhere. The data used originate from three main areas: Risha, Wadi Sirhan and the Northern Highlands.

THE REWORKED ORGANIC PALYNOFACIES AND ITS APPLICATION IN SEDIMENTOLOGY

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The distribution of reworked organic detritus was investigated in the Permo-Triassic sequence in the subsurface of Israel. Cyclic changes were recorded in the distribution of reworked organic detritus, ranging from 20 percent up to 20-30 percent. This cyclicity was recorded in each of the studied sections.

The cyclic changes in the distribution of the reworked organic matter correlate well with the three transgressive-regressive sedimentary cycles defined in the Permo-Triassic sequence in Israel. Highly reworked organic matter was found in the regressive evaporitic Mohilla Formation (Carnian) as well as in the regressive clastic Gevanim Formation (Anisian) and Zafir Formation (Scythian). Moreover, cyclic changes in the reworked organic matter correlate with the sedimentary cycles even in the northernmost part of the area, where sections are mainly calcareous and clastic sediments are rare.

Silurian and Devonian palynomorphs were found to be reworked into Triassic sediments. This indicates transportation of detritus from southern Jordan and Saudi Arabia - the nearest known Silurian and Devonian rock sequences. This corresponds with the southern and southeastern provenance of clastics as reconstructed from lithofacies maps. These findings utilize the reworked organic detritus in defining the provenance of detrital sediments and the reconstruction of transgressive-regressive events.

LATE PERMIAN MACRO- AND MICROFLORAS FROM THE BUTTERLOCH (ALDINO, NORTHERN ITALY)

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The sequence in the Butterloch near Aldino is one of the best exposures in the Upper Permian Val Gardena and Bellerophon Formations of the southern Alps.

Plant remains, concentrated in thin layers and lenses, occur in the Val Gardena Formation. The material is to be found as small, but excellently preserved cuticles. These have been studied from bulk macerations. Several natural plant taxa, including a number of conifer species and a representative of the family Peltaspermaeae, could be assembled on the basis of cuticular analysis. Of some species pollen grains have been found in situ.

Microfloras have been studied from the Val Gardena Formation and the overlying Bellerophon Formation.

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The age given to the Permo-Triassic sedimentary strata of South Tunisia, marked by shaly-clastic facies with poor fauna remains badly defined.

The Upper Permian of the South of Tunisia, the only known marine outcrop in Africa, is characterized at the base by carbonatic reef deposits which indicate a marine environment. Above these reefs the slightly carbonatic deposits become gradually clastic, indicating rather a continental environment. So during the Upper Permian Tunisia has registered a transgressive cycle at the base, becoming regressive at the top. Above the latest Permian sediments, the Triassic deposits take place.

The Triassic presents two types of facies, evaporite at the North, shaly-clastic evaporite sediments at the South part of the area.

This present study is mainly based on well data, two wells have been drilled in the area near outcrop (Fig. 1). Combining palynology and micropaleontological data, it has been possible to define the Permo-Triassic boundary, to propose a biostratigraphy model of the different units of the Triassic which seems to be satisfactory, and to reconstruct the environmental history. The main results of this study we have reached are as follows:

- a The Upper Permian without microfauna has been dated by the presence of characteristic microflora: *Lueckisporites virkkiae*.
- b An important disconformity (stratigraphic unconformity) has been shown at the Lower Scythian level. It interests the Lower Scythian and probably a part of Upper Permian level? This phenomenon seems to be general. It has been described in the Middle East (Altina et al, 1979), in Libya (Adloff et al, 1986) and has been refound for the first time in Tunisia.
- c The Upper Scythian is characterized by carbonatic sediments with marine fauna (*Meandrosira pusilla*) and the annelide *Spirorbis phlyctaena*. The palynoflora is represented by *Endosporites papillatus* and *Alisporites grauvogeli*.
- d The Anisian-Carnian is expressed by clastic deposits indicating the important continental apport which invades the area. Although the fauna is absent, the flora is represented by *Alisporites* and *Densosporites* groups which indicate lagoonal to sebkha environment.

From the North to the South the sedimentation varies laterally in lithology and thickness: in the North sediments are carbonatic, in the South they are clastic.

Palynological investigations of the Upper Westphalian and Stephanian deposits in the Abadia Basin were probably the first ones in Algeria and North Africa.

Lately Miospore investigations have covered the Westphalian C and D in the Tindouf Basin in Algeria.

M.C. Adloff & J. Doubinger

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Une étude palynologique détaillée a été effectuée en Libye occidentale (Tripolitaine) dans le but de préciser la datation des différentes unités lithostratigraphiques. L'analyse porte sur 295 échantillons provenant de 19 sondages pétroliers réalisés, en majeure partie, par la Compagnie française des Pétroles et prélevés dans les Unités El-Uotla, Bir-El-Jaja, Ouled-Chebbi, Ras-Hamia, Azizia, Bu-Sceba et Bir-El-Ghem. Dans ces unités, 8 associations palynologiques ont pu être définies et ont permis leur datation grâce à l'excellente conservation des palynomorphes.

Dans l'Unité El-Uotla, une association à prédominance de pollens bisaccates: *Lueckisporites virkkiae*, *Klausipollenites schaubergeri*, *Crucisaccites variolulatus*, *Corisaccites alutas...* est attribuée au Permien moyen.

Un pourcentage très élevé des spores du groupes des *Densosporites*, la présence d'*Endosporites papillatus* et *Kraeuselisporites apiculatus* et de très nombreux acritarches (*Veryhachium*, *Michrystidium*) caractérisent l'association de l'Unité Bir-El-Jaja d'âge Scythien supérieur.

Une association comprenant essentiellement des pollens saccates (*Hexasaccites muelleri*, *Voltziaceasporites heteromorpha*, *Triadispore stajini*, *T. falcata*, *Alisporites grauvogeli*) a été identifiée dans l'Unité Ouled-Chebbi et rapportée à l'Anisien s.l.

A la base de l'Unité Ras-Hamia, on observe un épisode à nombreux *Aratrisporites* et *Calamospora*. Cependant la microflore de l'Unité comprend essentiellement des pollens bisaccates: *Triadispore* spp., *Sulcatissporites institatus*, *Alisporites magnus*, *A. cacheutensis*... On note la présence sporadique d'*Ovalipollis pseudolatus*, *Staurosaccites quadrifidus* et des *Circumpolles*. Cette association est datée du Ladinien s.l.

Dans l'Unité Azizia, 2 associations ont pu être distinguées:

- celle de la base se définit par l'importance des *Circumpolles*: *Fraecirculina granifer* et *Camerosporites secatus*, c'est une microflore typique du Carnien inférieur;
- celle du sommet comprend de plus *Vallasporites ignacii*, *Classopollis classoides* et *Brodispore striata* ce qui justifie son attribution au Carnien supérieur.

