

Attilio Petruccioli

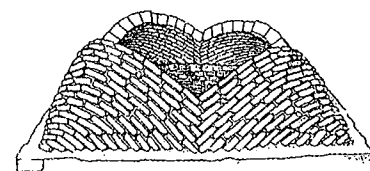
An Atlas of Building Elements in the City of Bukhara

Architectural restoration work has primarily been focused on great historic monuments. Although theories of restoration are fluid, there is a pragmatic general agreement, following UNESCO's principles, that a project of restoration should bring a building back to the best condition possible and make it useful again. In order to preserve the historic and aesthetic value of the building it is generally accepted that the monument may be totally or partly frozen in time.

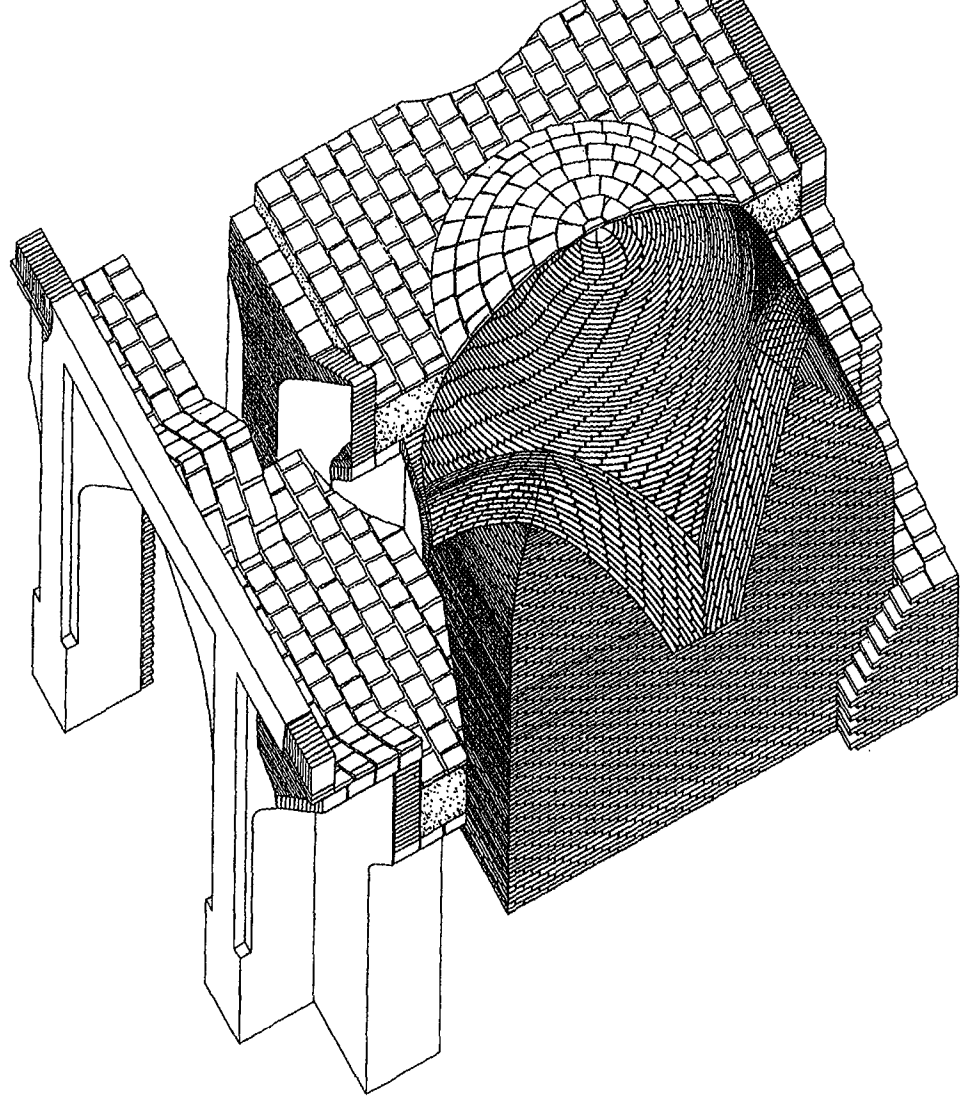
The urban fabric and vernacular architecture have, on the contrary, long been victims of neglect. In many countries monuments are isolated from the urban fabric by a complete demolition of its surroundings, and wide streets have been constructed through the middle of residential districts, tearing the fabric. Additionally, when dwellings are restored they are generally victims of hurried modern construction techniques.

