

FIGURE 4—Altitude and configuration of the bedrock surface.

- EXPLANATION**
- Bedrock outcrop
 - Approximate alignment of principal valleys in bedrock surface—Line pattern indicates paleovalley
 - Bedrock surface contour—Shows approximate altitude of bedrock surface. Contour interval 20 feet. Hachures indicate depression features. Datum is sea level
 - Line of geologic section

Altitude and Configuration of the Bedrock Surface

The map of the altitude of the bedrock surface (fig. 4) was computed by the geographic information system as the difference between the maps of the altitude of the land surface and the thickness of the unconsolidated sediments. Land-surface altitude was defined by digital coverages (digital representation of a map), which were smoothed to produce a generalized land-surface coverage that has a resolution commensurate with the thickness coverage. The geographic information system was used to subtract the thickness coverage (fig. 3) from the smoothed land-surface coverage and to plot the resulting map of the altitude of the bedrock surface (fig. 4). Figure 4 is a smoothed surface and does not show small-scale features present in the bedrock surface. Thus, in areas where the unconsolidated sediments are thin, the altitude of a smoothed bedrock contour might be slightly above or below the altitude of a corresponding unsmoothed land-surface contour shown on the base map. These small discrepancies are beyond the intended resolution of figure 4.

In areas of thin unconsolidated sediment, the altitude and configuration of the bedrock surface (fig. 4) are similar to that of the land surface; however, the bedrock surface can have deeper valleys and greater relief than the land surface in areas of thick sediments. The geologic section (fig. 5) shows the altitude and configuration of the land surface and bedrock surface and the thickness of the unconsolidated sediments along a line extending from southwest of Greeley to north of Pleasant Valley (fig. 4). In the upland area southwest of Greeley, the unconsolidated sediments are thin, and the shape of the bedrock surface is similar to that of the land surface. Under much of Greeley and to the northeast of Greeley, the unconsolidated sediments are thick, and the bedrock surface does not correspond to the shape of the land surface.

Several shallow stream valleys north of the Cache La Poudre River are classified here as paleovalleys (fig. 4) because the small streams presently flowing in the valleys are unconfined; that is, the streams lack sufficient erosional capacity (competence) to have eroded these broad, deep valleys in the bedrock surface. One or more ancestral streams of greater competence may have cut these paleovalleys, which are now largely filled with the sediments and are poorly drained by the present streams. South of these paleovalleys, the valleys in the bedrock surface are closely associated with and likely formed by the ancestral Cache La Poudre River, South Platte River, Sheep Draw, and Ashcroft Draw.

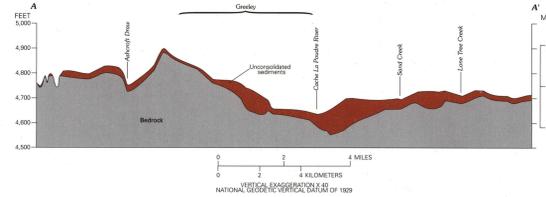


Figure 5—Geologic section.