

iaSU
2012

JAPAN

Archi-Cultural Translations through the Silk Road

2nd International Conference

Mukogawa Women's University
Nishinomiya, Japan

July 14 – 16, 2012

International Association of SILKROAD UNIVERSITIES

Proceedings

Contents

Preface

Invited talks

1. Cross-cultural interaction along the Silk Road
2. Regional characteristics and individuality of living space
3. Modernization, globalization and urbanization
4. Science and technology that underpin culture
5. Sustainability and global environment
6. Religion and art
7. Case studies on cultural formation

ISBN 978-4-9906255-1-1

Archi-Cultural Translations through the Silk Road

**2nd International Conference, Mukogawa Women's University, Nishinomiya, Japan,
July 14-16, 2012, Proceedings**

Edited by iaSU2012 JAPAN Publication Committee



Mukogawa Women's University Press

This proceedings includes 2 invited talk extended abstracts and 71 refereed extended abstracts submitted to the 2nd International Conference on Archi-Cultural Translations through the Silk Road (iaSU2012 JAPAN), held on July 14-16, 2012, at Kami-Koshien Campus of Mukogawa Women's University, Nishinomiya, Japan. Copyright remains with the author(s).

First published 2012 by Mukogawa Women's University Press

Mukogawa Women's University Press

6-46 Ikebiraki-cho, Nishinomiya, Hyogo, 663-8558, Japan

No part of this publication may be reproduced in any form or by any means without permission from the copyright owner. For more information regarding permission, write to iaSU2012 JAPAN Publication Committee (itcs@mukogawa-u.ac.jp).

The publication committee and its publisher accept no responsibility for any information, opinion or statement presented in the extended abstracts, which are the responsibility of the authors. Authors are responsible for securing permissions to reprint copyrighted material. Any fees required to secure copyright permissions or use of figures are the responsibility of the authors. The publication committee and its publisher accept no liability whatsoever for any loss or damage sustained by any reader as a result of his or her action upon any information, opinion or statement presented in the extended abstracts.

Printed in Japan

ISBN 978-4-9906255-1-1

CONTENTS

Preface	viii
<i>Ryo Okawara</i>	

Invited talks

001	ADVANCED SEISMIC DESIGN OF BUILDINGS FOR THE RESILIENT CITY	002
	<i>Akira Wada, Nobuyuki Mori</i>	
002	TRACING THE ORIGIN OF JAPANESE PAGODAS ALONG THE SILK ROAD	008
	<i>Koji Miyazaki</i>	

1. Cross-cultural interaction along the Silk Road

101	THE ORGANIZATION OF LONG-DISTANCE TRADE AND ITS INFLUENCE ON THE SETTLEMENT TYPOLOGY IN ANATOLIA IN THE OTTOMAN SOCIETY	015
	<i>Sezin Tanriover, Hüseyin Tanriover</i>	
102	CUBOCTAHEDRON AS A POTENTIAL EVIDENCE OF THE “CULTURAL BRIDGE” BETWEEN KYOTO AND KAYSERI	020
	<i>Hakan Hisarligil</i>	
103	TRANSITIONS AND USAGE OF SAWS IN THE EURASIAN CONTINENT: THE COMPARATIVE HISTORY OF THE DEVELOPMENT OF TECHNIQUES AND TOOLS TO CREATE WOODEN ARCHITECTURE	026
	<i>Marcelo Nishiyama, Akira Watanabe</i>	
104	CULTURAL EXCHANGE IN THE HISTORY OF ARCHITECTURE	030
	<i>Uzushi Nakamura</i>	
105	HIEROPHANIC INFLUENCES ON TIMURID ARCHITECTURE ALONG THE SILK ROAD	036
	<i>Elena Paskaleva</i>	
106	ARCHI-CULTURAL PARALLEL OF PERSIAN AND TURKISH BAZAAR ALONG THE SILK ROAD CASE STUDIES: REY, TABRIZ AND ISTANBUL BAZAAR	042
	<i>Mohammad Reza Pourjafar, Ghodsieh Samani, Ali pourjafar, Razieh Hoorshenas</i>	
107	INVESTIGATING THE SUSTAINABLE CITY INDICATORS THROUGH PROMOTING PHYSICAL SECURITY IN THE MARGINS OF THE SILK ROAD (CASE STUDY: YAZD CITY)	048
	<i>Zahra Sadat Saeideh Zarabadi, Taimaz Iarimian, Mohsen Foruzanfar</i>	
108	SYMBIOSIS BETWEEN MAN AND NATURE: JAPANESE INFLUENCE ON LANDSCAPE ARCHITECTURE OF ISLAMABAD	053
	<i>Abdul Rehman</i>	
109	THE CROSS-CULTURAL INTERACTION BETWEEN THE ART OF GARDEN DESIGN OF OLD CITIES OF IRAN AND INDIA ALONG THE SILK ROAD	057
	<i>Mohammad Reza Pourjafar, Mohammadjavad Mahdavinejad, Mostafa Shamshirband*, Saeed Farmahin Farahani, Razieh Hoorshenas</i>	
	<i>*Presenting author</i>	

2. Regional characteristics and individuality of living space

201	STUDY OF SENSE OF DEPTH IN THE VIEW OF ENTSU-JI TEMPLE GARDEN064 <i>Noritoshi Sugiura, Miyuki Ami</i>
202	ICE SHELL - CONTEMPORARY 'KAMAKURA'070 <i>Tsutomu Kokawa, Koji Watanabe, Tohru Watanabe</i>
203	ARCHITECTURAL THEORETICAL EXAMINATIONS OF TYPICAL JAPANESE SPATIAL CHARACTERISTICS IN INTERIOR SPACES OF KYO-MACHIYA TOWNHOUSES076 <i>Takahiko Otani</i>
204	THE INFLUENCE OF IRANIAN ISLAMIC ARCHITECTURE ON TRADITIONAL HOUSES OF KASHAN ...081 <i>Atefeh Zand Karimi, Bahareh Hosseini</i>
205	HISTORICAL STUDY OF SITTING IN JAPAN: WITH "SEIZA" AS MAIN TOPIC087 <i>Yusei Tazaki</i>
206	A PHENOMENOLOGICAL APPROACH TO FOLDINGS AS SPATIO-TEMPORAL CONTINUITY THROUGH THE MOTIFS OF TURKISH FOLK SONGS AND TURKISH RUGS093 <i>Beyhan Bolak Hisarligil</i>
207	CONCEPT OF 'SACRED SPACE' IN TRADITIONAL TURKISH ARCHITECTURE099 <i>Murat Dündar</i>
208	TYPICAL MOUNTAIN IMAGE OF TURKISH STUDENTS BASED ON LANDSCAPE MONTAGE TECHNIQUE: THROUGH COMPARISON WITH JAPANESE STUDENTS105 <i>Kazuhiko Yanagisawa, Shigeyuki Okazaki, Murat Dündar</i>
209	STUDY ON PREFERENCE OF TOURISTS ON THE LANDSCAPE OF FLOWERING CHERRY TREES AT YOSHINOYAMA, NARA PREFECTURE, JAPAN111 <i>Junichi Imanishi, Yosuke Harada, Yoshihiko Iida, Ryo Higashiguchi, Yukihiro Morimoto</i>
210	STUDY ON FORMS OF HISTORICAL WEIRS IN JAPAN AS LANDSCAPE ELEMENTS115 <i>Shuichi Murakami</i>
211	BELBAR, FROM LIMITATIONS TO OPPORTUNITIES DISCOVERING THE NATURAL POTENTIALS121 <i>Atyeh Ashtari, Faranak Khas Ahmadi, Paya Salem, Mona Tajeddini</i>
212	SPATIAL COMPOSITION OF THREE INTERMOUNTAIN SETTLEMENTS LOCATED ON SLOPES IN NORTHERN AND CENTRAL TURKEY127 <i>Toshitomo Suzuki, Shigeyuki Okazaki</i>
213	RELATIONSHIPS BETWEEN FENG-SHUI AND LANDSCAPES OF CHANGAN AND HEIJO-KYO133 <i>Hideaki Tembata, Shigeyuki Okazaki</i>
214	"THE IMAGE OF THE WORLD" OF THE TRADITIONAL LIVING SPACES IN JAPAN: COMPARING TO THE ONE OF THE DESERT CIVILIZATIONS139 <i>Takashi Doi</i>
215	VILLAGE HABITATIONS OF HOWRAMANAT VALLEY, IRAN145 <i>Majid Ziaei</i>

3. Modernization, globalization and urbanization

301	TRENDS OF URBAN DEVELOPMENT PLANS IN HISTORIC AREA IN EAST ASIA152 <i>Nobuya Ueda, Shigeki Sugita</i>
-----	--

302	STUDY ON REVITALIZATION OF HOUSING COMPLEXES THROUGH UTILIZATION OF OPEN SPACES BASED ON RESIDENTS' ACTIVITIES	158
	<i>Shigeaki Takeda</i>	
303	A SILK ROAD BLUEPRINT: RELIGIOUS KINSHIP AND STATE CONSTRUCTION PROJECTS IN THE DEVELOPMENT OF A NORTHWESTERN CHINESE BORDERLAND, 1912-1946	163
	<i>Tristan G. Brown</i>	
304	APPEARANCE OF SLUMS, SIDE EFFECT OF DEVELOPMENT	168
	<i>Amir Shahrad</i>	
305	CROSS CULTURAL EDUCATION IN ARCHITECTURE: FINDINGS FROM TEACHING INTERNATIONAL STUDENTS TRADITIONAL JAPANESE ARCHITECTURE AND GARDENS	173
	<i>Arno Suzuki</i>	
306	A PSYCHOLOGICAL ANALYSIS OF THE SOCIAL PROBLEMS ARISING FROM MODERNIZATION, GLOBALIZATION AND URBANIZATION	179
	<i>Mari Aoki</i>	
307	ISTANBUL FIRES IN THE 19 TH CENTURY: AN ANALYSIS ON ARCHITECTURE AND URBAN PATTERN	182
	<i>Pınar Sunar, Zeynep Ceylanlı</i>	
308	ANARCHIST DESIGN	186
	<i>Fatemeh Ziaei</i>	

4. Science and technology that underpin culture

401	THERMAL ENVIRONMENT IN AJANTA CAVES	191
	<i>Tomoko Uno, Yoshiko Shimazdu</i>	
402	RESEARCH OF ANTI-FREEZING FOR THE BUDDHIST IMAGE CARVED ON TUFF CLIFF BY CLOSING SHELTER	197
	<i>Masayuki Morii</i>	
403	AIR CONDITIONING IN IRAN DESERT	201
	<i>Mohsen Ziaee, Ahmad Fakhar</i>	
404	CHARLES CORREA'S HOUSING LANGUAGE	207
	<i>Belinda Torus</i>	
405	THEORETICAL AND HISTORICAL PERSPECTIVES IN DESIGN, INNOVATION AND POLICIES	213
	<i>E. Tezel</i>	
406	NATURAL VENTILATION AROUND OPEN GROUND FLOORS WITH PILOTIS IN HIGH-RISE RESIDENTIAL BUILDINGS IN TROPICAL AREAS: HARMONIZATION OF MODERN AND TRADITIONAL HOUSING IN TROPICAL AREAS	219
	<i>Abdul Razak Sopian, Noor Hanita Abdul Majid, Shuichi Hokoi*</i>	
	<i>*Presenting author</i>	
407	EVOLUTION OF TIMBER CONSTRUCTION IN TURKEY	225
	<i>Görün Arun</i>	
408	FLYING A 100m-LONG JUMBO KOINOBORI	231
	<i>Mamoru Kawaguchi</i>	
409	SEISMIC RETROFIT OF HIGH-RISE BUILDING WITH DEFORMATION-DEPENDENT OIL DAMPERS ...	236
	<i>Osamu Hosozawa, Yuichi Kimura, Hideshi Aono</i>	

410	SEISMIC PERFORMANCE AND REINFORCEMENT OF JAPANESE HIGH-RISE BUILDINGS FACING SUBDUCTION EARTHQUAKE: E-DEFENSE SHAKE TABLE TESTS	240
	<i>Takuya Nagae, Masayoshi Nakashima</i>	
411	THE 2011 VAN EARTHQUAKES OCURRED IN TURKEY	245
	<i>Baris Denizer, Takuya Nagae</i>	

5. Sustainability and global environment

501	SUSTAINABLE SOCIETY: ENERGY SAVING CONSTRUCTION	251
	<i>Shushi Sugiura</i>	
502	NATURE AS A SOURCE OF SUSTAINABLE DESIGN IN ARCHITECTURE OF ORIENTAL COUNTRIES (CASE STUDY: TRADITIONAL ARCHITECTURE OF IRAN)	257
	<i>Shaghayegh Afrasiabian, Mohammadjavad Mahdavinejad, Negar Badri</i>	
503	ROLE OF CULTURE IN SUSTAINABLE ARCHITECTURE	262
	<i>Sinem Kultur</i>	
504	OYA PROJECT OF SYNCHRONIZED CAVE COMPLEX: UNDERGROUND REVITALIZATION PLAN UTILIZING ABANDONED MINES	268
	<i>Itsuo Kamiya</i>	
505	SUSTAINABLE BIODIVERSITY AND COMMUNITY DESIGN IN HYOGO JAPAN	274
	<i>Mayumi Hayashi</i>	
506	AKSARAY SULTANHAN CARAVANSERAI: A STUDY OF CULTURAL INTERACTIONS AND SUSTAINABILITY ALONG THE SILK ROAD	277
	<i>F. Yesim Gurani, Tulay Ozdemir Canbolat</i>	
507	PERSIAN GARDENS ARE SUSTAINABLE GARDENS: SCRUTINIZE THE SUSTAINABILITY FEATURES IN PERSIAN GARDENS	280
	<i>Hirbod Norouzian Pour, Mehri Motahari Rad, Samane Motaghi Pische</i>	

6. Religion and art

601	A STUDY OF THE LANDSCAPE AT THE WANG RIVER VILLA THROUGH ANALYSIS OF THE POEM "DEER PARK" BY WANG WEI	287
	<i>Akira Tanaka</i>	
602	THE STUDY ON THE SOUNDSCAPE OF THREE JAPANESE GARDENS	293
	<i>Haruyoshi Sowa</i>	
603	BUDDHIST ATTITUDE TOWARDS CULTURE AND OTHER RELIGIONS	296
	<i>Rev. Satyananda Sraman</i>	
604	STUDYING THE GRAPHICAL STRUCTURE ALTAR INSCRIPTIONS AND AROUND NEYRIZ GREAT MOSQUE	302
	<i>Azam Monazzah, Mohamad Khazaei*</i>	
	<i>*Presenting author</i>	
605	A STUDY ON THE ORNAMENT OF THE FORMER KOSHIEEN HOTEL: ARATA ENDO'S PHILOSOPHY ON ARCHITECTURAL BEAUTY AND ITS DEVELOPMENT THROUGH ORNAMENT	306
	<i>Jun Sakakihara</i>	
606	A STUDY OF THE SIGNIFICANT INFLUENCE BY SHIN-BUDDHISIM TO THE TRUELY ORIGINAL JAPANESE CRAFTS DESIGN	312
	<i>Satoru Kiyosawa</i>	

607	A BREIF SURVEY ON THE PRINCIPLES OF IRANIAN ISLAMIC ARCHITECTURE	318
	<i>Bahareh Hosseini, Atefe Zand Karimi</i>	
608	ORIGINALITY OF CENTRAL COLUMN IN JAPANESE PAGODA	324
	<i>Fumie Ooi</i>	
609	AN ARTUQID BUILDING: DUNAYSIR GREAT MOSQUE	330
	<i>Hilâl Aktur</i>	
610	CONSISTENCY THROUGH DIVERSITY IN TRADITIONAL ARCHITECTURE OF ORIENTAL COUNTRIES IN CASE OF IRAN, JAME MOSQUE OF QAZVIN	336
	<i>Mohammadjavad Mahdavinejad, Nickta Pilbala*, Mostafa Shamshirband, Saeed Farmahin Farahani</i> <i>*Presenting author</i>	
611	MOUNTAINS PAINTED IN CHRISTIAN PAINTINGS IN THE MONASTERY OF HOSIOS LOUKAS	342
	<i>Keisuke Inomata, Shigeyuki Okazaki</i>	
612	1 SILK PATH / 2 NAKAGAWA-MACHI MOUNTAIN PATH: 1 TO 2 COMPARISON CONTROVERSIES	348
	<i>Bojan Milan Koncarevic</i>	
613	LINKING ROUTES FROM THE SILK ROAD THROUGH NEPAL – THE ANCIENT PASSAGE THROUGH MUSTANG AND ITS IMPORTANCE AS A BUDDHIST CULTURAL LANDSCAPE	354
	<i>Susanne von der Heide</i>	
614	TURKMEN RUG MOTIFS IN RENAISSANCE PAINTINGS: REFLECTIONS ON THE JOURNEY OF TURKMEN MOTIFS FROM EAST TO WEST	360
	<i>Mahnaz Shayestehfar, Mohammad Khazaie, Rezvan Khazaie, Erfan Khazaie</i>	
615	ZEYNEL BEY TOMB: THE UNIQUE PERSIAN TOMB IN ANATOLIAN PLATEAU	365
	<i>Ashkan Mansouri, Mustafa Cağhan keskin</i>	

7. Case studies on cultural formation

701	BEHAVIOR OF STUDENTS IN A NEW TYPE OF JUNIOR HIGH SCHOOL IN JAPAN	372
	<i>Satoshi Matsushita</i>	
702	THE SPIRITUAL JOURNEY: A STUDY OF THE SPATIAL ATTRIBUTES FOUND BETWEEN CAR PARK AND INNER SHRINE	378
	<i>Luke Chalmers</i>	
703	CARAVANSARIES: THE ARCHITECTURAL TREASURES OF SILK ROAD AND THE CASE OF KAYSERI-SULTANHANI	384
	<i>Gonca Büyükmihçi</i>	
704	AN EXAMINATION OF THE USE OF THE CARAVANSERAI AT CAPPADOCIA ON THE SILK ROAD; SARUHAN CARAVANSERAI	390
	<i>Z. Ozlem PARLAK BICER, Fusun KOCATURK</i>	
705	RESEARCH FOR LAND USE PROCESSING OF TEA PLANTATIONS IN A MOUNTAINOUS REGION	395
	<i>Shinya Kimura, Shuichi Murakami</i>	
706	A DELEUZEAN INTERPRETATION OF URBAN MORPHOLOGICAL TRANSFORMATION	401
	<i>Saeid Nazari Adli, Mohsen Mohamadzadeh</i>	

iaSU2012 JAPAN Committees	407
--	------------

Financial Supporters	409
-----------------------------------	------------

Preface

As the Chancellor of Mukogawa Women's University, I am delighted with, and proud of, holding the 2nd International Conference on Archi-Cultural Translations through the Silk Road hosted by the International Association of Silk Road Universities (iaSU), at our university.

The iaSU was established in March 2011, at the proposal of Envel Yucel, the Chairman Board of Trustees of Bahcesehir University, Turkey, principally by Bahcesehir University and Mukogawa Women's University, Japan, located respectively on the west and east of the Silk Road. The iaSU's mission is to promote extensive academic studies on life, technology and culture centered around architecture of countries on the Silk Road, to clarify commonality among them, and thus contribute to renewed mutual understanding and eventual peace and prosperity of the Silk Road region.

The 1st International conference on Archi-Cultural Translations through the Silk Road was held at Bahcesehir University in Istanbul from March 16 to 18, 2011, by iaSU and Bahcesehir University co-hosted by our university. Researchers from 12 countries of the world, including Turkey and Japan, participated in this conference and presented their studies on architecture, city, landscape, and environmental art etc. with active discussions as well. This conference achieved a great success.

We are truly glad that many papers were submitted to the 2nd International Conference from 14 countries worldwide, including the ones from Turkey and Japan. We hope that through this international conference, academic exchanges in the Silk Road region are spread to, and deepened in, many more universities and research institutes.

We would be sincerely delighted and honored to have you in our conference.

Kindest regards,

July 2012

Ryo Okawara
Chairman of the Board, Mukogawa Gakuin School Corporation
Chancellor, Mukogawa Women's University

Invited talks

ADVANCED SEISMIC DESIGN OF BUILDINGS FOR THE RESILIENT CITY

Akira Wada¹, Nobuyuki Mori²

¹ Tokyo Institute of Technology, Japan

² Nikken Sekkei Ltd., Japan

Keywords: Seismic Design, Building Structure, Resilience

Abstract

Advances in seismic design technology today enable structural engineers to design buildings with a variety of seismic safety levels corresponding to different demands of the society. However, target of design is basically limited to secure life safety level within relatively short time span, i.e., serviceable life of each building. Aspects of constructing sustainable and resilient cities, which consists of buildings with long life, are not taken into account in general. Strong earthquakes occur at intervals that are longer than life of individual building or people. On the other hand, as life of cities is obviously much longer, the corresponding seismic action is stronger than the design action and may cause serious damage in buildings designed for their life only. Taking these into account, we have to design each building for earthquakes considering the life of cities in order to secure continuity of urban activities over disastrous earthquakes. However, there are problems to be solved in order to implement such seismic design. In this paper, factors in seismic engineering that hinder to realize long life city are identified and discussions on future steps of structural engineers to contribute in constructing sustainable and resilient society are indicated.

Development of Seismic Design Method

Starting with a simple seismic resistant design where strength of building structures only is the bases for seismic performances, new technologies and design methods to provide various levels of seismic safety in buildings have been studied and developed. They are grouped into:

- Seismic isolation where seismic energy input to building is remarkably reduced;
- Passive control system where energy absorption devices of various types are installed;
- Orthodox strength dependent system where seismic safety is mainly provided by the strength of structures; and
- Ductility dependent system where seismic safety is mainly provided by ductility of structures.

Making use of these design methods, buildings of various types and structural characteristics are being built. The difference in design method usually produces difference in seismic performances. Among the listed design methods, seismic isolation can realize the highest seismic performance of buildings and, generally speaking, the order of the above list indicates decreasing performances.

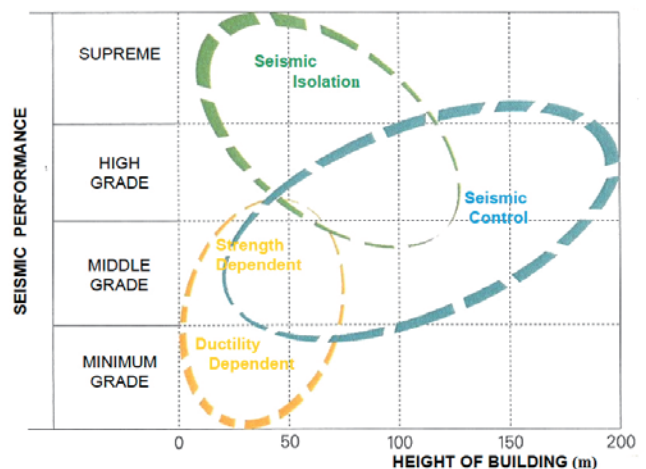


Fig. 1: Design Method and Seismic Performance

Although we should not be too haughty of our present technology nor forget that there are certain limits of scope of application in each design method, it is possible to state that the structural engineers today can provide appropriate design solutions to demands for any level of seismic performances in buildings with a variety of height if only characteristics and intensities of design input earthquake ground motions are defined. *Figure 1* on the next page shows which design method can realize what level of seismic performance in buildings corresponding to their heights. In *Figure 1*, seismic performance is classified into four (4) levels. The seismic performances here mean those of buildings as a whole and not limited to structural issues. The “minimum” level corresponds to the level of performance which can be obtained by satisfying requirements of the Building Standard Law and Enforcement Order only and design target for this level is to ensure life safety under very rare (expectation for approx. 500 years) seismic action.

Cost Increase for Performance Enhancement

As prescribed, the development in structural design methods makes it possible to realize remarkably high seismic performances. Consequently, targets of seismic design today are of great variety including life safety, functionality after seismic action, damage mitigation, etc. In addition, objects of design are not limited to structures but include all elements consisting buildings. However, there are still bottlenecks in popularizing such high performances in the society. It is the problem of the construction cost increase.

The enhancement of seismic performances is not achieved without increase in their construction cost. As the seismic performance is not limited to structural safety, cost increase is inevitable not only in structure but also in cladding, finishes, and MEP system.

An example of calculation of increase in cost associated with enhancement of seismic performance of a model building designed with strength dependent system is shown in *Figure 2*. Here, minimum grade, middle grade and high grade corresponds performance of life safety, limited function secured and main function secured respectively after very rare earthquakes. Design seismic strength of a middle grade and high grade building is 125% and 150% respectively of that of minimum grade building. It should be noted that increase in total construction cost is influenced by types of the buildings and cost allocations for various works. *Figure 2* shows results of a case study on just an example model building which is based on relatively old data and a fairly conservative estimation taking into account possible increase in non-structural elements and MEP system. taking into account possible increase in non-structural elements and MEP system.

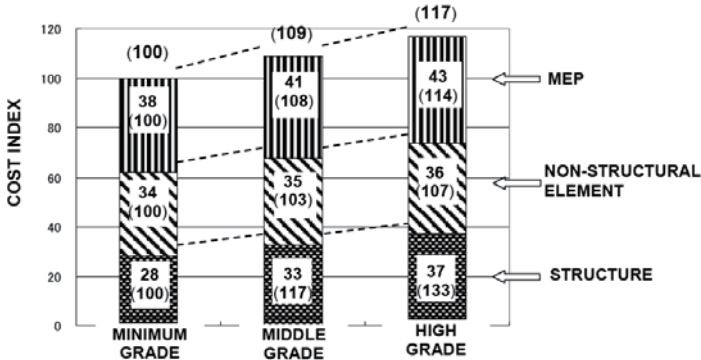


Fig. 2 : Seismic Performance Upgrading and Cost Increase

Widespread Moment-Resisting Frame Structure

The spread of performance based seismic design philosophy has positively affected in improving seismic performances of buildings. However, due to lack of sufficient understanding of damage levels in buildings caused by strong earthquakes, the developments in seismic design technology sometimes resulted in increase of rather vulnerable buildings of which the structural design is too much focused on satisfying the minimum requirements of codes and standards.

Diversification in seismic design method does not necessarily result in reduction of potential earthquake damage in buildings. The most representative example is the excessive reliance on structural ductility. It is possible to evaluate ductility of structures more precisely today and obviously the result of the evaluation in moment resisting frames is more reliable than that in frames with shear walls. This fact tends to increase risk of misunderstandings that the most popular and simple moment-resisting frame system without shear walls or vertical braces is the best type of structures as their characteristics and seismic performance can readily be calculated. The structures which can be easily analyzed and designed are not necessarily those with preferable performances. These are the most rational structures in a sense but they are the ductility dependent structures. Their seismic performances are provided mainly by capability of structure to support vertical loads in large deformation ranges where there is high potential that finishing, claddings, MEP systems, etc. are seriously damaged. In fact, their coefficient of structural characteristics, ***Ds***, which is equivalent to inverse of ***R***-factor, is from 0.25 to 0.30. On the other hand, ***Ds*** in the buildings with strength dependent earthquake resistant system is from 0.45 to 0.55. It is obvious that ultimate lateral shears in the ductility dependent buildings are less and damage in the buildings will be serious once they are hit by strong earthquakes even if the life safety requirements are satisfied.

The revised Building Standard Law (BSL) went into effect in this June and stipulations in the revised law and relevant regulations require more precise evaluation and calculation with high accountability on the characteristics of earthquake resisting elements, especially those of shear walls. These requirements are intended to and perhaps efficient to prevent falsifications in structural calculation but contain high risk of a side effect to facilitate design of ductility dependent buildings with high potential of seismic damage.

In the current seismic design regulation in Japan, intensity of very rare seismic action expressed in terms of standard shear coefficient, ***Co*** = 1.0 is 5 times that of rare earthquakes for which ***Co*** = 0.2. Although there is a certain possibility that ground motions due to strong earthquakes may partly exceed this design condition, most buildings in urban areas will be hit by the ground motion within this bound. As the result, buildings with strength dependent resisting system suffer serious damage only in limited zones where quite intense ground motions occur but those with simple moment-resisting frames suffer the same level of damage in wider areas. It is understood that design targets in current BSL are to maintain functionality for rare earthquakes and life safety for very rare earthquakes. The people seems to understand that all buildings are designed to possess the same level of performances as a minimum standard stipulated by BSL and no explicit difference exists excluding special cases. However, the actual damage in buildings will be not same as considered.

Today, damage control issues are often highlighted and PML has become an important factor to evaluate seismic performance. In addition, business continuity issues after earthquakes in various types of facilities are frequently discussed. On the other hand, however, it is a quite unfavorable trend from the viewpoint of design for durable and sustainable buildings that the simple moment-resisting frame structures, in which large plastic deformations under intense seismic motions is predicted, are becoming widespread.

Widespread Design Seismic Action for Building and City

The prescribed two problems, namely, cost increase necessary to enhance performance and widespread of ductility depending structures are the factors which may hinder the effort to mitigate earthquake damage in buildings. These problems are even more serious when we consider issue of how to keep functionality of urban activity over disastrous earthquakes and to realize sustainable and resilient cities.

Earthquakes are natural phenomena and the most fundamental problem in seismic design of buildings is that we can not predict precisely what the intensity of the critical earthquake is and when it occurs. In this context, it is perhaps a rational engineering judgment considering impacts on

construction cost, not to take into account explicitly the maximum possible earthquake that is with very low probability of occurrence in designing individual building. As such earthquakes will occur only quite rarely, this is an appropriate approach from probabilistic viewpoint and works well to ensure a certain level of seismic safety of each individual building against design seismic actions established based on the life of the building. However, this design philosophy concerning seismic action will be a risky choice from the viewpoint of creating sustainable and resilient cities due to the synergy effect of two factors, namely: expected life of cities is much longer than that of buildings; and buildings should be treated as being not replaceable but component parts of cities when seismic actions are concerned.

Although the serviceable life of each building is 60 years or less in general, the life of a city is much longer and ranging from several hundreds to over a thousand years. The risk of strong earthquakes in the life of a city is much higher than that of each building. In other words, the critical earthquakes to be considered in discussing the continuous functionality of cities throughout their expected life should be much stronger than that to be considered in securing safety of each building only. Under ordinary situation, each building is deemed to be a replaceable part of a city. Buildings can be replaced one by one as the end of the life comes and sustainability of the city will be secured even if design life of each individual building is shorter than that of the city. However, the same principle cannot be applied in case of very rare earthquakes. If a very rare and strong earthquake hit a city, most of the buildings there will suffer serious damages and the function of the city will be lost for a considerably long period.

There may be argument that importance factor can provide some solutions to the problem. Concepts of importance factor are not stipulated in BSL but increase of required ultimate lateral shear for important governmental facilities and buildings accommodating hazardous materials are stipulated in "General Seismic Design Standard for Governmental Building with Commentary". Such increase is efficient in mitigating probable damages of important facilities and in improving social preparedness for emergency operation immediately after earthquakes. However, the improvements are limited to performance of so classified important facilities. All remaining buildings are out of scope of application. When discussing sustainable and resilient cities, seismic performance of not only facilities for emergency operation but also ordinary buildings for maintaining urban functionality is the key issue.

Limit of Legal Control

Despite all of the prescribed arguments, it is not easy to design individual buildings to be free from any damage for the maximum possible seismic action which we cannot predict when to occur only because they are basic components of a city. If the buildings are not subjected to strong ground motion for several decades until end of their life, we can't help being blamed that we have forced our clients to make useless additional investment. In Japan, it is a common understanding that the average life of ordinary buildings is 40 years or less. Provided that these buildings are designed to withstand strong ground motions that occur once in 400 years, as they are demolished and rebuilt 10 times in the 400 years and it means that only one out of the 10 is hit by the design earthquake and demonstrate the fruit of seismic design. The rest 9 buildings end their life without experiencing design seismic action and it will be judged that they are over-designed for seismic safety.

Under this situation, it seems that the restriction or control by laws or codes will be most effective to construct sustainable and resilient cities through enhancing required minimum seismic performance level of buildings. However, there are limits also in laws and codes and it is difficult to regulate obligations of owners or private companies to make their buildings having higher level of seismic performance beyond the target of life safety within their expected life because such regulation involves extra financial loads on the owners and/or private companies as explained before. If the government put such requirements, it may be deemed an infringement of the people's right to

control their own property, which is protected by the Constitution of Japan. Consequently, not the preservation of functionality nor property but life safety level by preventing failure or collapse only is required for very rare intense earthquakes in BSL.

Needs for Supreme Seismic Performance without Cost Increase

Recently, concepts of performance based design are often discussed and issues such as PML and BCP are becoming more popular in structural engineering. Other methods to evaluate seismic performances are being studied and developed from various aspects. At the same time, we need to have practical methods to respond various requests for enhancement of seismic performance.

The prescribed arguments call for the development of structural systems which realize supreme seismic performance without or with very slight increase of cost compared with those required in ordinary buildings. If substantial increase in cost is not required, then, it is rational to design buildings which suffer substantially no damage from very rare earthquakes and such design will be accepted by the society. As the results of enhancement of seismic performance of individual building in a city, the performance of the city itself will be improved remarkably. Development of such structural system will make it reasonable to design buildings for the seismic action based on the return period corresponding to the life of a city, say 1000 to 2000 years. Of course we should be aware of the fact that our knowledge is still limited and further researches and studies are necessary to identify the seismic actions corresponding to such long return periods.

Today, studies of seismic engineering in the countries or areas where risk of destructive

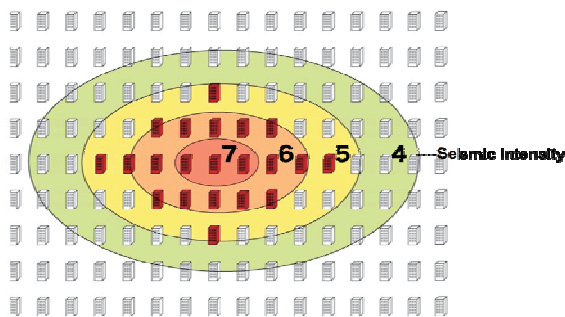


Fig. 3 : Damages of buildings in the city after big earthquake, in the case that all buildings were designed as ductile frame structure.

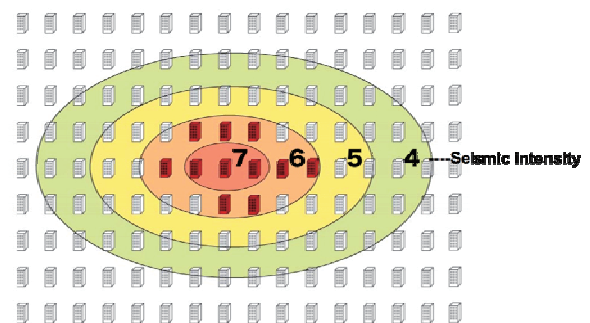


Fig. 4 : Damages of buildings in the city after big earthquake, in the case that all buildings were designed as strength oriented structure.

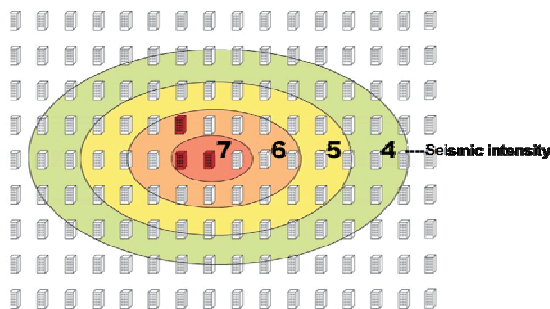


Fig. 5 : Damages of buildings in the city after big earthquake, in the case that all buildings were designed as passive controlled structures.

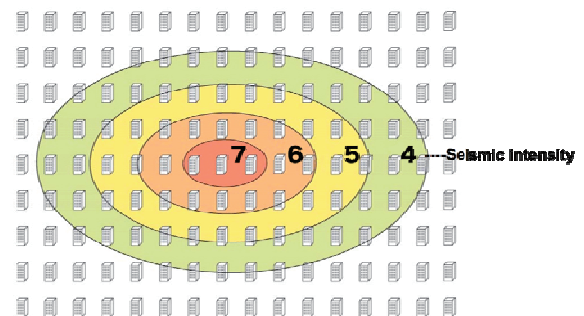


Fig. 6 : All buildings were designed as seismic isolated structures.

earthquakes is high should be focused on developing the technology to realize supreme seismic performance. Since the methods of reinforced concrete and steel structures were introduced to Japan in approximately 100 years ago, lots of buildings had been designed and constructed based on the methods. They have suffered from various earthquakes and it seems that the limit of seismic performances obtained based on such orthodox technology is becoming evident today. We are at the time to make effort to enhance seismic performance of cities by enhancing those of individual buildings. What we are requested today is to seek not for cost reduction keeping same performance level but for higher performance level without cost increase and to promote building structures with higher seismic performance which contribute to develop a long lasting therefore sustainable and resilient society.

Concluding Remark

Sustainability is obviously one of the most important and common key-words all over the world today. The most important role of structural engineers in this relation is perhaps to contribute by providing long-lasting buildings. Especially in areas where risk of destructive earthquake is high, the key issue is to secure functionality of cities over earthquakes of the intensity corresponding to their life but there are obstructions for the implementation. The most serious obstruction is the increase in cost required for this purpose. Therefore, we should changeover the direction of technology development from “cost reduction keeping same performance level” to “higher performance level without cost increase”. In addition, we should note that it is one of the important duties of structural engineers to explain the true merits for clients and all stakeholders of enhancing the seismic performances of buildings.

Finally, one other important issue should be pointed out. It is the increasing risk brought about by the advance in civilization. Torahiko Terada, a famous scientist and essayist once stated that the more the civilizations advance, the more the disasters evolve. One of depopulated areas in Japan, Noto Peninsula district was hit by an earthquake in March 2007. One month was necessary to provide the temporary houses for the refugees. It is predicted that 10 years will be necessary for the same purpose in case a strong earthquake hit Tokyo even if there are sufficient spaces for temporary houses. The structural engineers, based on the knowledge in physics, mathematics, structural dynamics, etc, and complying with the laws, have been striving effort to complete many project for satisfaction of request from society. Transportation system such as railways and roads, life lines including water, gas and electricity supply and lots of buildings have been constructed. The large cities so constructed are highly efficient and active in normal situation. They have provided bases for activating economy and spaces for people to enjoy modern civilization. As the result, excessive concentration of population as well as social function to main cities has been brought about. The excessive concentration is most remarkable in Japan. Among the total population of 80 million in Germany, only 3.4 million (4%) is living in the largest city, Berlin and there are many other active cities all over the country. In US, 8.2 million among the total population of 290 million is in New York and there are also many large cities. On the other hand, approximately 25% of total population of Japan is living in Tokyo and the surroundings. Once Tokyo is damaged by destructive earthquakes, the whole country may be put into functional disorder for a long period. It is obvious that the social system of Japan is quite vulnerable strong earthquakes.

The pursuits of excessive concentration to mega cities inspired by people’s demand and facilitated by activation of economy, high efficiency obtained by the concentration, highly controlled traffic network and pleasant social life supported by mass use of energy, all these will produce contrary effects to weaken the resistance against natural disasters.

Perhaps most of the citizens including engineers are honest in their activities. However, we shall perceive and alarm today that civilization resulted from integration of individual honest activity creates a high risk society and start actions in our discipline to mitigate such risk.

TRACING THE ORIGIN OF JAPANESE PAGODAS ALONG THE SILK ROAD

Koji Miyazaki

Professor Emeritus, Kyoto University, Japan

Key words: Silk Road, Japanese pagodas, Buddhism, geometry, regular polyhedra

Abstract

This paper will trace the origins of a geometric tradition in the construction of Japanese traditional Buddhist pagodas, especially the five- and three-storied pagodas, as well as the Gorinto and Hokyointo pagodas, at the Western end of the Silk Road. Our guides along the way are geometric figures, the circle, square, and the regular polyhedra. The main conclusion is that the five-storied and Gorinto pagodas have been traditionally associated with the Shingon sect of Japanese Buddhism, which was fond of the circle and the number 5, while the three-storied and Hokyointo pagodas were favored by the Tendai sect, which seemed to like the square and the number 3 more. The rivalry between these two big sects continuing to this day reminds us of a philosophic tradition from the ancient Greece.

1. Introduction

In Japan, the construction of Buddhist pagodas begun as early as the 7th century and thus, they became symbols of traditional Japan. Among them, the most remarkable ones are the large wooden five- and three-storied pagodas, and the small stone Gorinto and Hokyointo pagodas. Furthermore, there is also a special wooden two-storied Tahoto pagoda which may have been the origin of the multi-storied pagodas in Japan (Fig.1).

Curiously enough, they have been designed according to strict geometric rules, although it is often said that Japanese are traditionally not fond of geometry. Various attempts have been made to solve this riddle but failed to provide conclusive results.

This paper proposes to answer the conundrum through the medium of basic geometric figures: the circle, square, and the regular polyhedra, all of which are heavily featured in the ancient cosmologies of Greece, India, and China situated along the Silk Road [1].



Fig.1 Typical pagodas in Japan. From left to right, the five-storied pagoda at Horyu-ji temple, Nara, 7th century, the three-storied pagoda at Hokki-ji temple, Nara, 8th century, a Gorinto pagoda at Sainan-in temple, Mt.Koya, 14th century, a Hokyointo pagoda at Tokugen-in temple, Shiga, 14th century, and the Tahoto pagoda at Ishiyama-dera temple, Shiga, 12th century.

2. Regular polyhedra

The regular polyhedra are 3-dimensional solids whose faces are congruent regular polygons assembled around each vertex in the same manner. There are only five of them: the regular tetrahedron, the octahedron, and the icosahedron, composed of regular triangles, the cube composed of squares, and the regular dodecahedron, composed of regular pentagons. In the 5th century B.C., the Greek philosopher Plato claimed that the shapes of the four elements that make up the universe coincide with the first four of them: a tetrahedron for fire, octahedron for air, icosahedron for water and a cube for earth. Furthermore, Plato imagined that the Universe itself is shaped like a regular dodecahedron. Because of this, the regular polyhedra have come to be known as the Platonic solids (Fig.2).

Aristotle, Plato's best student, repudiated this idealistic cosmology based on polyhedra and claimed that we must think more realistically, in terms of quality, rather than shape. It has been therefore said sometimes that every person in the world is either a pupil of Plato or Aristotle. Plato was an idealist, sometimes with his head in the clouds and preoccupied by geometry, the circle and the number 5. Aristotle, on the other hand, was a down to earth realist, who believed in arithmetic, the square and the number 3.

It is also said that Western cultures, which excel at geometry originated in Greece, may be Platonic. To the contrary, Eastern cultures are very good at arithmetic originated from India and may be Aristotelian. Ancient Japanese, living in the Far East, were of course Aristotelian and had no great liking for geometry, though some simple regular polyhedra, such as a tetrahedron, cube or an octahedron, were occasionally used to shape objects of daily necessity. The Emperors' treasure house in Nara stores even a regular dodecahedral incense burner from 8th century Persia. Furthermore, Japanese traditional mathematics (Wasan), which developed between the 17th and 19th century, dealt with primitively the regular polyhedra.

Nonetheless, it was only after the Meiji Revolution (1868) that accurate geometric knowledge about them was finally introduced.

On the other hand, since the dawn of Japanese culture, the circle, square and the regular polyhedra have been appearing in the shapes of various cosmologies inherited from China and India.

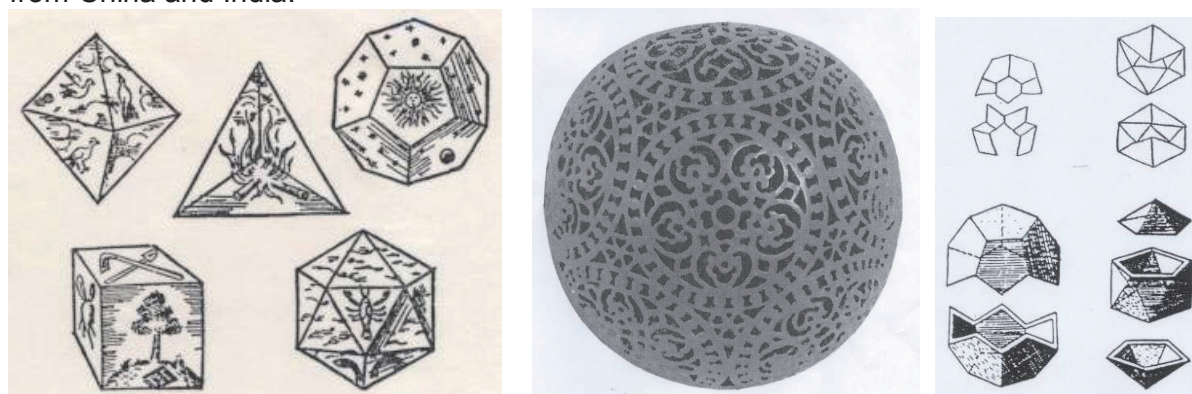


Fig.2 From left to right, pictures of regular polyhedra associated with Plato's cosmology (from "Harmonices Mundi" by J.Kepler, 1619), a regular dodecahedral copper incense burner stores in Shoso-in treasure house, Nara, 8th century, the oldest pictures of a regular dodecahedron and icosahedron in Japan (Upper, from a book about the measurement by Toshino Matsumiya, a Wasan mathematician, 1728. Below, the resembling pictures in the above-mentioned book by Kepler).

3. Wooden multi-storied pagodas

Traces of a circle, square, and regular polyhedra in traditional Japan can be seen at wooden multi-storied pagodas erected to commemorate the Buddha since the 7th century. 100 or more three-storied, 20 or more five-storied, a small thirteen-storied pagoda, and 80 or more special two-storied Tahoto pagodas remain since before the Meiji revolution (Fig.1).

These pagodas (with the exception of a Tahoto pagoda) were designed according to the serious geometric rules: The number of floors is usually an odd number ranging from 3 to 13, and the shape of the floor is a regular polygon whose number of edges is usually an even number ranging from 4 to 8.

Various images of Buddha in a pagoda are usually installed on the ground floor. The upper floors are merely decorations that protect a vertical spinal column, called Shinbashira, which passes through the center of the pagoda. The upper part of the Shinbashira thrusts through the top roof and is decorated as a Sorin, which shows a stacking of a cube, hemi-sphere, nine circles, some sets of smoky water-shapes, sphere, and a Chintamani (a magic, onion-shape mythical jewel known as a "Hoju" in Japanese), from bottom to top. It is said that the Sorin is the most symbolic part of a pagoda, which was originally designed after the model of an ancient Indian stupa, such as the one at Sanchi, for example (Fig.4).

The most typical wooden pagodas consist of a five- or three-storied stackings of square floors. Each of the five floors in a five-storied pagoda symbolizes one of the five elements of the Universe in Indian cosmology: earth, water, fire, air, and the Universe, in this order from bottom to top.

The somewhat unusual two-storied Tahoto pagoda is composed of a square lower floor, circular upper floor, and a Sorin on the roof. There is a plausible theory which posits that the original shape of a Tahoto was in fact a one-storied cylindrical pavilion sheltered from the rain by four eaves surrounding the body. We believe, to the contrary, that the Tahoto which consisted of a square earth underneath and a circular heaven symbolizes in fact the ancient cosmology of Japan.

4. Stone Gorinto and Hokyointo pagodas

As a place-holder for big, expensive wooden pagodas, miniature versions of them made of various materials have also been erected since antiquity.

The most typical stone pagoda is the Gorinto, which is a common form of tombstone from around the middle of the 12th century (Fig.1).

A Gorinto is, as a rule, composed of five blocks: a cube, sphere, pyramid, semi-sphere and a Chintamani, from bottom to top. Each of them is usually inscribed with the Chinese characters or Sanskrits for earth, water, fire, air, and the universe, in the same order. It follows, therefore, that a five-storied Gorinto is probably a substitute for the wooden five-storied pagoda.

There are many theories attempting to explain this shape as a symbol of the sitting Buddha or an imitation of ancient Indian altar fittings including the stupa (Fig.3). One of the most convincing opinions is that it shows a solid version of a planar Sotoba-panel, which is composed of five planar geometric shapes: a long rectangle, circle, triangle, semi-circle and a Chintamani-shape, from bottom to top. According to a Buddhist sutra from around the 5th century, a square, circular, triangular, semi-circular and a Chintamani-shaped islands are said to be floating on a huge circular sea representing the universe. The square island at the center is the Heaven and Mankind is living on the triangular island at the south. This cosmology is also represented in Mandalas.

The original shape of this Sotoba can already be seen as an emblem of Mithraism, a Western Asian religion pre-dating Christianity. Therefore, today, it is said that the solid Gorinto has been devised in Japan, while the planar shape must have originated in India or the Western areas of Asia.

The Hokyointo is another typical form of Japanese tomb stones, used from around the same time as the Gorinto (Fig.1). In contrast to the simple, five-storied geometric Gorinto, the Hokyointo shows complicated non-geometric features. Its outline, however, consists of three parts: a pyramid-shaped stacking of several square blocks, a cube with some circular engravings as symbols of the element of water, and a stacking of more flat square panels with flame-like decorations at the four corners and a Sorin on top. These may be interpreted to symbolize the earth, water, and fire elements, from bottom to top.

The origin of a Hokyointo is thought to be a small golden-pagoda made by a king of China at 10th century, who in turn followed the design of stupas by King Asoka of India at 3rd century B.C. (Fig.4). A so-called Asoka pagoda usually shows three-storied towers. If so, a Hokyointo may therefore be thought of as a substitute for the three-storied pagoda and a counterpart to the five-storied one. Therefore, a Gorinto as a five-storied pagoda and a Hokyointo as a three-storied pagoda are sometimes erected side by side.

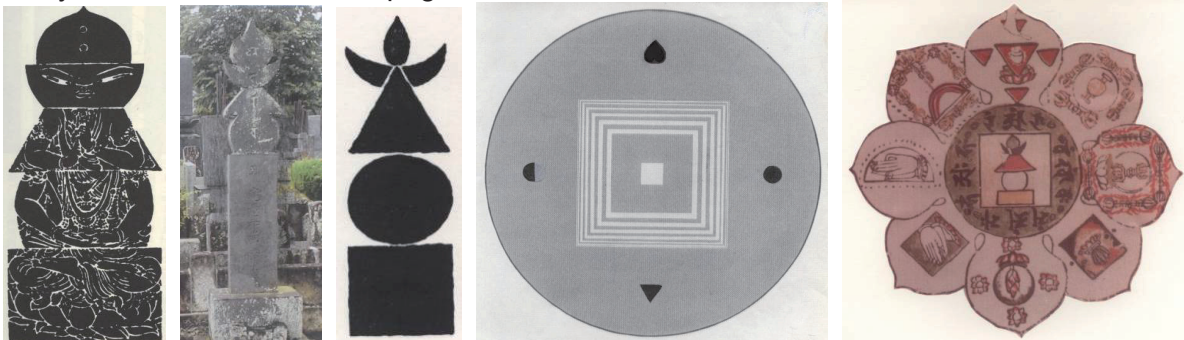


Fig.3 From left to right, a Gorinto representing a sitting Buddha as imagined by Kakuban, a monk at the 12th century, a stone Sotoba-panel in Japan, an emblem of Mithraism, the plan of the Universe as imagined by Buddhists in ancient India, and a Gorinto in a square at center of a Mandala surrounded by petals painted a circle, triangle, semi-circle and a Chintamani-shape.



Fig.4 From left to right, a miniature stupa of King Ch'ien Kung-Ch'u, 10th century, China; the Asoka-pagoda as a three-storied pagoda at Ishido-ji temple, Shiga, Japan, 8th century; the great stupa at Sanchi designed by King Asoka showing a three-storied pagoda on top, India, 3th B.C. ; modern Gorinto and Hokyointo pagodas standing side by side, Osaka, Japan.

5. Kukai as Plato and Saicho as Aristotle

In the past, the Gorinto and the Hokyointo may have been symbols of a strong rivalry. K.Yabuta has claimed that a Gorinto was originally a monument of the Shingon sect of Japanese Buddhism, while the Hokyointo belongs to the Tendai sect [2]. Because of this, it seems that Shingon temples tend to be fond of five-storied pagodas and Gorinto, while Tendai temples favor the three-storied pagoda and the Hokyointo.

The Shingon sect was originated by the Japanese monk Kukai, while Tendai was founded by another monk, Saicho around the same time in the 9th century. Kukai and Saicho were the first great rivals of Japanese Buddhist. The Shingon sect of Kukai seems to have a liking for the number 5 and the symbolism of the circle, while Saicho's Tendai is fond of 3 and of square shapes. The sphere that represents water in a Gorinto is thus changed to a cube in the Hokyointo. The circular upper floor of a Tahoto pagoda is also sometimes changed to a square floor by the Tendai-sect. Furthermore, according to various legends, the character of Kukai was suitable for a pupil of Plato and Saicho of Aristotle.

Therefore, we believe that the Gorinto of Kukai shows the influence of Plato's idealistic regular polyhedral cosmology: The earth block is surely a cube. The water block is a sphere because Plato said that the element of water is a regular icosahedron which rotates like a sphere. The fire block of a modern Gorinto is usually a square pyramid but was mostly a regular tetrahedron in older Gorintos (Fig.5). The air block is a hemi-sphere because Plato said that the element of air stands halfway between the non-spherical tetrahedron and the spherical icosahedron. The oldest wooden Gorinto shows half of a regular octahedron as the air block. The oldest wooden Gorinto shows half of a regular octahedron as the air block. The block of the universe, a Chintamani, shows the most meaningful shape. It looks like a regular dodecahedron, in other words, the outer shape of the Universe as imagined by Plato. The dome of Islamic mosques also shows a Chintamani decorated by a polyhedric pattern. A small polyhedric Chintamani representing a hexagonal pattern seems also to have been passed on to Japan. Judging from the oldest picture of the Chintamani-shape seen on wall paintings in the Qizil cave at China, H.Yagi has claimed that the original shape of the Chintamani must have been a polyhedron (Fig.6) [3]. Some cuboctahedral Chintamanis can be seen on the top of roofs in Japan.

Based on this evidence, we have devised a Gorinto and Mandala composed of regular polyhedra, which can be seen in Fig.6.

In contrast to a Gorinto, a Hokyointo of Saicho is composed of numerous squares and complicated strange decorations which may be an attempt to represent matter realistically. Because of this, it is surely Aristotelian in spirit.

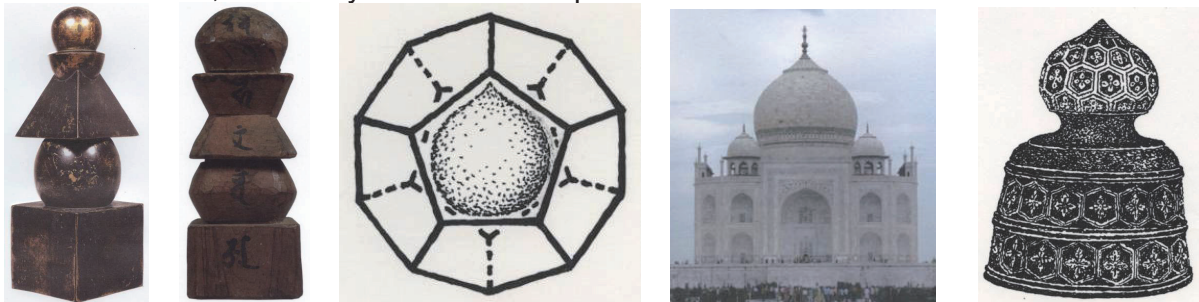


Fig.5 From left to right; an old Gorinto showing a regular tetrahedron as the fire block, Konomiya-jinja shrine, Shiga, 12th century; the oldest Gorinto showing half of a regular octahedron as the air block, Shikobuchi-jinja shrine, Kyoto, 12th century; a Chintamani inscribed in a regular dodecahedron; the Chintamani-shaped domes of Taj Mahal, India, 17th century; the Chintamani decorated with hexagonal patterns, Tsurugaoka-Hachimangu shrine, Kamakura, 14th century.

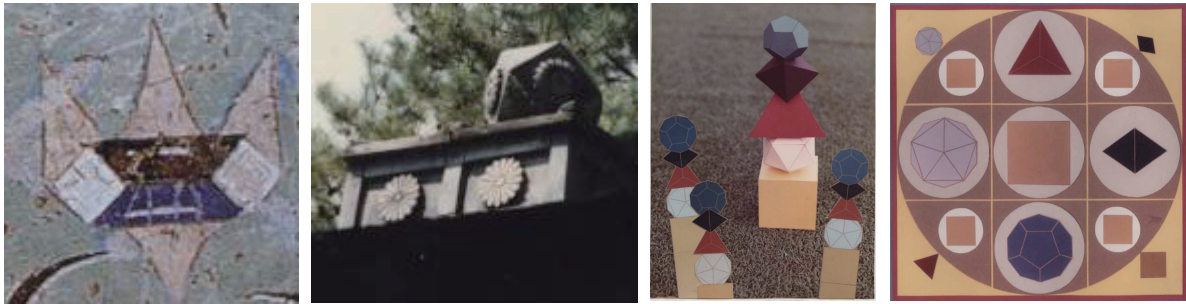


Fig.6 From left to right, the oldest known wall painting of a Chintamani seen in the Qizil cave, China, 3rd ~8th century; a cuboctahedral Chintamani, Shugakuin-rikyu, Kyoto, 17th century; an imaginary Gorinto composed of regular polyhedra and three Sotobas composed of planar projections of regular polyhedra; an imaginary Mandala composed of planar projections of regular polyhedra.

6. Conclusion and a remark

In this paper we have established the following two sequences of concepts, the flow of which can be traced along the Silk Road:

- Five-storied pagoda – Gorinto – 5 – Circle – Heaven – Geometry – Idealism
– India – Mithraism – Kukai – Plato
- Three-storied pagoda – Hokyointo – 3 – Square – Earth – Arithmetic – Realism
– China – Christianity – Saicho – Aristotle

It is usually said that Japanese traditionally showed little interest in geometric thinking. Nonetheless, whether the ancient Japanese liked them or not, images of such geometric figures as the square, circle and the regular polyhedra have been used in the design of the various forms of pagodas, which are symbols of Japanese culture since antiquity.

Regarding these, there is a final remarkable issue that demands special attention: our conclusions were derived from observations of traditional pagodas mainly erected before the 17th century, at a time when Kyoto (in the West of the country) was the capital of Japan. However, after the capital was changed to Edo (today's Tokyo) in the East during the 17th century, various traditional manners and customs were greatly changed and sometimes entirely reversed. For example, we have found out that in the Edo area, many of the five-storied pagodas belonged to the Tendai sect of Saicho, while three-storied pagodas belonged to the Shingon sect of Kukai. As a result, today, many of Japanese including historians and monks who have no interests in geometric figures mistakenly believe that five-storied pagodas denote a rich temple, while three-storied ones belong to poorer temples. An important part of Japan's history is thus distorted and in danger of being forgotten.

References

- [1] Miyazaki, K. Puraton to Gojyu-no-To [*Plato and a five-storied pagoda*]. Jinbunshoin publisher, Kyoto, 1987. (in Japanese)
- [2] Yabuta, K. Gorinto no Kigen [*Origin of the Gorinto-pagoda*]. Sogeisha publisher, Kyoto, 1967. (in Japanese)
- [3] Yagi, H. Hoju no Shiso [*The symbolism of the Chintamani Stone*]. *National treasures of Japan*, 002. pp.48-49, Asahi newspaper press, Tokyo, 1997. (in Japanese)

1

Cross-cultural interaction along the Silk Road

THE ORGANIZATION OF LONG-DISTANCE TRADE AND ITS INFLUENCE ON THE SETTLEMENT TYPOLOGY IN ANATOLIA IN THE OTTOMAN SOCIETY

Sezin Tanriover¹, Hüseyin Tanriover²

¹ *Bahcesehir University, Turkey*

² *ESTA Construction Industries and Trade Inc. Co., Turkey*

Keywords: Ottoman Empire, Organization of Trade, Long-Distance Trade, Anatolia, Settlement Typology, Silk Road.

1. Introduction

East and West have always been in contact, even before the Ottomans, since the Ancient Greek and Hellenistic period. Although interruptedly, this contact mostly went on via Anatolia and East Mediterranean till India, maintaining the whole potential of trade and transportation. Long-distance trade and transportation organized and benefitted from existed even before the Ottoman's organization besides being trade, was the sum of very significant relationship for that period.

Ottoman Empire with its own central-feudal dynamics has benefitted from the oversupply either by conquest and loot or by organizing the already existing trade relationship between East and West.

The phenomena mentioned above have been thought of influencing the Ottoman settlement typology. Within such a frame work of thinking, this study was aimed to illuminate the influences of trade organization on the settlement typology and emerging variations within the Ottoman society, which was a dependent variable of the social structure in the central-feudal system and a hierarchically balanced structure. Methodology selected for the study is a concise review of the literature.

2. Methodology: Literature Review

2.1 The Order of Settlement in Anatolia until the 16th Century

In the Ottoman society, the basis of hierarchy depended on the sum of all relationships between the cities and hinterland with different functional specializations and variations; and within these variations each city's role in the control of oversupply [1].

Consequently, the hierarchy of settlements in the Ottoman Empire in the 16th century was:

- Capital City (Istanbul)
 - o Regional Centers
 - Market Cities
 - Villages and Semi-Nomadic Groups

The capital city Istanbul was at the highest level in the hierarchical system with a population of 400.000 [2]. It is not possible to think that the largest city of the medieval period was fed by the oversupply in the country alone, especially when the primitive methods of agriculture are considered. Sustaining a population that is assumed to increase from 100.000 in 1400's to 400.000 in 1500's, required serious organizations regarding infrastructure, collection of oversupply from different regions and the profits of the transit trade [3].

Regional centers within the boundaries of the Ottoman Empire in the 16th century and the limits of this study (Anatolia) show a homogenous distribution (Fig.1). Their populations were changing in between 20.000-40.000. It is also worth paying attention that these centers were located on the significant trade routes and/or on the transfer points, such as ports [4]. These cities, above and beyond serving for trade, were specialized in various production areas and branches. For instance, Sivas located on the junction of major trade routes from north-to-south and east-to-west, was specialized in woolen and cotton weaving; Diyarbakir, located on the route Trabzon-Mosul-Baghdad specialized in textile and leather manufacturing; and Ankara specialized in production of hardware and accessories for caravans. These regional centers, in the time, became the cultural and social service centers due to the central authority's investments in the form of trusts (vakıf) and soup kitchens (imaret). The factor determining the Anatolia's typology of settlement, meaning the organization of settlements in relation to the long-distance trade was not only the spontaneously developed centers but also the settlements developed with the enforcement of Ottoman's central authority [5].

Market cities constitute the third level in the hierarchy of settlements in the Ottoman society. These cities with a population not exceeding 10.000, used to serve as market places for the hinterlands and immediate surrounding, but also were somewhat different from the general settlement typology of Ottoman society. They were located seldom related to the trade and martial routes [6].

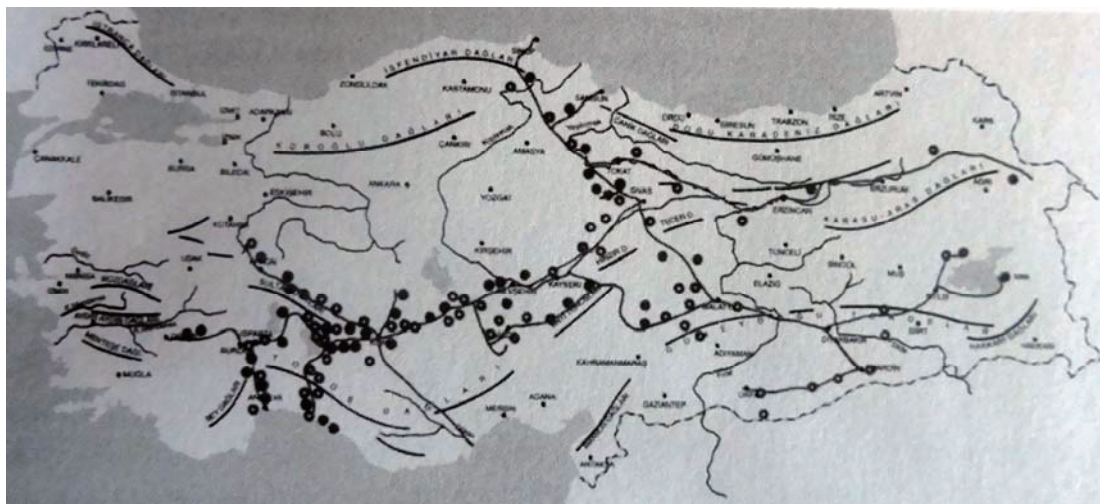


Figure1: Trade routes, regional centers and caravanserais/inns in Anatolia

The foundation of the settlement hierarchy of the Ottoman society was comprised of two basic units; **villages** of agricultural production and the villages with basic functions other than agriculture. The first one is the most important unit of the feudal system that depends on agriculture as the basic function. In the central feudal system of the Ottoman Empire, oversupply from agricultural production was being transferred from these villages to a

particular center. The other one existed for the purpose of organizing transportation, trade and contact within the country. Although not many in number, these units show a systemized and functional distribution in Anatolia. Moreover, these units were happened to be either forced inhabitations or were the existing settlements with new functions assigned.

2.2. The Organization of Transportation in the Ottoman Empire

The empires that were founded in Anatolia and Middle East before the Ottoman Empire, have constructed shelters called “*ribat*” to provide secure accommodation for traders, travelers, caravans and military forces. These shelters have emerged as trusts financed and constructed by wealthy people of the region [7]. When Seljuk’s have settled in Anatolia, first security and peace have been established and then many caravanserais were constructed systematically on the transit trade routes by the authority, which is aware of the significance of Anatolia for the long-distance trade connecting east-west. These systemized constructions of Caravanserais which have not been seen in the other Turkish-Muslim states, were the tangible signs showing Seljuk’s effort of securing, organizing and benefiting from transit trade in Anatolia [8]. In time, immediate surrounding of caravanserais have become trade centers, which later had significant roles in the social and economic life of the empire (at the Syria-Iraq-Middle East-Armenia junction, Karatay Caravanserais) [9].

During the period in between Seljuk’s fall and Ottoman’s rise, the control and security of the trade routes in Anatolia has decreased, therefore the organization of transit trade and contact between east and west influenced adversely. For the recovery and reinforcement of the trade and trade routes within the boundaries of the new empire, a guard organization “*Derbent Teşkilatı*” has been set up [10]. This organization that commenced as guarding the mountain passages, bridges and gates later became a system for controlling the whole transportation network and was managed by the central authority. “*Derbent*” units were mostly set up in the uninhabited areas, especially on the intersections of key martial and trade routes and on the mountain passages.

With the foundation of such a system some locals have taken over the responsibility of guarding and maintenance of the routes, gates and bridges and were excluded from the taxes in return [11]. Responsibility and dependency to the system have been used as a policy for inhabitation in the desolated neighborhoods of trade and martial routes [12]. As is seen “*derbent*” units, guarding desolated neighborhoods and roads, have emerged as a type of settlement with single function and have served successfully for the trade and transportation and have become an example of central authority’s direct influence on the settlement typology.

2.3. Settlement Typology Concerning the Long-Distance Trade

Settlement typology in Anatolia can be studied within two groups. First, settlements organized by the central-feudal authority on the trade routes; the second, settlements spontaneously emerged near or on the trade routes.

The first group of settlements has already been described as “*derbent*” in the previous sections. These small-scale service settlements in Anatolia were the most conscious influence of the central-feudal authority in Ottomans by which the security and maintenance

of the trade routes were provided. The existence, scale and the distribution of these settlements were directly related to the distance that a caravan could travel in a day time, hence the distribution of these units were balanced and homogeneous on the trade routes[15]. This settlement typology in Anatolia have already existed before the Ottomans since the Ottoman Empire has been established on the on the major trade route “The Silk Road”.

Ottomans, for along time have benefitted from the international transit trade due to the special geographical location and empire’s dominance over the Persian Gulf, Red Sea, Ports of Syria and all the trade routes in Anatolia [16]. Taxes collected from the merchandise on the trade routes were a significant income for the Ottoman Empire. Furthermore, public living on and near the trade routes was earning their living by taking an active role in trade as innkeepers, saddlers, and commission agents. Nomadic and semi-nomadic groups in Middle East were living as transporters and caravan organizers.

Not only these service settlements but also other small or large ones used to make profit from trade. Besides each village close to the routes with caravanserais, ones located away used to transfer vegetables, fruits and various goods to the market cities [17].

Larger settlements which were mentioned as regional centers in the previous sections and were pointed out as the contact points of East and West are subjects requiring further analysis concerning the basis of their existence and distribution. The influence of long-distance trade or any other dynamics in their formation also requires further research [18], [19]. However it is certain that long-distance trade routes have brought additional functions to regional centers, by which consequently a kind of diversification due to particular specializations emerged. For instance Sivas, located at the intersection of east-west and north-south trade routes specialized in cotton and wool textiles; Maras, located near mountain Berid, iron industry; Konya and Afyon, making of felt; Ankara, iron and leather hardware for caravans; Usak, carpets and rugs; Bursa and Bilecik, silk weaving; Diyarbakir, coloring textiles, leather [20], [21].

Diversification due to the specialization of regional centers have had dynamics that impeded with the feudal structure of the empire since specialized regions needed to be supported with the agricultural oversupply in the country. When the primitive agricultural techniques and large populations of these centers in the 16th century are considered, the only dynamic that make specialization possible seems to be the transit trade.

3. Discussion and Conclusion: The Settlement Structure Influenced by the Transit Trade Social Structure Change in the

Briefly, there were two different ways of utilizing oversupply in the central-feudal organization of the Ottoman society. On account of the unique geographical location of the empire, benefiting from the organization of the transit trade, which happens to be one of the major branches of the historical trade route “The Silk Road”, influenced the settlement typology in Anatolia significantly.

One of the major reasons for central-feudal authority of the Ottoman Empire to loose strength after the 16th century was the change in the trade routes connecting east and west. The changes in the transit trade routes have reduced public’s income in the villages and cities,

and states treasury. Reduced income and control of trade routes have also agitated the security of the transportation network (26). Furthermore, small-scale service settlements with single function, the guarding and maintenance of the trade routes have collapsed correspondingly [22].

Although the traces of change in the regional centers, which make profit greatly from the transit trade, are the subjects of further research. After the specialization and interdependency between these settlements have collapsed, they have thought to become self-sufficient feudal cities that only interact with immediate surrounding. Some sources mention that these settlements' populations have continued growing until the 19th century, due to the immigration from villages to cities as a result of insecurity in the villages [23].

Further more, in the 16th century, craftsmen and artisans in Anatolia started experiencing difficulty in maintaining raw material. Especially the economic inflation due to the increase in the amount of silver and gold in Europe, caused raw material to be sold cheaper in Anatolia. This phenomenon led to the flow of raw material from Anatolia to Europe, resulting with the collapse of artisanship and craftsmanship in the Ottoman Empire (31).

The adverse influences of change in the transit trade routes have become powerful both for the public and state in the Ottoman society. Especially, Europeans settling down on the shores of America, India and Persian Gulf had strengthened the adverse affects of change.

References

- [1] Tekeli, I. The Evolution of Spatial Organization in the Ottoman Empire and the Essentials of the Regional Policy of the Turkish Republic. Seminer Notes, Ankara, 1970, p:3
- [2] Ibid.
- [3] Tekeli, İlhan. "Anadolu'daki Kentsel Yasantinin Orgutlenmesinde Degisik Asamalar" Anadolu'da Yerlesme Sistemi ve Yerlesme Tarihleri. Vakif yayinlari, Istanbul. 2011
- [4] Tekeli, I. op.cit. 1970.
- [5] Ibid.
- [6] Tekeli, I.op.cit. 2011, p.228
- [7] Orhonlu, Cengiz. "Osmanli Imparatorlugunda Derbent Teskilati" Istanbul, 1967.
- [8] Orhonlu, C. Op. cit. p:4 (Turan, O.)
- [9] Orhonlu, C. Op. cit. p:14 (Turan, O.)
- [10] Orhonlu, C, op.cit. p:17
- [11] Ibid.
- [12] Ibid.
- [13] Ibid.
- [14] Avcioglu, D. (eds). Tankut, Hasan Rasit. "Koylerimiz" in "Turkiye'nin Duzeni", Ankara, 1968. p:13.
- [15] Orhonlu, C. op. cit. p:28
- [16] Orhonlu, C. op. cit. (Barkan, Omer Lutfi) p:14
- [17] Avcioglu, D. op.cit.
- [18] Orhonlu, C. op. cit. (Tankut, H. R.)
- [19] Tekeli, I. op.cit. 1970, p:13
- [20] Orhonlu, C. op. cit. (Tankut, H. R.)
- [21] Tekeli, I. op.cit. 1970, p:35
- [22] Orhonlu, C. op. cit. 1967. p:211-228
- [23] Sencer, Oya. "Turk Toplumunun Tarihsel Evrimi" Istanbul, 1969. p:35

CUBOCTAHEDRON AS A POTENTIAL EVIDENCE OF THE “CULTURAL BRIDGE” BETWEEN KYOTO AND KAYSERI

Hakan Hisarligil

Meliksah University, Turkey

Keywords: Vector equilibrium, cuboctahedron, R.B. Fuller, Kayseri, Kyoto.