I do not support the idea of the urban fabric as environmental context, as was proposed after the conference of Gubbio in 1960, which suggests extending the concept of the monument to the entire walled city and also suggests a folklorist function for the fabric. I would instead put forward the idea of the urban fabric as a structure in which each element is logically related to the others. The enormous importance of the fabric lies in the fact that elements such as subdivisions of plots and units, additional structures on top of roofs, and encroachments into courtyards are all reflections of the daily life of the inhabitants. The urban fabric has an ethical value because it holds the expression of people's hopes and struggles. A restoration project dealing with it must be based on the idea of transformation and process, which allows continuity between past and future. The importance of the urban fabric comes from being the record of historical memory and that is where the principles of proper future designs are located.

Currently we face a deep crisis in building construction. Traditional knowledge of construction, of techniques and types, has been lost to



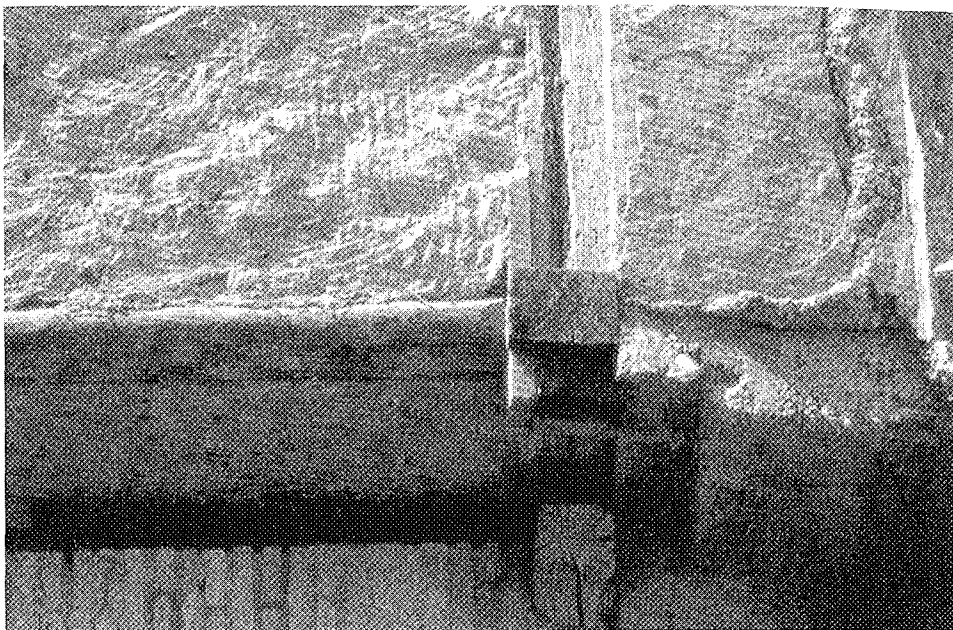
Typical brick pattern of a dome structure



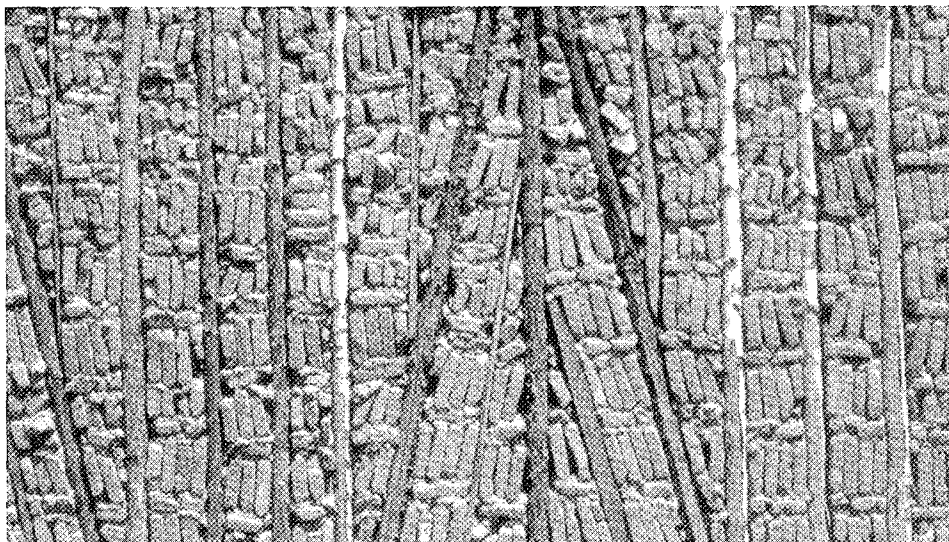
*Isometric view of a typical
karawansaray's module,
dome and its front*

