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ARCHAEOLOGY VI. ISLAMIC IRAN
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ARCHAEOLOGY

vi. Islamic Iran

From the outset Islamic archaeology in Iran was overshadowed by the numerous and splendid sites of earlier periods, and archeological investigation of Islamic sites began appreciably later in the Iranian world than in western Islam and in the Indian subcontinent. It was not until the 1930s that the first group of major Islamic sites was dug (C. K. Wilkinson, *Expedition* 13/3-4, 1971); even then, the excavators were not primarily interested in the Islamic material that they uncovered, since the medieval period was well known from literary sources. It is typical of this neglect that air photography was only rarely used for Islamic sites (see, however, E. F. Schmidt, *Flights over Ancient Cities of Iran*, Chicago, 1940, pls. 10, 24, 25-28, 30-36, 43-45, 47, 59-64, 74, 76, 79-82, 87-89, 91, 99, 102-03, 111). Later scholars are now working on the unpublished material produced in early excavations at Ray and Eṣṭaḵr (see respectively E. J. Keall and D. Whitcomb in *Akten des VII. internationalen Kongresses für Iranische Kunst und Archäologie*, Berlin, 1979, pp. 363-70 and 537-44).

In marked contrast, the numerous standing Islamic monuments of the country have attracted European interest for centuries. Archaeology is frequently

defined as a study of the human past through the things people have made and used; in this liberal sense of the term, the earliest archeologists working on Islamic material in Iran were perhaps the European visitors to the Safavid court. Men like Herbert, Chardin, Olearius, Tavernier, Kaempfer, de Bruin, and della Valle left engravings of cities and of individual Islamic monuments (see Sir Roger Stevens, "European Visitors to the Safavid Court," *Iranian Studies* 7/3-4, 1974, pp. 421-57). They were followed, after a lapse of nearly two centuries, by a group of predominantly French scholars. Texier (*Description de l'Arménie, la Perse et la Mésopotamie*, Paris, 1842-52), Hommaire de Hell (*Voyage en Turquie et en Perse*, Paris, 1853-60), Laurence, Flandin and Coste (*Voyage en Perse*, Paris, 1851, and *Monuments modernes de la Perse*, Paris, 1867), and the Dieulafoys together produced the first serious survey of the country's monuments, richly illustrated by ambitious measured drawings. The Russians Khanikov and Dorn accumulated much epigraphic material in Azarbaijan and the Caspian provinces (*JA*, 1862; *Mélanges asiatiques* 4, 1862), while the Englishman Ker Porter produced the first comparatively accurate plan of Ray (*Travels in Georgia, Persia and Armenia*, London, 1821). With the works of Sarre (*Denkmäler persischer Baukunst*, Berlin, 1901-10) and Diez (*Churasanische Baudenkmäler*, Berlin, 1918), modern art-historical techniques came to be applied to Islamic architecture in Iran. The 1930s witnessed an unprecedented information explosion as American, English, French, and German scholars such as Byron, Godard, Herzfeld, Pope, Schmidt, Schroeder, Siroux, Smith, and Wilber published the results of their intensive fieldwork—though little of it involved excavation. All subsequent work on Islamic archaeology in Iran has leaned heavily on the achievements of this astonishing decade of labor, which culminated in the multi-volume *Survey of Persian Art*.

The decades since 1945 have seen a greater interest in excavation. Increasingly detailed surveys of the country have been made, principally by the Iranian archeological services (see the journals *Bastan Chenassi va Honar-e Iran, Honar o mardom, and Barrasīhā-ye tārīḵī*)but also by individuals like W. Kleiss (published in *AMI* from 1969 onward) and M. Siroux (published in *Bulletin de l'Institut français d'archéologie orientale* and *Annales islamologiques*). These surveys indicate that few standing monuments of major importance remain to be discovered. The history of Iranian architecture from about 440/1050 onward is now known in its broad outlines; the trickle of newly discovered buildings serves mainly to fill in a few details. But only archaeology can illuminate the pre-Saljuq period, the very time when Iranian

Islamic architecture apparently took on its distinctive character, and when classic forms were evolved for mosques, *madrasa*s, tombs, and other public buildings. Again, only excavation will resolve the perennial controversies about the provenance and chronology of pottery, metalwork, textiles, and other decorative arts.

