

## Chapter XX

### A Tenth-Century Source for Architecture\*

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Historians of Islamic art have usually been hampered in their research by the absence of easy availability of contemporary literary sources for monuments. Our understanding of the actual use, appreciation and evaluation of ancient artefacts or works of art still relies largely on today's assumptions and constructs. Works dealing exclusively with lives of artists and the evaluation of their works are very rare. Dust Muhammad's few pages on Persian painters have been used to establish the chronology of Persian paintings, while his critical comments form the beginning of a critical (and technical) vocabulary.<sup>1</sup> Sadiqi's memoirs illuminate his own drawings and miniatures and give us a glimpse of a complex artistic personality.<sup>2</sup> Yet these two works, with their total preoccupation with criticism of painting and drawing, may be exclusively the products of their time, the sixteenth century, or of the tradition of royal libraries, particularly cultivated and encouraged in Iran, Central Asia and India in the fifteenth to the seventeenth century. They can also be understood as an extension of the traditional concern of poets and literati for the arts of the book. While mention of a treatise or manual on architecture did occur among the lost volumes of Rashid al-Din's *Universal History*, the earliest extant treatise is a seventeenth-century Ottoman work, reflecting the unusually important position occupied by architects in the Ottoman court and, perhaps, their specific practices.<sup>3</sup>

Technical treatises, while not providing contemporary or critical information, are nevertheless crucial in providing the specialized contemporary knowledge and vocabulary. Abu' al-Qasim's treatise on ceramics [311] has been of unique

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<sup>1</sup> For Dust Muhammad's treatise, see L. Binyon, J. V. S. Wilkinson and B. Gray, *Persian Miniature Painting* (1933; reprinted New York, 1979). Another example is Qadi Ahmad, whose *Calligraphers and Painters* was translated by V. Minorsky (Washington, DC, 1959).

<sup>2</sup> For a discussion of Sadiqi's memoirs, see A. Welch, *Artists for the Shah* (New Haven, 1976), pp. 41 ff.

<sup>3</sup> The manual on architecture was written by Safar Efendi for the Ottoman chief architect Muhammad Agha. See R. Lewcock, "Material and Techniques," in *Architecture of the Islamic World*, ed. by G. Michell (New York, 1978), p. 133.

importance in all discussions of Persian pottery of the thirteenth century.<sup>4</sup> The eleventh-century treatise of Ibn Badis gives a detailed description of bookmaking with a precise terminology for the preparation of pens, inks, colors, papermaking and bookbinding.<sup>5</sup> Other technical treatises have been noted in manuscript versions; only a minuscule number has been published.<sup>6</sup>

Thus the art historian must turn to other types of works, in which the description or evaluation of monuments or artefacts may be part of a historical narrative, a legal argument, a geographical description, a poetic metaphor, or a treatise on mathematics. Maqrizi's *Khitat Misr* and Qadi al-Rashid's *Kitab al-Dhakhā'ir wa al-Tuhaf* provide a hitherto insufficiently explored but quite extraordinary dimension to the study of Cairo and the Fatimid court, describing in extensive technical detail the construction of the monuments of Cairo as well as the holdings of the Fatimid treasuries.<sup>7</sup> *Hisba* manuals, regulating the production of various crafts, can contain valuable technical information. For example, the twelfth-century manual of Ibn 'Abdun mentions sizes of construction materials, bricks, tiles, joists and beams prescribed for construction in Seville.<sup>8</sup> Al-Kashi's fifteenth-century treatise on arithmetic provides instructions for the measurement and computation of surfaces of arches, domes and stalactites, thereby revealing the sophisticated theoretical background on which Timurid architecture, with its precise modular system and its series of structural innovation, could have drawn.<sup>9</sup>

[312] Finally, the ethnographic record can be used for information, particularly on processes of manufacture. In his description of the building industry in Tunis, Revault assumes a basic continuity of construction techniques and nomenclature, and extrapolates from the present to describe the materials and construction of seventeenth-, eighteenth-, and nineteenth-

<sup>4</sup> For the most recent translation and discussion of Abu' al-Qasim's treatise, see J. W. Allan, "Abu' al-Qasim's Treatise on Ceramics," *Iran*, 11 (1973), pp. 111–20.

