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Formal Designation: Reef Trail Member, Bell Canyon Formation, and its Significance for Recognition of the Guadalupian-Lopingian Boundary

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ABSTRACT

The Guadalupian Series, with its type section in the Guadalupe Mountains, west Texas and New Mexico, has generally become the accepted worldwide standard for the Middle Permian. The Cisuralian of Russia is the accepted standard for the Early Permian; and the Lopingian of China has been accepted as the Late Permian standard. Most recently, the task of securing this threefold worldwide standard has been pursued by a host of workers in many specialties in order that no major gaps or overlaps are left for chronostratigraphic correlation.

Following established international procedures for defining a chronostratigraphic boundary, the base of the Guadalupian Series is recognized at the stratigraphically lowest occurrence of the conodont Jinogondolella nankingensis in a section recording continuous deposition in the middle of the El Centro Member of the Cutoff Formation, Roadian Stage, Guadalupe Mountains. This designation is in basic agreement with the ranges of important species of three other major faunal groups: the ammonoids, brachiopods, and fusulinaceans.

Designation of a formal top of the Guadalupian Series has remained more elusive inasmuch as the final establishment of the base of the overlying Lopingian in China has remained in a rather unsettled state until recently. Enough is now known to insure that the Lopingian base will fall chronostratigraphically somewhere between the upper Lamar Limestone, Bell Canyon Formation, and the base of the Castile Formation of the Delaware Basin. This interval includes the so-called "post-Lamar beds" of the upper Bell Canyon Formation.

As a means of equating the lithostratigraphy to the chronostratigraphy, we describe herein the Reef Trail Member of the upper Bell Canyon Formation by establishing its type section at McKittrick Canyon, Guadalupe Mountains, as a formal replacement name for the informal "post-Lamar beds". We also identify the fusulinacean and conodont faunas from composited sections of Lamar Limestone and Reef Trail members, and extend their correlations biostratigraphically from the Guadalupe, to the Apache and Glass mountains. The McKittrick Canyon Limestone is a new name given to the "Middle" Limestone (Brown, 1996), following his recognition that this limestone had for too long been misidentified as the McCombs Limestone. Finally, correlation of faunal zones established in the Delaware Basin from the three mountainous areas are extended globally in an attempt to reconcile chronostratigraphic problems.