Transportation Architecture at Xochicalco, Morelos, Mexico[1]

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Trade and long-distance communication between areas were important aspects of pre-Hispanic Mesoamerican societies. In the absence of natural waterways, most resources were transported by human porters. Communication routes apparently followed intermontane valleys, coastal plains, and river systems, where population was densest and most easily reached. In contrast to those of many of the Old World civilizations and the Andean cultures of South America, most roads in Mesoamerica seem to have been simple paths without durable architectural features. The bulk of our knowledge of pre-Columbian communication routes comes from ethnohistoric and early historic sources, since many colonial roads were simply modifications of earlier routes to accommodate wagons (for a review, see Lee and Navarrete 1978).

The causeway systems of the Maya are the best-documented examples of early roads in Mesoamerica. Although the transportation function of these structures is still open to debate,[2] causeways around the site of Coba in northern Yucatan link it with the ceremonial center of Yaxuna, 99 km away (Thompson, Pollock, and Charlot 1932, Villa Rojas 1934). North of the Maya region, however, roads are rare. A network of pavements at Monte Albán in Oaxaca follows the natural contours of the terrain and links the various residence areas of the site (Blanton 1978); these winding transportation arteries were not part of an architectural design and do not provide access to the site's major ceremonial precinct (Blanton 1978:66). A regional network of ramps and roadways is reported from the Early Postclassic site of La Quemada in Zacatecas (Kelly 1968:774). Berghes's 1833 map shows 13 causeways leaving the site and running to and between small sites in the valley; Trombold's (1976) recent study documents more than 175 linear km of roadway connected to La Quemada. In Central Mexico, the earliest evidence for regional roads comes from Teotihuacan, where intensive mapping of the city and reconnaissance throughout the valley suggest that the main north-south and east-west streets extended out into the countryside (Millon 1973; Sanders 1965:121). Charlton's (1978) survey east of the Valley of Teotihuacan suggests that the transportation routes leading into western Tlaxcala and southeastern Hidalgo that are recorded ethnohistorically were being used at least as early as Teotihuacan times.

Regional reconnaissance in 1978 has revealed the presence of an Epiclassic road system in Central Mexico. Intensive mapping of the large Epiclassic center of Xochicalco in western Morelos has confirmed the existence of paved pathways running throughout the site and out into the valley (González Crespo and Garza Tarazona 1966; González Crespo, personal communication, 1973). Subsequent study has shown that these roads were important in the design of the city at the same time as they facilitated communication between sites (fig. 1).

Xochicalco has long been recognized as a site important during and after the disintegration of Teotihuacan's empire around A.D. 700 (Noguera 1945, Litvak King 1970). It is located on a hilltop with flanking residential terraces on the north, west, and south. Terrace construction and the positioning of limited-access ramps and gates suggest purposeful fortifications indicative of increasing militarism and social unrest after A.D. 600. Stylistic evidence indicates that Xochicalco was a major center throughout the Epiclassic, with long-distance trade relationships with the Mayan lowlands, Veracruz, the Valley of Oaxaca, and central Guerrero (Saenz 1962).

Mapping of the site revealed a well-planned network of ramps and pavements. Because of irregular topography, much of Xochicalco was extensively terraced. This had the effect of disarticulating major constructions and segments of the city from any overall plan. Paved thoroughfares were constructed

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[2] Folan (1977) points out that, while causeways *end* at major centers, few village or ceremonial sites are found along them, even in optimal resource zones.

to provide access to horizontally and vertically separated architectural groupings and were used as alignment axes for such groupings.

Major access to Xochicalco is from the south along a paved south-to-north thoroughfare. Three other pavements connect with this one at roughly 90° angles. Pavements converge with one another only through connecting plazas. Thoroughfares are 3–5 m wide and paved with a mosaic of rough-cut stones 25–50 cm in diameter. They appear to have been edged with finished-cut stone blocks, most of which have been removed and recycled in the residential construction of later occupants of the site.

The pavements do not appear to have been stuccoed except on their masonry edges. Pavements are flush with the surfaces they traverse except across slopes, where artificially inclined ramps were constructed that elevated the pavements and evened out the ascent across terraced areas before entering open patios. In some cases steplike stone abutments interrupt their smooth ascents. These ramps would have facilitated vertical movement within the site, beautified plaza-temple groups, and minimized the effects of erosion on pavements over sharply sloping surfaces. Entrance points into the site along the thoroughfares were guarded by large flanking mounds. In one instance a small bridge, presumably of wood, was apparently built along a thoroughfare to span a defensive moat.