1. Introduction

There are several abstract geometrical forms ascribed to have a symbolic meaning in various cultures through history. Among these cuboctahedron, one of 13 Archimedean solids has been an interest of art and religion in Japan in the past [1]. Recently the existence of cuboctahedron discovered in other cities and countries on the “Silk Road” also leads to question whether they represent similar content as well [2]. However the examples here in this short text are to be limited to the ones discovered in downtown Kayseri belonging to the 13th century. Thus, following the trace of cuboctahedron, we will try to demonstrate the potential evidences of cultural affiliation between two cities of remote geographies through this study.

2. A Brief Outlook to Cuboctahedron

2.1. Cuboctahedron "By Any Other Name"

The cuboctahedron is named thusly because it is simply an intersection of a cube and an octahedron, as represented in the "Crystal" by M.C. Escher in 1947 [3]. Associating the episode "By Any Other Name" of *Star Trek* TV series (Fig. 1), where aliens seize the Enterprise by transforming crew members into inanimate cuboctahedron [4], it is attributed numerous names in geometry such as *triangular gyrobicupola*, *cantellated tetrahedron*, *rectified cube* and *heptaparallelhedron*. Buckminster Fuller applied the name "Dymaxion" to this shape along with “*Vector Equilibrium*” [5]. Further, in “sacred geometry” this shape is known as “Heart Sphere” or “Terra Prana Sphere”, since it represents both the earth (cube), and air/prana (octahedron), implying the perfect synthesis for just about everything [6].

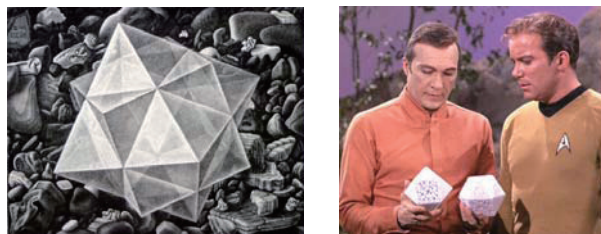


Fig. 1: Left: Mezzotint "Crystal" by M.C. Escher, 1947, Right: "By Any Other Name", *Star Trek*

2.2. Cuboctahedron through History

The first appearance of cuboctahedron is in the book titled as “Archimedean Solids”, which Pappus of Alexandria lists solids and attributes to Archimedes, though Archimedes makes no

mention of these solids in any of his works [7]. Long after, it reappears in Luca Pacioli's book "De divina proportione" written around 1497 where all figures are drawn by Leonardo da Vinci [8]. Johannes Kepler (1571-1630) was the next to write about the Archimedean solids collectively in his book "Harmonices Mundi" [9]. In 1950, Dr. Derald Langham, agricultural geneticist and author of "Circle Gardening", developed the "Genesa Concept" [10]. He believed that Genesa crystal is a sacred geometric shape called cuboctahedron that uniquely contains within it all of the five platonic solids that are the building blocks for all organic life. Cuboctahedron is at the center of Buckminster Fuller's philosophy. Fuller calls this shape the "Vector Equilibrium" meaning as the dynamic balance of tensional cosmic forces, since, unlike Cartesian coordinate system, it can strikingly be developed around one nuclear sphere [11]. Equilibrium of this kind is also called 'isotropic vector matrix' as an omnidirectional closest packing around a nucleus about which omnidirectional concentric closest packing of equal spheres about form series of vector equilibria of progressively higher frequencies (Fig. 2). Following Fuller, the physicist Nassim Hameiri in his unified field theory suggests that the structure of space-time is a cuboctahedral "vector equilibrium". According to his theory, the structure can be seen in the close-packed hexagonal cells of honeycombs and bubbles, boiling water, and the storms on gas giants [12].



Fig. 2: Cuboctahedron through history Left: Pappus, Middle: Leonardo da Vinci, Right: Fuller

3. Cuboctahedron in Kyoto and in Kayseri

3.1. Cuboctahedron in Kyoto

Cuboctahedron seems to have had a special meaning for religious people in Japan. It is still open to discussion that in the past the most revered solid symbol was not the cuboctahedron but the *Hoju* gem, a chest-nut shaped solid. It is known that it had been widely used as decorations in furniture and buildings in Japan in the past, since cuboctahedral decorations can easily be made and practically used. Lamps called *Kiriko*, in the shape of cuboctahedra were appeared as a lantern in pictures as early as 13th century and they are still used today in certain religious ceremonies in memory of the dead (Fig. 3) [13]. Besides, numerous examples of *Hoju* may found in the sanctuary of a shrine or a temple. In particular, a big *Hoju* usually is put on the top of the *Gorinto pagoda*, a five storied small pagoda, which is the most typical monument for the Buddhist in Japan (Fig. 3). This pagoda is made of five blocks which symbolizes the earth (a cube), water (a sphere), fire (a square pyramid or sometimes a tetrahedron), air (a hemisphere), and the universe (a Hoju), from bottom to top [14]. There is an opinion that such construction might be derived from Plato's book entitled "Timaeus". If it is so, the Hoju represents the regular dodecahedral universe of Plato (Fig. 3).



Fig. 3: Left: Kiriko lanterns in a Bon ceremony Middle: Pagoda Right: "Hoju" gem

Symbolizing the God, it also forms the decoration or monuments such as *pagoda*, the main hall of a temple or shrine (Fig. 4) or at the top of sacred buildings (Fig. 5).



Fig. 4: A cuboctahedral sacred offering completed in the middle of the 17th century, tomb of Tokugawa Ieyasu, Nikko



Fig. 5: Cuboctahedral top decorations on Imperial monuments (tea house) in Shugakuin Imperial Palace, Kyoto

Hargittai has also reported that there are some cuboctahedral top decorations on garden lantern (“Toro” in Japanese) in Shugakuin Imperial Palace in Kyoto (Fig. 6) [15].



Fig. 6: Cuboctahedron examples on top of a garden lantern in the Shugakuin Imperial Villa in Kyoto

3.2. Cuboctahedron in Kayseri

The first Turkish contact with the political power in Islam was in the 11th century at the hands of the Seljuks. Among the many Turkish States and cultures formed throughout history, the Seljuks have a very significant place and their art represents an important milestone within Turkish art [16]. Involving common specific features of Islamic art and architecture in general, numerous works of Seljuk Turks in Anatolia represent abstract geometrical dimension of the Muslim World particularly. According to Rabah Saoud, the artists of that era used and developed geometrical art for two main reasons: “*The first reason is that it provided an alternative to the prohibited depiction of living creatures. Abstract geometrical forms were particularly favored in mosques because they encourage spiritual contemplation, in contrast to portrayals of living creatures, which divert attention to the desires of creatures rather than the will of God. Thus geometry became central to the art of the Muslim World, allowing artists to free their imagination and creativity. A new form of art, based wholly on mathematical shapes and forms, such as circles, squares and triangles, emerged. The second reason for*

the evolution of geometrical art was the sophistication and popularity of the science of geometry in the Muslim world. They also show that early Muslim craftsmen developed theoretical rules for the use of aesthetic geometry, denying the claims of some Orientalists that Islamic geometrical art was developed by accident (e.g. H. Saladin 1899) [17]. Indeed, the recently discovered Topkapi Scrolls by Gulru Necipoglu [18], dating from the 15th century, illustrate the systematic use of geometry by Muslim artists and architects. Further, showing how mathematicians instructed artisans, Alpay Ozdural provides us with an insight into the explicit collaboration between mathematicians and artisans in the Muslim World [19]. Remarkable works on Seljuk art (Makovicky, 1992; Alexander, 1993; Lu & Steinhardt, 2007) [20] also conclude and suggest that artisans of the era had an intuitive understanding of highly complex mathematical problems. Likewise, the recent discovery of numerous examples of cuboctahedron of 13th century in Kayseri in 2009 [21], also indicates such a complex geometrical content of the art of the era. In fact, cuboctahedron is a quite common figure in iron window grills of the buildings of both Seljuk and Ottoman era in Turkey. Further, the base of almost all kumbets also implies almost an upper part of a cuboctahedron on the ground surface (Fig. 7). However, there has been found no written record indicating their existence and possible meaning so far.



Fig. 7: Cuboctahedron on kumbets and iron window grills

Hence, demonstrating the examples discovered in Kayseri, numerous possible meaning will be attributed to cuboctahedron under the guidance of extensive explanations on cuboctahedron in “Synergetics” by R.B. Fuller who is putting cuboctahedron at the top of the cosmic hierarchy as center of creation. The first one is if the cuboctahedron replaced by some other forms of capital of colonnade such as ‘tree of life’ and ‘muqarnas’ represent cosmos, humanity or the entire creation with the creator veiled (Fig. 8). Second whether the niche in the form of cube enclosing almost all examples represents the location of eternal energy as described by the God in the “Al-Noor” (The Light) verse of holy Quran [22].

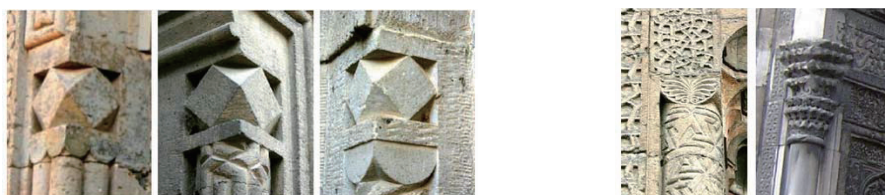


Fig. 8: Left: Examples of cuboctahedron enclosed by a niche in the form of cube Right: examples of ‘tree of life’ and muqarnas replacing cuboctahedron

Bearing in mind that octahedron represents “air” and cube represents “earth” for Plato, cuboctahedron placed in the middle of the arches of main portals associates the balance as the worldly creatures between ‘earth and sky’ (Fig. 9) [23]. If so, beside this vertical balance, the animal figures placed on the cuboctahedron, a bird on the left and a lion on the right, at the main portal of Karatay Caravanserai, would virtually represent the Yin-Yang as the

'harmony of opposites' common both to Eastern and to Western philosophy since ancient times (Fig. 9) [24].

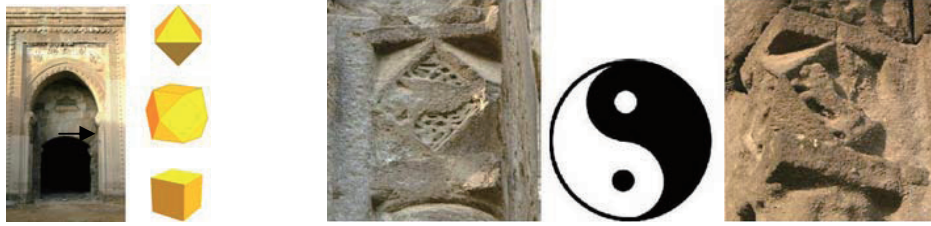


Fig. 9: Left: Location of cuboctahedron at main portals, Right: Cuboctahedron with animal figures at Karatay Caravanserai

Further, the octahedron discovered at the main portal of Kilij Aslan Mosque leads us to think whether the artisans of 13th century have already had the idea of “jitterbug” representing the phase transformation between cuboctahedron and octahedron as envisioned by Fuller at the end of 20th century (Fig. 10) [25].

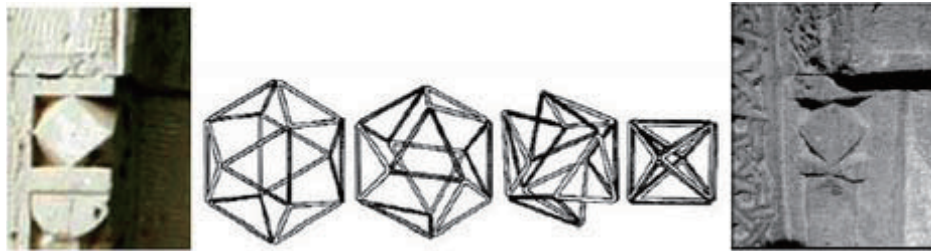


Fig. 10: “Jitterbug” representing the phase transformation between cuboctahedron and octahedron

4. Discussion and Conclusion

After having observed the examples presented above, any one clearly trace that two cities of remote geographies, Kayseri and Kyoto, had explicitly shared something common in the past: Cuboctahedron. Regardless the differences in terms of size, position and material etc. between the examples, they are somehow a form of a secret manifestation of Japanese and Turkish designers practicing for either sacred or practical purpose. The examples of cuboctahedron of both cultures in their unknown meaning and context can be regarded as not only as the evidence of cultural affiliation between two locations but further as the road map of guiding throughout both ends of the “Silk Road”. However, having discovered numerous other examples in other cities and countries, it is obvious that this limited survey is far from covering the subject and geography it deserves. Our hope is that, by drawing the attention of scholarly circles on that relatively new and exciting content, the cuboctahedron will lead a series of colorful researches bridging the East and the West as it was in the past.

References

- [1] Hisarligil, H., & Bolak-Hisarligil, B. Back to the Future: “Cuboctahedron” Revisited. *Design Principles and Practices: An International Journal*, Vol. 3, No.4, pp.109-124, 2009.
- [2] *The exhibition: M. C. Escher: Cycle, Spirals, and Snakes.*
http://www.artistsmarket.com/files/MCE_10.0_CSS_Gallery.pdf (22/03/2012)

- [3] *By any other name*. http://en.wikipedia.org/wiki/By_Any_Other_Name (22/03/2012)
- [4] *Cubeoctahedron*. <http://en.wikipedia.org/wiki/Cubeoctahedron> (22/03/2012)
- [5] *Sacred geometry*. www.zakairan.com/.../SacredGeometry.htm (22/03/2012)
- [6] Pappus of Alexandria, *Archimedean Solids*. <http://www.math.nyu.edu/~crrres/Archimedes/Solids/Pappus.html> (22/03/2012)
- [7] Pacioli, L. *De Divina Proportione*. Silvana, 1982. (In Italian)
- [8] Kepler, J. *Harmonices Mundi*. http://en.wikipedia.org/wiki/Johannes_Kepler#Harmonices_Mundi (22/03/2012)
- [9] Langham, D. *Genesa Crystals*. <http://www.genesa.org/> (22/03/2012)
- [10] Fuller, R.B., Applewhite, E.J., & Loeb, A.L., *Synergetics: Explorations in the Geometry of Thinking*, Edition: 2, Macmillan, 1975.
- [11] Haramain, N. *Harmonics study postage*. http://www.zazzle.com/harmonics_study_postage-172904018863995877 (22/03/2012)
- [12] Miyazaki, K. The Cuboctahedron in the Past of Japan. *Mathematical Intelligencer*, Vol.15, No.3, pp.54-55, 1993.
- [13] Hargittai, I. Imperial Cuboctahedron. *Mathematical Intelligencer*, Vol.15, No.1, pp. 58–59, 1993, Miyazaki, K. The Cuboctahedron in the Past of Japan. *Mathematical Intelligencer*, Vol.15, No.3, pp.54-55, 1993.
- [14] Ibid.
- [15] Ibid.
- [16] Saoud, R. *Muslim Architecture under Seljuk Patronage (1038-1327)*. Foundation for Science, Technology, Civilisation Publication No: 4041, Manchester, 2003.
- [17] Saoud, R. *Introduction to Islamic Art*. <http://muslimheritage.com/topics/default.cfm?ArticleID=1190>, (04.06.2012)
- [18] Necipoglu, G. *The Topkapi Scroll. Geometry and Ornament in Islamic Architecture*. The Getty Center for the History of Arts and the Humanities, Santa Monica CA, 1995.
- [19] Ozdural, A. The Use of Cubic Equations in Islamic Art and Architecture. In *Nexus IV: Architecture and Mathematics*, ed. J. F. Rodrigues and K. Williams. Kim Williams Books, Turin, Italy, pp. 165-179, 2002.
- [20] Makovicky, E. 800-year-old Pentagonal Tiling from Maragha, Iran, and the New Varieties of Aperiodic Tiling It Inspired. In *Fivefold Symmetry*, ed. I. Hargittai. World Scientific Publishing, Singapore, pp. 67-86, 1992. Alexander, C. *A Foreshadowing of 21st Century Art: The Color and Geometry of Very Early Turkish Carpets*. Oxford University Press, New York, 1993. Lu, P.J., & Steinhardt, P.J. Decagonal and Quasi-Crystalline Tilings in Medieval Islamic Architecture, *Science*, No.315, pp.1106-1110, February 2007.
- [21] Hisarligil, H., & Bolak-Hisarligil, B. Back to the Future: “Cuboctahedron” Revisited. *Design Principles and Practices: An International Journal*, Vol. 3, No.4, pp.109-124, 2009.
- [22] *Chapter 24, Al-Noor*. <http://www.submission.info/servlet/qtbrowse?pickthall=true&yusufali=true&arabic=true&chapter=24&verseBegin=30&verseEnd=31> (22/03/2012)
- [23] Hisarligil, H., & Bolak-Hisarligil, B. Back to the Future: “Cuboctahedron” Revisited. *Design Principles and Practices: An International Journal*, Vol. 3, No.4, pp.109-124, 2009.
- [24] Ibid.
- [25] Ibid.

TRANSITIONS AND USAGE OF SAWS IN THE EURASIAN CONTINENT: THE COMPARATIVE HISTORY OF THE DEVELOPMENT OF TECHNIQUES AND TOOLS TO CREATE WOODEN ARCHITECTURE

Marcelo Nishiyama¹, Akira Watanabe¹

¹ *Takenaka Carpentry Tools Museum, Japan*

Keywords: Eurasian continent, copper, bronze, iron, saw, pulling-use, pushing-use, joints, China, Europe, wooden architecture, coniferous forests, sitting

1. Introduction

Tools for creating architecture that takes wood as its primary material (wooden architecture) originate with the axe.

This applies to both the eastern and the western parts of the Eurasian continent. It is presumed that the stone axe, composed of a stone tool attached to a wooden shaft, was used from the era of chipped stone tools (the Paleolithic age) when stones were chipped with other stones to create a blade. Entering the era of ground stone tools when blades were created by grinding a stone with another stone (the Neolithic age, the Jomon era in Japan), the performance of tools increased dramatically, and it is presumed that the stone chisel also began to be used around this time. It is believed that the two primary tools for creating wooden architecture in this period were the stone axe and the stone chisel.

From around 5,000 years ago, tools made of metal such as copper, bronze, and iron began to be used, adding the saw and the plane to the set of primary tools used for creating wooden architecture. The axe was mainly used for logging and lumbering, the saw and the chisel for working on the joints of construction members, and the plane for finishing the surface of construction members.

Comparing the development of those primary tools in the Eastern and Western parts of the Eurasian continent, the axe and the chisel have followed similar transitions.¹

Both in the east and the west, by about 3,000 years ago when tools began to be produced with bronze, three different sizes of saws were used, from large, to middle and small. According to the bronze saws that have been discovered so far, we can discern a tendency of saws in the west being designed for pulling-use and those in the east for both pulling and pushing-use. It is believed that pushing-use became predominant both in the east and the west when tools began to be produced with iron (about 2,000 years ago).²

The plane with a wood or metal body began to be used in the west around 2,000 years ago, but the spearheaded plane continued to be used for a long time in the east. It is presumed that the plane with a wood or metal body began to be used around 800 years ago (Yuan and Ming dynasties). The plane with a wood or metal body was designed for pushing-use both in the east and the west.³

However, both the saw and the plane with a wooden base were designed for pulling-use in Japan, an island located at the Eastern edge of the Eurasian continent. Why could this be, and are there no other regions that use the tools by pulling?

Below are the findings of a research regarding these questions.

2. Technologies and saws for making wooden architecture

2.1 Usage of saws

In Japan, pulling-saws were introduced around the 15th century, and the one-man operated wide-blade rip saw replaced the two-man large-sized saw as the most common saw for lumbering from the mid-16th century onwards.

In china, it is presumed that iron saws began to be used by pushing around 3rd century B.C. (Han dynasty) and its usage has continued to the present day.

In Europe too, iron saws began to be used pushing around the 3rd century B.C. (Roman era), and its usage has continued to the present day.

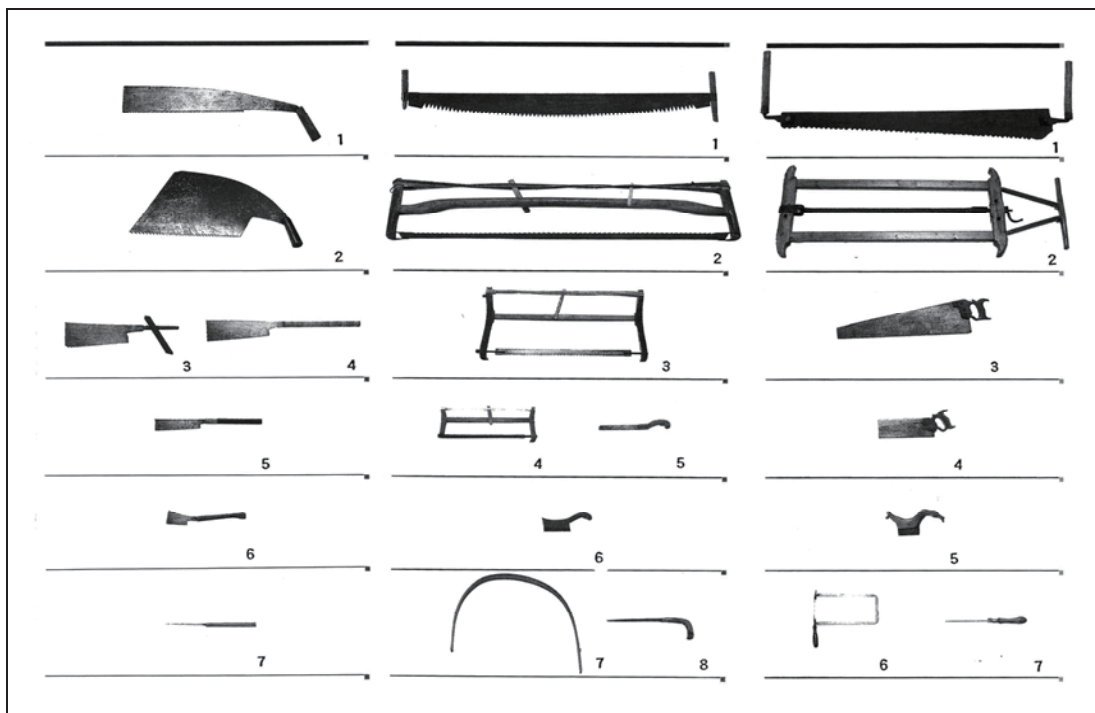


Fig. 1: Usage of saws

2.2. Technology for making wooden architecture

In Japan, around the 15th century when there was a transition from the lumbering method employing splitting (split lumber) to a method employing saws (ripped lumber), wide and thin boards as well as square timber with accurate cross-sectional surfaces began to be used as members for constructing wooden architecture. As a result, craftsmen were required to finish the joints of those members in an increasingly sophisticated manner, and due also to the

advancements in blacksmith technology, the performance of saws improved. The thinner the blade is, the more smooth the surface and the higher the accuracy of the joints. We can presume that due to these factors, pulling-use, which allows for more subtle control over the saw, became widespread.

On the other hand, pushing-use in China and Europe is a method suited for processing hard architectural members. Hard wood requires the saw to be used not just with the strength of the arms but that of the entire body too. Thus the blade needs to be thick, as a thin blade would easily break when used in such a manner. A thick blade creates a rough cross-sectional surface and lowers the accuracy of joints. The architectural philosophy that it was not a problem to have gaps in the joints may have allowed pushing-use to continue to be prevalent in China and in Europe.

2.3 The geographical distribution of different saw usages

In the 19th century, when wooden architecture was still created using traditional hand tools, pushing-use was prevalent in Europe and China, while pulling-use was prevalent in Japan. How, then, are saws used in those regions that connect the eastern and western parts of the Eurasian continent? According to research literature, pulling-use was prevalent in Turkey, and other countries dominated by Turkey during the Ottoman rule such as Greece and Bulgaria, Iraq, Iran, Afghanistan, Northern India, Nepal and Bhutan.⁴

Looking at the distribution of forests in the Eurasian continent, coniferous trees can be observed in those regions where pulling-use is predominant. These are, in other words, regions where coniferous trees which are softer in comparison to the hard broadleaf trees (such as oak trees) are used for creating construction members. Regions with coniferous forests are connected in belt form from Turkey to Japan.⁵ We shall call this the “pulling-use belt”.

The Guizhou and Yunnan provinces of southern China are also located within this belt but many of the residents are ethnic minorities such as the Dong. Among such people too, saws designed for pulling-use are used although only partially.⁶

3. Conclusion

In the Eurasian continent, saws are used by pushing in Europe and China, and by pulling in the coniferous tree belt from Turkey to Japan. The primary reasons for this difference are the hardness of timber and the required accuracy of processing for construction members. Pulling-use was observed in those areas where soft wood (coniferous trees) was processed with high degrees of accuracy.

Addendum

When did saws begin to be used by pulling in the different regions in the coniferous tree belt? In Japan, it is believed that this happened around the 15th century, but this remains unclear for other countries such as Turkey and should be the subject of further research. Moreover, although this article suggests that the difference in usage originates in the hardness of the wood and the required accuracy of the processing, another factor that may be related is the working posture, which was predominantly sitting in many of the regions in the coniferous

trees belt. We hope that detailed research in each region will be carried out as joint research in the future.

Notes

1. See the reference [1] and [2].
2. See the reference [3].
3. See the reference [4].
4. See the reference [9].
5. See the reference [10].
6. See the reference [11] and [12].

References

- [1] Watanabe, Akira. History of Axes and Adze in the West and East of the Eurasian Continent, Third Research Report on the Comparative History of Development in the Technology and Tools Used to Build Wooden Structures. *Bulletin of Takenaka Carpentry Tools Museum*, Vol. 18, 2008. (In Japanese)
- [2] Watanabe, Akira. History of Chisels and Drills as digging tools in the West and East of the Eurasian Continent, Fourth Research Report on the Comparative History of Development in the Technology and Tools Used to Build Wooden Structures. *Bulletin of Takenaka Carpentry Tools Museum*, Vol. 21, 2010. (In Japanese)
- [3] Watanabe, Akira. History of Saws in the West and East of Eurasia, First Research Report on the Comparative History of Development in the Technology and Tools Used to Build Wooden Structures. *Bulletin of Takenaka Carpentry Tools Museum*, Vol. 16, 2004. (In Japanese)
- [4] Watanabe, Akira. History of Planes in the West and East of Eurasia, Second Research Report on the Comparative History of Development in the Technology and Tools Used to Build Wooden Structures. *Bulletin of Takenaka Carpentry Tools Museum*, Vol. 17, 2005. (In Japanese)
- [5] Watanabe, Akira. "The basic forms of the saw" and "Saws in Japan, China and Europe" in The Small Universe of the Saw. *Takenaka Carpentry Tools Museum*, 1996. (In Japanese)
- [6] Watanabe, Akira. Research on the History of Architectural Technology in Japan. *Chuo Koron Bijutsu Shuppan*, 2004. (In Japanese)
- [7] Goodman, W.L. The History of Woodworking Tools. *Bell&Hyman Limited*. London, 1964.
- [8] Watanabe, Akira. European wooden architecture and their tools. *Carpentry Tools in the World and in Japan, Museum Ujiie*, 2003
- [9] Salaman, R.A. Dictionary of Tools. *George Allen & Unwin Limited*. London, 1975.
- [10] Ota, Kunio. Wooden architecture in the world: its construction method and vegetation , vol. 1214, *Architectural Institute of Japan*, 1983. (In Japanese)
- [11] Ishimura, Shinichi. Tubs and Barrels (3 volumes). *Hosei University Press*, 1997. (In Japanese)
- [12] Watanabe, Akira. The history of the development of primary tools for architecture in Japan. *JACAM Report, The Japanese Association for Conservation of Architectural Monuments*, Vol. 67, 2002. (In Japanese)

CULTURAL EXCHANGE IN THE HISTORY OF ARCHITECTURE

Uzushi Nakamura

Mukogawa Women's University, Japan

Keywords: Cultural Exchange, Etymology of Silk Road, Subjects of "Architecturo-logy," Travel of Architects, "Voyage d'Orient, Carnets" by Charles-Ed. Jeanneret

1. Foreword

Thinking about the Silk Road, I refer to the globe again and again. Even if my knowledge is very poor, the name spurs my imagination of our vast history.

As is well known, the etymology of such naming does not go back any further than the end of the 19th century when the word: "Seidenstraße" was defined by F.Richthofen. However, in 5th century BC, Herodotus already knew the road along which not only cultural or economic exchange, but also political conflict between Greece and Persia, had been engraved. He wrote that one of "the first architects," Mandrokles, had led the construction of a pontoon bridge beyond the Strait Hellespontos [1]. Some four hundred years later, ancient Rome dominated ancient Greece and imported many goods and much loot, as written in Horatius' famous poem: *Graecia capta ferum victorem cepit et artes intulit agresti Latio* [2].

In the era of Augustus, the first Roman Emperor, Vitruvius also made reference to "Asia," a land foreign to him. This name is derived from the ancient Assyrian "as," which designated "the direction of the rising sun," as opposed to "era," Europe. He used the name only seven times in his book, but it is extremely important that one was involved precisely in the "origin" of a Greek temple style. According to him, «*Eeustyli ratio...huius exemplar Rmanae nullum habemus...eas autem symmetrias constituit Hermogenes*» (Ionian architect, born in Asia) [3].

2. Subjects of our "Architecturo-logy"

There are already three subjects: The first is the definition of culture; the second concerns the center of the world; and the last resides in the meaning and reality of exchange. In order to clarify the problem, let us set forth the following questions:

1) What is human culture?

The concept of culture may contain our ideas, sentiments, values, objects, behaviors, tendencies, and accumulations. Various art and technology may be included. In any case, it is essentially significant to recognize some continual tendency to "realize ourselves through contact with others." One of the fundamental characteristics of human beings seems to be defined as "ex-sistere," analyzed by M.Heidegger.

2) Where is the center of the world positioned for each time?

The Asia referred to by Vitruvius was limited to a small coast of the Near East, though, after his age, the Romans came to glorify "*omnes viae Romam ducunt*."

Today, in Japan, the east-end of the Silk Road is situated in Japan, while the west-end is in Rome, far more west than the Hellespontos. Both ends are connected via three paths: the Step Road, Oasis Road, and Ocean Road. Why "the End of the East?"

In ancient China, "Toyo" meant the sea (or direction) of east, as they knew its end was an unknown area of the Pacific Ocean, which we can now traverse in only eight hours. This

fact lets me imagine another “Silk Road of the Airplane,” although, of course, in an abstract and symbolic sense. The younger generation may add many roads of information or technology (sometimes unfortunately including air pollution), such as a “rhizome,” exactly the same as the “World Wide Web.”

Our globe indeed tells us that east of Japan lies the United States, whose East Coast is connected to Europe across the Atlantic Ocean, and Europe is tied to the Orient, the vast Eur-asian continent, which finally circulates back to our country.

I am absolutely not advocating that our country is the only center of the world, but it is “one” of the centers exactly in the way all homelands are. If you agree with our opinion of “circulation,” it can be said that the concept of the Silk Road is somewhat romantic and exceedingly historic, rather than geographic.

3) How can we exchange our cultures?

The Silk Road primarily consists of the exchange of goods. “Silk and Gem” were its symbols in the real sense of *συν-βάλλω* (throw together). By so-called barter, our economic activity developed with the idea of “give & take”, yet, the meaning of the Silk Road is not limited to the dimension of things. For our country, as well as the Tang Dynasty in China, the introduction of Buddhism has had decisive effect. Needless to say, Chinese characters, methods of wood construction, and the historical influence of China on Japan stay remarkable even after the motto “Datsua-Nyuo (abandon Asia in order to join Europe)” and the Second World War. In any case, we tend to appreciate and introduce several aspects of foreign cultures that are supposed to be superior to ours.

Thus, our third question should refer back to the first. As a structure of cultural exchange, we will find some currents spreading to “the peripheral” from “the center.” Each is supposed in each time, just like the wave theory of Ch.Huygens. However, our problem is “where is the true center?” Sometimes, we do not know what we do not know. For our individual body, is the center always closed and separated from its surroundings?

Absolutely, not. Our physiological body is always related to our natural surroundings. The phenomenology of the 20th century tells us that our human nature should be achieved through contact with others. If this is the fundamental reality, we must state that the most important for our cultural exchange is to know, from the outset, what our differences are.

3. Beyond the Exchange ?

Now, we must return back to the history of architecture and consider more precisely these subjects. Vitruvius himself longed for ancient Greece, but not for his daily surroundings. Also, in the Middle Ages, the Christian world often sought its origin in the East or in another world, the Heavenly Paradise. In contrast, architects of the Renaissance returned to ancient Rome and Greece. Their “theories of order” were derived principally from the text of Vitruvius and then resonated to the French Academy and Beaux-Arts educations.

In my opinion, it is surely possible to establish a concept of “Travel of Architects” in a large sense. In fact, we remember many examples: Villard de Honnecourt, J.W.von Goethe, Fr.von Schlegel, A.W.N.Pugin, J.Ruskin, A.Laprade, and so on. If Lord Elgin had not visited Athens, the Parthenon Marbles would not have been seen in the British Museum.

The architect’s profession does include the aim to create some new world beyond the habitual surroundings. A variety of foreign experiences sometimes bring a decisive influence. The world of architecture does not remain in the “exchange of goods.” Moreover, an entire architectural space can be created with a new way of dwelling.

We now recall a famous example of modern architecture, the case of Charles-Edouard Jeanneret. It was because of his “Voyage to the Orient” that he decided “to become an architect” (Le Corbusier).

4. Six Sketchbooks of Jeanneret:History,Meanings,Motifs and Structure

4-1). It is well known that Le Corbusier was polishing his manuscript “*Le Voyage d’Orient*,” just before his death in August,1965. The book was published the following year with a preface by Jean Petit as follows: «*Voici donc ce “Voyage d’Orient“ que Le Corbusier considérait comme une documentation importante et significative sur l’année décisive de sa formation d’artiste et d’architecte*» [4].

This book is based on his journey in 1911 to the Orient and the Mediterranean. He was only 24-years-old, intending to be an ornament artist, who still made himself called Charles-Edouard Jeanneret-Gris. Referring to letters from that time period, his itinerary can be followed in detail. After his death, six sketchbooks of his journey were found in 1982 and *La Fondation Le Corbusier* printed all of their pages. His sketchbooks include various styles and expressions. You often find false spellings, deletions and corrections. Furthermore, some involve daily life topics such as travel expenses and addresses of acquaintances. However, these also include attractive sketches and measured drawings, as well as interesting descriptions. Various expressions represent the dawn of Le Corbusier and the dynamic course of his mental formation.

4-2). Jeanneret’s sketchbooks are neither edited conceptually as architectural theory nor organized in a united language. Philosophically reflected as well, the core of architectural theory is not to be constructed by some essays or everyday journalism, yet, the six books include an essential *θεωρία* (observation×contemplation) for Le Corbusier and therefore they became a significant source of his architectural creation in later years. If classic architecture explored the verification between *θεωρία* and *πράξις*, in the “*harmonie préétablie*” (Leibniz), there is room to estimate a way of modern architecture. The traditional concept of “truth” itself, i.e., «*adaequatio intellectus et rei*» [5] is part of our question here again.

Some sketches became very famous, through quotations and transcriptions in his various books and works. Many examples are already known, such as “*Vers une architecture*”(1923), “*L’art décoratif d’aujourd’hui*”(1925), “*Urbanisme*”(1925), “*Le Corbusier et Pierre Jeanneret;Ihr Gesamtwerk von 1910 bis 1929*”(1929),“*Le Modulor*”(1950), “*L’Unité d’habitation à Marseille*”(1946-52),and “*La Chapelle de Ronchamp*”(1956-60).

However, it is more important that he discovered the true value of architecture during his journey. A life experience of voyage significantly changed him. The journey led him, so to speak, from the dark shadow of the forest of Jura to the bright glitter of the Mediterranean Sea. As pointed out in an excellent paper by Giuliano Gresleri, his sense abroad is seen here and there along the itinerary. Although he was with Auguste M. Klipstein, who studied under W. Worringer, his own inquiry was purified all the more.

A “tour” often makes the sense of the “tourist” especially keen. At the same time, it brings essential recognition of the universal principles of human nature. Our travels can give us fecund opportunity to reflect on our habitual way of thinking. The six notebooks, in this sense, maintain his original decision toward “une architecture” in the glitter of his incisive sensitivity.

4-3). An investigation into the modern current in Germany was the commission given to Jeanneret by *L’Ecole d’art de La Chaux-de-Fonds*. He stayed in Munich from April to May of 1910 and visited the Exhibition of Modern Houses and, at the end of April, went to Vienna to see the Secession movement. He also met such valuable people as Th.Fischer, P. Behrens, and William Ritter, but this travel was not as satisfying as his visit to Italy in 1907. A letter to Ritter proves his strong desire to visit the Classic World inspired by the writings of this great intellectual: «*Mon esprit s’est,...tant ouvert à la compréhension du génie classique...Toute*

l'époque actuelle, n'est-ce pas, regarde plus que jamais vers ces terres heureuses où blanchissent les marbres rectilignes, les colonnes verticales et les entablements parallèles à la ligne des mers... je prépare un voyage très grand....» [6].

Following Gresleri, his plan was a tour toward the metaphorical past as well as the true past. We find here only some reference to the fundamental elements of architecture without structure. Thus, his tour of metaphor has been developed along the course of seeking the origin of architecture. It is this awareness that acted as the motivating power behind his journey to the Orient. Later in life, Le Corbusier said that no decoration can arouse the inspirations of a traveler. Under inspiration is only the pure form and unified construction of architecture. In other words, works of art exist there.

As discussed later, a sort of “reductive thinking” is recognized here. Even the universality found by Le Corbusier underwent a return and, seen from the other side, the viewpoint is nothing else but an architectural world assessed by his own eyes. Such an understanding of the origin of architecture bloomed into various works in his later life.

4-4). Thus, the six sketchbooks are positioned as a step to investigate the nature of architecture. His awareness of the essence in architecture is no less his standpoint as “an architect.” Therefore, the structure of the six books should be traced.

The first book was written between June of 1910 and July of 1911 when he visited Istanbul. His memories of Prague and Vienna and the voyage on the Danube are described. The second book is concerned with almost the same period. Special interests that struck him in the Danube, Balkan districts, Prague, Adrianople, and Istanbul are described therein.

Generally speaking, his writing styles are like the reports of a journalist and the same types of passages were sent to “*La Feuille d'avis de la Chaux-de-Fonds*.” Yet the sentences from the second book are widely referred to in “*Le Voyage d'Orient*,” elaborated later in his life, and sometimes reveal an obvious “literal intention.” It is full of depictions of landscapes, folk customs, and shapes of foreign houses that attracted this “traveler.”

The third book covers the days from August 21st, when he visited Bursa, to October 5th, when he arrived at Brindisi. This is the most organized and descriptive of the books. It corresponds with the guidebook “*Baedeker*” that he was carrying. The topic of this book is Bursa, its green mosque, and the famous profile of Istanbul. Numerous impressive drawings of Athos, Acropolis, and Delfi are also included here.

The fourth book concerns Pompeii, Napoli, and Rome. It includes notes from October 5th to the 20th when he visited the *Villa di Adriano*. Here, his intention of “*Hermeneutic*” as a creator, his professional concern to the forms of architecture, is particularly demonstrated. According to Gresleri, here we find a clear expression of his desire to restore ruins destroyed through history. The fifth book, for the most part, is about the Villa, and is the most “architectural.” His interest in the grand monuments of the past is strengthened. We find decisive motifs of later creations of architectural space, such as *La Chapelle de Ronchamp*. The fifth sketchbook covers the week of October 20th to the 26th.

The sixth book describes the last days of his journey, from his arrival at Florence (October 26th) to his homecoming. The description begins with the *Campo Santo* in Pisa, followed by the sketches of *La Chartreuse d'Ema* in Florence. Various sketches here are “drawn with surprisingly inclusive silhouette lines.” That is to say, an object is returned to its intuitive form by trifling lines, relying on his drawing technique to grasp the object as a whole.

5. Seeing, Writing, Drawing and Thinking

These properties of his sketchbooks promote our considerations regarding his writing style. His attitude of grasping an object gradually changes from extremely literal descriptions to

some “*sachlich*” observations with measurements, and then to the drawings seasoned with his own architectural imagination. At the same time, his writing style considerably varies from descriptive expression, allowing a third person to understand, to rather personal notations of his professional consciousness. His emotional experience around the Danube, intoxication in Istanbul, and sensational impression in Athens and Rome allowed him to represent plentiful visual images. In Athos, he wrote that «*l’œil était l’avant courir de l’esprit* ». It can be said here that, before literal processing, his description became more adherent to the reality of architecture. Soon after, «*des yeux qui ne voient pas*» was so violently accused.

It is reckless to attempt to understand a simple linear transformation and yet the transfiguration of his sketchbooks in fact traces vivid trails. Therefore, these phenomena shall be demonstrated here in contrast (more images will be shown in our conference). You will find an essential procedure of architecture, i.e., seeing, writing, drawing, and thinking.

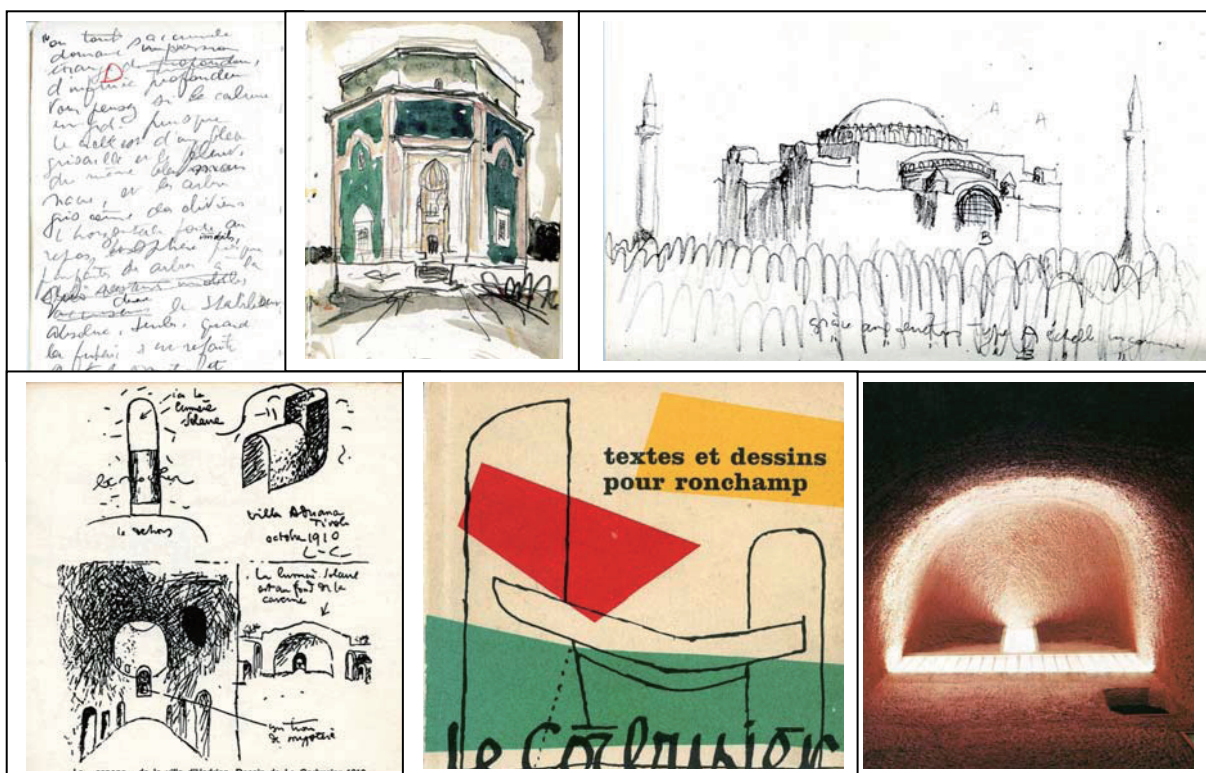


Fig. 1: Pages from six sketchbooks 1911 / Texts & Works of Le Corbusier 1960
(Famous images, but even now they stimulate our thinking on architectural theory)

6. An Interpretation

This change in writing styles and expression forms seems to hold an important architectural meaning. According to Gresleri, Jeanneret had the means and tools to direct himself within visible matters, such as his stenography similar to a reporter, the tour guide *Baedeker*, his excellent skill of “*croquis*,” binoculars, camera, and specifically the six sketchbooks.

Such tools or, strictly speaking, techniques, are to be the basic criterion for an architect to identify himself. Out of them, the overlapping relationship between the “*Lebens-Welt*” and architecture is shaped. It can be said that the abstract work of measuring historical buildings already indicates an introduction to the world of architecture. These technical prospects are

based on a process that allows the real architectural space to be represented in mathematics. They must assure a common way in “*architectonique*” in order to grasp architectural phenomena, while cooperating with aesthetic criteria such as “*sym-metria*,” “*pro-portion*,” “*échelle*,” or “*le modulator*.” But, is this all that we should consider?

I have attempted to argue some points on the structure of the sketchbooks. Some references were provided concerning the standpoint of Le Corbusier. As mentioned above, the tour to foreign countries had surely stimulated his interest in culture, especially in Istanbul, where he admired the entire city. Then, in Athos and Athens, sketches without comments showed his deep inspiration. The adventure to the Orient led Jeanneret to the sparkling sky of the Mediterranean Sea. However, from our viewpoint, it is essentially significant that such a transition was achieved as an experience of ἀ-λήθεια, i.e., to “dis-cover and find” the true origin of architecture. This transition is neither a simple reflection of culture shock nor a technical result of translation from one style to another. It is not a problem of listing up the historical styles. Moreover, this transition is not a state of so-called empathy, where foreign features are found in the mere exoticism, rambled and imitated immediately.

Even though he had the writings of Worringer during his journey, Jeanneret’s architectural experiences exceeded the old frames of applied art and modern aesthetic. The change in writing styles indicates his decision toward “*une architecture*” prior to literal processing. An ancient relic can be regarded as the primary structure of the building left as time goes by. Nature and our art interact with each other, and historic incidents can logically lead to solid principals of structure. “*Firmitas*” was the primary requirement by Vitruvius.

Jeanneret’s sketches, however, do not stay simply as observations of old constructions. Sketching itself extracts the essence of space in ruins and derives from there the source of an architectural idea. Here, his sketches sublimate from a pictorial means of describing objects to an architectural tool of designing and his drawings develop into architectural extractions. Just at this point, his sketchbooks come to be regarded not as a sightseeing diary, but as “*esquisse*” of his architecture.

For my conclusion, I must quote a significant concept of Vitruvius. The essential point of architecture seems to be “*conlocatio rerum aptis locis* (put all the elements in their proper places)” i.e., διάθεσις. Whether in foreign countries or in his homeland, the task of an architect remains to find the most appropriate space, since all works of architecture should be situated somewhere in our dwelling place.

References

- [1] Horatius, Quintinus Flaccus, *Epistolae*, II,1,156.
- [2] Herodotus, *Historiae*, (C.Hude), IV 87-9 (He was born in Halicarnassus, modern Bodrum, Turkey).
- [3] Vitruvius, Marcus Pollio, *De Architectura Libri Decem*, ed. Valentinus Rose et Herman Müller, 1867, in sermonem japonicum versit Keiiti Morita, 1969, Lib. III-iii-8.
- [4] *Le Voyage d’Orient*, Pub.dans *La Feuille d’avis de La Chaux-de-Fonds* sous forme d’articles. Pub.suos forme de monographie à Paris:Ed.Forces vives,1966,préface.Traduit en italien,1974, Giuliano Gresleri,1984. *Carnets*, en japonais, U. Nakamura et T.Matsumasa,1989.
- [5] Heidegger, M., *Holzwege*, 1950, idem. *Bauen Wohnen Denken*, 1951, ins Jap.U.Nakamura, 2008.
- [6] Ch-Ed.Jeanneret, *Lettre à William Ritter*, île de San Giorgio, le 10 septembre 1911.

HIEROPHANIC INFLUENCES ON TIMURID ARCHITECTURE ALONG THE SILK ROAD

Elena Paskaleva

Leiden University, The Netherlands

Keywords: Tīmūrid architecture, four-*īwān* plan, hierophany, mosque, madrasa, stupa, Paradise, *Axis Mundi*, Cosmic Cross.

Introduction

The paper analyses how architecture represents sacred realities. The main focus is on the architecture of the Tīmūrids as an instrument to legitimize extreme and universal power. The four-*īwān* plan is examined as a dynastic architectural tool marking the centre of the world, from which power spreads along the cardinal points to all corners of the macrosomos. For the first time, the four-*īwān* plan is discussed in terms of the hierophanic palimpsest. This approach offers comparative analysis with Buddhist and Hindu cross-axial monuments, encompassing the current theories that regard the four-*īwān* plan only as a strictly Islamic phenomenon. Examples of Tīmūrid mosques, madrasas and tombs are used to illustrate this approach. The geographical focus is on Transoxania (modern-day Uzbekistan).

Methods

The methodological approach is based on the representational theory by Mekking¹. Further parallels are drawn with existing architectural theories regarding the use of cosmological schemes and realities as discussed by Snodgrass², Koch³, Ardelan and Bakhtiar⁴, Gangler, Gaube and Petruccioli⁵.

Results

Current architectural theory analyses the existence of the four-*īwān* compounds mostly within their regional historical scope. This leads to the misinterpretation of the architectural plan, which is associated with local architectural heritage symbolism, limited only to Islam. The building tradition of the four *īwāns*, the ubiquitous plan of Tīmūrid architecture, remained virtually unchanged after the 2nd c. AD. A plausible explanation shedding more light on the lack of evolution in the four-*īwān* building tradition is the fact that the four-*īwān* plan was used

¹ Mekking, A. The Architectural Representation of Reality. The Built Environment as the Materialization of a Mental Construct. *The Global Built Environment as a Representation of Realities*, ed. A. Mekking and E. Roose. Amsterdam University Press, Amsterdam, pp.23-50, 2009.

² Snodgrass, A. *The Symbolism of the Stupa*. Cornell Southeast Asia Program, New York, 1985.

³ Koch, E. The Mughal Waterfront Garden. *Gardens in the Time of the Great Muslim Empires: Theory and Design*, ed. A. Petruccioli. Brill, Leiden/New York, pp.140-159, 1997.

⁴ Ardelan, N. and Bakhtiar, L. *The Sense of Unity. The Sufi Tradition in Persian Architecture*. Chicago University Press, Chicago, 1973.

⁵ Gangler, A.; Gaube, H. and Petruccioli, A. *Bukhara. The Eastern Dome of Islam*. Edition Axel Menges, Stuttgart/London, 2004.

only for representational buildings, commissioned by the supreme imperial and local rulers. The four-*iwān* plan was a power statement, rediscovered by the subsequent ruler trying to relate his power to a previous undisputed chief patron. For the first time, the four-*iwān* plan has been discussed in terms of the hierophanic palimpsest. This approach offers comparative analysis with Buddhist and Hindu cross-axial monuments, encompassing the current theories that regard the four-*iwān* plan only as a strictly Islamic phenomenon.

Discussion

The concept of the hierophany is used to differentiate between the elements of sacred order (the ideal world believed to be created by the primordial God) and the items of profane experience (the perception of the real world as seen by man). The hierophany is a tool to experience sacred order in a profane reality. Via the hierophany, the human transcends time and space and is transpositioned into the mythical time when the world was created. The hierophany can be regarded as a microcosmic *Axis Mundi*⁶, a sacred channel that assures man's access to the realm of God's creation. The visual representation of the hierophany is a mimetic process that denotes either a certain aspect of God (manifestation of the sacred) or an element of God's creation (sacred rivers and mountains, the cosmic ocean). The process of hierophanic visualization can be analyzed as an attempt to reproduce God's creation on earth by profane means and in a profane environment.

The basic hierophany of the four elements combined with a central element can be found in all mythologies and religions of the world. The most prominent representations are related to the four cardinal points: the Cosmic Cross and its cosmic centre: the *Axis Mundi*. In this paper, I argue that the Cosmic Cross defines orthogonal axes of the *iwāns* in the four-*iwān* compounds (Fig.1).

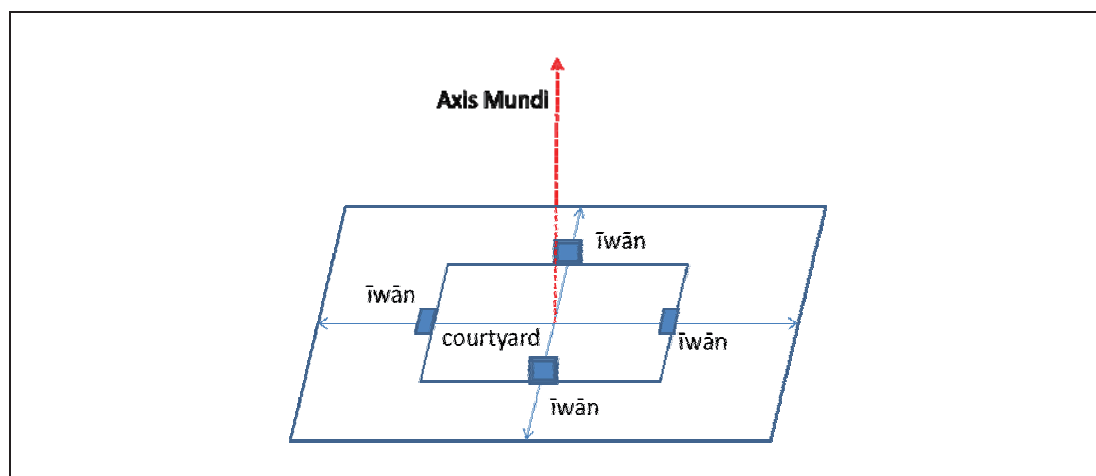


Fig. 1: Spatial orientation of the hierophany of the four and the *Axis Mundi* in a four-*iwān* plan

In the mythological thought, the hierophany of the four can be found in the representations of the four winds, the four seasons, the four elements, the four humours of the human body, the four giants holding the world, etc. In the polytheistic thought, the hierophany of the four

⁶ Cosmic axis, pillar of the world.

evolved in the representation of the four major deities plus one omnipotent central deity, the four castes; the four Vedas, etc.

Upon the ascension of monotheistic beliefs, the hierophany of the four developed further as a representation of the four evangelists (Christianity), four pillars (angels) holding the Throne of God (Islam). In the Old Testament and in the Quran, there are the four rivers of Paradise, emanating from one source (Genesis 2:10 and Sūra 47:15), the four “animalia” and the four major prophets. In the New Testament, there are the four evangelists and the four Gospels that spread across the world, the four *mysteria Christi*, the four cardinal virtues and the vision of the Throned Being amid the four living creatures (Revelation 4).

In the mystical beliefs that accompanied monotheistic thought such as Manichaeism (Christianity), Sufism (Islam), the hierophany of the four remained unchanged. In Sufi cosmology, the fortification of the four world directions has cosmic dimensions, whereby the four spiritual masters (*awtād*, “pegs” or “pillars”) are related to the east, west, north and south. Ibn `Arabī postulates that God preserves one pillar for every direction and one central “pole”, *al-qutb*, which can be interpreted as the cosmic axis (in terms of the representational themes, the equivalent of the hierophany of the *Axis Mundi*).

Along this central *Axis Mundi* humans can transcend through the three cosmic zones: starting from a.) the underworld, the unholy zone (as in the case of tombs, in which the sarcophagus is placed underground, e.g. Gur-i Amir in Samarkand), experiencing the horizontality of b.) the earthly world, the first holy zone, where the earth meets the Heavens (i.e. the building itself, the intersecting axes of the four *īwāns* marking its centre), and proceeding to the verticality of c.) the Heavens, the second or heavenly holy zone (which can be associated with the dome, rising above the point of the intersecting axes as in the *khānaqāhs*).

Since the origin of the hierophany of the four is related to the spatial orientation of man in the world, it acquired spatial representations based on a symmetrical geometrical grid used for centuries along the Silk Road. The origins of such a grid can be traced down to Plato (in the West, with his cosmological dialogue *Timaeus* - one of his best known works in early Islam) and to the mandala (in the East). The hierophany of the four, geometrically transformed in the Cosmic Cross, was adopted in the construction of quadripartite cities (*urbs dei*), palaces, temples (Buddhist stupas – Fig. 2, Hindu temples, Christian cruciform churches and martyria⁷, Islamic four-*īwān* mosques and madrasas – Fig. 3, Sufi domed four-*īwān khānaqāhs* – Fig. 4), and gardens (*čahār bahrs*). Herewith, we should differentiate between two types of sanctuaries based on the mandala. The first type is the centrally organized, square sanctuary with wall openings along the cardinal points (e.g. *vihāra*, stupa). The second type is a square sanctuary, situated in a rectangular courtyard (e.g. the Gupta Temple, the Kailasa Temple). The first type can be architecturally associated with the Islamic tombs, mausoleums and centrally-domed Sufi *khānaqāhs*. The second type can be described as a cosmic prototype of the open-courtyard four-*īwān* mosques, madrasas and caravansarays.

⁷ One of the earliest examples is the martyrion described by Saint Gregory of Nyssa (c.335-394) in Mango, C. *The Art of the Byzantine Empire (312-1453). Sources and Documents*. Prentice-Hall, Englewood, pp.27-28, 1973. It had an octagonal sanctuary inscribed in a circle and four cruciform naves.

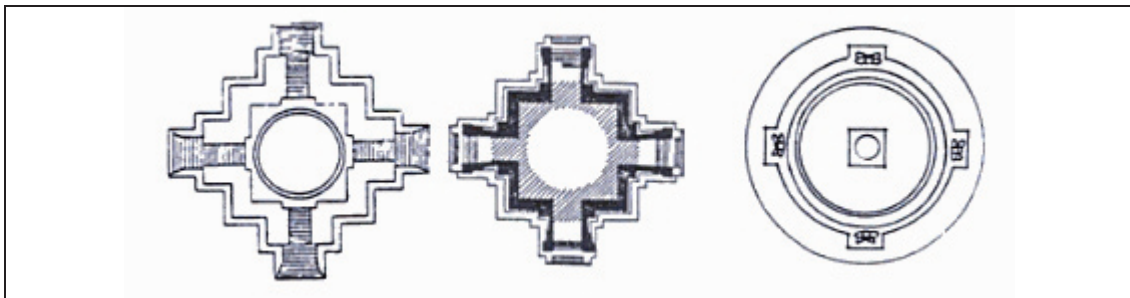


Fig. 2: Plans of stupas with four stairways or four Buddha images in the cardinal points after Snodgrass

Source: Snodgrass: *The Stupa*, 1985, p.132, Fig.75



Fig. 3: Samarkand, isometry of the major Tīmūrid Congregational Mosque Bībī Khānum (1399-1405) after Borodina

Source: Borodina: *Central Asia*, 1985, p.70

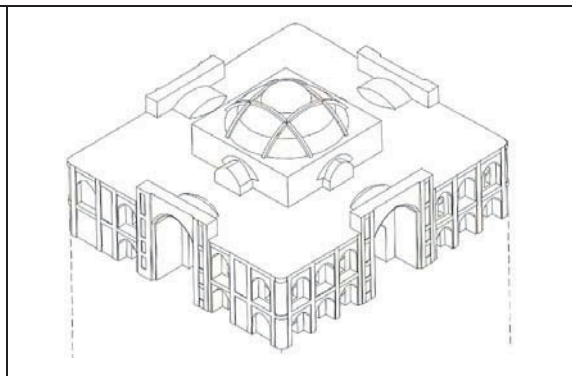


Fig. 4: Bukhara, Bahauddin khānaqāh 16th c. AD, isometry after Gangler, Gaube and Petruccioli

Source: Gangler, Gaube and Petruccioli: *Bukhara*, 2004, p.150

Medieval Islamic architecture can be directly related to Buddhism. One of the best examples that testifies the influence of Buddhist architecture on the development of the four-īwān plan is the Buddhist monastery at Adzhina Tēpa⁸ from the 7th-8th c. AD in present-day Tajikistan (Fig. 5), which consists of two four-īwān courtyards, oriented along the intercardinal points.

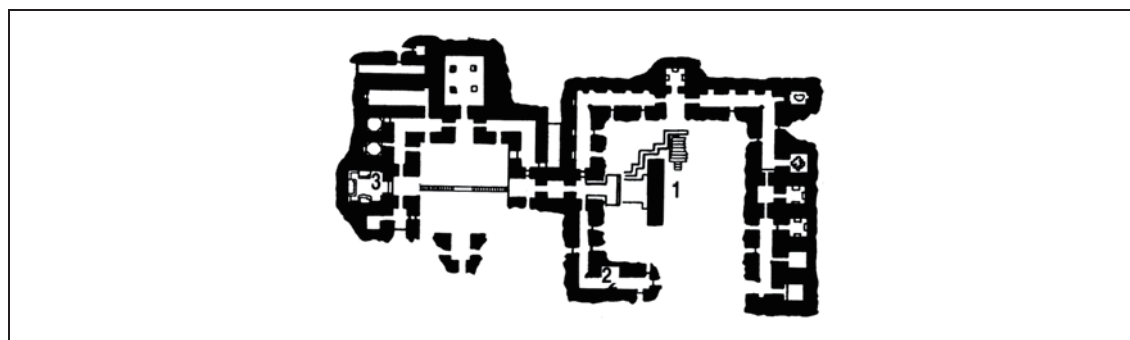


Fig. 5: Adzhina Tēpa, plan of the two courtyards: the monastery to the south-east (to the left) and the main sanctuary with the cross-axial stupa to the northwest (to the right) after Pander

Source: Pander: *Zentralsasien*, 1966, p.42

⁸ Meaning "Devil's Hill".

The main sanctuary has a cross axial stupa in the centre of the four-*īwān* courtyard and two smaller votive cross-axial stupa's in two side chambers. The smaller four-*īwān* courtyard had a residential function and accommodated Buddhist monks. The Buddhist monastery at Adzhina Tepa is very important for the history of the four-*īwān* plan since it underlines the coexistence of Buddhist and Islamic architectural iconography as late as the 7th-8th c. AD. Adzhina Tepa brings forward two major arguments: a) the four-*īwān* plan co-existed with cruciform Buddhist stupas based on the hierophany of the Cosmic Cross and the *Axis Mundi* as late as the 7th-8th c. AD and b) the four-*īwān* plan might have had an Eastern origin related to Buddhism.

I argue that the four-*īwān* plan with the four gates (*īwāns*), ideally denoting the four cardinal points, is a visual representation of the hierophany of the four: the Cosmic Cross and the hierophany of the cosmic centre: the *Axis Mundi*. As I have shown above, the hierophany of the four is very complex and includes many different visual representations, which have evolved in a hierophanic palimpsest throughout time and beyond mythological and religious thought. To analyze the existence and the quintessence of the four-*īwān* plan in terms of exclusively Islamic iconography and architectural morphology would be a limitation, depriving the hierophany of the four of its broader and extremely complex meaning.

In the Buddhist stupas and in the Hindu temples the *Axis Mundi* is clearly represented by the horizontal centre of the mandala and by the verticality of the mountain-like tower. However, the four-*īwān* plan reveals two potential *loci* for the *Axis Mundi*. The one is of course in the centre of the courtyard, which is the geometrical centre of the compound and the intersecting point of the two orthogonal axes (Fig. 1). The second one is the *mīhrāb*, situated in the sanctuary along the *qibla* axis. On the one hand, the imam or the shaykh carrying out the service assumes the function of the cosmic man in the *mīhrāb* and connects metaphorically with the Heavens. On the other hand, the congregation in the courtyard as a whole acts as an *Axis Mundi* and unobstructed by any architectural settings (lack of a cupola) directly connects with the divine reality. These two architectural centers: the centre of the courtyard and the *mīhrāb* can be explained with the hierophanic palimpsest. Primarily, the orthogonal centre of the courtyard was also the locus of the *Axis Mundi* and the most sacred place. However, with the advent of monotheistic thought and with the Islamic necessity to incorporate the *mīhrāb* in the *qibla* as the most sacred locus in the compound, the four-*īwān* plan acquired two hierophanic centres: the centre of the courtyard, marked by the water basin, and the *mīhrāb* niche as the most sacred part of the *qibla*.

All of the above presented architectural sites had clear rectangular boundaries, defined by two intersecting orthogonal axes denoting the four cardinal or semi-cardinal points. The geometrical principles of symmetry were applied ubiquitously to create a representation of the built environment as similar as possible to the creation of the world by God. The geometrical organization of space (as attributed to God) is opposed to the chaos of the profane, unorganized space (in opposition to God's perfection). Creating order in the chaos by means of symmetry is regarded as an ideal topography, the only one that fully represents order and is subject only to God's rules of perfection. The four-*īwān* plan was used to represent political agendas and imperial ambitions. Its hierophanic essence has been utilized to relate to the glorious imperial past by re-evoking the imagery of Paradise in a four-*īwān* setting. The ruler professes his omnipotent divine power as a commissioner of a pious building based on a paradisiacal plan, situated at the centre of an orthogonal imperial capital, representing in turn the totality of the macrocosmic world on a microcosmic scale.

Conclusion

The concept of the *hierophanic palimpsest*, presented above, only stresses the obvious parallels between the Buddhist, Hindu and Islamic orthogonal compounds and opens the debate on the hierophanic essence of their architectural plans. The hierophanies of the *Axis Mundi* and the Cosmic Cross represent architectural traditions based on the same anthropomorphic and physiomorphic beliefs and cosmological schemes that form the architectural heritage along the Silk Road.

References

- Ardalan, N. and Bakhtiar, L. *The Sense of Unity. The Sufi Tradition in Persian Architecture*. The Chicago University Press, Chicago, 1973.
- Borodina, I.: *Central Asia. Architectural Monuments from the 9th -19th c.* Photo album. Moscow: Science Publishing House, 1985.
- Broadbridge, A.F.: *Kingship and Ideology in the Islamic and Mongol Worlds*. Cambridge University Press, Cambridge, 2010.
- Dudoignon, S.A., Hisao, K. *Research Trends in Modern Central Eurasian Studies (18th-20th Centuries)*. A Selective and Critical Bibliography of Works Published between 1985 and 2000. Part 2. The Toyo Bunko, Tokyo, 2006.
- Golombek, L. and Subtelny, M., eds. *Timurid Art and Culture: Iran and Central Asia in the Fifteenth Century*. Brill, Leiden/New York, 1992.
- Lentz, T.W. and Lowry, G.D. *Timur and the Princely Vision. Persian Art and Culture in the Fifteenth Century*. Museum Associates, Los Angeles, 1989.
- Levi, S.C. and Sela, R., eds. *Islamic Central Asia. An Anthology of Historical Sources*. Indiana University Press, Bloomington, 2010.
- Mekking, A. and Roose, E., eds. *The Global Built Environment as a Representation of Realities*. Amsterdam University Press, Amsterdam, 2009.
- Nasr, S.H. The Principle of Unity and the Sacred Architecture of Islam. *Islamic Art and Spirituality*. Golgonooza Press, Ipswich, pp.37-63, 1987.
- Necipoğlu, G. An outline of shifting paradigms in the palatial architecture of the pre-modern Islamic World. *Ars Orientalis* 23, pp.3-24, 1993.
- O’Kane, B.: *Timurid Architecture in Khurasan*. Mazda Publishers, Costa Mesa, 1987.
- Pinder-Wilson, R. Timurid Architecture. *The Cambridge History of Iran*, Vol. 6. Cambridge University Press, Cambridge, pp.728-758, 1986.
- Pugachenkova, G.A. *Timurid Architectural Heritage*. Tashkent, 1996.
- Snodgrass, A.: *The Symbolism of the Stupa*. Cornell Southeast Asia Program, New York, 1985.

ARCHI-CULTURAL PARALLEL OF PERSIAN AND TURKISH BAZAAR ALONG THE SILK ROAD CASE STUDIES: REY, TABRIZ AND ISTANBUL BAZAAR

Mohammad Reza Pourjafar¹, Ghodsieh Samani¹, Ali pourjafar², Razieh Hoorshenas¹

¹ *Tarbiat Modares University, Iran*

² *Payame Noor University, Iran*

Keywords: Archi-cultural parallel, Silk Road, Traditional Architecture, Urban Design, Rey Bazaar, Tabriz Bazaar & Istanbul Bazaar

Introduction

History reveals that human beings were depending on each other for their survival on the earth. They had to exchange their commodity and goods for their various requirements. Everything was not available in one place; various materials were found in various places. Therefore, people had to travel to find out their needs and requirements. This was the way that a network for such traffic and transportation was developed and later on they called it the Silk Road.

Most of the important intersections along the Silk Road were bazaars. This research focuses on the comparison of the physical layout and the culture of architecture of Iranian and Turkish traditional covered bazaars in the context of Rey, Tabriz and Istanbul.

The analysis in this paper indicates that there are various similarities among the architecture of the bazaars along the Silk Road. These have been defined through comparison of various architectural elements, which has been used in both countries Iran and Turkey. In this research, comparison of the physical layout of traditional covered bazaars of the two of the most important regions of the Silk Road routes in Persia (Iran) and Ottoman Empire (Turkey), that influenced the culturings, architecture and legal characteristics of the era are studied in the context of Tabriz and Istanbul respectively. In fact the word of Bazaar itself is originally Persian which has transferred to the vocabulary of various nations and finally to the English as well.

Method and the Scope of the Research

The method of this study is basically a kind of comparative analysis of culture of architecture among various nations along Silk Road. This analysis has done through plans, sections, elevations, various details, views and functions of the Bazaars of Rey, Tabriz & Istanbul. These cities were locating in the middle part of Silk Road, connecting east to west and their bazaars have been the hub of various socio commercial activities.

Although the city of Rey had one of the oldest bazaars of Persia but unfortunately it has been damaged by Mughal attacked and all its documents were lost. Therefore, this article focused on comparing the functional, spatial structures as well as the architecture of the Turkish and Persian bazaars in Tabriz and Istanbul in details, and Rey in general.

The scope of this research is limited to the study of three manifest bazaars and their function to prove their similarity and finally the impact of Persian bazaar on creating such kind of urban design for commercial activities along Silk Road.

Silk Road

The Silk Road actually was an ancient trade network, connecting the East to the West. The Silk Road trade system was created by interactions between China B.C.E. and their western neighbors. The Silk Road was not one road but many (Fig. 1); it was actually a network of roads, generally going from east and west, but with spurs into southern Iran, the northern Eurasian steppe, and south over the Hindu Kush to the Indian subcontinent [1].

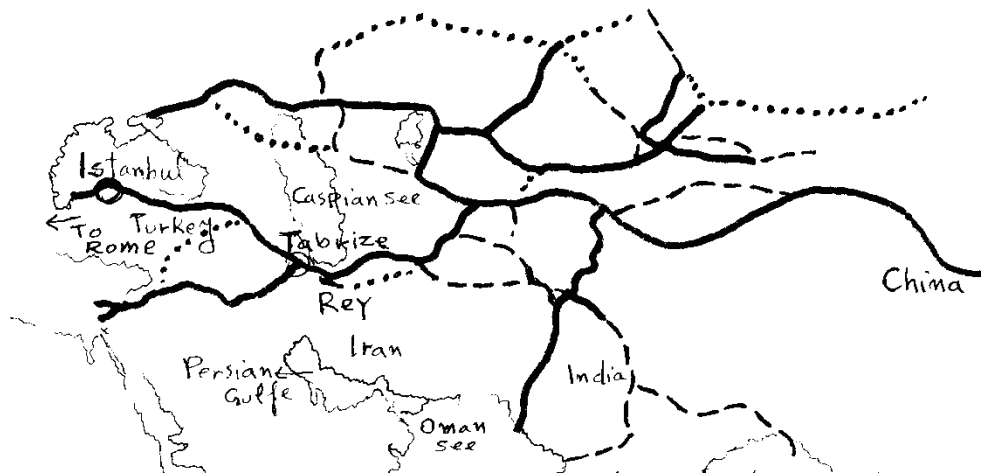


Figure 1: ___ Silk Road 2nd BC to 4th AD - - - - 5th century AD to beginning of 13th AD
.....From 13th AD to 16th century AD
(Source: Authors on the bases of ICHHTO, 2009)

Bazaars

Originally, bazaar is a Persian word. It is not only a place for commercial activity but also a place where many other cultural activities have been taking place. It has a great social capital [2].

Bazaar is also a symbol of traditional architecture of Persian Islamic art & architecture which is best visible in Iran and Turkey.

In Iranian architecture, bazaars are formed either organic or planned, and usually located at the centre of the cities, the layouts are usually linear in shape, positioning the public and socio-cultural spaces through this linear form [3]. They were usually constructed during the periods of great economical growth and welfare [4]. Moreover, bazaars have always defined the major street of urban fabric, connecting two major entrances of the city [4].