Une association à spores abondantes, à nombreux *Circumpolles* (*Circulina granulatus*, *C. meyeriana*, *Classopollis classoides*, *Spiritisporites spirabilis*) et rares *Ovalipollis pseudolatus* a été inventoriée dans l'Unité Bu-Sceba et peut correspondre au Norien s.l.

Enfin dans l'Unité Bir-El-Ghem, une microflore encore moins diversifiée a été identifiée. Cette association a été attribuée au Lias inférieur à cause de la prédominance de *Classopollis classoides* et de la présence de spores caractéristiques: *Concavisporites torus*, *Torisporites major*, *T. minor*, *Trilitites microverrucosus* et *Ischyosporites mesofoveosolidus*.

H. Visscher & W.A. Brugman

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When applying the Alpine Triassic palynological record as a 'standard' for inter-regional palynostratigraphical correlation, one should realize that within the IUGS Subcommittee on Triassic Stratigraphy (STS) still exists considerable controversy with regard to (a) the ammonoid zones applied in defining chronostratigraphical units, (b) the relative value of zonation schemes based on a variety of fossil groups other than ammonoids, (c) the position of biostratigraphical and chronostratigraphical boundaries, (d) the recommended (sub)stage nomenclature, and (e) the status of some of the chronostratigraphical units.

Yet, also in the STS discussions, the impact of palynology in Triassic stratigraphy become fully appreciated. It is recognized that a palynostratigraphical approach frequently offers the only practical possibility for an inter-regional application of standard units of Triassic subdivision.

In the present paper, the main problems related to the establishment of a widely acceptable chronostratigraphical subdivision are outlined. On the basis of the still accumulating data from the Alpine Triassic in Europe, it is attempted to assess the possibilities and limitations of the Alpine Triassic palynological record in inter-regional chronostratigraphical correlation.

RELATIONSHIP OF CIRCUM-MEDITERRANEAN AND TETHYS HIMALAYAN PALYNOFLORA DURING PERMIAN AND TRIASSIC TIMES

Dr. Vijaya

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Palynological data from Tethys Himalayan sequences has opened a new area of analysis, whereby the question of Circum-Mediterranean influence on Tethyan deposits in the Himalayas has drawn attention with relation to plate-tectonics. If it is so, what is the degree of such a relationship? The present communication deals with this palynological quarry, after the analysis of well known palynofloral assemblages from Permian and Triassic sediments along the Circum-Mediterranean realm. Comparative study reveals very limited provinciality of Tethys Himalayan palynoflora with that Western and Northern areas of Circum Tethys, but maximum with Peninsular Gondwana influence.

Zhang Lujin

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The differentiation of Late Palaeozoic floras of the world is well-known to palaeobotanists and the four floral provinces (the Gondwana flora of the southern continent and the Euramerican flora, the Cathaysia flora and the Angara flora of the northern continent) are generally acceptable. Taking into account the palynological evidence, a certain relationship between the Late Palaeozoic floras of northern and southern continents may be assumed. The palynological assemblage from northern Xinjiang, China bears a considerable resemblance to those from Gondwanaland and southern Euramerica. A series of characteristic palynomorphs of Gondwanaland and Euramerica have been found in several localities of northern Xinjiang, such as *Crusisaccites*, *Virkkipollenites*, *Parasaccites*, *Endosporites*, *Hamilipollenites*, *Vittatina* etc. The writer is inclined to believe that during the Late Palaeozoic time, west China may have been an important place for linking the floras between Euramerica and Gondwanaland, and was adjacent to the southern continent.

CAMBRIAN AND ORDOVICIAN ACRITARCHS AND CHITINOZOA FROM THE CANTABRIAN MOUNTAINS, NW SPAIN, PRELIMINARY RESULTS

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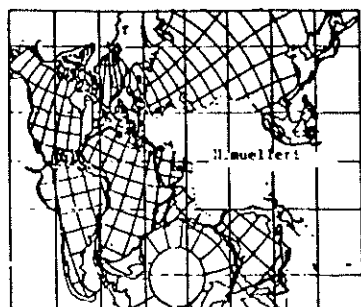
Cambrian-Ordovician rocks are investigated for their palynological content in the Cantabrian Mountains, NW Spain from three tecto-stratigraphic areas: Central Asturias, North León and East Asturias. Four associations are recognized. A diversified association characterized by well preserved specimens of *Cristallinium cambriense* and *Timofeevia lancarae* is found in the Oville Formation. It indicates a Middle Cambrian age not older than the *Paradoxides paradoxissimus*-*P. forchhammeri* trilobite zones. A single sample from the middle part of the Barrios Formation in the Barrios de Luna section, North León, yields poorly preserved specimens identified as *Timofeevia pentagonalis* and *Vulanisphaera turbata*. It indicates a Middle-Upper Cambrian, pre-Tremadocian, age. Sphaeromorphs are exclusively recorded in a third assemblage within the Barrios Formation in a very shallow (possibly brackish water) marine environment where *Skolithos* trace fossils are very abundant. Higher in the section typical Ordovician (post-Tremadocian) acritarchs and chitinozoa are observed in the Sueve (and lateral equivalents) Formation.

TETHYS: OCEANIC BARRIER OR DISPERSAL WAY FOR THE TRIASSIC PLANTS?

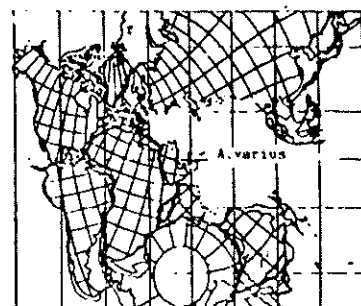
J. Taugourdeau Lantz

Université P. et M. Curie, Paris et U.A.319 du C.N.R.S., France

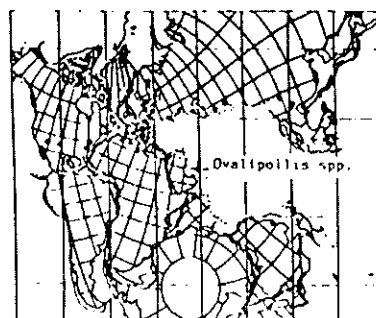
The distribution maps of *Hexasaccites muelleri* (Reinh. et Schmitz) Reinh. et Schmitz 1965, *Cristianisporites triangulatus* Antonescu 1970, *Triplexisporites playfordi* (de Jersey et Hamilton) Forster 1979, *Guthoerisporites cancellosus* Dettmann et Playford 1965, *Acanthotriletes varius* Nilsson 1958, *Triancoraeisporites ancorae* (Reinh.) E. Schulz 1962, *Triadispora* spp., *Ovalipollis* spp., *Chasmatosporites* sp., indicate the extent of a palaeofloristic province stretched along the northern shore of the Tethys, by middle and Upper Triassic times. Some northern tethyan elements like *Ovalipollis* seem to have been transported along the southern shore of the ocean. But the Tethys acted also as a barrier.