The opening of the excavations at Sīrāf in 1345 Š./1966 heralded numerous digs of specifically Islamic sites in Iran, but no excavation has yet yielded finds on the scale of the spectacular digs elsewhere in the Islamic world, such as Samarra, Fosṭāṭ, and Khirbat (Ḵerbat) al-Mafǰar. This is partly because the most important medieval cities, including Ray, Hamadān, Tabrīz, and Isfahan, lie inaccessible beneath their modern counterparts, while many of the great medieval centers—Herat, Balḵ, Marv, Bukhara, and Samarkand, for example—are located outside the borders of modern Iran. Thus the essentially urban nature of medieval Iranian civilization is still insufficiently explored by archaeology. Moreover, illegal excavations have ruined certain sites almost beyond recovery—particularly Ray, where scores of 4th-5th/10th-11th-century silks were removed from medieval graves in the 1920s (G. Wiet, *Soieries persanes*, Cairo, 1948). Sīrǰān and Sāva have been similarly vandalized.

The major achievement of Iranian Islamic archaeology to date is the Sīrāf excavation, which extended for seven seasons and is being continued by Iranian archeologists (excavation reports by D. Whitehouse, “Excavations at Sīrāf: First Interim Report,” *Iran* 6, 1968 and ff.). It has produced a new understanding of medieval society in Iran. It has shown, for example, how the Islamic community at Sīrāf continued the Sasanian tradition of servicing the trade from India and the Far East in such commodities as spices, perfumes, silks, and other luxury goods, including a new one: ceramics (D. Whitehouse and A. Williamson, “Sasanian Maritime Trade,” *Iran* 11, 1973, pp. 29-49). The site yielded a wealth of inscribed stone sarcophagi otherwise unrecorded in Iran (see especially D. Whitehouse, “Excavations at Sīrāf: Second Interim Report,” *Iran* 7, 1969, pp. 39-62). Even more unexpected were mausoleums used for communal burial, a practice that suggests a combination of Muslim and Zoroastrian customs (“Excavation at Sīrāf: Sixth Interim Report,” *Iran* 12, 1974, pp. 1-30). Such syncretism characterized the numerous short-lived heretical groups of Iran in early ʿAbbasid times. Archeological surveys indicate that irrigation systems brought water from the mountains that hemmed the city in, while its food came from the plains and valleys on the other side of the range. This complex supply system, necessitated by the cramped and

inhospitable site of the city, argues for a highly efficient local administration. It also helps to explain how Sīrāf could support a population approaching that of Shiraz (D. Whitehouse, "Siraf, A Sasanian Port," *Antiquity* 45, 1971, pp. 262-67 and "Excavations at Siraf: Fifth Interim Report," *Iran* 10, 1972, pp. 63-87).

Auxiliary disciplines of Islamic archaeology in Iran include numismatics and epigraphy. These enjoy special importance because many Islamic sites are too recent in date, too damaged by brick robbers or clandestine diggers, or too continuously occupied for an acceptable stratigraphy to be established. Excavations at Ray and Persepolis have produced sufficient coins to deepen existing information appreciably (see G. C. Miles, *The Numismatic History of Ray*, New York, 1938 and *Excavation Coins from the Persepolis Region*, New York, 1959), while the value of Islamic coins as absolute dating controls has been demonstrated time and again at Sīrāf, Bīšāpūr, and Kangāvar among other sites. Similarly, some monumental inscriptions, such as those on some of the Sīrāf grave covers, provide actual dates. Others mention names that can be identified from literary sources, such as the stamped bricks from Ghubayra (Ḡobayrā) with the legend *al-maleka* (A. D. H. Bivar and G. Fehérvári, "Excavation at Ghubayrā," *JRAS*, 1974, pp. 20ff.). More often it is only the style of the script that gives an approximate indication of date. The pioneer of this branch of epigraphy was S. Flury (1863-1936), but while his comparative tables of Kufic scripts (see especially "Le décor de la mosquée de Nāyīn," *Syria* 2, 1921, pp. 305-14, "La mosquée de Nāyīn," *Syria* 11, 1930, pp. 43-58) have slowly been augmented, an analytical corpus of Buyid and Saljuq inscriptions is still sorely needed for precise dating as well as for the identification of innovations and borrowings among local and regional schools.

