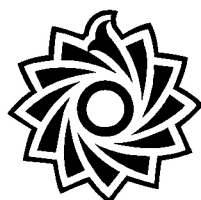


In the name of god, the beneficent, the merciful



Shahid Rajaee Teacher
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Arch and Vault in Iranian Architecture

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Acknowledgement

The book "Arch and Vault in Iranian Architecture" undoubtedly is a universal reference book. In this unique book of Iranian architecture, about 157 arches and vaults are presented in various and beautiful forms with detailed applicable and structural features. The arches which presented in this book can also be used in decorative and structural forms nowadays. Therefore, the method of drawing of these arches and the images related to each one are presented in the book.

With my effort and the cooperation of V.P. of research and technology of Shahid Rajaei Teacher Training University at that time, translation order of this book into the English language was entrusted to Dr. Ali Sharghi, an expert member of Architecture Faculty at SRTTU.

He did the translation with the cooperation of Mehrnaz Ramzanpour. The language editing of this book was also done by Dr. Mehrak Rahimi Ashtiani.

This book has valuable images in which there are various types of geometry pattern such as Gereh, Haft-Ghalam Khat, Eslimi, Khataei, Mo'ghali and Banaei lines as well as arched elements such as Rasmibandi, Karbandi, Yazdibandi, Tase Saz, Ghatarbandi, Mogharnasbandi, and etc. They have hardly been collected and classified from many historical and contemporary building throughout Iran. In order to have a suitable quality, these images have been printed on glossy paper by university publication. I hope the English version of the book will be useful for architects and enthusiasts of Iranian architecture in other countries of the world. I wish you (as a researcher or a reader of this book), joy and be successful in your life.

Many thanks to all the devotees and especially the colleagues of the Shahid Rajaei Teacher Training University who helped me in publishing the book.

Hossein Zemorshidi

January 2019



Introduction of publisher

Traditional architecture of Iran is at the height of the manifestation of world of allegory in the body of essence. Yard, the earth paradise and pond, is the whole mirror for sky and variously colored windows called "Orosi" represents the variously colored creatures to which the sun of the world of essence shines.

From this points of view maybe it could be said that our interest and attachment sharp arches in any type goes back to “arches' margin”, especially in the praying space, that prayer is the ascension of the one who believes in the only GOD. The points in which these 2 arches reach to each other is the place of familiarity and fondness to the Unlimited.

Iranian architect with this link to familiar with the building materials and construction techniques, whatever he has built abundant with taste and innovation, hence it is always new and passage of time doesn't affect it.

Although technical developments and styles of building in any time and locality characteristics of any place had created a situation for the architect but reletiveness of constructions with each other represents

Various appearances that all refer to a unique beauty.

The attribute of the current book is the introduction of the manifestation which were told and a mirror of the professors' activities, who humbly named themselves, and had been finishing the activity.

The respected author also through along many years of non-stop working, collecting several examples, drawing various arches and presenting the use of each of them by geometrical method, has provided enthusiastic men , students and researchers of traditional architecture of Iran with technique and functional of arches from drawing to construction.

“Shahid Rajae Teacher Training University Publications” has done the first edition of this precious work in english language and it is necessary to consider that the difference between this edition and previous ones is in the quality of editing, drawings and pictures, which are printed by the latest methods off computer and paging. It is obvious that all these efforts are for granting the architects, who without any expectation from one generation to another have taught these methods to their students in order to reach us today.

Preface of author

Thanks to god, the almighty who helped me to compile the book of "the Arches in Iranian architecture", which is the result of many years of research and study on arches in buildings of Iran. The book can be the first one in the rich and extensive study of arches.

In this book, the subject of arch from the era before Christianity to the boom of Iranian Islamic Architecture is studied.

In this book, a history of development, matters and details of the arches and above all the way of drawing of various arches (with criteria and in a clear, scientific and expressive way), alongside the pictures of monuments used in the ancient and Islamic buildings of Iran is presented.

It is worth telling that with the orientation of today building of our country to the ancient and brickwork frontages, the need of using the book of arch and application of various types of arches especially decorative arches is felt.

Generally, due to the shortage of various types of building steels, and with regard to the implementation of concrete works and their special technology for today construction, in making various types of arches in covering, entrances, doors, windows and in cases, different types of arch- coverings with different brick anthologies. It has been made use of this book, that all in all it is a great help to the building in ancient and even modern forms. This work, from different views and with regard to shortage of today building materials, has welcomed so much by constructors.

It should be considered that for the third edition of this work, necessary correction has been done carefully and suitable pictures of unique works off Iranian architecture, from all parts of our great country with so much effort is collected and gathered, because film and all pictures of the work was destroyed in the "*Keihan* publication" (previous publication of the book), therefore, with so much endurance the mentioned pictures with so much values of architectural arts from all aspects "arches' margin" was provided. In fact pictures of the book, in addition to indicating the arch- coverings and domes, includes other interesting topics such as brick works with various anthologies, "tile- works", "works of tile and brick", "marquetry tile", "capital construction", "frieze construction", "line in different types", "patterns of arabesque and *khitai*", "*Rasmibandi*", "*karbandi*", "*Taseh* construction", "cornice" and many others which could be studied by other related arts to the Islamic Iranian architecture.