Distribution map of *H. muelleri*
Tethys acts as a barrier



Distribution map of *A. varius*
Tethys favours the extent of a
tropical palaeoflora along its
northern shore



Distribution map of *Ovalipollis* spp.
Tethys seems to be the dispersal way

MACROFLORE ET MICROFLORE DU PERMIEN INFÉRIEUR SOMMITAL DU BASSIN DU HAOUZ ORIENTAL (MAROC): MISE EN EVIDENCE DE L'INFLUENCE GONDWANIENNE PAR LA PALYNOLOGIE

9

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L'étude paléobotanique portant sur les macrorestes provenant du sondage OT7 (bassin du Haouz oriental) montre la présence de: *Odontopteris dufresnoyi*, *Lebachia piniformis* et de Calamitales, soit une association exclusivement euraméricaine et suggérant un âge Stéphano-Autunien (Beauchamp J., Doubinger J., Roy-Dias C., and Sagon J.P. 1987).

L'étude palynologique a apporté des données plus précises. Elle a été réalisée sur 15 échantillons prélevés dans les rares niveaux gris rencontrés dont 10 ont livré une microflore assez abondante et bien conservée.

L'association palynologique est composée d'éléments euraméricains dont les marqueurs sont: *Potonieisporites novicus* - *Hamapollenites tractiferinus* encore communs à assez abondants. Ils indiquent l'âge anté-Thuringien de cette flore. Par contre, l'apparition des premiers représentants de *Lueckisporites singhii* et *Gigantosporites hallstattensis* ainsi que le pourcentage élevé en bisaccates indiquent un âge post-Autunien. On note une grande similitude quantitative avec l'association LO2 à Lodève (Doubinger J., Odin B. et Conrad G., 1987) qui est attribuée au "Saxonien".

En outre, nous avons rencontré un ensemble original d'éléments gondwaniens d'âge Artinskien dont: *Korbapollenites novus*, *Misrapollenites barakarensis* associés à *Crucisaccites latisulcatus*, *Crucisaccites indicus*, *Diverisaccus strenger*, *Hoegiasaccites transitus* et *Primisporites* sp.

Ces éléments confirment l'attribution stratigraphique déjà proposée et permettent même de l'affiner. Si on prend comme référence les étages marins, cette association serait l'équivalent continental de l'étage Artinskien.

Cette association caractérisée par une prédominance des pollens par rapport aux spores témoigne aussi d'un paléoenvironnement sec.

The megafloreal study of the Eastern Haouz Basin, provides only euramerican species, suggesting a Stephano-Autunian age: *Odontopteris dufresnoyi*, *Lebachia piniformis* (Beauchamp J., Doubinger J., Roy-Dias C., and Sagon J.P. 1987). In the same strata, the occurrence of spores and pollen of post-Autunian age and euramerican origin (*Lueckisporites singhii*, *Gigantosporites hallstattensis* associated with gondwanian Artinskian species (*Korbapollenites novus*, *Misrapollenites barakarensis*) was observed.

The small percentage of spores indicates a dry paleoenvironment.

THE DEVELOPMENT OF PALAEOBOTANY AND PALYNOLOGY IN UTRECHT

Introduction

This CIMP meeting is organized on the occasion of the 25th anniversary of the Laboratory of Palaeobotany and Palynology. The official jubilee celebration will take place during the reception banquet on Wednesday 20th April.

In 1963 Prof. Dr. F.P. Jonker formally founded the Laboratory of Palaeobotany and Palynology as a research institute and training centre. However, palaeobotany was introduced in Utrecht long before. The present contribution includes a summary of a historical review written by Prof. Jonker for an earlier edition of STUIFMAIL (Vol. 2, No 1).

The early history of palaeobotany and palynology in Utrecht



Prof. F.A.W. Miquel

Palaeobotany was introduced in Utrecht by the famous botanist F.A.W. Miquel (1811-1871), who became interested in fossil plants by the work of H.R. Göppert. The earliest specimens of the Utrecht palaeobotanical collection are some Permian plant remains from Ottendorf and Braunau (now Otovice and Broumov, CSSR). In 1853 Miquel published a paper on some angiospermous plants from the Upper Cretaceous of South Limburg. Miquel only left us this single publication, the type material of the Late Cretaceous angiosperm leaves and some self-made drawings used for lecturing in palaeobotany.

Although Miquel's successors Went and Pulle gave lectures in palaeobotany and palynology, no practical work was carried out for more than seventy years. The second palaeobotanical publication appeared exactly 75 years after Miquel's paper. It was the dissertation of R.G. Koopmans on the Carboniferous Finefrau-Nebenbank

coal ball flora. Koopmans worked in Heerlen under the supervision of Prof. Jongmans, but he defended his thesis on the Utrecht university.

In 1928 Prof. Dr. A.A. Pulle invited F. Florschütz (1887-1965) to introduce the pollen analysis in Utrecht. Florschütz was originally a lawyer. He was part-time employed as secretary at the agricultural university of Wageningen and he was a teacher in economy. Later on he studied biology and he became interested in pollen analysis by the work of Von Post and Erdtman. During his biology study he worked with Flörbas. Florschütz still had his jobs as secretary and teacher, but he also had a private laboratory at home in Velp and every Friday he gave his lectures in Utrecht. Later in his career Florschütz became appointed as a professor in the palaeobotany and palynology of the Cenozoic at the university of Leiden. Van der Hammen and Zagwijn are some of his students.

The foundation of the Laboratory of Palaeobotany and Palynology

After Florschütz left Utrecht, Jonker was his successor as lecturer in historical plant geography. The restriction to historical plant geography was made, because there were no relevant palaeobotanical collections in Utrecht. In 1960 he was appointed as professor in palaeobotany and palynology. At the age of 50 he had to establish a palaeobotanical and palynological research and training centre.



Prof. Dr. F.P. Jonker

Two visits to foreign institutes have strongly influenced Prof. Jonker's concept of the Laboratory of Palaeobotany and Palynology. In Krakow (Poland) and in Lucknow (India) he saw laboratories where the various aspects of palaeobotany and palynology were united. From then on he gave all his efforts in order to establish an all-round palaeobotanical and palynological institute in Utrecht. Staff-members were appointed and pollen morphology, Prequaternary and Quaternary palynology and palaeobotany were studied and a palaeobotanical museum was founded. The integration of biology and geology was realized!

In 1966 the 2nd International Palynological Conference was held in Utrecht. This congress is one of the milestones in the history of the Laboratory. The proceedings of the conference were published by Elsevier and the series was continued as an international journal which is now one of the leading ones in palaeobotany and palynology: The Review of Palaeobotany and Palynology.