Excavation is currently revolutionizing our knowledge of Islamic decorative arts, though the pace of discovery varies from one medium to the other. So far, the major schools of Saljuq metalwork have had to be defined purely on stylistic grounds, and these rarely command general agreement. Excavation could permit a more detailed subdivision and a fresh dating of key types of metalwork currently attributed to the pre-Saljuq period, but up to now even the origins of inlaid bronzes, one of the commonest types of medieval Iranian metalwork, are obscure. Except at Rebāṭ-e Šaraf and Nīšāpūr, very little medieval metalwork of quality has been excavated. Nothing of importance from Sīrāf; a bronze tripod and a quantity of household objects from Eṣṭaḵr, and only one Il-khanid bowl from Ḡobayrā, a site that yielded the oldest

lacquered object yet found in Iran—an Il-khanid wooden casket (A. D. H. Bivar and G. Fehérvári, “Ghubayrā,” *Iran* 13, 1975, pp. 180-81). Lacquer has also been found at Rebāṭ-e Šaraf. The finds of glass have likewise been sparse, apart from the Sīrāf material.

Excavation has become of equally crucial importance in the study of ceramics, especially as earlier classifications based on style alone approach the limits of their usefulness. Archaeology can help to resolve the authenticity of certain types of pottery, such as Garrūs ware (recently excavated at Taḵt-e Solaymān, Šayḵ Tappa, and Kangāvar), or identify the sites that produced luster ware. The discovery of numerous wasters at a given site strongly suggests that pottery of that type was made there; occasionally complete kilns have been found; and Gorgān yielded a cache of twenty carefully packaged pieces of glass, luster pottery, and other wares in mint condition (M. Bahrāmī, *Gurgan Faiences*, Cairo, 1949). A similar discovery was made in a house at Ḡazna (U. Scerrato, “Summary Report on the Italian Archeological Mission in Afghanistan,” *East and West* 10, 1959, pp. 23-55). At the remote site of Taḵt-e Solaymān the discovery of molds for making tiles and of bronze buckets containing remnants of glaze suggests that potters would on occasion travel to a site and set up their workshops there rather than transport the finished material over long distances (R. Naumann in *Diez Festschrift*, ed. O. Aslanapa, Istanbul, 1963). Only when this transport was by sea (i.e., along the Persian Gulf) were large consignments of pottery handled, as surface surveys have shown (A. Williamson, “Islamic Trade Routes in Southern Iran. Third Interim Report,” *Iran* 8, 1970, pp. 206-07. Later surveys by Williamson establishing trade patterns and plotting the distribution of pottery types (see published abstracts of papers delivered at the Sixth International Congress of Iranian Art and Archaeology, Oxford, 1972) have revealed that most fine pottery was made locally throughout medieval Iran and that only the rarest types, such as luster, *mīnāʾī*, and Chinese pottery, were transported for any distance. This pattern is borne out by the contents of major sherd collections (e.g., at Rome and Tehran); not only has it altered the current understanding of the role of the major pottery centers, but also sheds light on the scope of international trade in the medieval period (D. Whitehouse, “Excavations at Sīrāf,” *Iran* 9, 1971 , pp. 1-17; idem, “Chinese Stoneware from Sīrāf: The Earliest Finds,” *South Asian Archaeology* I, ed. N. Hammond, London, 1973, pp. 241-55).