most people. The ideology of Modernism, which required a separation from tradition, has favored the use of completely new materials and techniques. The disasters created in restoration work by reinforced concrete, with the Parthenon at the top of the list, are endless. This is particularly true in Central Asia where seventy years of prefabricated building techniques have lead to two fundamentally erroneous principles underpinning any restoration work. Restoration has come to mean creating a replica or completing unfinished or partially ruined monuments. Conservation is translated into demolition and substitution of the residential urban fabric.

A codified methodology for the restoration of more modest architecture, mainly traditional masonry buildings, does not exist. Conservation is allowed to progress on a case by case basis, thus being subject to the decisions of particular owners, and to the availability of increasingly rare local labor skilled in traditional construction technologies.



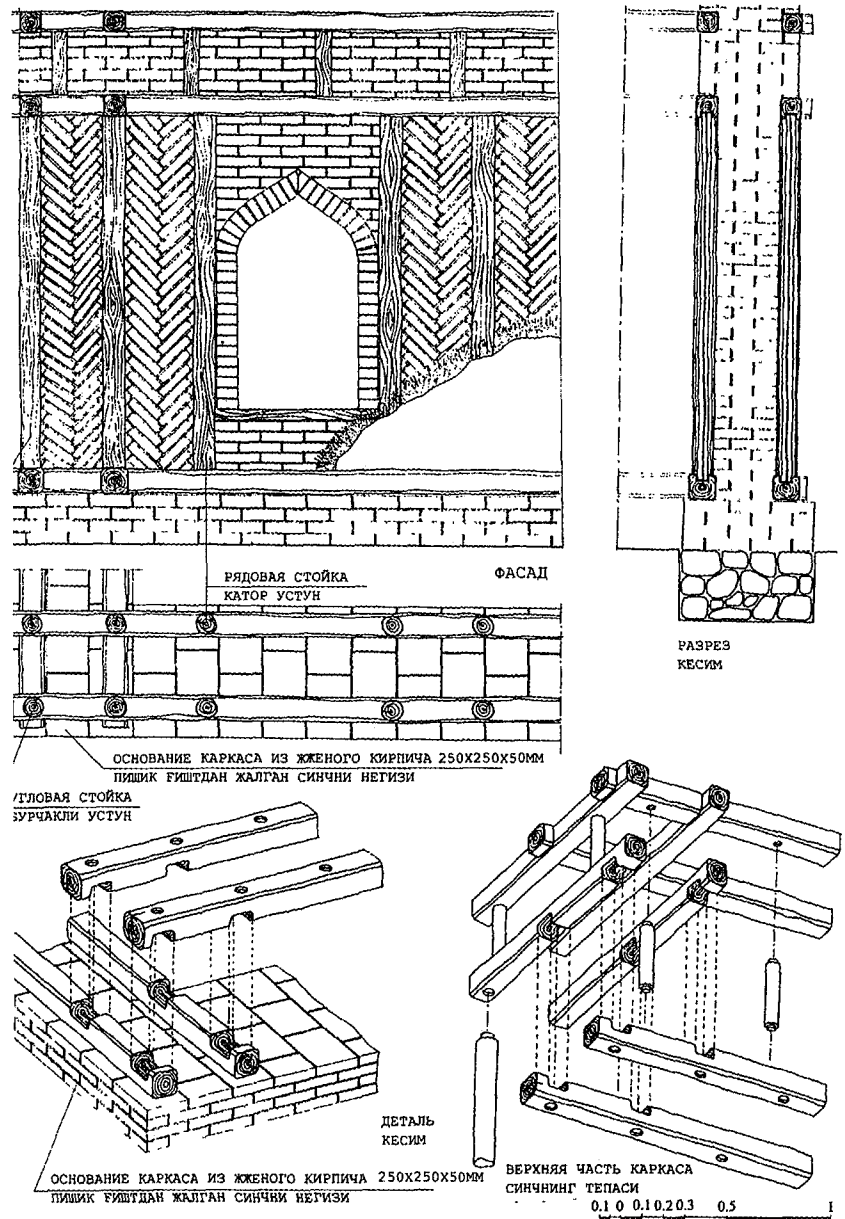
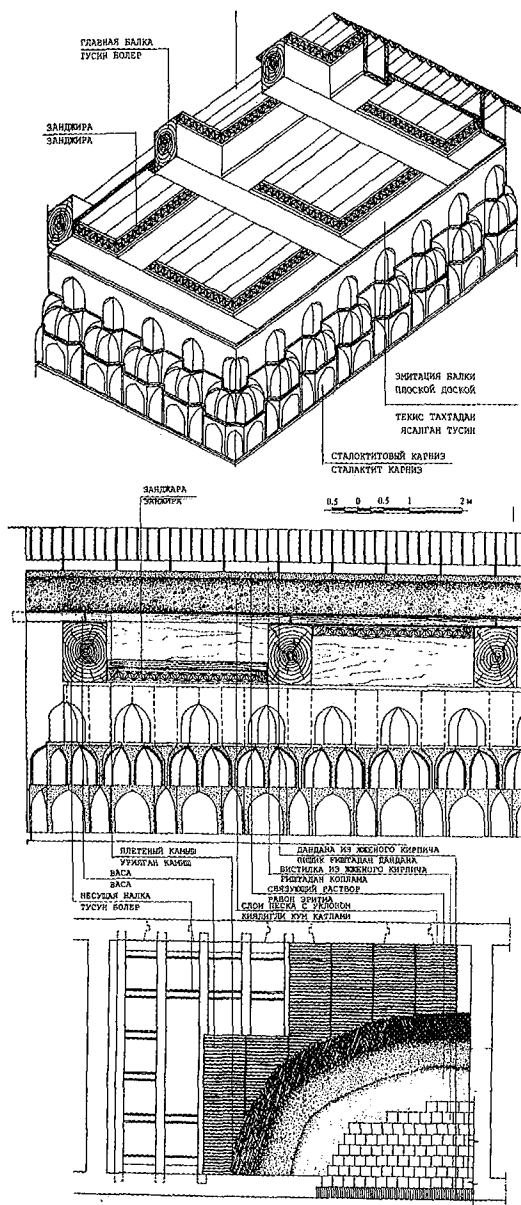
Detail of the wooden beam-post joint at foundation