Notably, for the richness of this great work, extracting the 'history of construction of building and its arch' with reference to several sources and sufficient accuracy and with my own information was done, by this advantage, the book even has been more precious.

In summary, revision, collecting new pictures with other topics and many cases for this book, has made the work "a new compilation" which could either from scientific and artistic view or from applied aspects be regarded. Generally in cases, "the use of arch" in steel structures, concrete structures, buildings with special "masonry" materials, had a great impact.

Totally, function of arches in various types of Islamic architectural works, in of a specific characteristic, that in many of the mentioned cases, arch in Iranian architecture is a great help to the mentioned designs and accurate implementations.

With the aim, that this work, will be a guide for architecture and civil students, and professors and experts and conductors of constructing the ancient and Islamic buildings like "previous notifications".

Finally, I should appreciate from Dr."Ali Abdolalizadeh" for the help and permission to publish the work, when he was in charge of department of housing and urban development.

He is a well-informed, resourceful and sympathetic person for culture and art of Iran. Meanwhile I should acknowledge the helps of Mr. "Mohammad Saeidikia", the Respected and sympathetic minister of department of housing and urban development and also other dear people who helped to provide this book, especially Mr. "Sa'ed Meshki" for implementation of all procedures.

Hossein Zemorshidi

History of arches

At the beginning, early human beings that did not have fixed resort, They gathered in cave after living in deserts and mountains. Neanderthal men started to build settlements because of their needs and evolution. So, especial resorts with limited size were created.

They put big stones beside and top of each other and coverage of integrated and flat board set at the top of the stone base as ceiling. So small resorts are built to protect men against a wild animal (Figure 1).

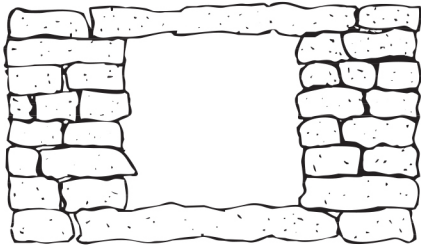


Figure 1: Flat board stone as a ceiling

It is obvious that these resorts had limited spaces for couples and small families. Stone cottages were gradually created for social life. Figure 2 shows the first arch which early men built them and it's statically provided by joining the stone elements (Figures 2 and 3).

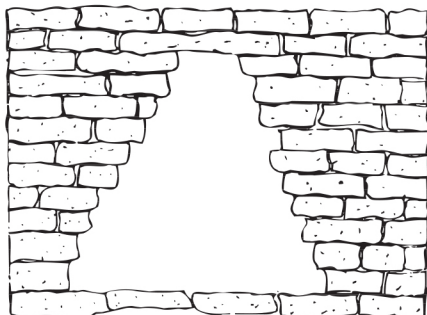


Figure 2: Schematic of stone arch and vault



Figure 3

Discovery of limestone was a big evolution which happened in this period. When nomads built an oven with stone, sometimes they used limestone unconsciously, in this way, discovery of limestone occurred. These stones were cooked in fire and when they blended with rain, they slaked and sap of lime mixed with washed soils and gravel around oven and change to hard stone after chemical interaction.

So, early men recognized that the place of the oven is harder than the natural ground. They distinguished the type of stone, thus limestone, its cooking method and lime mortar were realized. The setting of stone elements at the top of each other adjusted using mortar. So the principles of masonry were formed (Figures 4 and 5).

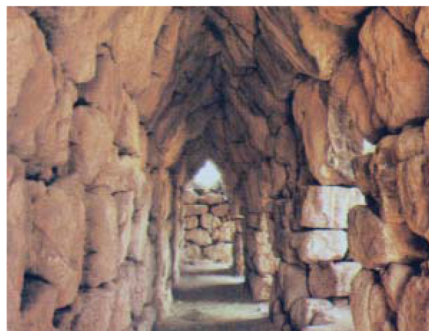


Figure 5: Stone construction without mortar in column, wall and conical arch

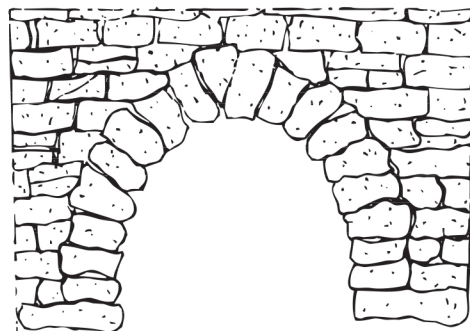


Figure 4

Cultures, traditions and art of tribe were created with the birth of races and ethnic group. One of ethnics was Aryan. This group came to Iran and settled here, so new traditions and cultures entered Iran. They started farming, planted trees and built gardens and paths.