

Biostratigraphy Of Fossil Plants: Successional And Paleoecological Analyses

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APPLICATIONS AND LIMITATIONS OF PALYNOLOGY IN AGE, CLIMATIC, AND PALEOENVIRONMENTAL ANALYZES OF TRIASSIC SEQUENCES IN NORTH AMERICA

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ABSTRACT: The palynostratigraphy of the Newark Supergroup basins of eastern North America, particularly for the Newark, Gettysburg, Richmond, and Taylorsville basins, is presented and compared to that of the Chinle Formation and Dockum Group of Arizona and Texas. Seven palynofloral zones are recognized in the Newark Supergroup ranging in age from early Carnian (Late Triassic) to Pliensbachian? (Liassic). Three zones ranging in age from middle Carnian to early Norian are recognized in the Chinle Formation, but only the older two zones are recognized in the Dockum Group. New well data from the Richmond and Taylorsville basins allow the recognition of the *Aratrisporites* last acme zone, the oldest Carnian palynoflora, as well as the discovery of a Dockum-Chinle palynofacies (late Carnian) within those basins. Evidence is presented for the existence of major climatic and floral cycles on the order of two million years duration. The applications and limitations of taxonomic distribution versus palynofacies succession in age determination and correlation of nonmarine Triassic successions are addressed.

INTRODUCTION

The use of palynology in dating and analyzing Triassic strata in North America came of age with the palynofloral study of the Cameroonian Formation of North Carolina (Kooib, 1961), the paleoecological study of the Petrified Forest Member, Chinle Formation of Arizona (Gottesfeld and Kremp, 1966; Gottesfeld, 1971), and palynological study of the Dockum Group of Texas (Dunay and Traverse, 1971). Contributions to the palynology of Triassic strata in Canada involved mostly Lower Triassic sequences (Jansonius, 1962; McGregor, 1965). As palynology became more popular, additional studies of North American Upper Triassic strata followed in the 1970s (e.g. Schulz and Hope, 1973; Dunay and Fisher, 1974; Gottesfeld, 1972a, b, 1980). Two important and unexpected discoveries came out of these studies: The Moenave Formation of southern Utah and northern Arizona and the youngest strata in the Newark Supergroup of eastern North America are Early Jurassic in age (Comet, *et al.*, 1973; Peterson, *et al.*, 1977). Previously, the Newark had been considered all Triassic in age, and the age of the Moenave Formation was uncertain.

Subsequent palynological studies and publications deal mostly with taxonomy, stratigraphic ranges, and age determination (e.g., Cornet and Traverse, 1975; Dunay and Fisher, 1979; Fisher and Dunay, 1984; Cornet and Olsen, 1985; Traverse, 1986). Doctoral dissertations on the palynostratigraphy and age of the Dockum, Chinle, and Newark were completed by Dunay

1

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