THE KAHA ATCHEE MOUNTAIN GROUP AND LATE PRECAMBRIAN—LOWER CAMBRIAN WESTERN MARGIN EVOLUTION

By

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INTRODUCTION

Based on primary facing data, the Kahatchee Mountain Group is the oldest stratigraphic sequence in the Talladega slate belt (Fig. 4) (Tull, 1982). It is composed of a heterogeneous assemblage of sedimentary and volcanic/volcanoclastic (?) rocks with mineral assemblages and textures indicative of the lower green-schist facies of regional dynamothermal metamorphism.

Four formations comprise the Kahatchee Mountain Group (Fig. 5): (1) the lowermost Waxahatchee Formation; (2) the Brewer Formation; (3) the Stumps Creek Formation; and (4) the Wash Creek Formation. Interunit contacts appear to be conformable. Fault surfaces of the Talladega-Cartersville fault system form the lower boundary of the group. The uppermost contact of the group is stratigraphically complex. In places it is a gradational contact with marbles of the Sylacauga Marble Group (Pendexter, 1982). In other areas metaclastic rocks of the Talladega Group lie unconformably on rocks of the Wash Creek Formation. Northeast of Shelby and Chilton Counties along the northwestern border of the Talladega belt the Kahatchee Mountain Group is represented by the Wash Creek Formation with local occurrences of Stumps Creek Formation. In most of the areas the Wash Creek/Sylacauga Marble Group contact is preserved and represents a key contact in the westernmost crystalline rocks of the southern Appalachians (see Tull and Guthrie, this volume).

Conodonts obtained from the upper Sylacauga Marble Group and shallow marine invertebrate fauna and conodonts from the Talladega Group (Butts, 1926; Sutley, 1977; Harris and others, 1984) constrain the age, for at least this part of the section, between late Early Ordovician and early Devonian. Despite the palaeontological evidence for the ages of higher level stratigraphic units the age of the Kahatchee Mountain group has been a subject of controversy for many years.

Conventional K-Ar whole rock slate ages (see Tull, 1982 for compilation) ranging from 370 to 415 m.y., interpreted as cooling ages following an Acadian thermal event, provide an upper age limit for rocks of the Kahatchee Mountain group. Direct faunal evidence for the group's age is as yet unconfirmed. An indirect age for the group can be gleaned from lithostratigraphic correlations with units of known age in the foreland fold and thrust belt and western Blue Ridge belt. Correlations with these areas are based on overall lithostratigraphic and paleo-environment similarities.

The various lines of evidence have led to the conclusion that the Kahatchee Mountain Group is equivalent to the lower Cambrian Chilhowee Group and a part of the upper Precambrian Ocoee Supergroup. The extreme lithostratigraphic similarity between correlative units both along and across strike is indicative of deposition that occurred on crustal material in transition between a crust active in basin development and one passive in basin development.

GEOLOGIC SETTING

The Talladega slate belt is the westernmost crystalline thrust nappe in the southern Appalachian orogen of Alabama and Georgia (Fig. 1, Tull and Guthrie, this volume). To the southeast medium to high grade metamorphic rocks of the eastern Blue Ridge belt are juxtaposed along a complex regional fault system (Moore and others, 1983). To the northwest the Talladega belt is bounded by Paleozoic rocks of the foreland fold and thrust belt along the Talladega-Cartersville fault system (Smith, 1888; Hayes, 1981). From Sylacauga, Alabama (Fig. 1) to the Alabama-Georgia border a structurally complex sequence of thrust nappes containing lower Paleozoic rocks (including the Chilhowee Group) forms the footwall of the Talladega nappe. The contact between the two is interpreted in a number of ways (see Bocz, this volume).

The western Blue Ridge belt of Georgia, Tennessee, and North Carolina is located in the same structural position as the Talladega belt (Fig. 1). Near the juncture of the two at Cartersville, Georgia a similar structural situation exists, in that lower Paleozoic rocks are contained in a complex nappe sequence beneath the crystalline rocks (Hayes, 1891; Costello and others, 1982). In eastern Tennessee the foreland is bounded to the east by upper Precambrian/lower Cambrian rocks of the Unaka belt along the Great Smoky fault system (Keith, 1927). The western Blue Ridge belt overrides the Unaka belt along the Miller Cove/Sylco Creek/Alcusy Valley fault system (King and others, 1958; Salisbury, 1961; Costello and McConnell, 1983).

An along strike projection of this complex "belt" of late Precambrian/lower Cambrian rocks can be found in the Columbiana region of Shelby and Chilton Counties, Alabama (Fig. 1). Based on stratigraphic facing data this region contains the oldest exposed units in the Talladega belt and is the type area for the majority of units comprising the Kahatchee Mountain Group.

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