Clay masonry filling of the wall



Preparation of the wall finishing, i.e., mortar of mud and straw



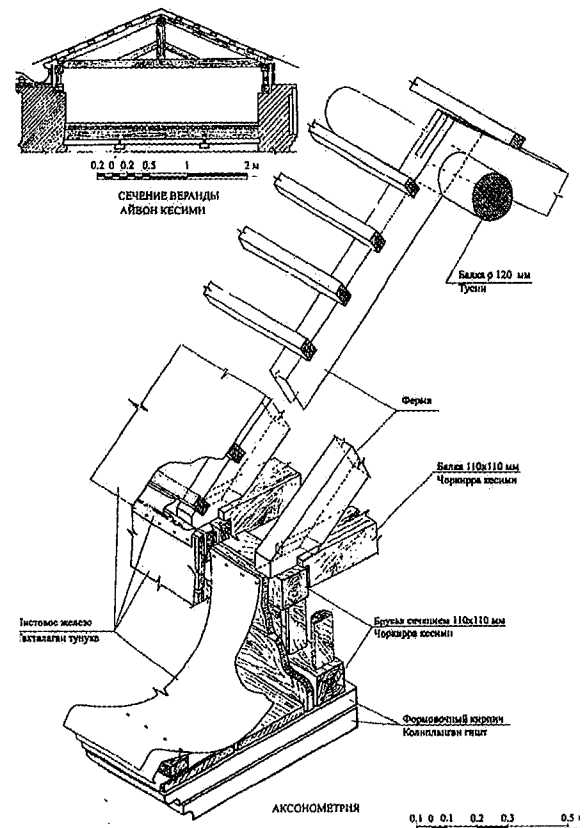
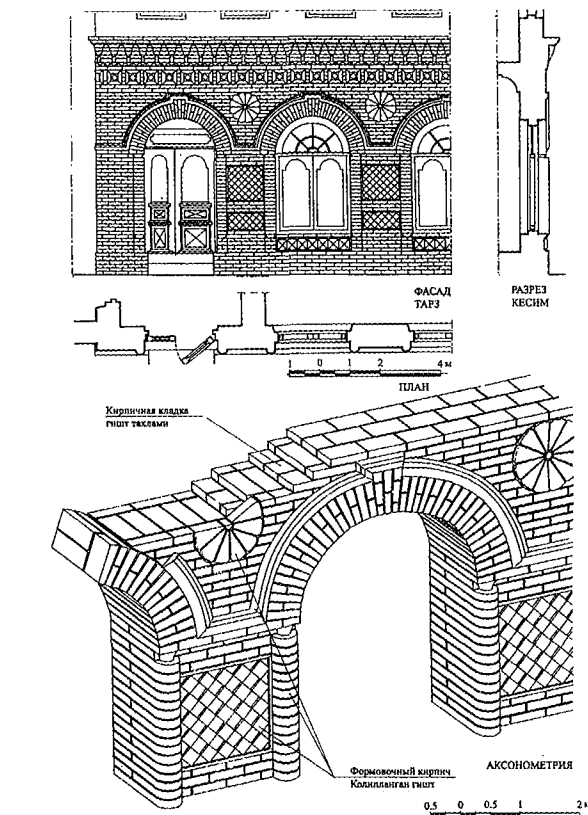
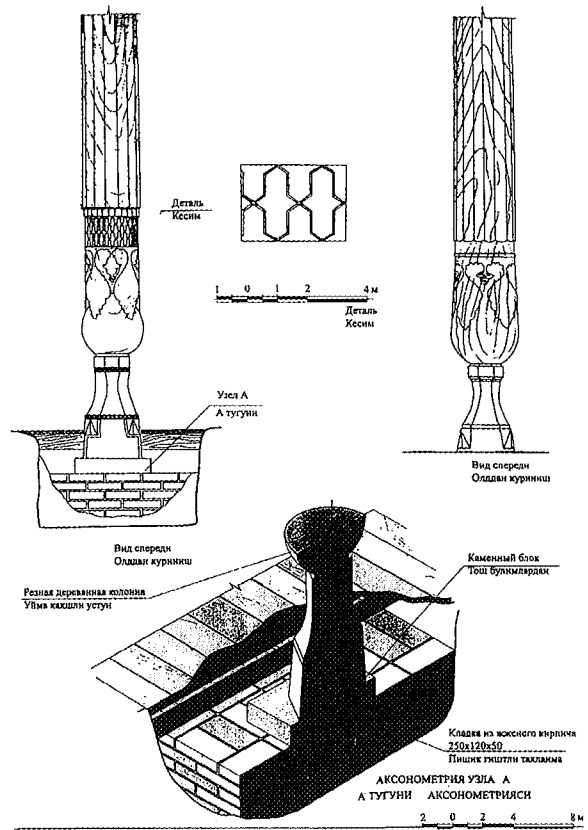
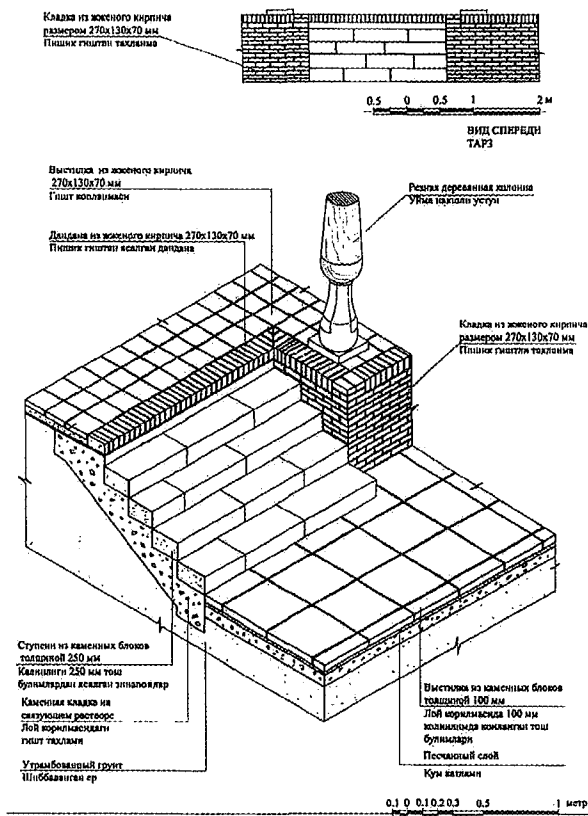
Isometric and cross section view of the roof structure, roofing and ceiling. The bottom of the figure shows the roof framing, lath and plaster based ceiling. Right: Details of the typical structural module and its masonry filling, whose no load bearing conditions enhances the seismic performance of the structure.