Two pavements leave Xochicalco on its east side and extend out into the countryside. Each of these has been traced more than 3 km before it disappears in plowed fields. These pavements are rough-stone mosaic without stone edging; they average 2–3 m in width and are flush with the surfaces they

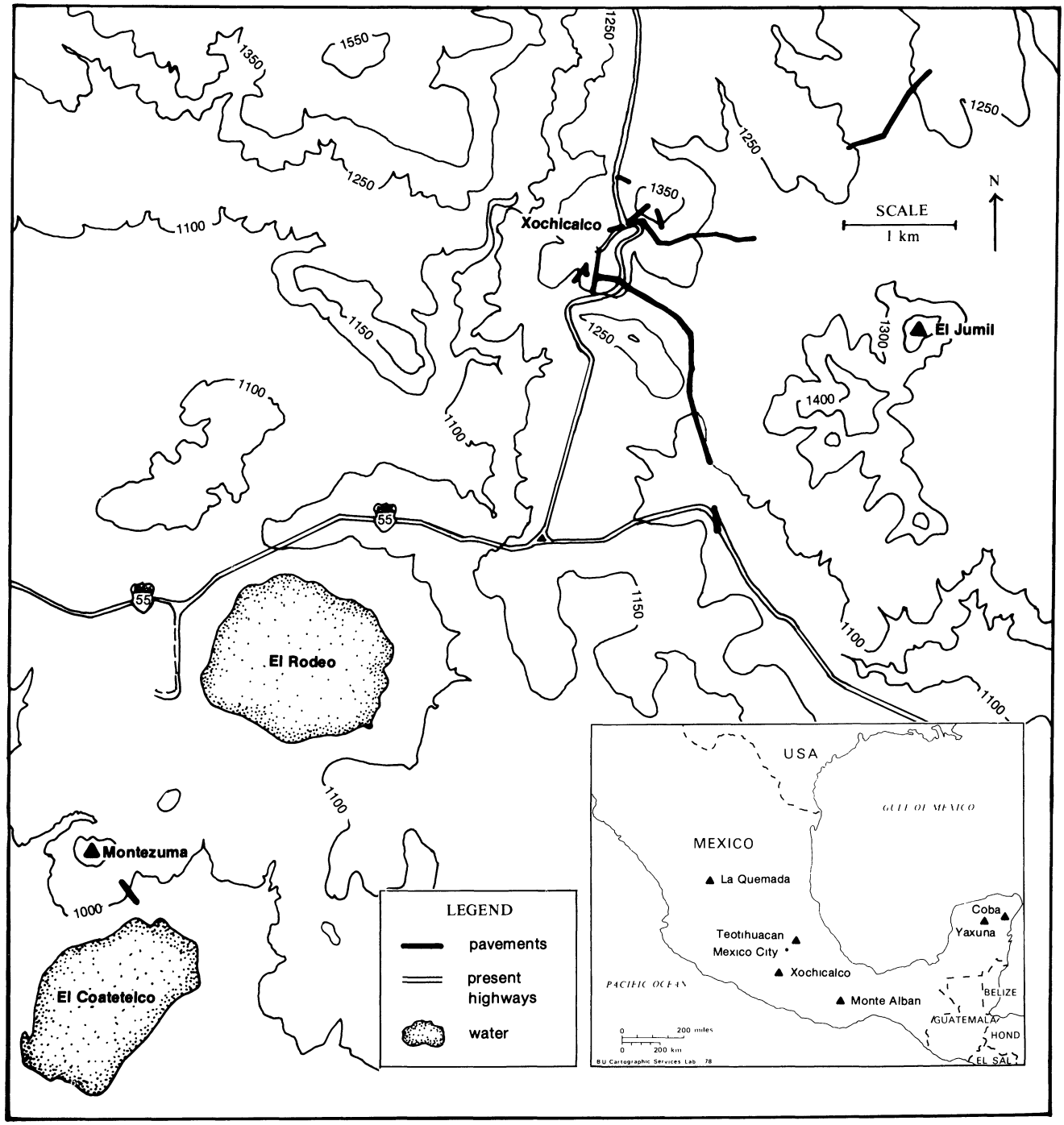

FIG. 1. Ramps and roads in the Xochicalco area.

traverse. Elevated ramps are found along these roads where they cross irregular terrain.

At Teotihuacan streets were laid out to form a north-south grid to organize civic and residential space and direct traffic flow within the community. At Xochicalco the thoroughfares fulfill the same basic function, although their form is visibly distinct; rather than a gridiron of streets, we find the use of partial axes as a compromise with the site's irregular topography. Major structures on the top of the hill are oriented with respect to the major thoroughfares. Residential and other civic monuments outside of this district conform to terrace orientations or topographic irregularities rather than to any master grid plan.

The presence of pavements radiating throughout the surrounding countryside indicates Xochicalco's central position in a regional system of sociopolitical and religious interaction. Contemporaneous sites with similar stone-faced ramps and pavements are known at Cerro Montezuma and perhaps at Cuauchichinola, some 7 and 18 km south. It is my belief that these were linked in a single regional communication network.

Xochicalco's roads helped structure the use of architectural space, facilitate and direct movement within the site, and emphasize and beautify approaches to important temple precincts. They were apparently built to fulfill more than just ceremonial needs. At the important hilltop site of El Jumil, no pavements could be detected which would have linked its ceremonial precinct directly with Xochicalco, and the ramp at Cerro Montezuma links a hilltop residential area with the lake at its base rather than with another ceremonial precinct. Both of these examples stand in contrast to what we find in the Maya region and may reflect a more important transportation, rather than ceremonial, function for the Xochicalco roads. The existence of these roads indicates the presence of a regional political unit capable of undertaking large-scale public construction. Thus they are important not only for what they add to our knowledge of pre-Hispanic communication networks, but also as evidence for the emergence of regional authority at a time when Teotihuacan was declining as the dominant political power in Central Mexico.

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