In recent years an increasingly wide range of scientific techniques has been deployed in order to determine the date and provenance of the major types of

Iranian pottery. These techniques include neutron activation and other chemical analysis, X-ray spectrography, the Munsell color system, electron-probe microanalysis, and thermoluminescence (see U. Schultze-Frentzel and H. Salge, “Glazes and Decorating Colours of Persian Islamic Ceramics . . . and Transparent Seljuq Glass,” *Kunst des Orients* 10/1-2, 1975, pp. 80-90; J. W. Allan, “Some Observations on the Origins of the Medieval Persian Faience Body,” in *The Art of Iran and Anatolia*, ed. W. Watson, London, 1974, pp. 60-67). Ceramic bodies, slips, and glazes can all be analyzed, and by such means it is possible to detect repairs and additions to the object, to expose most types of fakes, and to distinguish between wares that look superficially similar. Sometimes it is even possible to determine provenance. These modern techniques have been used to resolve some of the longstanding problems of Iranian ceramics, such as the difference between the wares of Nīšāpūr and those of Samarkand (C. K. Wilkinson, *Nishapur: Pottery of the Early Islamic Period*, New York, 1973) or more generally, between imported pieces and their local imitations. Recent research also suggests that the origins of the so-called Saljuq white ware may lie in faience beads or in glass (J. W. Allan et al., “The History of so-called Egyptian Faience in Islamic Persia,” *Archaeometry* 25/2, 1973, pp. 165-73). As such work proceeds it will be possible to identify production centers and to reduce the overelaborate classifications of pottery types, hitherto based on observed details of style, shape, and decoration.

Modern techniques have also allowed scholars to plumb some of the technical secrets of the medieval potter, including opaque glazes, firing techniques, and distinctions among various methods of underglaze painting (notably simple slip colors versus genuine underglaze colors fixed by a clay paste). They have also produced many unexpected results, such as the findings that local potters at Sīrāf and other sites along the Persian Gulf seem to have been unaffected by imported wares; that not only slips but also numerous underglaze colors can resist lead glazes; and that sgraffiato pottery began to be popular in northwest Iran only around the mid-5th/11th century (J. W. Allan, *Keramos*, 1974). These scientifically based findings have also shown the need to revise accepted terminology: Saljuq glazes are not “alkali glazes,” and even the common term “lead glaze” is an oversimplification that ignores the other vital components of the glaze. The coordination of scientific analysis with literary evidence strongly suggests that at least some Iranian potters followed the recipes laid down in the technical treatise of Abu’l-Qāsem (J. W. Allan, “Abū’l-Qāsim’s Treatise on Ceramics,” *Iran* 11, 1973, pp. 111-20). Plant ash was in fact used for making glaze frits, while the iron-free white clay he describes was actually

being used two centuries earlier.

The value of excavations is by no means restricted to overturning shibboleths and vindicating medieval technical recipes. The sheer quantity of excavated material can document crucial periods of transition, such as that from slip painting to incised patterns (attested at Laškar-e Bāzār and Bost [J. C. Gardin, *Lashkari Bazar*, Paris, 1963] as well as at Taḵt-e Solaymān in Iran proper), or, in the case of Eṣṭaḵr, the transition from a modest glazed ware (including glazed barbotine ware) to various luxury types of Chinese or Mesopotamian inspiration. It can provide the necessary proof for theories previously based only on analysis of style and technique (excavations at Eṣṭaḵr, Qaṣr-e Abū Naṣr, and to a lesser extent Naqš-e Rostam have shown that the earliest Islamic pottery there was unglazed). Or it can shed light on the uses of certain types of pottery (all the "egg and spinach" sherds of imitation T'ang ware at Taḵt-e Solaymān were from bowls [R. Schnyder, "Mediæval Incised and Carved Wares from North West Iran," in *The Art of Iran and Anatolia*, pp. 85-94]).

Excavation of medieval kilns at Sīrāf suggests that the medieval potters used a type of updraft kiln in which the heat is drawn through the floor of the kiln to a hole at the top (J. W. Allan, *Mediaeval Islamic Pottery*, Oxford, 1971). The unfired pots were placed on pottery bars projecting from the walls, and stilts were used to separate them if they were stacked on top of each other. Kilns at Nīšāpūr, Sīrāf, and Gorgān alike used tripods and stoppers (see M. Y. Kiyani, "Jurjān," *Iran* 11, 1973, p. 196). The Sīrāf excavations have also yielded fragmentary potters' wheels and small ovens used for making glaze. Above all, they have clarified, with a wealth of detail, the exact balance between locally made pottery and imports, and they have also identified the sources of these non-local wares in order of importance. As a result it can now be proved that at Sīrāf imports from China—especially celadon and porcelain—were on a massive scale (D. Whitehouse, "Excavations at Sīrāf," *Iran* 9, 1971, pp. 1-17; idem "Chinese Stoneware from Sīrāf: The Earliest Finds," *South Asian Archaeology* I, ed. N. Hammond, London, 1973, pp. 241-55).

