SEDIMENTOLOGY AND STRATIGRAPHY OF THE BASIN-FILL SEDIMENTS IN THE SAFFORD VALLEY

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The late Tertiary sediments in the Safford basin consist predominately of fine-grained floodplain deposits, with smaller quantities of river gravels and lacustrine beds. The fine-grained, thin-bedded floodplain and lacustrine deposits have been collectively referred to as "lake beds", both in the literature and by workers in the field. This informal usage has resulted in some confusion because only a very small percentage of the volume of sediments has been recognized as being lacustrine in origin. I would like to propose that the term "lake beds" in this sense be discarded by workers in the area in favor of another term, "basin fill". Thus the major part of the sediments in the Safford basin can be recognized as the older basin fill, which comprises the bulk of the basin sediments, and the much younger inter-valley fill, which generally occupies the axial area of the valley and is related to relatively recent cutting and filling by the Gila and San Simon Rivers.

The basin-fill sediments typically consist of fine-grained sand and silt. Gentle cross-bedding, ripple marks, and small-pebble conglomerates are common, which suggest a fluvial floodplain environment of deposition. The basin fill is preserved along the margins at elevations as high as 3, 800 feet in some areas. In almost all the exposed marginal contacts of the basin fill with the basement rocks of the mountains the basin-fill sediments are fine-grained, and lacustrine clay and silt are often in contact with the crystalline rocks.

The central area of the basin has been deeply eroded. The Gila River enters the basin at an elevation of about 3, 050 feet and drops to 2, 700 feet at Ft. Thomas about 33 miles to the northwest. This would indicate that about 500 to 800 feet of basin-fill sediments have been eroded from the center of the valley. At least three major step-like "terrace" surfaces parallel the axis of the valley, and are often capped by a cobble-to-boulder conglomerate about 20 feet thick.

Some lacustrine deposits occur in the basin fill and consist of brightly-colored laminated clay and silt, volcanic ash, diatomite, and limestone. In some areas they grade laterally into the coarser floodplain sediments, and in other areas the contacts are sharply defined. One of the problems of this study is to determine the time relationships of the several sub-basins recognized within the area.

In the Safford basin pebble-to-boulder conglomerates are present, and they occur principally in four positions within the valley: (1) Channel sheets interbedded with the basin-fill sand and silt, mainly pebble-textured, and occuring almost exclusively in the lower part of the section near Sanchez; (2) cobble-textured channel fill related to either the modern inter-valley fill or to preserved remnants of older and higher inter-valley fills; (3) "terrace-cap" or "pediment-cap" conglomerates which form a lime-cemented cobbly mantle about 20 feet thick over most of the north side of the valley, and occur locally in many other areas; and (4) scattered fanglomerates of relatively recent origin, located at the mouths of the large mountain canyons. It is significant that no fanglomerates have been observed interbedded within the basin fill anywhere in the valley.

In the vicinity of Sanchez, where the Gila River enters the basin, there are cobble-to-boulder conglomerates high in the section, above 3, 250 feet elevation. They occur in old channels and contain thin intercalated silt beds. Massive silt units of the basin-fill sediments occur at higher elevations in the immediate area. The coarse sediments may be either interbedded conglomerates within the basin fill, or much younger channel fillings. It is significant that the conglomerates occur at or near the local land surface and are not in contact with the thick

sections of the upper part of the basin-fill silts in any of the observed exposures. It is the writer's opinion that most, if not all, of these conglomerates and the intercalated silt represent much younger reworked deposits, and are not interbedded with the basin-fill material. Farther downstream, opposite Solomon and Safford, similar channel fills are found near the crests of lower terrace scarps. As the terrace surfaces are cut on both the coarse deposits and the floodplain silts, it might be possible to interpret these cobble conglomerates as being interbedded with the basin-fill. However, the conglomerates do not extend laterally for more than about one-half mile from the modern Gila River valley floor (usually much less), and their lower surfaces are clearly unconformable with the underlying lacustrine and floodplain deposits. Moreover, the petrologic and textural similarity of the channel conglomerate to the topographically higher "terrace-cap" conglomerate during downcutting of the Gila River during comparatively recent times.

In conclusion, it can be said that almost all of the coarse material is of local origin, as well as a small amount of the fine material of the basin fill. However, the volume of material that had filled the basin from below 1, 400 feet elevation to over 3, 600 feet is so great that it seems likely that much of the fine material of the basin fill must have originated outside the basin. Climatic differences in the past may have accounted for the necessary water volume, but a much larger watershed area might have provided both the larger volume of water and a larger sedimentary provenance to supply the fine debris now found in the basin fill.