Recent developments

Prof. Jonker was succeeded by H. Visscher, who was the first geologist to become appointed as a professor within the faculty of biology. During the last ten years the Laboratory has expanded considerably. New trends and subdisciplines have been introduced. Although palynology has originally started in the form of Quaternary pollen analysis, now also stratigraphic palynology of the Prequaternary forms an important part of the Institute's research and training programme. During the last twentyfive years the Laboratory of Palaeobotany and Palynology has played an active role in various fields of interdisciplinary palaeobotanical and palynological research. Results of our investigations on micro- and megaflores from Devonian to Holocene, have been published in international scientific journals. Collaborators and students of the Laboratory of Palaeobotany and Palynology have contributed to various geological research programmes, including the participation in several IGC projects.

The number of students still increases. Our Institute also provides palynological training to visiting graduate and post-graduate students from various countries. Furthermore contract-research is carried out for various companies and institutes. One of the highlights in the history of our laboratory was the visit of a delegation of over 30 staff-members and students to the palynological and palaeobotanical conferences in Canada in 1984. This trip was made possible by Special Services, the consultancy division of the Laboratory of Palaeobotany and Palynology.

Former students are have found employment all over the world. In order to keep in touch with former students, staff-members and everyone who is interested in our work, the PPGU (Palaeobotanical Palynological Society of Utrecht) was founded in 1982.

4

A NEW INTERESTING PROJECT

FOR

STRATIGRAPHIC

PALYNOLOGISTS:

PERMIAN PALYNOFORMS:

INDEX

to

GENERA AND SPECIES

PALYNOINDEX (Copyright)

Laboratory of Palaeobotany and Palynology

State University of Utrecht

 **HYDRO**

RESEARCH CENTER IN BERGEN

A new and interesting project for stratigraphic palynologists

PERMIAN PALYNOFORMS: INDEX TO GENERA AND SPECIES

In a time of increasing application of computer and database work for stratigraphers, there exists an urging need for comprehensive and authoritative reviews of the taxonomic and nomenclatural status of palynological taxa.

For dinoflagellate work, the index of fossil dinoflagellates, prepared by Lentin and Williams over a period of 15 years, has developed a standard for this type of literature.

Unfortunately, no such comprehensive, easy-to-reach and up to date reference work has as yet been developed for other palynomorph taxa, notably pollen and spores. As a result, the evaluation of the status of fossil palynomorph taxa is a time-consuming, ineffective and expensive occupation, mainly taken care of by academic palynologists.

In order to overcome these difficulties, in 1986 Norsk Hydro initiated a project, which aimed at the collection of Triassic palynomorph taxa. The project was accomplished by staff members of the Laboratory of Palaeobotany and Palynology at the State University of Utrecht, the Netherlands.

The first result of this project became available in 1987, when Miente Boersma, Pim Brugman and Harry Veld produced a preliminary version of: "Triassic Palynomorphs: Index to Genera and Species"

The Triassic Palynoindex (Copyright LPP/Norsk Hydro) covers pollen and spore, acritarch, dinocyst, incertae sedis, algal/fungal spores and megaspore species described from Triassic deposits. No major taxonomic decisions have been taken in this volume.

In order to continue this work on Palynoindexes, the Laboratory of Palaeobotany and Palynology in Utrecht now proposes to start with a volume covering Permian palynomorphs. Accomplishment of this work will take approximately 3 years, beginning in mid-1988. In addition, work will continue on phase II of the Triassic Palynoindex, involving taxonomic re-evaluation.

Norsk Hydro would like to invite other companies to join this project, which within the course of the coming years should result in the preparation of a whole series of Paleoindeces. 11

Results of the project "Permian palynomorphs: Index of Genera and Species" will eventually be published. However, companies and institutes sponsoring this project will receive preliminary and updated versions throughout the project period, at least once every year.

Upon publication, floppy disks containing the Permian Palynoindex will become publically available in several formats.

C O S T S

Hfl. 15.000,- per year over three years (1988-1990). Those companies supporting this project will receive 3 copies of the report: "Triassic palynomorphs: Index to Genera and Species" free of charge (version April 1987).

My company is interested to support the project "Permian Palynomorphs: Index to Genera and Species"

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Laboratory of Palaeobotany and Palynology
State University of Utrecht
Heidelberglaan 2
3584 CS Utrecht
The Netherlands

 **HYDRO**

Research Activities at the University of Utrecht

DETERMINATION KEY FOR *CICATRICOSISPORITES* SPECIES.

P.J. de Haan¹, H. Leereveld¹, J. Leloux¹ and J.J. van den Bergh²

¹ Laboratory of Palaeobotany and Palynology, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands

² Geological Survey of Israel, 30 Maikheil Yisrael St., Jerusalem 95501, Israel

In the past a great number of badly described and/or depicted species have been assigned to the formgenus *Cicatricosisporites*, causing a taxonomic chaos. Therefore, a new accurate concept of distinguishing *Cicatricosisporites* species has been established. Consequently, a determination key for *Cicatricosisporites* species has been compiled, including one new species, *Cicatricosisporites borrenii* and several emended diagnoses.

Four different morphological groups have been distinguished, based on the number and pattern of sets of taeniae on the proximal and distal surfaces. In addition a glossary of descriptive terms used in the determination key is added.

TRIASSIC PALYNOMORPHS; INDEX TO GENERA AND SPECIES

Boersma, M., Brugman, W.A. and Veld, H.

Laboratory of Palaeobotany and Palynology, State University of Utrecht, The Netherlands

The Index of Triassic Palynomorphs lists formally proposed palynomorph taxa at and below the generic rank (including new combinations) which have been originally described from Triassic or supposedly Triassic strata. It reflects the present state of knowledge of the Laboratory of Palaeobotany and Palynology, State University of Utrecht, The Netherlands.

The Index follows the approach advocated by Lentini and Williams (1985) in their "Fossil Dinoflagellates: Index to Genera and Species". However, in this first edition taxonomic decisions have not yet been made.

With regard to nomenclature it has been attempted to strictly follow the rules of the International Code of Botanical Nomenclature (1978 edition), even if this results in unsatisfactory decisions about invalidity, illegitimacy, synonymy or homonymy of taxa.

The Index project is based on collaboration between Norsk Hydro (Bergen, Norway) and the Laboratory of Palaeobotany and Palynology, State University of Utrecht, The Netherlands.

H. Leereveld¹ & P.J. Hoedemaecker²

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² Rijksmuseum voor Geologie en Mineralogie, Hooglandse Kerkgracht 17, 2312 HS Leiden, the Netherlands

Based on a tentative correlation of the Tethyan Berriasian-Lower Hauterivian standard succession (W. Switzerland, SE. France) with the Boreal and Arctic successions (S&E. England, NW. Germany, Canada, N. Siberia and Russian Plain), ranges of selected dinoflagellate cysts in the different regions have been compared.