Through excavation medieval domestic architecture is gradually becoming better known. Striking similarities to modern houses have been noted, although unadvertised changes in social patterns, demography, or climate (e.g., in the Kermān area) might gradually have entailed major alterations, as yet undocumented. But the Nīšāpūr excavations indicate that Iranian kitchens and heating systems, have changed little over the last millennium (C. K.

Wilkinson “Heating and Cooking in Nīšāpūr,” *Bulletin of The Metropolitan Museum of Art* (*BMMA*), N.S. 2, 1944, pp. 282-91). At Eṣṭaḵr, Sīrāf, and Ray entire city quarters have been recovered, while recent work on Isfahan has reconstructed the service routes and main landmarks of the city in earlier times by combining the literary evidence with detailed on-the-spot surveys (L. B. Golombek, “Urban Patterns in Pre-Safavid Isfahan,” *Iranian Studies* 7/1-2, 1974, pp. l8-44; R. Holod, “Comments on Urban Patterns,” ibid., pp. 45-48). This project has already shown the degree of self sufficiency enjoyed by the various quarters of the city and has also clarified the role of the *čahār-sū*, the *ḥammām*, the mosque, and the bazaar in defining each local community, since the siting of these key buildings at the intersections of certain streets helps to establish their catchment area. Similar work is needed to clarify the relationship between a given town and its dependent villages.

Numerous houses were excavated at Sīrāf and these amplify medieval travelers’ reports of the luxurious stone multistory housing here (D. Whitehouse, “The House of Sīrāf Iran,” *Archaeology* 24/3, 1971, pp. 255-62). The windowless ground floors were apparently used for storage or perhaps even rented to the poorer classes. Most houses at Sīrāf (and remarkably enough, Nīšāpūr [C. K. Wilkinson, W. Hauser, and J. M. Upton, “The Iranian Expedition,” *BMMA* 32, 1937]) exhibit central open courtyards with up to fourteen rooms grouped around them. Stairs led to the upper story, which often had a gallery. Sometimes, reflecting the function of *ayvān*s in public buildings, a room at the center of each ground floor side opened into thc courtyard. At Taḵt-e Solaymān, however, the type of house common in ʿAbbasid and Il-khanid times had a cruciform central chamber with workrooms in the corners (R. Naumann, “Takht-i Sulaiman,” *Iran* 13, 1975, pp. 188-91). At Sīrāf building space was unusually limited, and people preferred to repair houses rather than building afresh. As in overcrowded medieval Cairo, façades were sometimes adjusted to conform to the line of the adjacent street. Whole quarters had broad thoroughfares intersected by narrow alleys, or streets forming a regular grid. Such patterns suggest official control, quite different from the haphazard layout of private housing in contemporary Susa (M. Kervran in *Cahiers de la délégation archéologique française en Iran* 4, 1974), or the miserable bazaar area of Sīrāf, sited near the Great Mosque according to custom. Here the shops were all small and pokey—the largest measured scarcely 3 by 2 m internally. Some had ovens. These structures prefigure the small lock-ups and workshops of modern bazaars. Sīrǰān yielded glassmaking and iron smelting installations (A. Williamson in *Excavations in Iran: The*

British Contribution, ed. P. R. S. Moorey, Oxford, 1972) while at Ḡobayrā a Muzaffarid industrial quarter complete with six metalworkers' furnaces, henna pits, and storage jars was identified (A.D. H. Bivar and G. Fehérvári, *Iran* 10, 1972, pp. 168-69). At Susa the industrial remains suggested a sugar refinery, with furnaces for lime and troughs to decant the syrup (J. Perrot, "Suse," *Iran* 12, 1974, pp. 217-18). Buns of iron slag found at Tappa Dašt-e Deh indicate an extensive ironworking industry (A. Williamson, "Tepe Dasht-i Deh," *Iran* 9, 1971, pp. 182-83). Bronze and iron were worked at Sīrāf from imported raw materials, and a large pottery with thirty kilns was excavated there (D. Whitehouse "Excavations at Sīrāf," *Iran* 9, 1971, pp. 1-17).