<sup>5</sup> Al-Mu'izz Ibn Badis, "'Umdat al-Kuttab wa 'uddat dhawi al-albab." For translation, glossary and technical commentary, see M. Levey, *Mediaeval Arabic Bookmaking and its Relation to Early Chemistry and Pharmacology*, Transactions of the American Philosophical Society, n.s., vol. 52, pt 4 (Philadelphia, 1962).

<sup>6</sup> Two handbooks on carpentry are mentioned by Lewcock, "Material and Techniques," p. 133. The tenth-century treatise of Abu' al-Wafa' al-Buzjani on what a craftsman should know of measuring has been translated by A. S. Krasnova, "Geometricheskie preobrazovaniia," *Akademia nauk SSSR/Institut istorii estestvoznania ... v stranakh Vostoka*, vol. 1 (1966).

<sup>7</sup> Al-Maqrizi, *Khitat Misr* (Bulaq, 1854); Qadi al-Rashid, *Kitab al-Dhakhā'ir*, ed. M. Hamidullah (Kuwait, 1959).

<sup>8</sup> E. Lévi-Provençal, *Séville Musulmane au début du XII siècle: Le traité d'Ibn Abdun sur la vie urbaine et les corps de métiers* (Paris, 1947), p. 74. For a glossary of terms, see E. Lévi-Provençal, "Un document sur la vie urbaine et les corps de métiers à Séville au début du XII siècle: le traité d'Ibn Abdun," *Journal Asiatique*, 224 (1934), pp. 177–299.

<sup>9</sup> Jamshid Ghiyath al-Din al-Kashi, *Miftah al-Hisab wa al-Risalat al-Muhitayyah*, translated into Russian by B. A. Rosenfeld, with commentary by Rosenfeld and A. P. Iushkevych (Moscow, 1956), pp. 161–79.

century mansions.<sup>10</sup> Similarly, contemporary Yemeni or Persian building practices and materials have been given a historical currency reaching far into the past, because they are considered traditional utilizations of regionally available materials and skills.<sup>11</sup> While such argumentation may indeed be true, effort must continually be taken to check such information against the historical and archaeological record.

The following pages deal with one text, found in a particularly unexpected place, which provides a description of building techniques in tenth-century Khorasan or Transoxiana, areas which have so often been discussed by Professor Pritsak.

The *Kitab al-Ba'd wa al-Ta'rikh* (Book of Creation and of History) was composed in 355/965–6 by Mutahhar b. Tahir al-Maqdisi, who was from the city of Bust, now in southern Afghanistan.<sup>12</sup> It is one of several “histories” – the most celebrated being Mas'udi's *Muruj al-Dhahab*<sup>13</sup> – which sought, among other things, to provide a Muslim statement of the nature of the world and of history culminating in the Prophet's Revelation.<sup>14</sup> One of its chapters deals with the traditional argument for the existence of God; that is, that no creation is possible without a creator. In it al-Maqdisi compares the creation of the universe with the construction of a building, the making of a ship, and the weaving of a cloth. None of these existing “things” are possible without a maker, and thus the existence of the universe presupposes the existence of God.

The argument itself is hardly an original one, as it is merely a modification and concretization of the broader theological notion of a Prime [313] Mover. To limit ourselves to the Muslim world, al-Ash'ari, in his *Kitab al-Luma'*, uses the examples of cotton being spun and woven and of a mansion (*qasr*) having been erected in a wasteland to demonstrate the same point.<sup>15</sup> Further searches would no doubt uncover any number of other instances in which theologians, preachers, or just ordinary litterateurs utilized what certainly became a literary *topos*. What distinguishes al-Maqdisi's version is the unusual precision of his description of the building and weaving processes. Since this precision is of little significance to the theological argument and otherwise

<sup>10</sup> J. Revault, *L'Habitation tunisoise: Pierre, marbre et fer construction et décor* (Paris, 1978).

<sup>11</sup> Lewcock, “Material and Techniques,” p. 139; H. Wulff, *The Traditional Crafts of Persia* (Cambridge, Mass., 1966), p. 110 ff.

