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ANCIENT ALTIPLANATION TERRACES NEAR FAIRBANKS, ALASKA

The Fairbanks area in unglaciated central Alaska has long been the subject of geological study involving investigations of the gold-bearing bedrock and gravel, the perennially frozen gravel and silt, and the widespread loess deposits that blanket the area. Despite intensive study, no clear understanding has been reached regarding the origin of the subdued bedrock step-like terrace forms on crest of ridges and the coarse, angular auriferous gravel deposits of local derivation ubiquitous in the creek valley bottom of the area.

It is here suggested that the step-like forms on bedrock ridges and crests in the area are relict altiplanation terraces and that the frost-rived debris shed from the hills during terrace formation was transported to creek valley bottoms and slightly reworked by small streams to form the angular coarse sandy gravel present today. More than one stage of gravel formation is recorded. The upper terraces have been greatly rounded and subdued; the lower terraces are equally subdued and, along with the gravel, have been buried by 1 to 60 m of loess and reworked loess of Illinoian to Holocene age.

The presence of relatively level summits and large step-like forms on bedrock in the Fairbanks area have long been known, having been topographically mapped in 1907. The highest flat areas, about 650 to 900 m in elevation, were related to peneplain surfaces by early workers. These stepped bedrock terraces occur on ridges and hill tops (truncated flat-top hills) in the Fairbanks area at elevations from 260 to 900 m above sea level and are here suggested to be relict altiplanation terraces. The terraces possess at least one scarp (ascending and/or descending) and a tread surface. The tread or "flat" area is 5 to 100 m wide and 10 to several hundred meters long. This tread is not actually flat but slopes for 1 to 15 degrees parallel to the ridge crest. Terrace scarps may be from 1 to 30 m high. All treads and scarps are cut into

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bedrock, and bedrock crops out in the scarp or is near the scarp surface at most localities. The terraces exist on all bedrock types in the area.

In this area the tread and also the scarp are overlain by a veneer of blocky, silty rock debris $\frac{1}{2}$ to 2 m thick. Residual *in situ* bedrock knobs occur on and protrude above the terraces, especially the summit terraces. The knobs are tors and result from differential weathering and mass movement. They are 1 to 15 m high and are of the most resistant (less-jointed) parts of the bedrock.

In the Fairbanks area the terrace scarps and tors are greatly subdued, gently rounded, and overlain by a blanket of loess that is a few centimeters to 1 meter thick in most localities, but as much as 15 m thick near the Tanana River at elevations lower than 300 m. A forest of white spruce, birch, and aspen grows on the terraces except above elevations of 700 or 800 m, where shrub brush exists. Therefore, at altitudes lower than 700 m, the altiplanation terraces are greatly masked and only by detailed mapping and by knowledge of the characteristics of more active altiplanation terraces at higher elevations can one identify and recognize the altiplanation terraces in the Fairbanks area.

At elevations of 1500 m in the Yukon-Tanana upland and at elevations of 1150 m in areas in western Alaska are much younger and fresher looking altiplanation terraces. These "modern" altiplanation terraces at higher elevations are similar in size, shape, and form to those in the Fairbanks area, except that at higher elevations they have sharp scarps, no loess, and support only alpine tundra. The solifluction debris extends from the terraces down the hill slopes and into the creek valley bottoms, where the debris is waterworked and retransported, giving rise to a local subrounded coarse gravel similar to the creek gravel in the Fairbanks area. In some regions the fresher, sharper altiplanation terraces at higher altitudes can be traced continuously to lower altitudes on the same ridge, where they are older, more rounded, and similar to the existing Fairbanks altiplanation terraces.

The subdued bedrock stepped ridges and crests in the Fairbanks area are very old altiplanation terraces, the first such suggested in the Fairbanks area. They occur from elevations of 260 to 900 m above sea level, the lowest elevations ever reported for altiplanation terraces in central Alaska. As they formed, the frost-rived debris was shed as a solifluction blanket from the terraces down the slopes to creek valley bottoms, where the debris was transported short distances by water and slightly rounded. Considerable "gravel" occurs in valley bottoms, including placer gold. The solifluction layers are still present from the high terraces to the valleys. The altiplanation terraces, solifluction layers, and reworked creek valley gravel are now buried by loess and by retransported loess of Illinoian, Wisconsin, and post-Wisconsin age. The terraces are thus early to middle Quaternary in age and are believed to be the oldest yet reported.