SUMPTER AREA GEOLOGY
By Dale Russell

The Sumpter quadrangle is an area of about 850 square mile in Baker, Grant, and Union Counties, northeastern Oregon, that includes several of the more productive mining districts, viz. – Cracker Creek (Bourne), Elkhorn, Cable Cove, Granite, Bonanza, and Greenhorn.

It lies near the middle of the Blue Mountains, a chain of ridges and mountain groups of different trends and altitudes that extends southwestward from the northeast corner almost to the center of the State. The higher summits in the Sumpter quadrangle are along Elkhorn Ridge and its northern continuation which is called the John Day - Powder River divide. Several summits within the quadrangle range in altitude from 8,500 to 9,000 feet above sea level and from 4,000 to 5,000 feet above adjacent valleys.

To the southwest the mountains decrease in height until they finally disappear in the plains of central Oregon. Lowlands that occupy no more than 5 or 6 per cent of the total area of the quadrangle include, in the northeast corner, a small part of Baker Valley and , in the southern half, Sumpter Valley along the upper course of Powder River and smaller valleys along the north and middle forks of Burnt River.

Access to these valleys and to most of the mountainous areas is afforded by automobile roads. U.S. Highway 26 crosses the southern part of the quadrangle from east to west Sumpter at the head of Sumpter Valley is the principal settlement and Bourne, Granite, and several other more or less intermittent or "ghost" mining camps are in the north-central and western parts of the quadrangle. Farming and stock raising are carried on in the valleys. Much of the quadrangle is within the Whitman National Forest, and lumbering is one of the chief industries.

The rocks of the Sumpter quadrangle comprises an older and a younger series separated from each other by a major unconformity and otherwise distinguished by marked differences in their character, occurrence, and relations to the motallifoerous deposits. The older series consists of pre-Tertiary rocks, most of them severely deformed and conspicuously altered formations of sedimentary and volcanic origin, such as argillite, greenstone, and schist, with relatively small amounts of limestone or marble Into these formations several bodies of granitic rock have been intruded.

Fragments of fossils, such as corals and the foraminifer Fusulina, found in some of the limestone bodies, indicate a Carboniferous (Pennsylvanian) age. Great thicknesses of rocks lie above and below the fossiliferous limestone, however, and may include both Mesozoic and pre-Carboniferous beds. The bedded rocks of this group show a prevailing westerly strike and appear everywhere to be closely folded. They are more or less schistose and commonly show evidence of faulting, but the main structural features are generally obscured by the smaller features and have not been satisfactorily worked out.

The known metalliferous lodes are confined to rocks of this (pre-Tertiary) series. The younger series includes formations of Tertiary and Quaternary age. The Tertiary rocks consist chiefly of lava flown and other volcanic materials with interbedded sedimentary rocks of Miocene and probably Pliocene ages. They have been slightly tilted or warped and broken by many normal faults, most of which strike northwestward and thus cross the structural trends of the older rocks at considerable angles.

The Quaternary deposits, composed mainly of unconsolidated alluvial and glacial material, occupy several large valley areas. They are not noticeably deformed. Placer gravels are found at different horizons in both the Tertiary and Quaternary formations.

PLACERS: A placer deposit, as generally understood, is a body of alluvial or other superficial material containing gold or some other valuable mineral that may be profitably extracted by simple washing. Placer gravels have a more general distribution in the Sumpter Quadrangle than metalliferous lodes Some of them, for example those of Miners Creek, Buck Gulch and upper Bull Run Creek, are well removed from known areas of lode mineralization, but in general the placer deposits form a fringe closely associated with such areas and extending beyond them in the direction of drainage. Most of the remnants of Tertiary gravels in the quadrangle are gold-bearing and, in fact, it is probable that they have produced as much if not more than the later deposits.

In the past the Tertiary gravels were extensively mined at French Diggings on the divide between Trail Creek and the North Fork of John Day River, at the "ghost" mining camps Winterville and Parkerville east of Greenhorn, and at the Weaver and Griffith mines near the divide at the head of Buck Gulch west of Sumpter. In places the early Quaternary terrace gravels contain enough gold to form placers and they have been mined to a small extent at Crane Flats and near Sumpter.

Many of the placer gravels in the Sumpter quadrangle are in the same drainage basins as the lodes and not far below them. This association is illustrated by the deposits along Oliver Creek and other streams that drain the Greenhorn district, and by those along Bennett Creek and Granite Creek, which drain respectively the Bonanza district and the area containing the Monumental, Buffalo, and other mines. The material composing these deposits is ordinary stream alluvium of Quaternary age and, near the lode outcrops, it may also include surface mantle not classified or rearranged by stream action In the glaciated areas ice action has interrupted and modified the ordinary process of placer deposition as illustrated in the vicinity of Bourne.

In that district the upper course of Cracker Creek, which drains an area containing the outcrops of the rich Mother Lode and other gold veins and would therefore be expected to contain placers, is practically barren. This condition is the result of glaciation which repeatedly scoured the valley of its placer gravels, transported them further downstream, and diluted them with much unsorted drift. Since the ice disappeared, time has been relatively so brief that the stream has been able only to rework the mixed material into the lean placers found along its lower course. In the same way is to be explained the absence of placers or the presence of lean deposits only, along the glaciated valleys of Rock Creek, Silver Creek, upper McCully Fork, and other streams that drain area of lode mineralization.

An exceptional placer deposit includes the North Fork or Klopp mine and other workings situated along the North Fork of John Day River near the mouth of Trail Creek. It is a heterogeneous bouldery mass forming the terminal moraine of the earlier glacier that descended the North Fork. Extensive workings made in its before 1909 show the material to be of low grade, but an abundant water supply and other favorable conditions have made possible the profitable working of a large part of the mass. Apparently the gold was derived from older placer gravels that lay in the path of the glacier and were plowed up and incorporated in the moraine. In several of the Valleys Quaternary gravels that were too poor or too difficult for the "early day" miners to work have, in later years, yielded much gold by dredging. A large deposit of this type in Sumpter Valley was actively mined for a number of years after 1914 and again since 1936.