<sup>12</sup> *Le livre de la création et de l'histoire*, ed. and trans. by C. Huart, 6 vols (Paris, 1903); undated (?) Beirut facsimile of Huart's edition. Little is known about our author; Huart was, in fact, at some pains to identify him (*Journal Asiatique*, 9th ser., 18 [1901], pp. 16–21; *Geschichte der arabischen Literatur*, supp. 1, p. 222). See also F. Sezgin, *Geschichte des arabischen Schrifttums*, vol. 1 (Leiden, 1967), p. 337.

<sup>13</sup> Ed. and trans. by Barbier de Meynard and Pavet de Courteille (Paris, 1861–77).

<sup>14</sup> T. Khalidi, *Islamic Historiography* (Albany, NY, 1975), esp. chaps 2 and 3, with frequent references to our author.

<sup>15</sup> Al-Ash'ari, *Kitab al-Luma'*, trans. by R. J. McCarthy as *The Theology of al-Ash'ari* (Beirut, 1953), p. 6 of text, p. 7 of translation.

unique,<sup>16</sup> it is perhaps reasonable to suggest that it may reflect a somewhat more detailed practical knowledge of the two activities than would usually be expected. Too little is known about the author to use this information to imagine or reconstruct his life or social setting. But for architecture or weaving this text is a rare document on both the division of labor prevalent in Central Asia or northeastern Iran in Samanid times and the terminology for the various activities involved. This short note is limited to the section dealing with buildings. We will retranslate the text and then provide a few comparative observations drawn from the archaeological and ethnographic record.

The text itself reads as follows (vol. 1, pp. 68–9; translation, pp. 61–3):

If it were permissible to imagine the creation (*huduth*) of this world without a creator (*muhdiḥ*), it would in fact be possible to imagine the existence of building (*bina*) without a builder (*bani*), of a piece of writing (*kitabah*) without a writer (*katib*), of a design (*naqsh*) without a designer (*naqqash*),<sup>17</sup> of an image (*surah*) without a painter (*musawwir*). It would, in fact, be permissible to the one who sees a solid residence (*qasr*)<sup>18</sup> and a firm building (*bind*) to believe the following: (1) a pile (*kumah*) of earth (*turab*) was gathered together without a [314] gatherer (*jami*); it was then mixed (*akhtalata*) without a mixer until cohesive (*alfaltaffa*) and moist (*nada*); (2) then it was molded (*ansabaka*) into a brick (*libn*) of perfect proportion (*taqdir*) and admirable squareness (*tarbi*) without someone to plan it in advance (*sabiq*) and to fashion it (*darib*);<sup>19</sup> (3) then the foundations (*asas*) of the residence (*qasr*) laid themselves out, its footings (*qawa'id*) strengthened themselves (*tamakkana*),<sup>20</sup> its pillars (*saqat*) and transoms (*a'raq*) rose up,<sup>21</sup> so that its walls (*haytam*) could be extended (*tawala*) and its corners (*arkan*)<sup>22</sup> completed; and mud

<sup>16</sup> The point of uniqueness in so much detail is advanced with some reservation, since neither one of us is familiar with theological literature. Enquiries from colleagues more learned in these matters failed to elicit immediate parallels in Muslim or Christian literature, although the idea itself permeates such passages as 1 Corinthians 2:10 and ff., as has kindly been pointed out to us by Professor Leo Hines of Fitchburg State College, Massachusetts.

<sup>17</sup> There are several different ways of understanding the word *naqsh*, including “design, engraving, decoration.” In the absence of historical dictionaries, we chose the least specific meaning.

<sup>18</sup> The translation of *qasr* as “residence or mansion” seems more appropriate in this context than the usual “castle.” The more general *bind* was rendered simply as “building.”

<sup>19</sup> The terms *sabiq* and *darib* refer to pouring the mud brick mixture into the wood frame of the mold and beating it into its corners. See the commentary which follows.

<sup>20</sup> The exact activity involved here is unclear; most likely it still refers to the extension of the foundation into the first course of socle. See the commentary which follows.

<sup>21</sup> These two words are difficult to interpret. *Saqat* may be taken to mean tree trunk, whereas *a'raq* (sing. *'araqah*) means “transom between two courses of brick stone.” In this context, the author is referring to a process of half-timber construction where the wood frame is raised before laying in brick. See the commentary which follows.