On the other hand, in Turkish architecture, "Bedesten", the covered and enclosed core building, where the most expensive and valuable goods are exchanged, determines the formation of the whole bazaar, as can be seen in Bursa, Edirne or Istanbul covered bazaars [5]. Contrary to usually timber framed shops, "Bedesten" and "Arastas" of the Turkish bazaars are predesigned and built in single sessions without any expansion. Since, the ownership status as mentioned before, belonged to the "Vakifs", as long as there is demand, and as long as the "Vakifs" had the capital, shop strips were built within time and the bazaar continued to expand horizontally. Thus, although in both cultures, both organic and pre planned bazaar systems, developed from linear strips are seen, contrary to the articulated and clustered Iranian bazaars, Turkish bazaars formed through connection of "Rastas" acting as gridiron building blocks [6]. Bazaar have been the pulsating heart of most of famous Iranian & Turkish cities, They were also forming various origin and destination along Silk Road, located mostly at the intersection of two important route of Silk Road.

Rey Bazaar

Rey formerly was one of the great cities of Iran. Its ruins of Ashkani Palace on Cheshm-e Ali hill, located near Capital of Iran, Tehran. The remains of the ancient city sprawl out the eastern side of the modern city of Shahr-e-Rey, located just a few miles southeast of Tehran. The Silk Road in Iran connected the cities of Tous, Neishapour, Damghan, Gorgan, and Rey.

Rey was famous for its decorated silks, of unsurpassed artistic perfection, and for ceramics. Only two architectural monuments survive the tower of Toghril (1139) and a partially ruined tower [7]

Shahr-e Rey lies along the major migration routes taken by the household of Prophet Mohammad (PBUH) and his followers. Imam Reza (AS) crossed this route to Khorasan. When Alavids ruled Mazandaran, Shahr-e Rey was a passageway for Shias who sought protection in Mazandaran in the 3rd and 4th centuries AH (10th and 11th centuries AD) [8].

Rey Bazaar is located to the north of Abdol-Azim's shrine, which is comprised of two sections and a crossroad is formed at their intersection. Since old days, it has been a center for the sale of spices, traditional herbs and commercial goods which were imported by traders via the Silk Road. The structure of the bazaar is constructed from plaster, baked brick, raw mud brick and mud. It dates back to the Safavid era and is approximately 500 years old [9].

Construction technology of Rey Bazaar is of point vault arches & domes.

Tabriz Bazaar

Since Tabriz was located on Silk Road route, it was one of the most important commercial centers in Iran and in the world in past (Fig 2&3). It was the center of exchanging European commodities; therefore, it was famous in the world [10]. Among famous travelers, who visited and described Tabriz bazaar in different centuries are Moqaddesi in the 4th century, Yaqoot Hamavi in the 7th century, Marco Polo in the 7th century, Ibn Batooteh in the 8th century and Hamdollah Mostoofi in the 8th century. In addition, Sharden gave a great detail of it. He considered it as the largest bazaar in Asia with 15,000 shops [11]. According to the bazaar separation by The Mehran Rood River into two parts of the bazaar, the north part has lost its importance and has been neglected. A large part of the Bazaar area is located in the south of the Mehran Rood River [10]. The existence of the river has caused the formation of bridge-bazaars (Bazaars created on bridges) along the "Rasta", leading to the north of the Bazaar. A large number of entrances are one of its important and outstanding elements [12]. Although Persian Bazaars were established in Achaemenid era. Religious places like mosques for Muslim are usually built in Bazaars too.

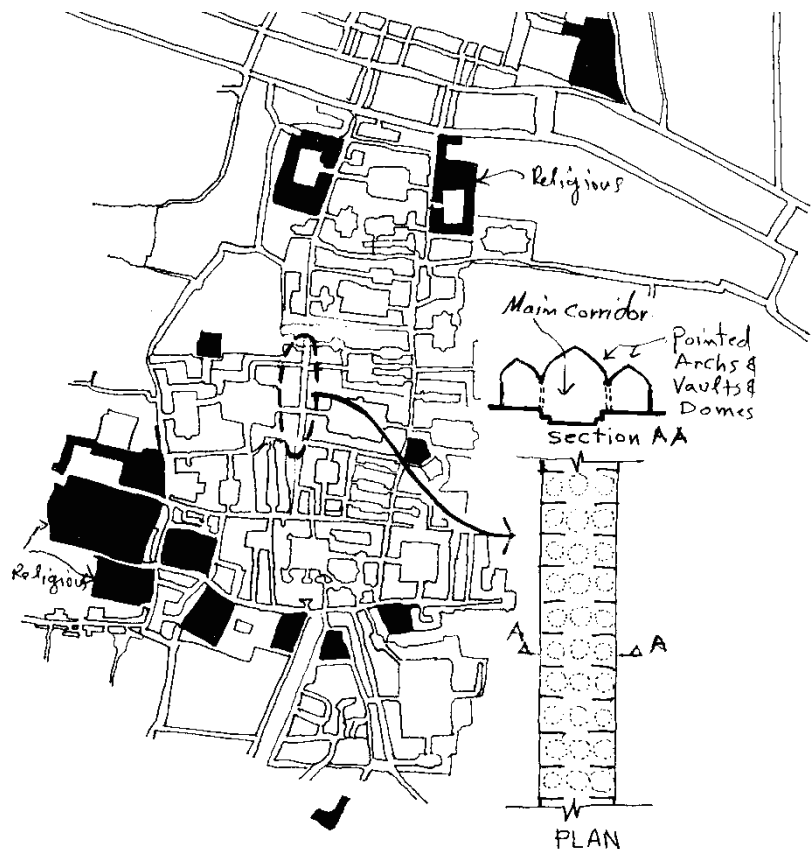


Figure 2: Layout plan & detail of Tabriz Bazaar, Source: Authors

The existence of the river has caused the formation of bridge-bazaars (Bazaars created on bridges) along the "Rasta", leading to the north of the Bazaar. A large number of entrances are one of its important and outstanding elements [12]. Although Persian Bazaars were established in Achaemenid era. Religious places like mosques for Muslim are usually built in Bazaars too.

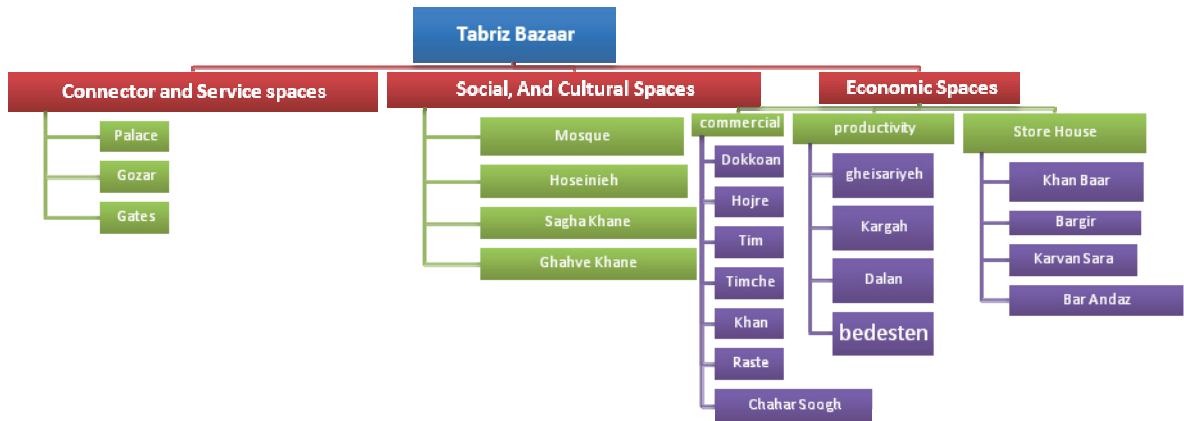


Figure 3: The Persian Bazaar elements, source: Authors

Istanbul Bazaar

The Grand Bazaar is a historical trade centre more than 500 years in the historical peninsula of Istanbul, Turkey [13]. The construction of the core of the future Grand Bazaar started during winter 1455/56, shortly after the Ottoman conquest of Constantinople. Sultan Mehmet II let erect an edifice devoted to the trading of textiles (Fig. 4&5).

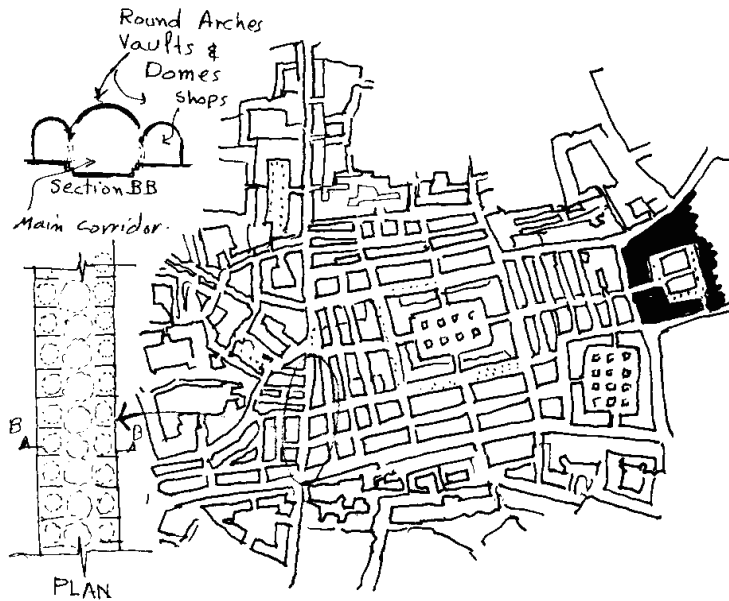


Figure 4: Lay out plan and detail of Istanbul Bazaar, Source: Authors

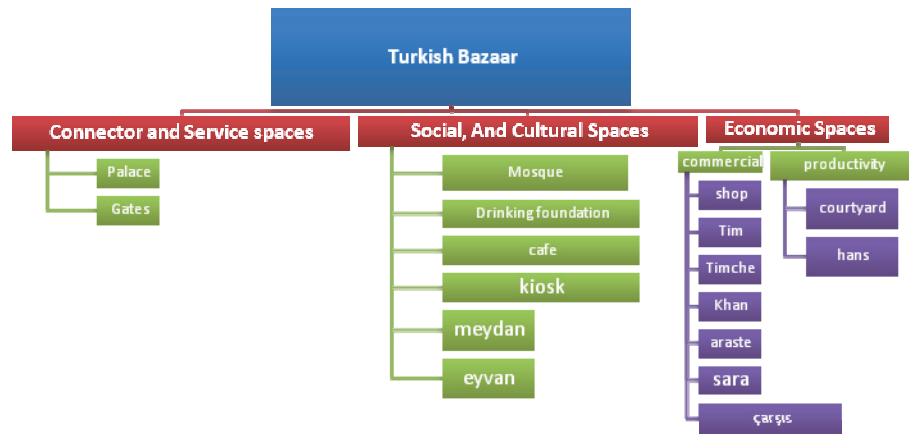


Figure 5: The Turkish bazaar elements, source: Authors

Conclusion

Bazaars in Iran, Turkey and India are more than local markets for the barter of traditional goods and handicrafts. They are urban marketplaces where national and international trade is conducted. These are urban spaces where political news and gossip have been shared. Religious and national symbols have been usually on display, and various social classes have been mingling. Comparison of the bazaars of Tabriz, Istanbul & Delhi shows many similarities in terms of architecture configuration, social network, proportion parameters and function in their various traditional urban spaces (Fig. 6&7).

The similarities of the bazaars of Persia and Turkey present the types and elements of the spatial configuration. Accumulation of various architectural elements in forms of “Rarays”, “Rastas”, “Carşıs”, “Charsugs” and such are the key factors of Persian and Turkey bazaar formation. The location of tradesmen, or artisans, the semantic or social relations of these are other issues of bazaars to be dealt with. In detail, we can strongly mention that Bazaars were the hub of commercial & social activity along Silk Road and they were a kindly traditional CBD in most of eastern cities along the Silk Roads.

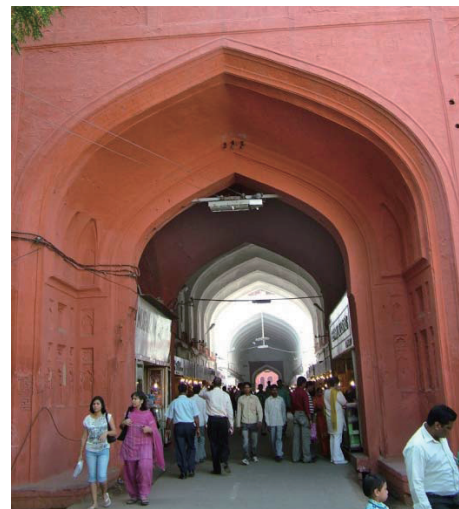


Figure 6: Mina Bazaar in Delhi, Source: Authors

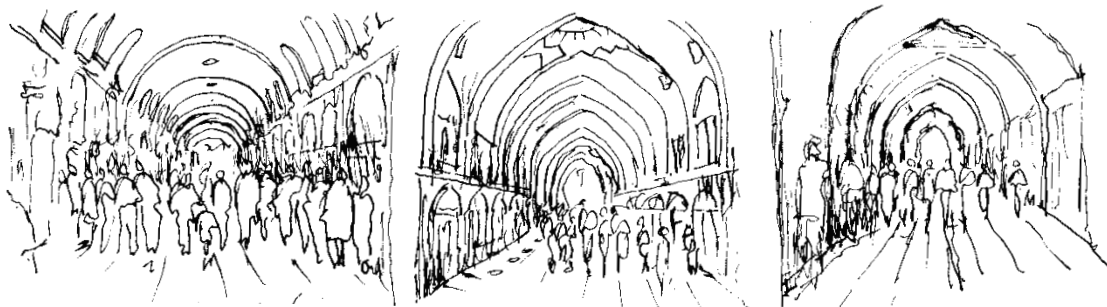


Figure 7: From left, View of Istanbul, Tabriz & Rey Bazaar

The tradition of planning, design and construction of Persian bazaar has its influence on other countries, like Turkey, Central Asia and India (Bazaars of Samarkand & Bokhara and Mina bazaar of Delhi are the good examples.), which is out of the scope of this paper to discuss about them.

Usually all the bazaars have specialized sections of various land uses and functions. These sections are like silver & gold sellers, leather, shoes, bags etc. Carpet seller, wooden works, glass & mirror seller, silk, cotton, Copper seller and many others. Due to this types of arrangements customers could find their best choice with a reasonable price.

Notes

For further information you can see the following:

1. Biglari, Esfandiar, 1976, Iranian Bazaar, Art and People Journal, vol. 162.
2. EDGÜ, E., et al., TRADITIONAL SHOPPING: A Syntactic Comparison of Commercial Spaces in Iran and Turkey, Eighth International Space Syntax Symposium, Santiago de Chile: PUC, 2012.
3. Eyice, Semavi (1955) (in French). Istanbul. Petite Guide a travers les Monuments Byzantins et Turcs. Istanbul: Istanbul Matbaası.
4. Faghani, Abbas, Rey: Treasure of History, 2006, Resalat Newspaper, p. 17.
5. Iranian Cultural Heritage, Handicrafts and Tourism Organization (ICHHTO), (2009) Tabriz Historical Bazaar Complex, UNESCO World Heritage Convention Nomination of Properties for Inclusion on The World Heritage.
6. Khansari, M., Yavari, M., PERSIAN BAZAAR, THE. Veiled Space of Desire, Mage Publishers, Washington, DC, 1993.
7. List, <http://whc.unesco.org/uploads/nominations/1346.pdf>
8. Liu, X, 2010, The Silk Road in World History, Oxford University Press.

References

- [1] Folts, R., 2000, Religions of the Silk Road: Overland Trade and Cultural Exchange from Antiquity to the Fifteenth Century, New York: St. Martin's. Press.
- [2] Pourjafar, M.R, Pourjafar, Ali, Rule of Social Capital in Economy of Traditional Bazaar, Urban Management journal, Vol. Special Issue, 2012.
- [3] Kermani, A. A., Luiten, E., (2010), Preservation and Transformation of Historic Urban
- [4] Moosavi, M. S., (2005), Bazaar and its Role in the Development of Iranian Traditional Cities, in Conference Proceedings 2005 IRCICA International Conference of Islamic Archaeology, pp. 40-41.
- [5] Küçükkömürcü, B., (2005), Geleneksel Türk Osmanlı Çarşısı Yapıları ve Günümüzdeki Alışveriş Merkezleri Üzerine Bir İnceleme, A Research About Traditional Turkish Ottoman Bazaars And Today's Shopping Centres (an Turkish), Mimar Sinan University of Fine Arts, Graduate School of Science and Technology, MSc. Thesis on Architectural Design Issues Program, Istanbul.
- [6] EDGÜ, E., et al., TRADITIONAL SHOPPING: A Syntactic Comparison of Commercial Spaces in Iran and Turkey, Eighth International Space Syntax Symposium, Santiago de Chile: PUC, 2012.
- [7] <http://www.britannica.com/EBchecked/topic/492588/Rayy>, March 2012
- [8] Anvari, A, 2012, Religious Places Representing Iran's Arts, Architecture, and Tourism Capacities, Tourism.
- [9] http://www.iranchamber.com/cities/ray/shahre_ray.php, March 2012) <http://stt-tour.com/>
- [10] Khamachi B (2009). My city Tabriz (1st edition). Tabriz: Nedaye Shams, 35, 196-202.
- [11] Ahour I (2008). Tabriz city. Professor: Doctor Seyyed Rahim Moshiri; Class Research, PhD Student at Islamic Azad University, Tehran Sci. Res. Unit, p. 37.
- [12] Sma'eeli SH , Omrani B (2008). The history and architecture of Tabriz bazaar (1st edition). Tabriz: Sotoodeh, pp. 208, 227.
- [13] Yusufi Far, Sh., Mohammadi, M.H., 2010, Survey of the influence of religious beliefs on social life in Rey through Seljuk era, HISTORICAL ESSAYS, 105-125.

INVESTIGATING THE SUSTAINABLE CITY INDICATORS THROUGH PROMOTING PHYSICAL SECURITY IN THE MARGINS OF THE SILK ROAD (CASE STUDY: YAZD CITY)

Zahra Sadat Saeideh Zarabadi¹, Taimaz Iarimian¹, Mohsen Foruzanfar²

¹ *Islamic Azad University, Iran*

² *Tehran University, Iran*

Keywords: Physical Security, Urban Sustainability, Fuzzy AHP, Yazd City.

Introduction

Safety and security have been significant issues throughout history, from early prehistoric cave-dwelling societies to medieval and modern cities. There are some notable commonalities between the concepts of sustainable development and urban security which require exploration. In addition, City and urban form is sustainable when a city is safe in its total aspect for its residents. On the other hand, physical security was one of the most important issues to the attention of Iranian traditional cities which caused the achievement of sustainable cities. Especially Iranian desert cities had sustainable and secure tissues.

In this paper at first the physical security indicators are determined, then with the aim of benefiting from one example of a sustainable city in the margins of the Silk Road, Yazd city is chosen to prioritize the physical security indicators affecting urban sustainability. Yazd as a good example of a sustainable deserted city is located in the central part of Iran. The city has a 3000 year long history, dating back to the time of the Median Empire, an ancient settler of Iran.

Indeed this paper is attempting to present an urban sustainable model by identifying the principles and concepts of physical security in Yazd old fabric and investigates the extent to which safety and security are integrated within urban sustainability. For this purpose a hierarchical model with three levels is suggested. So, the physical security indicators are categorized in three groups of form, meaning and function. These indicators later are prioritized using pair wise comparison logic and fuzzy group Analytic Hierarchy Process (AHP) method for determining the relative importance of each factor on achieving urban security.

Method

This paper has been used two types of methods including library-based method and fuzzy AHP method. The method which is adopted for Identifying the criteria and sub-criteria of the proposed model is descriptive and library-based, in the sense that it is based on documents and archives. The reason for adopting this method is that this research attempts to explore historical and cultural phenomena requiring documentary evidences and references.

Indeed, this paper proposes the use of fuzzy AHP method and presents an analytical model to determine the relative importance of indicators affecting urban sustainability based on their physical security, in Iranian traditional cities in the margins of the Silk Road.

Results

The proposed fuzzy AHP model is composed of the following steps (See figure 1):

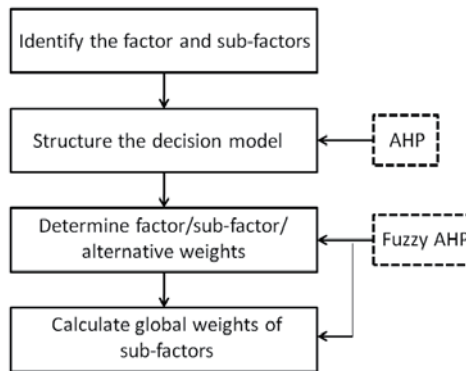


Figure 1: Schematic framework of the proposed fuzzy AHP model

Step 1: Identify the criteria and sub-criteria of the proposed model.

Step 2: Structure the AHP model hierarchically based on the criteria and sub-criteria identified at Step 1. As can be seen in figure 2, the AHP model is structured in 3 levels such that the objective is in the first level, the main dimensions of urban design (function, form and meaning) as the criteria are located in the second level and the sub-criteria related to each criterion are in the third level.

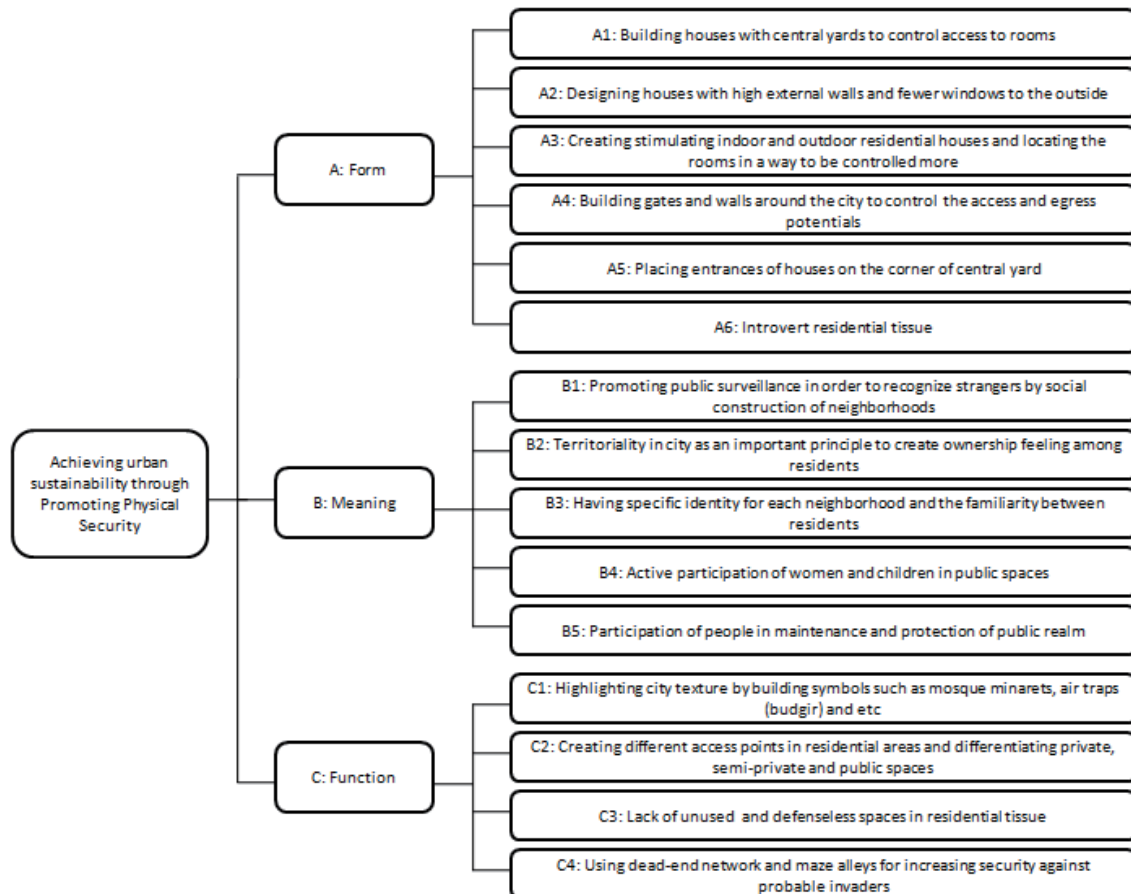


Figure 2: Proposed AHP Model

Step 3: Determine the priorities of the main principles with respect to the goal, by using pairwise comparison matrices (w_1).

Step 4: Determine the local weights of the criteria (w_2) and sub-criteria (w_3 (Local)) (table 1).

Step 5: Calculate the global weights for the sub-criteria (w_3 (Global)) (table 1).

Table1: Hierarchal Model with Local and Global Weights

Achieving urban sustainability through Promoting Physical Security	criteria		Sub-criteria		
				Local weight	Global weight
	A	0.558	A1	0.279	0.155
		A2	0.172	0.096	
		A3	0.279	0.155	
		A4	0.172	0.096	
		A5	0.048	0.027	
		A6	0.048	0.027	
B	0.097	B1	0.219	0.021	
		B2	0.344	0.033	
		B3	0.223	0.021	
		B4	0.117	0.011	
		B5	0.096	0.009	
C	0.345	C1	0.421	0.145	
		C2	0.244	0.084	
		C3	0.091	0.031	
		C4	0.244	0.084	

Discussion

Security is an integral part of sustainability. In a sustainable urban environment it is essential that the inhabitants should not have cause for fear for their personal safety and the safety of their possessions [1]. In addition, increasing opportunities for secure urban spaces can contribute towards the creation and maintenance of safer, vibrant and more sustainable communities, and it is now widely recognized that sustainable communities must therefore possess high levels of both safety and security [2]. So it is obvious that the proper design and effective use of the built city can lead to a reduction in the fear of crime and the incidence of crime, and to an improvement in urban sustainability.

Iranian cities throughout history had the important principles of urban defensible spaces under the physical and social dimensions, with creating a dynamic environment [3]. In fact, the old context of Iranian cities due to their physical structure, had the features and values such as security, privacy and identity that was necessary to achieve urban sustainability [4]. These cities were complete samples of the diversity and mixing land use for increasing public participation and raising social control. They also could be considered as a background in social capital, and a comprehensive model for creating defensible space, and environmental security of today cities. It should be mentioned that creating defensible spaces had an effective role in the sustainability of Iranian traditional cities. One of the important issues in Iranian traditional cities is the spatial domains and hierarchy of access to different spaces. Usually these cities had both public and private spatial domains and the exact definition of the interface between the domains.

The especial structure of historical city of Yazd as an example of a sustainable city in the margins of the Silk Road is originated from its location at the desert. In the past, the creative designers of the city utilized from modular concept in the form and the size of building, compatible with climate, the maximum use of potential and local materials [5]. Also they avoided their designs from unnecessary decoration by using ornaments including aesthetic and functional aspects. They considered human scale in proper form based on resolving human needs during time to create an urban sustainable form too. The most important factors for achieving urban sustainability in Yazd old tissue are mentioned in figure 3.

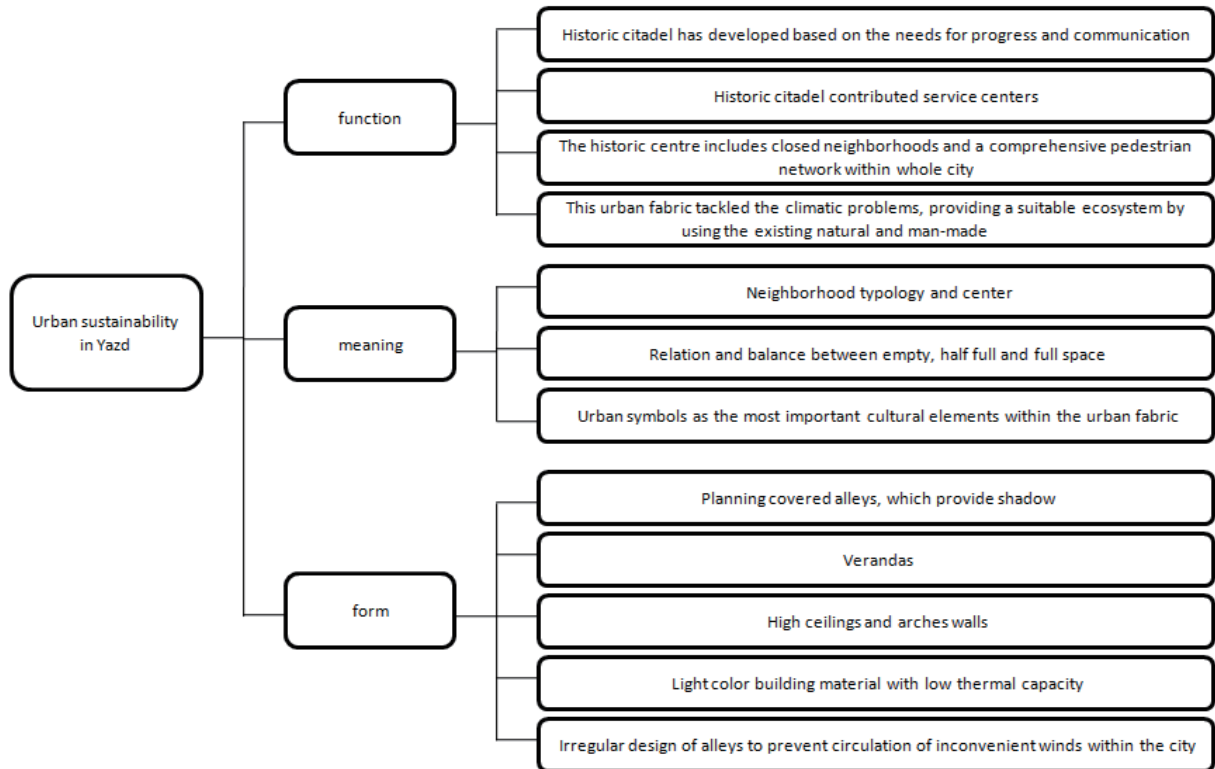


Figure 3: Factors for Achieving Urban Sustainability in Yazd

Yazd, like other historical cities of Iran, has been increased the environmental security with the use of physical indicators. Another positive feature of Yazd old tissue was the consecutive residence of generations of the family in one neighborhood that caused a strong social relationship, sense of security and cooperation among residents. Most of the houses in Yazd old tissue had a central courtyard and were made up of two quite distinct parts. The external part or courtyard was completely private space that awarded to the women and children, and the internal or exterior part of the house belonged to the owner of the house and his guests (figure 4). Also affluent people's house had a special independent yard for guests.

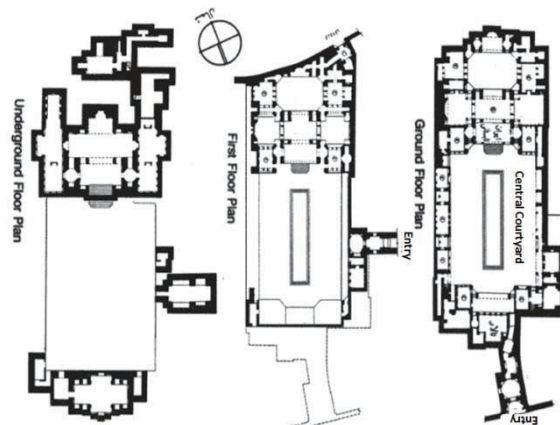


Figure 4: Plan of a House With Central Courtyard

The city texture was dense, so residents could focus on more limited space and be able to defend against invaders. On the other hand, one of the most important features in the desert cities of Iran was privacy. In addition, houses were isolated from the external spaces with high walls and fewer windows to the outside. Lattice - windows, despite of making privacy and aesthetic criteria, allowed to see from inside to outside of the house, while prevented the view from outside (figure 5). The location of these windows in the height above the 2/5 meters, created privacy in the first place, and on the other hand, increased the supervision of

residents on the environment. Also the house doors had two types of knots, one for women, and the other belonged to men (figure 5).



Figure 5: A Lattice-window and Door with Two Types of Knots

Conclusion

This paper aimed to clarify the key role of physical security in achievement of urban sustainability in the Iranian traditional cities. In addition, proposed an analytical model for investigating the Sustainable City Indicators through Promoting Physical Security. For this purpose criteria and sub-criteria affecting physical security in the Yazd city have been prioritized by fuzzy AHP method.

Results of applying the model in studied area showed that in order to achieve physical security, 'form' with the weight of 0.558 is the most important criteria. In addition, the most significant sub-criteria determined to be 'Building houses with central courtyards' and 'Creating stimulating indoor and outdoor residential houses' with importance global weights of 0.155 and 0.155 respectively.

As the paper shows that increasing opportunities for secure urban spaces can contribute towards the creation and maintenance of safer, vibrant and more sustainable communities, and it is now widely recognized that sustainable communities must therefore possess high levels of both safety and security [6]. Also a review of the literature clearly indicates that safety and security can seriously undermine the broader aims of urban sustainability [7].

On the other hand, a sustainable community must be the one that is defined as safe, perceives itself to be safe and is considered by others to be safe. Finally, a brief look at the history of the ancient land of Iran is a proof of claim that in traditional Iranian cities, physical security had a key role in urban sustainability.

References

- [1]. Cozens, P., Sustainable urban development and crime prevention through environmental design for the British city. Towards an effective urban environmentalism for the 21st century. *Cities*, 19(2), pp. 129-137, 2002.
- [2]. Madanipour, A., Redistribution of Urban land and the Quality of Environment, public and private responsibilities in Housing Design and Settlement Planning, Open House international Association, Conference Proceedings, pp. 115-126, 1989
- [3]. Kheirabadi, M, Iranian Cities, Formation and Development, Texas University press Austin, USA, pp. 73-76, 1993.
- [4]. Soltanzadeh, H., History of City and Urbanism in Iran, pp. 67-69, Tehran, 1986.
- [5]. Bonine, M.E., Yazd and its hinterland, a central place system of dominance in the central Iranian plateau, pp. 95, Marburg/Lahn, 1980.
- [6]. Armitage, R., & Monchuk, L., Reconciling security with sustainability: the challenge for eco-homes. *Built Environment*, 35(3), pp. 308-327, 2009.
- [7]. Deylami, M., Architecture, Urban Development, and Urbanism of Iran in passing the time, Tehran, pp. 107, 1988.

SYMBIOSIS BETWEEN MAN AND NATURE: JAPANESE INFLUENCE ON LANDSCAPE ARCHITECTURE OF ISLAMABAD

Abdul Rehman

University of Engineering & Technology, Pakistan

Keywords: Islamabad, Capital Park, nature and landscape, Japanese influence, rock garden, water and landscape, water harvesting.

Introduction

Islamabad, the capital of Pakistan, is among the few capitals of the world which were planned and constructed in the later half of the twentieth century and where landscape development was given prime importance. Greek planner Constantinos A Doxiadis was commissioned to prepare master plan of the capital city in 1959 and soon after construction work commenced on a virgin site. The master plan was based upon the philosophy of dynapolis and gave a lot of importance to nature. Doxiadis expressed this as "Nature provides the foundation upon which the settlements are created and the frame within which they function." The master plan divided the city into residential block each measuring 2 kilometer square. Each block was numbered from A to H from northwest to southeast and 1 to 20 from north east to south west. Each block was termed as sector. Thus sector F-9 was termed as Capital Park, now known as Fatima Jinnah Park was considered to be developed keeping in view the objectives of the master plan. The success of the objectives of the master plan was thought to be achieved with the collaborative efforts of master architect and landscape architects. The services of Landscape architects were hired right from the inception and implementation of the master plan. The idea behind such expert services was that after the implementation of landscape plan and looking at the importance of landscape in an urban environment, that other cities would follow the same exercise. Derek Lovejoy and Associates of Britain was hired as landscape design consultant for the new capital. However, Mr. Roy Takahashi, a Japanese Landscape expert under Colombo plan worked on the landscape of Capital Park and made an important contribution on developing relationship with nature in line with the Japanese tradition. The plan prepared by Takahashi was not fully implemented but important features were retained in the subsequent plans. These contributions have not been previously documented and will become focus of the present paper.

Landscape Design Concept of Capital Park

The site of capital parks located in sector F-9, slope north to south from 1880 to 1800 feet from mean sea level, play an important role in providing fresh air to the capital in addition to being an important source of recreation for the local inhabitants. The site is uneven with two perennial streams traverse it and join in the south providing strong basis for the master plan. The site was initially used for agriculture and therefore, had the potential for development as

a park of desired quality. The idea of large scale central urban park was approved in the late sixties. The initial concept of the park was prepared by Mr. Roy Takahashi, the Japanese landscape architect and graduate of Chiba University. He came to Islamabad in 1968 and stayed three years to work on the master plan of Capital Park, now known as Fatima Park. Ever since several proposals by the foreign as well as the local consultants were put forwards but none of them has fully implemented as yet but in all proposals the basic concept given by Takahashi remained the same. In early 1991, it was decided to hold national design competition but unfortunately again the result were not up to the required standard. Subsequently it was decided by the Capital Development Authority (CDA) board that the design prepared in 1971 by the landscape unit of the Authority in association with Mr. Takahashi may be adopted for the development of the park. Consequently, a loop road was developed to create different zones as perceived by the landscape architect. In 2005, it was felt to make another effort to review the plan once again and the work was entrusted to Mr. Nayar Ali Dada and Associates, a Pakistani firm, based in Lahore. The design prepared by Nayar Ali Dada and its so far implementation followed the Japanese landscape tradition. The local materials and elements taken from nature to be used in natural way formed the basis of the landscape design.

The basic design theme revolves around passive planning concept and uses functional and aesthetic requirement. The detailed design of variety of functional areas was considered to have their own identity maintaining unity in planning and visual form in the presence of vehicular and pedestrian pathways. Access to variety of areas has been designed keeping in view the topography and natural features of the site. The primary work which includes construction of fence work and loop road was completed in 1993 to provide access to following six functional zones: i). Formal garden and children amusement/play areas, ii). Educational area including sizable rock garden iii). Recreational area iv). Central Water Body (lake). v) Wood land / future city centre and finally vi) Area of Cuisine [1].

More recently the services of a Mr. Kitayama Yasuo, a leading landscape artist from Japan was hired to develop a Japanese-style garden in a portion of the Park for which initial modalities with the Capital Development Authority (CDA) have been finalized. This garden will be spread over an area of about four acres of land. According to the architect it will be a traditional Japanese garden with waterfalls being one of the key attractions in addition to bridges and ponds. As he said "I am not too sure about the water situation here but I will look into it, for water features will be an essential part of the garden," he said and hoped that the residents would feel great pleasure visiting the facility. Pakistani ingredients such as plants and flowers intended to be used in developing the garden with the help of local labor and gardeners as "I think Pakistanis' technique of using stone is of high quality and their skills are exceptional." According to Yasuo, "My first impression of the city was that it is very green and resembles Nagano." He hoped the garden he would eventually create here would help people learn more about the Japanese culture. "Our style of garden is not only good to look at, it is also a fine place to hold tea ceremonies [2]."



Fig. 1: (Left). Tee house under construction.



Fig.2: (Right): Use of natural rocks

The more important aspect of original concept and later interventions was the continuity of the idea of symbiosis between man and nature. In fact, the use of water, rocks and plants have been used in an intelligent manner without being dominating the man made intervention over the nature. Bridges over the perennial streams at different intervals united the different landscape zones with one another. The varying width of streams at interval helps to retain water in non rainy seasons to promote water harvesting. At the same time a number of collection ponds of rainwater harvesting have been constructed all over the park. The waterscape is further strengthened by the construction of the series of waterfalls either at the change of levels or building artificial mound lined with raw stones. In this way the water falls have been given a more natural look. The idea of use of waterfall has been derived both from the Japanese as well as Kashmiri landscape tradition [3].



Fig 3: (Left). Perennial stream and water harvesting cascades



Fig. 4: (Left). Use of stones in

The most important aspect of landscape design is the use of rocks in the natural manner. The rocks have been successfully used for the first time in Pakistan in this park. This particular feature clearly took inspiration from the Japanese tradition. The rocks and pebble stones have been used in parking areas, steps or simply arranged in a natural manner. A variety of shapes of rocks depicting movement, calmness and progression and development create liveliness in the natural environment.

The northeastern corner of the park has so far been largely developed where in addition to

above mentioned features an open air theatre has been developed following the natural topography of the site. In addition, a tea house having a thatch roof has been developed over the perennial stream. The tea house has been constructed in the depression with lowest level. The location at the lowest contour as well as use of natural materials integrated it well with the nature.

Local native trees, shrubs and ground covers have been used. Dense plantation along the ravines dominated the central areas and provided visual segregation between different parts of the park. In this way the only possibility of accessibility of one part with another is through loop road.

Conclusion

The project implemented so far gives a complete different outlook as compared to other parks in Islamabad or elsewhere in Pakistan. The inspiration taken from Japanese landscape tradition is a complete departure from earlier Mughal or English landscape tradition. This particular paper will discuss these themes in detail..

References.

- [1] Capital Development Authority. The Design of Capital Park. C.D.A, Islamabad. 1970
- [2] Ahmad, Imran Ahmad Naeem. Fatima Jinnah Park: Japanese Garden Faces Delay. www.dailytimes.com.pk/default.asp?page...28-7-2008_pg11_3
- [3] Rehman, Abdul. *Islamabad: Architecture and Planning of New Capital of Pakistan*. Dost Associates Lahore (forthcoming) 2012.

THE CROSS-CULTURAL INTERACTION BETWEEN THE ART OF GARDEN DESIGN OF OLD CITIES OF IRAN AND INDIA ALONG THE SILK ROAD

Mohammad Reza Pourjafar¹, Mohammadjavad Mahdavinejad¹, Mostafa Shamshirband^{1*}, Saeed Farmahin Farahani¹, Razieh Hoorshenas¹

¹ *Tarbiat Modares University, Iran*

* *Presenting author*

Key words: Silk Road, Garden design, India, Iran

1. Introduction

The silk roads which are defined as a network of land and sea paths built with commercial purposes in Asia and connected East Asia to the West and South Asia as well as the northern Africa and East Europe, resembling a chain of countries (Christian, 2000). This interactional network of roads has preserved the solidarity between the important areas of Africa, Europe, and Asia.

From its early prominence in the 2nd century B. C. until the fourteenth century, this historical network was the liveliest international area in the world. Although there is no more economic activity in this region nowadays, a reconsideration of the area can be regarded as a sort of revision and rehabilitation of the past cultures and civilizations. A closer look at these roads shows that it was through this path that nations used to introduce their identities and ideologies to each other. In fact, as a result of the trades of goods being done via this route, businessmen could get familiarized with the customs and culture of other regions, which sometimes in turn led into their immigration to foreign lands.

Among all, the art of garden designs and landscapes has always been favored by the residents living near the silk path. In those eras, being surrounded by green mass gardens, most of the Iranian cities were regarded as convenient havens for the residents and cities such as Isfahan, Shiraz, Qazvin, and centuries earlier, cities of Neyshabur, Balkh, Herat, Samarqand, and Bactria were famous for their beauty, liveliness, delicacy, and numerous marvelous gardens in those days.

In the same vein, the cities in eastern countries have been inspired by Iranian gardens. King Baber, one of the Mogul kings ruling over India, took the Iranian Garden design methods to India and made some gardens in Acura in northern India, from which, very few are still available. Later, Jahangir, one of his successors, built a number of other gardens in Kashmir, which are now regarded as the most well-known Mogul gardens in the East.

In his book entitled "the Story of Civilization" (The Age of Faith), Will Durant states: "Iranian gardens have been imitated by other nations, getting prevalent among both Arabs and Muslims as well as in India. They have also inspired the Europeans in Middle Ages"(Durant,1980).

The introduction of topics such as "the simulation of Garden design throughout the silk roads" can easily indicate the attention paid to the issue in line with the importance attached to the silk route. But the unanswered question is that of how and to what extent the silk roads can affect the design of gardens in different cities. In this regard, the present study aims to find the answer to the question that whether the silk roads have affected the similarity between the gardens located throughout these roads and how such possible effect could be interpreted.

In order to find the answer to the above questions, a logical argumentation was utilized to analyze the case. As far as the case studies are concerned, four gardens were selected to conduct the analyses. Two of the chosen gardens are located along the silk roads, one in Iran and the other in India. The other two samples are chosen in a way that are not influenced by the silk roads. The four selected gardens, which are far from the main route of the Silk Road, are similar in terms of their distance and climate.

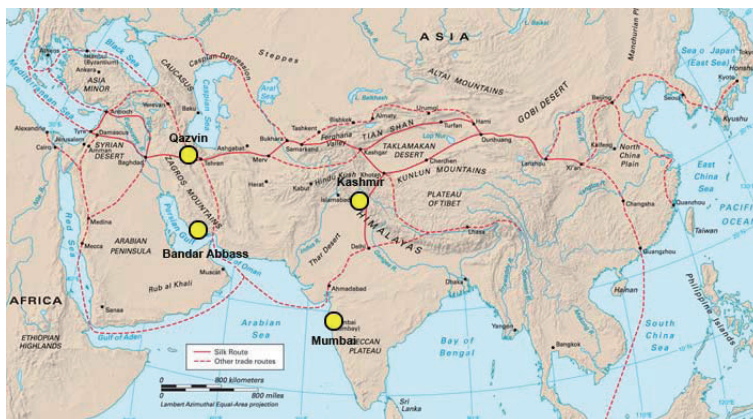


Fig. 1: The location of the cases studied along the Silk Route

The results of the present study revealed that the silk roads were not only used for the exchange of goods, but they were indeed a means of communicating cultures, beliefs, ideologies, languages, and religions among different nationalities. Such cultures form the old history of the East and this has caused similarities between the art and architecture of the neighboring countries along the silk roads(in this case, Iran and India), especially in the field of Garden design and landscaping.

2. Garden design in the Orient

In the Zen Buddhist school of thought, nature has been generally defined as including all the objects and phenomena in the world, thus all the creatures are considered as valuable. In the oriental culture, however, the term "nature" include different aspects such as: 1. To understand the beauty of the nature and the visual appreciation of that, 2. A collection of myths and concepts, 3. Nature as the basis for creation and thus something to be admired and adored, and 4. Nature as it is a place for human's life and existence.

An example of the interaction between eastern human and the environment is Tea ceremonies, dating back to sixteenth century. The tea ceremony is an old Zen Buddhist tradition which is also favored by people from other far eastern countries. The ceremony was held in a small room named Chatsio in one corner of a garden. The room was made of simple materials and its unique decoration and flower ornament indicated a deep interest in recording a spiritual experience through reviving the old cultural and religious traditions (Varley, 1989).

The art of garden designs and landscapes is dated back to very old days in the East. In fact, in countries such as China and Japan it is of a history of thousands of years. In her famous book named "the gardens of China"(Keswick, 2002), Maggie Keswick overviews the theoretical principles and historical background of gardens and landscapes in China and emphasizes that a Chinese garden is a combination of a tendency towards nature and spiritual peace.

Gardens in China are also defined in urban scale. Such constructions are available in many of the Chinese old cities. The most important features of Chinese landscaping and Garden

design include the realization of behavioral virtues, human society, and intact environment. Among all, one of the most famous gardens in China is the ancient gardens of Suzhou which were recorded in the World Heritage List in 1997 (Mahdavinejad, 2010).

Similarly, Japanese gardens are considered as an example of human's effort to access the ideal world and environmental imaginations. In the Japanese culture, a garden is regarded as the true reflection of people's thoughts and beliefs. Indeed, a Japanese garden is a metaphor of the universe and the Japanese ideologies in interpreting the creation system. Using stones in the art of building Japanese gardens and landscapes is an illustration of mystery and imagination in eastern schools of thoughts.

3. Iranian gardens

It may not be easy to prove the fact that Iranians were the first group of people who established gardens as a pre-designed and organized place that include natural elements being decorated in a unique manner, and has been repeated noticeably throughout the history. However, one cannot deny the special Iranian style in organizing the landscapes and its influence on some other communities. There are frequent documents showing that Iranian gardens have appeared in many different forms for many centuries. This stability throughout long periods of the history is an indicator of the deep solidarity and compatibility between this feature and other aspects of Iranian culture. It is noteworthy that even after huge revolutions such as the entrance of Islam to Iran and the acceptance of such great ideological change, the Iranian style of gardens is being continued by many in this region.

Form the ancient eras, the form and appearance of Iranian gardens has always been in harmony with the climate, environment and the amount of water available to them. The phenomenon of garden designs has an old history in Iran and the paintings of springs and forests on the pottery found in the city of Susa along with other similar patterns could indicate the importance of gardens in the lives of people who were used to deserts and sunshine in the ancient region of Iran. In fact, most of the Persian gardens had a sustainable design (Ansari, 1998).

In a comprehensive article about Iranian gardens, Victoria Sackville-West has referred to a pottery bowl detected by professor Hertzfeld in the city of Sumer and writes: here is a pottery bowl which is estimated to date back to 2000 years B. C., and there are pictures of intersecting streams of water on it showing four gardens, in each of which, there is also a tree and a bird (Ansari, 1998).

Cyrus the great has built a huge garden in Sard and he himself planted some trees in his book entitled as " Oeconomicus ", Xenophon has stated that Cyrus the great had personally took Alexander to see his garden in sard and that Alexander admired the beauty of the trees, the order with which the trees were planted, the direct rows and accurate angles along with the multiple pleasant scents smelled while they were strolling along the garden.

The Achaemenidan gardens were of accurate rectangular shapes with intersecting streets and trees. The stone carvings and pictures remained from the Achaemenidan era along with the upright standing trees, indicate the significance of gardens among Iranians as well as the geometric order in the Iranian types of gardens.

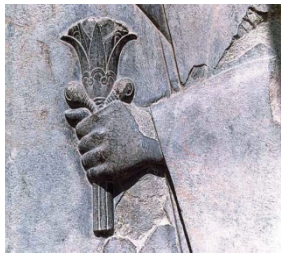


Fig. 2: The pattern on the walls of Persepolis, based on the Achaemenid king's desire for the nature (www.googleearth.com)



Fig. 3: The pattern of the walls of Persepolis, based on the respect for the nature (www.googleearth.com)

During the Islamic period, the palaces were surrounded by masses of trees which were considered as parts of the palace architecturally, in a way that the gardens encompassed all the main facades of the building symmetrically. The entire area of the palace was divided into rectangular sections through which passed small water streams. These gardens were built following the ancient Iranian styles. The major geometric characteristics of Iranian gardens include: 1. A wide view, 2. Water axes, 3. A rectangular shape, 4. Symmetry, and 5. Centrality (Pourjafar, 2010).

The Iranian garden of Saadat in Qazvin, located along the silk roads was selected for the purpose of the present study. This garden was built by Shah Tahmasp, the Safavid king of Persia, after selecting the city of Qazvin as his capital. This garden is a collection of 23 private gardens and flowerbeds. There are four gardens and a plateau in the main part of the area, where the building, or the garden pavilion, is located. The other case study is the city park, in Bandar Abbas, which is placed in the center of this harbor.



Fig. 4: The Saadat garden of Qazvin



Fig. 5: The Saadat garden in Qazvin, and its central palace.

4. Indian gardens

In the early days of Gurkanies kingdom in India, gardens were regarded as one of the important urban elements in cities. The first person who attempted to build Gurkany gardens was "Babur" who was trying to establish order in India and create beauty. His successors (Taymor and Changiz) concurred many regions including the middle Asia, northern India, Iran, Syria, and Asia Minor and could expand their empire with Samarqand and later Heart as their capitals. In a century, Taymor had gathered many of the artists and craftsmen from all around Asia and as a result, the Islamic art and civilization reached to its stable form under the influence of Arabs, Iranians, people of middle Asia and even the Chinese people.

The tradition of garden designs before the Taymor, which was prevalent from the Atlantic beaches to Bengal bay, is divided into two main branches, one going to south and form the Iranian gardens and the other to east, leading to the emergence of Gurkany gardens.

The main features of such gardens are the water canals, four gardens, and the irrigation systems which are connected to the all the four gardens and form an organized geometric network with unlimited capability of expansion. In an Indian garden, water plays a key role,

even more important than that of the soil. The possibility of water movements modifies and balances the spatial relationships between different parts of the garden. a summer palace is located in the back of the gardens, and usually the owner is also buried there. Such gardens mostly expanded in Agra, Delhi, Lahore, Kashmir, etc (Pourjafar, 2005).

The other selected garden is the Kashmir Shalimar Park, which was located along the silk roads near Srinagar. The primary plan of the garden was designed in 1638 by Alimoradkhan, an Iranian nobleman who sought refuge in Gurkanies territory. The plan included four gardens with two terraces that surrounded a central water stream. The water was supplied by a spring and the palace was also located in the center of the garden.

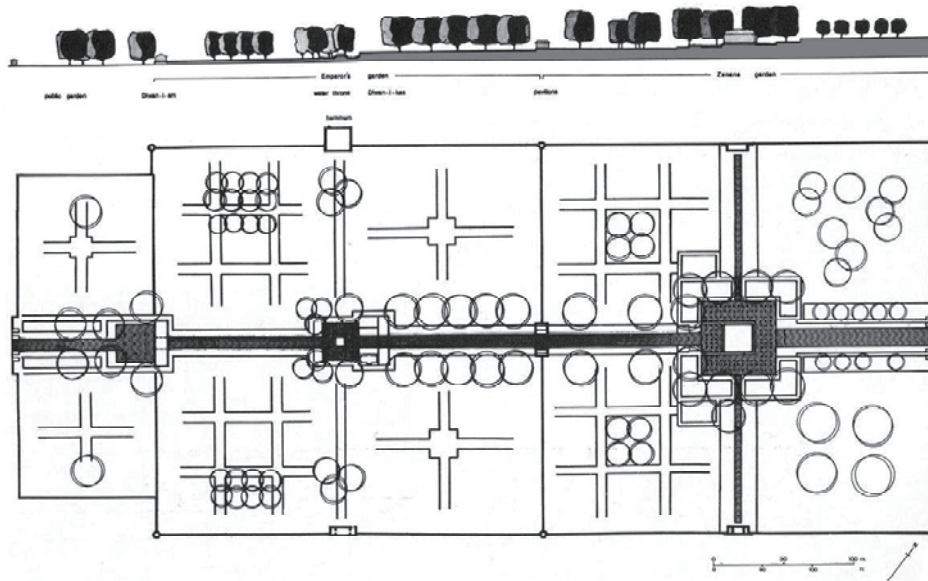


Fig.6: Plan and section from Shalimar Garden, Kashmir

The fourth case study is related to the Mehla Nehru Park in Mumbai. This park is located on top of the Malabar hill, covering an area of 4000 square meters and is named after the wife of Jawaharlal Nehru, the first prime minister of independent India.

5. Similarities and differences

Given the investigations carried out for the present study, in this section, an analysis of the selected cases is presented based on the main characteristics of gardens, as illustrated below graphically.

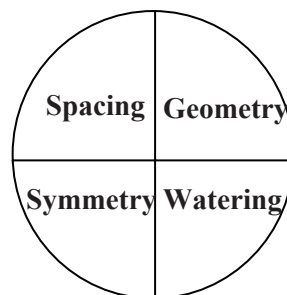


Table.1: Goal achievement chart













	The Saadat garden in Qazvin	The City park in Bandar Abbas	The Shalimar Garden in Kashmir	Mehla Nehru park in Mumbai
The Saadat garden in Qazvin				
The City park in Bandar Abbas				
The Shalimar Garden in Kashmir				
Mehla Nehru park in Mumbai				

Table.2: an overview of the garden features available in the four case studies in comparison to one another

A comparison of the findings shows that both the Saadat garden in Qazvin and Shalimar in Kashmir possess all the main four characteristics of gardens and have the same geometry, symmetry, spacing and irrigation system. However, from all those features, the city park of Bandar Abbas only enjoys a simple spacing and there is no geometric shape or symmetry in this case. Even the watering system is not similar to that of Saadat and Shalimar gardens, which were located along the silk roads. In a similar vein, there is no sign of geometry or symmetry in the Mehla Nehru park of Mumbai.

6. Conclusion

At the end, one may come up with the conclusion that these roads are in fact, a means of exchanging cultures, thoughts, ideologies, and even dialects among various nations. Such cultural elements are indeed the precious background of the East and propagating their ideologies and beliefs, people of these cultures have been in interaction with other civilizations and have tried to establish their identities in foreign areas as well through this route. Rather frequently, the trades of goods done along the roads have caused the businessmen to get acquainted with the traditions and customs of other cultures and occasionally, this led them to leave their homelands and immigrate to other regions.

According to the analyses carried out in the present study, it was found that there are more similarities between the two gardens of Saadat in Qazvin and Shalimar in Kashmir, due to their being located along the silk roads. Given the other two gardens. i.e., those of Park-e-Shahr in BabdarAbbas and Mahla Nehru in Mumbai, however, such similarities are less evident. Therefore, the underlying reason behind such similarities is hypothesized to be the existence of the silk roads and the exchange of arts and architecture between Iran and India by means of this route.

References

- [1] Ansari, Mojtaba, PhD Thesis: The Iranian garden values (Safavid - Isfahan), Faculty of Art and Architecture, Tehran University, 1998.
- [2] Christian, David. Silk Roads or Steppe Roads? The Silk Road in World History. Journal of World History 11, no.1, pp. 1-26, 2000.
- [3] Durant, Will, The Age of Faith, Publish by Simon & Schuster, pp.16-23, December 1980.
- [4] Keswick, Maggie, Chinese Garden, publish by Frances Lincoln; 2nd edition, march 2002.
- [5] Mahdavinejad, Mohammadjavad, The World Architectural, publish by nashr jahat, pp.29-56.2010.
- [6] Pourjafar, M.r, Pourjafar, Ali, Tajmahal, The Reflection of Iranian Islamic Art and Architecture in Indian Subcontinent, International Symposium Tajmahal, 2010.
- [7] Pourjafar, M.r, Taghvae, Aliakbar, , 'Indo Iranian Cultural Paralel Past, Persent, Future', Cultural Paralel, Ahmadabad, India, 2005.
- [8] Varley, Paul, Kumakura, Tea in japan: Essays on the History of Chanoyu. University of hawaiiPress. pp. 4. 1989.

2

Regional characteristics and individuality of living space

STUDY OF SENSE OF DEPTH IN THE VIEW OF ENTSU-JI TEMPLE GARDEN

Noritoshi Sugiura¹, Miyuki Ami²

¹ Mukogawa Women's University, Japan

² Meiwa Pax Co., Ltd, Japan

Keywords: Depth in the View, Entsu-ji Temple Garden, overlapping composition, garden scenery, elements of scenery

Introduction

This paper investigates the sense of depth in the traditional Japanese garden by focusing on Entsu-ji Temple, one of the most famous temples in Kyoto, Japan, which was built by Emperor Gomizunoo in the 17th century. The garden of Entsu-ji temple benefits from the view of Mt. Hiei (Fig. 1). To give a magnificent view of Mt. Hiei from inside the temple, various landscape techniques were applied there [1][2]. Overlapping composition is one of them. Depth of the garden is expressed by arranging the elements, which face the viewer, in parallel. Overlapping composition is a universal issue in the architectural field because it is seen in both Japanese traditional landscape drawings and spatial compositions in ASMT experiments [3]. As the first step in our analysis, we will model the scenery of Entsu-ji temple garden. Next, effects of the elements and composition of the scenery on sense of depth will be explored through some experiments.



Fig. 1: View of the garden in Entsu-ji

Model of garden scenery in Entsu-ji temple

ELEMENTS OF SCENERY

The typical view from Entsu-ji temple shown in Fig. 1 is composed of the following nine elements (Fig. 2): (1) Tatami floor, (2) Wooden verandah, (3) A row of columns, (4) Upper wall, (5) Moss-covered ground, (6) Hedge, (7) A row of trees, (8) Bamboo grove, (9) Mt. Hiei. Floor, verandah, column and upper wall are regarded as the elements that constitute the near view. The hedge, row of trees and bamboo grove are regarded as the elements that constitute the middle-distant view. Mt. Hiei is regarded as the sole element of the distant view. The ground is regarded as an element of both the

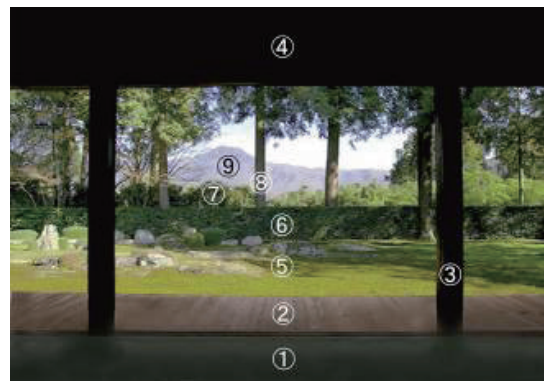


Fig. 2: Elements of the scenery

near and middle-distant view, which we call the near-middle view.

FORM OF ELEMENTS

We classified the elements into the following three types in terms of their form:

- a) Vertical line: column and tree
- b) Vertical plane facing the viewer: upper wall, hedge, bamboo grove and Mt. Hiei
- c) Horizontal plane: floor, verandah and ground.

CHARACTERISTICS OF GARDEN SCENERY BASED ON THE MODEL

These elements are placed to overlap each other from the viewpoint to the distant side as “c (floor) – a (columns) and b (upper wall) – c (verandah) – c (ground) – b (hedge) – a (trees) – b (bamboo grove) – b (Mt. Hiei) (Fig. 3).” The view of the garden from Entsu-ji temple is composed of overlapping elements that have different direction, form and texture without monotonous repetition.

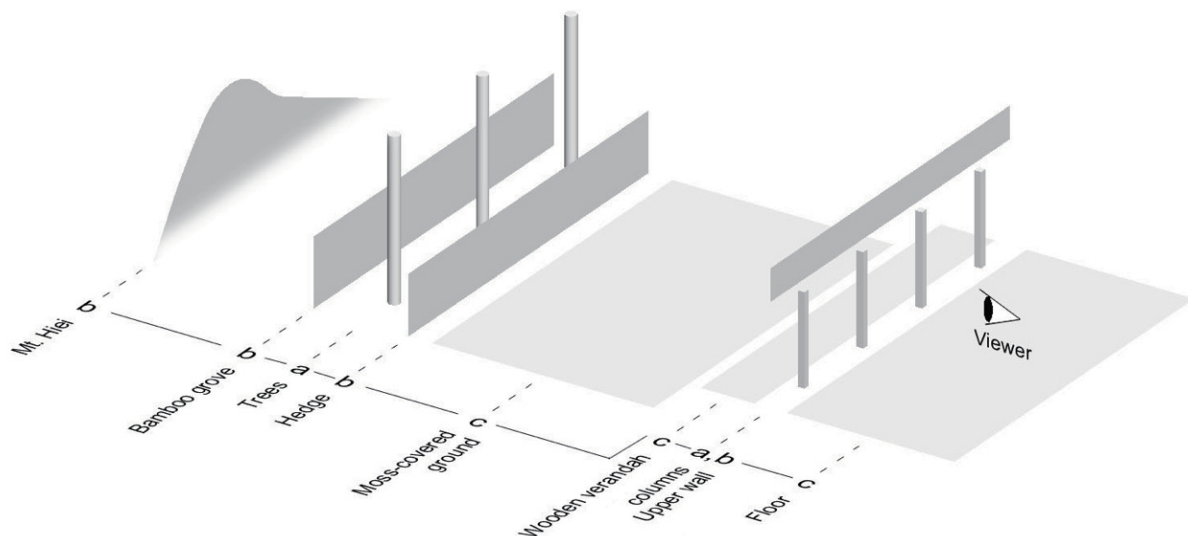


Fig. 3: Model of scenery of the Entsu-ji garden

Experiments

PROCEDURE

To examine the influence of each element on sense of depth of the view, we conducted experiments as follows. The picture of the view of the garden shown in Fig. 1 is named the “original picture.” Fourteen pictures of the view were made by adding / deleting / transforming elements in the original picture. These pictures are called “retouched pictures.” Participants had no knowledge of Entsu-ji Temple. The original picture and a retouched picture were presented to each participant for five seconds each, and they judged which picture gave the greater sense of depth. They could also reply, “no difference.” These procedures were repeated 14 times for each participant with changing the retouched pictures. The number of participants was 37. They were chosen among university students who did not know the Entsu-ji garden so that advance knowledge did not influence the sense of depth that they felt.

EXPERIMENTAL DEVICE AND ENVIRONMENT

A participant looked at a picture through the box shown in Fig. 4 (a). The box was fixed on a stand, on which participants put their chins (Fig. 4 (b)). The inside of the box was painted black. Every experiment was conducted in the same room with the same lighting.

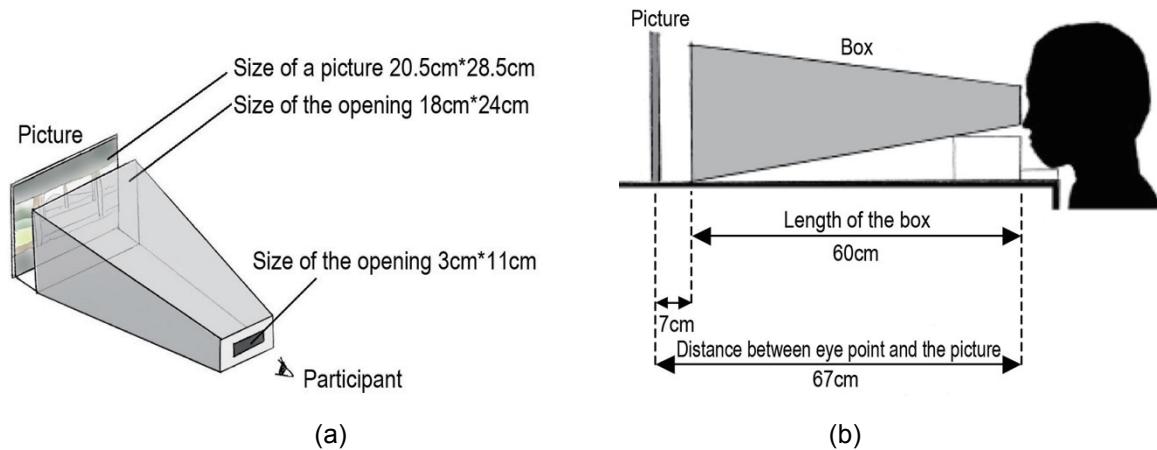


Fig. 4: Experimental device and environment

RETOUCHED PICTURES

Figure 5 shows the retouched pictures used in the experiments. Differences between the original picture and the retouched pictures are as follows.

[1] Deleted elements

A) Deleted element for near view

A-1) Verandah, A-2) Row of columns, A-3) Verandah and row of columns

B) Deleted element for middle-distant view

B-1) Hedge, B-2) Bamboo grove, B-3) Row of cedar

[2] Adding or transforming elements

C) Adding or transforming elements for near view

C-1) Adding fittings, C-2) Increasing depth of verandah, C-3) Shortening space between columns, C-4) Extending upper wall

D) Adding or transforming elements for middle view

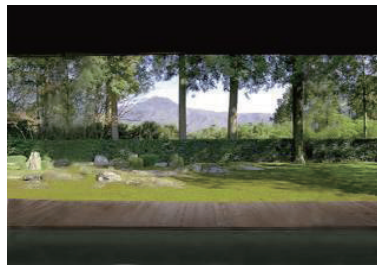
D-1) Extending space between trees, D-2) Extending hedge

E) Adding elements for near-middle view

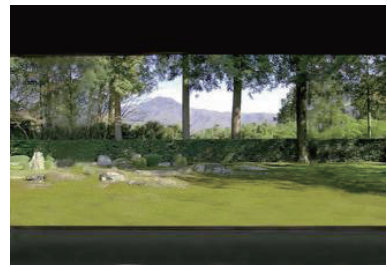
E-1) Adding trees on the ground, E-2) Adding shrubbery on the ground



A-1) Deleted verandah



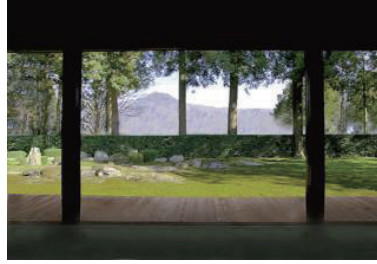
A-2) Deleted row of columns



A-3) Deleted verandah and row of columns



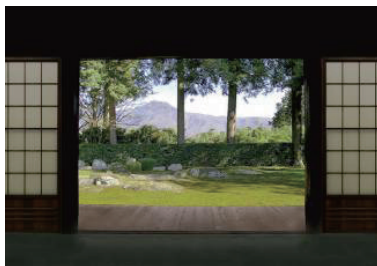
B-1) Deleted hedge



B-2) Deleted bamboo grove



B-3) Deleted row of cedar



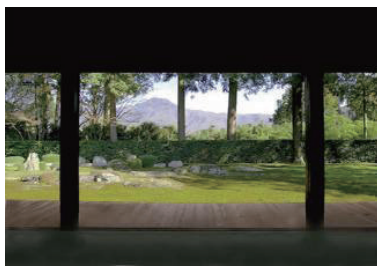
C-1) Added fitting



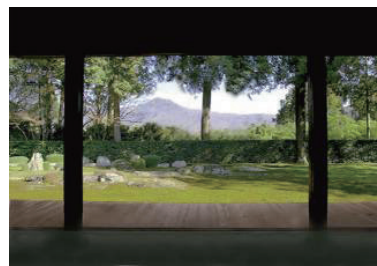
C-2) Increased depth of verandah



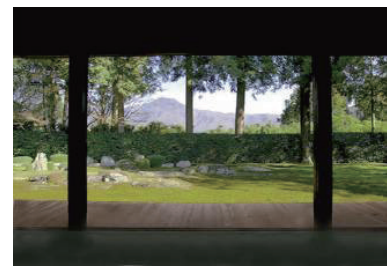
C-3) Shortened space between columns



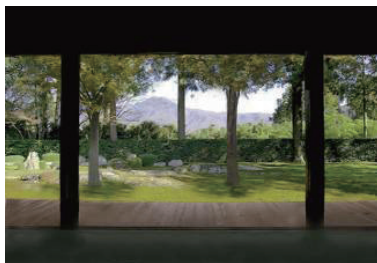
C-4) Extended upper wall



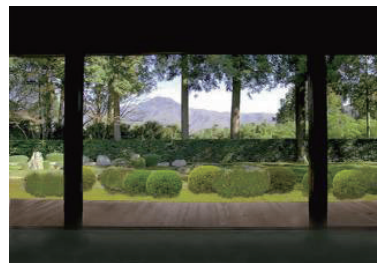
D-1) Extended space between trees



D-2) Extended hedge



E-1) Added trees on ground



E-2) Added shrubbery on ground

Fig. 5: Retouched pictures used in experiments

Results of experiments

Figure 6 summarizes the results of the experiments. Percentages of the number of participants who made each choice out of the total number of participants are shown. Significant differences between numbers of participants who selected the original picture and those who selected a retouched picture were seen in the cases of A-1, A-3, C-1, C-3, C-4, E-1 and E-2 by t-test (significance level 5%). Retouched pictures A-1, C-1, C-3, C-4, E-1 and E-2 were rated higher for the sense of depth than the original picture. On the contrary, A-3 was rated lower than the original picture. In this paper, we focus on these cases.

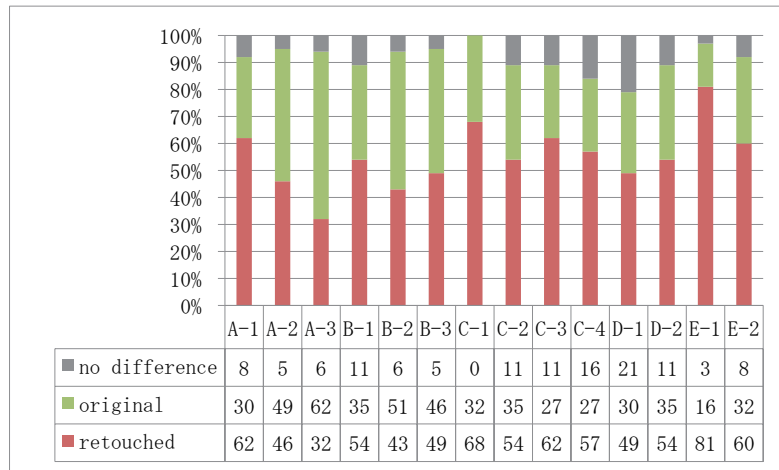


Fig. 6: Results of experiments (Figures are the percentages of the number of participants who made each choice out of the total number of participants.)

Discussion about factors that affect sense of depth

(1) Elements of near view

Five of the seven retouched pictures that have significant differences from the original picture, A-1, A-3, C-1, C-3 and C-4, had changed elements of the near view. Two of the seven retouched pictures, E-1 and E-2, had changed elements of the near-middle view. It is inferred that the composition of elements located near the viewer has a great influence on the sense of depth of the view.

