ABSTRACT: Evidence of three major episodes of erosion and two reversals of stream flow direction during the Tertiary is present in the east-central Medicine Bow Mountains. The first period of extensive erosion occurred during late Eocene (?) and earliest Oligocene (?) time, when streams of southerly flowing drainage systems dissected the area and produced a hilly terrain of moderately high relief (pre-White River surface). Throughout much of early Oligocene time vast quantities of tuffaceous sediments of the White River Formation were deposited in the region, burying the pre-White River surface. Little is known of the late Oligocene (?) and early Miocene (?) history, but apparently at least part of this time was marked by prolonged uplift and erosion (pre-North Park surface developed), and by late Miocene (?) time the direction of stream drainage had been reversed to a predominantly northward trend. Rapid uplift in the Medicine Bow Mountains of Colorado persisted from late Miocene to early Pliocene time and provided source areas for the conglomeratic North Park Formation and equivalent gravels that extend northward onto the pre-North Park surface. In middle or late Pliocene time uplift to the north and/or downwarping to the south (near the Colorado-Wyoming line) caused the second reversal of drainage re-establishing a generally southward stream flow direction, a trend which has prevailed to the present. Erosion during the late Pliocene (?) and early Pleistocene (?) apparently produced much of the present high-level surface of low relief (Medicine Bow surface), although many portions probably represent exhumed remnants of earlier surfaces. During the late stages of Pliocene-Pleistocene erosion, a thin veneer of quartzite boulder gravel was deposited on the Medicine Bow surface and this was later augmented by glacial outwash material. Wisconsin glacial deposits are well developed in the northern part of the area, and five stadial moraines are recognized.

INTRODUCTION

Observations presented in this paper were obtained during a study1 of the Precambrian rocks of the east-central Medicine Bow Mountains for the Geological Survey of Wyoming. The area of investigation includes approximately 120 square miles in Albany and Carbon Counties, Wyoming (fig. 1), and is underlain chiefly by a metamorphic complex cut by numerous small bodies of mafic and felsic igneous rocks, all of Precambrian age. These rocks are disrupted by a system of shear zones which apparently have been sites of several episodes of tectonic rejuvenation (Precambrian through Laramide) (Houston and McCallum, 1961, p. 91). Post-Laramide erosional processes have effectively beveled most of the crystalline rock units, and a high-level, slightly dissected erosion surface of low relief characterizes much of the present Medicine Bow Mountains. The development of the high-level surface (Medicine Bow surface) was apparently complex, and very likely is related to several periods of middle and late