<sup>22</sup> *Arkan* normally means supports or pilasters. One can understand it simply in this fashion or, because a wood frame has already been mentioned by the author, a less common meaning, “corners,” may be intended to describe some fashion of reinforcing corners. Such a technique is documented in stone and rubble masonry, although it is

bricks (*libn*) flew into the air, landed on their (proper) sides (*tarakamat'ala hawdshiha*), and arranged themselves in the most beautiful order; (4) then joists (*judhu'*) and beams (*jawa'iz*) fell on their own according to the measurements of apartments (*buyut*)<sup>23</sup> and of sectors (*khitat*) and were cut for building without anyone gathering them (trees) and cutting them; (5) then [wood] was hewn (*antajara*) without a hewer, sawed (*antashara*) without a sawyer, smoothed (*asfana*) without a plane; when [these wood pieces] are completed, the uneven parts straightened out, they rise on their own grooves (*mughariz*), transform themselves into ceilings over rooms (*buyut*), and their pillars (*asatin*) rise under them; (6) then a sheathing (*safa'ih*) covers them (ceilings), doors open and close on their own; (7) then the building is covered with lime (*takallasa*) and mud (*tasayya*),<sup>24</sup> paved (*taballata*) and plastered (*tajassasa*); it is decorated (*naqqasha*) with different kinds of ornaments (*tazawiq*) and designs (*nuqush*). And so the work is finished, the building completed, its separate parts united in the best fashion and the most perfect arrangement. Not one of its partitions, bricks, or wooden beams appear without the viewer's admiration for its wisdom and its purpose, all of this without the maker (*fa'il*) who made it, the fashioner (*sani'*) who fashioned it, the expert (*sa'i*) who formed it, the planner (*mudabbir*) who planned it!

[315] Al-Maqdisi has identified seven steps in the process of construction clearly separated by the conjunction “then.”

(1) *The preparation of mud bricks*: Before mud bricks can be formed, the earth not only needs to be thoroughly moistened and mixed, but an addition of straw and/or chaff is necessary to give it resiliency and to prevent it from crumbling. As observed in recent practice in Iran, the three components – mud, straw and water – are mixed with a hoe or by treading.<sup>25</sup> Al-Maqdisi's omission of straw in his description may indicate his unfamiliarity with the preparation process or, as is more likely, his assumption that this addition was common knowledge. His term *jami'* would then refer to the person treading the mud mixture.

(2) *Molding the mud brick*: The shaping of mud brick involved using a wooden mold frame, packing the mud mixture into it and beating it into the corners of the mold.<sup>26</sup> Al-Maqdisi's terms refer to the specialized workmen who manufacture mud brick.

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not commonly known in mud brick, half-timber construction. See the commentary which follows.

<sup>23</sup> The word *bayt* is another term with a long and complicated history. Since we are dealing with a single building, we prefer to interpret it in its early meaning of a discrete living unit within a larger complex; it could be as small as a single room (see below) or as large as a whole complex of rooms. See O. Grabar, R. Holod, J. Knudstad and W. Trousdale, *City in the Desert* (Cambridge, Mass., 1978), especially pp. 79–80.

<sup>24</sup> Although the process of covering the building with plaster is here described as having two parts – i.e., a covering with lime and then with clay – the author is actually referring to the mud plaster mixture found on most buildings studied.

<sup>25</sup> Wulff, *Traditional Crafts*, p. 109.

<sup>26</sup> The most complete discussion of the process is given in *ibid.*

(3) *The laying of foundation and building of walls*: The author does not specify the type of foundation that was laid. The simplest foundations could have been quite shallow stone rubble packed into a trench wider than the intended width of the walls, with a mud and lime plaster poured over the rubble course.<sup>27</sup> However, since the author also mentions another term, *qawa'id*, “footings”, or, even more likely, “socle”, the building in question could have been larger, requiring somewhat more extensive foundations. Since the author was presumably describing a manner of building in Khorasan and perhaps Transoxiana, it is interesting to compare his statements with the foundation techniques known through archaeological or architectural studies. A common way of preparing the area on which a building would stand was to level it and make a platform of hardened earth by tamping it (*pisé*) or by flooding it several times. Such a platform was then edged with rough cut stone. Footings for walls which would bear additional weight were laid in rough cut stone with rubble brick and mud lime mortar core. A variety of footings and foundations could be found within one monument.<sup>28</sup> The footings for the walls [316] were built above the ground to about fifty centimeters as a socle. It is on this socle that the wood framing elements would be erected.

