INTRODUCTION

The area covered here is that south of the Canadian border, north of the Missouri River, longitude 106°-110° West, and is a southward continuation of the area described in the preceding paper by Stanton.

These remarks constitute an enlargement of Stanton’s paper and the lithologies and correlations described by him can be assumed to be those present in this area with exceptions noted hereinafter. (See cross section to accompany this paper, folded and inserted in back pocket.)

RED RIVER

While the Red River thins very gradually from eastern Montana into this area, the color change is striking and indicates a rather sharp change from basinal to shelf conditions. Here the Red River consists of two distinct members: (a) a lower member of light to dark brown dolomite, mottled in color and texture, resulting from the dolomitization of a very finely fossil-fragmental limestone (b) an upper member of white to cream dolomite, cryptocrystalline to lithographic, thin bedded, breaking to hackly, subtranslucent fragments, probably anhydritic in part.

These subdivisions are correlative with those basinward and may be seen in the Little Rocky outcrops.

The porous zone of the upper Red River, consistent throughout most of the extent of this formation, is absent to very poorly developed in this area.

The zero edge is an erosional edge, and the westward thinning of the unit is gradual east of the erosional edge of the Stony Mountain.

STONY MOUNTAIN

The Stony Mountain consists of cream to pale brown dolomite, crypto-crystalline to lithographic, commonly pinkish when wet. Occasional oolite zones and fossil fragments are noted in this area, but no quartz grains. The lower few feet of the unit are mottled in texture and color (cream to dark gray green) and may be correlative with the lower Stony Mountain of the central Williston basin.

INTERLAKE

The erosional remnant of Interlake present in the northeastern part of the area consists of pale yellowish brown to cream dolomite, mostly crypto-crystalline, with considerable oolitic, finely fragmental and saccharoidal material interbedded. Some algal (?) material is present. Small anhydrite inclusions are common. This unit has better porosity than any of the underlying carbonates.

It is difficult, on the basis of lithology as seen in drill cuttings, to separate the three units discussed above.

ASHERN

The Ashern is poorly developed in most of this area. Only the Gulf No. 1 Cornwell on the east flank of Boidolin dome has encountered more than a few feet of it. Gray green dolomitic mudstone, mottled with more or less dark red, is the dominant lithology here.

WINNIPEGOSIS

The Winnipegosis here is that of the edge of the shelf. It consists of white to light gray to brown gray dolomite, generally crypto-crystalline, sometimes lithographic, sometimes very finely saccharoidal. Minor amounts of included anhydrite are common in the upper part of the unit.

This is the only unit isopached for which the zero line shown must closely resemble the original limits of deposition.

SECOND RED BED

The Second Red is much better developed throughout this area and northeastern Montana than is the Third Red (Ashern), which is entirely absent in some areas. This fact, coupled with the fact that the Winnipegosis may closely resemble any of the carbonates upon which it rests, once led to the mistaken identity of the Second Red as Ashern, and the Dawson Bay as Winnipegosis, in northeastern Montana.

The Second Red consists of dark red to orange to green gray mudstone, dolomitic, with fine to coarse quartz grains and polished brown chert grains up to 3 mm. often found in the lower part.

This unit may lie upon a mild unconformity developed here as the Prairie evaporite and Winnipegosan reefs were being deposited north and east of this area.

DAWSON BAY

The Dawson Bay includes the second Red and a dolomite unit (lower Manitoban) which throughout this area ranges in thickness from 50 to 80 feet.