The comparative range chart clearly shows the latitudinal control of dinocyst distribution:

Species characteristic for the Tethyan/Atlantic Berriasian dinocyst associations, subsequently are encountered in northern regions during the Lower Valanginian; optimal similarity of the associations is reached in intervals equivalent with the *trezanensis/pexiptychum* and *campylotoxus* ammonite Zones; simultaneously, characteristic Arctic/Boreal species have their LAD in the southern areas. A major warming of the sea water in the northern regions, culminating during the Valanginian, is inferred.

Species which have their FAD in the northern regions during the period of relatively warm sea water, subsequently appear in the record in the Boreal, Central Atlantic and Tethyan Realms during the Lower Hauterivian; optimal similarity of the associations is reached in intervals equivalent with the *radiatus* ammonite Zone. A major cooling of the sea water in the southern regions, culminating in the Hauterivian, is inferred.

THE VEGETATION OF NORTHWEST SCOTLAND DURING THE KIMMERIDGIAN

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Based on the composition of a flora it is possible to reconstruct the general climate during the deposition of a flora.

Based on the differences in structure etc. between the species the latter can be assigned to different vegetation types within a flora. With help of comparison between different assemblages of the same age and within the same region it is possible to reconstruct the landscape in terms of vegetation types. For this purpose the ECOLOGICAL COMPARISON TABLE method has been invented. This method has been designed for Tertiary deposits of the Lower Rhenish Basin. However, also in older deposits the application of this method can be useful.

As an adstruction the composition and reconstruction of the vegetation of the Scottish hinterland of the Moray Basin during the Kimmeridgian has been demonstrated.

A CORRELATION BETWEEN APTIAN STRATA IN CENTRAL AND SOUTH PORTUGAL BASED ON SPORE/POLLEN AND DINOFLAGELLATE CYST ASSEMBLAGES

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² Laboratoire de Géologie des Bassins sédimentaires, Tours 14-15, 4^e étage, 4 Place Jussieu, 75230 Paris Cedex 05, France

Spore/pollen and dinoflagellate cyst assemblages of several outcrop sequences in the Estremadura (Central Portugal) and the Algarve (South Portugal) have been investigated. Accurate dating by means of dinoflagellate cysts suggested the existence of hiatuses in Upper Barremian and Upper Aptian to Lower Albian strata in the Estremadura (see figure). In the Algarve, especially in the western part, complete Upper Aptian sequences are present. The present work has focussed on the establishment of age-diagnostic palynofloras for the western Algarve, based on spore/pollen assemblages. Preliminary results are shown in semi-quantitative range-charts. A correlation with sedimentological data is indicated.

| | |
|-------------|---|
| ALBIAN | Calcaires de "Bellasian" |
| | Grès supérieurs d'Almargem |
| APTIAN | Assises à Orbitolines |
| | Grès inférieurs d'Almargem |
| BARREMIAN | Marno-calcaires à Choffatelles et Dasycladacées |
| HAUTERIVIAN | ???????????????? |

TOWARDS SYNCHRONIZATION OF VEGETATIONAL EVENTS IN THE SERRA DA ESTRELA, PORTUGAL, BY MEANS OF THE REGISTRATION OF COMMON TRENDS IN POLLEN DIAGRAMS

13

C.R. Janssen, J.A.A. Bos, R. Bakker, J.F.N. van Leeuwen

Laboratory of Palaeobotany and Palynology, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands

Palynological work from a variety of sites (lakes, peatbogs of various sizes and soils) within an area of limited extent in a number of mountain ranges in France (Vosges, Forez) has shown that a detailed chronology can be obtained by tracing common trends in the fluctuations of a number of pollen curves. These trends are the reflection of vegetational events within and outside the area of study; they show the changes in the regional pollen deposition with time all over the studied area.

In contrast the trends in the fluctuations of other pollen curves apply only for a restricted number of sites. The fluctuations in these curves reflect the local vegetation development, i.e. the development of the strictly local vegetation of lakes or peatbogs and the extralocal vegetation in the vicinity of the sites.

In this way the allochthonous component in the pollen deposition can be separated from the autochthonous component and the development of the vegetation patterns in relation to environmental factors can be established.

In the Serra da Estrela in Portugal common trends in the fluctuations of the curves of Pinus, Quercus, Ericaceae and total non-arboreal terrestrial pollen for 4 sites can be traced. These trends form the basis for the establishment of chronozones. The transitions of these chronozones have been tentatively dated on the basis of available radiocarbon dates for two of the sites.

It is shown that these chronozones can be used to demonstrate the diachronous behaviour in the fluctuations of the curves for Betula. It appears that the changes in the areal distribution of birch depend on altitude viz. large fluctuations in the extent of birch at lower altitudes throughout the Holocene and shorter living and later population towards higher altitudes.

More detailed radiocarbon dating of critical levels must establish the relation with climate and human interference.

DINOFLAGELLATE CYSTS FROM THE TYPE-AREA OF THE PRIABONIAN

H. Brinkhuis and R.M.C.H. Verreussel

Laboratory of Palaeobotany & Palynology, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands.

Preliminary results, biostratigraphic implications and palaeo-environmental interpretation of dinocyst distribution of the Priabonian in its type-area (N.E. Italy) is presented. Emphasis is placed on the L.A.D. of *Areosphaeridium diktyoplokus* and a significant dominance of *Homotryblum*-species at the top of the Bressana-section, one of the para-stratotypes of the Priabonian in the area. Evidence suggests that latter section is more complete than the Priabonian-type, and that it even comprises sediments of definite Oligocene age, hence providing a continuous Eocene/Oligocene interval.

STRATIGRAPHICAL SIGNIFICANCE OF *TANYOSPHERIDIUM* AND *BOURKIDINIUM* SPECIES IN THE TETHYAN REALM

H. Leereveld & H. Brinkhuis

Laboratory of Palaeobotany and Palynology, Heidelberglaan 2, 3584 CS Utrecht, The Netherlands

Palynological investigations have been carried out on the Lower Cretaceous of Southern Spain (Subbetic sequence near Caravaca, province of Murcia) and Southern France (section of Angles, province Alpes de Hautes Provence). Occurrences of six species of the morphologically closely related formgenera *Tanyosphaeridium* and *Bourkidinium* appear to have stratigraphical significance: *T. isocalamus*, *T. variecalamus*, *T. regulare*, *T. magneticum*, *B. visscheri* nov.spec. and *B. egginki* nov.spec.. Latter two species are restricted to the Tethyan and Boreal Hauterivian.

To emphasize the intergrading nature of the characteristic features of the species, one morphological entity is established, the *Tanyosphaeridium variecalamus* morphon.

6 Palaeobotanical Palynological Society of Utrecht (PPGU)

This Society which was founded in 1982 was established initially to provide a focus between past and present staff and students of the Laboratory of Palaeobotany and Palynology, Utrecht. In the last two years its membership has expanded to take in non-Utrecht members and currently has almost 200 members. One of its more important activities is the publication of its quarterly journal STUIFMAIL (derived from the Dutch word for pollen : stuifmeel). This worthwhile publication contains details of the Utrecht laboratory's activities, news of recent meetings and excursions together with book reviews etc. The official language is English and it is officially registered with an ISSN number.