(2) Vertical planes in the foreground that occlude viewer's eye

Both retouched pictures C-1 and C-4 have added or expanded vertical planes in the foreground. It is quite likely that screening the view directs the viewer's attention into the distance. All fittings that partition the indoors and the garden are removed there. If fittings are set as their former state and we see the garden through the open fittings, the sense of depth will be emphasized.

(3) Vertical line or plane in the near-middle area that constitute overlapping composition

On retouched pictures E-1 and E-2, a row of a vertical line and a vertical plane facing the viewer were added as elements of the near-middle view. It is considered that the increase of overlapping elements in the near-middle view intensified the sense of depth.

(4) Amount of information of the near view

Because of deletion of the wooden verandah and the row of columns in the foreground, the sense of depth of retouched picture A-3 was weakened. Conversely, it is inferred that the viewer can be more conscious of the space where she is as the number of elements of the near view are increased; in other words, as the information of the near view is increased. Therefore, the contrast between near and far becomes clear. As a result, the sense of depth will be emphasized. The same explanation can be applied to retouched picture C-1. This technique to direct the viewer's attention into the distance is also used in Japanese landscape drawings by Hiroshige Ando (Fig. 7). Retouched picture A-1, in which the verandah was deleted, was rated higher than the original picture. This result is contrary to the above, and we could not understand the reason.

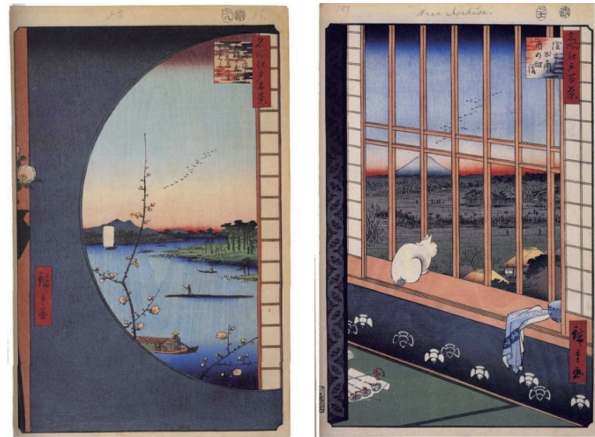


Fig. 7: Landscape drawings by Hiroshige Ando [4]

(5) Frame in the near view

In the original picture, two columns and the edge of the upper wall and verandah constitute a frame that includes Mt. Hiei. Retouched picture C-3, in which the space between the columns was shortened, was rated higher than the original picture. This change can be interpreted as the decrease in the width of the frame. It is considered that the sense of depth is intensified as the frame is narrowed down.

Conclusion

This paper addressed the relationship between the spatial composition of the scenery of a typical Japanese garden as seen at Entsu-ji Temple and the sense of depth that the viewer feels. In the experiments, 37 participants compared the original and retouched pictures of the view of the garden and selected one from which they felt a greater sense of depth. From the results, the following five factors affect the sense of depth: (1) Elements of the near view, (2) Vertical planes in the foreground that occlude the viewer's eye, (3) Vertical line or plane in the near-middle area that constitute overlapping composition, (4) Amount of information of the near view and (5) Frame in the near view. There are still many questions regarding the differences between the sense of depth on / in 2-D picture and 3-D space, the relationships between elements of scenery, and so on, which merit further research.

References

- [1] Higuchi, T. *The visual and the spatial structure of landscapes*. The MIT Press, 1988
- [2] Kitamura Y. *The Garden of Entsu-ji Temple*. *Bulletin of Fukuyama University*, vol. 7, pp. 131-134, 1985 (In Japanese)
- [3] Noritoshi, S. & Shigeyuki, O. *Relationship between Rules of Spatial Composition Process using Architectural Space Montage Technique and Typical Expressions of Japanese Architecture and Landscape*. *Archi-Cultural Translations Through the Silk Road*, pp. 87-97, Bahcesehir University Press, 2011
- [4] Asano, H. *Hiroshige Meisyo Edo Hyakkei*. shogakukan, pp. 45 & 115, 2007. (In Japanese)

ICE SHELL - CONTEMPORARY 'KAMAKURA'

Tsutomu Kokawa¹, Koji Watanabe¹, Tohru Watanabe²

¹ Tokai University, Japan

² Hoshino Resort Corporation, Japan

Keywords: Ice Shell, Temporary Structure, *Kamakura*, Construction Method, Application, Hokkaido in Japan

Introduction

Snow and ice can be used as a structural material for temporary architecture in snowy and cold regions.

"*Kamakura*" in Tohoku district of Japan is a traditional snow hut where children play house during the New Year holidays, and is formed by scooping out snow from a small mound of snow. It is a very fantastic instant dome, however it is generally very small in size because its structural material is snow which mechanical property is very low.

On the other hand, the ice shell in Hokkaido, which is thin curved plate-structures made of ice, can cover a much wider space than "*kamakura*". It is

a new type of ice structure based on modern structural engineering. It was suggested that the ice shell, as a concept in architectural technique in cold and snowy regions during winter, could be used for creating a unique built environment [1].



Fig. 1: "*Kamakura*"

<http://pics.livedoor.com/u/kamebugofukuten/4584147>

Construction Method

The construction method for the ice shell is technically simple, mechanically reasonable and economical as stated below referring to Fig.2.

- (1) Building up a 3-dimensional formwork by inflating a 2-dimensional membrane bag covered with reticular ropes anchored to the snow-ice foundation.
- (2) Covering the membrane with a thin snow-ice layer ($\leq 1\text{cm}$) by blowing milled snow with a rotary snow blower, spraying water and letting it freeze naturally at temperatures below -10°C .
- (3) Repeating the application of snow and water until the desired shell thickness is reached, then removing the bag and ropes for reuse.



Fig. 2: Construction sequences of 15m ice dome* constructed by students of Tokai University [2]

Current Applications

Almost 30 years since 1980s, the shells have been practically used inland Hokkaido with sufficient snow and low temperature for a variety of temporary structures such as a winter storage of vegetables, a factory house for making Japanese "sake", an indoor space for an ice fishing on a frozen lake and event facilities for winter festival etc.[3]. As the typical examples of the applications, two examples, 'Ice Village in Tomamu' and 'Ice Pantheon Project in Asahikawa' are described here referring to Table 1.

Table1: Meteorological Data (1981-2010)(<http://www.jma.go.jp/jma/index.html>) and Usage

Construction site	January~February		Usage (year)
	Average air temp.(C°)	Precipitation (mm)	
Tomamu	-9.8	92.9	Leisure-recreation (1997~)
Asahikawa	-7.0	120.9	Sake factory-storage (1989~), Winter festival (2008~), Ice pantheon project (2009~)

Ice Village in Tomamu

Since 1997 in Tomamu, many ice shells, especially 10~15m ice domes* which use 10~15m diameter of circular membrane bag are being used each winter for about 75 days as leisure-recreational facilities in a ski resort.



(a) Outside view (2008-2009 winter)



(b) Ice hotel



(c) Café bar

Fig. 3: Ice Village in Tomamu

Ice Pantheon Project in Asahikawa Campus of Tokai University

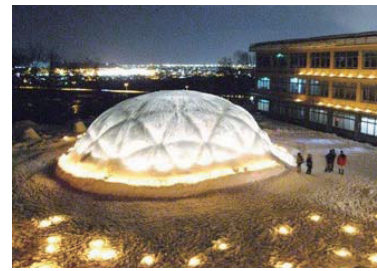
In addition to the numerical results of a theoretical analysis [2], the past construction experiences and the field experiments of 20~30m ice domes [4], [5], [6] would support the realization of a huge ice dome spanning 40 meters never existed before, which has comparable same size as Pantheon in Rome well known as one of the biggest classical stone dome. The ice dome is easier to construct than the stone dome and the strength/density of the ice is almost same as that of stone in short term loading, so it could be possible for students as amateur to construct a 40m ice dome* if they gradually experience the construction from small domes. Towards the realization of the ice dome, so called 'Ice Pantheon', the students started to go on an exciting, thrilling and wonderful voyage under the technical guidance by the authors of Tokai University. In winter of 2009, as the first step toward this end, a small size of 10m ice dome* was constructed. In winter of 2010, a non-spherical 15m ice dome* was constructed by them and used as event architecture. And then in this winter the students tried to construct a non-spherical 20m ice dome* which was not practically used before, although three 20m ice domes* were constructed for creep experiments in the past. Fig. 4 shows three ice domes constructed in IPP2009-2011.



(a) IPP2009 10m Ice dome* (base diameter=8.6m, height=3.0m)



(b) IPP2010 15m Ice dome* (base diameter=12.6m, height=5.0m)



(c) IPP2011 20m Ice dome* (base diameter=16.0m, height=6.3m)

Fig. 4: IPP (Ice Pantheon Project) 2009-2011

And then, in winter of 2012, a non-spherical 25m ice dome* was constructed successfully. Fig.5 shows the photos of the working sequences up to the completion.



(1) 25m square polyethylene blue sheet



(2) Gluing for 25m diameter 2-D circular membrane bag



(3) Manufacturing for polypropylene cover rope

(a) Preparation for pneumatic formwork



(1) Site surveying



(2) Putting snow and pouring water

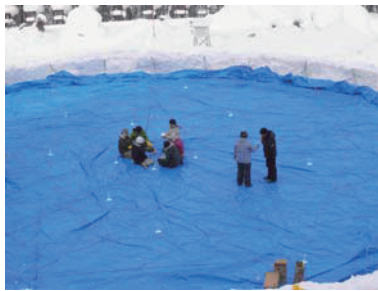


(3) Completion

(b) Construction of snow-ice foundation ring



(1) 2-D membrane



(2) Setting cover rope



(3) 3-D air inflated formwork

(c) Setting pneumatic formwork



(1) Blowing snow



(2) Pump engine for high pressure



(3) Spraying water

(d) Application of snow and water



(1) Switch off air blower



(2) Removing rope



(3) Folded membrane

(e) Removing pneumatic formwork

Fig. 5 Work record of 25m ice dome constructed by students of Tokai University in IPP2012

After the completion of 25m ice dome*, the dome was lighted up and then used for jazz piano concert as shown in Fig.6.



(a) Outside view



(b) Jazz piano concert

Fig. 6 25m ice dome (base diameter=21m, height=8.1m) used for event

Ending Remarks

Ice shells, which are thin curved-plate structures made of ice, have been used as temporary winter structures since 1980s in inland Hokkaido with sufficient snow and low temperature. The construction method of blowing snow and spraying water onto the pneumatic formwork consisting of a 2-dimensional membrane bag and a reticulated cover rope has constructional rationality. The ice structure has also high structural efficiency as a shell.

And then the shell creates a beautiful space in the environment from the translucent thin plate and the unique curved surface shape. The interior space has a translucent atmosphere with full of natural light in daytime, and the exterior looks like a gigantic illuminator in the dark at night. Also, the shell is environmentally compatible because it simply returns to the earth as water in spring.

Although there still remain to be studied in more detail about the construction technique, the structural design and the maintenance method of the ice shell as a special temporary structure, it has a possibility to become a useful structure common in not only inland Hokkaido but also severe cold regions all over the world.

Note

*. 'Xm ice dome' means the ice dome constructed by using Xm diameter of circular membrane bag in the formwork before inflation.

References

- [1] Kokawa, T. Experimental Study on Ice Shells in Asahikawa, *Cold Regions Science and Technology*, Elsevier Science Publishers B.V. 11(1985), 155-170., 1985.09.
- [2] Suzuki, T., Kokawa T. and Watanabe, K. Ice Pantheon Project 2010, *Proceedings of IASS Symposium in Shanghai, China*, 2958-2970., CD-ROM, 2010.10.
- [3] Kokawa, T. State of the Art Developments in Ice Shell Construction, *Proceedings of 17th Canadian Hydrotechnical Conference*, 973-982., CD-ROM, 2005.08.
- [4] Kokawa T. and Murakami, K. Challenge to 20-m Span Ice Dome, *Proceedings of the IASS Symposium on Membrane Structures and Space Frames in Osaka*, Volume 1, pp. 297-304., 1986.09.
- [5] Kokawa, T., Itoh, O. and Watanabe, T. Re-Challenge to 20-m Span Ice Dome, *Proceedings of IASS in Nagoya* (Edited by Kunieda, TP187, CD-ROM, 2001.10.
- [6] Kokawa, T. Field Study of A 30-m Span Ice-Dome, *Journal of IASS* Vol. 43(2002) n.2, August n.139, 93-100., 2002.08.

ARCHITECTURAL THEORETICAL EXAMINATIONS OF TYPICAL JAPANESE SPATIAL CHARACTERISTICS IN INTERIOR SPACES OF KYO-MACHIYA TOWNHOUSES

Takahiko Otani

Mukogawa Women's University, Japan

Keywords: interior space of kyo-machiya, dimness, depth, spatial connection, asymmetry, ambiguity, situational spatiality, emotionalization, symbolization

Introduction

Background: Kyo-machiya townhouses are traditional, wooden, urban dwellings in Kyoto, and have a quiet and emotional atmosphere in their interior space. Life in kyo-machiya townhouses is symbiotic with nature, and living with high-quality aesthetic sensitivity and spirituality integrated inside them. Their spatiality has a deep relationship with typical Japanese mentality. But, many contemporary or remodeled kyo-machiya lack such spatiality.

Aims: The original spatiality of kyo-machiya townhouses can be carried over to new kyo-machiya townhouses. I will examine their interior spatiality from an architectural theoretical perspective based on Japanese mentality and thought.

Methods: As an example, I take the interior space of a kyo-machiya townhouse built in the *omoteya-tsukur* style, which is the typical Kyo-machiya style for merchant families in the center area of Kyoto-city. It is composed of a front ridge for shop area and a back ridge for dwelling. There are an entrance area and a court garden between both ridges. A main garden and a warehouse are located in the deepest space. The entire space is composed by the earthen passageways and residence area (tatami-rooms), putting them together with line placement from a front towards the back. (Fig.1)

Kyo-machiya has left behind the customs and sensibilities of a historical lifestyle even now.

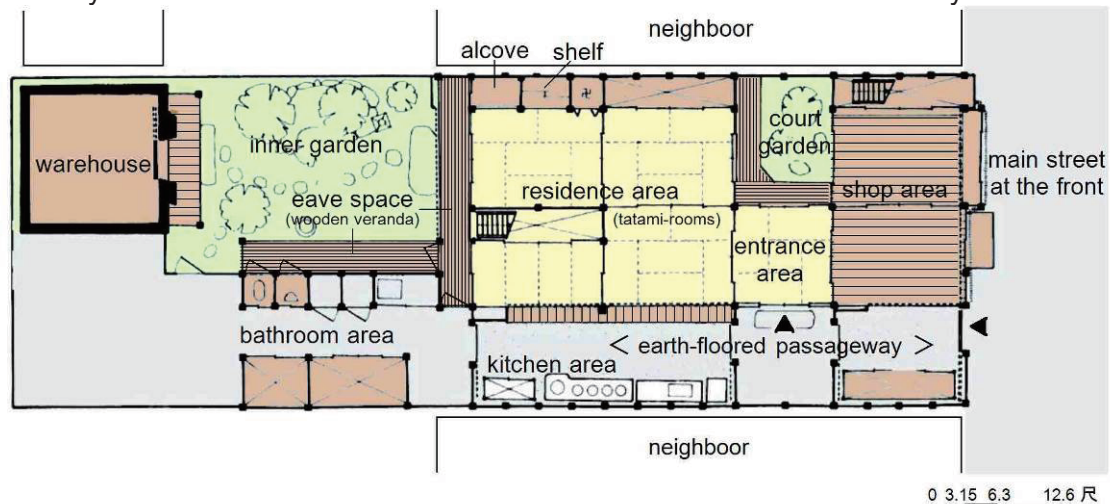


Fig. 1: Ground plan of kyo-machiya in omoteya-tsukur style [1]

When we experience spaces in kyo-machiya townhouses, we feel a strong sensation of spatial characteristics such as *dimness*, *depth*, *spatial connection*, and *asymmetry*. I will examine each from the viewpoints of architectural space and Japanese mentality.

Discussion

D-1. Examination from Viewpoint of Architectural Space

(1) *Dimness*

- The inside of kyo-machiya townhouses is dim because both sides are separated from the neighboring houses by a wall, The deep space inside captures the light from the main street at the front and the back inner garden. There is a uniform change from dark to light as one faces inwards.
- Built in a wooden framework structure, the sides of the rooms facing inwards in kyo-machiya townhouses are on the whole width open, although the eave canopy stretching out onto the garden softens the strong light from the outside. The trees in the garden shade direct light.
- The natural materials of kyo-machiya townhouses buildings do not reveal their presence as *objects*. They sink into the *dimness*. The earthen walls softly reflect light as if soaking it up.
- The latticework, paper screens, reed blinds, and other devices make the inside of the house dim (Fig. 2).
- *Dimness* pervades and uniformizes the interior spaces of kyo-machiya townhouses in this way, and these spaces are enveloped in *dimness* to create *spatiality* as *hazy regions* under the control of *dimness* (Figs. 3 and 4).

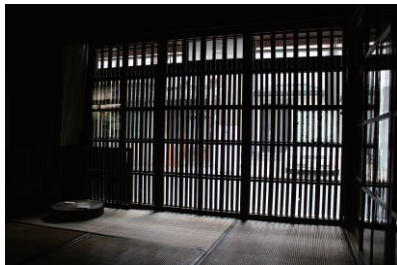


Fig. 2: Latticework inside

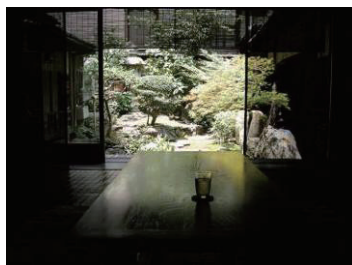


Fig. 3: Dimness = spatiality as hazy



Fig. 4: Entrance room

(Phot. by Hironobu Yoshida)

with court garden in back

2) *Depth*

- Within a densely urban configuration, kyo-machiya townhouses are narrowly isolated by the closed walls of the neighboring houses and are spaces with narrow frontage and large depth.
- The nature and brightness of the inner garden ahead of the dim space and the gradual change from dark to light from the inside outward strongly emphasize the directionality toward the inside depth (Figs. 5 and 6).
- Such sliding light fittings as shoji (translucent sliding screens) and fusuma (opaque papered screens) only provide a weak sense of shielding, allowing anticipation that they can be easily opened to create awareness of the back space. Although the four fusumas, which

are usually built into the full width of a room, obscure the field of view at both edges of the room when they are drawn to both sides, segmental continuity exists.

- In the earthen passageway, the temporal lapse and spatial change of the course reaching inside creates depth as a sequence that penetrates these segments. The row of side posts rising up from the ground every 90 cm outside the kitchen area and the splendid through-beam that stretches create an impression of depth (Fig. 7).



Figs 5, 6: Directionality towards inside depth of continuous rooms and garden in back

Fig. 7: Row of side posts and through-beam (Phot. By Hideaki Tenhata)

(3) *Spatial connection* *Paradoxical boundaries*

1) Connection between interior and exterior spaces: *mutual intermingling*

- At the *eave space* as an open space for connecting the inside and outside, the entire width of the tatami-floored rooms is fully open to the garden, diverting one's gaze from inside the rooms to the trees or rocks in the garden by the eaves that stretch out from the veranda space, emphasizing the connection to the garden. (Fig. 8)
- The garden stones that penetrate under the eaves are an intrusion from the outside inwards, and the eaves that continue out from the veranda are an expansion of the inside outwards. The eave space becomes an ambiguous interface where the inside and outside mutually intermingle. (Fig.8)
- The eave space is a transitional region between the inside and the outside and at all times a place of orientation with visual and spatial changes or unstableness.

- The *earthen passageway* is a continuous course passing through the building. This rustically built earthen space, as the entrance porch is an intermediate region with a semi-external, semi-internal expression.

- Usually the entrance has the ambiguity of being opened and closed. The earthen passageway, however, is not a simple ambiguous wall opening entrance. The effect of its segmental depth is exploited and it becomes a *mutual intermingling* space for the inside and outside in anticipation of the spatial and temporal allowance or the *margin of pause*. (Fig.9)

2) Connection of interior spaces: *Segmental continuation*

- The *residence area space*, which has no walls that block the characteristic of the depth between(or through) the rooms stretching to the inside is separated and joined by such light sliding fittings as fusuma or shouji.
- The sliding fittings invoke a latent awareness that they can be easily opened and exhibit a *faint sense of closure* and *ambiguity* since they are semi-isolated and semi-open. Because of

the implicit effect at the parts hidden by those fittings, we imagine the connection to scenes visible at the opened parts (Fig. 10).

- A lattice at the front and translucent sliding screens also effectively create a casually sense of the path ahead because of semi-transparent effect.



Fig. 8: Space of eaves
connection to inner garden



Fig. 9: Earthen passageway



Fig. 10: Sliding fittings.

Imagine the connection to scenes

(4) Asymmetry

• The basic space of a kyo-Machiya townhouse is configured in double spaces, earth-floored passageway and tatami-floored residence area and, furthermore, *asymmetry* is apparent in the configuration of both spaces. The space of the main tatami-mat rooms (zashiki) and the inner garden are emphasized asymmetrically by the building elements, the alcove and the shelves in the tatami-zashiki and the open veranda that extends from these rooms in the inner garden. Moreover, the positions of the building elements both spaces are reversed. The further effect of the movement *reversal* is cleverly interwoven into the dynamic sensation of *asymmetry* (Figs. 11 and 12).



Fig. 11: Alcove and shelf as asymmetry elements
right-side of room

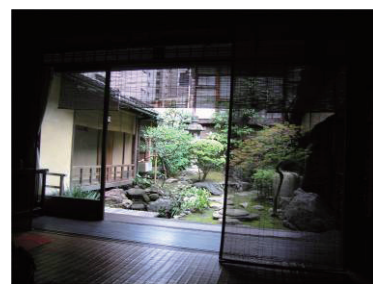


Fig. 12: Open veranda on left-side of
inner garden on

D-2. Examination from Viewpoint of Mentality

• In Japanese thought (ideology), such concepts as *emptiness* and *absence* are far removed from reality [2]. The *dimness* of the kyo-machiya townhouses also forms an atmospheric

spatial region based on a sense of *airiness drifting* as a silent movement that is neither substantive nor has certain boundaries.

- *Yugen* or hidden beauty, which is a symbol of Japanese medieval culture suggests subtle *depth* something that cannot be measured and easily learned. *Depth* in the Japanese sense of the word is not an absolute depth as a definite place; it is a dynamic direction and perpetually moving towards endless depth [3].

- The *spatial connection* of kyo-machiya townhouses is a *boundary* having the ambiguity of mutual intermingling and connection across the semi-isolated and semi-open [4].

This ambiguity exists as if two meanings melt into one, a veritable duality of Japanese vagueness. Such boundaries cause and corroborate the atmospheric region *dimness* and dynamic direction's intentionality *depth* as the situational spatiality, and heighten their effect.

- The asymmetry of Japan is anti-formal, and shoulders the effect of activating spatial emotions or even movement and change that is compositely built into kyo-machiya townhouse spaces.

- What is important in the Japanese mentality is not *objects* but *situations*. Typical Japanese spaces do not necessarily require a distinct *center* and *boundary*, besides these visible clarities, like Western spaces.

- Life in kyo-machiya townhouses also has a relationship with nature, including a flower arrangement or hanging scrolls (*kakejiku*) within the transition from one season to another. There is a strong awareness of *situations* with less shape than objects.

"Movement, change, or ambiguity" looking at the interior space of kyo-machiya townhouses are situational characteristics concerned with Japanese mentalities. The life in kyo-machiya townhouses is also based on these Japanese mentalities.

Conclusion

Typical Japanese Characteristics of Spatiality of Kyo-machiya Townhouses

- In kyo-machiya townhouses, such spatial characteristics as *dimness* as an atmospheric spatial regionality, *depth* as a dynamic direction intentionality, *spatial connection* as an ambiguous boundary, and *asymmetry* as an anti-formal movement uniformize and integrate the space to configure its spatiality.

- The spatiality of kyo-machiya townhouses that unified their life is a *situational spatiality* composed of spatial characteristics based upon these typical Japanese mentalities. Such spatiality increase the orientation towards the emotionalization and symbolization of kyo-machiya townhouse spaces.

References

[1] Shintani, A. *Kyo-machiya*, pp.4. Mitumura-suiko shoin , 1998

[2] Inoue, M. *The space of Japanese architecture, SD selected books*. Kashima shuppankai, 1969

[3] Maki, F. *The city that appears and disappears thought for depth, SD selected books*. Kashima shuppankai, 1996

[4] Masuda, T. *The scenery of house and garden*, Nakanishiya Publication, 1987

THE INFLUENCE OF IRANIAN ISLAMIC ARCHITECTURE ON TRADITIONAL HOUSES OF KASHAN

Atefeh Zand Karimi¹, Bahareh Hosseini¹

¹*Shahid Beheshti University, Iran*

Keywords: House, culture, Iranian Islamic Architecture, Privacy, Climate Responsive Design, Kashan, Iran.

Introduction:

This essay is an attempt to discover the place of residential houses in Iranian history and culture. As a place where they spend a significant amount of time there, should be able to fulfill their needs physically and spiritually as well as satisfying their cultural and religious aspects of their lifestyles.

Mainly focusing on the city of Kashan which is located in Isfahan province, where it is a locus of Islamic architecture. The city itself is a field where exhibits the traces of works of architects who could find suitable methods to organize the spaces in such a way that can function as a medium in order to signify the relation of architecture of landmark and lifestyle. By looking at many old buildings around the world, it is noticeable that there are reasonable relations between human lifestyle and the architecture of the place. As Alexander, who is the writer of architectural books about identity of places, has mentioned: The identity of old buildings come from each of their parts being united with their environment and, can recognize the forces around it and obeys the principle of environment and human nature. [1]

There are some articles published about Iranian Islamic architecture however, few of them are particularly focusing on the functions of residential houses. There is a need to question the principles of designing of residential houses in Kashan from the points of culture, religion and tradition along with environment and climate conditions of the city. Two key examples of traditional houses in Kashan will be investigated. As a brief introduction to the houses, Bafande's house and Shahyalani's house are two of the oldest traditional houses in Kashan and based on reports of cultural heritage organization of Iran, they belong to Qajar Period. Qajar dynasty ruled Iran from 1795 to 1925. [2]

Before starting to focus on different aspects of design of houses of Kashan, it is essential to describe the role of art in Islamic architecture as there is a one to one connection between traditional architecture and pure art.

Eastern art is based on spirituality. It pays more attention to traditions, which has been formed by the people of society. [3] Iranian traditional art can perform functionally in such a way that aims to console the human soul [4], while architecture attempts to create an environment that suits particular aspects of human life, which respects his believes and personal ambitions, his thoughts and high spiritedness [5] as well as providing safety and privacy. [3]

In addition to the importance of spiritual issues in architecture, Islamic architects has considered climate and environment as one the most important factors that generates a correlation between the spiritual demands of the inhabitants, the environment and the climate, and applied these factors to create a formal form. [6]

The ancient city of Kashan, situated in central of Iran where the history of human presence dates back to 6,000 B.C., the city can be considered as one of the first foci for the

organization of civilization. [7] It is situated in a hot and dry region with very hot summers and cold winters. For Instance In the year 2010 Minimum temperature in winter was -5 Celsius and Maximum temperature in summer was 45 Celsius [8] The difference between day and night temperature is high in Kashan, The reason is its proximity with the Kavir desert. [9] Shortage of water resources, few greeneries and desert winds which spread sands in the area, [10] are main elements responsible for the harsh situation there. In order to create a harmony within this climate condition, the vernacular architect has implemented some strategies in response to such weather, while basing his designs on environmental concerns and the sustainable interaction between the human and the environment is observed. [11] The architecture of residential houses in Kashan is based upon several principles in order to conceive a design that satisfies necessary demands of society.

1. Condensed Urban Fabric:

Urban fabric in the whole city of Kashan is condensed. Houses are compressed to each other and have merged walls. [12] This can minimize the contact of wall surfaces with air so there would be less thermal exchange between inside and outside of the buildings. Meandrous and narrow allies with high walls in sides can reduce winds speed and provide shady area in passages. (Fig. 1) Like allies, building has enclosure too. They are surrounded by high walls which make isolated from outside environment. These walls perform as a shell, protecting the building from intense sun ray and desert dust winds and in the cold season, from cold winds. There are few openings on the shell and in many cases the only opening is the main entrance. [10]



Fig. 1: Entrance of Bafande's house



Fig. 2: Entrance of Shahyalani's house

2. Introversion:

Before considering the word introversion in architecture, it's better to have a clear understanding of it from the moral point of view including meanings that have a tendency to inner feelings and avoid from showing them. Facades have been presented in Iranian Islamic architecture at very modest level, (Fig. 1-2) however the interior has been decorated in an elegance way. (Fig. 3) Here, this can be called as an introvert architecture. [13] This types of architecture has applied in many residential houses where there isn't any direct connection or openings between interior and exterior spaces. By creating some openings in interior spaces, it opens the spaces into a private environment that will be explained fully later.

Most of the times when walking in allies of Kashan, it is not easy to realize this phenomenon features on the other side of the walls without getting inside of the building. The only clues of domestic life are the entrances. These houses are modest in relation within their urban environment are like jewel inside an un polished cover. [5]



Fig. 3: Decorated interior facades of a traditional house in Kashan (Ameri's house)

3. Vernacular Materials and Giving Them Qualifying:

Materials available in Kashan are generally mud and brick and mud mixed with chaff. Usually the same soil that has been prepared for excavating the ground is also been used as the material for constructing of the house. The traditional architect knows every constructional and structural property of the materials. He employs them in the right place and in the appropriate amount [5] using this material with heavy thickness so that the walls surrounded the house function like a capacitor that observe solar heat during the day and transfer the heat to the environment during the nights time. So that it can balance the temperature and reduce fluctuation of it during day and night. The architect stripped the raw material, refined the attribute and adorned them with patterns and lines until it progressed to ascending degrees of perfection step by step. In this way the quality of raw materials which were unpleasant, heavy untamed and dull were shaped into a pleasant feature light delicate tamed and alive. [5]

4. Courtyard:

Almost all of the houses in Kashan has one courtyard or more and the rooms and other spaces of the house take place around the courtyard and have openings to it. The courtyard is functioning an element to unite the different space of the house. As this has been mentioned before the entire house so that the courtyard is surrounded with very high and thick walls that can make shady area inside the yard. The humidity provided by the water and the plants and in addition the shade provided by high walls, can increase the relative humidity of the air and cool the air in order to create a microclimate in the middle of the house. The airflow passing the courtyard and touching the water in the pond enters the spaces of the house and cool them. (Fig. 4- 5)

Courtyards are the main core of social gathering in Iranian culture. It provides outdoor activity and privacy. A family can get together in the evenings and water the gardens and enjoy the small environment and beauty provided inside their house in a private and comfortable atmosphere. Courtyard gives life to buildings in a dry climate and few greenery. Water in the courtyard not only smooth the air but also creates a good perspective. Sound of water coming from water work [14] and the reflection of light on it can all add a dynamic quality to

the space, while water and light are two aesthetical parameters in Islamic architecture.[15] Form inside the courtyard, the building seems like a statue that has embraced and surrounds people, increasing the feeling of intimate bond between humanity and the space.[5]



Fig. 4: Courtyard in Shahyalani's house



Fig. 5: "Godal Baghche" Courtyard in Bafande's house

5. Underground Structures

Usually the whole building and specially the courtyard is lower than ground level. In dry climate of Kashan, access to water resources was an important parameter in design.[16] Going down in the earth could provide easier access to water reservoir and underground water pathways. in addition by placing a part of the building under the ground heat transfer between inside and outside decreases and controls the temperature of day and night.[10] underground floor in Kashan houses are living places and the architect pays a lot of attention for designing and decorating it as a main part of the house. Underground floor is a cooler place although in some cases all of it is under the ground and in some cases it is one meter upper of the ground floor and light and ventilation is provided for it by this space. in some cases, in the middle of the courtyard and other yard take place in the ground in which trees are planted and it is called "Godal baghche"(Fig. 5). This place with more shade and humidity could provide a beautiful and cooler place for the house.

6. Orientation and Seasonal Function:

Most of traditional houses are formed along an orientation which is near to the orientation of north to south. This allows the house to be divided into a part in the north and a part in the south of the house. Due to geographical location of Kashan, spaces located in the northern part of the yard which face the south direction, observe more sunray and heat and become warmer where and can be used in cold seasons. In the opposite spaces located in southern part of the yard which face the north direction, observe less sunray and are shady so can provide a cooler place. They are mostly used in hot seasons although there might be some exceptions in some cases. This seasonal movement occurring between spaces in the house is one of the human responses to climate condition.[6] Houses in Kashan are living places for all four seasons of the year. Occupants may move to a more suitable place when season changes in order to advantage a better situation. For instance basements can provide cooler places for hot summers. "Sardab" is an underground semi open space which is usually located in southern part of the house that can provide a cooler place in hot summers. Sardab

usually has a pond and sometimes has access to underground water pathways which are called "Ghanat".

7. Privacy and Hospitality:

The concepts of privacy and hospitality have had a great impact on home culture and house formation in Iranian Islamic architecture.[6] Iranian family both needs to have privacy as well as social contact with neighbors'. In order to achieve this aim, the hierarchy of spaces starts with a public space and it continued with a semi-public space, semi- private and at last a private space. Spatial configuration to manage this divided the whole house into spaces with different characteristics such as the entrance, the exterior (guest room) and the interior (private rooms). In Iranian houses the entrance were extremely important and sequences as well. The intention of the entrance was to block direct sight to the interior. Vestibule or "Hashti" was designed as a stopping point and could be used as a temporary reception room for those who did not need to enter the quest room. (Fig. 6-7) reception area or exterior room is a part of the house into which male guests can enter.[17] This room is a main space in house where has been well decorated[18], at the same time marks the economic condition of the family. This room is situated in the main ax of the yard and has the best view to the courtyard with double height ceiling. Its interior is the most private part of the house where it has been designed in a way that should not be seen or accessible by guests. As walking from the entrance towards the interior spaces, there are usually two different corridors; first one is facing to the exterior part and the second one, which is usually longer curvy, facing to the interior part. This pattern of spatial configuration is by no means accidental, it is a carefully considered response to balance needed relation between hospitality and social contact as well as providing privacy throughout the house.

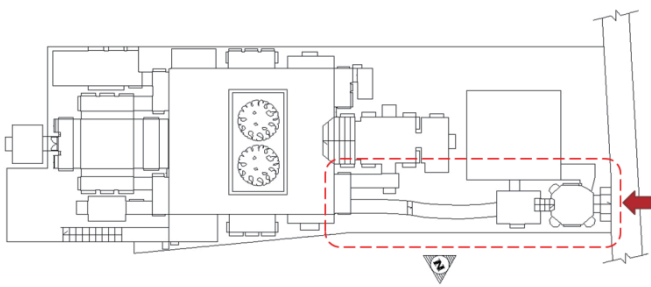


Fig. 6: Entrance in plan of Bafande's house with a long corridor to the interior part and a short corridor to the exterior part

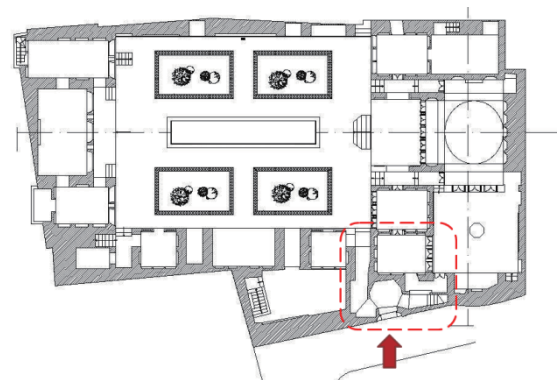


Fig. 7: Entrance in plan of Shahyalani's house with a long corridor to the interior part and a short corridor to the exterior part

Conclusion:

Residential buildings in Iranian Islamic architecture have been designed based on culture, religion, traditions and in response to climate and environment of each region and lifestyle. This architecture could create forms which is able to generate a correlation between these parameters. Old residential houses in Iran despite of having a simple outer shell or facade, they were providing a complex inner shell in order to create an elegance and comfortable atmosphere for its residence. In spite of the rich history of Iranian Islamic architecture of traditional houses, today residential buildings are not designed as carefully as before. They are mostly designed by focusing more on its appearance or its outer shell rather than

creating a complex and comfortable interior. As lifestyle in Iran has been changed quite fast recently. this has evoked new demands. It is the responsibility of contemporary architects to realize them and achieve a comprehensive understanding of these needs in order to be able to response to the new conditions. They can design spaces and create forms adapted to the new lifestyle and be able to satisfy these requirements. Studying of history of architecture in residential houses in Iran can introduce a new path to architects that how those traditional houses could find suitable responses to people's demands at that time and lead them to create a better architecture appropriate for this period of time.

Notes:

1. All of the photos by Atefeh Zand Karimi.

References:

- [1] Alexander Christopher, *The Timeless Way of Building*, Oxford University Press, 1979
- [2] Youssef M. Choueiri, *A Companion to the History of the Middle East*, Blackwell Pub. Limited, 2005
- [3] Pour Jafar M., *Honar va Memari az Manzare Shargh va Gharb (Art & Architecture from Point of View of East & West)*, Research center of dwelling and urban design, 2008 (in Persian)
- [4] Nasr Seyed. Hasan, *Honare Sonnati Honare Moqaddas(Traditional Art Holly Art)*, articles published for religious art conference by organization of cultural heritage, 2001(in Persian)
- [5] Haji Ghasemi K. , *Searching for Meaning in Persian Islamic Architecture*, Annual MESA Conference, Washington, 1999, <http://ilex.ilexfoundation.org/confer/ mesa.html>
- [6] Memarian G. & Sadoughi A. , *Application of access graphs and home culture: Examining factors relative to climate and privacy in Iranian houses*, *Scientific Research and Essays Vol. 6(30)*, pp. 6350-6363, 9 December 2011
- [7] Ghirshman Roman, *Fouilles de Sialk près de Kashan(Excavations of Sialk near Kashan)*, 1933, 1934, 1937, vol. 1, Paul Geuthner, 1938 (in French)
- [8] Iran Meteorological Organization of Kashan, <http://www.kashanmet.ir/>
- [9] Tolou Behbood K., Taleghani M., & Heidari Sh. , *Energy Efficient Architectural Design Strategies in Hot Dry Area of Iran: Kashan*, BEST 1 Confrence of Building for Energy Efficiency and Durability at the Crossroads, 2010, <http://best2.thebestconference.org/program.php>
- [10] Ghobadian, V., *Barresiye Eghlimiye Abniye Sonati Iran (Climatic Analysis of the Traditional Iranian Buildings)*, 2nd Edition, Tehran University Press, 2003, (In Persian)
- [11] Faizi. M. & Fazel M., *Environmental Strategies in Iranian Architecture. The International Journal of Environmental, Cultural,Economic and Social Sustainability. Volume 5, Issue 3*, pp. 111-124, 2009
- [12] A'zami A., Yasrebi S.H., & Salehipoor A., *Climatic responsive architecture in hot and dry regions of Iran* 2005
- [13] Memarian GH., *Ashnaili ba Memari Maskooni Irani, Ghuneh Shenasi Darunghara [An introduction to house typology in Iran: Courtyard houses]*. Soroush Danesh,1993 (In Persian)
- [14] Zandiyeh M., Parvardi nejad S., *Toseye Paydar va Mafahime an dar Memari Maskooni Iran (Sustainable Development and it's Concept in Housing Architecture of Iran)*, *Fasnameye Maskan va Mohite Roosta [Journal of Housing And Rural Environment]*, Issue 130, 2010, (in Persian)
- [15] Arjmandi H., Mohd Tahir M., Shabankareh H., Shabani M., & Mazaheri F., *Psychological and Spiritual Effects OF Light and Color from Iranian Traditional Houses on Dwellers*, *Journal of Social Sciences and Humanities Volume 6, Number 2*, pp. 288-301, 2011
- [16] Nassiri N. , *The influence of climatic design on Iranian symbolic form designing*, *The Oxford Conference: A re-evaluation of education in architecture*, Published by WIT Press, 2008
- [17] Memarian GH. , & Brown F. ,*The shared characteristics of Iranian and Arab courtyard houses*. In SM. a. HM. Edward B (eds) *Courtyard Housing*, pp. 21-30, Oxon: Taylor & Francis, 2006, (In Persian)
- [18] Pirnia M., *Sabk Shenasiye Memari Iran (Stylistics of Iranian Architecture)*, Soroush Danesh, 2008

HISTORICAL STUDY OF SITTING IN JAPAN: WITH "SEIZA" AS MAIN TOPIC

Yusei Tazaki

Mukogawa Women's University, Japan

Keywords: sitting, Seiza, Japan, floor, tatami, tea ceremony, manner, national identity

1. Prologue

Nowadays, we live sitting on chairs almost all day long in Japan. In individual houses, we sometimes relax on tatami mats in a traditional Japanese room or on a carpet over a hard-surfaced floor, but this is rarely done outside of the house. Even outdoors, adults rarely sit on the ground directly or squat down for a while. The modern western living style of sitting on chairs, which was introduced radically in the Meiji Period, has become pervasive. One way in which Japan still differs is that we take off shoes before entering the house. Such apparent westernization has already been completed in Japan, and the westernized life in Japanese style has been popular for young generation in the western countries for these years. However, in recent globalization, some Japanese characters have become skeletonized and lost for most Japanese. "Seiza" or sitting on one's heels, which has been a representative Japanese characteristic, is no longer very popular particularly for the younger generations.

In this study, I historically examine the sitting postures in Japan to reflect on the ontological problematics concerning the dwelling.

2. Various types of sitting found in the Japanese picture scrolls

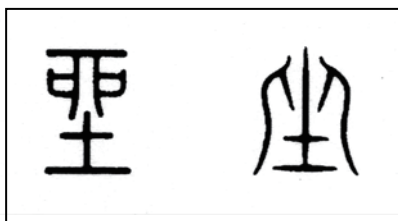


Fig. 1-a (right), 1-b (left): ancient Chinese characters for sitting

In Japan today, we use generally 座 as the Chinese character that means sitting, but properly this character was presented as 坐. In strict usage, 坐 means the action of sitting and 座 is the sitting place. When we decompose this older 坐 into three parts as 人+人+土, it is found that this Chinese character originally signified two persons sitting face to face on the ground (Fig. 1-a). After that, it also came to mean two persons sitting on a bench (Fig. 1-b).¹ It seems that in ancient China, 坐 primarily meant sitting on the ground and afterwards obtained the meaning of sitting on chairs, which were brought to China by invading northern mounted nomads.²

As clues for reflection on sitting in ancient Japan, there exist some documents such as the diaries of aristocrats and priests, many statues and pictures such as clay figures called "Haniwa", and Buddhist images or portraits. In particular, some picture scrolls drawn from the



Fig. 2-a Sitting people in front of gate
("Kasuga-Gongen-Reikenki")



Fig. 2-b Sitting warriors on the ground
("Kitanotenjin-Engi")

end of the Heian Period until the Kamakura Period illustrate concretely the living situations of the peoples of those days. In the 12th century, in the areas around Kyoto, both the governing classes and the common people seemed to live in comfort independently without formal customs. Concerning sitting, according to Tsuneichi Miyamoto,³ some aristocrats and samurai warriors sat down naturally in the "Agura" position on bare ground. They occupied raised-floor houses but didn't have a disdain for the soil and felt safe on natural ground. For the common people, who generally inhabited small, earthen-floor dwellings and walked around with bare feet, the soil and ground seemed to be more familiar than for modern people. It seems that the soil adhering to their clothes and the soles of their foot was not considered dirty. When they couldn't sit on the ground on a rainy day, they squatted to rest temporarily.⁴ Such squat sitting is found in many picture scrolls as the defecation posture. This defecation posture has been popular in Japan until recently, but with the spread of western-style toilets, it has become a hard posture for modern Japanese to maintain.



Fig. 3-a Defecation posture in squatting⁵
("Gaki-Zousi")



Fig. 3-b Squatting in the courtyard
("Shigisan-Engi")

We could find the "Seiza" style in various scenes of the picture scrolls. "Seiza" was the posture for prayer on the ground and later, at ceremonies, the attendants sat in "Seiza" to



Fig. 4-a Sitting for prayer
("Kasuga-Gongen-Reikenki")

Fig. 4-b Sitting attendants at ceremony
("Ippen-Shonin-Eden")

show respect. In the picture scrolls, there exist some scenes of carrying tatami mats, which were a sort of floor cushion for "Seiza". Thus, the Japanese have adapted their sitting styles according to various life situations. Obviously, we could discover such variety of sitting styles under the influence of natural and cultural climates of each region not only in Japan but all over the world.

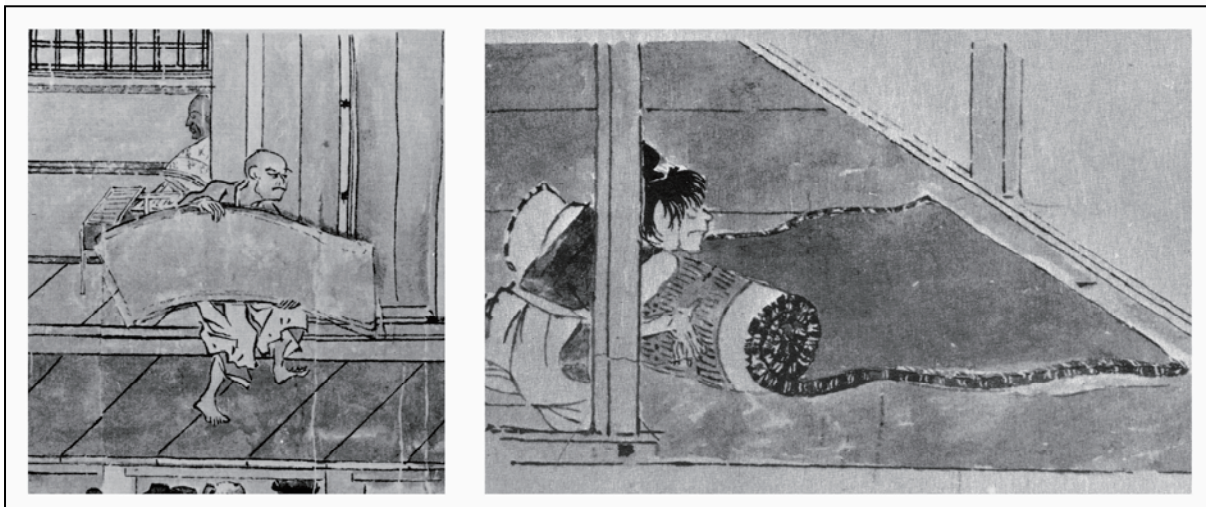


Fig. 5-a Carrying tatami mat
("Ippen-Shonin-Eden")

Fig. 5-b Rolling up tatami mat for carrying
("Kitanotenjin-Engi")

3. Diversity of "Seiza" sitting

Koichi Satoh, who established the Department of Architecture at Waseda University, was one of the groundbreakers in architecture education for women at the Japan Women's University and others. He also led the conservation movement of traditional houses in cooperation with Kunio Yanagida and Wajiro Kon. In "Ars Complete Lectures of Architecture" he took charge of writing the categories on "History of Western Architecture" and "Residential Architecture". From this fact, we could find that Koichi Satoh has held the point of view of the ordinary citizen as the pioneer of female education, and he had gained a deeper interest on



Fig. 6-a "Kikyo" for baby⁶

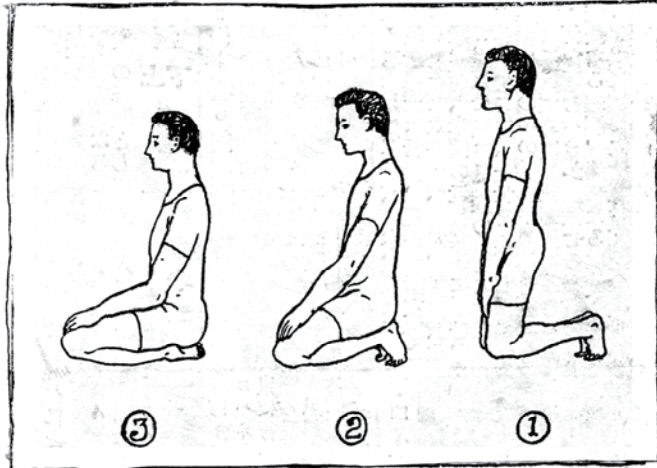


Fig. 6-b Three types of "Kiza" (③: "Seiza")⁷

the concrete aspects of daily life as the background of his architectural studies on buildings, particularly on the house. His article "Transition of Sitting Styles"⁸ shows well his attitude on architecture.

He classified our human posture into three types: "standing", "sitting" and "lying". He gave a brief account of these postures in which standing represents motion, lying represents rest and sitting, between standing and lying, is the posture for doing something with little movement. Such sitting posture is divided into two types: sitting on the floor and sitting on a raised seat or a chair. Yoshito Harada enumerated "Seiza" (sitting straight), "Kikyo" (sitting with one's legs stretched), "Sonkyo" (squatting) and "Fuza" (cross-legged sitting), and this "Seiza" is included within "Kiza" (sitting on one's heels with the legs bent) in a broad sense. "Seiza" in Japanese literally means proper sitting or correct sitting, but in fact it is quite unnatural and causes physical pain of the legs and knees. On the contrary, "Kikyo" is the first sitting position for a baby and is the most natural posture for the human body (Fig. 6-a).

Tatsukichi Irisawa wrote in his essay⁹ on Japanese sitting that "Seiza" was counted among the strange customs in the world by foreigners, similar to Chinese foot-binding and Indian nose-rings. In his opinion, in the past, while the master boldly sat cross-legged in the "Agura" position, the servant sat on his heels in order to stand up quickly to respond to the master's orders. After this opinion, Koichi Satoh divided this sitting on one's heels into three types, and these sitting types seem to be more active than other sitting postures like "Kikyo" and "Agura", which are difficult to stand up from (Fig. 6-b).

If sitting is the opposite of standing as Tatsukichi Irisawa explained, then "Kiza" and "Seiza" seem to be preparatory postures for standing up and are only temporary positions.

In Japanese, the word for sitting is closely related to the word for existing (for human beings), and the word for standing is also often used with the word for existing.¹⁰ For Japanese, sitting on one's heels may be the representative posture under the relation to standing.

4. "Seiza" as a compelled manner in education in the modern period

As mentioned, such sitting on one's heels as "Seiza" was found early in the Heian Period, and this posture became the essential manner for the tea ceremony in Japan. However, this word "Seiza" was not published in the first modern Japanese dictionary "Genkai" in Meiji 22 (1889).¹¹ Nowadays, in the most popular dictionary "Kojien", it is explained briefly as "to sit in a proper posture" without any descriptions about the exact pose. "Seiza" is a matter of

common sense with no need of explanation as to only one correct posture, we believe. In the first half of the Meiji Period, the sitting of "Seiza" style was already popular, but it didn't have the name "Seiza" itself.

Therefore, there were various sitting postures in daily life, and "Seiza" was a sitting type for ceremony, prayer and respect. It's not a posture for relaxation. However, in Japan eating has been regarded as a sort of ceremony. Therefore, it has been believed that, when we take a meal, we should sit in "Seiza" as with the posture for ceremony, prayer or respect. Undoubtedly, we sit in "Seiza" on the occasion of sutra-chanting at the temple or at home. The same type of sitting can be found at places of prayer almost all over the world. For example Moslems pray to Allah sitting in "Seiza" style wherever they are at the worship time and Christians kneel in prayer in the church. I could be persuaded that such "Seiza" is a special posture for prayer or at ceremonies, but unconvinced that sitting in "Seiza" is a distinctive posture of the Japanese and "Seiza" is the correct sitting that the Chinese characters of its name mean to the letter.

It is widely known that the diffusion of sitting in "Seiza" is bound with the development of the tea ceremony. Still, "Seiza" was not indispensable for early tea drinking and, after the perfection of the tea ceremony by Sen Rikyu, sitting in "Seiza" became a requirement in the tea ceremony in order to guarantee the religious significance of Zen sect. As Isao Kumakura indicated, the posture for the tea ceremony changed from "Agura" to "Seiza"¹² in the early stages of the tea ceremony in Japan, and drinking tea was for relieving exhaustion and dispelling sleepiness in Zen training. Initially, the practice was not so severe, but the tea ceremony as an ascetic practice of Zen developed into a strict religion and adopted this "Seiza" with quite a bit of physical pain. The religious institutionalization of the tea ceremony required the strict "Seiza" and gave birth to the ascetic architectural space known as the "Koma", or the small austere tearoom. Its physical narrowness seems to give a *raison d'être* to a condensed posture of "Seiza" called "Tanza", or upright sitting.

In the Edo Period, as society became stable and various formalities were respected, "Seiza" was formally considered an important manner even in civic life in some cities particularly. However, in the countryside of Japan, there survived various other sitting postures on the earthen floor and so on.

Such unnatural "Seiza" seemed to be very effective for maintaining the newly established social institutions. At the beginning of the Meiji Period, the newly established government modeled a lot of modern political systems after those of powerful western countries. On the other hand, the government attached importance to schooling in order to create a national identity of modern Japan that the entire Japanese people should commonly possess. In schools, the enlightenment of "Seiza" was advanced, and this sitting posture was first named "Seiza" or correct sitting posture. In the Meiji Period, before the name "Seiza" had been popularized, Soseki Natsume, in his novels, expressed this sitting posture as sitting respectfully.¹³ Thus, "Seiza" was not common in the daily life of ordinary people. As modernization progressed and Japan came to be seen as an emerging power by the Japanese people themselves, the name "Seiza" was acknowledged as the representative sitting posture for Japanese.

To establish the nation of Japan, the Meiji government utilized such "Seiza" politically. For the purpose of establishing the national identity of Japan, "Seiza", which looked most unnatural and curious to visiting foreigners, was made the representative Japanese sitting posture with the aid of education as in the Ogasawara School of Etiquette. The government, to emphasize the individuality of Japan, intentionally adopted this characteristic posture that surprised foreigners because of its unnaturalness. From foreigners and, similarly from Japanese people, the government hid the existence of other sitting postures on the earthen floor, which remained in the countryside, to fix a uniform image of Japan. All over Japan,

"Seiza" has spread in the usual settings, but there have sporadically remained various other sitting postures.

5. Conclusion and development

In this study, I could confirm that there have existed many types of sitting on floors or in chairs in Japan from ancient time to today, though it is believed that only "Seiza" has been the representative sitting posture for a long time. "Seiza" is one of the many types of sitting, and after the Meiji Period its name was used commonly. Formerly our ancestors sat on the ground immediately to relax and enjoy the warmth of the earth in each posture as "Agura" or "Kikyo" even in working. Each sitting posture has been synthetically influenced by living circumstances and particularly the sitting is linked with the structure and materials of the house floor. With the diffusion of the raised-floor and "Tatami" mat, we have detached from the mother earth and asked for the social manners for the sitting posture too. In these days tatami are disappearing from houses, and we rarely sit in "Seiza" on tatami mats. Some western furniture like chairs, tables and beds are necessities for modern daily life, but we habitually take off the shoes when entering houses as a matter of course. Under such a mix of Japanese and western traditions, we should reflect fundamentally on the sitting and living styles in Japan from a wider point of view. To that end, I plan next to research sitting postures of the many countries along the Silk Road.

Notes

1. Fig. 1-a is the older type called "Kobun" found in "Setsumon" and Fig. 1-b is "Shoten" instituted by Qin Shi Huang or first emperor of unified China as the simplified "Daiten" character.
2. Concerning the origin of Chinese chairs, see Toyohachi Fujita, On the old Chinese chair "Kosho", The Journal of the Research Department of the Toyo Bunko, Vol.12, No.4, 1922.
3. Tsuneichi Miyamoto as a folklorist emphasized variously the liberal and magnanimous life of the Japanese common people in the middle ages in his numerous literary works. Cf. T. Miyamoto, Life history of the Japanese common people found in the picture scrolls, 1981.
4. French sociologist and ethnologist Marcel Mauss indicated, from his original point of view of the techniques of the body, that French soldiers, who couldn't squat down in the rain, were inferior to Australian soldiers. cf. M.Mauss, Sociology and Anthropology, 1968. See Hidemasa Yatabe, Sitting Styles of Japanese, 2011.
5. "Gaki-Zousi" in Kamakura Period. Two women and a child squatted in a field with Japanese wooden sandals for defecation.
- 6., 7., 8. Koichi Satoh, Transition of Sitting Styles, Ars Complete Lectures of Architecture, Vol. 1, 1927 and Vol. 2, 1928. This article was republished in Complete Works of Koichi Satoh, 1941.
9. Tatsukichi Irisawa, On the Sitting Styles of Japanese, Journal of Historical Science, Vol.31, No.8, 1920.
10. cf. Yoshiyuki Morita, Concise Dictionary for brushing up on Japanese, Volume on Verbs, 1988.
11. cf. Rie Kawamoto, Michikazu Nakamura, Origin of Seiza : Sitting-Up Straight in Japan, Bulletin of Tokyo Kasei Gakuin University, Vol.39, 1999.
12. Isao Kumakura, Cha-no-Yu : Mind and Form of Wabi-Cha, 1977. In this book, he explained that the posture at the tea party changed from "Agura" to "Seiza" with some literal documents on the Tea ceremony.
13. cf. Munetetsu Tei, Seiza and Japanese, 2009.

A PHENOMENOLOGICAL APPROACH TO FOLDINGS AS SPATIO-TEMPORAL CONTINUITY THROUGH THE MOTIFS OF TURKISH FOLK SONGS AND TURKISH RUGS

Beyhan Bolak Hisarligil

Meliksah University, Turkey

Keywords: Vernacular Anatolian settlements, phenomenology, Turkish folk songs, Turkish rugs, the in-between.

Introduction

Almost everything can somehow be regarded as a phenomenon; phenomenology as a rigorous way of understanding the concerns of everyday life is still under question in many fields. One of the reasons behind this doubt may be traced back to the pseudo-problems relating to reality in Western metaphysics based on the dilemma between idea and matter that still veils our actual world. Hence, although a new reality termed nowadays as “virtual”, which is based on epistemology as the outcome of the above-mentioned dilemma, seems to dominate our world, the ultimate agenda hiding itself in parts remains to be uncovered. Accordingly, architecture like many other disciplines has a role to play in this paradigmatic battle. However, no matter on what theoretical level the ideological battle is conducted, the main aim and concern in actual life is to preserve the quality of the lived environment itself.

In this context, today's production of space via design, or the planning process as a form of framing, calculative and representative mode of cognitive thinking indifferent to the spatio-temporal performance of our immediate environment, dissolves the “belonging togetherness” of man and place. Consequently, the embeddedness of man and spatio-temporal activities are compartmented or dispersed as function, scale, detail or material and so on. In this presentation, contrary to our present day approach, we aim to understand the role of “in-between” as “foldings” in generating spatio-temporal continuity. The reason for comparing vernacular Anatolian settlements with nearby newly constructed ones, which are clear examples of spatial discontinuity, is to examine the phenomenon of foldings where they open themselves up. The newly constructed settlements clearly exhibit how continuity is destroyed by the design and planning process, as in the case of functional zoning at the scale of an urban block or boundary lines petrified by concrete walls at the scale of a building block. However a momentary glance may easily give a sense of the way in which spatial organization in vernacular settlements goes beyond our present-day framing mode of thinking. It can accordingly be assumed that the poetic quality of this mode of thinking can also be traced through the other forms of work of art peculiar to the inhabitants of these settlements. Among these, Turkish folk songs - *turkus* and Turkish rugs - *kilims* as dominant features in the history of Anatolian daily life are used to examine this quality.

Methods

This study is a phenomenological attempt at understanding the role of “in-between” as “foldings” in generating spatio-temporal continuity in vernacular Anatolian settlements¹. Foldings, where differences do not give way to oppositions but to a betweenness, may open

up a way for understanding these relations in terms of specific architectural situations in everyday life. Foldings do not imply either a metaphor or a new conceptual model. Rather, as a phenomenon of development arising from the articulation of “spatio-temporal continuity”, foldings open and close themselves to the possibilities embedded in in-between’s thingly character. No matter what the scale is, having an in-between character in terms of in / out, under / above, up / down, here / there, front / back and now / then actualities of everyday life, foldings are not sheer oppositions, but relations as dualities. Thus a phenomenological approach to foldings may help to understand the condition shaping both space and ourselves in turn. Using the examples of courtyards, streets, and thresholds in vernacular Anatolian settlements, this phenomenon is examined by comparing them with the poetic quality of Turkish folk songs called *turkus* and rugs called *kilims*. A common motif used in many *turkus*, “the front of their home” as a mode of folding will be examined in a number of vernacular settlements.

Results

Turkus and *kilims*² can both be regarded as the works of dwellers whereby they express their understanding of themselves and their world accordingly. They cannot be placed in a formal category of the art of our time. In the case of the latter, a number of studies have been done on their visual and material quality. Among these which are concerned with the field of design is Christopher Alexander’s work on very early Turkish carpets [1]. David Seamon makes his commentary on this work as a “well-argued evidence for the possibility of learning what genuine order is and someday transforming that learning into a concrete world through a spiritualized design and policy” [2]. Alexander’s main finding in the samples is density as a complex whole generated around *centers*. In addition, according to him the strength of the carpets does not arise from their formal beauty but from their spiritual and religious nature [3] in that the “weavers’ seeking to use craft is a way to find union with God” [4]. *Turku* singers too can be regarded as seeking to use their craft as a way to find union with God and also their everyday life. They are an intricate part of the world of the Anatolian people and express their awareness on the meaning of their lives. In both forms, it can be seen that the momentary building of their feelings is guided by simple rules and techniques. This obviously is their way of thinking oscillating between mastery and mystery poetically. Contrary to “one-track thinking”³, weaving a *kilim* and singing a *turku* as a way to find union with God recalls Martin Heidegger’s thoughts on “*measure-taking*”⁴. Measure-taking, in contrast to metric measuring, is man’s way of spanning the between: the dimension by which he measures himself against the Godhead.

Turkus and *kilims*, as in the examples given below (Fig. 1) have a number of common qualities such as strong motifs forming the whole pattern in a rhythmical order. Also, these motifs are the sub-wholes generated by figurative units intertwining the meaning of the whole pattern. These units can range from a single word of a *turku*, as in the below sample of “night, day and go” where life is viewed as a road leading to an unknown destiny. Similar to this, a motif of in a *kilim* can range from a single knot, as in the above sample of a “dragon” motif, the sub-wholes generated by geometrical figurative units which make up the whole pattern (Fig. 2). In *turkus* and *kilims* the repetitive character of such motifs are open to improvisation. Whatever their meaning, the ordered whole created through them is not only a constellation of fragmented parts, but an articulated continuity of a flux. Any motif can be replaced by others without detracting from their uniqueness in their new context. The reason behind this flexibility can be traced through the simplicity of details, the number of scales and the coherency between form and content. According to Alexander, “simplicity is not so simple to

achieve; it is only when simplicity encompasses richness that it counts as a quality” [5]. Through this simplicity, the construction process seems to have a momentary character which reveals the richness of meetings between feelings and knowing, technique and style poetically.



THE ROAD by Asik Veysel

*I walk on a road long and **narrow**:
Night and day, on and on I go.
 Where am I heading? I don't **know**;
Night and day, on and on I go.
 Since I took my first painful **stride**
 I've been traveling far and **wide**;
 The inns have doors that lead **outside**.
Night and day, on and on I go.
 Even in sleep I must forge **ahead**;
 No rest for the weary, no warm **bed**;
 Fate has doomed me to the roads I **dread**.
Night and day, on and on I go.
 Who can tell why my life went **awry**?
 Sometimes I laugh, sometimes I **cry**.
 Craving a **caravanserai**,
Night and day, on and on I go.*

Fig. 1: A *kilim* and a *turku* from Sivas/Turkey



“Night and day, on and on I go”

Fig. 2: The “dragon” motif in the *kilim* and a phrase as motif in *turku*

The above examples of motifs used in *turkus* and *kilims* are so common that they can be seen in almost every part of Anatolian geography. Similar to the geometrical language of the *kilim*, the metric and rhythmic quality of the *turku* can be explained by the use of the words that become a powerful sub-whole called a motif. For example the motif “in the front of “their” home” reveals an architectural situation in everyday life. The repetition of this motif in many *turkus* accompanied by different objects such as wells, stones, thresholds, fountains and trees native to the region implies their belonging togetherness. Such a motif might fold and unfold the spatio-temporal continuity that can be traced in vernacular Anatolian settlements. Motifs as such, found at both the local and regional level, reveal the common experiences of the inhabitants. The motif of “in the front of “their” home” expresses the side by side continuity of the “frontness” through the whole pattern. However having an omni-directional character, this frontness does not imply a definite back. Moreover, it is a meeting place that gathers a world with many confrontations. Around a fountain, a staircase, a niche or a step in the street, a world is built up. These fronts open themselves to various possibilities just as the sub-wholes existing in *turkus* and *kilims* do. Through the nights and days and seasons, a number of activities bring to mind the phenomenon of “in the front of “their” home”. There are many fronts at different levels depending on the complexity of interaction; sometimes the

whole street, sometimes an opening such as a doorway, a window, and even a hollow in a wall or sometimes just a piece of stone (Fig. 3). One front opens onto another continuously.



Fig. 3: “In the front of “their” home”, a tree, a well, a stone, a stair, Kayseri / Turkey

The fractal nature of texture calls for a meeting on, in and around itself. Sometimes silent, sometimes aloud, stone is everywhere when you look around. Stone on stone, stone by stone, just as in the words of a *turku* and knots of a *kilim*, a folding reveals itself as an invisible whole. Any repetitive pattern in the settlement similar to that of a *kilim* and a *turku* resonates the rhythmic dimension of life. However, this repetition is not a strict determination against change and transformation. Rather it holds the possibility of giving breath to the life that goes on around at any scale and instance, as in the case of insects and plants living in minute hollows. Hollows between stones and openings in a wall gather life forms so that the spatial performance of a wall is not a boundary but an articulated continuity. Life fills even the momentary places between the stones in a wall or in a pavement as a generative force. It is an articulated continuity where wall and pavement meet. Contrary to the anthropocentric view, the spatial performance of a wall tells a lot about what the fractal and articulated character of continuity is. The front of “their” home is a common experience of daily life. It is not a programmed or designed place. Contrary to the common belief that claims at life and space in traditional settlements are introverted because of the religious beliefs of the inhabitants, the actual reality tells a completely different story. The “there” in this context is quite beyond the introvert / extravert dichotomy. It is a front folding sunlight and shadow, timber and stone, stone and cushion, wall and ground, now and then... poetically (Fig. 4).



Fig. 4: The cushion at the threshold, Harman Street, Talas, Kayseri/Turkey

Conclusion

Today a number of building regulation codes, standards or design guidelines which have been established to ensure quality are openly in conflict with meeting the actual quality of everyday life. Also, the widening rift between spatial discourse and practice can be explained by a number of reasons. However, many of them may easily veil themselves behind the world of the reductive paradigm they rely on. Therefore, rather than posing as pseudo-problems, problem solving through a few principles and elements can be performed as in the above examples as a mode of thinking must be developed. The problem with this way of thinking cannot be just the matter of meeting standards for material, technical and economical necessities aimed for ultimate comfort; that would be a dead relation.

Rather than finding the right answers to the questions concerning formal issues, the phenomenology of foldings may contribute to a mode of thinking on the meaning of questions that may reveal spatio-temporal relations as the meeting of differences. Foldings in this approach may give a sense of opening to these relations not just as an ontic situation, but as an ontological condition. For this purpose, by using the works of *turkus* and *kilims* as examples, the generative potential of foldings for spatial relations as the betweenness of actual life is traced: a syllable of a *turku* or a couple of knots in a *kilim*, a piece of stone in a stair, on a wall or around a well may easily be considered as a folding in this contextual world. The in-between nature of foldings cannot be a direct outcome of predetermined strict relations, but a number of emergent frontness. The frontness of a folding in these cases does not indicate a directionality of confrontation, but an articulated continuity of potential meetings of surfaces at any scale. Unfolding these relations as betweenness, foldings are not finished artifacts, but an ongoing spatio-temporal performance revealing the belonging togetherness of man and place. In this manner, frontness expressed in the phrase “in the front of their home” in many *turkus* reveals the thingly character of foldings that gather a world around themselves.

Notes

1. This study is developed from the PhD dissertation of the author which is supervised by Prof. Dr. Belkis Uluoglu. (Bolak-Hisarligil, B. A Poetic Thinking of Dwelling: The (In- Between) in Vernacular Anatolian Settlements. *An unpublished PhD dissertation*, Istanbul Technical University, Institute of Science and Technology, Istanbul, 2007).
2. *Turku* literally means “belong to Turks”. These songs have been passed from generation to generation through the oral tradition. The stories told by these songs resonated with people’s experiences such that they have been preserved for centuries without losing their essence. Most *turkus* are considered anonymous, where the composer or the lyricist is not known, which only adds to their value as a collective national treasure of the Turkish people. A *kilim* cannot be simply considered as a rug; it is a Turkish word which refers to the way something is made or to the weaving technique. A *kilim* is not made up of pile, a technique used in carpet making. It is a weft faced fabric consisting of interlacing warps and wefts. These products are not an economic activity, but identified with the life rituals of marriage, birth, circumcision and death. Although they have common motifs and colors, they show differences according to regions. Similar to *turkus*, the basic principles forming their motifs are anonymous and have been passed from generation to generation.
3. In 1951 Martin Heidegger gave a series of lectures entitled *Was heisst Denken?* (What Calls For Thinking?). In these lectures Heidegger challenged many of the things that people usually call thinking, questioning whether people have indeed learned to think. He states that we can learn thinking when we learn not to think the thinking of thinking. And he discusses the dangers of the single-mindedness of calculative, instrumentalist or technological thinking which he calls “one-track”

thinking. (Heidegger, M. What Calls For Thinking? In *Basic Writings*, pp. 365-391, Routledge, London, 1993), Instead, Heidegger applauds poetry as true thinking. According to J. Glenn Gray, poetry is “in a strict sense a measure or a standard by which man receives the measure for the width of his being.” Poets alone can teach us our limits and their words are not simply arbitrary: “They are neither subjective nor objective but a true standard of man’s situation in time and in the midst of nonhuman realities. Such utterance is the voice of Being itself. They teach us to dwell rightly on earth, to make a home instead of merely inhabiting a series of houses”. (Gray, J.G. Poets and Thinkers: Their Kindred Roles in the Philosophy of Martin Heidegger. In *Phenomenology and Existentialism*, p.104, Johns Hopkins University Press, Baltimore, 1967).

4. According to Heidegger, poetry is measure-taking; it is not a metric measuring but calling the thing concealing itself. In “...Poetically Man Dwells...”, Heidegger claims that “the poetic” is the basic capacity for human dwelling by his conviction that poetry has the ability to take measure: “*The taking of measure is what is poetic in dwelling. Poetry is a measuring*”. The poetic measure-taking capability of poetry effectively recaptures and restores authentic rooted dwelling. The nature of poetry is one of taking measure, and that poetry is the ultimate building; further, man dwells in that which he builds, and thus man dwells, ultimately, in poetry through measure-taking. (Heidegger, M. Poetically Man Dwells. In *Poetry, Language, Thought*, pp. 213-228, Harper & Row, New York, 1971).

References

- [1] Alexander, C. *A Foreshadowing of 21st century Art: The Color and Geometry of very early Turkish Carpets*. Oxford University Press, New York, 1993.
- [2] Seamon, D. A Foreshadowing of 21st century Art: The Color and Geometry of very early Turkish Carpets, by Christopher Alexander 1993, a book review. *Environmental & Architectural Phenomenology News Letter*, Vol. 6, No.1, pp. 5-10, 1995.
- [3] Alexander, C. *A Foreshadowing of 21st century Art: The Color and Geometry of very early Turkish Carpets*. Oxford University Press, New York, p.90, 1993.
- [4] Alexander, C. *A Foreshadowing of 21st century Art: The Color and Geometry of very early Turkish Carpets*. Oxford University Press, New York, p.89, 1993.
- [5] Alexander, C. *A Foreshadowing of 21st century Art: The Color and Geometry of very early Turkish Carpets*. Oxford University Press, New York, p.89, 1993.

CONCEPT OF 'SACRED SPACE' IN TRADITIONAL TURKISH ARCHITECTURE

Murat Dündar

Bahçeşehir University, Turkey

Keywords: Sacredness in Architecture, Traditional Turkish Architecture, Sacred and Profane

Introduction

The purpose of this study is to make a conceptual analysis of the term '*sacredness*' and '*sacred space*' in traditional Turkish residential buildings. This research starts with providing an outline of the basic concepts that have mostly been used to clarify lifestyles in traditional Turkish house types.

Traditional Turkish houses are located in a wide geography and show characteristic differences. Construction methods, material selections, number of stories, space allocation, relationship among the spaces etc. are some of the most featuring characteristics that show differences from a region to another.