Public amenities varied in quality. The streets of Sīrāf were unpaved; alleys were apt to become choked with rubbish and had to be walled off. Yet earthenware pipes drained rainwater from roofs into stone-lined pits, and stone-lined drains were also found. The arrangements at Gorgān were more elaborate: one street, up to seven meters wide, had brick paving and a central canal that fed side channels running to the houses on either side M. Y. Kiyani, "Recent Excavations in Jurjan," in *The Art of Iran and Anatolia*, pp. 126-33). Sīrǰān and Susa also had an elaborate urban piped water supply and drainage system, while Nīšāpūr had ample underground water channels tapped by *āb-anbārs* and wells (C. K. Wilkinson, "Life in Early Nishapur," *BMMA*, N.S. 9/2, 1950, pp. 60-72). Elsewhere, as in certain quarters of 4th/10th-century Nīšāpūr (ibid.) and 9th/15th-century Sīrāf, the facilities were much more primitive. Houses were built of rubble and mud, floors were of trampled earth, and the walls had no stucco decoration. In striking contrast to this plainness, a house at Ray contained an octagonal chamber of sybaritic luxury, furnished with an octagonal pool and wall revetments of glazed tilework (A. U. Pope, *The Illustrated London News* 186, 22 June 1935), while in homes at Nīšāpūr and Dašt-e Deh (A. Williamson in *Iran* 8, 1970) respectively fine luster and Chinese pottery was displayed. All the wealthier houses at Nīšāpūr had plastered walls and floors; some even had ambitious wall paintings and carved painted plaster dadoes (C. K. Wilkinson et al. in *BMMA* 32, 1937). At Sīrāf the better houses had panels of carved stucco set above doorways, windows, or niches, while rooms with high ceilings sometimes had carved stucco cornices and friezes with Kufic inscriptions, probably of 4th/10th-century date. Yet the domestic water supply, drainage, and sewage of these wealthy houses were often inadequate or even nonexistent.

In monumental architecture the major lacuna is the medieval palace. Virtually

no standing royal palaces survive, although one was found at Sāva, yielding rich figural stucco (possibly including the panel illustrated in the *Survey of Persian Art*, pl. 518; similar panels are known from Ray, ibid., pls. 515-17); the excavations were illegal and unpublished. Many such palaces lie beneath modern Iranian cities. It is not clear whether Iran followed the early Islamic custom of siting the ruler's palace next to the Great Mosque. Literary evidence (e.g., from the *Šāh-nāma*) suggests that medieval palaces boasted large-scale wall paintings. Those found at Laškar-e Bāzār (5th/11th century) depict the royal bodyguard (D. Schlumberger "Le palais Ghaznévide de Lashkari Bazar," *Syria* 29, 1952, pp. 251-70) while at Samanid Nīšāpūr, where the context is not necessarily a princely one, the subjects include a mounted figure with a hawk (C. K. Wilkinson, "The Iranian Expedition," *BMMA* 37, 1942). At Sīrāf a palatial complex commanding a high ridge was found to date around 493/1100. Measuring at least 37 by 38 m, it contained some thirty rooms haphazardly arranged at different levels. An associated complex on a lower terrace had two irregular courtyards and chaotically disposed rooms. Nothing in either structure suggested that these were royal foundations (Whitehouse, "Excavations at Sīrāf," *Iran* 12, 1974, pp. 1-30). Very elaborate residences, perhaps palaces, were found at Sīrǰān and Tepe Dašt-e Deh (A. Williamson, "Islamic Trade Routes in Southern Iran," *Iran* 8, 1970, pp. 206-207). They are datable to the Buyid and Il-khanid periods respectively. At Taḵt-e Solaymān the palaces ensemble, mostly datable around 675/1275, was unusually complex, perhaps because of a desire to group its elements as closely as possible to the lake (R. Naumann, *Takht-i Suleiman*, Munich, 1976). The classical arcaded 4-*ayvān* scheme was modified here in a thoroughly novel manner, and was stretched far beyond its normal dimensions to accommodate the lake. This becomes the typical central pool or fountain of a Persian courtyard, writ large. Whence the Il-khanid palace becomes an agglomeration of essentially unrelated but individually magnificent elements; a huge *ayvān* with stalactites (U. Harb, *Ilkhanidische Stalaktitngewolben*, Berlin, 1977), an octagonal kiosk whose tiled dado displayed Chinese phoenixes and dragons, a gateway, a domed square—presumably a mausoleum—and various rectangular, cruciform, and duodecagonal structures of uncertain function. A Mongol kiosk with tiled decoration has also been found at Bīsotūn (E. J. Keall, "Qaḷʿeh-i Yazdigird," *Iran* 5, 1967, pp. 99-121).