Next page: above: Details of the paving and carved wood post at the entrance of the loggia. Below: To the left, details of the brick construction technique of the beginning of the century; to the right, details of the roofing system of the same period.

The Atlas is a first important step towards the establishment of a reliable reference point for those involved in restoration and conservation projects in this period of crisis.

There are no precedents in the Islamic world and only two examples in Europe. The *Manuale del recupero*, created by the Architecture and Planning Office of the Municipality of Rome, is one of the most successful attempts. But because of the specific nature of the construction techniques described, it has little chance of being used outside its particular cultural and architectural context.

The other example is the French *Arts et metiers*, the so-called *compagnonage*, which has been published without interruption since



1700. Its specialized information is subdivided according to different types of construction: from vaults, foundations, and masonry, to mortar, plaster, and stucco. It's an extraordinary compendium of cultural heritage and patrimony.

The objective of the Atlas is two-fold. First, it aims to compile scientific knowledge of building components typical of the geographical area being studied. And secondly it provides a set of criteria for restoration and rehabilitation, focusing on the improvement of the functional performance of individual elements as well as of the building as a structural whole.

The Atlas is organized as a repository dedicated to the art of building. It consists of highly detailed working drawings accompanied by written information in Russian and Uzbek, and it indicates with great precision the materials, building components, techniques, tectonics, and resources used in the local urban fabric.

Compiling the Atlas was done in two phases. The first was an on-site survey of the building's measurements and tectonics, with particular attention to partially degraded structures to allow an in-depth understanding of the layering of construction details. This phase was focused on understanding the building as a structural whole, concentrating on its finite building components and relative assembly, in categories such as the following: Masonry: construction techniques and construction details; Vaults: brick cross vaults and false vaults with *muqarnas*; Ceilings: double warp ceilings, lacunar and caisson ceilings; Roofs; Floors: various geometries and textures; Doors: plank doors with inset panels, door hardware; Windows and *Musharabiyyas*; Stairs: materials, construction techniques, tread and raiser proportions.

The second phase consisted of on-site research in local archives of extant drawings, documents, construction contracts and bills. This phase was an in-depth compilation of historical and archival research and analysis, which lead to a better historical understanding of the surveys, and to a formulation of categories of the different components according to qualitative and quantitative types and their principal variations. The historical period under examination ranged from the 18th century to the early 1920s.

The next step in the creation of the Atlas is to illustrate the process of restoration, rehabilitation and structural improvement as an integral part of the building component's evolution, which can be understood by careful analysis of the structural elements. Topics to be covered include construction and restoration of vaults; interventions relative to the flow of lateral walls; static improvement of

wooden ceilings; and structural improvement of staircases. Finally, an example of structural restoration will be included to illustrate the theoretical and technical knowledge required to make extant structures resistant to earthquakes.

The Atlas in its final form will be a manual which aims to fill a gap in the restoration and rehabilitation of minor architecture. It will offer guidelines to construction firms, local craftsmen, designers and contractors. It is not intended to be a set of prescriptive norms, but rather a collection of instructions to be absorbed into the local building codes. The value of it lays in the fact that it is not directed towards professionals of a single category, but is compiled for the benefit of a wide variety of users.

Otherwise stated all photos and drawings by the author.