Although forms and construction methods and materials of traditional Turkish houses in different regions are characteristically different in essence and they were shaped in completely different ways, it is clear that dwelling customs of inhabitants of these houses bear some conceptual resemblances to each other. What they have in common, however, is that all house types of different regions represent architecture of extreme meanings in the same space as profane and sacred.

Sacredness or the concept of sacred in architecture has mostly been discussed by directly referencing to the religious architecture including churches, mosques, shrines, temples or some other buildings in which people perform religious rituals of their beliefs. The role of this concept--sacredness--in shaping spaces and/or the relation between various spaces in traditional house types in Turkey has mostly been neglected. Günay was among the leading figures who have indicated significance of way of life of the users in the formation of traditional houses. In spite of the fact that physical features of man are more or less universal, and even though the climate they live in and the building materials they use may be identical traditional houses of different nations shows characteristic differences from each other. *Günay explains this situation as follows: "...the history of various people, their culture, their economic and technological levels, their religion and traditions influence their way of life, and subsequently their houses."* [1]

Inhabitants' beliefs are among the one of the most significant criteria that shape the configuration of the inner spaces. Forms and plan types of Turkish houses have intentionally been excluded from the scope of this study. This research is an attempt to clarify reflections of users' lifestyles (including religious belief) on the sacredness of the room in the traditional Turkish house. User requirements can be analyzed under two major titles as follows: profane and sacred. Beliefs and customs of the users are the main source lay behind the concept of

sacredness. In this research, reflections of the users' belief in the formation of inner space of the house will be studied.

This research will be done in the following way: after this introduction, chapter II provides an outline of the room of traditional lifestyles. In order to understand the role of religious beliefs in the formation process of the room of traditional Turkish house, religious influences have been analyzed in the following chapter. The next chapter titled as " What makes a space sacred?" is devoted to conceptual analysis of space in terms of 'sacredness.' Finally, the way of life of dwellers has been analyzed under the heading "sacred and profane spaces."

The Room of Traditional Lifestyles

What the most appreciated argument about traditional houses is the perfect harmony of the inner spaces with the users' way of life. This attitude has been notified by Blaser [2] with an example from traditional Japanese houses. Traditional Turkish house too is the example of this kind of attitude that pays attention to the harmony between the house and dwellers 'way of life' as well as the nature.

The room is the main component of the Turkish House.[3] In the Turkish house in Anatolia the rooms reflect the old nomadic way of life.[4] Regarding the featuring characteristics of traditional Turkish houses, several questions are called to mind, but among which especially the following one needs to be thought in order to understand design thoughts of the time: how was the life within?

Room of the traditional Turkish house is a place that houses multipurpose human activities in different time of a daily usage. The multipurpose usage of the room and furniture-free floor surface is the main characteristic of traditional Turkish room that enables dwellers to use this space for various activities including profane requirements like eating, sleeping and sacred rituals like performing Islamic prayers. The room does not contain much furniture.

The primary characteristic of the room in the Turkish house, according to Küçükerman [5], is that of a unit serving specific purposes within the house. In other words, it is possible to say that a room in traditional Turkish house is a multipurpose space satisfying profane and sacred requirements of its inhabitants. This kind of multilayered relations occurring in the same space was defined as intraspatial relationships. [6]

It is used as a place of worship, eating, chatting, sleeping etc. in different time in a day. In case of room's usage, there is no sharp distinction between profane and sacred in terms of space. Although the religious rituals take place as the part of daily life, the room or the house itself is not a sacred space in its generally understood meaning. Rather there is a sacred direction (orientation to Mecca) to which all Muslims turn their faces when they perform religious rituals of Islam.

Religious Influences in traditional Turkish houses

Influences of the users' way of life, which include worldview and religious belief of inhabitants, goes far beyond the other influential factors such as climate, existing material, regional factors over the general design solutions and construction methods of traditional Turkish houses. In other words, houses of different nations reflect the worldview of the users. This fact of worldview took its lead directly from religious belief and customs. A house universally

represents inner world of its users. The most crystallizing influence of religious thought and customs is that traditional Turkish house generally represents introverted way of life. The family is inner and private and so the house was closed to the outside world. "*The gardens and interiors of houses are separated from the streets by high walls; the windows are latticed.*" [7]

Another major influence of religious belief of Islam in traditional Turkish house is the division of inner spaces as Harem (Women's quarter) and Selamlık (Men's quarter). The Harem's space is so private that access is not allowed to the people from outside the family.

The Moslem religion demands its believers performing ritual prayers five times a day. Additionally, the ablution should also be performed before each ritual prayer. Since each room is thought as an independent unit with the man and his wife, there is washroom and ablution closets within the room so as to meet profane and sacred requirements of the family.

No specific space has been allocated for worship within the house. [8] The only obligatory rule about the inner space of a house (room) when performing ritual prayers is that the inner space must be kept clean all the time since this is the place of worship in different times of a daily usage.

Turkish custom of sitting on the floor by kneeling and performing the ritual prayers directly on the floor plays an important role in the usage of the floor in such a basic way. Küçükerman especially put an emphasis on philosophical thought by the following verse: "*whatever he is doing, man remains in close contact with Nature with little more than a very thin, almost symbolic, barrier between himself and the earth.*" [9]

In addition to all, as Günay noted in his book, Islamic worldview as the 'temporality of human life' has played an important role in building methods of traditional Turkish house. The main *building material is wood and the building method is generally timber frame.* [10] So that houses were not built to last perpetually like mosques, rather they were built to last for a temporary period like human life-period.

What makes a space sacred?

It is the fact of meaning that makes the space sacred. It is not easy to make visible the sacredness of a certain place in the house, since it is invisible in essence. Rapoport defines demonstration of sacredness of a place as 'symbolic process.' [11]

Concept of sacredness in traditional Turkish houses is directly related to the customs and beliefs of inhabitants. In case of traditional Turkish architecture it is certain that religious belief is among the most important criteria that shape space formation and configuration. In addition to the factors as the climate, materials, construction systems and economy [12], the basic 'idea of dwelling' took its root from domestic traditions and way of life. In order to understand concept of sacred space in traditional Turkish house, it is necessary to clarify the major requirements of users. Conception of Sacredness in traditional Turkish house is not a visible and tangible and there is no any symbolic marker indicating the boundary between profane space and sacred space.

Dwellers give the space meaning of sacredness by performing religious rituals time to time. The sacred space can also be rephrased as religious or spiritual space since religious

activities give the sacredness to the place. It is not the matter of physical properties of a space but rather the meaning assigned to that place through the ritual activities taken place in it.

The family is the most sacred conception in Islam. Introverted life of traditional Turkish house took its lead directly from religious thought of Islam. In other words, a house is sanctuary from the pollution of the mundane world. But this concept of sacred space is not the same with that of religious buildings like mosques .

The purity of a house is acknowledged through the spiritual performers of dwellers like daily religious rituals, gatherings at certain times for various occasions including religious festivals, funeral and Quran recitations. All of these ritual activities and family privacy creates multidimensional spatial characteristics comprising extremes in itself.

Sacred and profane spaces

"The sacred and profane space and time concepts have influenced the architecture and the utopia history closely."[13] The paired concepts of 'sacred and profane' was first profoundly discussed by the German theologian Rudolf Otto, in the *Idea of the Holy* (1917). Dilemma between conceptions of sacred and profane is universal and has mostly been discussed in light of religious thoughts. Mircea Eliade [14] describes these contrasting concepts as follows: *"...two modes of being in the world."*

Another important study in clarifying the meaning of profane and sacred spaces was Larry E. Shiner's *'Sacred Space, Profane Space, Human Space,'* in which Shiner [15] briefly summarize Eliade's conception of sacred space and profane space and reconsider these paired concepts in light of analysis of human spatiality in its manifold dimensions.

Larry E. Shiner is among the leading figures who showed a new approach to the common method of juxtaposing profane and sacred together and emphasizing contrast between the two by drawing attention to the manifold dimensions of human spatiality. In place of this radical polarity, Shiner sketch in a description of "lived space", which *"is the possibility of both homogeneous space of objectifying thought and the luminosity of sacred places."*[16]

In the traditional Turkish house, the same space is used for various purposes in different time of the day. The sacredness is attained by the religious activity of the dwellers. The division between inner and outer world or sacred and profane is marked only symbolically. Distinction between the realms of profane and sacred in traditional Turkish houses is not as clear and visible as the barrier between private space (Harem--Women's quarter) and semi-public space (Selamlık-Men's quarter).

Al-Attas, in his *'The Islamic Worldview,'* wrote that "Islam does not concede to the dichotomy of the sacred and the profane; the worldview of Islam encompasses both al-dunya (this world) and al-akhirah (the world to come.)" [17]

The multipurpose usage of inner space (room) of traditional Turkish architecture reminds Larry E. Shiner's [18] original approach that is going beyond the sacred-profane dichotomy and suggesting to begin discussing the concept of sacred space from the concept of *'lived space.'*

Another significant criteria about the multipurpose usage of the same space in traditional Turkish architecture is the 'time phenomenon.' Space usage cannot be understood without taking into the account the time factor. Each activity in the house is bounded with a certain time period. The same space (room) is used for various daily activities like eating, gathering, performing ritual prayers (Islamic religious rituals), playing, working or studying, and sleeping. The key factor for the space usage is the time. The certain time period of the daily schedule is devoted to the each one of the above mentioned activities, regardless of they are profane and/or sacred.

Conclusion

Although forms and construction methods and materials of traditional Turkish houses in different regions are characteristically different in essence and they were shaped in completely different ways, dwelling customs of inhabitants of these houses bear some conceptual resemblances to each other as all house types of different regions represent architecture of extreme meanings in the same space as profane and sacred.

A room in traditional Turkish house is a multipurpose space satisfying profane and sacred requirements of its inhabitants: It is used as a place of worship, eating, chatting, sleeping etc. in different time in a day. In case of room's usage, there is no sharp distinction between profane and sacred in terms of space.

Religious influences in traditional Turkish house can be summarized as visible/tangible and invisible/intangible properties as follows: introverted way of life of the house; harem (Women's quarter) and selamlık (Men's quarter) sections of inner space; having washroom and ablution closets within the room so as to meet profane and sacred requirements of the family to comply with the demands of Islamic religion; keeping the floor clean all the time since this is the place of worship in different times of a daily usage. In addition to this, Islamic worldview as the 'transience of life' has played an important role in building methods of traditional Turkish house.

It is the fact of meaning that makes the space sacred, which is directly related to the customs and beliefs of its inhabitants. Conception of Sacredness in traditional Turkish house is not visible and tangible and there is no any symbolic marker indicating the boundary between profane space and sacred space. It is not the matter of physical properties of a space but rather the meaning assigned to that place through the ritual activities taken place in it.

In short, it is not the material, construction methods, or the position of the room in the traditional Turkish house that create sacredness but rather the human basic activity that goes beyond profane feelings and attain sacredness to the place. Entering a sacred realm from a profane means changing the mood from mundane world to the spiritual mind, which can be achieved by performing one of the religious rituals of Islam.

It is also important to note that users' philosophy of life as contentment with very little during their daily activities, which are inspired by tradition, customs and religion, is another major source in the multipurpose usage of the floors of the room. The multipurpose usage of inner space (room) of traditional Turkish architecture means going beyond the sacred-profane dichotomy and suggesting a new concept of sacred space from the concept of 'living space,' which comprises everything related to the human psychology including contrast of extremes like material & spiritual, matter & spirit, profane & sacred.

References

- [1] Günay, R. Tradition of the Turkish House and Safranbolu Houses, Yem yayınları first edition December 1998, p.91, ISBN 975-7438-68-5
- [2] Blaser W., Classical Dwelling Houses in Japan, Teufen AR : A. Niggli, 1958.
- [3] Günay, op. cit.
- [4] Küçükerman, Ö. Turkish House in Search of Spatial Identity. Turing. English translation Tamer Çelensü, Adair Mill, p.145, 1st ed. 1978, (6th ed. 2007), ISBN 978-975-7641-43-8
- [5] Günay, op.cit., p.9.
- [6] Eyüce, A., Geleneksel Yapılar ve Mekanlar, p.31, Birsen Yayınevi, İstanbul, 2005.
- [7] Günay, op.cit., p.105.
- [8] Ibid. p.106.
- [9] Küçükerman, op.cit., p.147.
- [10] Günay, op.cit., p.66.
- [11] Rapoport A., Symbolism and Environmental Design, Journal of Architectural Education (1947-1974), Vol. 27, No. 4 (1974), pp. 58-63 Published by: Blackwell Publishing on behalf of the Association of Collegiate Schools of Architecture, Inc.
- [12] Günay, op. cit., p.19.
- [13] Demirkan M., Journal of Istanbul Kültür University, pp. 41-53, 2005/1.
- [14] Eliade M., Sacred and Profane, pp.37-41; Cosmos and History: The Myth of Eternal Return (New York: 1959), 6-21
- [15] Shiner, Larry E. Sacred Space, Profane Space, Human Space. Journal of the American Academy of Religion Vol. 40, No. 4 (Dec., 1972), pp. 425-436, Published by: Oxford University Press.
- [16] Ibid.
- [17] Al-Attas Syed Muhammad al-Naqib, 'The Islamic Worldview: an outline' p. 215, in 'Islam/Tradition and change,' Ministry of Culture, Ankara, 1977.
- [18] Shiner, op.cit.

TYPICAL MOUNTAIN IMAGE OF TURKISH STUDENTS BASED ON LANDSCAPE MONTAGE TECHNIQUE: THROUGH COMPARISON WITH JAPANESE STUDENTS

Kazuhiko Yanagisawa¹, Shigeyuki Okazaki¹, Murat Dündar²

¹ Mukogawa Women's University, Japan

² Bahçeşehir University, Turkey

Keywords: mountain image, cultural difference, Landscape Montage Technique, form, color, landscape, Turkish student, Japanese student, development

Introduction

The Landscape Montage Technique (LMT) is an art therapy technique devised by Nakai (1970, 1971) based on sandplay therapy [1] [2]. The therapist draws a frame on a piece of paper and tells the participant to draw a landscape within it. The items to be drawn are said sequentially, and the participant draws only one landscape by adding the following items in order: river, mountain, rice field, road (large items); house, tree, person (medium-sized items); flower, animal, and stone (small items). After drawing them, anything else can be added. The participant then colors the landscape to finish the drawing.

We previously conducted developmental and pathological studies on *spatial schema* using the LMT, e.g. [3] [4] [5], hypothesizing that universal and fundamental principles can be found in human beings and in the compositions of landscapes by children and schizophrenic patients.

As one of our previous studies, Yanagisawa applied LMT to 1080 Japanese students ranging from kindergarten to university age, and focused on the *space enclosed by a frame*, which is one LMT feature, analyzed how a river is drawn with respect to the frame, and clarified the developmental characteristics of the spatial composition based on the types of rivers [3].

This study is an extension of our many previous studies. Here, we focused on a cultural perspective, which is a new perspective for us, and applied LMT to Turkish students ranging from kindergarten to university age. In this paper, as part of our comparative studies between Turkey and Japan based on LMT, we analyzed mountain images in landscapes drawn by Turkish students compared with the Japanese cases in our previous study [3]. Furthermore, the analysis of the types of rivers with respect to the frames in landscapes drawn by Turkish students will be discussed in another paper.

Method

We conducted our research on 233 Turkish students ranging from kindergarten to university age in Istanbul. Participants included 35 kindergartners (one class with four- to five-year olds and one class with five- to six-year olds), 92 elementary school students (one class per grade from first to fifth grades), 47 junior high school students (one class per grade from sixth to eighth grades), 16 high school students (volunteers from ninth to twelfth grades), and 43

university students (undergraduates from 18 to 23). Table 1 shows a breakdown of the participants.¹

We conducted the research on the entire class of students during their normal class time as a group. However, for the high school students, the research was not conducted on one particular class, but on a group who volunteered. Dündar, one of the authors, explained the LMT procedure in Turkish, while Yanagisawa and class teachers supported the process from the side. B4-size paper, black felt pens, and colored pencils were used.

As for the Japanese cases for comparison, we analyzed 984 of the 1080 cases in our previous study [3], excluding the cases of entire classes where we did not have enough time for coloring of the landscapes. The original study was conducted in Kyoto, Japan.

Results

Mountain images were analyzed based on their form and color. In analyzing the form, we focused on mountains with a form such as \wedge , which is common among the Turkish cases. We call it a “mountain of the crowned type”. Table 1 shows the number of Turkish cases with and without mountains of the crowned type and their percentages for each grade. Table 2 shows the result of the same analysis done on the Japanese cases. Figure 1 shows the percentages of the Turkish and Japanese cases with mountains of the crowned type for each grade based on Tables 1 and 2.

In analyzing the color, we identified mainly eight types of colors of the mountains (see Table 3, from cases with mountains of brown color to cases with mountains without color). Table 3 shows the number of the Turkish cases analyzed by color of mountain and their percentages for each grade. Table 4 shows the result of the same analysis done on the Japanese cases. Figure 2 shows the percentages of the Turkish and Japanese cases analyzed by color of mountain for each grade based on Tables 3 and 4.

Discussion

Figure 1 shows that there was an overwhelming majority of cases with mountains of the crowned type in the Turkish cases, whereas, in the Japanese cases, mountains of the crowned type were not drawn very much.

Furthermore, Figure 2 shows that there was an overwhelming majority of cases with mountains of brown color in the Turkish cases, whereas, there was an overwhelming majority of cases with mountains of green color in the Japanese cases.

Therefore, we found that the typical mountain image of Turkish students is a mountain of the crowned type and of brown color (Fig. 3). In contrast, we found that mountains of the crowned type occur less often and mountains of green color occur often in drawings done by Japanese students (Fig. 3). Furthermore, a future challenge remains of analyzing in detail mountain forms other than the crowned type, especially in the Japanese cases.

The characteristics of the typical image of a mountain already existed strongly at about the age of 5-6 and remained common even up to university students. Therefore, it is unlikely that developmental factors figure strongly in the background of these characteristics. Rather, we believe that cultural and climatic factors have a strong effect.

Table 1 Turkish cases with/without mountains of the crowned type and percentages for each grade

	K 4-5		K 5-6		1st graders		2nd graders		3rd graders		4th graders		5th graders		6th graders		7th graders		8th graders		9th-12th graders		Univ. students		Total	
M-CR	0	1	4	3	4	7	6	6	1	8	6	8	7	6	11	5	8	4	2	5	2	2	1	14	52	69
	1 (5.9)		7 (38.9)		11 (55.0)		12 (70.6)		9 (47.4)		14 (70.0)		13 (81.3)		16 (94.1)		12 (75.0)		7 (50.0)		4 (25.0)		15 (34.9)		121	
M-NCR	13	3	4	7	7	2	2	3	6	4	4	2	2	1	0	1	2	2	4	3	7	5	6	22	57	55
	16 (94.1)		11 (61.1)		9 (45.0)		5 (29.4)		10 (52.6)		6 (30.0)		3 (18.8)		1 (5.9)		4 (25.0)		7 (50.0)		12 (75.0)		28 (65.1)		112	
Total	13	4	8	10	11	9	8	9	7	12	10	10	9	7	11	6	10	6	6	8	9	7	7	36	109	124
	17		18		20		17		19		20		16		17		16		14		16		43		233	

For each type of mountain under each grade, upper left box indicates cases by males, upper right box indicates cases by females, and total number of cases with each type of mountain is shown in the bottom box with percentage of total number of cases for each type of mountain for each grade shown in parentheses.

M-CR: Cases with mountains of the crowned type

M-NCR: Cases without mountains of the crowned type

K 4-5: 4-5 year-old kindergartners

K 5-6: 5-6 year-old kindergartners

Table 2 Japanese cases with/without mountains of the crowned type and percentages for each grade

	K 4-5		K 5-6		1st graders		2nd graders		3rd graders		4th graders		5th graders		6th graders		7th graders		8th graders		9th-12th graders		Univ. students		Total			
M-CR	0	1	0	0	3	4	8	4	3	0	3	2	2	1	5	0	8	1	7	2	13	2	0	0	0	0	52	17
	1(4.5)		0(0.0)		7(9.3)		12(16.2)		3(4.2)		5(15.2)		3(4.1)		5(7.1)		9(10.7)		9(10.7)		15(5.1)		0(0.0)		69			
M-NCR	14	7	29	30	35	33	31	31	33	35	14	14	34	37	28	37	36	39	36	39	127	154	33	9	450	465		
	21(95.5)		59(100.0)		68(90.7)		62(83.8)		68(95.8)		28(84.8)		71(95.9)		65(92.9)		75(89.3)		75(89.3)		281(94.9)		42(100.0)		915			
Total	14	8	29	30	38	37	39	35	36	35	17	16	36	38	33	37	44	40	43	41	140	156	33	9	502	482		
	22		59		75		74		71		33		74		70		84		84		296		42		984			

For each type of mountain under each grade, upper left box indicates cases by males, upper right box indicates cases by females, and total number of cases with each type of mountain is shown in the bottom box with percentage of total number of cases for each type of mountain for each grade shown in parentheses.

M-CR: Cases with mountains of the crowned type

M-NCR: Cases without mountains of the crowned type

K 4-5: 4-5 year-old kindergartners

K 5-6: 5-6 year-old kindergartners

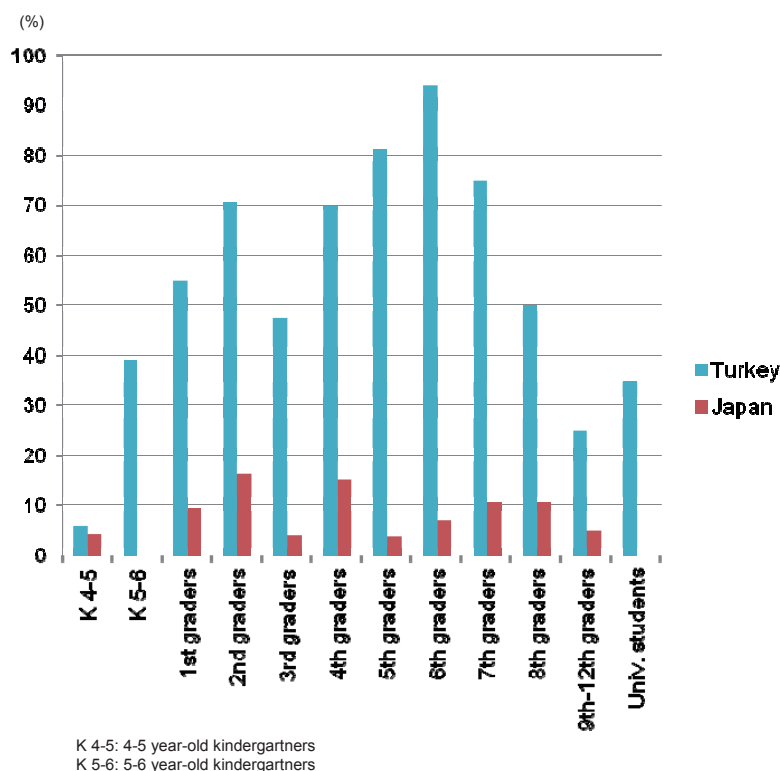


Fig. 1 Percentages of Turkish and Japanese cases with mountains of the crowned type for each grade

Table 3 Turkish cases analyzed by the color of mountain and percentages for each grade

	K 4-5	K 5-6	1st graders	2nd graders	3rd graders	4th graders	5th graders	6th graders	7th graders	8th graders	9th-12th graders	Univ. students	Total
M-BR	1 1 2 (11.8)	4 4 8 (44.4)	4 5 9 (45.0)	6 8 14 (82.4)	7 10 17 (89.5)	7 8 15 (75.0)	8 4 12 (75.0)	11 3 14 (82.4)	7 3 10 (62.5)	3 5 8 (57.1)	7 7 14 (87.5)	4 31 35 (81.4)	69 89 158
M-G	3 3 (17.6)	2 1 2 (11.1)	1 1 2 (10.0)	1 1 (5.9)	2 2 (10.5)		1 1 2 (12.5)	2 2 4 (25.0)	2 2 4 (25.0)	3 2 5 (35.7)	1 1 2 (12.5)	3 3 3 (7.0)	13 15 28
M-Y		2 2 (11.1)		1 1 (5.9)		1 1 (5.0)							3 1 4
M-R	1 1 1 (5.9)	2 1 2 (11.1)				2 2 (10.0)						1 (2.3)	2 4 6
M-P	1 1 2 (11.8)	3 1 3 (16.7)	1 (5.0)			1 (5.0)					1 (6.3)		3 5 8
M-BL	1 (5.9)	2 (11.1)	1 (5.0)	1 (5.9)									3 2 5
M-BK	1 (5.9)		2 (10.0)	1 (5.9)		3 (15.0)			1 (6.3)				8 8
M-NC	3 (17.6)	1 1 2 (11.1)	3 2 5 (25.0)				1 2 3 (18.8)	1 1 2 (12.5)	2 (7.1)	1 (6.3)	1 (6.3)	1 (2.3)	12 7 19
M-O		1 (5.6)	1 (5.0)						1 (6.3)	1 (7.1)	1 (6.3)	2 2 4 (9.3)	5 4 9
M-U	3 1 4 (23.5)	1 1 2 (11.1)											4 2 6
Number of participants	13 4 17	8 8 18	11 9 20	8 9 17	7 12 19	10 10 20	9 7 16	11 6 17	10 6 16	6 8 14	9 7 16	7 36 43	109 124 233

For each type of mountain under each grade, upper left box indicates cases by males, upper right box indicates cases by females, and total number of cases with each color of mountain is shown in the bottom box with percentage of total number of cases for each color of mountain for each grade shown in parentheses. A blank box means that no such mountain was found.

When a case showed some mountains in different colors, we counted the number of cases according to the colors. For instance, if there were two mountains of brown color and one mountain of green color in a case, we counted one case in the M-BR type and also one case in the M-G type. Therefore, the total number of cases analyzed by the color of mountain for each grade is more than the number of participants for each grade. The percentages for each grade were calculated with respect to the number of participants for each grade.

- M-BR: Cases with mountains of brown color (including orange color)
- M-G: Cases with mountains of green color (including yellow green color)
- M-Y: Cases with mountains of yellow color
- M-R: Cases with mountains of red color (including pink color)
- M-P: Cases with mountains of purple color
- M-BL: Cases with mountains of blue color (including sky blue color)
- M-BK: Cases with mountains of black color
- M-NC: Cases with mountains without color
- M-O: Cases with mountains with colors other than the above
- M-U: Cases in which mountains are unidentifiable

K 4-5: 4-5 year-old kindergartners
 K 5-6: 5-6 year-old kindergartners

Table 4 Japanese cases analyzed by the color of mountain and percentages for each grade

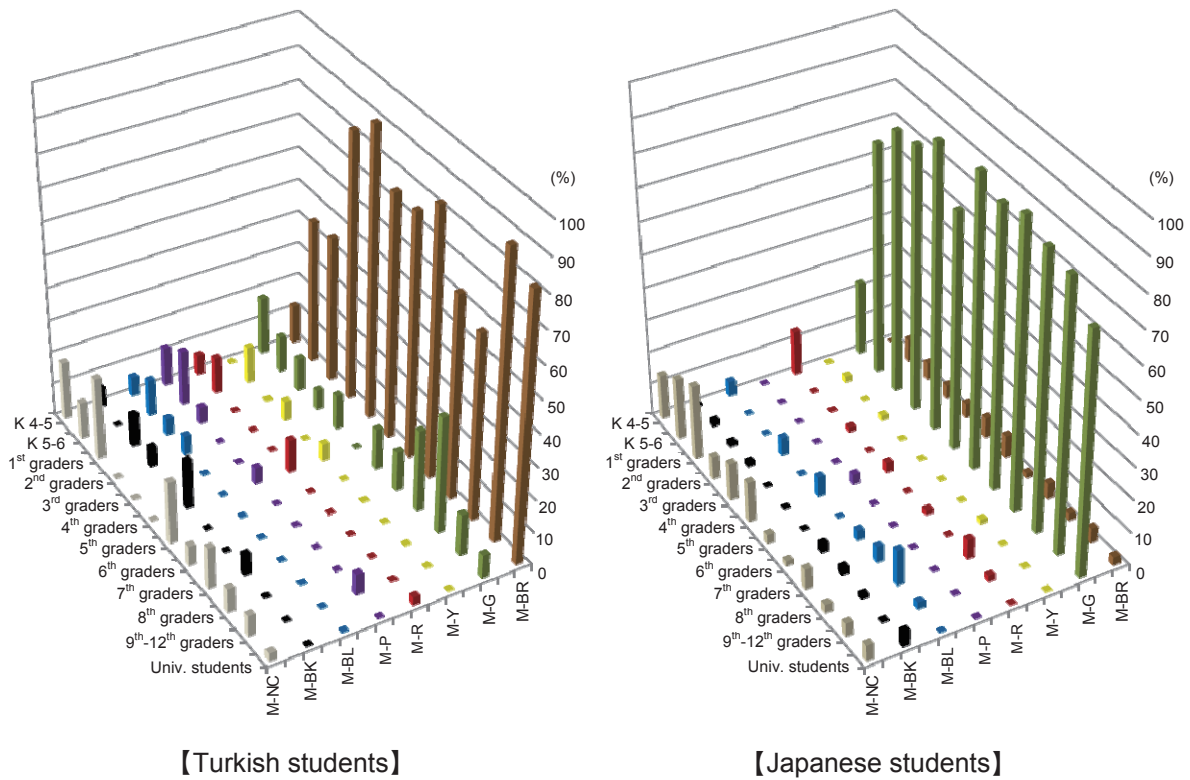
	K 4-5	K 5-6	1st graders	2nd graders	3rd graders	4th graders	5th graders	6th graders	7th graders	8th graders	9th-12th graders	Univ. students	Total
M-BR		2 2 4 (6.8)	3 1 4 (5.3)	2 1 3 (4.1)	3 (4.2)	2 (6.1)	5 (6.8)	1 (1.4)	2 2 4 (4.8)	1 1 2 (2.4)	10 3 13 (4.4)	1 (2.4)	32 10 42
M-G	5 5 (22.7)	21 21 42 (71.2)	31 29 60 (60.0)	28 32 60 (81.1)	28 34 62 (87.3)	12 12 24 (72.7)	29 37 66 (89.2)	26 34 60 (85.7)	36 38 74 (88.1)	33 38 71 (84.5)	101 144 245 (82.8)	31 (73.8)	800
M-Y		1 (1.7)		1 (1.4)					1 (1.2)				1 2 3
M-R	1 2 3 (13.6)			1 (1.4)		1 (3.0)		1 (1.4)		5 (6.0)	4 (5.1)		11 5 16
M-P						1 (3.0)							1 1
M-BL	1 (4.5)			3 1 4 (5.4)		2 (6.1)		2 (2.9)	3 1 4 (4.8)	8 1 9 (10.7)	6 (6.2)		24 4 28
M-BK		1 (1.7)	1 (1.3)	1 (1.4)				2 (2.9)	2 (2.4)	1 (1.2)	1 (0.3)	2 (4.8)	10 1 11
M-NC	3 (13.6)	4 7 11 (18.6)	9 8 17 (22.7)	5 (6.8)	7 1 8 (11.3)	2 2 4 (12.1)	1 1 2 (2.7)	1 (1.4)	3 2 5 (6.0)	1 1 2 (2.4)	7 5 12 (4.1)	2 (4.8)	44 28 72
M-O	3 (13.6)	2 (3.4)		2 3 5 (6.8)		2 (6.1)	3 1 4 (5.4)	4 1 5 (7.1)	4 1 5 (6.0)	5 2 7 (8.3)	22 7 29 (9.8)	8 (19.0)	50 20 70
M-U	5 2 7 (31.8)										1 (10.3)		6 2 8
Number of participants	14 8 22	29 30 59	38 37 75	39 35 74	36 35 71	17 16 33	36 38 74	33 37 70	44 40 84	43 41 84	140 156 296	33 9 42	502 482 984

For each type of mountain under each grade, upper left box indicates cases by males, upper right box indicates cases by females, and total number of cases with each color of mountain is shown in the bottom box with percentage of total number of cases for each color of mountain for each grade shown in parentheses. A blank box means that no such mountain was found.

When a case showed some mountains in different colors, we counted the number of cases according to the colors. For instance, if there were two mountains of brown color and one mountain of green color in a case, we counted one case in the M-BR type and also one case in the M-G type. Therefore, the total number of cases analyzed by the color of mountain for each grade is more than the number of participants for each grade. The percentages for each grade were calculated with respect to the number of participants for each grade.

- M-BR: Cases with mountains of brown color (including orange color)
- M-G: Cases with mountains of green color (including yellow green color)
- M-Y: Cases with mountains of yellow color
- M-R: Cases with mountains of red color (including pink color)
- M-P: Cases with mountains of purple color
- M-BL: Cases with mountains of blue color (including sky blue color)
- M-BK: Cases with mountains of black color
- M-NC: Cases with mountains without color
- M-O: Cases with mountains with colors other than the above
- M-U: Cases in which mountains are unidentifiable

K 4-5: 4-5 year-old kindergartners
 K 5-6: 5-6 year-old kindergartners



M-BR: Cases with mountains of brown color (including orange color)
 M-G: Cases with mountains of green color (including yellow green color)
 M-Y: Cases with mountains of yellow color
 M-R: Cases with mountains of red color (including pink color)
 M-P: Cases with mountains of purple color
 M-BL: Cases with mountains of blue color (including sky blue color)
 M-BK: Cases with mountains of black color
 M-NC: Cases with mountains without color

K 4-5: 4-5 year-old kindergartners
 K 5-6: 5-6 year-old kindergartners

Fig. 2 Percentages of Turkish and Japanese cases analyzed by the color of mountain for each grade



Turkish student, 6th grader, male

Japanese student, 6th grader, female

Fig. 3 Typical Examples of LMT

Conclusion

We applied the Landscape Montage Technique to 233 Turkish students ranging from kindergarten to university age, analyzed mountain images in landscapes drawn by Turkish students, and compared them with the Japanese cases in our previous study. We found the following.

1. There was an overwhelming majority of cases with mountains of the crowned type in the Turkish cases, whereas in the Japanese cases, mountains of the crowned type were not drawn very much.
2. There was an overwhelming majority of cases with mountains of brown color in the Turkish cases, whereas there was an overwhelming majority of cases with mountains of green color in the Japanese cases.
3. The typical mountain image of Turkish students is a mountain of the crowned type and of brown color. In contrast, we found that mountains of the crowned type occur less often and mountains of green color occur often in drawings done by Japanese students.
4. Cultural and climatic factors, rather than developmental factors, strongly influence the above characteristics.

Notes

1. The number of cases of high school students was very low. Therefore, in this paper we grouped them together as “9th-12th graders.” A future challenge remains to increase the number of cases of high school students.

References

- [1] Nakai, H. Psychopathology of schizophrenics as revealed by various drawing techniques invented for psychotherapy. *Japanese Bulletin of Art Therapy*, Vol. 2, pp.77-90, 1970. (In Japanese)
- [2] Nakai, H. A few general implications derived from analysis of schizophrenic drawings. *Japanese Bulletin of Art Therapy*, Vol.3, pp.37-51, 1971. (In Japanese)
- [3] Yanagisawa, K. Seikatsukukan no kosei ni kakawaru kukanzushiki no hattatsuteki kenkyu: Kyojukurankoseiho oyobi Fukeikoseiho no kosatsu o toshite [Spatial schema related to architectural and environmental composition: A developmental study based on Architectural Space Montage Technique and Landscape Montage Technique]. Kyoto University Doctoral Dissertation (Engineering), March 24, 2003 (In Japanese)
- [4] Yanagisawa, K., & Okazaki, S. Architectural Meaning of a River That Connects the Left and Right Sides of Frame, Drawn by Chronic Schizophrenic Patients Based on Landscape Montage Technique: Similarity to Traditional Japanese Space. *Intercultural Understanding*, Vol.1, pp.113-120, 2011.
- [5] Yanagisawa, K., & Okazaki, S. Types of Rivers with Respect to Frame, Drawn by Chronic Schizophrenic Patients Based on Landscape Montage Technique: Similarity to Traditional Japanese Space. In M. Dündar, S. Tanrıöver, N. Ü. Gülmez, & S. Kültür (Eds.), *ARCHI-CULTURAL TRANSLATIONS THROUGH THE SILKROAD*. Bahcesehir University Press, Istanbul, pp.55-65, 2011.

STUDY ON PREFERENCE OF TOURISTS ON THE LANDSCAPE OF FLOWERING CHERRY TREES AT YOSHINOYAMA, NARA PREFECTURE, JAPAN

Junichi Imanishi¹, Yosuke Harada¹, Yoshihiko Iida¹, Ryo Higashiguchi¹, Yukihiro Morimoto¹

¹ *Kyoto University, Japan*

Keywords: landscape preference, cultural landscape, sacred landscape, tourism, conjoint analysis, trade-off

Introduction

The Japanese are particularly fond of the flowering cherry trees. The landscape at Yoshinoyama, Nara Prefecture has history of 1,300 years and is the most famous scenic place for cherry blossom appreciation in Spring. Torigoe considered that the landscape is originated from the custom of devotion of flowers to the god of mountain [1]. In the oral tradition at Yoshinoyama, En-No-Ozunu, a master of Shugendo (mountain asceticism), carved a statue of god, Zaoh-Gongen, and decided it as the principal object of worship in Shugendo. Since then, the flowering cherry trees have been planted for devotion to the god and protected as sacred trees. Recently, the landscape has been designated as an area of the UNESCO World Heritage Site, Sacred Sites and Pilgrimage Routes in the Kii Mountain Range. The landscape of flowering cherry trees at Yoshinoyama is now important cultural heritage for the Japanese as well as important economic resource for local people through tourism.

However, aging of population and depopulation at Yoshinoyama has become a serious matter to sustainably manage the landscape of flowering cherry trees. A research report on declination of tree health at Yoshinoyama pointed out that shortage of workforce and budget to daily care on the trees is one of the reasons for the declination and advised to recognize trade-off between area of planting sites and available effort on individual trees [2]. However, conventional methods such as the Semantic Differential Method to investigate landscape preference do not incorporate concept of trade-off, and thus has limitation in practical use of the result to consider preferable landscape. Therefore, we studied landscape preference of tourists at Yoshinoyama using conjoint analysis which is suitable to consider trade-off among attributes.

Methods

We prepared a questionnaire sheet for conjoint analysis with full-profile evaluation design consisted by three important attributes that determine tourists' preference on landscape of flowering cherry trees at Yoshinoyama (Nara Prefecture, Japan): area of planting sites, percentage of healthy trees, amount of donation per one year per one person (Table 1). Then, we carried out the questionnaire investigation to tourists at Yoshinoyama in December 2011, and obtained 91 effective samples. From the data, we estimated utility of the three attributes in light of tourist characteristics: place of residence, age, gender, occupation,

income, accumulated number of visits to Yoshinoyama in Spring and throughout a year, and preference to flowering cherry trees, artificial coniferous forests, and declined flowering cherry trees.

Table 1: Attributes and levels used to the conjoint analysis

		Attributes		
		Area of Planting Sites	Percentage of Healthy Trees	Amount of Donation per One Year per One Person (*1)
Levels	Expanded to 1.5 times	Increased to 90 %	7,000 JPY (*2)	
	Reduced to 0.5 times	Decreased to 50 %	1,000 JPY (*2)	

*1: We explained that 1 person per 1,000 persons will donate in average based on the statistical result in Japan.

*2: The amount of donation were determined by simulating necessary budget to manage the landscape. (cf. Currency Rate: 1 TPY = 45.97 JPY = 0.55 USD, on March 21, 2012)

Results and Discussion

The most significant difference was observed in age and accumulated number of visits. The other tourists' characteristics did not show statistically significant difference except for gender (male or female) and occupation (student or non-student).

Along with increase of age or number of visits, clear trends were observed: utility of "area of planting sites" (hereafter we call it "quantity") was decreased, and utility of "percentage of healthy trees" (hereafter we call it "quality") was increased (Figs. 1, 2 and 3).

Tens to 20s showed that utility of quantity was 2.3 times larger than utility of quality, while 30s to 40s 0.84 times, 50s to 60s 0.49 times, and 70s to 80s 0.17 times (Fig. 1). Regarding number of visits in Spring, persons who have not visited in Spring showed that utility of quantity was 1.1 times larger than utility of quality, while persons who have visited from 1 to 3 times showed utility of quantity was 0.53 times larger than utility of quality, and persons who have visited more than 6 times showed utility of quantity was 0.34 times larger than utility of quality (Fig. 2). Regarding number of visits throughout a year, persons who have visited from 1 to 3 times showed that utility of quantity was 1.1 times larger than utility of quality, while persons who have visited from 4 to 6 times showed utility of Area was 0.27 times larger than utility of quality, and persons who have visited more than 6 times showed utility of quantity was 0.33 times larger than utility of quality (Fig. 3). The result of persons who have visited from 4 to 6 times in Spring was not statistically effective due to small group size.

The trend of change of landscape preference in number of visits were slightly weaker than the trend in age. The reason was assumed that all of tourists have not necessarily visited Yoshinoyama for seeing flowering cherry trees; some of them have visited there for worshipping Kinpusen-Ji Temple, the head temple of Shugendo.

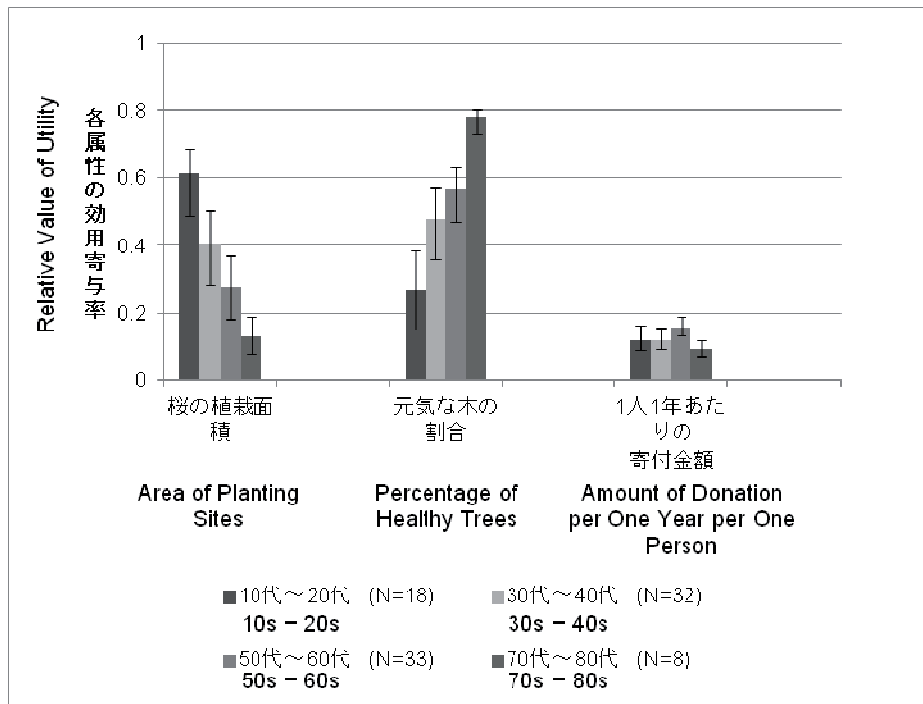


Figure 1: Relative values of utility in different ages

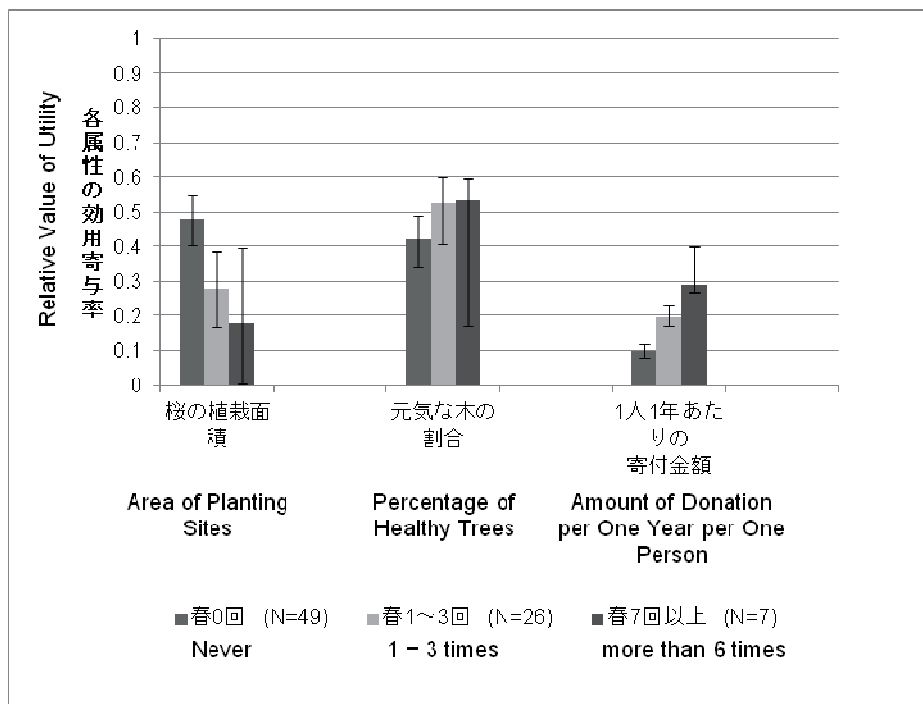


Figure 2: Relative values of utility corresponding to number of visits in Spring

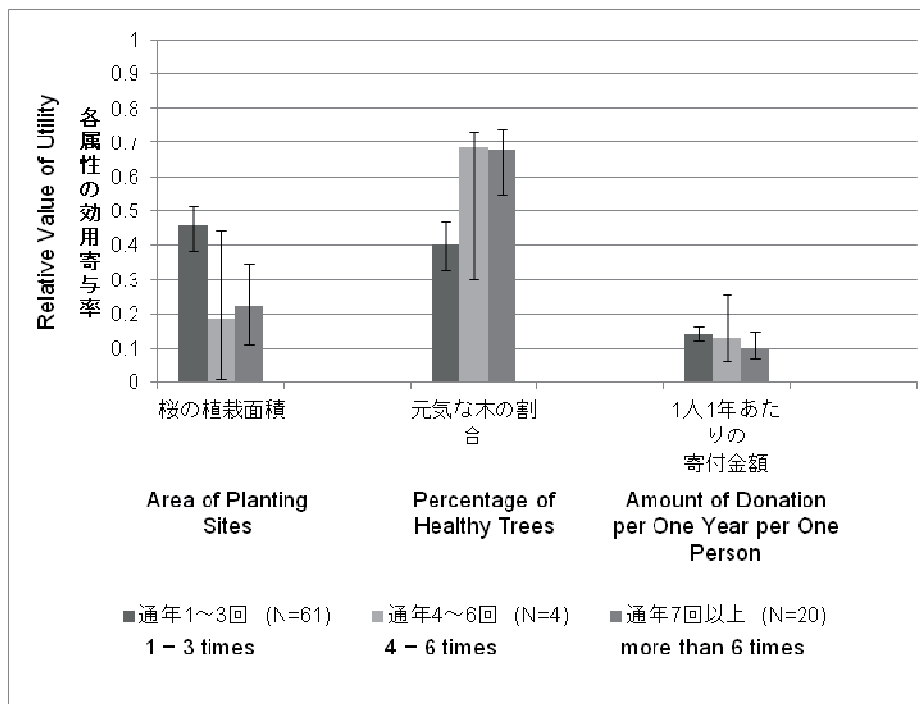


Figure 3: Relative values of utility corresponding to number of visits throughout a year

Conclusion

From the analysis on landscape preference of tourists who visited Yoshinoyama, we found that tourists tended to change their preference from valuing quantity (area of planting sites) of flowering cherry trees to valuing quality (percentage of healthy trees) along with increase of age or number of visits. People seem to have tendency to more carefully look at landscape after gaining experiences. Considering the flowering cherry trees are sacred in Shugendo and decline of tree health is recognized as a problem by local people, it seems important to make effort to change attitude of tourists for admiring landscape of flowering cherry trees, from quantity to quality, so that we can sustainably manage the trees with limited workforce and budget, and thus conserve the cultural landscape with long history. For example, it may be effective that education and donation are made to caring about trees rather than planting more trees.

References

- [1] Torigoe, H. Visiting Flowers to Yosihonoyama. Shueisha Shinsho, 205 pp., 2003. (In Japanese)
- [2] Yoshinoyama Sakura Investigation Team. Heisei 20 – 22 Fiscal Years Report of Investigation on Flowering Cherry Trees. 184 pp., 2011. (In Japanese)

STUDY ON FORMS OF HISTORICAL WEIRS IN JAPAN AS LANDSCAPE ELEMENTS

Shuichi Murakami

The University of Shiga Prefecture, Japan

Keywords: cultural landscape, rural landscape, water-friendly space, river space, traditional river technology, irrigation, flood control, headworks, modernization

Introduction

Weirs are constructed to change the flow of rivers in order to intake water. They are thought to be one of the landscape elements which tell us about the long history of regional lives with the rivers. Karino explains the characteristics of forms of historical weirs¹ as follows [1]. Weirs are not perpendicular but oblique to the river course so that the flow is induced smoothly to the canals (Fig. 1 Left). This expands the area of irrigation, since water can reach farther without losing momentum at the intake points. It also prevents the weirs from breaking because water pressure to their bodies becomes smaller. The tops of them are kept low in order to reduce the risk of overflows to the hinterlands. Chino and Okuma irradiate the other aspect. Historical weirs are composed with natural materials such as stones and woods because modern materials such as concrete were not available in those days [2]. Therefore, it is assumed that the weirs create the sort of landscape that water runs gently over the body of stone weir lying low in the river at an angle (Fig. 1 Right).



Fig. 1: Traditional forms of historical weirs

Left: Diagram implied by precedent studies

Right: Example of historical weirs (Ogawa-esuji weir, the Natsui River, Fukushima)

However, it is anticipated that changes have arisen in such traditional forms today. Before modernization, difficulties of repair were troubling people whenever the weirs were damaged by floods. It is thought that such vulnerable materials and structures have been transposed to more solid and durable ones by modern technology, which is represented by concrete. The issue what kinds of change have occurred in the traditional forms is raised. Iwaya mentions that 239 oblique weirs have been existing or existed once in 78 domestic river basins [3]. Thus, the objective of this research is to clarify the characteristics of forms of existing examples of these oblique weirs².

Methods

With reference to the research of Iwaya, 167 examples of the oblique weirs which have been confirmed to still exist in 73 river basins are investigated (Fig. 2). 78% of them are located in the western part of Japan including the districts of Kinki, Chugoku, Shikoku and Kyushu. The tendency of the west unbalance distribution is also pointed out by Iwaya. There is no example preserved as cultural asset.



Fig. 2: Map of existing oblique weirs in Japan

It is assumed that the forms of those oblique weirs could change in the following ways. First, the section may have changed from the board-like form to the trapezoid. The trapezoid section which has a steep slope with a horizontal apron followed is the standard form in the design of modern weirs [4]. Next, the material of the weir bodies must have changed from stone and wood to concrete. Furthermore, a mechanical flushing gate may be equipped.

On-site survey was carried out from 2008 through 2011. The contents of investigation are measure of length, width and slope, record of both sectional form and material of the weir bodies, and check of the existence of mechanical flushing gates.

Results

The length of the weir bodies takes the value from 27m to 840m, and average value is 132m. Meanwhile, the width of the weir bodies takes the value from 1m to 71m, and average value is 14m. The scatter diagram shows the combination of length and width (Fig. 3). No specific tendency about the combination of length and width is recognized.

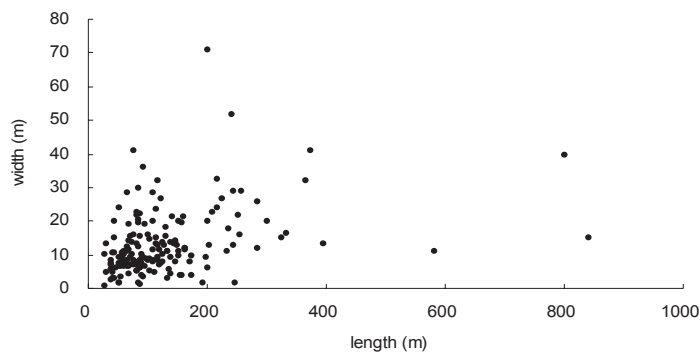


Fig. 3: Scatter diagram of weir sizes, length and width

There are three types of sections, which are trapezoid, board-like and step-like shapes. The board is the shape that the whole surface is a loose slope or a flat. Comparing the average of slopes between the shapes, the board is 11% to the trapezoid being 94%. The step is the shape that the level surfaces of different height continue. The bar graph shows the rate of the three shapes (Fig. 4). It turns out that nearly a half of the oblique weirs are trapezoids (Fig. 5).

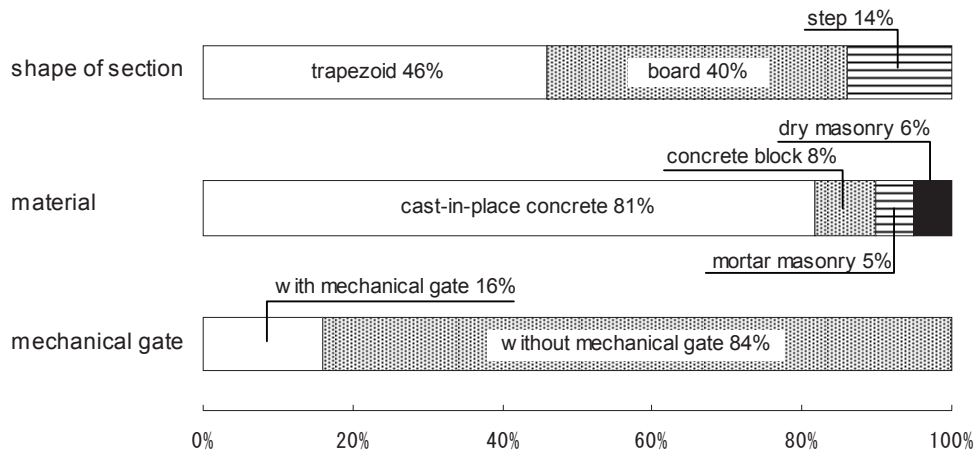


Fig. 4: Bar charts of shape of section, material of weir body, mechanical gate



Fig. 5: Example of trapezoid shape (Kusuriya-weir, the Kuji River, Ibaraki)

In the case of material, 81% of the weir bodies are composed with cast-in place concrete, 8% with concrete block, 5% with mortar masonry and 6% with dry masonry (Fig. 4, 6, 7).



Fig. 6: Example of material, concrete block (Tajimaya-weir, the Arakawa, Saitama)

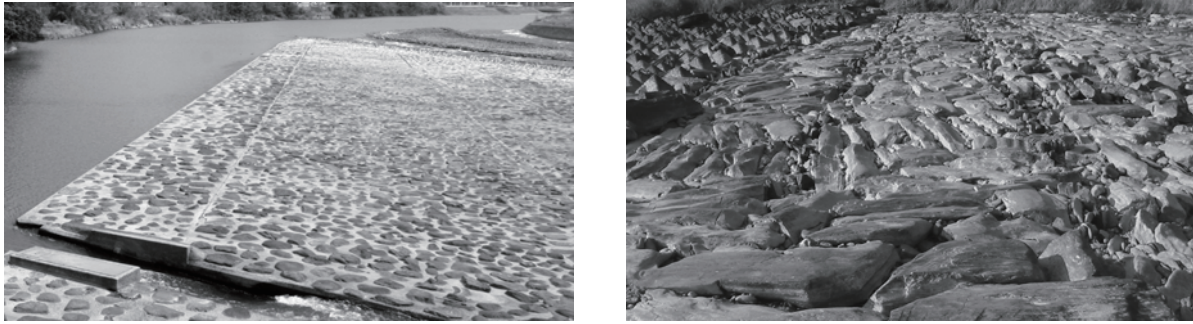


Fig. 7: Examples of material

Left: Mortar masonry (Yamada-weir, the Chikugo River, Fukuoka)
 Right: Dry masonry (Daiju-weir, the Yoshino River, Tokushima)

In the case of flushing facility, 16% of the weirs are equipped with one or more mechanical gates (Fig. 4, 8). The remaining 84% are operated by people's hand mainly with sheathing boards.



Fig. 8: Example of mechanical flushing gate (Hata-weir, the Niyodo River, Kochi)

Discussions

The typology of the weirs is derived from the result that the weirs have been classified according to the combination of shape of section, material and mechanical gate (Fig. 9). All the weirs of trapezoid section are composed with cast-in-concrete. These weirs, which account almost half of the whole, create the sort of riparian landscape different from the original, mainly because of their much steeper slopes. Moreover, quarters of them are equipped with the mechanical gates.

Conversely, both board and step weirs still keep the landscape that water runs gently over the bodies lying low in the rivers diagonally. But there are few differences of appearance of water among them as to materials and ways of placement. In the case of board, more than 70% of weirs are in cast-in-concrete, but only three of them in concrete block. The remainder is masonry and the ratio of wet and dry is half-and-half. In the case of step, there is almost no masonry while cast-in-concrete and concrete block are divided mutually into the same number. Even if the weirs of both board and step sections are composed with concrete, there are few examples equipped with mechanical gates.

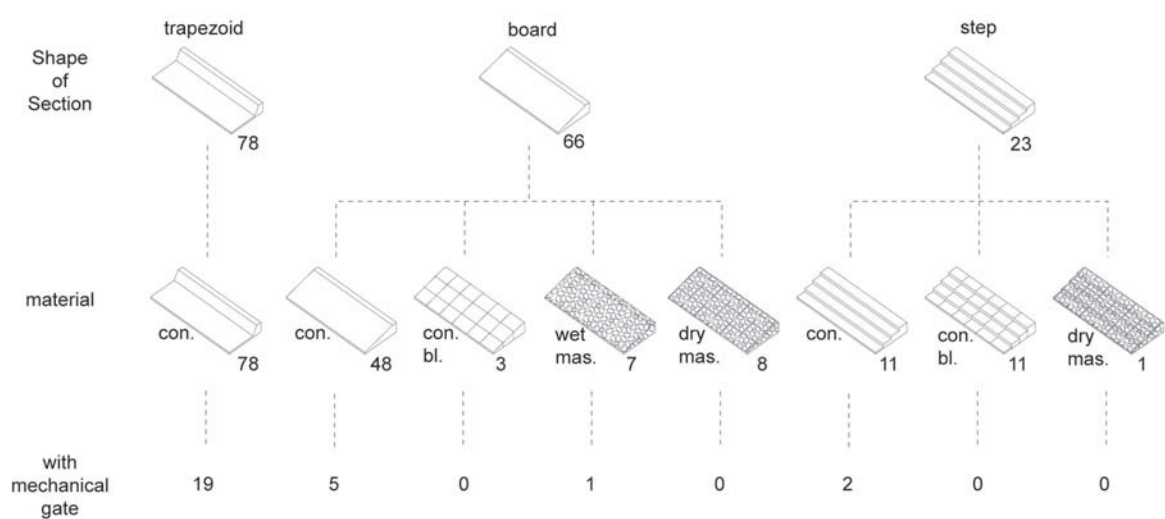


Fig. 9: Typology of oblique weirs according to the results

A figure under a weir shows the number of its type.
 con. : cast-in-concrete, con. bl. : concrete block, wet mas. : wet masonry, dry mas. : dry masonry

It is thought that traditional forms remain completely in the weirs of board and step with dry masonry, but such weirs are only 5% of the whole. Although there is not so much difference in masonry between wet and dry with the point that stones cover their surfaces, there is a great difference at the point of whether water penetrates the weir bodies. In addition, there is a difference of technique because high level of skill is needed for stacking stones in dry masonry.

90% of the whole are made from concrete and seem to be modern products. However, if looking carefully, there are also forms considered to be traditional succession. To fix concrete blocks by frames is a modern version of the traditional construction method which stuffed stones into wooden frames. The frames which fix blocks are made from wood, concrete and steel.

Conclusions

As mentioned above, it is a trend that historical weirs are altered to the trapezoid in cast-in-concrete equipped with mechanical gates, and only being oblique to the flow of river is inheriting the conventional form as the original riparian landscape elements. However, though there are few numbers, the weirs which have inherited the traditional forms by shape of section, material, and flushing gate operated by human power still exist. It is important to clarify the factors in which the historical weirs have remained without designation as the cultural assets and to explore the methods of preservation and succession of them.

Notes

1. The term of historical weir refers what was initially constructed before the modern times.

2. Iwaya classified the weirs according to the plane forms in terms of river technology, but not evaluated those as landscape elements.

References

- [1] Karino, T. *Intake Weir*. Chikyu-shuppan, pp.25-26, 1971. (In Japanese)
- [2] Chino, Y. & Okuma, T. A Study on Weirs under Edo Era's Flood Control System – in Relation to the Development of Weir Techniques. *Journal of Civil Engineering History*, Vol. 14, pp.93-108, 1994. (In Japanese)
- [3] Iwaya, T. Functions and Configurations on the Oblique Weir in Japan. *Journal of Civil Engineering History*, Vol. 26, pp.45-58, 2007. (In Japanese)
- [4] Edited by Investigative Commission of Educational Materials in the Japanese Society of Irrigation, Drainage and Reclamation Engineering. *Design of Headworks*. JSIDRE, p.96, 1982. (In Japanese)

BELBAR, FROM LIMITATIONS TO OPPORTUNITIES DISCOVERING THE NATURAL POTENTIALS

Atyeh Ashtari¹, Faranak Khas Ahmadi¹, Paya Salem¹, Mona Tajeddini²

¹ University of Art, Tehran, Iran

² University of Tehran, Kish International Campus, Iran

Keywords: Howraman, Belbar, rural architecture, harmonization with nature, limitations, mountainous climate, compressed contexture, step like geometry, native materials, Vernacular constructing technology

Guiding professors: Dr.Behshid Hosseini, Mr. Majid Ziaei

Introduction:

First glance: The land of Iran is located in western half of historical Silk Road. Howramans region is situated in western south of Kordestan province which lies on outspread mountainsides and plains of Zagros mountain range. Howraman is an ancient region which has been populated since the arrival of Aryans. Howraman's writings on leather (charm-nebeshte) which belong to first century AD are evidences to age of this fascinating land. The word, "Howraman" means divine land or the place of Ahura-mazda(the name of God in ancient Persian theology).

Second glance: Studying and forming a precise understanding of villages are of importance from so many aspects, since present cities are formed from the heart of small and grand villages which many of those are on the edge of destruction. On the other hand, these rural settlements in Iran are perfect examples of harmonization with nature and transforming limitations to opportunities. In general, rural architecture can be described as the resultant of given responses to climatical, economical, cultural and social conditions of the village that's been embodied in stone, wood and straw-clay.

Third glance: The rural settlement that's being discussed, Belbar (i.e. forty springs), is one of the villages of Howramans region. Residents of this village have dealt with many limitations such as geographical, climatical and social limitations in constructing their settlements. This article is an effort to study the kind of responses these people gave to each one of these limitations. These limitations are discussed in two categories of A) contexture Formation and arrangements of the blocks of the settlements and B) form and construction methods of residential blocks of Belbar.



Fig. 1:Whole vision of Belbar

Treatise:

A) The effects of limitations on contexture Formation and arrangements of the blocks of the settlements

Weather and climatic feature

Lying in the valley and locating on the banks of Sirvan River (see Fig. 1), this village disobeys mountainous climate of Kordestan province and is a little bit more moderate during winters and humid in summers.

General Introduction of Rural Contexture

The contexture is organic like a Semicircular, located on two side of the valley. Because of Mountainous and moderate climate, the contexture is formed from compressed step like small blocks of settlements; The houses are placed in a way that shading and obstructing each others' vision are minimized.

Different ethnic groups are settled in zones considering their requirement and history .for example Shiras are farmers therefore their houses are near the fields. Mollahas are religious people and therefore, they live near the mosque. (See Fig. 2)

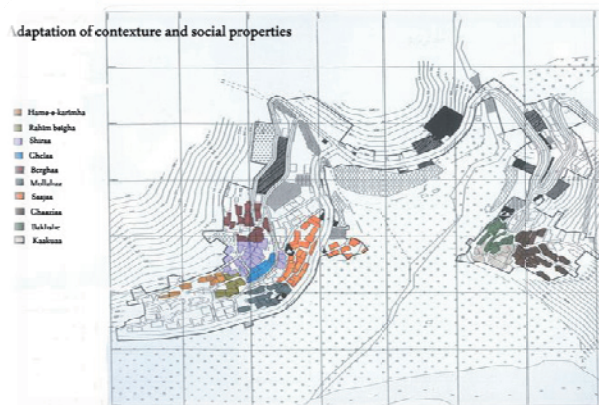


Fig. 2 Village site plan / zones of ethnic groups



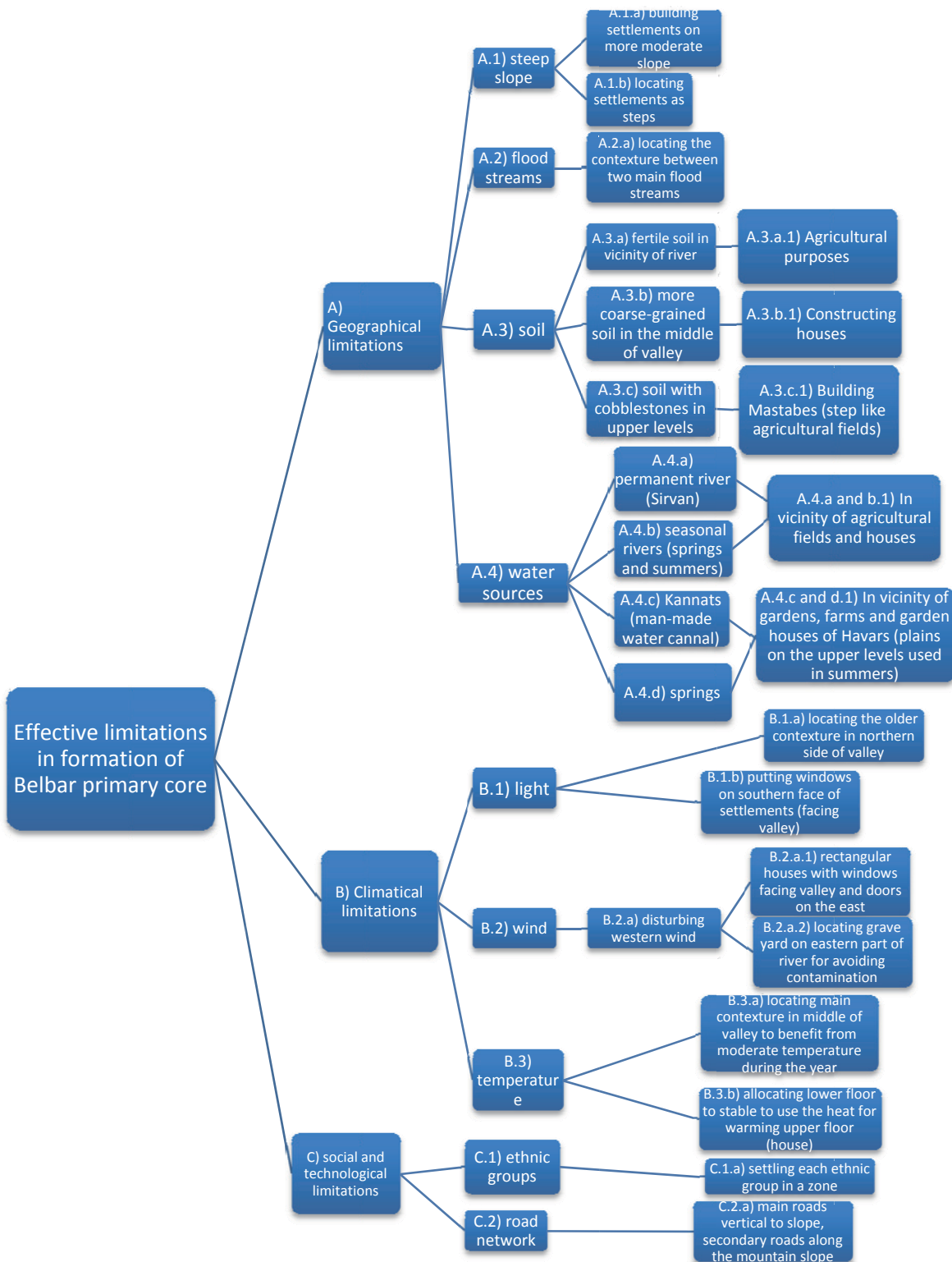
Fig. 3 Part of village contexture

The architecture of houses is Extroverts that make them not to have central patio despite of the houses located in warm climate.in fact these patios are superseded by verandas which can be seen before entering the house. (Table 1)

Table 1

Limitation	A response for it
Mountainous climate	compressed and small blocked contexture
compressed and small blocked contexture not shading each other	Step like geometry
Mountainous climate	Not using central patio
Not using central patio and step like geometry	The roof of each house is yard ofupper one

In general, we can put these limitations in 3 categories of A) geographical, B) climatical and C) social and technological. These limitations, how they transformed to opportunities and their responses have been studied as shown in the Fig. 4 below:



OPPORTUNITIES

Fig. 5 Effective limitations in formation of Belbar primary core •



Fig. 6 Mastabas (step like agricultural fields)

Fig. 7 On right: garden On left: agricultural field

B) The Effects of Limitations on form and construction methods of residential blocks of Belbar

B.1) Locating the Rural Settlements According to Limitations

Like any other project in any region, the first step for constructing a building is choosing its site. In this step, two main categories of limitations play important roles in choosing the site

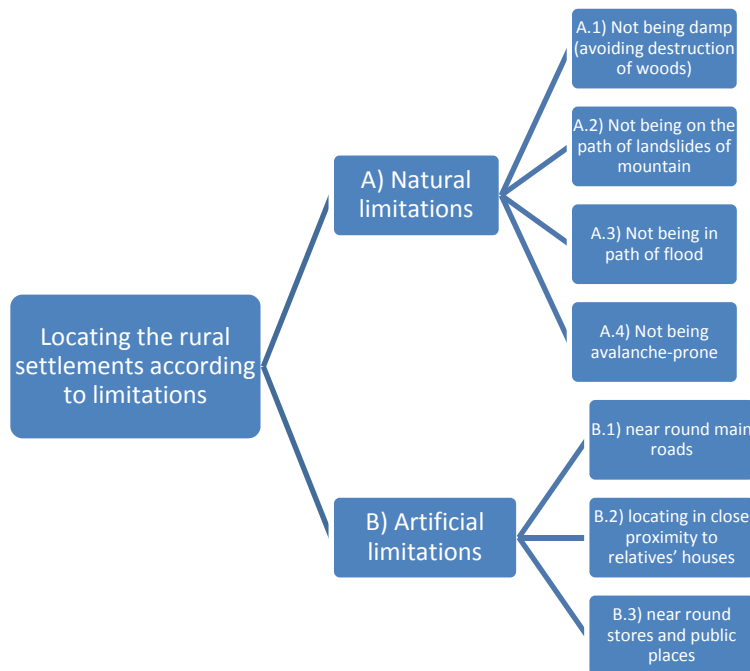


Fig. 8: Locating the rural settlements according to limitations

B.2) Form: The forms of settlements are generally rectangles in two stores that the down floor was allocated to stable. Because of placing the houses in gradient, the roof of every house also functions as the upper house's court-yard. In fact one out of four faces of every house faces the valley always. By paying attention to appropriate light and inappropriate western wind, windows face the valley and doors open towards the east. Also houses extend through the east-west axis. Buildings are placed on stone platforms and they have linear order which concentrates in complexical points. (Fig.7)



Fig. 9: (A residential block in Belbar)

B.3) Construction of Rural Settlement:

B.3.a) Limitations in Choosing Materials:

Table 2

Materials	Ability	Where they are used
Stone	Bear pressure forces/vertically transfer weight of the walls and ceiling to the ground/High Heat Capacity/recyclability	the bearing walls, ceiling
Lumbers, made from a native tree called "Daar" or "Chenaar", length 4 to 5 meters.	high tensile strength/High Heat Capacity/recyclability	Flat ceilings, door and window frames, different sections of the exterior walls
Wooden boards	high tensile strength/High Heat Capacity/recyclability	On the beams of Ceiling
Straw-clay plaster	adhesive quality, High Heat Capacity, High Thermal Resistance/recyclability	Fill the cracks, join the materials, cover the inside surfaces of the walls and ceiling, and as moisture and thermal insulation.

B.3.b) Construction Methods: Construction technology adapts to using accessible materials and confronting nature forces like wind. For instance their special method of placing stones emphasis on reinforcing resistance against vertical forces. Also Longitudinal and transverse lumber are used to distribute loads in walls evenly. (Fig. 7) A fine example of this vernacular technology, considering the low tensile strength of stone, is using lumber pieces in particular places of different sections of the exterior walls as tension frames to connect the parts of the whole structure in order to make the walls strong enough to stand the horizontal forces.