Apart from palaces and mosques few medieval public buildings of note have been excavated. Tammīša in Māzandarān yielded a square keep with round corner towers, of possibly Samanid date (G. Fehérvári and A. D. H. Bivar, "The

Walls of TammīsÂ²ḫa," *Iran* 4, 1966, pp. 35-50). The mausoleums found at Sīrāf and Ḡobayrā (G. Fehérvári in *Art and Archaeology Research Papers* 6, 1974) add little to what is known from standing structures. A Saljuq *ḥammām* at Kangāvar is as yet unpublished; earlier examples have been excavated at Nīšāpūr (W. Hauser and C. K. Wilkinson, loc. cit.), Sīrāf (D. Whitehouse, "Excavations at Sīrāf: Fourth Interim Report," *Iran* 9, 1971, pp. 1-18), and Susa (J. Perrot in *Iran* 12, 1974). The identification of the Saljuq *madrasa* with figural decoration at Ray discussed by A. Godard remains dubious ("L'origine de la madrasa de la mosquée et du caravan sérail à quatre Īwāns," *Ars Islamica* 15-16, 1951, pp. 1-9). Three seasons of excavation at Hülegü's observatory at Marāḡa have revealed a plan comprising several concentric circles, within which, oriented toward the south, was a long corridor-like room with workrooms opening off it. The remains of a segmental ramp on a stepped platform, presumably a quadrant like that at Samarkand, were found, and fragments of tile and tile mosaic (the latter of significantly early date) suggest that the building was sumptuously decorated (P. Vardjavand, in *Akten des VII. internationalen Kongresses für iranische Kunst und Archäologie München 7-10. September l976,* Berlin, 1979, pp. 527-36). At Solṭānīya the immediate precincts of Öljeitü's mausoleum have been laid bare; they comprise a mass of small rooms and include traces of an enclosing wall of the greenish stone used in the other Mongol mausoleums of the city.

Excavations have greatly deepened our knowledge about religious architecture in Iran, and they have come increasingly to include standing structures. The removal of plaster and revetments to uncover the original wall surface has led in some cases (e.g. shrine of ʿAbd-al ʿAẓīm, Ray (M. K. Pirnia in *Bastan Chenassi va Honar-e Iran* 2, 1969), the shrine mosque at Besṭām, and the Friday mosques of Sāva, Naṭanz, and Borūǰerd, to the discovery of Kufic inscriptions and thus to a redating of these buildings. Ray (H. Karīmān, *Ray-e bāstān*, 2 vols., Tehran, 1345, 1349 Š./1967, 1970), and Solṭānīya (W. Kleiss, "Bericht über Erkundungsfahrten in Iran im Jahre 1971," *AMI*, N.S. 5, 1972, pp. 135-242), have yielded the plans of tomb towers apparently larger than any surviving examples. ʿAbbasid-type congregational mosques have been excavated at Susa (R. Ghirshman, "Une mosquée de Suse du début de l'hégire," *Bulletin d'études orientales* l2, 1948, pp. 77-79) and Bīšāpūr. At Sāva the Saljuq dome chamber is now seen to have replaced the remains of a hypostyle prayer hall with huge piers of unbaked brick, while the west *ayvān* also replaced a row of piers. Above these ran a painted Kufic inscription. Arcades, not *ayvān*s, occupied the north and east sides. Several subsidiary *meḥrāb*s of Saljuq date