Studies on Iranian and Central Asian architecture have been concerned largely with brick (actually mud or baked) building and vaulting techniques and have neglected the important role played by wood. Not only was it used for scaffolding and tie-beams in great monuments,<sup>29</sup> but its use in residential architecture appears to have been extensive. What al-Maqdisi is describing is a half-timber construction where the walls, with their openings for doors (and windows), are framed out in wood. However, he appears not to be describing a half-timber construction where there are any diagonal cross-bracing members or where the vertical members are too numerous to allow for horizontal brick coursing.<sup>30</sup> At Lashkari Bazar, mud brick as well as *pisé* was laid in courses with tie-beams inserted at infrequent intervals. The author of our text appears to be referring to an intermediate technique which used wood framing rather extensively, but still laid brick in courses rather than wedging them between the cross-bracing. Further proof of

<sup>27</sup> Cf. *ibid.*, p. 111.

<sup>28</sup> Cf. N. B. Nemtseva, “Medrese Tamgach Bogra-Khana v Samarkande,” *Afrasiyab*, 3 (Tashkent, 1974), pp. 11–113; V. A. Nilsen, *Arkhitektura Srednei Azii V–VII vv.* (Tashkent, 1966), p. 217; N. M. Bachinskii, *Antiseismika v arkhitekturnykh pamiatnikakh Srednei Azii* (Moscow and Leningrad, 1949), pp. 16–20; D. Schlumberger et al., *Lashkari Bazar: L'Architecture*, Mémoires de la délégation archéologique française en Afghanistan, vol. 18 (Paris, 1978), p. 15.

<sup>29</sup> Cf. Schlumberger, *Lashkari Bazar*, p. 16; Nemtseva, “Medrese Tamgach Bogra-Khana,” p. 113; Bachinskii, *Antiseismika*, p. 25.

<sup>30</sup> For examples of such techniques, see Bachinskii, *Antiseismika*, p. 30; T. V. Rapoport, “O progressivnykh traditsiiakh v arkhitekture narodnogo zhilishcha Uzbekistana,” *Arkhitekturnoe nasledstvo*, 13 (1961), p. 209.

horizontal coursing may be the reference to the corners (*arkan*) of the walls, which seem to have been interlaid in bond.

(4) *Preparation of parts of the superstructure*: That wood superstructures were utilized throughout history in seemingly treeless areas is confirmed by archaeological and ethnographic evidence. Apparently, wood was available wherever there was irrigated land. At Dalvarzin Tepe, a Kushan site in southern Uzbekistan, numerous charred fragments of wood beams were discovered.<sup>31</sup> The famous seventh- to eighth-century site of Penjikent used wood in its superstructures, supports and decoration.<sup>32</sup> Although Lashkari Bazar is better known for its rich collection of vaults, some traces of wood superstructures, destroyed by the conflagration in the mid-twelfth century, have been recorded.<sup>33</sup> There are a few [317] monuments, such as the *masjid-i jami* of Khiva, which still retain some of their early (tenth- to twelfth-century) elements.<sup>34</sup> According to the ethnographic record, wood joists and beams are probably the most ubiquitous superstructure in domestic architecture throughout Iran and Central Asia.<sup>35</sup>

(5) *The assembling of the ceiling*: Although al-Maqdisi seems to be describing domestic architecture, the edifice is not a simple peasant house. Because it has a ceiling, it must be a mansion or urban residence. The wooden pieces mentioned by the author are battens which were grooved to receive panels of wood mosaic.<sup>36</sup> They have also been recorded in traditional domestic architecture of Tajikistan, the Ferghana valley, and the Hindu Kush. What is even more important for our purposes is the discovery of charred remnants of a paneled mosaic ceiling in the reception hall of a residence at Dalvarzin Tepe.<sup>37</sup> Such a find indicates the continuity of a building tradition and allows us to utilize comparative examples from the ethnographic record with more certitude.

The rooms described in our text must have had spans larger than the available beams. Their ceilings were supported by wooden pillars or columns. For certain areas of Central Asia, a typology and chronology of wood elements has been developed.<sup>38</sup> In Iran, such material still needs to be

<sup>31</sup> G. Pugachenkova, *Dalvarzin Tepe* (Tashkent, 1978), p. 196.

