Petrologic and thermochronological analysis of the Santaquin metamorphic complex (SMC) reveal that it differs in composition and age from Archean basement exposed 50 km to the north and may represent the northern most exposure of Colorado Plateau basement. The SMC consists of mildly strained garnet amphibolite and schists intruded by granitoid bodies, which are mildly deformed by mostly non-rotational shear. Hornblende separates yield 40Ar/39Ar plateau cooling ages of 1657 +/- 2 Ma for the host amphibolite and 1623 +/- 2 Ma for a mafic syenite intrusion. K-feldspar from the syenite indicates the SMC cooled to <100ƒC at around 750 Ma, which is near the age of the unconformably overlying Big Cottonwood Formation. Reheating to 325 +/- 30ƒC occurred from around 500-350 Ma. This event was most likely caused by burial of up to 10 km of sedimentary successions during passive margin and Oquirrh Basin development. The feldspar reached its closure temperature (~200ƒC) at around 180 Ma, most likely as a result of basin inversion associated with the Sevier orogen. The time/temperature history after this event is currently being explored by analysis of apatite fission tracks.

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Herbert E. Gregory, Pioneer Geologist of the Colorado Plateau

Herbert E. Gregory, Yale Geologist, spent over four decades studying the geology of the Colorado Plateau. He began his studies in the southwest in 1907 on the Navajo Indian Reservation in northern Arizona and ended it with his studies of Zion and Bryce Canyon National Parks in 1951, less than a year before his death. Between these two studies he spent considerable time in southeastern Utah and on the Kaiparowits Plateau in southern Utah. He produced five classic United States Geological Survey Professional Papers: #93, Geology of the Navajo Country: A Reconnaissance of Parts of Arizona, New Mexico, and Utah, 1917; #164, with Raymond C. Moore, The Kaiparowits: A Geographic Reconnaissance of Parts of Utah and Arizona, 1931; #188, The San Juan Country: A Geographic and Geologic Reconnaissance of Southeastern Utah, 1938; #220, Geology and Geography of the Zion Park Region: Utah and Arizona, 1950; and # 226, The Geology and Geography of the Paunsagunt Region, Utah: A Survey of Parts of Garfield and Kane Counties, 1951. With such expertise, it is little wonder that the International Geological Congress which was held in the United States in 1933, invited Gregory to write the guidebook for the excursions in the Colorado Plateau region. The guide is still an important first course for geologists new to the Colorado Plateau. In 1919, Gregory wrote his wife about the plateau country: "Gee! How I love those red rocks and sands and dry heat."

Gregory's greatest contribution to geology came with his studies of the Kaiparowits region. He gave the world there first view of this remote and isolated region. This poster presentation will outline Gregory's pioneering effort into this relatively unstudied region of the Colorado Plateau. He made his first reconnaissance into the Kaiparowits in 1915. This survey study was followed by extensive fieldwork in 1918 and 1922, and another short expedition to the region in 1924. Today the Kaiparowits Plateau is the centerpiece of the Grand Staircase-Escalante National Monument. For the student of the monument, a knowledge of the work of Gregory is necessary. Gregory felt the Kaiparowits was the centerpiece of the geology of the Colorado Plateau. At the Fifty Mile Point on the Kaiparowits he wrote in his field notes: "profound straight walled meandering canyons, and Navajo Mountain is a gorgeous spectacle." To his wife he exclaimed: "For scenery, the Grand Canyon must take second place."

In addition to featuring Gregory's work in the Kaiparowits, a chronology of his life and work and a short bibliography will be presented. Herbert E. Gregory was one of the great pioneers of geology on the Colorado Plateau and his story needs to be told.

HINTZE, LEHI F. and AXEN, GARY J.

The Lime Mountain area, an unusually informative window into the Mesozoic – Cenozoic structural complexities of southeastern Nevada.

The Tule Spring Hills are a Basin and Range horst that exposes a structural complex produced by Mesozoic southeastward thrusting and Cenozoic east-west extension. The Tule Spring Hills thrust, eastern kin to the Las Vegas area Keystone thrust, places a 1000-foot- thick (300m) sheet of brittlely fractured, pervasively faulted, Cambrian carbonate strata over less faulted Jurassic Kayenta redbeds and, locally, a mélange of Triassic strata. Sandwiched locally between the overthrust Cambrian carbonates and the Mesozoic redbeds are remnant blocks of mélanges several thousand feet (m) long, which have been dragged along beneath the thrust plate.

The Lime Mountain thrust places Cambrian and Ordovician strata over Mississippian limestone, a different subthrust stratum than that of the Tule Spring Hills thrust. On the north end of Lime Mountain, the Mississippian limestone is cut by a dike of Miocene volcanic rock and has been locally marbleized. Miocene volcanic rocks, from sources north of the area, originally were laid unconformably across the area but have been removed by erosion, except in a few areas. They include 22 to 24 Ma ash-flow tuffs from the Caliente caldera complex and 10 to 14 Ma tuffs and basaltic rocks from the Clover Mountains just north of the Lime Mountain area.

The north end of the Tule Spring Hills are cut by east-southeasterly trending right-lateral strike-sli faults that appear to offset some of the volcanic rocks and, thus, may be of late Cenozoic age. the major Basin and Range normal faults that bound the Tule Spring Hills are not exposed but have been identified on seismic lines and separate the Tule Spring Hills from the Tule Desert Basin, on the northwest, and the Mesquite Deep Basin on the southeast. The Mesquite Deep Basin contains 32.000 feet (10km) of Tertiary valley-fill in its deepest part, including sediments derived from the Lime Mountain area.

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