have also been discovered. At Isfahan, where the arcades of the original mosque were probably distributed quite unevenly, the court façades in the Buyid period had columns decorated by small recessed and projecting bricks forming geometrical patterns. At the corners of the courtyard were quadrilobed pilasters displaying a decorated brick technique of great subtlety and refinement. These decorated columns reduced the size of the earlier courtyard with its simple, "naked" façade (E. Galdieri, *Isfahan, Masǧid-i Ǧumʿa: II periodo Al-i Buye*, Rome, 1973). Similar decorated columns have been found recently at the Ardestān Jāmeʿ. The masterpiece of this style is the façade of the Jorǰīr mosque, uncovered in 1955. Here epigraphic and vegetal themes, including a highly stylized Tree of Life, join the geometric ornament. Architectural features include polylobed arches and slender arched niches (A. Godard in *Survey of Persian Art* XIV). At Eṣṭaḵr the early mosque (4th/10th century?) had fluted columns and other elements in dressed stone, and even one of the bull capitals mentioned by Eṣṭaḵrī (D. Whitcomb in *Akten des VII. internationalen Kongresses für iranische Kunst und Archäologie*, pp. 363ff.). Even simpler early mosques have been found. That at Dašt-e Deh (2nd/8th century?) had an arcaded prayer hall seven bays wide and three deep; the courtyard was surrounded by mud-brick walls or by a single arcade (A. Williamson, "The Yaḥyā Project: Tepe DasÂ²ḫt-i Deh," *Iran* 10, 1972, pp. 177f.). At Fīrūzābād, the mosque had an ample sanctuary with two rows of columns (D. Huff, "Firuzabad," *Iran* 11, 1973, pp. 192-94). Several types of small mosque have been excavated in Sīrāf and Nīšāpūr. In one case, at Tepe Madrasa, the mosque complex (occupied 3rd-6th/9th-12th centuries) had been repaired and remodeled so frequently that the excavators could scarcely follow one level throughout (W. Hauser and C. K. Wilkinson, "The Iranian Expedition," *BMMA* 37, 1942). At its center was a small barrel-vaulted sanctuary with an *ayvān* opening onto a courtyard. Its early 3rd/9th-century *meḥrāb* was flanked by round colonnettes, while its decorative stucco illustrated three successive stages of development spanning the period between early Samanid and Saljuq times. In the latter period the mosque gained a brick minaret with an octagonal base and received an unusual decoration of bands of polychrome carved brick with epigraphic, floral, and geometric ornament. Some inscribed glazed bricks were also found. Surprisingly, no excavation has yet confirmed the literary evidence that fire temples were converted into mosques. The sites of most early mosques excavated so far show no evidence of previous occupation. The Great Mosque of Sīrāf is an exception, for it was built over a large Sasanian building, apparently a fort. As at Nīšāpūr, Sāva, and Isfahan—to limit the parallels to excavated mosques—the Sīrāf mosque

underwent constant changes over the three centuries of the city's prime (D. Whitehouse, "Excavations at Sīrāf: Fourth Interim Report"). At least five main periods can be distinguished. The earliest mosque, a rectangle measuring 44 by 57 m, reflected Moḥammad's house at Medina. Its sanctuary had four aisles parallel to the *qebla*; double arches encircled the square courtyard, and to the northeast was a square minaret. Successive campaigns enlarged the sanctuary, added numerous rooms below the earlier floor level, and provided facilities for ablutions, latrines, and storage rooms. The medieval mosque was of stone, often faced with plaster, and was paved; wooden cylindrical columns carried a wooden roof. Its decoration included painted and incised plaster, stucco crenellations (also found in the Bīšāpūr mosque), and stucco foundation inscriptions.

BIBLIOGRAPHY

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