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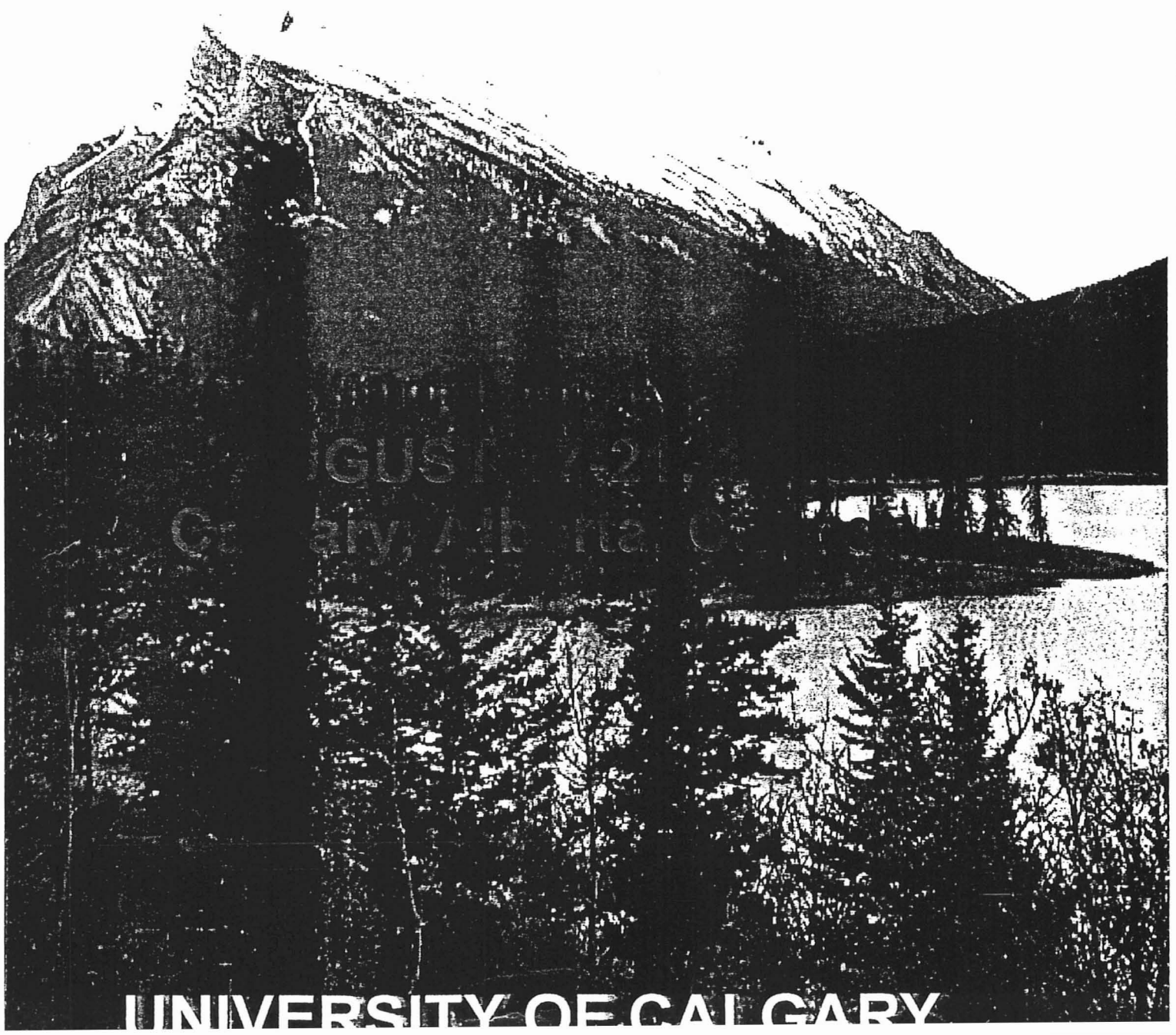

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CYCLES IN PIAUÍ FORMATION, PARNAÍBA BASIN, AND ITARARÉ SUBGROUP, PARANÁ BASIN, BRAZIL.