Fig. 10: Lumbers in different sections of the exterior walls (woven in corners)



Fig. 11: Wooden boards on the beams of Ceiling

B.3.c) Age of Houses in Response of Limitation in Choosing Materials:

The age of the houses depend on the wood age so if the roof has good insulation that water doesn't reach the lumbers and maintenances well, houses could be used for decades.



Fig. 12 Wooden structure

Conclusion:

As mentioned in this article, Belbar is one of the valuable rural settlements of Howrman region that has been harmonized with nature, culture, tradition and economics through time, as reflected in the wholesale of the village, from its general arrangement to construction of every single settlement. In order for this architecture to be harmonized there are some limitations to deal with and be transformed to opportunities. This transformation is best indicated in its rural contexture and building technology. Construction has always been performed with considering the potentials of every available vernacular material and this affects the optimization of energy usage and all of these facts lead this native constructing to be considered as some kind of sustainable architecture. These features should be preserved and followed in expansion process of Belbar.

References:

1. Kasmaii Morteza, Climate and Architecture, Khak publication, Tehran, Second edition 2003
2. Interviewing with residents and native traditional architects of Belbar and council of Belbar
3. Guiding plan of housing foundation of Iran

SPATIAL COMPOSITION OF THREE INTERMOUNTAIN SETTLEMENTS LOCATED ON SLOPES IN NORTHERN AND CENTRAL TURKEY

Toshitomo Suzuki¹, Shigeyuki Okazaki¹

¹ Mukogawa Women's University, Japan

Keywords: settlement, mountain, slope, topography, climate, house, road, mosque, square, roof

Introduction

For designing, constructing, and conserving human and sustainable living environments, we focused on the spatial compositions of intermountain settlements located on slopes. We conducted documentary searches and field surveys of three settlements in northern and central Turkey. From them, we discussed the relationships among the topographies, the lives of residents, the buildings, and the roads to determine the spatial characteristics of the settlements.

Methods

We selected three settlements (Fig. 1). Bolkuş in Karabük Province is surrounded by green mountains. Demirdağ in Divriği District, Sivas Province, is surrounded by bald mountains. Çiğdemlik in Amasya Province is at the intermediate location between them.

We conducted our documentary searches and field surveys in them. In our documentary search, we mainly collected the temperature and the precipitation of the nearest city or town [1], satellite images [2], topography [3], and outlines of each settlement from the Internet. In the field surveys conducted from March 10-14, 2011, many photographs were taken, and residents were interviewed when possible.



Fig.1: Locations of three settlements in Turkey [2]

© 2012 Google, US Dept of State Geographer, Data SIO, NOAA, U.S. Navy, NGA, GEBCO, © 2012 MapLink/Tele Atlas © 2012 Cnes/Spot Image

Results

COMPARISONS OF TEMPERATURES AND PRECIPITATION

We compared the monthly mean temperatures and precipitation in Karabük City (about 15 km east of Bolkuş), Amasya City (about 13 km southwest of Çiğdemlik), and Divriği Town (about 6 km south of Demirdağ) (Fig. 2, 3).

The four seasons are clearly differentiated in these cities, as in Istanbul. The differences of the mean annual precipitation in Karabük (488 mm), Amasya (447 mm), and Divriği (387 mm) [1] are lower than that in Istanbul (697 mm). The precipitation in summer (Jun. to Sep.) is lower than in winter. Karabük has the highest precipitation in summer, followed by Amasya and Divriği. The Köppen-Geiger climate classification [4] places Karabük in the humid subtropical climate, like most of Japan and parts of China and South Korea, and Amasya and Divriği in the Mediterranean climate in the Mediterranean Basin. The two climates are classified based on

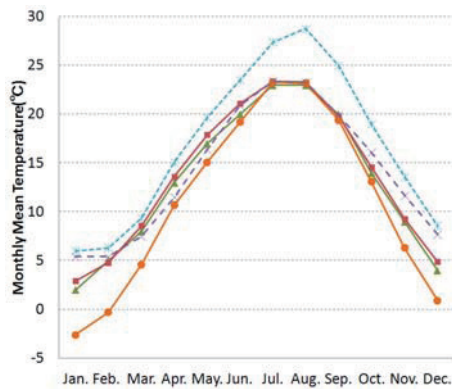


Fig. 2: Comparisons of monthly mean temperatures [1]

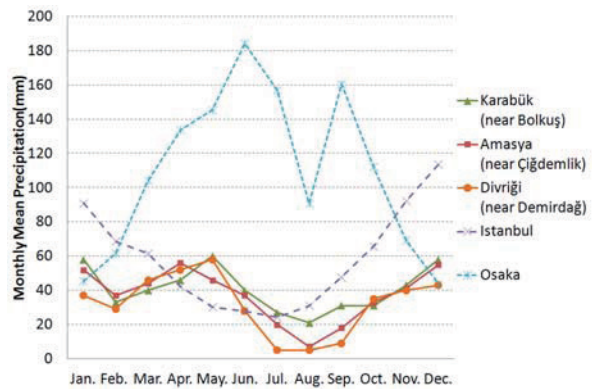


Fig. 3: Comparisons of monthly mean precipitation [1]

summer precipitation, which seems to affect the mountain vegetation. Below are the results of our documentary searches and field surveys for each settlement.

BOLKUŞ

Documentary search [2][5]

Geography (Fig. 4, 5): Two independent settlements are surrounded by green mountains. Filyos River, State Road D030, and a railway run through the bottom of the valley. The south settlement is located on the gentle slope of the river's south side. The north settlement, called Yalnızca, is on the steep slope, which is about 120 to 200 m higher than the south.

History: People have lived here from the Ottoman Empire.

Population: 197 (in 2000, total of two settlements)

Economy: The main industry is forestry. Some of the residents work in iron and steel industries.

Field survey (March 10, 2011) Below are the results in the north settlement, Yalnızca.

Settlement: Houses were clustered in an area from which the residents regularly walked to the mosque (Fig. 6). There was a little square in front of the mosque around which the settlement's community was centered (Fig. 7). Men gathered before prayer times at the mosque and converse with each before and after prayer.

No road ran parallel to the contours. Every road was steeply sloped (Fig. 8-10). The houses were lined near the roads. Plowlands were mainly spread on the outer



Fig. 5: Closeup satellite image, contours and map of Bolkuş Yalnızca Settlements 1:5,000

Satellite image in 2005 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (10 m intervals) [3][6] : GeoMapApp © <http://www.geomapp.org>

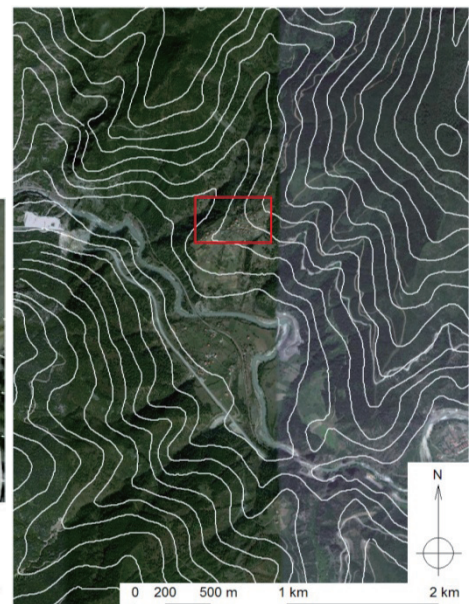


Fig. 4: Satellite image and topography of Bolkuş Village 1:50,000

See Fig. 5 for closeup in framed rectangle.
Satellite image in 2005 and 2011 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (50 m intervals) [3][6] : GeoMapApp © <http://www.geomapp.org>



Fig. 6: Appearance of Bolkuş Yalnızca Settlement



Fig. 7: Square in front of mosque



Fig. 8: Upslope road in settlement



Fig. 9: Downslope road in settlement



Fig. 10: Downslope road in settlement



Fig. 11: Gabled wooden house popular in settlement



Fig. 12: Gable sides faced valley



Fig. 13: Masonry walls used in downstairs

side of the settlement. Roads connected the settlement's inside and outside and led to the mosque, the mountains, and the plowland paths. No paths had been developed that connected the higher and lower houses like stairs.

Buildings: Many gabled houses shared similar scales sides faced the valley (Fig. 11, 12, 14). They created a sense of unity among the houses when they were viewed from the other side of the river (Fig. 6).

Many houses were wooden. In some of them, masonry constructions were used downstairs to effectively use the slope (Fig. 13). There were only minimal land formations with low retaining walls.

Unlike the other houses, the mosque faced Mecca (south-southeast). Its form and color were different from the other houses (Fig. 7).

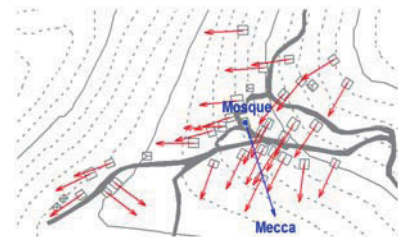


Fig. 14: Aspects of gable houses and mosque in Bolkuş Yalnızca Settlements 1:10,000

Contours (10 m intervals) [3][6]; GeoMapApp © <http://www.geomapapp.org>

ÇİĞDEMLİK

Documentary search [2][7]

Geography (Fig. 15, 16): The settlement is surrounded by green mountains. However, parts of the mountainsides near the settlement have just a few trees. Yeşilirmak River and State Road D100 run through the bottom of the valley.

History: Pontic Greeks formerly lived in the settlement and called it Zana. After the Treaty of Lausanne in 1923, the Greeks migrated to Greece, and the number of Turkish residents increased. Now the Turks call it Çiğdemlik, which means crocus flowers.

Population: 543 (in 2000)

Economy: Cherries, peaches, grapes, apricots, apples, plums, pears, and okra are grown.

Field survey (March 12, 2011)

Settlement: The settlement was on a slope from the state road through the upslope road. The houses were spread like a fan. A



Fig. 15: Satellite image and topography of the Çiğdemlik Village 1:50,000 See Fig. 16 for closeup in framed rectangle.

Satellite image in 2010 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 GeoEye
Contours (50 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>

low hill and trees on the west side complicated obtaining a full view of the settlement from the bottom of the valley (Fig. 17, 18).

A small pond and a primary school were located at the settlement's entrance. A square was found at the center of the settlement. The village head office and a small snack shop faced the square (Fig. 19).

A mosque being reconstructed was very close to the square. The mosque was on the site of the former mosque.

The slope roads branched from a road running east to west along a gully (Fig. 20). Few paths connected the higher and lower houses.

Buildings: The old houses shared a characteristic facade with an overhanging gable, a front wall, and a window upstairs (Fig. 21-23). The facade faced the lower altitude rather than the nearby road (Fig. 25). Some of the houses were visible from the lower altitudes with hipped roofs and a small gable and from higher altitudes as one gabled wall (Fig. 24). The color of the



Fig. 16: Closeup satellite image, contours and map of Çiğdemlik Settlement 1:5,000
Satellite image in 2010 [2] : © 2012 Google, Image © 2012 GeoEye Contours (10 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>

to the square. The mosque was on the site of the former mosque.

The slope roads branched from a road running east to west along a gully (Fig. 20). Few paths connected the higher and lower houses.

Buildings: The old houses shared a characteristic facade with an overhanging gable, a front wall, and a window upstairs (Fig. 21-23). The facade faced the lower altitude rather than the nearby road (Fig. 25). Some of the houses were visible from the lower altitudes with hipped roofs and a small gable and from higher altitudes as one gabled wall (Fig. 24). The color of the

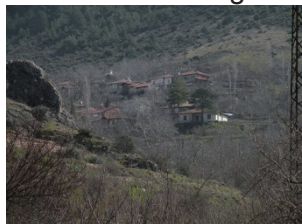


Fig. 17: Appearance of Çiğdemlik partially hidden by hill on the left.



Fig. 18: Houses spread like a fan



Fig. 19: Square. Village head office was in building on the right.

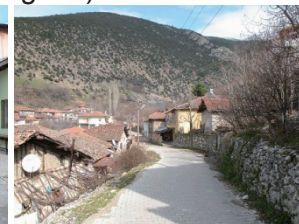


Fig. 20: Road in settlement was in building on the right.



Fig. 21: House with characteristic facade



Fig. 22: House with characteristic facade



Fig. 23: Masonry walls used downstairs.



Fig. 24: Gable wall of house visible from higher altitudes.

walls of the houses varied. However, the red roofs of most houses created a sense of unity when viewed from a distance (Fig. 17, 18).

There were many two-story wooden houses. In some of them, masonry construction was used downstairs (Fig. 23). There were only minimal land formations with low retaining walls.

Unlike the other houses, the mosque under reconstruction faced Mecca (south-southeast).

DEMİRDAĞ

Documentary search [2][8]

Geography (Fig. 26, 27): The settlement is surrounded by gentle bald mountains. Trees are limited to inside the settlement and near a stream.

History: The settlement was formerly called Purunsur. After the foundation of the Turkish Republic, it was named Demirdağ, which means iron mountain.

Population: 67 (in 2007)

Economy: Wheat and feed grains like barley, vetch, and clover are cultivated.

Field survey (March 14, 2011)

Settlement: The settlement was on a slope approached from the main road through a downslope road and a bridge over a stream (Fig. 28, 29). There was a square in its center (Fig. 30). A primary school at the west edge of the settlement had been closed. There was no mosque in the settlement. Many settlements around Divriği have no mosques.

Relatively high densities of houses were found inside this settlement (Fig. 31, 32). Some houses with wooden upstairs had already collapsed and only the masonry or mud downstairs remained (Fig. 33).

Buildings: Many houses had hipped or pavilion roofs. Although some houses had gable roofs, few gable walls faced the lower altitudes. The walls of the houses varied in color. However, red roofs and the similar scales of most of the houses created a sense of unity when viewed from a distance (Fig. 26). Some houses had overhanging upstairs (Fig. 34, 35).



Fig. 25: Aspects of facades in Çiğdemlik Settlements 1:10,000

Contours (10 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>

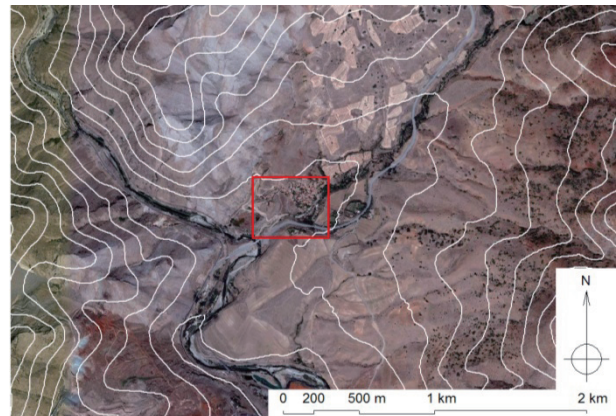


Fig. 26: Satellite image and topography of Demirdağ Village 1:50,000. See Fig. 27 for closeup in framed rectangle.

Satellite image in 2006 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (50 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>



Fig. 27: Closeup satellite image, contours and map of Demirdağ Settlement 1:5,000

Satellite image in 2006 [2] : © 2012 Google, © 2012 Cnes/Spot Image, Image © 2012 DigitalGlobe
Contours (10 m intervals) [3][6] : GeoMapApp © <http://www.geomapapp.org>



Fig. 28: Appearance of Demirdağ Settlement



Fig. 29: Entrance of settlement



Fig. 30: Square at center of settlement



Fig. 31: Density of houses inside settlement



Fig. 32: Dense houses inside settlement



Fig. 33: House with collapsed wooden upstairs in front.



Fig. 34: House with overhanging upstairs



Fig. 35: House with overhanging upstairs

Discussion

Our documentary researches and field surveys of the three settlements showed the following characteristics of spatial compositions:

- (1) The roads in each settlement branch from the mosque or the square. Houses are gathered in the area from where the residents regularly walk to the mosque or the square. The settlement's community is centered on the mosque or the square. The plowlands are mainly spread to the outer side of the settlement.
- (2) Many houses are wooden. Some have masonry or mud downstairs to effectively use slopes. Despite such slope topography, there are only minimal land formations with low retaining walls.
- (3) Each roof faces not a nearby road but the direction of the lower altitudes. Roofs visible outside each settlement share similar shapes, scales, and colors.

Conclusion

We conducted documentary searches and field surveys of three intermountain settlements located on slopes in northern and central Turkey and discussed their spatial compositions. We clarified the followings: (1) The spatial structure, which is centered around a mosque or square, helps community formation. (2) Some wooden houses have masonry or mud downstairs to effectively use slopes. (3) Sharing similar shapes, aspects, scales, and colors of roofs creates a sense of unity in the landscape.

References

- [1] WorldClimate. <http://www.worldclimate.com> (15/3/2012) Weatherbase. <http://www.weatherbase.com> (15/3/2012)
- [2] Google Earth. <http://www.google.com/earth/> (3/3/2012) Google Map. <http://maps.google.com> (2/3/2012)
- [3] GeoMapApp. <http://www.geomapapp.org> (3/3/2012)
- [4] Geiger, R., *Überarbeitete Neuauflage von Geiger, R.: Köppen-Geiger / Klima der Erde. (Wandkarte 1:16 Mill.)*, Klett-Perthes, 1961. (In German)
- [5] Bolkuş, Karabük - Vikipedi. http://tr.wikipedia.org/wiki/Bolku%C5%9F,_Karab%C3%BCk (25/2/2011, in Turkish)
- [6] Ryan, W.B.F, et al., Global Multi-Resolution Topography Synthesis. *Geochemistry Geophysics Geosystems*, Vol. 10, Q03014, 2009
- [7] Çiğdemlik, Amasya - Vikipedi. http://tr.wikipedia.org/wiki/%C3%87i%C4%9Fdemlik,_Amasya (25/2/2011, in Turkish)
- [8] Demirdağ, Divriği - Vikipedi. http://tr.wikipedia.org/wiki/Demirda%C4%9F,_Divri%C4%9Fi (25/2/2011, in Turkish)

RELATIONSHIPS BETWEEN FENG-SHUI AND LANDSCAPES OF CHANGAN AND HEIJO-KYO

Hideaki Tembata¹, Shigeyuki Okazaki¹

¹ *Mukogawa Women's University, Japan*

Keywords: Feng-Shui, enclosed space, city planning, landscape, mountain, river, Changan (Xian), Heijo-kyo (Nara)

Introduction

This paper studies the relationships between the landscapes of Changan (present-day Xian, China) and Heijo-kyo (present-day Nara, Japan) and interpretations based on Feng-Shui, which is a system of thought that originated in China for selecting locations for cities, houses, and graves. We previously studied the relationships between Feng-Shui and landscapes of Seoul, Keasong and Kyoto [1, 2]. In this paper we study Changan and Heijo-kyo. Tong Changan was influenced by Feng-Shui and was one of the largest cities along the Silk Road. Heijyo-kyo was influenced by Feng-Shui and was modeled after Changan [3]. There are a lot of comparative studies between Changan and Heijo-kyo, but most previous studies compare the inside of each capital, and there is no study comparing both from the viewpoint of Feng-Shui thought, including the neighboring geographical environment.

Enclosed Space based on Feng-Shui

In Feng-Shui, ideal sites are surrounded by mountains and rivers to accumulate "Qi." Relationships with mountains and rivers are crucial to evaluate invisible "Qi." In Feng-shui, mountain ranges are regarded as Dragon Pulse, which "Qi" flows through.

Figure 1(a) shows the ideal Feng-Shui model [4]. "Ketsu," which is the most important place, contains the most condensed "Qi" due to enclosed spaces. "Shu-zan" is the main mountain behind "Ketsu." "Sō-zan" is a mountain that leads to "Shu-zan." "Qi" comes to "Shu-zan" from "Sō-zan." Constructing cities, houses, and graves in "Ketsu" brought happiness and prosperity. This model has an axis (Sō-zan - Shu-zan - Ketsu - Myōdō - An-zan - Chō-zan) and a direction called "Zakō." This model is related to "Shijinsoō", which means the Four Celestial Animals (Black Tortoise, Green Dragon, White Tiger, and Red Phoenix) are in balance (Fig. 1(b)) [5].¹

Changan (present-day Xian)

Changan was an ancient capital of more than ten dynasties in Chinese history. Changan flourished in the golden age of the Tang Dynasty (618-907), which was founded by the Li family. During its heyday, Changan was one of the largest and most populous cities in the world. Sui Daxing, which was designed by Yuwen Kai, was the predecessor of Tang Chang'an. It is an established theory that city planning of Changan was influenced by Feng-Shui [6, 7]. On the other hand, there is an opinion that Changan does not fit into the ideal Feng-Shui model [8].

Figure 2(a) shows topographical maps of Changan. On a grand scale, Changan is naturally quite a good site because it is a large flat basin [8]. The Qinling Mountains rise to the east and west to approximately 35 km south. The Weihe River, which is a branch of the Yellow River, flows to the north side of Changan. Changan faces south. During Tang, the main exterior walls of Changan rose 5.5 m high and formed a rectangle extending 9.7 km east to west by 8.6 km north to south with an inner surface area of 78 km². The castle walls and the roads were symmetrical. On the topographical map, the north and west sides are open and the neighboring mountains are too far, so the impression of being surrounded by the mountains is weak. The south side is higher and the north side is lower.

Figure 2(b) shows a Feng-Shui diagram in *Dili-Renzixuezh* (a Feng-Shui book from the Ming Dynasty) [10]. This figure shows Changan equivalent to Supreme Palace enclosure, but there is no explanation about the relations with the actual topography. The Four Celestial Animals are not equivalent to its topography and become the names of the gates of north-south direction, Black Tortoise and Red Phoenix [6]. There is an interpretation that the topography of the Changan meets 64 hexagrams in Yi-king [11]. Atago argued that the central axis of Changan was determined based on the Shibianyu Valley in the Qinling Mountains [12].

Figure 2(c) shows panoramic views of Changan from the former Imperial Palace. To the south, the Qinling Mountains are the most prominent mountains in Changan. Mountains are hardly seen to the north and west. On a grand scale, Changan is an enclosed space, but in terms of landscapes, Changan is not a visually enclosed space. In the Qinling Mountains, there is no characteristic heap of becoming the standard for the central axis. Also, in terms of landscapes, the selection criterion of the east-west axis is ambiguous.

Heijo-kyo (present-day Nara)

Heijo-kyo (present-day Nara) was the capital city of Japan (710-740 and 745-784). According to the Emperor Genmei's words, "the place of Heijo is in accordance with the painting of Shikin (four beasts); Sanzan (three mountains) assuage things (平城之地 四禽凶叶 三山作鎮)," which can be found in the *Shoku Nihongi* (second of the six classical Japanese history texts), Heijo-kyo was selected based on Feng-Shui, "Shijinsoō" [4, 7, 13].

Figure 3(a) shows a topographical map of Heijo-kyo. Heijo-kyo is surrounded by the mountains and rivers as showed in this figure. Heijo-kyo faces south. It had no castle walls and was an irregular rectangle², and the area of city is more than 25 km². The north side is higher and the south side is lower.

The Feng-Shui interpretations of Heijo-kyo are as follows. There are various theories as to an interpretation of "Shijinsoō" and "Sanzan" in Heijo-kyo as follows: (1) Mt. Amanokagu, Mt. Unebi and Mt. Miminashi. (2) To the east, Mt. Kasuga; north Mt. Nara; west Mt. Ikoma. (3) To the east Mt. Mikasa; north, the tomb of the Emperor Heizei; west the tomb of the Emperor Suinin [15, 16]. Sijin is also described in the display in the First Imperial Hall, which was restored, but it is unknown which mountains each Celestial Animal is equivalent to. Huang argued that the central axis matches the Ochioka Hill, which is Red Phoenix. He said that "Sanzan" is "mountains surrounding the Heijo-kyo area," and there is no explanation about relations with the actual mountains [4, 17].

Figure 3(c) shows a view from the First Imperial Hall. Figure 3(d) shows panoramic views of Heijo-kyo from the Nara Palace Site. Heijo-kyo is surrounded in three directions by mountains. To the north, Mt. Nara is not prominent because no noticeable features of Nara's landscape on the central axis can be found. Also, the selection criterion of the east-west axis is ambiguous. Mountain ranges of the south side are prominent in comparison with the mountain ranges of the north side. To the South, Mt. Kongo and Mt. Yoshino are conspicuously seen as relatively high mountains in Nara. Rolling mountains on the east and west sides and high mountains on the south side enclose Heijo-kyo.

Comparison of Changan and Heijo-kyo

On a grand scale, Changan is an enclosed space, but in terms of landscapes, it is a very large area and is not a visually enclosed space. The topography in which the south is higher and the north is lower does not accord with an ideal Feng-Shui model. Meanwhile, Heijo-kyo is a space visually enclosed by mountains in three directions. The topography in which the north side is higher and the south side is lower accord with an ideal Feng-Shui model. Neither Changan nor Heijo-kyo has big mountains on the north side. In both cities, southern mountains are the highest in the area, and there is no interpretation of the Dragon Pulse. Also, in terms of landscapes, the selection criterions of the axes are ambiguous.

Conclusion

We studied relationships between Feng-Shui and landscapes of Changan and Heijo-kyo. Changan does not accord with an ideal Feng-Shui model, while Heijo-kyo accords with an ideal Feng-Shui model partially. Neither Changan nor Heijo-kyo has big mountains on the north side, and there is no interpretation of the Dragon Pulse.

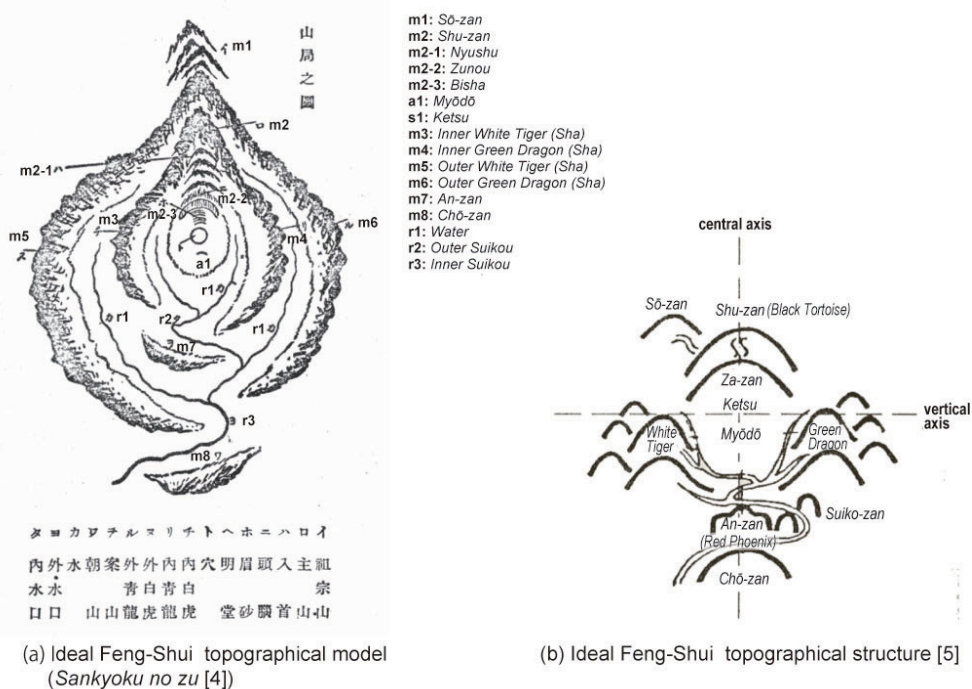
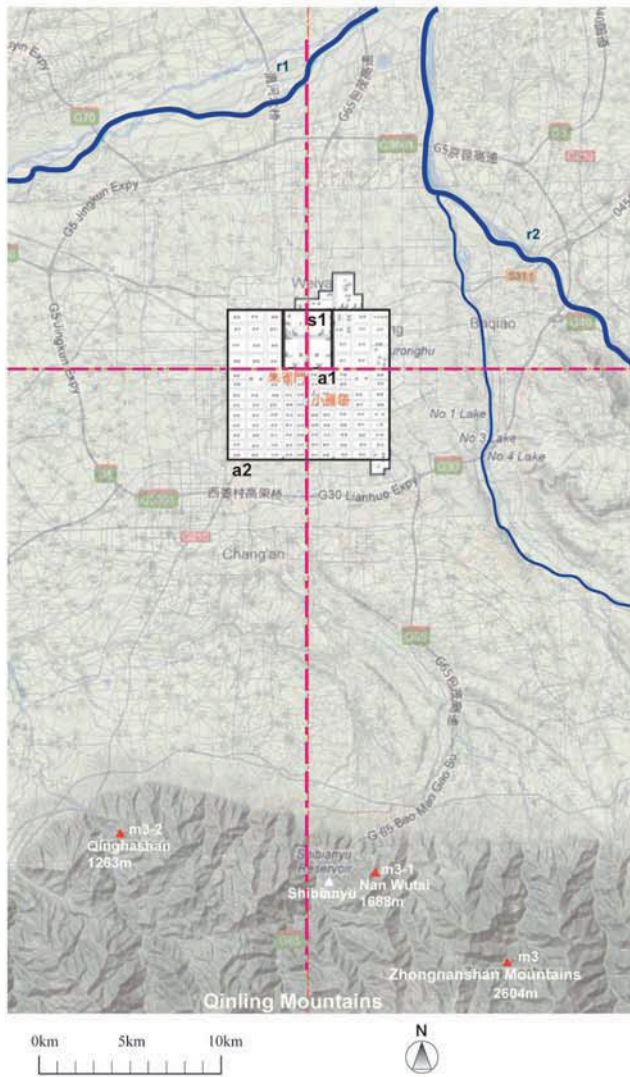
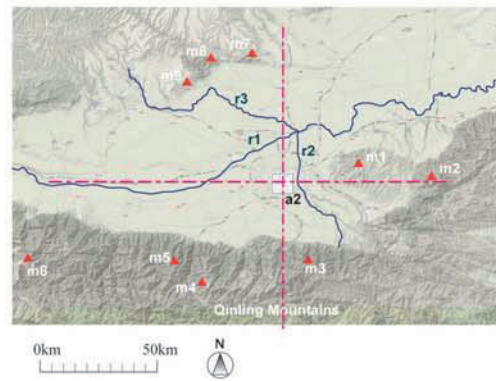


Fig. 1 Enclosed space model based on Feng-Shui



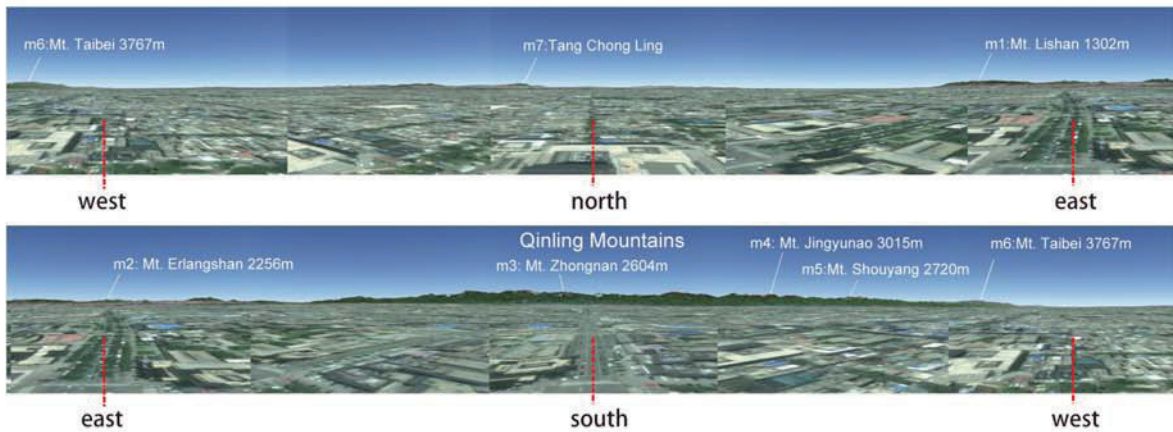
(a) Topographical map of Changan (created based on maps [9, 18])



- m1: Mt. Lishan 1302m
- m2: Mt. Erlangshan 2256m
- m3: Mt. Zhongnan 2604m
- m3-1: Mt. Nan Wutai 1688m
- m3-2: Mt. Qinghashan 1263m
- m4: Mt. Jingyunao 3015m
- m5: Mt. Shouyang 2720m
- m6: Mt. Taibei 3767m
- m7: Tang Chong Ling
- m8: Mt. Laolongshan
- m9: Zhao Ling
- r1: Weihe River
- r2: Bahe River
- r3: Jinghe River
- a1: Imperial Palace
- a2: Tang Changan area [19]
- s1: Imperial Hall

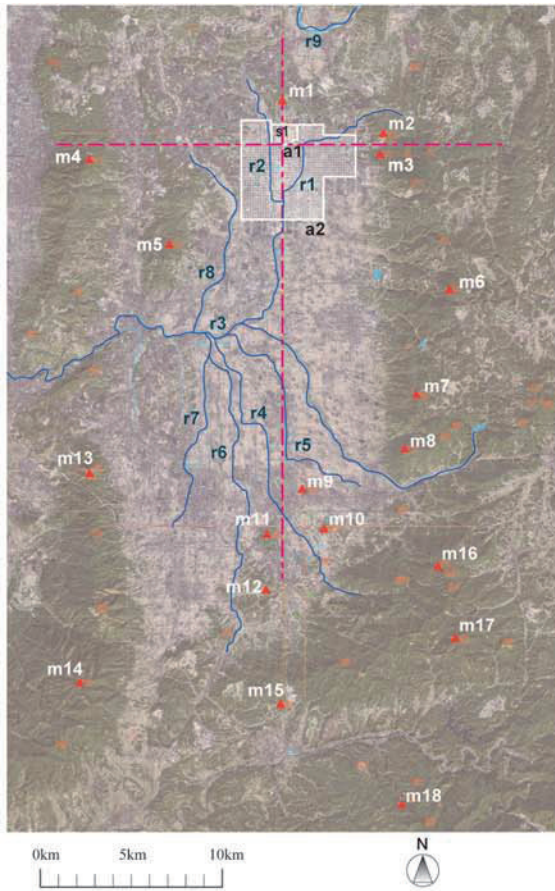


(b) Taibien Celestial map and topographical map [4, 10]



(c) Panoramic Views of Changan from former Imperial Palace (altitude 400m) created based on Google Earth

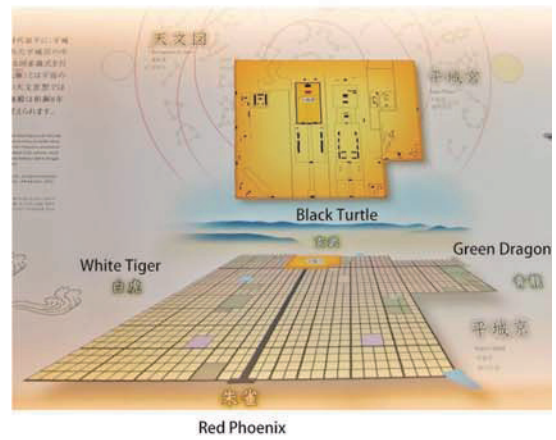
Fig. 2 Landscape and Feng-Shui interpretational diagram of Changan



- m1: Mt. Nara 90-100m
- m2: Mt. Wakakusa (Mikasa) 342m
- m3: Mt. Kasuga 297m
- m4: Mt. Ikoma 642m
- m5: Mt. Matsuo 315m
- m6: Mt. Takamine 632m
- m7: Mt. Ryuo 585m
- m8: Mt. Miwa 467m
- m9: Mt. Miminashi 139m
- m10: Mt. Amanokagu 152m
- m11: Mt. Unebi 199m
- m12: Ochioka Hill 150m
- m13: Mt. Futagami 517m
- m14: Mt. Kongo 1125m
- m15: Mt. Atago 258m
- m16: Mt. Otoha 851m
- m17: Mt. Ryumon 904m
- m18: Mt. Yoshino 500-900m

- r1: Saho River
- r2: Akishino River
- r3: Yamato River
- r4: Asuka River
- r5: Tera River
- r6: Soga River
- r7: Takada River
- r8: Tomio River
- r9: Kidu River

- a1: Imperial Palace (present-day Nara Palace site)
- a2: Heijyo-kyo area
- s1: First Imperial Hall

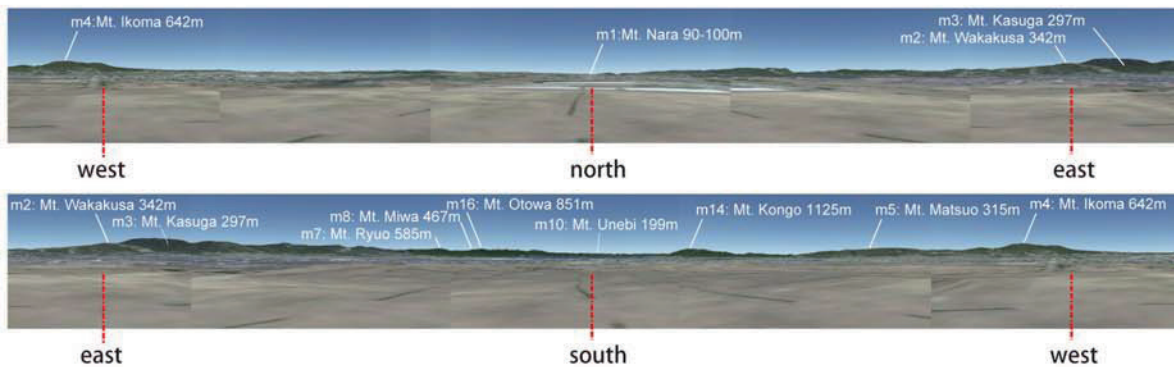


(a) Topographical map of Heijyo-kyo (created based on maps [14, 18])

(b) "Shijinsoo" and Heijyo-kyo (display in the First Imperial Hall, Daigokuden)



(c) Panoramic View of Heijyo-kyo from First Imperial Hall (altitude 72m) (created based on photos by author in 2012)



(d) Panoramic Views of Heijyo-kyo from Nara Palace Site (altitude 68m) (created based on Google Earth [18])

Fig. 3 Landscape and Feng-Shui interpretational diagram of Heijyo-kyo

Notes

1. Please refer to our previous studies [1, 2] for more information about the basic concept of Feng-Shui and ideal Feng-Shui models.
2. Heijo-kyo was divided by Suzaku Boulevard, the western part of the city was called the Right Capital, and the eastern part the Left capital, which together measured 4.9 kilometers from north to south and 4.3 kilometers from east to west. The Left Capital had an extension, called Gekyo toward the east on its northern half.

References

- [1] Tembata, H and Okazaki, S. *Enclosed Spaces for Seoul and Kyoto Based on Feng-Shui*. "Architectural Cultural Translations through the Silk road," Bahcesehir University Press, pp.45-54, 2011.10
- [2] Tembata, H and Okazaki, S. *Enclosed Spaces for Seoul and Kaesong based on Feng-Shui*. *InterCultural Understanding*, Vol. 1, pp.89-97, 2011.3,
- [3] Watanabe, A. Structure of Heijo-kyo. *Period of Heijo-kyo*. pp.26-32, Yoshikawakobunkan, 2010
- [4] Murayama, C. *Chousen no Feng-Shui*. Government-General of Korea, 1931 (1971 reprinted edition) (In Japanese)
- [5] Huang, Y. *Feng-Shui City -Spatial Composition of Historical City*. Gakugei Shuppansha, 1999 (In Japanese)
- [6] Watanabe, Y. *Feng-Shui and East Asia*. Jinbun Shoin, 1990 (In Japanese)
- [7] Mezaki, S. *Illustration Feng-Shui studies*. Tokyoshoseki, 1998 (In Japanese)
- [8] Yoon Hong-key. *Geomancy and Cities: A Preliminary Inquiry into the Origin of Chinese Geomancy and Its Application on City Locations in East Asia*. *Urban Morphology and the History of Civilization in East Asia*. International Research Center for Japanese Studies, 2004
- [9] *Maps of Chinese mainland on a scale of one to 50000 No.7*. Kagakushoin, 1997 (In Japanese)
- [10] Miura, K. *Lecture about Feng-Shui*, Bungeisyunju, 2006 (In Japanese)
- [11] Seo, T. *City Planning of Changan*. Kodansha, 2001 (In Japanese)]
- [12] Atago, H. A study on the central axis of Sui and Tong Changan for city planning. *Studies on Tong History*, No. 3, 2000
- [13] Makio, R. *Discussion on Feng-Shui Thought*. Sankiboubusshorin, 1994
- [14] Geospatial Information Authority of Japan. Topological map of 1:25000. 2010 <http://www.jmc.or.jp/map/gsi/25k.html> (3/2012)
- [15] Teramoto, K. Study on Feng-Shui No.2, Genealogy of Four Celestial Animals No.2. *Shiseki and Bijyutsu* No.75 (9), 2005 (In Japanese)
- [16] Shimizu, Y. Thought tied to the earth, Shijin and Sanzan. Sijin, Black Turtle on fresco in Kitora ancient burial mound. Nara National Research Institute for Culture Properties, 2007 (In Japanese)
- [17] Huang, Y and Honda, S. Site Selection and Planning of The Center Lines of Ancient Japanese Imperial Capitals: Feng-Shui thought and ancient capitals' city planning. *JOURNAL OF ARCHITECTURE AND PLANNING (Transactions of AIJ) No.474*, 1995 (In Japanese)
- [18] Google. *Google map*. <http://maps.google.co.jp/>(13/3/2012)
- [19] Zhu shi Guang. Urban Development and Cultural Change in Xian. *Urban Morphology and the History of Civilization in East Asia*. International Research Center for Japanese Studies, 2004 (In Japanese)

“THE IMAGE OF THE WORLD” OF THE TRADITIONAL LIVING SPACES IN JAPAN: COMPARING TO THE ONE OF THE DESERT CIVILIZATIONS

Takashi Doi

Professor Emeritus of University of Shiga Prefecture, Japan

Keywords: image of the world, traditional Japanese living spaces, closure of the domain, connection toward outside, Roman templum, hieroglyph of “city”, forest civilization, Shinto shrine, Utaki, horizontal direction.

Introduction

This thesis is intended to clarify the characteristics of the Japanese traditional living spaces by comparing to the ones of the four major civilizations; those are the desert civilizations and their descendants. I believe that the content of “the image of the world”, which people are holding, makes the differences of the characteristics of the living spaces in fundamental way.

“The image of the world”, found in the traditional Japanese living spaces, seems to be entirely different from “the image of the world” of the other major civilizations. To clarify what are the differences and why are they caused by is the theme of this thesis. As a result of this kind of research we can expect to find more precisely the unique characteristics of the traditional Japanese living spaces. The following is a short summary of a part of the thesis^[1].

When we try to understand and analyze living spaces of human settlements, such characteristics as “Closure of the Domains”, “Center of the spaces” and “Connection toward outsides” among others would have to be necessary to be discussed. “Closure of the domains” concerns how are the living spaces enclosed and separated from the outside world, composing their own territory. It relates to the feeling of safety for the residents inside, physically as well as psychologically, guarded in their own territory. “Center of the spaces” concerns spatial structure of the domains. It especially relates to the location and direction of the otherworld and the site of the main facilities such as churches, shrines and palaces of the rulers. “Connection toward outside” concerns the relationship to the outer world through paths and entrances. Characters of the entrance of the domains and relations to the outside world through paths would establish characters of the living spaces to the outer world. In this thesis the above characteristics are to be discussed in the followings.

Other characteristics such as “Inside structure of the path and network” should also be another field to be discussed. It relates to the relationship between elements of the spaces, which may show the inner structure of the space. The time concept should also be discussed. However they would not be included here, since we do not have enough space in this thesis.

“The Image of the World” in the Traditional Japan as the Forest Civilization

The climate of Japan is humid and rather hot in summer, somewhat like subtropical. It is cold in winter but not too severe. Such climate with rather high precipitation and temperature in summer fosters rapid and vigorous growth of trees and forests. It has cultivated and developed a forest civilization since the beginning of the history. The topographical features

of Japan forced the people to live in the valley areas or the basins, making their villages and towns there from the beginning of the history. These living spaces, therefore, had always been surrounded by green mountains and forests. People had felt safe and intimate in the enclosed domains by green hedges of mountains and forests as their own territory.

Closure of the Living Spaces

“The image of the world” for the traditional Japanese, thus, would have been the place surrounded by green mountains and forests. My point, furthermore, is that the image had prevailed on all levels of living spaces in the traditional Japan, from the levels of regions, capitals, great kings’ palaces, shrines and sacred spaces, villages and houses to rooms.

At first we are going to see at the regional level: An important and famous poem on the ancient capital region Yamato (today’s Nara) in the “Nihonshoki 日本書紀”, the first official chronological history book of the Nation, shows the image of the area among the ancient Japanese. It praises the land for the topography of the basin surrounded by the green mountains. The poem written in Japanese is; “倭は 国のまほらま 疊づく青垣 山籠れる 倭し麗し” The English translation of the poem is; “Yamato is the real basin of the country. It is surrounded by the overlapping mountains like green hedges. Yamato stayed inside of mountains is beautiful.” This poem was sung by the great king (the Emperor) standing at the top of the hill overlooking the land at the important magical ceremony called “Kunimi 国見” (seeing the land) in order to award magical power of green leaves, trees and mountains on the land to bring great harvests and fortunes. He sung the poem praising the land for being surrounded by mountains like green hedges. The name “Yamato” itself means the place surrounded by mountains. These facts mean that there must have been an understanding that such topography was appreciated supremely at that time. Many other poems and articles praising such places with the similar topography are found in the Nihonshoki and other ancient writings such as the “Manyosyu 万葉集”, the first official anthology of poems.

At the capital level; the same recognition on the image of the spaces was also seen. The second official history book “Syoku-Nihongi 続日本紀” mentions that the site of the first nation’s grid-iron style capital city Fujiwara-kyo was selected on the reason that it was surrounded by



Fig. 1: The Image of the world in the forest Civilization



Fig. 2: Cross section of villages in the forest civilization

important and beautiful mountains. The capital and its palace are also praised highly for its location surrounded by mountains in a poem in the Manyosyu. The capitals of Nara and Kyoto were selected on the same process and recognition. Actual topography of Nara and Kyoto, as all you know, is same as these poems and articles praise and describe.

At the level of the Great Kings’ palaces; the names of the palaces in ancient time are given in the Nihonshoki and another old history book, the “Kojiki 古事記”. They are mostly related to green hedges such as “磯城瑞垣宮”, “卷向玉垣宮”, “丹比柴垣宮”, “泊瀬列城宮” etc., all of which mean having green hedges around the palaces. These green hedges must be the boundaries of the palaces which are the sacred areas. Other names of the palaces have names of trees like “磐余稚桜宮”, “磐余甕栗宮”, “樟葉宮”, “磐余池邊双槻宮”. These facts show that

these palaces had been surrounded by green hedges and trees, some of which must be considered as the sacred trees on which the gods descended to guard the palaces.

Another poem about a great king's palace is sung in the Kojiki as follows; “纏向の 日代の宮は……竹の根の 根垂る宮 木の根の 根蔓う宮……新嘗屋に 生い立てる 百足る 槻が枝は上つ枝は 天を覆へり 中つ枝は東を覆へり 下つ枝は 鄙を覆へり……” The translation in English is; “the Hishiro Palace in Makimuku is …… the palace with deep roots of bamboos, with expanding and crawling roots of trees……the upper parts of the hundreds branches of the huge zelkova tree, standing nearby the ceremonial house, cover the Imperial regions; the middle parts of the branches cover the eastern regions; and the lower parts of branches cover the western regions of Japan ……”.

From this poem we can see the palace of the great king is surrounded by thick bushes of bamboos and other huge trees. And there grew a huge zelkova tree standing by the ceremonial house to protect the palace, from which the country was ruled. It must be considered that the ancestor gods were coming down on the tree. This poem also shows very vividly how the palace is surrounded by trees and woods.

At the level of the shrines and sacred spaces; the Shinto shrines in Japan are either at the foot of mountains or surrounded by woods and forest on the flat lands. The original locations of the Shinto shrines had been in the mountains and forests near of the settlements without any building. The physical or geometric centers of the Japanese living spaces are only void. Central qualities are in the physical and geometrical peripheries of mountains and forests.

The “Utaki 御嶽” in Okinawa, which is considered to be the original form of the Shinto shrine, consists of a void in the center, which is used for the ceremony space, and surrounding sacred bushes. It would be the prototype of the image of the world in Japan.

At the level of villages and houses; in ancient time and the medieval period, whole villages were surrounded by trees, woods and mountains. Some villages were divided into parts, and each part was enclosed by woods. In case of the villages where scattered individual houses were prevailing, composing scattered villages, most houses had rather large lots and had been surrounded by woods called “yashiki-rin 屋敷林 woods around a residence”.

At the level of rooms; all Japanese houses have always had a reception room called “zashiki 座敷”, which is considered most important room of the house. Buddhist temples also have the ceremony room called “hojo 方丈”, which is also used for receiving guests. These rooms always have gardens in front, since it is considered to be very important to show guests the best spaces of the buildings surrounded by mountains, woods, trees, rocks and water. The Japanese had thought that they should receive guests in the room where the image of the world be seen. You will see many such gardens of the Buddhist temples in Kyoto or everywhere in Japan.

Thus almost all levels of the traditional living spaces in Japan had been surrounded by green trees, woods, forests and mountains. Thus the people in the traditional Japan have come to conceive such image of the world, reflecting topography and their own living spaces.

A researcher^[2] made a hypothesis that the ancient Japanese had considered such topography of Yamato as a womb of mother, inside of which they felt to be perfectly guarded safely. There actually were some other evidences that archaeological remains of the houses in the Jyomon period (BC.10,000~BC.3000), which were pit dwellings with thatched roof, were considered as wombs of the Great Mother by the people of the time.

Centers of the Spaces

Another character of the image of the world is how are the central matters located.

The first capital area of ancient Japan in Yamato were created at the foot of the mountain, The god of the area, "Oomononushi, 大物主神", had been enshrined in the Mount Miwayama, where the god had protected the area as a whole. He had also guarded the area at the both entrances from the east and west of the basin against entering evils from outsides. See fig.1.

In the traditional Japan the dead persons had usually been buried in the woods of the mountains behind the villages, becoming ancestor gods to guard the villagers who are the descendants. The people in the traditional Japan have considered that the mountains behind the villages were the sacred places where their ancestor gods dwell, and the mountains had special power, a kind of mana, to revitalize everything and to produce blessings and fortunes.

Oomononushi in Yamato is one of the most important figures of such ancestor gods. The ancestor gods in the mountains behind the villages, after staying there for some time, go to the otherworld of upper grade in far distant place over the sea called "Tokoyo 常世", which is called "Niraikanai" in Okinawa. Thus the otherworld of Japan had double structure. The one is in the mountains behind the villages and the second is in far distant over the sea.

Both are in the almost horizontal direction, as against the vertical direction of the Heaven and Underworld in the desert civilizations. So the direction which the people had consciously or unconsciously perceived as main structure of the world is horizontal in case of Japan rather than vertical as in the desert civilizations.

The locations of the otherworld such as the cemetery and the Shinto shrines are in the outer edge or out of boundary of the actual living spaces, not like in the center of the living spaces connecting to the Heaven like in the desert civilizations.

We can see the locations of the Shinto shrines at the foot of mountains throughout the times and places in Japan. Most Shinto shrines of villages are always in forests at the outer edge of their boundaries. One of the most important Utaki in the Kutakashima-island, Okinawa, is in the bush far distant from the village. The location of other central functions such as the palace or castle of the ruler is also usually at the outer edge of the living spaces.

The area of the otherworld here is rather large and its boundary is vague, since they are in mountains or over the sea. There is not any clear mark or boundary which demarcate inside from outside. The shape of the living space is vague and amorphous. In case of the desert civilizations the boundary of the city is very clearly marked and distinguished by the city walls which protect inside from evil outside. The shape of the living space is geometrically clear.

Connection toward Outside

Usually a main trunk road goes through in the Japanese villages, towns and cities. It is protected from various evils of outside world by the ancestor god at the both entrances of the road. The outsides of the entrances are the unknown evil world. In Yamato, the first capital area of ancient Japan, the ancient highway no.1, called Yoko-ouji which means lateral highway that goes through east-west direction of the Nara-basin. Oomononushi, the god of the area, is also enshrined at the both entrances to the basin at Sumisaka on the east entrance and Osaka on the west. Therefore the image of Yamato (Nara) is like the figure 1.

The Image of the World in the Desert Civilizations

Now, how “the image of the world” in the other major civilizations, namely the desert civilizations and their descendants, would be?

In the desert man is surrounded by only sand all around him. He is in the center of the world. All he can see are only the horizon surrounding him except full of sand, and the scorching sun above his head high in the sky. Surrounding desert is considered as evil or chaos bringing him many troubles. Thus in the desert areas their world consists of man himself in the center, the horizon surrounding him, and the sun above him. Thus the image of the world is a circle of the horizon, where two crossing lines are inside; the one as the locus of the equator of the sun and the other as the axis of rotation of the sun, dividing the circle into four parts.

There are some proofs of such image of the world in the Desert Civilizations. They are the Templum of the Earth and the Templum of the Sky in the Roman period, which were used for augury for selecting the location or direction of the city or buildings in the ancient Roman period. It would be possible to say that the ancient Roman imaged the world like the figures below. Some engravings and drawings show that not only ancient Roman but also the Medieval Europeans consider Rome and Jerusalem circles.

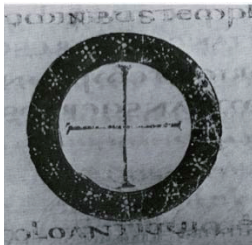


Fig. 3: Roman Templum of the sky^[3]



Fig. 4: Roman Templum of the earth^[4]



Fig. 5: Egyptian hieroglyph meaning “city”^[5]



Fig. 6: Assyrian relief showing city life^[6]

These desert civilizations are urban societies. They invented the cities for their living places. The living spaces here were always surrounded by solid and strong city walls, which guarded the inside and separated it from the outer chaotic desert. To live in a city is their inevitable choice to survive in the desert, since it is safe inside of the city walls in the chaotic environment of the deserts. According to Mircea Eliade the city is always a copy of “the image of the world” in the ancient time and everywhere in the world.^[7] Thus the image of a city is identical to the image of the world in its composition. The hieroglyph of the word “city” in the ancient Egypt is shown in the fig.5 above. The bas relief on the orthostat, showing the Assyrian city life, gives another proof, which is shown as two crossing roads inside a fortified circle like the fig.6 above. They are identical to the image of the world of the figure 3 and 4.

Since this figure is considered as the image of the world in Assyria, in Egypt and in Rome, we can say that it would be so throughout the Middle East and the Mediterranean region. Their domains are enclosed by the rigid city walls in order to protect their living spaces from the attacks of enemies and other evils from the surrounding deserts.

In the image of the world the God is supposed to be in the Heaven vertically upward of the crossing. In the center of the crossing, man is standing facing the

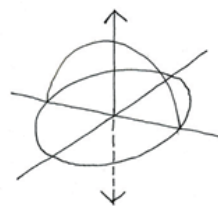


Fig. 7: The Image of the world in the desert civilizations



Fig. 8: Cross section of the city in the desert civilizations

God up in the Heaven. It is also considered the Underworld vertically down beneath the earth. Thus the vertical direction into the sky and the underworld is perceived by the people there as the direction to the God and the otherworld.

Almost all the houses in the desert civilizations are the courtyard type, surrounded with thick exterior walls without any opening except an entrance. These walls around the houses are identical to the fortified city walls. The central courtyard connects outside only to the sky where the God is. So the image of the house is almost identical to the image of the city. The house copies also the image of the world.

Other examples of the spaces which are connected to vertically upward direction of the Heaven is the great Nave of the Hagia Sophia, the nave of the Gothic cathedrals and the Naos of the Parthenon, where light from the Heaven come down from the top of the rooms, whose walls are enclosed by thick walls.

The degree of separation of inside from outside is very clear and rigid in both cases of cities and houses. Both in case of the cities and houses, isolation and separation of the inside seems to be more conspicuous and complete than the connection to the outer world. The ceremony of the creation of the city of Rome which is described in Plutarch^[8] seems to show the separation from the outside were thoroughgoing protected by the human sacrifice.

It is true that actual city forms in ancient desert civilizations are often rectangular, not the circle as the image of the world shows. Roman planned towns, which were originated from military camps, have also grid-iron square forms. The necessity as military camps made the plan. Babylon and Assyrian towns have also rectangular shapes. But the image of the people about the towns would have been circle as shown in the slides.

Conclusions

The author has shown in this thesis what “the image of the world” of the traditional Japan is like, and that it is almost opposite in structure to the one of the desert civilizations. This can explain the unique characteristics of the Japanese traditional living spaces. The Japanese people had been keeping such image of the world before the modern period began. It had become the basis for making their living spaces consciously or unconsciously..

This can explain the horizontal character of the Japanese living spaces in their expression, and their lack of the image for vertical direction. It can also explain the taste to make the living spaces to be penetrated into the surrounding nature through wide openings toward gardens. It seems obvious that such character comes from the fact that the image of the world in the traditional Japan is horizontal and surrounded by woods, forests and mountains.

References

- [1] Doi, Takashi *The Doctoral dissertation* submitted to the Kyoto university at 1994 (in Japanese)
- [2] Yoshino, Hiroko *Zouho, Nihon Kodai Jyujyutsu (Japan's ancient magical rituals, enlarged ed.)* (in Japanese) Daiwa-syobou, 1994
- [3], [4] Rykwert, Joseph *The Idea of a Town – The Anthropology of Urban Form in Rome, Italy and the Ancient World* The MIT Press, 1975
- [5], [6] Benevolo, Leonardo *Storia della città* (in Japanese translation) Editori Laterza, 1975
- [7] Eliade, Myrcea *The Sacred and the profane* (in Japanese translation *Sei to zoku - syukyoteki narumono no honsitsu nituite* Hosei daigaku syuppanyoku), pp. 35~41
- [8] Rykwert, Joseph *ibid.*, pp. 27~29

VILLAGE HABITATIONS OF HOWRAMANAT VALLEY, IRAN

Majid Ziaei

Tehran Art University and Tehran University's International complex- Kish, Iran

Keywords: village habitations, local knowledge, Howramanat, local architecture

Abstract

In immigration habitations for supplying vital needs such as primary needs, foods, security, and rest, human being could find habitations which they didn't require to long-term immigrations and meet his needs from potentials of the selected nature. These habitations are often called village in different cultures, which this term means place of growth and spring in Persian language.

Villages are considered as centers for agricultural, livestock, handcrafts, and food needful production needs of 75,000,000 population of Iran. In the other words, they can be considered as a center for producing wealth and value added of the country because there is gained about one third of Gross National Product (GDP) from villages, despite low investment comprising with cities. Values of such habitations are decreasing by considering unbridling system of early efficiency and promoting consumer patterns.

Village of Howramanat Valley in west of Iran within Zagros Mountains are part of these habitations which they have kept traditional permanent system of their life, because of very difficult access. They have used from local knowledge and technologies of very rare available materials, because of natural resource limitations, which this matter must be considered in permanent development.

Introduction

Village is resultant of artificial and natural heritage which it is programmed and constructed based on a comprehensive system. Artificial heritage is formed based on tradition. Tradition is a hidden and direct factor which it is current in heart of the society culture which it is emerged as affected material and spiritual forms from needs and values and based on requests and desires of people. It is finally combined with happiness, pains, and rest of human beings and creates an ecology pattern which following this pattern guarantees survival and developing life of people in each region. Experiences and findings of deceased support from this pattern which it is for permanent exploiting from environmental resources and avoiding natural obstacles. Sometimes the patterns seem illogical and/or severe, but clear reason of these severs is long alternation of occurring environmental obstacles. These environmental patterns are often explained as local knowledge in facing with all life's dimensions which its training and transition method is as word-of-mouth as which its understanding is difficult and time-consuming technique for un-local people.

Word-of-mouth training method is more possible in rural social systems because inhabitants of a village are considered as a united society from different ages in these systems with common interests and their survival is depended on collective life, because rural social

system can response to nature potentials. They cooperate in conducting works and they train each other by considering age level and all of them, from a child to an old man are responsible for a work. Although this powerful education system has been cut by considering immigration of adults to cities which this matter threatens future of rural habitations and production system.

A part of these habitations is their architectural body. Rural architecture has a simple and uncomplicated in first vision, but by searching its depth and scope shows that it is a complicated and shaped result of thought, effort, and error of human beings in scope of rural regions. Rural architecture is result of thought, cognition, and experiences of continuous generations which it has been appeared in thoughts of the current generation and used in creating inhibitions. Briefly, rural architecture is easy yet difficult to imitate which rural wisdom and thought has responded to the complicated problems of housing and environment through effective solutions of the environment materials and facilities. Rural residence and architecture response to needs of rural society about natural factors, living type, and production form and it has qualitative, spiritual, and social requests. This architecture is emerged by integrated cooperation and management of rural people in scope of function and experience. It inspires from their daily life and it is united with its environment without any ostentation, and it creates an appropriate space for living finally.



Chart 1: Effective Factors on Configuration of Rural Body

Rural body is affected by geography, economy, society, and culture factors in the worldwide. Although there is available other effective factors, but don't have continuous effect and are studied as case studies.

Howramanat

Plant growing structure of the Iranian Plateau includes mountains which they have effected emerging environmental resources and habitations regionally and locally. Zagros Mountain is one the most important these mountain chains which it has provided Mediterranean and the Black Sea flows because of its location against Mediterranean flows and appropriate height. It has created appropriate ecological conditions (temperature, humid, raining rate, radiation rate, and wind) in its eastern side which has prepared environmental resources for humans and animals with special obstacles. Howramanat is a long valley in this mountain chain which it is beginning from Zor city in Iraq and it is entered to Iran through western sections of Kurdistan and then it continues from Kermanshah to Paveh as linear.



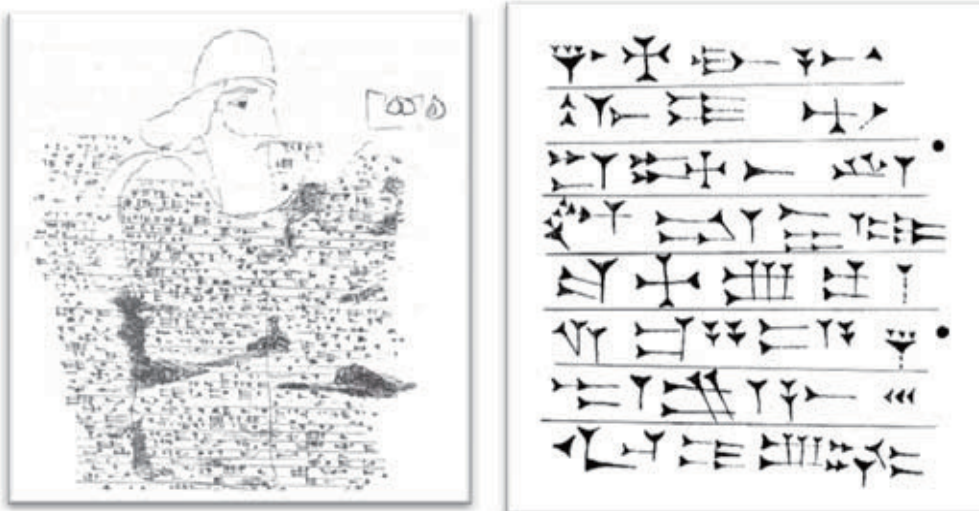
Figs. 1 and 2: Location of Auramanat in Iran and Iraq
 This picture shows approximate location of Auramanat according to studies of the writer and based on Howrami dialect, because of lacking necessary and appropriate studies for identifying careful location of Auramanat

Howramanat is a wide scope of the Iranian Plateau which most of it is a valley shape, in the other words, it is located between two mountains (Koh Salan and Shahoo) and its another part is as plain. This scope has been one of the major habitations of ancient Iranian people and then it was habitation of Aryan immigrant tribes. Reason of such a complaint is the valid archeological documents which there are pointed out two cases in the following:

1. Howraman deeds
2. Raised Design and stone epigraph of Zeinaneh Mountain in Howraman.



Figs. 3 and 4: Tittle Deeds of Howraman
 Part Era (88-87 BC); Topic: selling a land piece in Auramanat; Calligraphy: Pahlavi Party;
 Discovery place: Auramanat; Keeping place: Museum of London



Figs. 5 and 6: Petrograph of Zeinaneh Mountain in Auramanat
Media Era (2500 BC); it can't be provided a careful report, because of lacking archeological

Rural habitation of Howramanat

Habitations of this scope have been formed as rural structure, because of limitation of natural resources and lacking focus available resources on a special field. Villages have been formed based on special resources such as water, appropriate agricultural land, security possibility, grasses, long distance from environmental obstacles such as flood, avalanche and earthquake.

Local population have habituated in three types, because of distance between the resources due to natural specifications and lacking providing a rest scope in a place due to geographical specifications:

- rural
- villa
- mountain summering place (Hawar)

Settlement type in rural habitation

(Winter place) is as nucleus (houses near each other – Fig. 7), as scattered in villa habitations (include farms with separate houses – Fig. 8), and as wide and located near agricultural lands and grasses in mountain habitations (Fig. 9).



Fig. 7

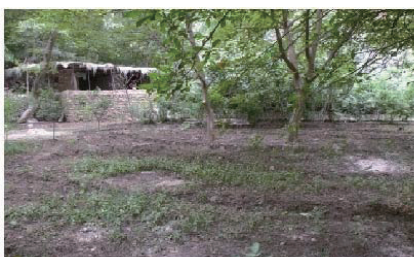


Fig. 8



Fig. 9

Purpose

Such habitations about place finding, architectural technology and life conditions has special points which all of them have been formed based on long-term experiences and permanent patterns in connection with the nature, purpose of this article is to express these points too.

Research Method

The writer has conducted field studies during seven years and has spent long time for gaining patterns and experiences in different seasons and very difficult conditions. He has also done laboratory studies by considering to rare of resources in Kurdish and Persian languages, and has taught local architecture in Faculties of Architecture and Urbanism for five years.

Findings

Although distance between Howramanat rural habitations between 3 and 10 km, but they are very different with each other because of natural and ecological conditions. Some of them are located in high gradient slope or naked mountain peak (fig. 10), some in covered slopes and beside river (fig. 11) and some in uncovered slopes (fig. 12), which they have different form and body by considering to the mentioned effective factors in chart 1.

There is observable unity of artificial and natural elements in Howraman habitations. The both are to take place in the frame, prayer, humility, and uncomparison himself with the God. Such secrets in phenomenon which recall to human beings to travel in the earth, and sometimes which it is coordinated with wisdom, creativity, and secrets, it can provide a time for thinking and recalling the God. They are final goal of Aurami Philosopher.

Aspect of Aurami habitations consider viewer as main player of the scene through a smart relation; set him to search by its attractive landscape; provide long-distance perspectives in order to think deeply; present the place marvelously; the viewer will be free, apogees, but finally he admires the landscape and the Creator.

Communicative artery of the structure is based on or parallel with rate curve and it follows with topography completely. Passages are narrow and short and their direction is often eastern-western.

Bed of passage are often roof of the opposite neighbor or natural stone. There is used from surfaces for involving feet in passages is vertical rate cure which their direction is northern – southern. Arteries is vertical slope are sharp and long which they are often for guiding floods, transporting animals, and sewage disposal. Main communicative arteries between villages pass from the highest village height rate (villages near river) to the lowest one (villages in heights) and this artery doesn't often break nuclear artery (except in special villages). There is a center of quarter in villages. This center is very important for village because of its unity functions, providing consumed and service needs of quarter and daily social communications. Limitation ratio (ratio of buildings' height to wide of passages) is larger than 2 and smaller than 8. The passages have perspective in one side and it is observed back of the opposite building in the other side.



Fig. 10



Fig. 11



Fig. 12

Conclusion

Local knowledge has been able to keep life continuous in this region despite all natural obstinacies and ecological problems, so it is very important and must be considered in development programs. Matters such as considering to the land apparent potentials, considering to resources' survival for future generations and appropriate exploitation from these resources, avoiding natural obstacles which they are providing severe threads for human and animal life, usage from local materials, and considering to cultural and social matters can result permanent development for this region and avoid from consuming threads and destroying these habitations.

3

Modernization, globalization and urbanization

TRENDS OF URBAN DEVELOPMENT PLANS IN HISTORIC AREA IN EAST ASIA

Nobuya Ueda ¹, Shigeki Sugita ²

¹ *Mukogawa Women's University, Japan*

² *Nikken Sekkei Ltd, Japan*

Keywords: Asia, Conservation, Development, Historic City, Style, Water

Introduction

For the most parts of Asian cities in touch with the Silk Road, there sporadically exist the architecture and old urban areas worthy of the historical heritage. Since many cities in East Asia have been colonized and served as concessions, European culture is fused with their own indigenous culture to yield their own characteristic enchantment. On one hand, it is a fact that they were mostly vandalized or illegally occupied to an anomalous state through political and economic chaos for a long time. In such a circumstance, these historical cities continue a rapid economic growth; however, they are unavoidably yielding to the pressure of development under a slogan of improved efficiency in every sense. Despite there are a material movement of ameliorating urban congestion and inviting tourists at home and abroad, there are not a few citizens who choose to preserve the historic views and a traditional pattern of life. Thus, there is emerging a new movement of trying to make development and preservation coexist. Of course, such a movement slightly varies with the nation and the phase of "modernization." In the case of "advanced" countries, people in "developing" countries have already understood certain aspects of such movements as encountered in their own situation. In the case of historic cities, there is a strong indication that such movement should be put on the right axis toward proper development.

With such understanding in mind, the authors have collaboratively undertaken urban design for development of some historic cities. Now is the time for the designers to pore on the trend of challenges and modus operandi common to all these cities.

Objectives and Method

Our research objective is to ascertain whether certain patterns can be found in the approach on the urban design stage for development, innovation or conservation in the historic area and surrounding area. The research is developed through analysis and comparison on the basis of five projects undertaken by us. In a more specific way, client's project specifications and designer's proposals' aspects are closely studied to select the subjects for grouping and analysis [1]. In this connection, it should be noted that these projects are located in different places involving different time and spatial elements, and have their own prerequisites in normative [2] – aspatial [3] aspects, such as values and lifestyles. For the description and analysis in these aspects, our efforts are made to use objective things wherever practicable.

Definition of Historic and Development Areas

There are largely two cases, i.e. where the entire development area is or its sectorial part falls under the historic area (intra district = iTRA) and where the development area abuts on or lies next to the historic area (inter district = iTER) (See Table 1).

Case Study

The selected five projects are briefed as follows; being classified in tables 3 and 4.

1. Osaka Business Park Development Plan (iTER)
 - The vestige of the largest arsenal yard in Asia which was disposed of by the government after the World War II.
 - The property is located next to two large rivers symbolic of Osaka and to the historic premises of Osaka Castle.
2. Protection, Renovation and Development Plan in Xianmen(前門) Area, Beijing(iTRA)
 - There exist the largest “Hutong-Alleys” (胡同)¹ built in Ming Dynasty to provide a lodging place for the examinees for the national “Keju.” (科舉)²
 - The development plan was likely to hollow out the city’s urban axis from the Tian’anmen Square(天安門) to the Temple of Heaven Park (天壇公園).
3. Xi’an Dayanta - Pagoda(大雁塔) District Master Plan (iTRA)
 - Now with six million population, this city was once the capital of the Tang Period and served as the starting point of the Silk Road.
 - The pagoda was a symbolic tower belonging to the temple where the monks translated the Buddhist Bible they carried back from India.
4. Hanoi Lake Guom District Master Plan (iTRA)
 - Centered on a lake, there exist the urban communities formed in the 18th century and a French town district in the 19th century.
 - The historic remains have been ruined by expanded traffic volume and disorderly construction activities associated with the immediate economy liberation.
5. Jakarta Kebon Melati Master Plan (iTER)
 - This waterfront city was called Batavia, which once flourished together with the headquarters of the East India Company.
 - There have been expanded population and disordered ruins of urban environment.

Analysis and Findings

Table 4 is as re-assembled from Tables 1 through 3 from a different angle. In Table 4, development or conservation is categorized into largely three groups; however, the preference orders neither in Osaka and Jakarta nor in Beijing and Hanoi are strictly categorized. Though the Xi’an Plan was commenced with an eye to protect Dayanta - Pagoda from disordered development in the surrounding area, it is categorized in the midway for the reason of the current project scheme being rather newly developed, except for the existence of the north-south axis which connects the current CBD and Pagoda.

