BRIDGE NEAR LIMYRA

The Bridge near Limyra (in Turkish: Kırkgöz Kemeri, "Bridge of the Forty Arches") is a late Roman bridge in Lycia, in modern south-west Turkey, and one of the oldest segmented arch bridges in the world. Located near the ancient city of Limyra, it is the largest civil engineering structure of antiquity in the region, spanning the Alakır Çayı river over a length of 360 m (1, 181.1 ft) on 26 segmental arches. These arches, with a spanto-rise ratio of 5.3:1, give the bridge an unusually flat profile, and were unsurpassed as an architectural achievement until the late Middle Ages. Today, the structure is largely buried by river sediments and surrounded by greenhouses. Despite its unique features, the bridge remains relatively unknown, and only in the 1970s did researchers from the Istanbul branch of the German Archaeological Institute carry out field examinations on the site. No information on the bridge survives from ancient sources. The first descriptions appear in European travellers' accounts from the 19th century. The British archaeologist Charles Fellows was the first to explore the region of Lycia, and visited the bridge in May 1840. Fellows, as well as T.A.B.

HISTORY

The bridge crosses the Alakır Çayı stream, whose ancient name is unknown, 3.2 km (2.0 mi) east of the ruins of Limyra (distance measured from the city's theatre) and 3.8 km

(2.4 mi) north of the modern coastline, close to the modern road from Turunçova to Kumluca. The local topography is dominated by the foothills of the Toçak Dağı mountains, which blend here with the alluvial bottomlands of the Bay of Finike. In this transitional area, the bridge was built immediately above the point where the narrow river valley opens into the wide estuary plain, and where the crossing of the river during the rain period would be obstructed by high water. While the eastern end of the bridge levels off at the gravel plain, the western end abuts directly to the rising rock wall of the mountain, presumably for protection against floods. The resulting sharp bend in the course of the road could also be exploited in case of need to block the road. A modern dam, Alakır Barajı, was constructed upstream for irrigation purposes and flood protection.

Lycia did not, in contrast to other Roman provinces, possess a very developed road system. While the north–south traffic was conducted primarily through the few river valleys, the east–west routes led, unlike today, mostly on and along the mountain ridges. This particular road, leading from Limyra over the Alakır Çayı and into the neighbouring region of Pamphylia and Attaleia, must have been of special importance, since the two regions were united in a single province, Lycia et Pamphylia, until the 4th century. In comparison to the main arterial roads of the Roman Empire however, the roads of Lycia were, with 3–4 m (9.8–13.1 ft) width, rather modest and confined to pedestrian and pack animal traffic. This is further corroborated by the fact that no wagon ruts are evident on the paving of the Limyra bridge, nor any traces of a parapet or breastwork.

CONSTRUCTION

With a length of 360 m (1,181.1 ft), the Limyra Bridge qualifies as the largest surviving engineering achievement of antiquity in Lycia. The bridge stands on 26 uniform segmental arches consisting of a double, radially laid course of bricks. At the eastern end, the original 27th arch has been replaced by two smaller, semicircular arches of later construction. The latter are built with a single course of bricks. Traces of the original, flat beginning of the collapsed arch are still visible on the piers.

At the time of Wurster's and Ganzert's visit to the site, the entire bridge was buried by river sediments up to the springing line of the vaults. No efforts to dig them up were

undertaken by Wurster and Ganzert. Only two of the 28 arches were exposed enough so that direct measurements of the clear span and the pier width could be undertaken. It was, however, possible to calculate the dimensions of the remaining bays from their exposed sections.

Only in a single case, between arches 26 and 27, were Wurster and Ganzert able to determine the breadth of a pier: 2.10 m (6.9 ft). Subtracting this value from the common arch span of 12.75 m (41.8 ft), a clear span of 10.65 m (34.9 ft) remains. Since all arches have a rise of ca. 2 m (6.6 ft), the Limyra Bridge has an unusually large span-to-rise ratio of 5.3 to 1. Such flattened arches were very rare at the time for stone bridges, and were not matched and surpassed