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In the Parnaíba Basin of northern Brazil, evaporite-carbonate depositional systems and transgressive-regressive (T-R) cycles have been recognized in the Piauí Formation of Pennsylvanian (Late Carboniferous) age. Cycles were formed under arid/semi-arid conditions and include transgressive shale, subtidal carbonate and anhydrite. Aeolian and lacustrine facies are less frequent. Inner basin evaporites are time equivalent to carbonates overlain by marginal mudcracked mudstone taken as the boundary of the evaporitic cycle. In the center of the basin, eleven T-R, probably fourth-order cycles, are recognized. Thickness of cycles ranges from 2-50m. Thicker cycles include aeolian and tidal facies. Fourth-order cycles are bundled into larger third-order and second-order cycles. Fourth-order cycles seem to have been mostly controlled by eustasy. Anomalously thicker cycles with aeolian facies suggest tectonic control.

In the glaciclastic Late Paleozoic Itararé Subgroup of the Paraná Basin of southern Brazil, a minimum of seven cycles, averaging 100 m thick, have been identified. Cycles may be incomplete due to erosion and they are better recognized in successions close to the basin margin. Cycles are basically fining-coarsening-upward successions of massive diamictite; variations include intercalated massive or cross-bedded sandstone, shale and/or diamictite; shale/mudstone and/or regular/irregular rhythmites with dropstones; massive or cross-bedded sandstone; and interbedded shale and siltstone. Lower and upper boundaries of each cycle beneath the massive diamictites are often marked by striated surfaces or glaciotectonized substrates or their correlative surfaces. Shale/mudstone beds often contain marine fossils, and are interpreted to represent post-glacial transgression with their tops corresponding to maximum flooding surfaces. Cycles are interpreted as eustatically controlled by advances and retreats of the Paraná glacial lobe. Poor paleontologic constraints limit interpretation of the age intervals involved in each cycle.

Key Words: Cyclothems; Parnaíba Basin; Paraná Basin; Brazil

LOWER STEPHANIAN MIOSPORES FROM THE CANTABRIAN MOUNTAINS, NW SPAIN.

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Carboniferous successions containing uppermost Westphalian and lowermost Stephanian strata are outcropping in the eastern part of the Cantabrian Mountains (Spain). At this stratigraphic interval, two sections (Las Llacerias and Demues sections) have yielded abundant miospores. These miospore associations bear great interest since they show some peculiarities with regards to the assemblages found in other West European areas by Clayton and others.

The differences deal with the ranges of some taxa, as well as their relative abundance, rather than the presence of new forms. The main differences in the composition of the assemblages are found at: 2) the middle of biozone OT; and 2) the biozone ST.

In the Cantabrian Mountains, the middle part of biozone OT has provided a miospore assemblage which combines typical Westphalian species with lower Stephanian taxa, such as *Savitrisporites camptotus, Angulisporites splendidus* and *Spinosporites spinosus.* In other regions these species have been recorded as becoming abundant at levels slightly higher than those corresponding to the acme of *Thymospora.* In the Cantabrian assemblages studied, however, *Thymospora* is still rare where these Stephanian forms occur already.

This situation is not reflected in the biozonation developed in northern Europe, where the succession at Saar-Lorraine contains a time gap estimated at 2 m.y. at the level of the Holz Conglomerate. This gap is filled mainly by the Cantabrian Stage with intermediate floras such as appear also in the palynological record reported here.

In the Cantabrian Mountains, the spore association that occurs immediately above biozone OT, differs from biozone ST, mainly in the pattern of incoming and relative abundance of spores, such as *Potonieisporites* and *Cheiledonites*, as well as in the common occurrence of Westphalian forms

Key Words: Carboniferous miospores, Westphalian, Stephanian, Miospore Biozones, Cantabrian Mountains.

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