Table 1: List of Projects



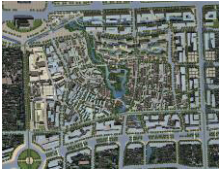
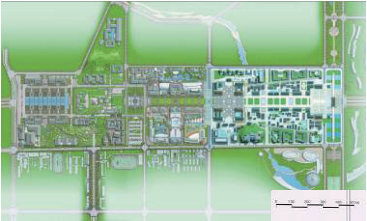


<ul style="list-style-type: none"> • Project Name • Key Plan (1:50000) 	<ul style="list-style-type: none"> • Client 	<ul style="list-style-type: none"> • Scope of Service 	<ul style="list-style-type: none"> • Present Status as of 2011
<ul style="list-style-type: none"> • Osaka Business Park Development plan 	<ul style="list-style-type: none"> • Form of Appointment 	<ul style="list-style-type: none"> • Major Functions 	
<ul style="list-style-type: none"> • Osaka (26ha) • Plannig Period 1969-1976 	<ul style="list-style-type: none"> • Development Comittee (Private) • Nominated 	<ul style="list-style-type: none"> • Master Plan • Detailed Master Plan • Office • Hotel • Commercial • Cultural • Park 	<ul style="list-style-type: none"> • Construction Completed
<ul style="list-style-type: none"> • Protection Renovation and Development Plan of Beijing Qianmen Area 	<ul style="list-style-type: none"> • City Government (public) • Nominated Competition 	<ul style="list-style-type: none"> • Master Plan • Office • Hotel • Commercial • Cultural • Residential • Park 	<ul style="list-style-type: none"> • Study Stage
<ul style="list-style-type: none"> • Dayanta- Pagoda District Master Plan 	<ul style="list-style-type: none"> • Urban Development Company (public) • Nominated 	<ul style="list-style-type: none"> • Master Plan • Hotel • Commercial • Religious • Cultural • Plaza 	<ul style="list-style-type: none"> • Partial Construction by Investors after Preliminary Building Design(16ha)
<ul style="list-style-type: none"> • Lake Guom District Master Plan 	<ul style="list-style-type: none"> • City Government (public) • Nominated Competition 	<ul style="list-style-type: none"> • Master Plan • Office • Hotel • Commercial • Shophouse • Cultural • Institutional • Park • Car/Bicycle Park 	<ul style="list-style-type: none"> • Study Stage
<ul style="list-style-type: none"> • Kebon Melati Master Plan 	<ul style="list-style-type: none"> • PT Trisarana Sumbaga (private) • Nominated Competition 	<ul style="list-style-type: none"> • Master Plan • Detailed Master Plan • Office • Commercial • Cultural • Residential • Park 	<ul style="list-style-type: none"> • Suspended at Preliminary Building Design Stage

Table 2: Pictures and Drawings


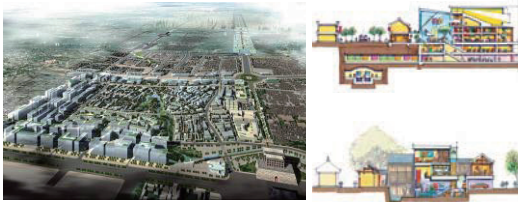






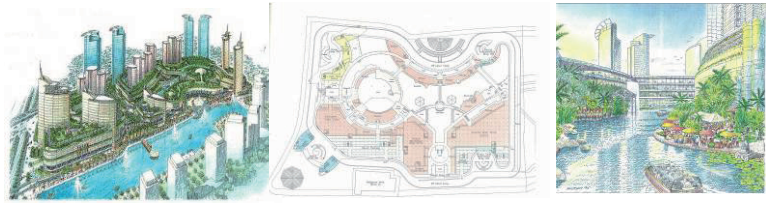
Project Name	Site Condition	Design Proposal	Detailed study/ Implementation
<p>Osaka Business Park Development Plan</p> <p>Osaka</p>			
<p>Protection, Renovation and Development Plan of Beijing Qianmen Area</p> <p>Beijing</p>			
<p>Dayanta-Pagoda District Master Plan</p> <p>Xi'an</p>			
<p>Lake Guom District Master Plan</p> <p>Hanoi</p>			
<p>Kebon Melati Master Plan</p> <p>Jakarta</p>			

Table 3: List of Major Subject and Theme

Project Name	Background <ul style="list-style-type: none"> • Values • Social structure • Institutions 	Physical		
		Fuctional <ul style="list-style-type: none"> • Land Readjustment • Land-use plan • Road/Infrastructure 	Spatial <ul style="list-style-type: none"> • Volume,Height,Wallline • Massing,Allocation • Open-Space, Landscape 	Visual <ul style="list-style-type: none"> • Historical Reference • Mode,Style • Landmark, Vista- Line
Osaka Business Park Development Plan Osaka	<ul style="list-style-type: none"> • Old Capital • Osaka Castle • Water and Rivers 	<ul style="list-style-type: none"> • New Structuterization by through Axis and 5 Superblocks • Business Activities Related Functions 	<ul style="list-style-type: none"> • Walllines and Building Height Control • Volume Reduction toward Riverfront • Open space-Bonus incentive System • On –Site Walkway Network 	<ul style="list-style-type: none"> • Unified Roadside Trees • Guidelines to Color, Signage and Landscaping,
Protection, Renovation and Development Plan of Beijing Qianmen Area Beijing	<ul style="list-style-type: none"> • Keju • Ming Dynasty 	<ul style="list-style-type: none"> • Conservation – Oriented Zoning • Function-based Land-Use Plan • Fire-Protection Zoning • Traffic Plan including LRT 	<ul style="list-style-type: none"> • Vertical Use of Inheriting Siheyuan (四合院)³ • Underground Use • New Store Floor Addition behind Quinmen Avenue • Green-Water Park • Centralized Building Services Sysytem 	<ul style="list-style-type: none"> • Hutong-alley Morphology • Streetscape of Quinmen Avenue in Early 20th C • Fabulous style of Early 20th C Buildings
Dayanta- Pagoda District Master Plan Xi'an	<ul style="list-style-type: none"> • Chinese Buddhism • Tang Dynasty • Changan(長安) 	<ul style="list-style-type: none"> • Tourism-oriented Zoning • Vehicular Movement • Mini-Transport 	<ul style="list-style-type: none"> • Dayanta Pagoda-North Water Plaza • Dayanta Pagoda-South Walkway and Plaza • Semi-enclosed Changan's Fang(坊)⁴ System • Water Channel • Wallline/ BuildingHeight 	<ul style="list-style-type: none"> • Scale and Patterns of Historical Zhuque Avenue(朱雀大路) • Tang Style Façade • Desert vs Oasis • Clear Vista to the Pagoda
Lake Guom District Master Plan Hanoi	<ul style="list-style-type: none"> • Millenium Capital • French Culture • River Hongha (紅河) 	<ul style="list-style-type: none"> • Conservation-Oriented Zoning • Reallocation of Building Volume • Man-Vehicle Hierarchy Reissue • Subway-EV shuttle-Cyclo System 	<ul style="list-style-type: none"> • Underground Use • Height and Frontage Control • Physical/Visual Improvement of Shophouses and French Quarter • Conservation and Improvement of Traditional Passages • New Piazzas 	<ul style="list-style-type: none"> • Traditional Shophouse Façade • French/French Colonial Façade • Vista-Lines to Opera House and Cathedral
Kebon Melati Master Plan Jakarta	<ul style="list-style-type: none"> • Batavia • Water and Canals • Mosques, Churches 	<ul style="list-style-type: none"> • Two Ultra- large Superblocks • High Volume Ratio • Multi-Functional and Autonomous Complex Including Vehicular Circulation and Building Services Sysytem • Lake Improvement 	<ul style="list-style-type: none"> • Podium-Tower Composition • Roof Garden atop of Horizontal Podium • Curve-Lineal Canal for Amusement and Customers Movement • Lakeshore Terrace 	<ul style="list-style-type: none"> • Radiant Allocation of Vessel-Imagery Office,Hotel and Residential Towers • Shade,Flowers, Waterfall and Void Space

Table 4: Classification of Project Contents

Aspects Conceived	More Development-oriented Project ← → More Conservation-oriented Project				
	Functional Aspects	Building Type, Height, Coverage Ratio, Traffic Infra-structure, Promenade	Building Type, Traffic, Infrastructure, Roof-Garden, Intra-Traffic System	Culture and Tourism-Oriented Facilities, Walkway, Mini-Tram	Building Type, Soho, Addition to Siheyuan, Centralized Building Services, LRT
Visual Aspects	Castle*, River*, Wallline	Canal*, Ship Morphology, Water, Massing, Water-use	Dayanta-Pagoda, Chanan's Fang System, Tang Style Façade, Wall line, Water-Plaza	Hutong, Siheyuan, Quinmen Style, Green-Waterpark	Lake Guom, Shophouse Façade, French-style Façade, Height and Frontage
	Osaka	Jakarta	Xi'an	Beijing	Hanoi

* Items outside the project boundaries

Based on the foregoing analysis, trends in these urban design cases may be found as follows:

1. Trends as viewed from the Development-Conservation axis
 - For those cities where historical buildings, establishments or settings are sparse, they are naturally development-oriented, with efforts driven to setting up urban “functions”. Simultaneously, they tend to create their own distinctive “visual” environment by taking natural elements, such as rivers and water, to their advantage (O, J)
 - For those cities where traditional modes of living and buildings are abundant, they are apt to make efforts to conserve them. Then, they tend to introduce new “functions”, while keeping the modes intact and sometimes they try to uphold the “visual” elements, including facades. (B, H)
2. Trends as viewed from the Functional-Visual axis
 - In every case, it seems that improved functions are ranked top. For the “development”-oriented cities, characteristic are the improvement in intra-traffic and higher-density land use. For the “conservation”-oriented cities, characteristic are the improvement in tourism functions, monumental walkways, and mall-like shopping streets. (X, B, H)
 - As for the improvement in a visual aspect, building height and setback restrictions are commonly observed. In the cities of sparse historic relics, but strongly “development”-oriented, it is not rare that a brand-new visual image is introduced in a habitants’ mode of living. In the cities tending to preserve the “conservation”, it is not rare that restrictions are imposed on the frontage of buildings. (J, H)

What is demanded of us is to reappraise the indigenous history and nature likely to be lost in the urban development and make them serve for modern urban functions and urban landscape. As described above, the authors have verified alternative judgment of the conservation or development having not yet employed in rapidly developing Asia.

Notes

1. The traditional foot-pass created by the group of Siheyuan
2. The imperial examination system in historic China
3. The traditional courtyard house
4. The traditional wall system surrounding the city block

References

- [1] Frampton, K. et al. (Ed.), *Nikken Sekkei - Building Modern Japan 1900-1990*, Princeton University Press, 1990.
- [2] Rapport, A., *Culture, Architecture, and Design*, Locke Science Publishing, 2005 (Translated into Japanese by Oono, R. et al., *Bunka ,Kenchiku, Kankyo Design*, Shoukokusha, 2008.)
- [3] Foley, D.L., An Approach to Metropolitan Spatial Structure, *Explorations into Urban Structure*, pp. 21-78, University of Pennsylvania Press, 1968.

STUDY ON REVITALIZATION OF HOUSING COMPLEXES THROUGH UTILIZATION OF OPEN SPACES BASED ON RESIDENTS' ACTIVITIES

Shigeaki Takeda

Museum of Nature and Human Activities, Japan

Keywords: open space, revitalization of housing complexes, residents' activities

Study Background and Purpose

Systematically planned housing complexes in housing developments and new towns in Japan were intensively built for a certain period as a part of measures to accommodate a rapidly increasing number of people moving to urban cities. With the rapid change in the social environment after their construction, however, various kinds of problems have emerged in housing complexes, and these have been commonly seen around the world.

There are open spaces in housing complexes which are rich in greenery nurtured over many years and are secure and safe for pedestrians. They now face difficult challenges, such as how they will be preserved, passed on to succeeding generations, and utilized. It has been said that effective utilization of these open spaces may hold great possibilities for efficiently enhancing the value of housing complexes, and have great effects on community revitalization and new lifestyle creation. Moreover, it can be considered that this may also make a great contribution to the revitalization of housing complexes.

Although some studies on how effective utilization of open spaces may contribute to the revitalization of housing complexes have reported the importance of the value of open spaces as natural environments and places with memories to pass on to succeeding generations, few studies have been done to examine the future direction for use of open spaces to meet changing social demands, as well as which characteristics need to be preserved and passed on to the next generation from the viewpoint of the relationship between residents' everyday activities and the open spaces.

In this study, we analyzed the function and management system of open spaces which have survived in housing complexes, as well as their relationship to everyday activities that occur there, and then determined which characteristics need to be preserved and passed on to the next generation. Finally, we explored how open spaces should be revitalized in order to improve the attractiveness of housing complexes as places to live.

Planning and Development of Open Spaces in Housing Complexes and Changes in Their Utilization and Management over Time

In this chapter, we examined what kinds of planning theory and technologies were introduced for constructing open spaces in housing complexes during the period from the end of World War II to the high-speed growth era, as well as changes in their use and management over that period, in order to discern the challenges which open spaces are facing now.

Changes in planning theory for open spaces adopted by the former Japan Housing Corporation, which played a leading role in developing housing complexes in Japan, were

investigated through literature review. At the early stage of development, efforts were made through trial and error to create a good balance between the two functions of dwelling performance, such as ensuring enough sunshine, privacy, and ventilation, and the outdoors to protect residents' everyday activities. As the scale of housing developments became greater, however, open spaces were used to separate certain housing units from others, as well as pedestrians and cars, with an emphasis on creating a community. Furthermore, open spaces in new towns were systematically planned with clear, distinctive roles for parks with different sizes and functions according to the theory of neighborhood units, in which living spheres within walking distance were constructed, and by networking open spaces in the neighborhood unit.

When looking at the use and management of open spaces during the period between 1965 and 1975, the majority of residents were in their 20s and 30s with families. However, in recent years, related to the decrease in children and rapidly increasing numbers of elderly people, the number of single-person households has increased. As a result, the needs for open space use have changed greatly. In addition, a system for voluntary involvement of residents in managing open spaces in each housing complex was adopted at the early stage of development, but this system was abandoned after standardized rules and a system for their management were established as the scale of housing developments and the number of improvements increased.

In this way, systematically planned open spaces in planned housing complexes not only provided dwelling performance, but also served to support residents' everyday activities outside. These functions are still effective, and how they will be preserved and passed on to the next generation is one of the big challenges housing complexes face. In addition, disparities between the planned aims at the time of construction and the current demands for their use have been widening, which indicates that creating a new relationship with fresh use of open spaces that has been adjusted to meet residents' lifestyles and active involvement of residents in their management is another challenge.

Possible Revitalization of Housing Developments through Utilization of Open Spaces Based on Everyday Activities and their Challenges

In this chapter, the relationship between everyday activities of residents and functions of open spaces in Keyaki Dai Danchi, located in the suburbs of Tokyo, was studied. It was chosen as a case study for housing development revitalization, in order to find methods of possible revitalization by utilizing open spaces, as well as to elucidate future challenges.

The questionnaire survey indicated that, although the decrease in the number of children is still continuing, the societal need for open spaces that allow young children to play safely and securely remains high. Especially, there were a large number of young children accompanied by their parents who played in open spaces, such as small play lots where it is easy to look around, suggesting that improving open spaces to meet demands for places for young children to play, while their parents are creating a community at the same time, may be an effective way to enhance the value of housing developments as suitable environments for child rearing.

On the other hand, looking at measures related to the rapidly aging society, it was found that only the introduction of simple health-promotion machines was not enough to attract older people to open spaces. Creation of various functional spaces in a larger open space and segmentation of open spaces by function may draw people, especially older people, to use them. Such multi-tiered use of open spaces by different generations would be not only attractive to older people, but also contribute to forming a multi-generational community, which may be the future direction for housing development renovation.

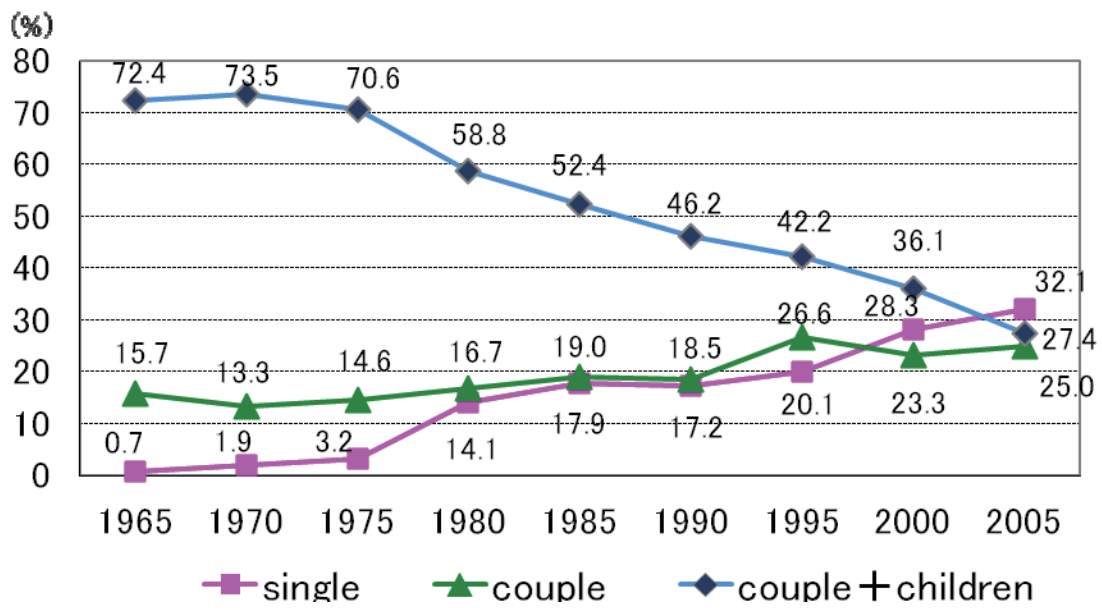


Fig. 1: Changes of family structure at housing complex



Pic. 1: Activities in open space of housing complex (1965)



Pic. 2: Landscape of housing complex (1978)

In addition, the survey indicated that even the same open space had largely different needs for use and function at different times. This showed that the creation of a system for managing and maintaining open spaces based on the situation of each housing development is an important challenge in rejuvenating housing developments in the future.

Possible Renovation of New Towns through Utilization of Open Spaces Based on Everyday Activities and Challenges

In this chapter, we examined the functions of open spaces and the relationship between the system for managing and maintaining them and residents' everyday activities in one section of Senboku Newtown, which is representative of the large-scale new towns developed in the early stages of new town development in Japan, through observation of those activities and an awareness survey on management and maintenance. Then, we considered possibilities for new town renovation using open spaces and deduced their future challenges.

The observations indicated that daily activities were most closely related to housing complex open spaces, and those had more diverse utilization and users in wider generations than public open spaces, such as parks and green walks. In particular, this trend was extremely noticeable in open spaces used for traffic, such as pedestrian ways and roadways. This showed that they function as a safe and secure space for traffic and serve as the foundation for community formation in housing complexes, suggesting that increasing their attractiveness and comfort and improving them to encourage residents' communication may be challenges to be addressed.

On the other hand, although utilization of block parks and green walks was higher, they were used disproportionately for specific purposes by certain groups of users, which suggests that another challenge is to seek new methods for their management and maintenance to accommodate the changing social environment, along with sharing functions based on the systematic layout plan at construction. It is especially important to improve block parks so for multi-generational exchange and usage. Since growth management of secondary forests, preserved at the time of construction, has been one problem, development of a system to allow residents to be involved in the daily management and maintenance of the forests may help older people find a new sense of purpose in life and may satisfy the need for involvement in park management. This would lead to the creation of another attraction in a new town as a place to live.

The awareness survey showed that residents considered rich greenery and the natural environment as one of the leading reasons in selecting to live there. This finding reconfirmed that systematically planned open spaces played a very important role in attracting people to the new town as a place to live. In addition, it indicated that the residents have a high appreciation for public open spaces, such as green walks and parks, as well as private open spaces in gardens and housing complexes, which suggested that a complementary increase in the value and function of open spaces may be an important challenge.

The survey also indicated that residents were most involved in daily maintenance of open spaces, such as weeding and watering, but that there were some residents who wanted more active involvement, such as exchange and cultural activities. In addition, residents who reported so were more emotionally attached to the location than those who didn't so report. These results suggested that it may be effective to create more involvement in managing and maintaining open spaces to increase residents' attachment to it and the attractiveness of the new town as a place. Moreover, the results of open questions asked in the survey made it clear that preservation of open spaces in systematically planned parks and the addition of

new value to them through voluntary involvement of residents in managing and maintaining them were also future challenges.

Utilization of Open Spaces that Contributes to Revitalizing Housing Complexes

This study reconfirmed that open spaces are of great significance in selecting a place to live, and that, with the increasing demand of older people to exercise in order to promote health, a secure and safe living sphere within walking distance of rich greenery created by networked open spaces is a valuable asset of housing complexes, and one which built-up areas do not possess. Increasing their value as good environments for child rearing by utilizing the existing open spaces would encourage younger families to move to housing complexes, and this might be one of the effective ways to rejuvenate housing complexes despite the decrease in children and increase in the elderly population. In addition, amid the problem of a decreasing sense of community in neighborhoods, changes of square-type open spaces into places for multi-generational exchange, and of open spaces only for traffic into places to develop residents' communication would lead to the creation of an attractive place for older people and forming a community of varied generations.

Naturally, open spaces need to be maintained at a certain level in order to enhance the attractiveness of housing complexes as a place to live, and this study also suggests that building a system for voluntary involvement by residents in daily maintenance may be one effective way. As it is expected that an increasing number of residents will prefer active involvement in managing their use over the traditional involvement in their maintenance, it is important to seek residents' involvement in creating new ways to use open spaces, which, in turn, may add another value to open spaces, rather than involvement only in dealing with the present issues.

In summary, we deduced the characteristics of open spaces in housing complexes that are still working effectively, as well as the future direction for their management and maintenance, by observing and analyzing residents' everyday activities, and which characteristics it is most important to preserve and pass on to the next generation. We also clarified that it is possible to create a new relationship between residents and open spaces and enhance the attractiveness of housing complexes by improving open spaces to accommodate the greatly changing social environment and by creating a system for maintaining and managing the improved open spaces. This study successfully suggested ways for rejuvenating housing complexes through utilization of open spaces.

References

- [1] "Theories and Practice on Play Lot Design in the Early Collective Housing Site Developed by Japan Housing Corporation" Syunsaku Miyagi, Takeshi Kinoshita, Ryosuke Shimoda. *Journal of the Japanese Institute of Landscape Architecture* 64(5), 703-708, 2001-03-30 (In Japanese)
- [2] "Study on Resident's Behavior of Block Park in Neighborhood" Shimomura Yasuhiko, Noboru Masuda, Daisyu Abe, Satoshi Yamamoto, Kousuke Suzuki. *Journal of the Japanese Institute of Landscape Architecture* 58(5), 217-220, 1995-03-31 (In Japanese)
- [3] "A Study on the Utilization and Evaluation of Block Parks at Tama New Town" Jyunkichi Kano, Youichi Kumagai, Akio Shimomura, Ryohei Ono, Seiji Ishibashi. *Journal of the Japanese Institute of Landscape Architecture* 63(5), 653-656, 2000-03-30 (In Japanese)
- [4] "The annual report of Japan Housing Corp", 1955-1980. (In Japanese)

A SILK ROAD BLUEPRINT: RELIGIOUS KINSHIP AND STATE CONSTRUCTION PROJECTS IN THE DEVELOPMENT OF A NORTHWESTERN CHINESE BORDERLAND, 1912-1946

Tristan G. Brown

Columbia University, United States

Keywords: Northwest China, Infrastructure, Islam, Ma Family, Rail, Legitimacy Narratives, Borderlands, Architectural Regimes, Family Genealogies, Nation-building

Introduction

How do architectural and infrastructural construction projects in northwestern China during and after the fall of the Qing dynasty reflect negotiated national and local modernization schemas along the historical Silk Road? Rather than seeing one state-legitimizing universalism (the Qing imperial ruling ideology) as having been replaced by another (the Communism), this paper shows how local military elites and distant state planners worked both for and against each other in a common pursuit: to securely connect the northwest with the rest of the nation militarily, economically, and politically. Building on a litany of previous studies that have approached this topic from changing intellectual regimes to shifting political alliances, this study specifically looks at architectural building plans – the monuments, mosques, mansions, tombs, parks, and rail lines that were constructed or were planned to be constructed by political elites along or in major cities. The architectural and infrastructural plans of early twentieth century northwestern China were envisioned over contested terrains and negotiated, deeply ideological spaces. This paper is the first academic endeavor to show readers how these architectural plans began, how they encompassed differing knowledge and political regimes and ideas of legitimacy, and how it was the precise non-uniformity of these architectural regimes and the peoples commissioning them that helped produce of a northwest incorporated into the Chinese nation state.

Sources and Discussion

This new approach calls for new sources, in particular the architectural insights from a Chinese Muslim genealogy, the *Mashi zupu (The Genealogy of the Ma Clan)*, which offers unparalleled insights into early twentieth century architectural projects in northwestern China, specifically Gansu province. The genealogy was commissioned in 1946 by Ma Hongkui, the powerful Ningxia-based Muslim warlord, to be a lineage record of the entire web of Ma family generals in northwestern China. This genealogy has remarkably been unexplored and contains a gem of historical knowledge: the blueprints of the Ma family mansions in Linxia (southern Gansu), the layout of the Ma family cemeteries, the blueprints of planned Ma family memorial halls (Fig. 1), and the construction plans of a modern Ma family public memorial park, in Lanzhou (the capital of Gansu) (Fig. 2), complete with a flower garden and public toilets – all of which were constructed during the reign of the Ma families in northwestern China between the fall of the empire and the rise of the People's Republic. The Ma family, descending from a long line of eminent Muslim generals and military officers, had to invoke spectacle to appeal to two major constituencies. In Linxia, the genealogical homeland of the Ma family, the family constructed buildings and edifices to control and appeal to the powerful Sufi lineages and orders that had held pronounced power in the northwest for centuries. Yet in Lanzhou, the capital of the

province, the Ma warlords (who were largely in power in neighboring provinces) appealed to the needs of a more general public – including a distant state – with a massive memorial park with modern facilities. Equally noteworthy is fact that the genealogy reveals that the Ma family held power to the extent that they maintained a permanent grave site in Beijing for their family members who had died in service to the Qing. These projects exemplify the complicated visions of the Ma family as they sought to solidify their own power bases (religious, military and commercial empires along the historical Silk Road) within a wider nation building project.

The second major primary source will complement the first yet arises from a very different origin – *Minguo tielu yanxian jingji baogao (The Republic of China Rail Line Economic Report)* from 1935, which contains two extensive state inquiries into the feasibility of linking northwest China by a series of rail lines through Mongolia and Gansu. In spite of the fact that the rail lines were not completed until the founding of the People's Republic of China, the reports – each hundreds of pages long – detail the concerns (trade routes, agricultural output, military capacity) – that the planners considered in their outlining of the rail lines (Fig. 3). While state engineers drew up the plans, the reports had to be drafted in conversation with local power elites who helped complete the planning. In the case of the Gansu and Baotou (Mongolia) rail lines, that meant extensive cooperation with the local Muslim elites, who advocated rail lines that largely passed through towns along Muslim-dominated trade routes. Just like the Ma families, who had different audiences to appeal to through their building projects, the state had different constituents which they had to rely upon. The architectural story of this borderland shows that the development of the modern northwest can be traced through the interests of a myriad of groups, that in negotiating their own interests, contributed to the unification of the northwest with China.

Conclusions

From these two primary documents we can trace how various architectural regimes of the post-imperial northwest were envisioned by constituents who ranged from related Muslim brethren in local position of power to state civil engineers. Rather than a product of careful vision and unified planning, the northwest was in part built by competing constituent groups – religious, political, and military elites – that worked both for and against each other in attempting to incorporate and control the region. In this sense, rather than being a backwards borderland, the very remoteness of the northwest and the autonomy and strength of its local ruling powers ironically gave it primary access to some of the newest architectural styles and infrastructure projects of modern China. Yet we cannot forget that many of these projects were not implemented exactly as they were envisioned: Republican rail lines were theorized but only finished by the Communists – who changed what had been previously planned – and many Ma family members fled into exile and hiding following the Civil War, with their mansions and parks only to be torn down. Today, the northwest is an integral part of the Chinese nation and will be for the foreseeable future, and in spite of the fact that the motivations and intentions (religious, economic, political, military) behind these building projects varied, they all contributed to an effort that eventually succeeded. There was no universalism – state or otherwise – in China's northwest at the dawn of the twentieth century. As a result, the Communists were able to exploit these myriad, incoherent narratives and provide their own while continuing their nation building project on the foundations that had been laid by others decades before.

Figures¹

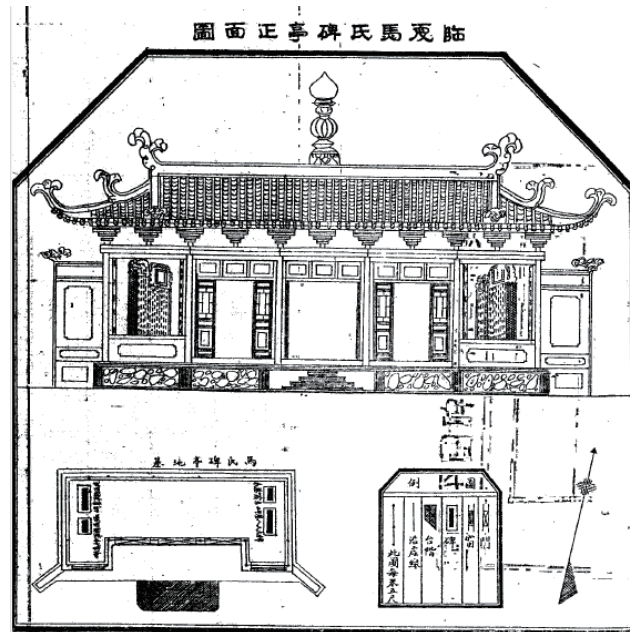


Figure One: Linxia Ma Family Memorial Pavilion Plan

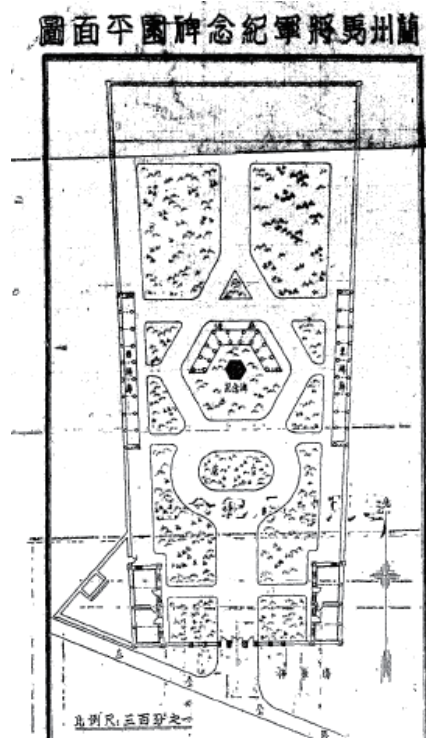


Figure Two: Lanzhou Ma General Memorial Park Plan

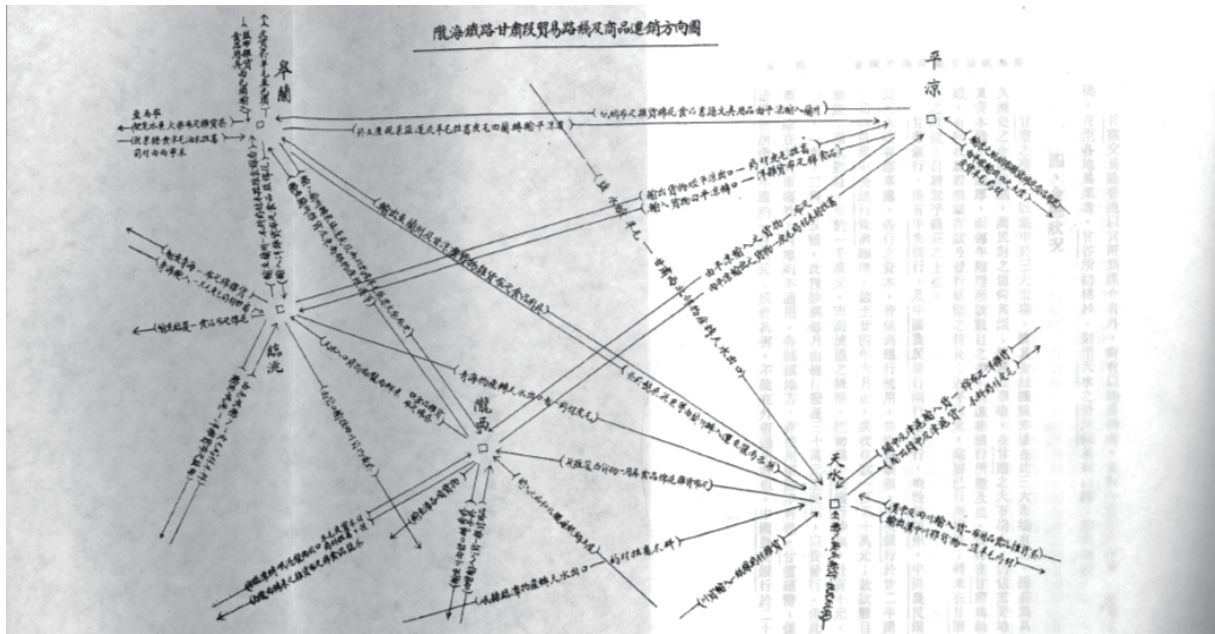


Figure Three: Map Showing the Trade Routes and Direction of Commodities in Gansu Province over the Region that the Longhai Railway Would be Built

Notes

1. The figures here are a selection. In the actual presentation and final paper, a wider array of building projects and graphs would be provided.

References

Chen, Zhihong. *Stretching the Skin of the Nation: Chinese Intellectuals, the State, and the Frontiers in the Nanjing Decade (1927-1937)*. Eugene: University of Oregon, 2008.

Elleman, Bruce A. and Stephan Koktin. *Manchurian Railways and the Opening of China: An International History*. New York: M.E. Sharpe, 2010.

Forbes, Andrew D.W. *Warlords and Muslims in Chinese Central Asia: A Political History*. Cambridge: Cambridge University Press, 1986.

Lai, Delin. "Searching for a Modern Chinese Monument: The Design of the Sun Yat-sen Mausoleum in Nanjing." *Journal of the Society of Architectural Historians*. Vol. 64, No. 1, 2005, pp. 22-55.

Lin, Hsiao-ting. *Tibet and Nationalist China's Frontier: Intrigues and Ethnopolitics, 1928-1949*. Vancouver: University of British Columbia Press, 2006.

Lipman, Jonathan. "Ethnicity and Politics in Republican China: The Ma Family Warlords of Gansu," *Modern China* Vol.10, No.3, 1984, pp. 285-316.

Lipman, Jonathan. *Familiar Strangers: A History of Muslims in Northwest China*. Seattle: University of Washington, 1997.

Ma Hongkui (ed.) *Mashi zupu*. Yinchuan: Ningxia renmin chubanshe, 1988 (Reprint).

Nietupski, Paul Kocot. *Labrang Monastery: a Tibetan Buddhist community on the inner Asian borderlands, 1709-1958*. New York: Lexington Books, 2011.

Yan Mengxia, Li Qiang (ed.) *Minguo tielu yanxian jingji baogao*. Beijing: Guojia tushuguan chubanshe, 2009.

APPEARANCE OF SLUMS, SIDE EFFECT OF DEVELOPMENT

Amir Shahrad

Shahid Beheshti University, Iran

Keywords: slums. Sustainable development. Growth of cities.

Abstract :

If we consider the development movement in 20th and 21st centuries as the practical thesis of all countries and also on the other hand consider the movements against development as the antithesis for that, we come to a movement called "sustainable development" which is of utmost importance in developing countries. Although it is expected, as the definition of development implies, for development to have some precautions to be continuous, the tendency towards economic growth has disturbed the balance between the human and the nature. Thus, some problems have been made in this regard. Consequently, a note should be added to all the rules of development knowledge.

The present study is an attempt to scrutinize the function of sustainable urban development within recent decades. To be more exact, the writer pays attention to that part of urban development which takes place at the Slums.

This question that sustainable urban development to what extent has managed to control the Slums and basically what approach it has taken, has come to this conclusion that migration and Slums settlements don't completely fall within the activities of the urban development plans. It may fall in higher plans such as land preparation plan. The designers of urban development can only legalize the settlements of the Slums, give them settlement salary and let them take part in the affairs related to target city.

It is worth mentioning that the word "hysteresis" is the phenomenon in which the value of physical property lags behind changes in the effect causing it; so it doesn't mean "waste", unusable or unwanted material.

Introduction :

Lack of success in urban development management and also existing Slums like what we can see in Tehran and other big cities necessitates the study about the movement of antidevelopment. The obstacles and limitations of development are determined through the ground storage capacity especially the one related to accepting more and more harm caused by economic system dominant on the world. According to this analysis, sustainable development is only a dream and sustainable economic systems are justifiable only if the growth falls to zero or below that. "The movement of antidevelopment" according to the "principle of survival of matter and energy" indicates that all the sources will finally change into waste. But we can dramatically decrease the Coefficient of pressure on the environment on the condition that the sustainability of economic growth be analyzed and revised again. The question arising here is whether the fears and hopes that "antidevelopment movement"

and “sustainable development” have shown each other within last decades are pursuable in low-density Slums or not. Is the “antidevelopment movement” workable in this case?

According to the study made by the institute of world recourses in 1990, 42% of urban settlers in developing countries live in the Slums. Although these Slums can be blame to urban development management, it is an inescapable and inevitable fact which exists and continues. Investigating the low-density Slums can be a subject to be included in urban Development Program in which it is missing now.

What drags people to the Slums -such as housing prices, attractions of big cities, their liveliness and energy, etc.-must be included in urban Development Program.

Content :

who is an Slums settler?

Economically speaking, these people are those living in the economic range of the city but not absorbed in the economy of the city. Socially speaking, they are mostly young with rural roots and with tendency towards having relation in their hometown without the skills necessary for living in cities. Culturally speaking, they are realistic and hardworking and trying to make better education and living condition for their children and also for themselves.

According to history, Jewish Ghettos have been the first Slums settlers in developed countries especially European countries (Fig. 1).In the middle centuries, Jewish people with law force had to live in distinct neighborhoods called “Ghetto” .these Ghettos were the fixed characteristics of the cities in Italy, Germany, Poland and other countries.



Figure 1 Jewish Ghetto in Rome circa 1789

Sometimes living in the Slums is also regarded as a way of living besides three existing way of living namely urban, rural and tribal. And according to its own social and economic characteristics has created a certain physical structure. The attraction of living in the cities and also the welfare available in the cities has made these people leave their hometown and pour into industrial cities and work market. Most of these people are rural migrants that rush to cities to make better living conditions.

The theories defining "Slums settlers" are divided into two categories: positive and negative.

Doctor Piran's Theory: migration in Iran should be considered as an intelligent measurement taken by ruralists and shouldn't be looked at as a negative phenomenon .in the Slums, common benefits unites the settlers with each other, control each other and also are united when facing problems.

Marshal klinrad says: Slums settlers are an urban problem and obstacle, it roots into crime and felony .Although it exists in different types and shapes, it enjoys a certain universal pattern. People living in the Slums have been separated from the general politic and power structure of the society, thus, is regarded as "low social group". These people look at the world with a cloud of doubt. Living in the Slums is appealing to them and they try to conceal living in the Slums.

Whyness and howness

The most important reason of living in the Slums is lack good living conditions. In other words, people move into the Slums due to obstacles in their original place more than the attraction of the target city. 'Piran' says because the capital of developing countries is the focus of facilities and fund and all welfare, people pours into the capital. And because this rush to the cities will badly affect the price of housing, so people have no other choice than living in the Slums. Two characteristics regarding migration are of more significance :being permanent or temporary. Although Broder,et ,al consider migration as temporary, migration in Tehran is regarded as permanent.

The formation of Slums involves several ways as follows:

1. Organized attack (gathering of 30-year-old couples with children, lawyers advocating the poor, law students, some of the politicians and clergymen advocating the poor).
2. Private dividing of the pieces of land with the permission of the owners (illegal dividing of farms)
3. Crawling-like obtaining of land.

The characteristics of the Slums

Creating the Slums is one of the effects of migration. Migration affects both original and target places. so when we consider Slums as one of the problems of the cities, the origin of this problem is migration. So migration is negative. The variety in form and function of the Slums has made them look like "economic - social districts"but we can't coordinate the characteristics of mere space and skeleton or mere economic-social to them. There are other theories which help recognize them better:

Broder: The Slums have a certain look and by different function on land we can recognize them. Shokuhi: The Slums are aged houses which are about to annihilate and are constructed with short-lived material. Perlman: these places centers for small business centers which form near these houses and are a part of it. They lack facilities and general services. There you can see uncovered wires, worn-out and inexact wiring.

Incongruous approaches towards Slums

The planners have an average and minimal view towards Slums. As we should give better services to people living in the Slums, at the same time we are paving the way for more migration to happen. For example when we construct more subway stations between the cities (like Kenya)(Fig. 2), it makes it easier for emigrants to commute so they decide to migrate permanently. On the other hand, if we ignore these places and pay no attention to them it will end in negative potential ,crime and abnormalities. One of the troubles made by these people is getting job opportunities from the natives of that city. So the government should employ the natives of that city first. But this is in contrast with the principle of letting these people participate in the city affairs.



Figure 2 train in Kenya on the dwarfs

Conclusion:

Development is the inevitable destiny of our cities. Sustainable development is a big jump in order to have a world that not only gives services but it can also maintain itself. Slums is the side effect of unsustainable development started in the last decades. Due to its hysteresis effect, even if we remove the factor and develop the planners view point, we can still see Slums in big cities. Ignoring the problem does not solve the problem. The government should make more facilities for those who have not migrated yet in their original places. And for those who already live in the Slums, the government should legalize them and find better ways of living for them to tackle their problems. The solutions mentioned in this article are based on social justice, human values, avoiding ready prescriptions, people surveys, long-term and big plans beside instant solutions.

The very first and important measurement that should be taken by planners of development is to accept Slums as a bitter reality. Fighting the authorities with these people, making them homeless, destroying their houses, aggressive police attack just adds salt to the injury. The government should also legalize their houses and gives them documents for their houses. Not giving documents does not solve the problem. Because living in the Slums is not to gain a piece of land, it has economic and job reasons. Giving certificate to these houses avoids informal land trading and dividing the land more and more. Their first need is to improve sewage system. This make them feel in a better place and decrease environmental crimes such as stealing electricity, unsuitable costruction, etc. Next step is to make public buildings to boost the Slums. In all these measurements we should let them participate in the affairs so that they feel kind of responsible towards their cities.

References

- [1] David w peers,gremy g varford. (1999) infinite world,economy,ecology and sustainable development.
- [2] Zohre davoudpour. (2004). tehran and automotive housing. tehran: housing research institue of iran.
- [3] Masoume nemati. (2009dec23).Slums from context. Tehran. Resalat newspaper.
- [4] Parviz piran. (2009). Emigration and inequality in fars state. shiraz
- [5] Broder,et,al. (1995)
- [6] Mike Davis. (2006). Planet of slums. Versu publication.

CROSS CULTURAL EDUCATION IN ARCHITECTURE: FINDINGS FROM TEACHING INTERNATIONAL STUDENTS TRADITIONAL JAPANESE ARCHITECTURE AND GARDENS

Arno Suzuki

Kyoto University, Japan

Keywords: Architectural education, International students, Japanese architecture, Vernacular architecture, Japanese gardens

Background

Internationalization and increasing students' mobility are requiring architectural educators to contemplate how to teach students with different background [1]. Especially when we discuss vernacular architecture or traditional design, how much contextual understanding can or should we provide? In practice, traditional Japanese architecture and gardens remain popular in the international market, while both domestic clients and successors are rapidly decreasing in Japan. Therefore, it is becoming common to receive clients and trainees from overseas [2]. Cross-cultural communication is significant in international practice [1], but it does not always seem successful, and 'wrong' Japanese architecture and gardens are often created. It also seems a worldwide trend to be universal, and young generations are no longer familiar to his or her own culture [3]. They may also be considered 'foreigners' when it comes to traditional design or lifestyle. Architectural education system in each country is changing toward a global standard [4]. Thus, cross-cultural education is being required in more and more occasions.

Globalization of architectural education systems in Japan has been debated ever more enthusiastically since 1996 when UNESCO-UIA Charter of Architectural Education [5] was adopted. Countless scholars and practitioners have been discussing the importance of practical training as well, however what is 'practical' is still in question [4]. When we think about traditional Japanese architecture, however, we have to consider a particular kind of 'practical training', which is outside the scope of modern architectural education.

Traditional Japanese architecture/gardening practice is based on design-build system, in which understanding of materials, building methods and construction management is imperative. In traditional arts and industry, trainees are supposed to learn on the job by watching experienced practitioners. Traditional construction sites depend on natural materials, which vary piece-by-piece or time-to-time. Therefore, it is difficult and inefficient to produce design drawings first and try to follow them as we do in modern construction. Many experienced traditional Japanese carpenters and gardeners agree that publishing a theory textbook or 'manual' would be difficult, or sometimes dangerous [2]. In such practice, empirical education is more effective even for future planners and designers, who do not aim to put their hands on the actual work as professional artisans do. However, many students from other countries, especially those who are from modernized western culture, wish to have theory-based lectures and reading materials first. To make them understand the different system of practice and importance of on-site training, showing the actual works, including successful and unsuccessful examples, should be most effective [6].

Research Methods

This research is based on both qualitative observation and quantitative surveys. The author has been exploring this topic in four different circumstances from 2000 to 2011; 1.upper level landscape architecture field and studio course at a university in the United States (2000-2002), 2.open-enrollment field study course in Kyoto, Japan, for American students (2001-2005)[6][7], 3.urban environment field and studio course at a Japanese university with Chinese students filling approximately 50% of the class (2002-present), and 4. Japanese architecture and garden lecture course with 50% Japanese students and 50% international students from various countries mostly from Europe and Asia (2008-2011). With all of these courses, different teaching methods were experimented, and students' feedback was given in written format. For the lecture course for mixed students, quantitative surveys were conducted in 2010 and 2011.

Effectiveness of Field Study

In the 4-week intensive summer workshop in Kyoto for American students to learn Japanese landscape design, we emphasized the meaning of design rather than discussing historical facts or design theories [6][7]. In the program, students visited historical gardens representing each style period in a chronological order, discussing social and natural context of the time when the garden had been created. This approach was proven effective for students' understanding by comparison to other methods in the past years. We also included many field trips to understand local practice, society and people (Fig.1). We always rode public transportation and walked to the site to experience the climate and people's lifestyle, which helped students to understand why certain architecture and garden designs had become necessary in this particular place. By hiking in countryside, students could see the source of natural materials and the design motives that had to from them. For the cultural side, we participated in religious activities such as Zen meditation and cultural activities such as tea ceremony, discussing the purpose and consideration of every forms and actions.

After those fieldworks, students understood the concept of Japanese gardens much better, the result of which was clearly observed in their term papers, projects and course evaluation. After the course, many students also testified in their reports that they got inspired to reconsider their lifestyle, not just they have learned the architectural design.



Fig. 1 Fieldwork snapshots from UC Davis Summer Japanese Garden Workshop, 2004-2005

Teaching Mixed Group of Students

In the recent campus internationalization in Japan [8], it is becoming common to teach a class of students with totally different educational or cultural background. By written and drawn surveys conducted in 2010 and 2011 with 185 students of various majors, scholastic years and nationalities, we learned that we could not expect domestic students to have better prior knowledge about traditional culture than foreigners (Fig. 2). It was more dependent on a student's interest, educational background and personal experience. The result of quizzes and exams showed that students from different culture did not have much disadvantage to study the subject. Only in the beginning there was a huge difference between design majors' drawing skills and that of non-design majors. (Fig. 3) However, the ability to understand Japanese design varied regardless of their major. The knowledge level in Japanese culture of those who studied Japanese history by choice was significantly higher than others regardless of their nationality. However, lectures and advices could close these technical gaps by the time they tackled the final research/design project.

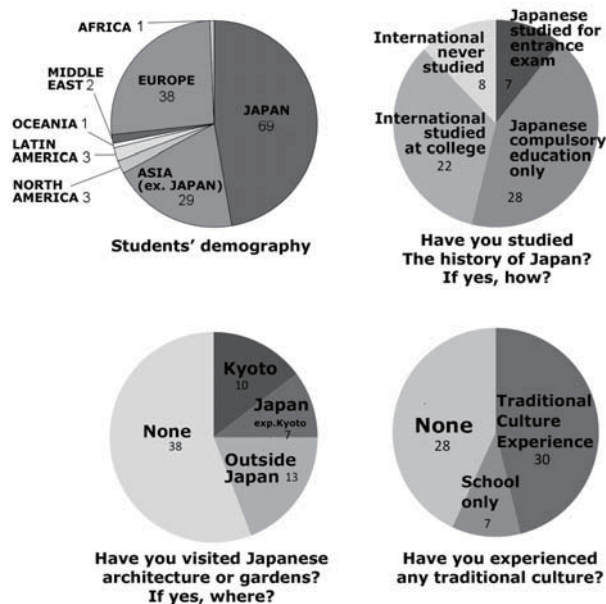


Fig. 2 Exerts from the survey result

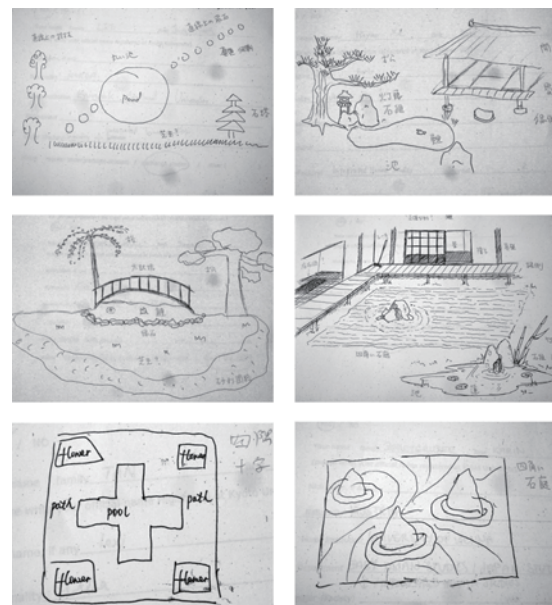


Fig. 3 Examples of students' first drawings of what they think is a 'Japanese garden'

One significant difference caused by different backgrounds was how they perceive Japanese architectural space. Here is an example from the pre-study survey. Those who have experienced traditional activity or have visited traditional architecture tended to pay more attention to conceptual elements such as 'connection between inside and outside', whereas those who having less experience in traditional culture tended to pay more attention to tangible elements such as rocks and plants. In contrast, nationality did not make much difference in their perception of Japanese architecture and gardens. (Fig. 4)

In conclusion, there is little disadvantage of being non-native to learn cultural design, and cross-cultural education is possible only if we teach them elaborately and if the student has a certain amount of interest and an open mind to accept a 'different' concept.

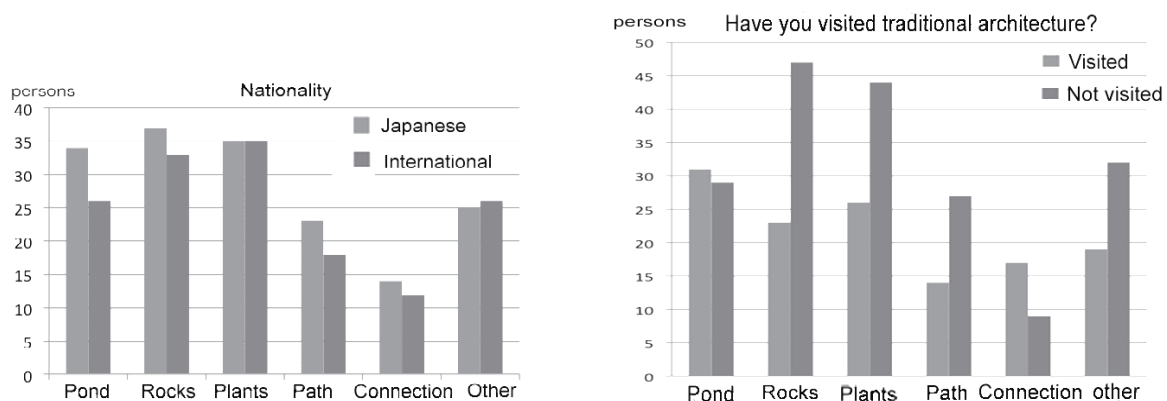


Fig. 4 Comparison of cross analysis to a question: 'What do you think the most important element in Japanese garden?'

'International' and 'Intercultural' issues

The majority of international students in Japan are Chinese (63%) and Korean (12%) [8]. These East-Asian countries and Japan have sensitive issues derived from the past, and we need to be careful when we discuss history. However, the close relationship among those countries for over 1400 years could also be an effective tool to inspire students to study further into the cultural context of each design. Traditional Japanese city planning and architectural design received direct influence from China by way of Korea, and they show formal similarities, which often confuse audience from other cultures. In such similarities, however, the subtle differences of details clarify different natural and social contexts of each region, and they teach us the essence of vernacular design. As a side product, studying those 'relative' architecture styles often dismantled the barrier between domestic and international students. In a broader vision, we sometimes find similar details in traditional Asian and European designs, even though there is no evidence of trades or communication at the time of production. This fact may be telling us what is universally rational and scientific. Such study of 'the meaning of design' helped understanding other cultures as well.

Discussion: The Future of Traditional Architecture Practice and Education

How far these traditional methods can be sustained in the face of growing dominance of high-tech building industry even in small-scale buildings? Unfortunately, there are so many social and economic obstacles that it is difficult to give a positive answer.

What destroyed the industry of traditional Japanese gardening was the inheritance tax, which started in Japan in 1905. Because the rate is relatively high and inheritors have to pay tax in cash, many property owners choose to sell their land, which might have been a valuable historical garden, or to build something more profitable like rental apartments or parking lots on it. Thus, gardeners have fewer and fewer new projects domestically, and there are less and less clients even for maintenance only. To survive, long-established traditional gardeners have started to expand their business into modern or public projects or to go abroad to look for new clients. In this situation, there is a very small job market for gardeners, and even if there is any offer, compensation and work condition have to stay sub-standard. Thus, the Japanese garden industry is maintained by limited number of enthusiasts. The culture, which everybody else in the world admires, would disappear soon if we do not take an action now.

The biggest obstacle to stop traditional Japanese architecture is the new building code that became effective in 2007. The law has almost prohibited traditional construction methods. Modern society requires the guarantee of safety by calculations and signed paperwork, and metal-fasteners are easier to calculate than solid wood with individual and irregular behaviors. Although experienced artisans can make the best of such irregularities of natural materials and build most effectively with them, they just cannot show a numerical proof. We should remember that so-called high-tech construction building methods such as seismic isolation and vibration damping were commonly used since centuries ago in traditional construction.

Another problem may be the population and lifestyle changes of the society. An example is the traditional thatched roof. In rural communities, people used to help each other to re-thatch roofs for no compensation. Such roofing was made of the fast growing grass in the neighborhood, so the material was readily available at no cost. And such roofs were providing good insulation to save energy, emitting no waste and revitalizing the ecological system. Nowadays, however, there is not enough labor force in those villages, and now they have to import grass from overseas and hire expensive professionals to do the work for them. Thus, having a thatched roof became a luxury, and they disappeared quickly. This mutual-helping system including re-thatching roofs is called '*yui*' and it only remains in Shirakawa Village in Gifu Prefecture. It is so rare nowadays that the village was designated as a UNESCO cultural heritage.

Modernized education and people's changed mind together may be a fundamental cause of the reduction of traditional architecture. Ever since westernization came after Meiji restoration, Japanese people tend to forget the rationality and sustainability of the traditional building system. Architecture schools have been teaching traditional architecture as 'history'. Few people talks about that old wisdom, and people's lack of knowledge in traditional construction is spreading misunderstandings such that it is weak against earthquakes. Recently, folklore houses like '*minka*' and '*machi-ya*' are receiving more and more attention because of their energy-saving and zero-emission system. Especially after the Tohoku Earthquake, Fukushima nuclear power plant accident and following energy problem, we should consider going back to the traditional lifestyle. Many people, however, just do not know how to deal with it.

Conclusion: The Expectation for Globalization to Save The Local Craft

It is very difficult for traditional building industry to make ends meet in the current society in Japan. There are, however, many potential clients overseas, and they are mostly enthusiastic. To maintain the valuable skills and methods, the practitioners may want to consider going overseas to find better job opportunities. Language and cultural barrier can be tackled by appropriate education for both practitioners and clients. To start, the wall between higher education and traditional industry ought to be dismantled. College educators and students should learn more about traditional industry so that they can discuss it correctly. Practitioners should also expand their territories by gaining systematic knowledge in foreign languages, structural engineering, and other useful subjects. They establish the equal status with modern practitioners and academics.

During our research, the author often observed that international students and tourists showed better understanding of historical residences, whereas Japanese tourists tend to pay respect to temples, shrines and castles only [9]. European and Americans have a custom to value old houses even though they are not famous or historically significant. They like to maintain old houses instead of resorting to scrap and build. The governments in Europe are generous in helping historical houses, and Americans make contribution individually. Social environs may be different as they are, we can still learn their attitude of fostering traditions. We already substantially depend on foreign apprentices for preservation of our local craft (Fig. 1). We should start revisiting our own culture before we completely lose it.

References

- [1] Furuya N., Kira, M., et al. Internationalization in Architectural Education in Japan, *Journal of Architecture and Building Science*, 2011-5, vol.126 No.1618, 48-52pp. (in Japanese)
- [2] Suzuki, A. Study Abroad and Internship Opportunities for Traditional Japanese Arts and Trades, *The 5th AEARU Cultural Workshop Proceedings*, Peking University, China, 2008 (electronic distribution)
- [3] Suzuki, A., Kawai, J., Tanaka, M., Suzuki, K., International Students' Housing Preference and Its Background: Questionnaire Analysis, *Proceedings of the Housing Studies Symposium*, Vol.6, 247-254pp., 2011 (in Japanese)
- [4] Feature Story: Establishing a Systematic Architectural Education in Global Era (Kokusaika-jidai no Kenchiku-kyouiku-system he), *Journal of Architecture and Building Science*, 2009-3, vol.124 No.1588 04-23pp. (in Japanese)
- [5] UNESCO-UIA charter for Architectural Education, <http://www.unesco.org/most/uiachart.htm>, June 1996
- [6] Suzuki, A. Learning Process of Japanese Gardens. *Kyoto University Graduate School of Engineering, Urban Design Research Seminar Proceedings*, Vol.2, 77-82pp. 2004
- [7] Suzuki, A. A Report from Japanese Garden Workshop. *Kyoto University Graduate School of Engineering, Urban Design Research Seminar Proceedings*, Vol.1, 1-7pp. 2002
- [8] Japan Student Service Organization, International student statistics as of 1st of May, 2011 http://www.jasso.go.jp/statistics/intl_student/data11.html (in Japanese)
- [9] Suzuki, A., 'Preservation and Utilization of Important Cultural Asset Residence – a Case Study of Fujioka Residence in Nara-machi, presented at the annual conference of *The Japan Society for Folk Architecture*, May 19, 2012 (in Japanese)

A PSYCHOLOGICAL ANALYSIS OF THE SOCIAL PROBLEMS ARISING FROM MODERNIZATION, GLOBALIZATION AND URBANIZATION

Mari Aoki

Kamakura Women's University, Japan

Keywords: psychological analysis, cultural succession, mutual understanding

Introduction

The Silk Road was a commercial route which connects China, Central Asia, west Asia, and Europe. The starting point in the east of this Silk Road is called Shosoin in Nara, and the most western point is Rome. Merchants carried various products back and forth from more than 2000 years ago. This trade also brought cultural exchange and a mutual understanding of the countries around the Silk Road. However in recent years, modernization, globalization, and urbanization have greatly changed the life of people.

Uzbekistan which prospered as a relay place of the Silk Road is located in the center of Eurasia. Samarkand, a world heritage city, has many important and historical sites which many Japanese travelers visit for sightseeing. For the Japanese, it is an opportunity to study the diversity of lifestyle and customs, to get in touch with a different culture from Japan. Although natural gas, gold, cotton, etc. are the mainstream industries of Uzbekistan, in recent years development has brought about the problem of the environmental pollution of emission of carbon dioxide and a decrease of river resources. Although a rich life can be got by developing nature, environmental pollution and destruction are brought about simultaneously. Japan has advanced technology which takes the environment into account. As such it should respond to helping Uzbekistan develop in a sound manner.

Japan has changed from an agricultural society to an industrial society. As a result, while information technology and the economy developed and life became more convenient, at the same time the destruction of natural environment, urbanization, dilution of relation neighborhoods, and various social problems have surfaced. For example, the present-day family has various problems which can even be called family pathology, such as divorce, abuse, restructuring, social withdrawal, depression, and alcohol dependence. These are considered to be also social problems, and the solution requires the mutual understanding between families, and understanding of the community which surrounds the family.

Although modernization, globalization, and urbanization had great influence on the development of a country, they also made various social problems. Although various solutions can be considered to these social problems, in my presentation I will focus on cultural succession and mutual understanding and examine these from a psychological viewpoint.

Methods

The first topic is cultural succession. The presenter works at a university in Kamakura. At the university, "the tour around the Kamakura historical sites" is carried out. The purpose of it is to inspect historical buildings, such as Tsurugaoka Hachimangu Shrine, Kenchoji Temple, Engakuji Temple, Daibutsu of Kamakura, and Asaina Kiridoshi Pass, to think about predecessors' life and culture, and to understand the samurai's ancient city, Kamakura.

The next topic is mutual understanding. Various group activities with psycho-education are used to promote understanding of oneself and others.

Results

Goryo Jinja in Kamakura has a “面掛 procession”(Menkake Gyoutetu) based on “伎楽”(Gigaku). “伎楽” spread in the countries around the Silk Road from India, and is said to have been introduced to Japan. And also, in Kamakura, Tsurugaoka Hachimangu Shrine, Kenchoji Temple, Engakuji Temple, Daibutsu of Kamakura, and Asaina Kiridoshi Pass, etc. which are due to be registered as world heritage sites, and many historical valuable buildings were built. From the students' reports it was clear that they learned about Kamakura culture and history very well and could understand Japanese culture, foreign culture, and noticed the importance of preserving that culture, i.e., cultural succession.

In recent years there are many students who are mentally immature, lack social skills, and are weak in experience of interpersonal-relations. The presenter has used group work with a small number of people so that participants can learn actively and not just be passive. Being aware of the feelings in oneself and others, asserting oneself and accepting others, and developing mutual understanding are ways to acquire deeper interpersonal relations.

Opportunities to experience cultural succession and mutual understanding are considered to be useful for decreasing environmental destruction and helping to diminish relationship difficulties, especially in the family.

Conclusion

The Silk Road prospered from over 2000 years ago as a place of various cultural exchanges. In order to develop a mutual life culture, what was excellent in the foreign country was accepted; the good things one's own country were exported to foreign countries; and a mutual life culture was developed. It is thought that the Silk Road area also had exchange of the heart which is not only a thing. It has formed the attitude which values a thing with people.

Although modernization, globalization, and urbanization have increased efficiency, developed economy, brought about strengthening of the relation between countries and raised the quality of people's life, problems have also appeared simultaneously. As a result of the lack of relationships with people, the trouble in interpersonal relations leading to isolation and to various family problems have appeared. With urbanization the sense of being a part of a neighborhood has decreased. This has led to difficulties in protecting and passing on culture. In order to enliven the Silk Road areas and create an atmosphere of coexistence and

co-prosperity and further development it is necessary to continue having a viewpoint which understands people and things different from oneself and one's environment.

This presentation has focused on cultural succession and mutual understanding for college students who will support society in the future and bring the idea of maintenance and development of the culture of their own country, understanding of a foreign culture, and understanding of oneself and others.

ISTANBUL FIRES IN THE 19TH CENTURY: AN ANALYSIS ON ARCHITECTURE AND URBAN PATTERN

Pınar Sunar¹, Zeynep Ceylanlı¹

¹ *Bahçeşehir University, Turkey*

Keywords: Istanbul, fires, 19th century, architecture, urban pattern

Introduction

In 19th century, the advent of industrial technology and imperialism played an important role in economic and sociopolitical changes in Europe [1]. Ottoman Empire had executed many social and institutional reforms (Tanzimat Charter) to adapt the Empire to the Western-inspired modernization. Rapid growth in population and urbanization in the 19th century the Ottoman Empire and its capital Istanbul almost paralleled with European capitals. The motives were not the massive industrialization of the city, rather, Istanbul has experienced migration from the Anatolia and Thrace. Increase in the population triggered the density of wooden buildings in residential fabric and Istanbul came across with the fire threat as it never did before [2].

Fires became an important phenomenon in Ottoman urban life. Especially in the second half of the 19th century, Istanbul has been struggling with fires rather than social, economical and political events. The main reasons of the ignition of fires were intentional fires, candle, brazier and ignition of chimney soot fires. Istanbul's fires spread rate depended on traditional wooden construction with bay windows (cumba) and large eaves in architecture on a smaller scale, attached buildings with narrow and blind streets in the urban fabric on a larger scale. In addition to the main reasons, deficiency in development of fire departments and extinguishment methods, lack of fire engine and city problems in quantity and distribution of water were caused difficulty in keep of fire under control. On the average of the each year, every district in Istanbul experienced fires. At the end of the 19th century, as a result of the fires; approximately 1/50 part of Istanbul was burnt and it was observed that Istanbul's silhouette and settlement were changed in every 50 years [3].

Research Method

This paper will analyze the 19th century fires effects on Istanbul especially in the "Westernizing" Pera and "obsolete" Suriçi (**Fig. 1**) in terms of urban fabric and built form depended on demographic structure, institutional reforms, and fire and insurance maps. Two fires are selected as case studies since crucial decisions, both in administrative and urban patterns, were made afterwards: Hocapaşa Fire in 1865 in Aksaray, and Pera Fire in 1870.

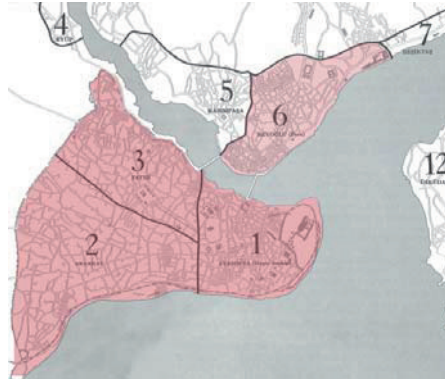


Fig. 1: The map of Istanbul in 1857 (Çelik, 1993)

Discussion

The research will focus on understanding how the aftermath of the fires were handled in these two counter-districts. The demographic overview of Pera in the nineteenth century presents us a noteworthy remark on how Pera and the neighbor quarters such as Galata and Tophane differentiate from the other parts of Istanbul. (Fig. 2) It should be noted that there had been a division among nations as such: the Ottoman people (*tebaa*) – including Orthodox Greeks, Catholics, Protestants, Jews, Armenians, Latins and Bulgarians- and the foreigners – whether they are Muslims or not. According to the census in 1885, the percentage of the population distribution in Istanbul in general was this way: Muslim 44,06%, non-Muslim Ottoman 41,56%, and the foreigners 14,74%. On the other hand, this situation turns upside down in the total of Pera, Galata and Tophane in the very same census: the foreigners 47%, non-Muslim Ottoman 32%, and Muslim 21% [2]. Though, there was a significant settling of Muslims nearby Galata and Pera after the removal of the palace from Topkapı to Dolmabahçe. However, “the other side” Galata had always been the district of non-Muslims and foreigners since the conquest of Istanbul by Ottomans. Suriçi, on the other hand, is the area inside the fortification walls of Byzantine Empire and consists of three districts: Ayasofya, Fatih, and Aksaray. (Fig. 3) According to the same census in 1885, the population of Suriçi was dominated by Muslims, followed by Greeks, Armenians, and Jews.

The modernization attempts of the urban structure were first materialized in the municipal model declared in 1857; the city was divided into fourteen districts and the only municipalities that had been established were the 6th (Pera), the 9th (Büyükdere), and the 14th (Princes’ Islands). The common characteristics of these three districts were that they were mostly settled by non-Muslim Ottomans and foreigners. One of the concerns of this study is to look for the differing attitudes towards the cultivation of the destructed are areas and precautions for fires in Suriçi and Pera.



Fig.2: Grand Rue de Pera, Beyoğlu (Atatürk Library)



Fig. 3: A street from Suriçi

(<http://www.azizistanbul.com/birsemt1.jpg>)

Conclusion

After the second half of the 19th century, the significant fires caused changes in Pera and Suriçi districts' urban planning and architecture depending on regulations and laws. This research will continue by comparing decisions and regulations on architectural and urban planning through insurance and fire maps. For final remarks, the changes in architecture and in the urban pattern will be observed the degree of the overall modernization and reformation attempts achieved.

References

- [1] Tekeli, İ., Osmanlı İmparatorluğu'nda Kent Planlama Pratiğinin Gelişimi ve Kültürel Mirasın Korunmasındaki Etkileri,
- [2] Çelik, Z., 1993. *The remaking of Istanbul: portrait of an Ottoman city in the nineteenth century*, Berkeley, Los Angeles, London: University of California Press.
- [3] Dünden Bugüne İstanbul Ansiklopedisi, 1995. Tarih Vakfı Yurt Yayınları, İstanbul.

Further References

- [4] Akın, N., 2011. *19. Yüzyılın İkinci Yarısında Galata ve Pera*, Literatür Yayınları, İstanbul.
- [5] Tekeli, İ., 1986. Cumhuriyet'e Kentsel Dönüşüm, *Tanzimat'tan Cumhuriyet'e Türkiye Ansiklopedisi*, pp. 878-890, İletişim Yayınları, İstanbul.
- [6] Dumont, P. ve G., F., 1992. Modernleşme Sürecinde Osmanlı Kentleri, Tarih Vakfı Yurt Yayınları, İstanbul.
- [7] Cezar, M., 2002. Osmanlı Başkenti İstanbul, Erol Kerim Aksoy Kültür, Eğitim, Spor ve Sağlık Vakfı Yayınları, İstanbul.
- [8] Akyüz, V., 1996. İslam Geleneğinden Günümüze Şehir Hayatı ve Yerel Yönetimler, İlkel Yayıncılık, Üsküdar, İstanbul.
- [9] Karpat, K.H., 1985. Ottoman Population 1830-1914 Demographic and Social Characteristics, University of Wisconsin Press, London.
- [10] Özcan, K., 2006. *Tanzimat'ın Kent Reformları: Türk İmar Sisteminin Kuruluş Sürecinde Erken Planlama Deneyimleri (1839-1908)*, Osmanlı Bilimi Araştırmaları VII/2, p.149-180, İstanbul Üniversitesi Edebiyat Fakültesi Bilim Tarihi Bölümü yayınları, İstanbul.

- [11] Kahya, F., 2010. Osmanlı Devleti'nde Sigortacılık, Libra Yayıncılık, İstanbul.
- [12] Mecelle-i Umur-u Belediye.
- [13] Turuk ve Ebniye Nizamnamesi, Mecelle-i Umur-u Belediye.
- [14] Ayverdi, E.,H., 1978. 19. Asırda İstanbul Haritası, İstanbul Fetih Cemiyeti Yayınları, İstanbul.

ANARCHIST DESIGN

Fatemeh Ziaei

Islamic Azad university, Iran

Keywords: Anarchy, Anarchism theory, urban aesthetics, urban design, society.

Abstract

In recent decades cities makes the trends that weaken our social and physical health and lead to unsustainable ways of living. The situation of urban places are a rising concern for citizens and cities filled with disease, crime, harassment, exploitation, isolation, hunger and ignorance.

Now is the time we can reorient our urban designs to focus on different approaches, a approach to develop theory that will foster a new way of thinking about cities.

This study investigates the urban aesthetics based on Anarchism approach. " Society's betterment is conceived as a collective process of self-actualization wherein individual freedom and social freedom are contiguous: anarchism's potential is realized in the social trace of its own immanence. But that trace asserts itself in the face of formidable opposition. Given that existing societies are so antithetical to anarchist values, anarchism necessarily provokes antagonism, conflict, and challenge alongside pre-figurations of freedom as a sensuous reality" (Allan Antliff, Adrian Blackwell's *Anarchitecture: The Anarchist Tension*, (Canada: Anarchist Developments in Cultural Studies), 2010).

Thus, the main objective of the study is to present the urban aesthetics idea based on the social aesthetic perception. Really urban space is a sociable place, one where people meet each other and take people when they come to visit. Sociability is a difficult quality for a place to achieve, but once attained it becomes an unmistakable feature. When people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community - and to the place that fosters these types of social activities.

Introduction

A esthetics Distinguished from both sensual pleasure and intellectual pleasure, aesthetic pleasure or aesthetic enjoyment is the emotional element in our response to works of art and natural beauty.

Kant and many theorists have accepted that aesthetic pleasure is a result of a disinterested and non-conceptual engagement with an object. But it is a point of dispute whether this pleasure arises from apprehending the formal character of the object, its content, or both.

This text begins with a review of the definition of Anarchist theory, followed by the next slide of Urban design idea based on Anarchist theory, and then concludes.

Aesthetically design

What makes aesthetically design?

Many variables involved in the determination of a beautiful urban aesthetics. According to urban design theories through which designers constantly focus on the physical features of place thus can say the physical characteristics of the place support the non-physical attributes and features.