The annual subscription to this worthwhile publication is only 15 Dfl. For further details write to Jeroen van den Bergh at Laboratory of Palaeobotany & Palynology, State University of Utrecht, Heidelberglaan 2, Utrecht, The Netherlands.

The first issue of 1988 includes abstracts of the Symposium on Organic Petrology held in Utrecht in November 1987 and a paper by Erik Tegelaar on Selective Preservation : Cause and Consequence.

7 1988 Subscriptions

If you haven't already made the payment of your 1988 subscription please do so as soon as possible. A list of people you can pay to locally was included in Newsletter 36.

Remember we can only operate with this low subscription level if people make regular payments.

8 RUSSIAN PALYNOLOGICAL TRANSLATION

Obukhovskaya T.G. New species of spores from the Devonian deposits of the Pripyat and Dnipro-Donets basins.
Geological Survey of Canada Translation Series No. 3111.

Further details concerning the availability of this translation may be obtained from the Librarian, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8, Canada.

9 CIMP - Chinese Palynological Cooperation

In Newsletter 36 an announcement was made concerning the establishment of working groups to develop cooperation in Upper Palaeozoic palynology between CIMP members and the palynologists of the Peoples Republic of China. Your participation was invited and suggestions were requested for programmes of investigations which you would like to see initiated. In the first instance because of the distance involved it was agreed that this cooperation would be largely by correspondence.

Due to an oversight on my part (B.O.) the list of convenors which was printed was incomplete. Please note the following additional convenors.

| | |
|---------------------|--|
| Namurian | Mr Zhu Huai-Cheng Nanjing Institute of Geology & Palaeontology Academia Sinica Chi Ming Ssu Nanjing Peoples Republic of China |
| Westphalian-Permian | Dr Ouyang Shu Nanjing Institute of Geology & Palaeontology Academia Sinica Chi Ming Ssu Nanjing Peoples Republic of China |

Tremendous scope exists for developing this programme of cooperation and for making real advances in long range palynological correlation. What is needed now is your cooperation.

10 A date for your diary "North Sea 90"

A special CIMP Symposium to be held in April 1990 at the British Geological Survey, Keyworth, Nottingham, England to review palynological developments after 25 years exploration on the Northwest European Continental Shelf and related areas.
The symposium will be concerned with palynological developments in sediments of all ages.

First circular to be issued during the Summer 1988.

11 A new CIMP (miospore subcommission) project:

INTERCALIBRATION OF MIOSPORES AND OTHER ZONAL FOSSILS

Correlations between the zonal scales of different fossil-groups are often unsecure for many reasons i.e. because the correlated zones are not found in one single section and because the degree of accuracy of, often lithological, alignment is not known. Localities where these correlations are established in one single section or in well aligned sections should be given some priority in the intercalibration of fossil zones.

Because miospores are one of the few fossil-groups which span the marine/continental facies limit, they have a central position in the intercalibration process.

Only miospore zonations based on clear-cut criteria such as first occurrence, should be used here, excluding in other words Oppel Zones and Assemblage Zones when limits between them are not clearly defined.

The intention is to collect and recirculate among interested CIMP members such data for the Silurian-Permian timespan, whether the zonal schemes involved are local or not.

Display of data may take the form given in addendum.

Competition between stratigraphers to provide the best documented sections should be encouraged.

CIMP members interested in the project should return the following form to M. STREEL, Paleontology, The University, 7, place du vingt août, B-4000 LIEGE, Belgium.

Name:

Address:

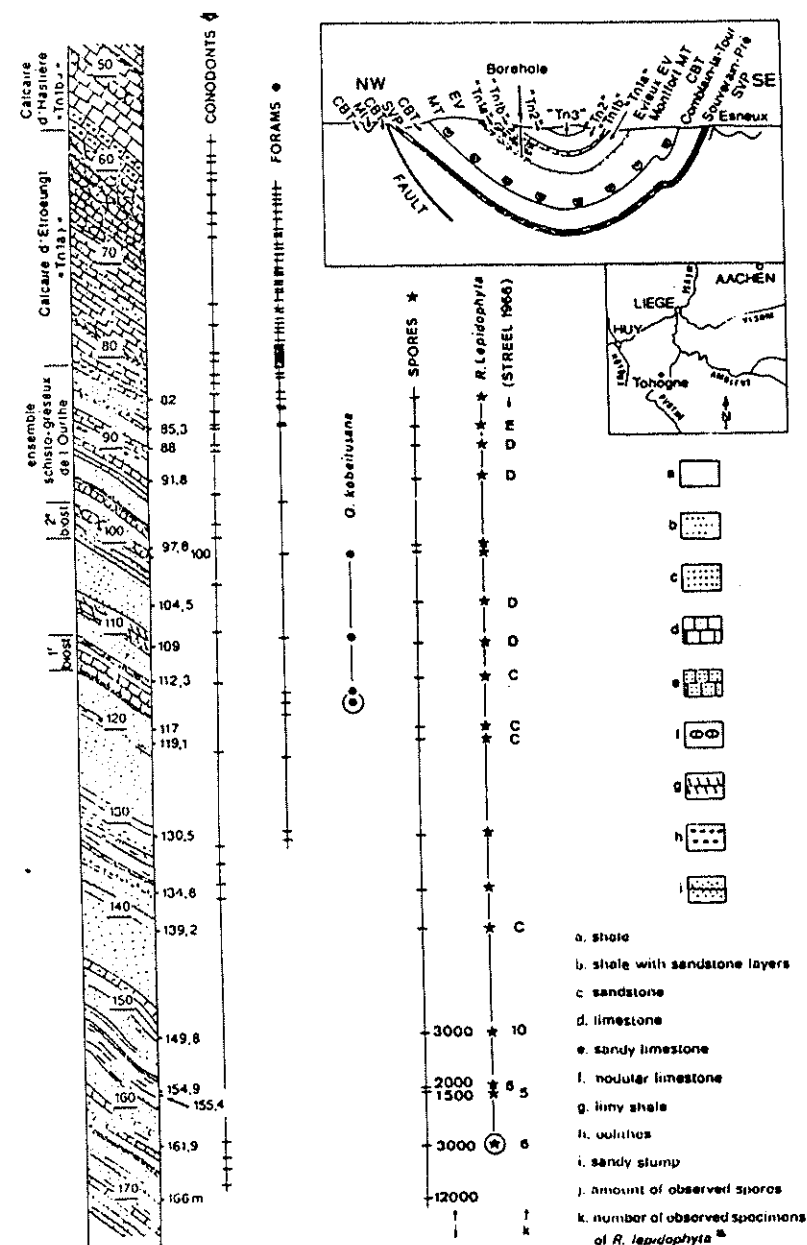
is interested in joining the CIMP INTERCALIBRATION PROJECT by contributing data found between Zone

and Zone

of age in the following locality.....
(Please complete as many forms as necessary)

is only interested in being kept in touch with the project.