<sup>32</sup> V. L. Voronina, "Arkhitelturnyi ornament drevnogo Piandzhikenta," in *Skulptura i zhivopis drevnogo Piandzhikenta* (Moscow, 1959), pp. 107–8.

<sup>33</sup> Schlumberger, *Lashkari Bazar*, pp. 16, 98.

<sup>34</sup> V. L. Voronina, "Kolony sobornoj mecheti v Khive," *Arkhitelturnoe nasledstvo*, 11 (1958).

<sup>35</sup> Bachinskii, *Antiseismika*, p. 32; Rapoport, "O progressivnykh traditsiiakh," p. 215; V. L. Voronina, *Narodnaia arkhitelturnaia severnogo Tadzhikistana* (Moscow, 1959); Wulff, *Traditional Crafts*, pp. 110–14.

<sup>36</sup> Wulff, *Traditional Crafts*, p. 87, and Rapoport, "O progressivnykh traditsiiakh," p. 215, describe the construction of traditional ceilings in detail.

<sup>37</sup> Pugachenkova, *Dalvarzin Tepe*, p. 195 and fig. 129.

<sup>38</sup> Cf. Voronina's works on Ferghana and Penjikent, and her "Order v narodnoi arkhitelturne Tadzhikistana," *Arkhitelturnoe nasledstvo*, 19 (1972), pp. 183–91.

studied, although the restoration studies of the Ali Kapu and the Chihil Sutun palaces in Isfahan now provide important information on the role of wood in Safavid architecture.<sup>39</sup> Mention should also be made of the relatively early (eleventh- to twelfth-century) wood structures in Abyaneh, north of Isfahan, and in Turan Pusht, west of Yazd. Little information is available on wood structural members in the region of Bust, although remnants of carved and painted wood consoles found at Lashkari Bazar might indicate a larger role for wood than is usually supposed.

(6) *Roofing and setting of doors*: The sheathing mentioned by the [318] author implies a flat roof, although it is not described in detail. Most likely, the covering consisted of reed matting or ceiling boards.<sup>40</sup> It was subsequently covered by several layers of a mud, lime and straw mixture. The thickness of the roof varied from region to region. The doors are set into their frames, already built during the construction of the wood skeleton, through prepared socket holes.<sup>41</sup>

(7) *Finishes*: Although the author has indicated two separate processes for finishing the walls of the building (*takallsa wa tasayya*), they were probably rendered in one step with a mixture of mud, straw, and lime. Such a procedure is well attested in archaeological and ethnographic sources.<sup>42</sup>

The term *taballata* can refer to any kind of paving. The author may have had a specific material in mind, such as the variety of baked paving bricks that were recovered from Lashkari Bazar.<sup>43</sup> The finish coat of gypsum plaster would have been applied only in sheltered areas, while the decoration mentioned by the author could have consisted of carved plaster and paint similar to that found at Lashkari Bazar.

The type of building described belongs to domestic rather than monumental architecture, in spite of its size and decoration. Examples of domestic architecture or contemporary descriptions of houses are very rare for this time. This text, therefore, is an important addition to the historical record. Yet several difficulties are apparent. Although the author is supposed to be from Bust, he may not have had a local building in mind. The information on construction techniques recently made available for Lashkari Bazar indicates a more extensive use of *pisé* for walls, intermixed with courses of mud brick, and much less wood than indicated by the author. Most striking

<sup>39</sup> C. Zander, *Travaux de restauration des monuments historiques en Iran* (Rome, 1968).

<sup>40</sup> These are mentioned by Wulff, *Traditional Crafts*, p. 111, and Rapoport, "O progressivnykh traditsiakh," p. 209.

<sup>41</sup> Wulff, *Traditional Crafts*, p. 86.

<sup>42</sup> Cf. Schlumberger, *Lashkari Bazar*, p. 15; P. I. Kostrov, "Tekhnika zhivopisi i konservatsiia rospisi drevnogo Piandzhikenta," in *Zhivopis' drevnogo Piandzhikenta* (Moscow, 1954), pp. 161–2; Zander, *Travaux de restauration*, p. 334; Rapoport, "O progressivnykh traditsiakh," p. 218; Wulff, *Traditional Crafts*, p. 112.

<sup>43</sup> Schlumberger, *Lashkari Bazar*, p. 17.





