PALEOCENE AND LOWER EOCENE ROCKS IN THE
SAND CREEK — NO WATER CREEK AREA,
WASHAKIE COUNTY, WYOMING

THOMAS M. BOWN

INTRODUCTION

Early Tertiary rocks in the Sand Creek — No Water Creek area of this report consist of a southeast-plunging prism of sediment which comprises the youngest exposed rock in the southeast axial region of the Bighorn Basin (Figs. 1, 2). Two formations have been designated for these rocks: Jepsen (1930b) assigned the Paleocene Series of the Bighorn Basin to the “Fort Union” Formation and Van Houten (1944) named overlying variegated Early Eocene strata the Willwood Formation, supplanting Cope’s (1882) name Bighorn “Wasatch.” Following a decade of field studies in the northern part of the basin, Jepsen (1940) abandoned the term “Fort Union” for the Bighorn Paleocene and introduced a new name, Polecat Bench Formation; an appellation which has, unfortunately, not been widely received in spite of Jepsen’s perceptive discussion of problems concerning the correlation of these rocks with the type Fort Union Formation of western North Dakota. These correlation problems are not solely homotaxic; lithologic subdivisions of the Fort Union which are recognized in Montana (e.g. Lebo and Melville members; Simpson, 1937) are not discernable as such anywhere in the Bighorn Basin. In view of a lack of lithologic and physical continuity between Paleocene deposits of the Bighorn Basin and the Williston, Powder River and Crazy Mountain Syncline basins, the Paleocene Series of the Bighorn Basin is assigned to the Polecat Bench Formation of Jepsen (1940).

Wortman (1882) presented the first map of Tertiary deposits in the Bighorn Basin. Subsequent maps have variously depicted the surface distribution of these rocks. Well-exposed Paleocene and Early Eocene strata east of the Bighorn River have not previously been adequately described or accurately delineated. A field party from the University of Wyoming Geology Museum surveyed this area in 1974 to determine the extent of fossiliferous exposures of the Willwood Formation and to collect fossil vertebrate remains. On the basis of continuing studies, this writer offers a preliminary report on the areal distribution, lithology and intrabasinal correlation of Early Tertiary rocks in the Sand Creek — No Water Creek area.

TERTIARY SYSTEM

DISTRIBUTION

East of the valley of the Bighorn River the Polecat Bench and Willwood Formations are exposed over approximately 300 and 150 square miles, respectively. The attitude of these rocks as well as their somewhat lunate surface outcrop are controlled by several anticlinal folds which border and roughly parallel the southeast axial region of the Bighorn sedimentary basin (Fig. 2). Earlier geologic maps of the southeastern Bighorn Basin (i.e., those of Wortman, 1882; Fisher, 1906; Weitz and Love, 1952; and U.S.G.S. Wyoming State Geologic maps, 1925 and 1955) have depicted the Willwood (“Wasatch”) outcrop south of the East Fork of No Water Creek as more or less coincident with that of the Polecat Bench outcrop as mapped in Figure 2. Field studies in 1974 demonstrate these earlier maps to be in error; the Willwood Formation is largely restricted to exposures north of the East and Cabin Prong Forks of No Water Creek. Van Houten (1944, p. 183) mentioned the No Water Willwood exposures in passing but apparently did not visit the area south of No Water Creek. A map published by Eldridge (1894) has, previous to this paper, most accurately defined the distribution of Eocene rocks in this area.

Exposures of Polecat Bench strata are best developed: (1) in a narrow belt east of the Sand Creek divide and marginal to the southwest flanks of Bonanza and No Wood anticlines; (2) in the vast badland tract south of the East Fork of No Water Creek (known locally as the “Honeycombs”); and (3) south of the axis of Neiber anticline. Poorer exposures exist north of the axis of Neiber anticline, north of U.S. Highway 16 in T47N, R90W, and on the high South Butte divide in the E1/4 T44N, R90W and W1/4 T44N, R89W. Harris (1952, p. 123) has earlier noted exposures of “Fort Union” in part of the Sand Creek Oil field (Sec. 26, T46N, R91W).

The Willwood Formation is exposed: (1) as a thin veneer of rock capping the Polecat Bench in the N1/4 T45N, R92W, and NW1/4 NW1/4 T45N, R91W, near the...