Rotation between the first occurrence and the biostratigraphic zonation (Streel, 1984) of the miospore *Reticularia lepidophylla* (Ker) Playford, 1976 and the first occurrence of the foraminifer *Quasimundina kobeltiana* Rösser (1948) in the Tuhogne borehole, Belgium (Bouckaert & Duser, 1976; Bouckaert et al., 1977).



Bouckaert, J. and Duser, M. 1976. Description du sondage de Tuhogne. Belgian geological Survey, Prof. paper 1976 n° 8. 1-10.

Bouckaert, J., Conil, R., Duser, M. and Streel, M. 1978. Stratigraphic interpretation of the Tuhogne borehole (Province of Luxembourg). Devonian - Carboniferous transition. Annales de la Société géologique de Belgique, 1: 139-87-101.

Streel, M. 1966. Critères palynologiques pour une stratigraphie détaillée du Trias dans les basses ardennoises. Annales de la Société géologique de Belgique, 1: 89-95-96.

* or biozonation based on measure of 100 specimens.

A.A.S.P. - 1988, Houston, Texas
CALL FOR PAPERS

The 21st Annual Meeting of the American Association of Stratigraphic Palynologists will be held in Houston, Texas, Thursday, Friday, and Saturday, November 10-12, 1988.

The A.A.S.P. meeting program will consist of a 1/2 day symposium on the Paleozoic (chaired by Gordon Wood) and another 1/2 day symposium on the Quaternary (chaired by Steve Hall and/or Owen Davis). The symposia will be scheduled one in the morning and the other in the afternoon on Thursday, November 10. Friday and Saturday are for technical sessions on Mesozoic palynology, Tertiary palynology, dinoflagellates, and general palynology. Poster sessions will run concurrently with the technical sessions.

Students who wish to have their papers judged for the L. R. Wilson Outstanding Student Paper Award should check the appropriate box on the abstract form. More information on the Wilson Award will be included in the April A.A.S.P. Newsletter.

The deadlines for presentations are:

Title due: May 15, 1988

Abstract due: July 15, 1988

Mail abstracts and titles to: Donald W. Engelhardt, Amoco Production Co., P. O. Box 3092, Houston, Texas 77253.

CIMP Publications of CNRS

Several copies of some of the parts of the CIMP Atlas published in the late 1960's and early 1970's have been discovered. There were originally 6 parts which were published.

Parts 1 & 2 dealing with Chitinozoa are not available.

Part 3 : Acritarchs by Deunff, Muir & Sarjeant (10 copies available).

Part 4 : Spores : Morphology by Grebe and Verrucosispores by Smith (40 copies available).

Part 5 : Spores : Lycospora by Somers (40 copies available).

Part 6 : Spores : Monoletes by Alpern & Doubinger (40 copies available).

Anyone interested in acquiring these publications should write to Dr. G. Lachkar, Laboratoire du Micropaleontologie, Université de Pierre et Marie Curie, 4 Place Jussieu, 75230, Paris, France.

Palynological Laboratory, Geological Institute,
Bulgarian Academy of Sciences, Sofia

As mentioned earlier in this edition of the Newsletter, the Symposium on Circum-Mediterranean Palynology was held in Utrecht as part of the celebrations to mark its Silver Jubilee. The participants were, however, pleased to learn that in fact 1988 also marks the Silver Jubilee of the Palynological Laboratory of the Geological Institute of the Bulgarian Academy of Sciences. Members of CIMP were able to share in the celebration of this event during one of the Symposium banquets and with the aid of some Bulgarian brandy to convey our congratulations and good wishes.

Dr. Rossa Kalvacheva presented a poster on the wide range of activities undertaken in the laboratory and the following item which was abstracted from that poster provides more information about the Laboratory.

"The laboratory was founded by Dr. Svetlana Cernjavskaja in 1963 with her palynological studies on the Paleogene in Bulgaria. During the last decade, parallel to her Paleogene studies, she worked also intensively on the Jurassic spore-pollen stratigraphy. During the 1960's three other palynologists began working in the Laboratory in different specialities: *Rossitsa Kalvacheva (1965) - acritarch dating of metamorphic rocks; Lilia Dodekova (1967) - Jurassic acritarchs and dinoflagellates; *Juliette Latcheva (1967) - Upper Carboniferous and Permian miospores.

A new generation recently entered the Laboratory and began investigating new fields: *Iskra Lakova (1962) - Silurian and Devonian chitinozoans; Ludmila Petrunova-Olova (1984) - Triassic acritarchs, spores and pollen; Polina Pavlishina (1985) - Upper Cretaceous dinoflagellates, spores and pollen.

The other two collaborators (*Lili Zafirova, geologist, 1966; Elena Todorova, technician geologist, 1973) perform the sample processing; the Laboratory is much indebted to them for their effectiveness and attention.

All palynologists as well as the methodologist of the Laboratory, Lili Zafirova, have graduated the SOFIA UNIVERSITY KLIMENT OHRIDSKI. Palaeopalynology, a new research field for Bulgarian geology, was developed independently in the Laboratory without any specialised training abroad."

CIMP members are marked by an asterisk (*)

KALVACHEVA, Rossitsa - A C R I T A R C H A

KALVACHEVA, R., 1972. Preliminary results from palynological studies of the Lower Palaeozoic rocks in the Iskur Gorge. Rev. Bulg. Geol. Soc., 43 (2), 241-251 (in Bulgarian, English summary).

KALVACHEVA, R., CHOBANOVA, A., 1973. Statistical analysis on several species of the genus Verrucospora (Acritarcha) from the Ordovician in the Iskur Gorge (Bulgaria). Bull. Geol. Inst., Bulg. Acad. Sci., ser. Palaeont., 22, 5-20 (in Russian, English summary).

- KALVACHEVA, R., DIMITROVA, N. 1973. Occurrence of acritarchs in the Lower Palaeozoic in the Iskur Gorge, Bulgaria. "Microfossils of the oldest deposits", Proc., III Intern. Palynol. Confer., "Nauka", Moscow, 32-35 (in English, Russian summary).
- KALVACHEVA, R., CHOBOANOVA, A., 1974. Biometrics of *Veryhachium minutum* Downie, 1958 (*Acritarcha*) from the Ordovician in the Iskur Gorge, Bulgaria, Rev. Palaeob. Palynol., 18, 177-186.
- KALVACHEVA, R., 1978. Acritarch stratigraphy of Lower Paleozoic Formations in the West Balkan Mountains, Bulgaria. Palynologia, num. extraord., 1, Leon, 303-311 (in English).
- KALVACHEVA, R., 1979. Palynological evidence (*Acritarcha*) for the age of the Lower Paleozoic rocks in the Vakarel hill, Bulgaria. C. R. Acad. bulg. Sc., 32 (10), 1397-1400 (in English).
- KALVACHEVA, R., 1980. Ordovician acritarchs from the Western Balkan Mountains. Proc. 11th Congress Carpatho-Balkan Geol. Assoc., Stratigraphy, "Naukova dumka", Kiev, 53-71 (in Russian, English summary).
- KALVACHEVA, R., 1982. Palynology and stratigraphy of the diabase-phyllidoid complex in the west Balkan Mountains. Rev. Bulg. Geol. Soc., 45 (1), 8-24 (in Russian, English summary).
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- KALVACHEVA, R., 1984. Acritarch evidence for Ordovician System in West Bulgaria, 27th Intern. Geol. Congress, Moscow, Abstracts, I, 72-73 (in English).
- SASSI, F. P., ZANFERRARI, A., KALVACHEVA, R., 1984. Acritarch dating of phyllites in the Agordo area (South-Alpine basement of the Eastern Alps, Italy). Ibid. 172-173 (in English).
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- SASSI, F. P., DEL MORRO, A., KALVACHEVA, R., ZANFERRARI, A., 1984. Chronological data and problems concerning the South Alpine basement in the Eastern Alps. IGCP No5 Newsletter, 6, 111-115, in Sassi and Julivert (Ed.), Barcelona.
- KALVACHEVA, R., 1986. Acritarch stratigraphy of the Ordovician System in Bulgaria. IGCP No5, Final Meeting, Sardinia, Abstracts, 38-45.
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A C R I T A R C H A
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Palynological staff of the Geological Institute,
Bulgarian Academy of Sciences, Sofia.

Dr Kalvacheva displayed a selected bibliography of works published by the Laboratory during the last 25 years. Because of the limitations on space in this Newsletter only the pre Jurassic components are listed here. A complete version of the list can be obtained from the Laboratory in Sofia.

New Members and Changes of Address

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Keyworth
Nottingham NG12 5GG
England



The board of the P.P.G.U. (Palaeobotanical Palynological Society of Utrecht)
J.H.F. Kerp, R.J. Poort, P.P. Hoen, J.W. Weegink and J.J. van den Bergh



H. Al-Tayyar and H. Visscher



H. Visscher and J.E. Meulenkamp



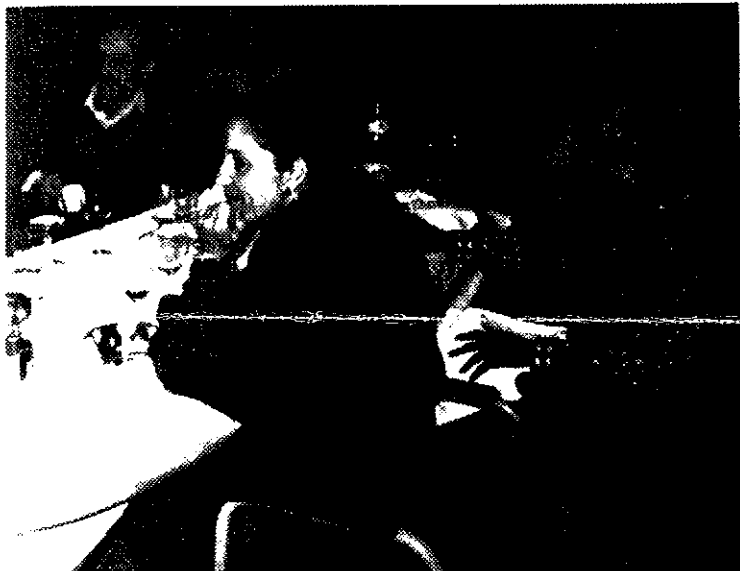
Excursion (M. Streef and M. Bless)



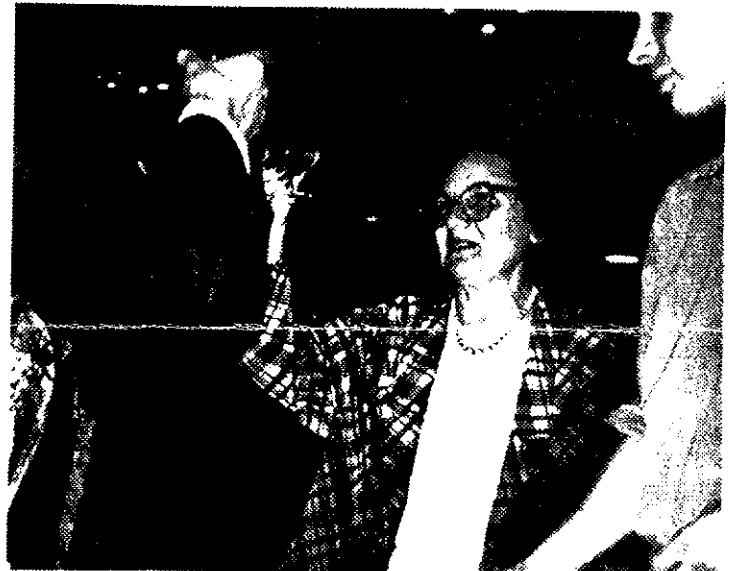
Henk Visscher & Mrs Jonker



Top It Up !! Broutin & Powell

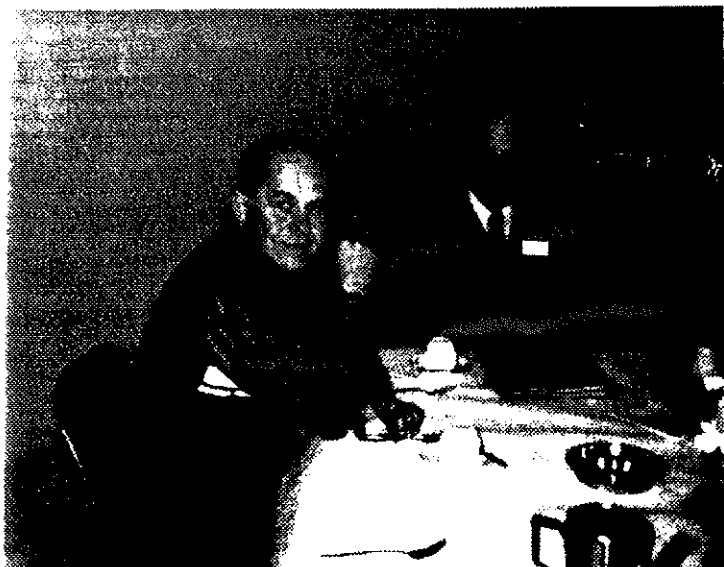


Rahmani- Antari & Trevisan



Happy Birthday Bulgarian Academy of Sciences

Rossa Kalvacheva



Loboziak & Vanguestaine



Herngreen & van der Eem