At this time , the question is asked that : What are the best physical features of the place?

I think on the basis of the Anarchist theory, can reply to the question.

Definition of Anarchist theory

Anarchy theory : I shall begin with a definition:

Anarchism, The philosophy of a new social order based on liberty unrestricted by man-made law; the theory that all forms of government rest on violence, and are therefore wrong and harmful, as well as unnecessary.

Anarchism, then, really stands for the liberation of the human mind from the dominion of religion; the liberation of the human body from the dominion of property: liberation from the shackles and restraint of government. Anarchism stands for a social order based on the free grouping of individuals for the purpose of producing real social wealth; an order that will guarantee to every human being free access to the earth and full enjoyment of the necessities of life, according to individual desires, tastes, and inclinations.(Emma Goldman 1910)

"Anarchism... is the great, surging, living truth that is reconstructing the world, and that will usher in the Dawn."

anarchy is not about a lack of order, but about a lack of authority. Anarchy is the absence of ownership. Authority is the forced application of ownership. Some might define anarchy as an absence of authority and thus a condition of "every man for themselves," a lawless world in which the gun or sword of every person rules. Clearly in this definition there is still a form of ruling/ownership, individuals ruling over other individuals by the power of the sword, killing anyone who would stand in their way toward their personal liberation. This may seem closer to capitalist libertarianism than anarchy, but this may be how some define it and approach it. (Merriam-Webster 1991, 83)

Anarchist urban design

Anarchy theory : I shall begin with a definition:

What form of the city that make up of the Anarchist theory? How Does Anarchist theory Fit in the Urban Design Process?

Actually the design of the city creates through Anarchist ideas is intended to guarantee the imagined new order. According to the definition of Anarchist theory : “ Anarchy is the absence of ownership ”

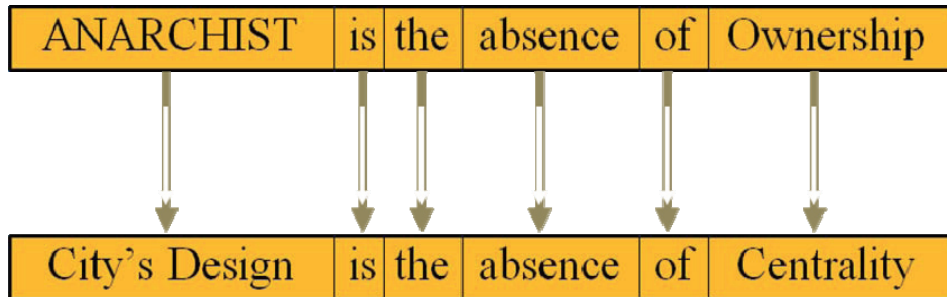


Fig. 1: Replace to definition of Anarchist theory

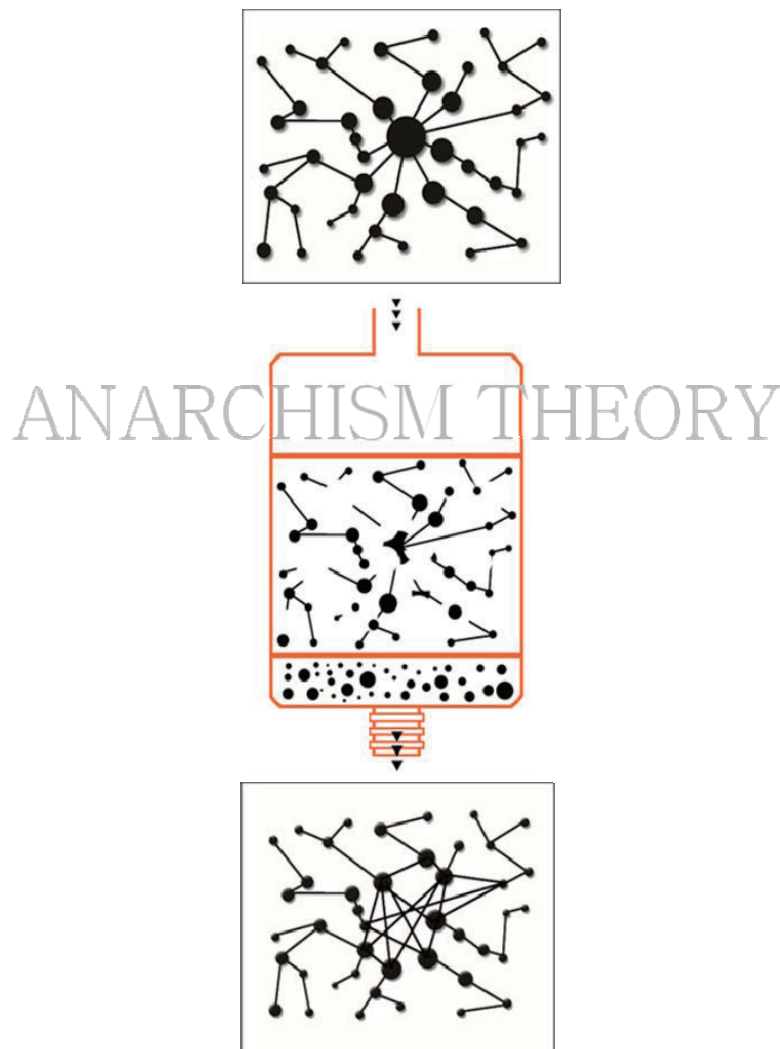


Fig. 2: loss of a urban hierarchy and rearrange urban structure

Conclusion

This study points up to take to a new precipice of understanding how ??place?? also I take the unconventional approach of looking at urban design from an anarchist perspective.

In this study found that perception of image-difference, in whatever its form, is the key to all meaning creation. And in that single unique value rests all of our orientation and morality. To produce an aesthetic pleasure must be create an aesthetic feel .This feeling lies in the meaning. I think if we produce meanings of pleasure , we can say that we create an aesthetic experience ,The experience of aesthetic pleasure, of being in place.

In the end I can only say that see the world with new eyes—eyes that create difference for orientation’s sake, to fearlessly know and find one’s way in life, because that is the only value which matters.

References

- Tveter Olympia, “Anarchist Urban Planning & Place Theory”, a Doctorate thesis , December 2009
- Articles of ISUF“17th Conference ISUF 2010”, Institute of comparative Urban History, University of Münster and Institute of Geography, University of Hamburg, August 2010
- Juan-Navarro Santiago, “The Anarchist City of America” Florida International University , January 2010
- Sorensen Andre, ‘Urban planning and civil society in Japan” , University of Tokyo, 2001
- Allan Antliff, Adrian Blackwell's Anarchitecture: The Anarchist Tension, Canada: Anarchist Developments in Cultural Studies , 2010.
- Haase Fee-Alexandra, “Beauty and esthetics meanings of an idea and concept of the senses “ University of Florida Jan 2011.
- <http://www.wikipedia.org/>
- www.anarchistplanner.org
- www.robertbrault.com

4

Science and technology that underpin culture

THERMAL ENVIRONMENT IN AJANTA CAVES

Tomoko Uno¹, Yoshiko Shimazdu²

¹ *Mukogawa Women's University, Japan*

² *National Research Institute for Cultural Properties, Tokyo, Japan*

Keywords: Thermal and moisture environment, Deterioration of murals, Visitors

Introduction

This paper reports the thermal environment throughout the year in the Ajanta Caves, India, with a focus on the influence of visitors. Ajanta is located at 20° north latitude and 75° east longitude in west-central India. The Ajanta Caves include about 30 caves which have richly decorated murals dating from the 6th century BCE to the 2nd century CE (Figures 1 and 2).

These murals have suffered from several causes of damage such as insects, small animals, and water [1]. An unsuitable thermal environment in the caves could be a factor that causes deterioration of the murals. Humidity changes in particular cause damage. High humidity causes damage to the plaster due to increased insect population, and wet and dry cycles cause cracks and loss of the surface of the paintings.

When the caves are open, the outside environment influences temperature and humidity in the caves. Nowadays, the cave openings are closed to prevent small animals from entering the caves; thus, the influence of the outside environment has become less. However, the influence of visitors is noticeable as a factor that increases temperature and humidity in the caves. To conserve the murals, it would be simple to close the caves to the public. However, the effective use of this cultural heritage for the development of the surrounding area requires public access. It is important to control the visitors in order to maintain a balance between sustainable development and conservation of this cultural heritage.

In the present paper, the temperature and humidity in the caves are discussed focusing on those caves open to the public.



Figure 1 View of the Ajanta Caves

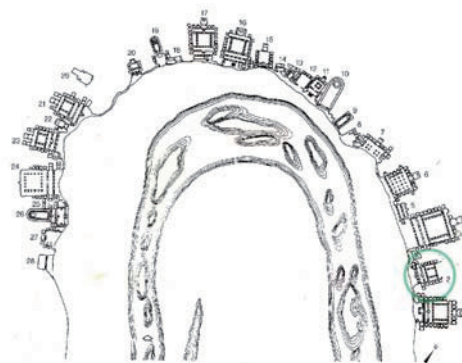


Figure 2 Site plan of the Ajanta Caves

1. Annual local climate

There are three seasons in this area: the rainy season, the dry season, and the hot season. Monthly rainfall is over 150 mm/month from July to September (Figure 3 left) [2]. Temperatures in April are the highest for the year with a monthly average temperature of 32 °C and a daily maximum temperature of over 40 °C. January temperatures are the lowest of the year with a monthly average temperature of 23 °C and a daily minimum temperature of 13 °C (Figure 3 right). The daily average relative humidity is 80% in the rainy season and 40% in the dry season (Figure 3 left). The changes in the temperature and humidity of the surrounding environment are very large.

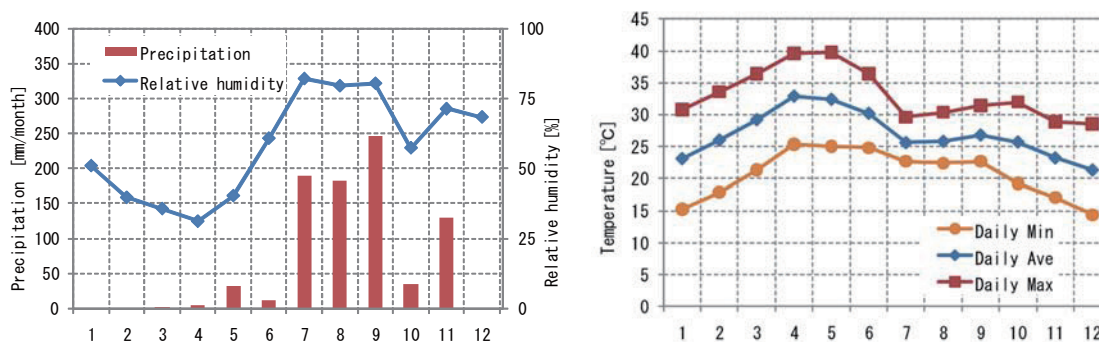


Figure 3 Local climate (left: relative humidity and precipitation, right: temperature)

2. Condition of the murals and the thermal environment

The factors causing the deterioration of the mural paintings in the Ajanta Caves are damage from rain water, a black substance related to bat excreta, insects and small animals, and deterioration of the materials used in past conservation treatments [1, 3].

Humidity changes accelerate deterioration of the mural paintings. For example, because the black substance related to bat excreta has high moisture absorbency, it undergoes repeated expansion and contraction whenever the humidity changes. As a result, humidity changes cause flaking of the paintings. Further, under high-humidity conditions, insects such as silverfish infest the plaster layers supporting the paintings [3]. The dry and wet cycle of humidity causes the expansion and contraction of the plaster, causing the plaster to detach from the back walls. In low-humidity conditions, the paint binder becomes friable, and the paintings detach from the walls. Thus humidity changes influence the condition of the mural paintings.

These damages to the mural paintings develop on the front side, where the outside environmental changes are larger than those on the back side. Nowadays, because the openings are closed to prevent small animals such as bats entering the cave, the influence by outside changes has become small. Now, however, the temperature and humidity increase caused by visitors has become a concern.

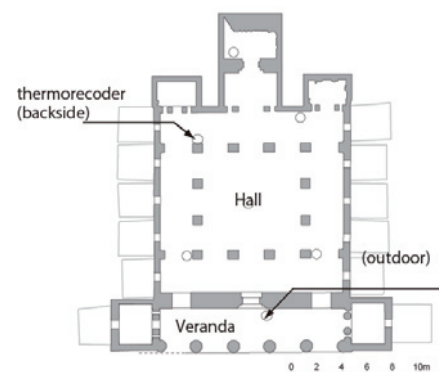


Figure 4 Plan of Cave 2

3. Environmental survey in Cave II

Measurements of the temperature and humidity by thermo recorders have been conducted at several points in Cave II since 2009. Cave II is located near the entrance to the Ajanta Caves (Figure 2) and consists of the terrace, main room, and small sub rooms (Figure 4). In the past, all of the walls and ceilings were covered by paintings.

3-1. Inside and outside temperature and humidity

The outside temperature becomes highest in April and lowest in January. However, the temperature in the caves becomes highest between May and June, which lags the changes in the outside temperature (Figure 3 right). The daily range of outside temperatures is small from June to September, and large from March to May and from October to December. The outside yearly variation is 5 °C, and inside it is 0.5 °C. The influence of the outside daily temperature change on the inside condition is small.

When the outside humidity is high between June and September, the inside humidity is close to that outside. When the outside humidity is low, the inside humidity is slightly higher than outside. This might be due to water sources in the cave.

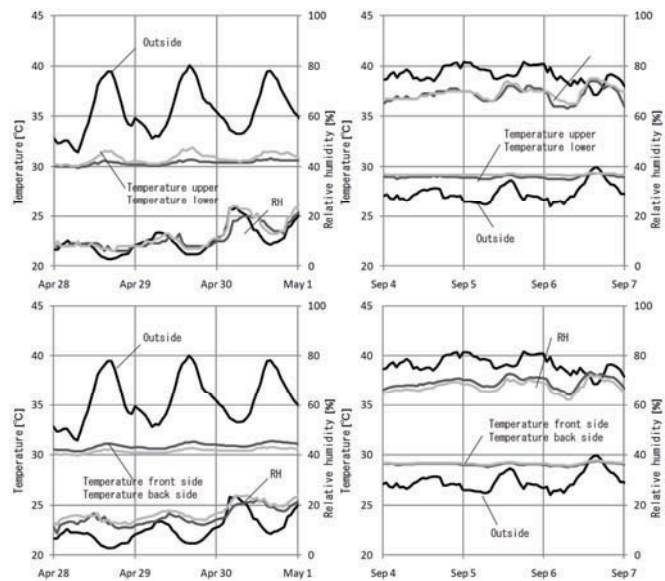


Figure 5 Temperature and relative humidity in Cave 2

(Left: April, Right: September)

The daily ranges of both temperature and humidity inside the cave are smaller than outside. The differences in the temperature and humidity from April to September are large: 10 °C in temperature and 60 points in relative humidity.

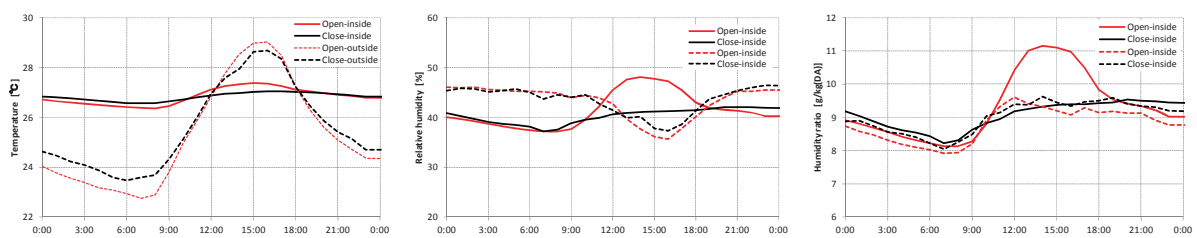
Comparing the temperatures upper and lower sides (Figure 5), the changes in the temperature upper side are greater than the changes in the temperature lower side. Particularly, the temperature change upper side is greater when the outside temperature is high, and that temperature change lower side is greater when the outside temperature low. The temperature difference between the front and back areas is smaller than that between upper and lower sides. The temperature at the front side is 0.5 °C higher than that at the back side. The differences in both the relative humidity and humidity ratio between front side and back side are small, and the humidity ratio is almost same as outside.

3-2. Temperature and humidity at the opening and closing days

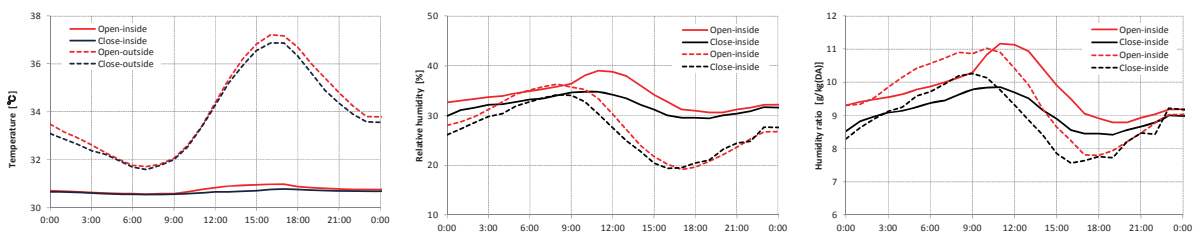
On a busy day, over 1500 visitors come to the caves. On a slow day, there are about 500 visitors. The open hours are from 9:00 to 17:00. If the average person stays for 15 minutes in the cave, there are on average 10 to 30 visitors inside the cave all of the time.

The temperatures at night for both open days and closed days are almost the same. While the daytime temperature on open days is 0.1–0.3 °C higher than that on closed days (Figure 6). This increase in temperature has been confirmed in all seasons. The difference in the dry season is greater even though the outside temperature is lower.

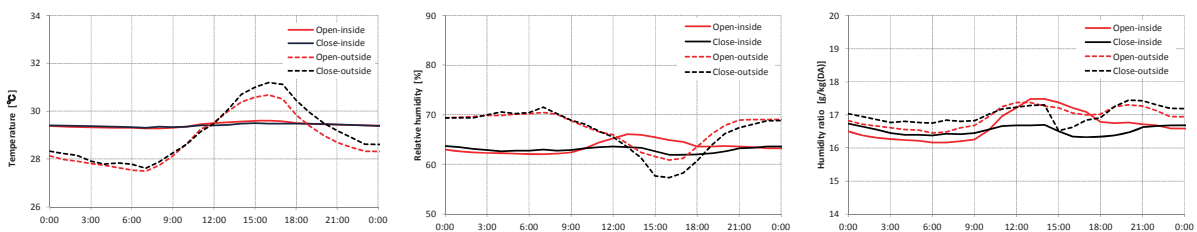
The changes in the humidity ratios denote the same tendency as the changes in temperature. The humidity ratio from 9:00 to 14:00 on open days increases greatly. The maximum difference between open days and closed days is 1.6 g/kg (DA). The changes in the humidity ratios are also shown for the rainy season and the hot season. The difference is greater on Sundays and Tuesdays when many visitors come to the caves.



(a) Dry season (December to February)



(b) Hot season (April to June)



(c) Wet season (July to September)

Figure 6 Comparison between inside and outside of temperature, relative humidity and humidity ratio

4. Influence of visitors

In order to evaluate an influence of the visitors on the thermal environment in the cave, the numerical calculation of air temperature and humidity ratio in the cave is conducted. This calculation includes the heat and moisture transfer in the porous materials. The equations (1) and (2) show the heat and moisture balances of the air in the cave. The heat and moisture flows from the surrounding walls, ceilings and floor, ventilation between inside and outside and generations from human are considered. The equations (3) (4) show heat and moisture

balances in the porous materials. One third of all wall and ceilings surfaces are assumed to be covered with the mortar which is porous material. The surface of the floor is assumed to be non-permeable to vapor. The air exchange volumes are decided as a function of the temperature differences between inside and outside. The temperature and humidity ratio measured from March 2009 to March 2010 in the veranda is used as the outside condition. The average temperature and humidity ratio are used as initial conditions, and the ground temperature and humidity ratio at a depth of 10 m is assumed to be the same as the average values of the outside.

Figure 8 shows the comparison of the calculated temperature and humidity ratio in the cave of both closed and open days on one day in March. There are 30 visitors per hour (1500 visitors per an open day). The differences daily maximum and daily minimum of the temperature and humidity ratio on open day are larger than those on closed day. These differences of the temperature and the humidity ratio were about 0.5 °C and about 0.6 g/kg(DA). The temperature and humidity ratio on open day are higher than that on closed day through the year.

$$c_a \gamma_a V_{cave} \frac{\partial \theta}{\partial t} = Q_w + Q_g + Q_v + Q_h$$

$$\gamma_a V_{cave} \frac{\partial X}{\partial t} = M_w + M_g + M_v + M_h$$

$$(c' \gamma' + \kappa) \frac{\partial X}{\partial t} = \lambda' \frac{\partial^2 X}{\partial x^2} + v \frac{\partial \theta}{\partial t}$$

$$(c \gamma + R \nu) \frac{\partial \theta}{\partial t} = \lambda \frac{\partial^2 \theta}{\partial x^2} + R \kappa \frac{\partial X}{\partial t}$$

(1) Symbols

- c : specific heat [J/kgK], c' : porosity [m³/m³], M : moisture flux [kg/s], Q : heat flux [W], R : heat of adsorption [J/kg K], t : time [s]; V : volume [m³], X : humidity ratio [kg/kg(DA)], x : distance into wall [m], α : heat transfer coefficient [J/m²sK], α' : moisture transfer coefficient [kg/m²s (kg/kg(DA))], γ : density [kg/m³], θ : temperature [degrees C], κ : amount of absorption and desorption of porous material per humidity ratio [kg/(m³(kg/kg(DA))], λ : thermal conductivity [W/m K], λ' : moisture conductivity associated with a moisture content gradient [kg/mh (kg/kg²)], v : amount of absorption and desorption per unit of temperature, [kg/(m³K)], ρ : density [kg/m³], ω : rate of moisture content [kg/m³].

(2) Subscripts

a: air, cave: cave, g: ground, h: human, v: ventilation between outside and cave, w: wall.

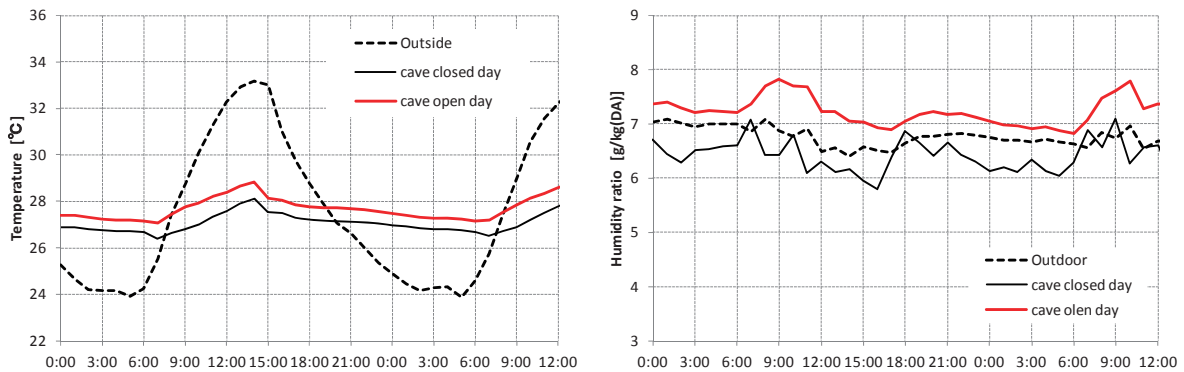


Figure 7 Calculated temperature and humidity ratio

5. Conclusion

In order to conserve the historical site with the sustainable development, the control of the thermal environment is required. In this paper, the thermal environment in the Ajanta Caves and the influence of the visitors on the caves environment are discussed.

Acknowledgment

A part of this work was supported by MEXT KAKENHI Grant Number 20700665.

References

- [1] Sharma, P.K., 2006. 'Painting techniques and materials of cave murals in India and their conservation problems', Murals of the Silk Road: Culture exchange between East and West, Proceedings of the 29th Annual International Symposium on the Conservation and Restoration of Cultural Property, National Research Institute for Cultural Properties, Tokyo: 101-106. Archetype publications.
- [2] NRICP • ASI: Indo-Japanese Project for the Conservation of Ajanta Paintings, 2008, Indo-Japanese Project for the Conservation of Cultural heritage, Series 1, JCICC, NRICP, 2010.
- [3] Tilak, S.T., Sharma, B.R.N., Sengputa, S.R., and Kulkarni, R.L. 1970. 'The deterioration and microbiological studies of Ajanta and Ellora paintings', Conservation of cultural Property in India, Vol. 5 (1970), Indian Association for Study of Conservation of Cultural Property, New Delhi: 77-82.

RESEARCH OF ANTI-FREEZING FOR THE BUDDHIST IMAGE CARVED ON TUFF CLIFF BY CLOSING SHELTER

Masayuki Morii

National Research Institute for Cultural Properties, Tokyo, Japan

Keywords: the Buddhist image carved on tuff cliff, deterioration, anti-freezing, shelter, ventilation rate, air current, thermal image

Introduction

The Buddhist images carved on natural cliff tend to be deteriorated by climate change such as freezing, crystallization and growing epiphytes because they are always exposure to outdoor. For example, in Usuki stone Buddha, which is located in Oita prefecture (Fig. 1), its surface was damaged by big chill every few years.

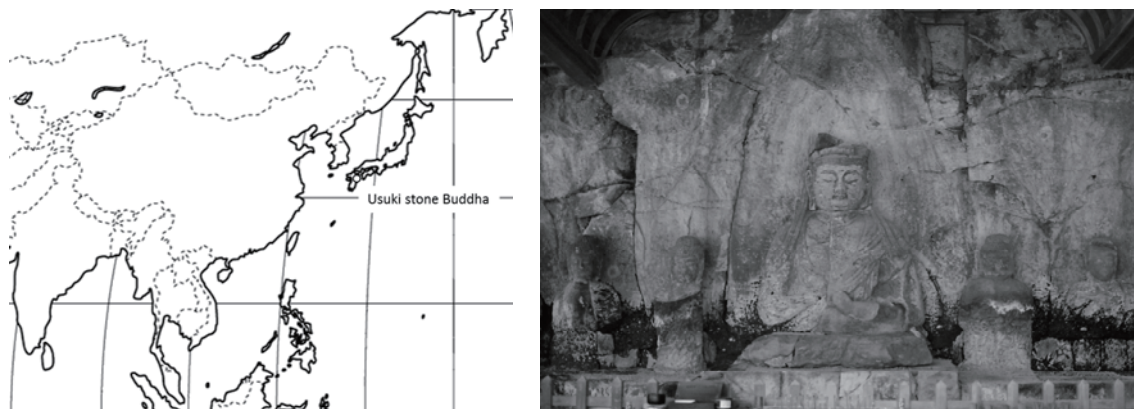


Fig. 1: The Usuki stone Buddha (Left: location, Right: the Buddhist images)

In the Usuki stone Buddha, it has been continued the researches to clarify what causes the deterioration and plan the next conservation project. From the meteorological observation, it was confirmed that freezing has affected the biggest deterioration phenomena. So we took some measures against the freezing.

In this paper, it has reported the conservation effect of shelter in the Usuki stone Buddha and the field test for anti-freezing of stone surface by closing shelter.

Classification of shelter type in the Usuki stone Buddha

In Japan, the shelter has often constructed at the Buddhist images carved on natural cliff for conservation themselves, especially they have been prevented from rain and inflow. The Usuki stone Buddha also has been constructed the shelter with wide roof about twenty years ago (Fig. 2). At first, the shelter of Usuki stone Buddha was compared with one of other Buddhist images by using "ventilation rate (the ratio of aperture area to volume in the shelter)" in order to confirm its conservation ability. Each shelters were classified under four

types from the viewpoint of whether its side wall were installed or not and how width of each roofs.



Fig. 2: Shelter of the Usuki stone Buddha (Hoki second cluster)

Table 1 shows the ventilation rate and monthly mean value of diurnal range between outdoor and indoor on August. If the shelter was closed, temperature change in the shelter was smaller than the others. However, it was observed that temperature change was small like a closed shelter in the Usuki stone Buddha although its side walls were not installed.

Table 1: Ventilation rate of each shelter types

(* Diurnal range was monthly mean value on August, 2005)

	S(m ²)	V(m ³)	VR(m ⁻¹)	diurnal range (outdoor)*	diurnal range (indoor)*
without side wall (usuki)	103.1	593	0.174	8.3	4.3
without side wall (small roof)	25.9	155	0.156	5.2	3.8
with side wall	13.8	137	0.101	8.3	4.4
Closed	7.2	223	0.032	7.9	3.1

It was estimated that the reason why temperature change was small was low impact of sunshine and radiation cooling because of wide roof in the Usuki stone Buddha. And it was also estimated that freezing was caused not by radiation cooling but advection of cold air.

Anti-freezing method in the Usuki stone Buddha

1. Heating on the Buddha surface

To prevent the Buddha surface from freezing, the heat lump was installed at Hoki second cluster and observed the temperature change on its surface by thermal images. Fig. 3 shows the change of temperature distribution because of heat lump irradiation. When it was turn on the heat lump, the surface temperature on the knee of main image was increased from 4.5 to 6.5 degree of Celsius. So it was confirmed that heat lump was effective on this site.

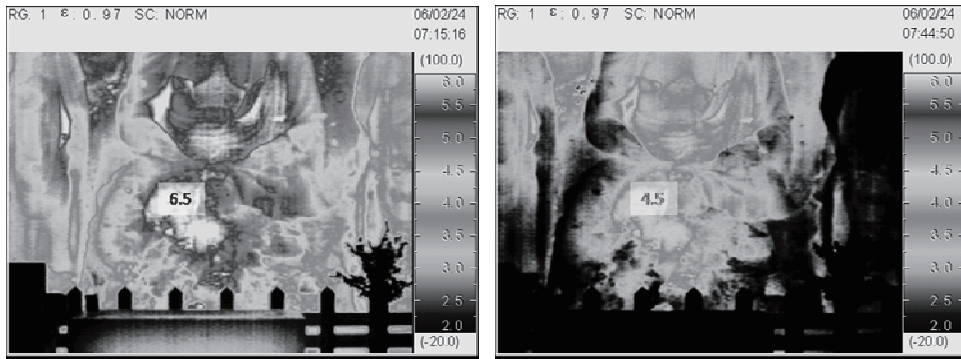


Fig. 3: Change of temperature distribution by heat lump

2. Control the cold wind

Heat lump was effective to prevent the Buddha surface from freezing, but it might help the vegetation growth. So the polyester curtain was installed each entrance of shelter and it was closed during the nighttime when it was cold (Fig. 4). And temperature and air current in the shelter was measured.



Fig. 4: The method to control a cold wind

Fig. 5 shows the change of temperature and wind speed. It notes that the polyester curtain was closed from the evening of 15th to the morning of 16th, January 2008. The left graph shows that the temperature when curtain closed was 3 degree centigrade higher than it opened. And wind speed was also decreased because of curtain. From this result, the polyester curtain was effective to control the cold wind.

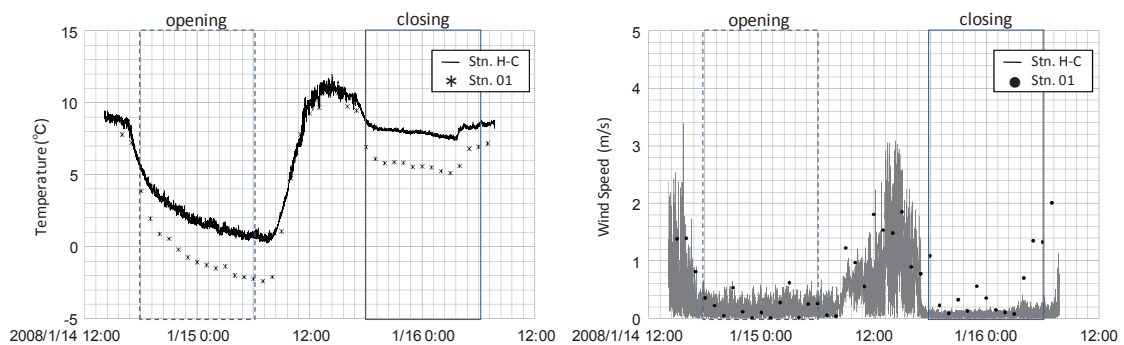


Fig. 5: Change of temperature and wind speed in the shelter

Results

The shelter was originally constructed in order to prevent the Buddhist image carved on natural cliff. From the investigation, it was confirmed that shelter was effective to control its environment and the risk of freezing has still remained because of cold air inflow.

Then, it was conducted two kinds of field test: heating on the surface and closing shelter. From the result, it was confirmed that closing shelter only when the cold weather predicted was effective and reasonable in the Usuki stone Buddha.

References

- [1] Masayuki, M. Conservation Environment and Conservation Studies for Stone Heritage in Japan, Papers presented at the International Symposium of Conservation Science for Cultural Heritage 2008, pp. 17-22, 2009.
- [2] Usuki City Education Board, The report of conservation at Usuki stone Buddha. (1997, in Japanese)

AIR CONDITIONING IN IRAN DESERT

Mohsen Ziaee¹, Ahmad Fakhar¹

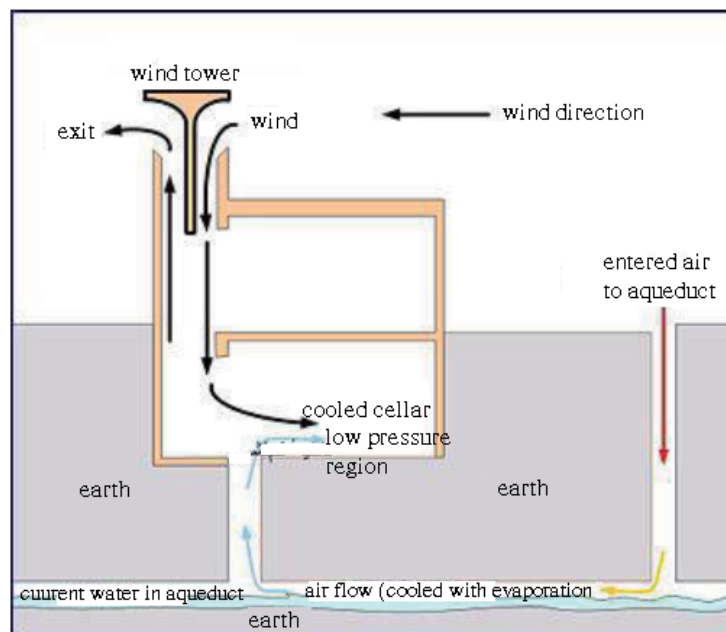
¹Kashan Islamic Azad University, Iran

Keywords: deflector, Iranian architecture, energy conservation

Abstract

Deflectors have been considered as the main elements of traditional architecture of Iran. They can be seen in settlements with warm climate, warm and moist, and warm and dry climates and they are shown off as vertical evident elements in the sky line of ancient cities of Iran.

Deflector is a symbol of Iranian civilization. It isn't clear that the first deflector has been constructed in which city of Iran, but travel account writers in the Medieval have pointed out to deflectors in desert and hot and dry cities such as Yazd. Without doubt, canal, deflector, and dome-shaped houses are considered as symbols of Iranian civilization. Deflector is composed of a turret on roof of house pretty much higher than elsewhere. Deflectors have been commonly built on a part of desert houses under name *aquarium*¹. The aquarium has been a small patio in end of summer rooms of each building. Summer rooms are composed large rooms with many doors- sometimes 5 doors- for air flowing, which they are located in end of the aquarium. The aquarium is like as an interface space between yard and summer rooms. There was a small pool in this space, which it is reason for naming this space. Deflectors are exactly located on top of the pool, but they direct air flow on water of the pool through their orifices. Deflectors have been made from mud brick and clay, and there have been used from wooden beams for their strong against wind.



¹ Part of the house containing a pool or stream

In history of the world, the first deflectors have been made in Yazd region. Function system of these deflectors is like the manner that they pull the current air outside of house and then cool and light the air by the prepared water tubs inside them, and finally conduct the air to the house.

Deflector is an Iranian innovative method for creating a cool atmosphere inside warm desert houses. The air conditioning system has been intolerable life space Iranian people for long time. Deflectors are usually small turrets as regular quadrilateral or polygonal which there isn't observed their triangular structure any way. Deflector is composed of a vertical canal with holes in head section which they conduct appropriate wind to inside space. Deflector has been possible accessing to concept of natural conditioning from previous times. This feature shows fitness capabilities of architecture based on the best form using environment for accessing appropriate air conditioning at that time. In traditional fitted plans with environment, deflector is an element which it works based on stability principles, energy conservation, and accessing to the best air conditioning.

Introduction:

Architectural design based on the best and the most effective form of accessing to appropriate air conditioning has been considered as a solution from previous times, in order to create a shelter for security against current climate conditions in Iran desert. In warm regions, Iranian people have invented different methods, in order to confront against tiresome warm. Tiresome warm, especially in the Central Iranian Plateau, has been one of the factors it is sometimes intolerable as which it can thread many life. There has been pointed out some methods for accessing appropriate temperature in Iran's historical documents, which they show Iranian efforts for safety against warm. Manazer Ahsan writes: "Abbasid covered their homes with two folder roofs by imitating Persian kings and smeared roof of their summer roofs with mud. Wet mud absorbed heat and cooled their inside air homes.

Natural conditioning and using un-mechanical cooling has had special place in the Central Iranian Plateau, and deflector, as indicator of Iranian architecture for this issue, has very important fame. Deflectors are elements of Iranian architecture in warm and wet and warm and dry climates, which they are observable in habitation space of old cities as a vertical element. These elements conduct appropriate wind inside space of buildings by holes in their heads, and they use from the environmental permanent energies by linking architecture with its environment and entering active air flow.

Deflector is a vertical canal which it is seen as square, rectangular, octagonal, or circular forms in plan. Deflector is composed from two sections:

- Inside section of the canal which it starts from ceiling and continue to basement
- Outside section which it includes wind entrance holes and it is located on the roof

Most of deflectors can get the wind from four directions, in order to increase their efficiency. But there can be seen one sided, two sided, and three sided deflectors.

Introduction with Working Method of Deflector

Deflector is the most natural method of conditioning. Deflectors are designed according to speed and direction of the wind. Air movement due to difference of air pressure is called the wind. The wind is a major factor changing temperature, humid, and transmitting suspended particles. This is very important for increasing mental and physical efficiency of people and decreasing affection to diseases. It can also be considered as a factor for decreasing use of fossil fuels. Importance of the wind has been considered for designing and building residential environment from previous times. Aristotle- 400 BC- and Vitrovires- Russian architecture, 100 BC- have talked about using the wind in architecture and urbanism.

Deflector, Past Heritage

In our country, all buildings have been built by considering environmental climate and conditions. The sun, wind, humid, cool, heat, and in general, weather and geographical conditions have had direct effect in traditional architecture of Iran in different regions.

Deflector is the most obvious method of natural conditioning in buildings. There have been different deflectors in many major cities in center and south of Iran, according to speed and direction of the wind. It is clear that deflector is very old phenomena by considering to its ancient and different names

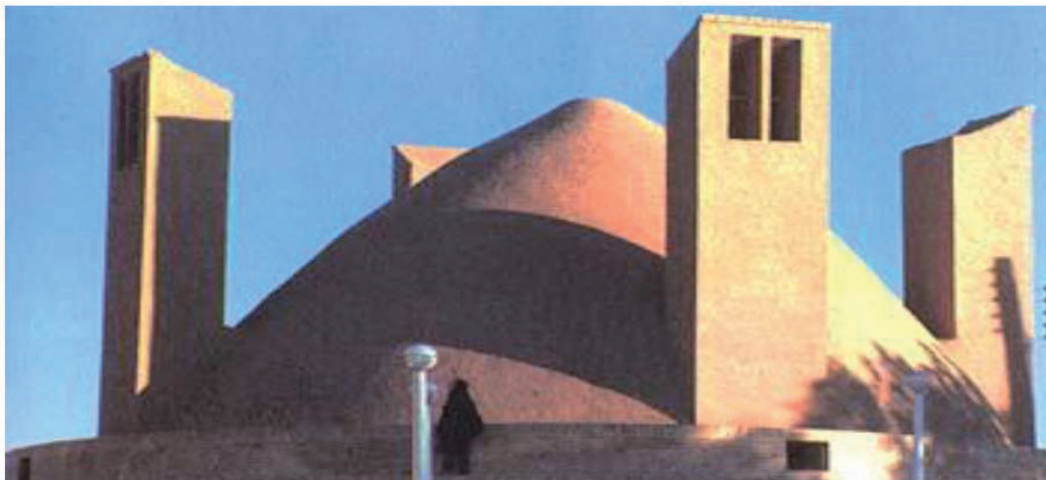
such as Waffer, Badhanj, Batkhan, Khishood, Khishkhan, Masooreh, and Havakep. After conjunction the wind with upper levels, it is guided to corridors which contacts with water in aquarium (such as deflector of Dowlatabad Garden) and then cools inside space of the room. In humid regions, the wind only passes from dry canals and ventilates room space (such as deflectors in southern port of the country).

Deflector types:

1. Ardakani Deflectors
2. Kermani Deflectors
3. Yazdi Deflectors

Ardakani Deflectors

This type of deflector is most seen in Ardakan region. In these deflectors, direction of springs is coordinated with Isfahani wind and it doesn't have any hole in its west, east, and south sides.



one sided deflectors- old structure of Ardakan

Kermani Deflectors (twins)

Kermani deflector, with its simple and small shape, is for middle and low middle families. Each bricklayer can build this type of deflector and its major constructions are mud brick and mud.



Dowlatabad reservoir with four Kermani deflector in Dowlatabad Garden, Yazd



a reservoir with two storage and seven Yazdi deflector in Hossein Abad, near Yazd

Yazdi Deflectors

Yazdi Deflectors are larger than other deflectors and they are often built as four sided deflectors; for this reason they are called four sided deflectors or four directions deflectors in some regions.

Affecting Factors on Categorizing Deflector types:

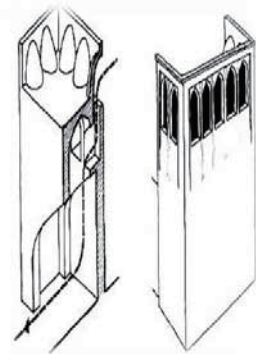
1. Column section form (square, rectangular, octagonal, or circular forms)
2. Numbers and types of deflector openings (one opening and four openings)
3. Numbers of deflector's floors
4. Construction of inside column

One Sided Deflectors

One sided deflectors are the simplest types. In this method, deflectors are made in direction with cool winds and light breezes, in order to avoid from heavy windstorms and floods and close their other openings. In some cases, one sided deflectors are made on opposite of violent winds. One sided deflectors are mostly found in Ardakan and Maybod regions. Of course, there is seen many one sided deflectors in other regions such as Mohanneh.



one sided deflectors- old structure of Ardakan



an abstract plan of a three sided deflector in Emamzadeh Hassan, Tabas

Two Sided Deflectors

These types of deflectors are made with two dimensions on opposite each other and with long and narrow windows without any fence; they can be seen one or two holes in shelf inside the building. This type is seen in Sirjan and hardly rare, in Kerman.

Three Sided Deflectors

These types of deflectors include two categories: connected three sided and separate three sided (torn abdomen). There can be used from one, two, or three sides separately in this type of deflector. Of course it is used rarely.

Four Sided Deflectors

Fourth type includes four sided deflectors which it is built more complete and comprehensive than other types. Usually inside canals of these deflectors are divided to some sections by brick, wood, or chalk partitions. In some cases, there has been built a beautiful and large pool under the deflector canal which dry and dusty air after conjunction with water, has changed rooms' space with a cool air in the summer season. In regions without possibility of building aquarium in ground floor of the building, water of aqueduct has been flown underground. These spaces (cellars) have been a place for collecting



four sided deflector with square section, Kashan

members of family in warm afternoons in the summer season. This type is seen in Yazd, Kerman, Booshehr...

Multi-Dimensional Deflectors

Using multi-dimensional deflector (usually octahedral and sometimes circular) which includes fifth type deflector is common in Yazd and some central parts of Iran. Reason of building these deflectors is appropriate winds which they are flown from every side and canal partitions can get the wind from every direction and then guide it to inside the considered path.

Pipe Deflectors

Pipe deflectors are sixth type of deflectors, which bricklayer has used from some bent pipes (denticulate knee-shaped) in outside section of the deflector, instead using cubic space. But inside canals and sections are like to the multi-dimensional deflectors. This deflector has been only seen in Sirjan.



eight sided deflector, Dowlatabad Garden, Yazd

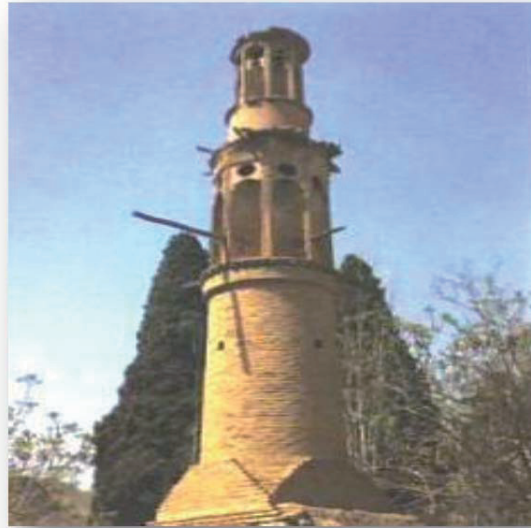


high and unit deflector, Rajabi House, Semnan



calument deflector, Sirjan

Deflectors have been constructed in multi floors which it has resulted increasing efficiency of deflector.



two floor deflector with circle section, Chehel Sotoon Palace, Sarhangabad village, Lorestan

Conclusion

Different typology of deflectors in Iran and their diversity in cities in warm regions of the country shows genius of Iranian experts in optimized using from natural elements, in order to be kept against tiresome warm. By inspiring the environment, they could build deflectors which they decreased air temperature to 15 degree which shows that Iranian people have been elite function technology, in addition to consider to build beautiful buildings. So it can be said that Iranian people have been innovators of this element (deflector) and they have provided deflector to the worldwide as an important result for appropriate conditioning. Although west countries have registered different types of natural conditioning under their name by studying Iranian deflectors but it can provided unique innovations to the world by considering innovation such elements including aqueduct, wind and water mills ... in order to coordinate with the nature and save energy consumption.

References

1. Dr. Mehdi Bahadorinejad, Alireza Dehqani. Deflector, Masterpiece of Iran Engineering;
2. Hossein Zomorahidi. Iran Architecture, Building a Construction with Traditional Materials;
3. Dr. Mohammad Karim Pirnia. Iranian Architecture;
4. Mahnaz Mahmoodi. Deflector Technology in Iran;
5. Behdornejadi Mehdi. Cooling Efficiency of Deflectors, Appropriate Conditioning Monthly,

CHARLES CORREA'S HOUSING LANGUAGE

Belinda Torus

Bahçeşehir University, Turkey

Keywords: Charles Correa, housing, shape grammars

Introduction

Charles Correa is an Indian architect, planner and theoretician, who has been doing architecture for fifty years [1] and designed many projects both in India and abroad. Correa, which Khan referred to as a lateral thinker and pioneer [2], designed his projects underpinning culture, vernacular and context without overlooking the user's need as well as cost and energy efficiencies. In this paper housing projects of Correa's are analyzed in order to draw a main frame for an architect's language, which can be said, is an interpretation of vernacular and culture. In order to analyze the projects shape grammar method is used.

Shape Grammars

Generative grammar is a system used to study and explore new languages with characters and symbols. Shape grammar is one type of generative grammars which deals with points, lines, shapes and solids instead of characters. In shape grammars, new shapes can be created by an initial shape, shape elements and production rules [3]. So basically it focuses on the shapes and the production rules with which the shapes come together. Analytical studies of shape grammars on architectural works help to understand the formal relations of architectural works and can be used to analyze design grammars of a certain architect, a characteristic tissue or a typology. It also helps to complete and reconstruct projects with the help of grammar or adding new grammars. It may inspire new projects especially computational projects both in the sense of form, concept and generation. Some architects have languages which are extremely suitable for this kind of analysis and data derivation. In terms of technology and science these derivations can be used in order to design new housing projects or at least can be inspirations for them.

Correa's Grammar

In Charles Correa's public housing projects, it is possible to see the effect of his design language. Correa, parallel to the rapid population growth in Third World Countries, designed settlements which are low-rise and quickly built as well as have the potential of expansion. In addition to this, each house is designed with its open spaces and house groups which its public spaces. In short, Correa designed low-rise housing with its open-space relations, well-resolved air conditioning with a rational manner [4]. The underpinning of culture as well as old architecture is the dominant factor for this manner. Correa stated that "In this, the old architecture – especially from vernacular – has much to teach us, as it always develops a typology of fundamental sense." [5]. In short the rationalism and efficiency between these projects lies on the teachings of vernacular architecture.

The Projects and Analysis

Correa has designed several houses with a variety of generation method [6]. The forms are mostly basic and the generations can be grouped as linear generations, grouped or clustered generations, and chainlike generations. In some settlements, only a single type of module is used while on the others various modules (units with a variety of fields) can be seen (fig. 1).

THE GRAMMAR of CHARLES CORREA	The Site Plan	The Types	The Modules	The Relations	The Generation	The Functions	The Generation
The Cablenagar Township Kota, Rajasthan-1967							
PREVI Experimental Housing Lima, Peru-1969-1973							
HUDCO Housing Jodhpur-1966							
Malabar Cements Township Kerala-1978-82							
ACC Township Wadi, Andhra Pradesh-1984							
Belapur Housing Belapur, New Bombay-1983-1986							

Fig. 1: Analysis of the houses [7]

1. The Cablenagar Township:Kota, Rajasthan-1967: The Cablenagar Township, designed in 1967 but never built, was to be at the edge of the Rajasthan Desert using several ideas which combined Correa's attitude to climate and materials [2]. There are different types of basic modules according to the size. The basic modules are rectangles and on the bigger types second stories are used. This project is an example of linear formation. Modules come together side by side by sliding slightly.

2. Previ: (Proyecto Experimental di Vivienda) in Lima, Peru, 1969-1973: The United Nations and the Government of Peru are the co-sponsors of this contest project. The jury was unable to make a consensus for the winner and 12 to 20 housing units from each project were applied in a region. Correa's design is focused on two issues in this project. First one is the minimization of the service area and to provide natural air-conditioning and the second one is the potential for expansion [2].

This is an example of a linear derivation. Both types of development are linear. The module in the first generation is formed as a result of the basic arithmetic operations. Two rectangles, large rectangle (6x15) and small rectangle (1x3) are used and the basic module is formed with the subtraction operation. The module is repeated and the generation is done by again sliding the module. The modules are connected with the subtracted parts into each other. The first floor and second floor of the same form used in this project. On the third dimension there are differences on the plan layout and the space typology. The stairs and toilets are on the cavities, parallel to the subtracted parts. Common living rooms is placed facing the inner courtyard, the kitchen is designed facing the outer courtyard. The second type of the first project has two different modules and the mirrored symmetry of these modules. Two rectangles are used to form each module. These modules come together in linear formation by sliding. In the functional analysis, a linear horizontal circulation is connected with a vertical circulation element (stairs) in the center. As in the first type, living room is in the center, while kitchen and rooms are facing outside.

3. HUDCO: (Housing & Development Corporation), Jodhpur – 1986: In this project Correa designed an addition of 176 housing units to an existing settlement. Local stone and materials are used and due to the climatic conditions of each house has an enclosed courtyard. The houses have either one or two floors [2]. There are different types of modules; small module (3x3) and mid-module (4x4) are both can be placed on a grid. Modules of same sizes came together in order to create grouping units with a 90° rotations. And one module is removed in order to repeat the same generation. Later, these generated groups came together in order to form the settlements. The rooms and living spaces and kitchen are placed facing the inner courtyard while the toilets and bathroom are looking outside.

4. Malabar Cements Township, Kerala-1978-82: The idea of a “company town” often located in remote areas or urban outskirts, is to provide a self-contained living environment for employees directly connected to the physical production plant [2]. In this project two houses are grouped or connected with bridges and the neighborhood is generated by clustered of these houses.

5. ACC: (The Associated Cement Company), Wadi, Andhra Pradesh – 1984: Two types of projects are designed in an existing settlement for the ACC Company [2]. Two types of modules are used in each solution and they both have two floors. In the first type, unit modules are grouped with 90° rotations and mirror operations. The generation is done by rotation, rotational symmetry and mirror operations. The site generation is done by repetition and rotation of the generated groups. In the center of the houses stairs and halls are designed and around the hall rooms, living room and kitchen is placed. In the second type, two types of modules are generated. With the combinations of two modules, different alternatives and perspectives can be obtained. All the rooms are facing outside in this project. In the first group, the generation is chainlike while in the second one it is clustered.

6. Belapur Housing: Belapur, New Bombay-1983-1986: The project uses one overriding principle: each unit is on its own individual site to allow for expansion. The scheme caters for a wide range of income groups, from the lowest up to the upper income levels [2] (fig. 2). The basic modules are formed as shown in figure 3. The bathroom and WC is on the courtyard while the kitchen is adjacent to the living spaces. All the buildings have their own courtyard and they come together by basic operations like 90° rotations and mirror (fig. 4). Houses come together with these relations and form a community space (fig. 5). These generated groups come together in order to form the settlement (fig. 6). The formation is clustered in this project.

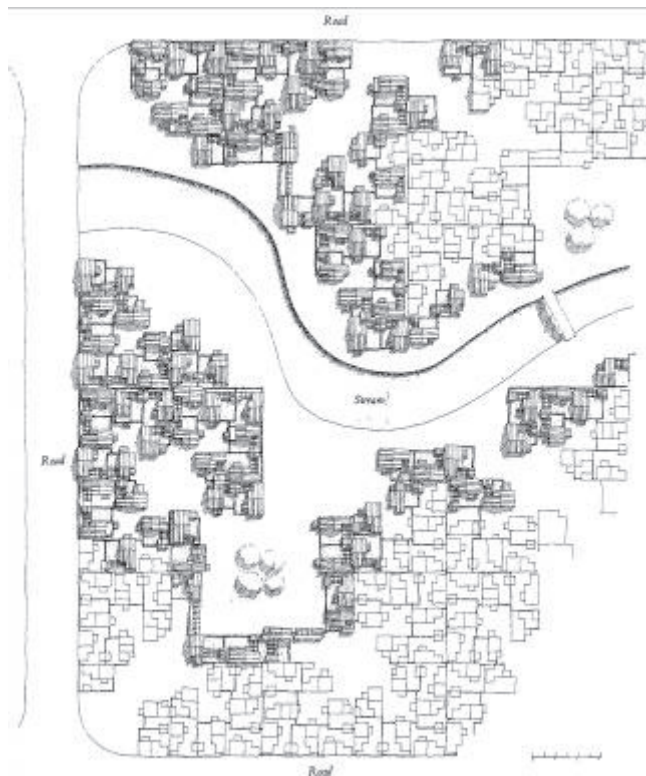


Fig. 2: The site [2]

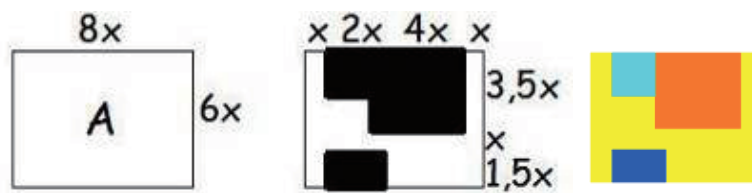


Fig. 3: Formation of the module

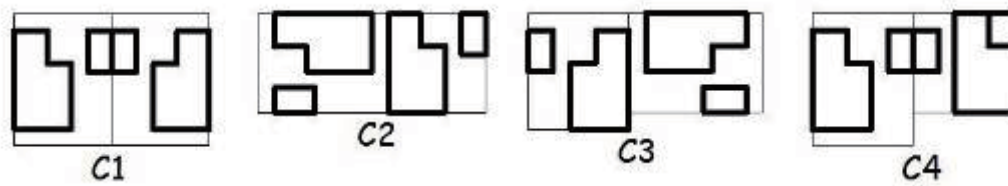


Fig. 4: The relations of the modules

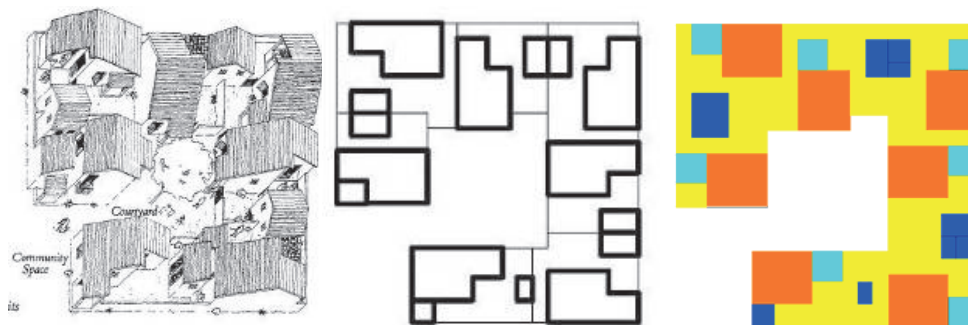


Fig. 5: Generation of the basic group and formation of the community space (first picture [2])

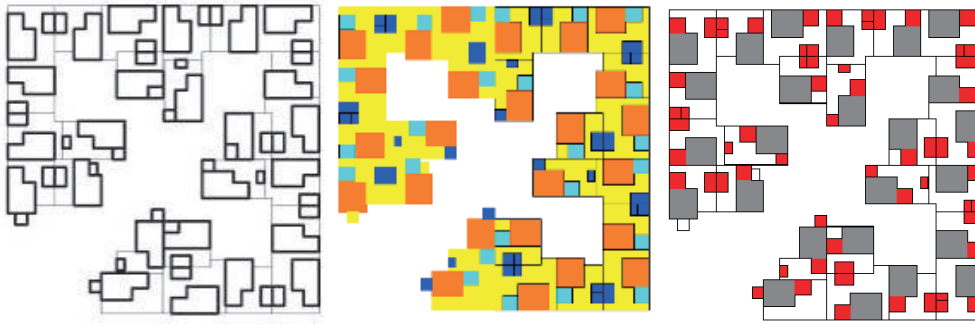


Fig. 6: Generation of the neighborhood

Results and Concluding Remarks

Shape grammars are illustrated generative grammars and deals with geometric elements. Repetitive elements (in Correa's case: houses) can be generated by the rules in this method. Rules must be derived and set in order to understand the language. The inspiration for the architect is based on vernacular and the houses are well acclimatized and cost efficient.

Three types of analyses are done: functional analysis, open-closed relationship analysis, generation method. In the generation method analysis, the examples of linear generations is shown in figure 1 (first three examples), grouped or clustered generations (4th, 5th, 7th and 8th examples) and chainlike generations (6th example). Mostly one or two floored houses are designed. All the houses have their open and closed spaces while on the clustered and chainlike generations community spaces are also formed.

The analytical shape grammar studies can be generated computationally. Computer-based generations have important features one of which is the editable nature of the scripting language. By changing the parameters, and adding randomness, the production space can differ widely and the design can be customized. In this sense, parametrically analyzed projects and derived rules can be used as a base for computer-based generations in the further phases.

Acknowledgement

I would like to thank Assoc. Dr. Birgöl Çolakoğlu and Prof. Dr. Murat Soygeniş.

References

- [1] <http://charlescorrea.net/> (19/03/2012)
- [2] Khan, H. U., Charles Correa: Architects in India, Butterworth Architecture, 1987
- [3] Stiny, G. Introduction to Shape and Shape Grammars, Environment and Planning B: Planning and Design, Volume: 7, pages: 343-351, 1980
- [4] Correa, C., The New Landscape: Urbanization in the Third World, Butterworth Architecture, 1989
- [5] Correa, C., The Blessing of The Sky (essay 7), Thames & Hudson, London, 2000
<http://charlescorrea.net/> (19/03/2012)
- [6] http://www.bot.yildiz.edu.tr/_sites/mardin/Doc/Correa.pdf (19/03/2012)

- [7] http://www.bot.yildiz.edu.tr/_sites/mardin/Cc.htm (19/03/2012)
- [8] Torus, B. Konut Ön Tasarım Sürecinde Kural Tabanlı Bir Yazılım Modeli: Mardin Örneđi, [A Ruled-Based Software Model in The Preliminary Design Phase Of Housing: Example Of Mardin], Master's thesis, YTU, 2008 (in Turkish)

THEORETICAL AND HISTORICAL PERSPECTIVES IN DESIGN, INNOVATION AND POLICIES

E. Tezel

Bahçeşehir University, Turkey

Keywords: Design, design policy, innovation, innovation policy, national development, Japan, Turkey.

Introduction

In the globalized economy of 21st century, many industrialized countries owe their social and economic successes to transform their conventional economies into the design oriented innovation economies. Achievements of industrialized countries indicate that there is an intensive and multidimensional relationship between design, innovation and R&D activities [1], [2], [3], [4], [5]. Asian governments, by following Japan's leadership, are encouraging and implementing design driven knowledge and technology to excel their position in competitive global market.

Economic performance of countries is related to national system of production and new developmental paradigms take into account not only the quantitative economic indicators but also social development and welfare of societies. Developmental patterns of countries depend on the implementation of policy tools such as innovation, research and development, technology and knowledge [6]. In this progress, differences in national economic structures, values, cultures, institutions and even histories contribute to the stories of development.

This paper attempts to describe the practical relationship between design, innovation and their core function in the national development. The relation of design as an economic factor in national design policies and its relation to innovation strategies were examined as the agents of national policies after Second World War. Dynamics that create differences between the developmental stories of countries are discussed in the cases of Japan and Turkey.

Innovation and Design

An early definition of innovation is given as the successful implementation of creative ideas within an organization [7]. In the contemporary literature, innovation is emphasized on wealth creation and change by which societies can enhance welfare when they organize and manage themselves for innovation [8]. Several theoretical and empirical studies indicated that successful relations between technology, innovation and knowledge bear out economic growth [9].

Innovation has been widely referred to technology, technical change and invention; but crucial role of design in innovation was rarely mentioned [10]. OECD (1992) proposes a distinction between technological innovation and product innovation due to the implementation of technological novelty to a product or service and the marketability quality of a product or service. Innovations have been categorized as product innovations and process innovations by OECD, but technological innovations have been distinguished as a diverse category of innovation that encompasses both product and process innovations. Technological innovations are accepted as inventions that have to be transformed into

marketable products or processes to provide a commercial advantage [11]. While technological innovation employs the methodology of science, design exceeds scientific methods and defines radical new meanings [12]. Thus, while regular design activity enables to transform technological innovations into product or service innovations or contributes to the incremental improvements in the quality of product or service, design driven innovation comprises production of radically new products or services obtained by design effort with no or minimal technical novelty [13], [14].

Role of design in innovation was first mentioned by Freeman (1982) in which design was placed in the innermost part of innovation process by indicating the use of resources like R&D activities [15]. Developing countries who perform effective national policies with design, technology and innovation systems succeeded in economic growth [16].

Design, Innovation and National Policies

The best known definition of industrial design was stated by the International Council of Societies of Industrial Design (ICSID) in 1969: *“Industrial design is a creative activity whose aim is determine the formal qualities of objects produced by industry. These formal qualities are not only the external features but are principally those structural and functional relationships which convert a system to a coherent unity both from the point of view of the producer and the user”* [17]. Yet economic value of industrial design has to be taken into account to understand how it has evolved to have an impact on cultural and economic systems. The council broadened the definition to encompass the services, processes and systems: *“Design is a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life cycles. Therefore, design is the central factor of innovative humanization of technologies and the crucial factor of cultural and economic exchange”* [18].

Historical and theoretical ties of design and economy appear to be strong as seen in the examples of some Asian countries that were led by Japanese economic model. Achievements of these countries depend on an anticipatory relationship between practice of design and economics on the common ground of innovation. As design is being granted in economic theories, it has a major significance in economic growth [19], [20], [21]. This begins from the concept that design has a power to add value to the artifacts with better product quality and innovation. Likewise design has situated as a policy agent that brings it to political agenda of countries. Hence design policy is used as a strategic tool by government's political and economic actions in order to achieve policy objectives for the development of society.

The relation between design and innovation as a policy is not very much in the literature, although the impact of design driven innovation was accepted as a power by many developed economies. In this respect, government intervention based on effective policies is necessary to create an environment conducive to integration of design and innovation [22].

Design and Innovation Policies in East and West Asia

Design and innovation policies of Japan and Turkey were selected as the paradigms of advanced industrial country and newly industrializing country respectively. These countries were evaluated by the applied design policies, design support programmes that have been implemented on the basis of innovation activities into policy structures. Application structures of strategies by the governments and effective results of these strategies on general policy structures in sectoral and social perceptions are discussed.

Japan

In years 1945-50's, post-war Japanese industrial strategies evolved from low wage industries like textile to capital-intensive economies in steel, shipbuilding, automobiles and consumer electronics in 1960's and early 1970's. Then in late 1970's and 1980's, a substantial growth was observed in high technology products and Japanese products confirmed their design identity by innovation and creativity. Japanese industry rose the highest level of competitiveness during 1980's. While foreign technologies were internalized and further developed, product quality has always been maintained [23]. Though the crisis in 1999 caused a decade of stagnation in Japan economy, reformation brought recovery after 2003 [24]. Today Japan is a world-wide competitive country that makes investments on knowledge technologies and service systems.

The active role of government in coordination of stakeholders in the national policies realized the leader position of Japan that became a model with its innovation policies for the other East Asian countries. 1950's and 1960's were the years of absorbing the foreign technologies and improving them with R&D activities but Japan had difficulties in formulation of its own innovative systems for the production of high quality products and processes. Due to the great need of design driven innovation the 1950's, Japanese government established the Design Department in the Ministry of Economy, Trade and Industry (METI) to encourage the design industry on a national scale.

In Japan, design has been promoted by various organizations. Japan Industrial Design Promotion Organization (JIDPO), established in 1969, has managed overall design promotion, including the implementation of design award systems for the development of innovative industries. Japan Design Foundation (JDF) has primarily coordinated international design collaborations while commercializing design by connecting good design products of the local small and medium size enterprises (SMEs) with international markets. Regional design centers are supported either by local governments or by private economic organizations. While they provide connections between design firms and local industries, they also organize design education programmes and design events to enhance the design recognition. Private design promotion corporations manage various design promotion businesses like design publication, support of SMEs for design development and execution of design events [25].

Japanese design promotion which played an important role in the structure of industrial based R&D and technology development activities have applied consistently as a policy for fifty years. Innovation has always been looked at as a key factor and high investment rates have maintained for R&D. The economic recovery began in 2002 achieved by METI's several policy start-ups that integrate design policy, innovation and R&D strategies. Innovation capabilities has enhanced by open innovation by university reform. The primary idea is to improve cooperation among local industries, universities and government. Universities were called upon to establish their policies on managing their intellectual property rights (IPRs). The knowledge and technology produced in universities transferred to companies [26]. Though Japan economic development suffered from the recession of 1990's, the country is a serious contender for world leadership in innovation in contemporary design.

Turkey

Industrial design in Turkey started in the context of modernization attempts mostly introduced by developed Western economies. Early initiatives of industrial design was the result of a comprehensive modernization project that embraces social, cultural and economic

aspirations [27]. In 1960's, high demand for consumer products that symbolize the modern life was answered by the establishment of a wide industrial base behind protective barriers under import substitution. Turkish production was based on copying the foreign samples and selling to a high-demand market free of competition. Design was not a desired agent of industrial production nor the government considered it as a required policy for national development [28]. In investment-driven industries, design was introduced as part of technology transfer through licencing agreements. Meanwhile innovation was not a self-produced mechanism to be transferred into marketable consumer products.

In Turkey, industrial design education started at the end of 1960's by American initiation. That imported start was away from a genuine demand from domestic industry and market for product design [29]. The first design promotion activities that took place in 1970's were not motivated by government policies, but appeared as bottom-to-up design propagations by design schools and industry [30]. As not being supported by government policies, results of these progresses faded away. Some innovative experiments in automotive industry was stopped because of difficulties in production line and lost competition against licenced investments.

Beginning from 1980, a dramatic change in industrial policy to liberalism modified the texture of production, at the same time the drift of industrial design in Turkey. Export-oriented strategies necessarily opened a space for design for the survival of production sector due to competitive pressures of barrier-free global market. However, design was still not an object of discourse in industrial policies.

Effects of export-led strategy with an increasing liberalization were felt more in 1990's. Turkey became the part of European market by customs union in 1996 and obliged to compete with technology, design and innovation. 1990's were the years of increase in design promotion activities mainly realized by Industrial Designers Society of Turkey (ETMK) founded in 1988. 1990's were also the years which the national innovation system was started to be discussed to enable coordination of institutions and mechanisms.

When the national crisis due to weak banking system hit Turkish domestic market in 2001, manufacturing sector relied on export market and tried to overcome lower-wage economies by innovation and branding strategies. In spite of impediments of global crisis in 2008, 2000's were the take-off years of industrial design in Turkey. As the most conspicuous governmental initiative in Turkish history, Turkish Design Council (TTK) was established in 2009 by the decision of the Council of Ministers in order to make design driven national economic policies. Since the beginning of 2000's national identity of design has been the central issue and its relation with national innovation system is the concern of policies.

Conclusion

This paper has attempted to describe the close relationship between design, innovation and their place in national development. Design thinking in a society requires maturation similar to development of its economy, administration and services. However, as seen in the historical examples, governmental support as the main coordinator keeps its importance in this progress. A comprehensive design policy requires the integration with national innovation system that are driven by R&D activities coordinated and motivated by governmental system. Realizing that design is one of the main driver of innovation, there is a need to rebalance innovation policy to include a greater appreciation and focus on design.

There have been major differences between countries in the way which they have organized and sustained the introduction, development, improvement and diffusion of design and innovation on new products and processes within their national economies. Both Turkey and Japan have started their modernization attempts in the same period when economic and

political predominance of developed economies were broadened over the world. However design awareness in society and government is much more earlier in Japan. When Turkey was establishing its closed-system domestic market, Japan has already realized the necessity of building national design identity. Japan appeared to lead the rest of the world in innovativeness, international competitiveness and economic growth. Japan is currently still seen as a model for economic growth by many other countries. However, no society is free from economic, political and cultural dynamics when building its design identity. By being in the meeting point of different dynamics like politics, geography, culture, and religion, Turkey is a distinct country that suffers the effects of its heterogeneous structure through crises, discontinuities and paradoxes. However, its natural complexity also creates an opulent infrastructure for the national design identity.

New development theories encompass the share of knowledge in the form of networking between users, academia, R&D centers, investors, manufacturers, and marketing departments who may play equal roles for dissemination of design and innovation [31]. Hence systematic links between design and innovation policies that respond the social, cultural, political and economic conditions of the countries will be built by the governments in the new developmental paradigms. Japan has started to adapt to new developmental policies by promoting communication between academia, private sector and policy makers. Turkey needs more experience for implementation of design promotion activities to be integrated into other policies while a lot has to be done to build the national design identity by exploring cultural values for design driven innovation.

References

- [1] Ahn, S. and Song, J. Evaluating the Effectiveness of Asian Design Policies. *The Design Management Review*, Vol. 21, No. 4, pp. 78-86, 2010.
- [2] Bengt-Ake, L; Björn, J., Esben, S. A. and Bent, D. National systems of production, innovation and competence building. *Research Policy*, Vol. 31, pp. 213-231, 2002.
- [3] Er, H. A. Developmental Patterns of Industrial Design in the Third World: A Conceptual Model for Newly Industrialized Countries. *Journal of Design History*, Vol. 10, no. 3, pp. 293-307, 1997.
- [4] Forrest, C.; Guilhavet, R.; Love, L.; Trevett, N.; Quick, H. and Skok, V. Design and the State and The State of Design+Survey of Government Policies in Asia, Japan, Western-Europe, Scandinavia and North America. *Design*, 495, pp. 43-50, 1990.
- [5] Jacobs, L. and Herbig, P. Japanese Product Development Strategies. *Journal of Business and Industrial Marketing*, 13(2), 132-154, 1998.
- [6] Shyu, J. Z. ; Chiu, Y. and Yuo, C. A Cross-National Comparative Analysis of Innovation Policy in the Integrated Circuit Industry, *Technology in Society*, Vol. 23, pp. 227-240, 2001.
- [7] Amabile, T. M. *The Social Psychology of Creativity*. Springer-Verlag, New York, 1987.
- [8] Schumpeter, J. A. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and Business Cycle*. In M. Casson (ed.), *Entrepreneurship: Theory, Networks, History*, UK: Edward Elgar Publishings, Hants, 1990.
- [9] World Bank (2011) oecd.org/sti/scoreboard (29/2/2012)
- [10] Walsh, V., Roy, R., Potter, S. and Bruce, M. *Winning by Design: Technology, Product Design and International Competitiveness*. Oxford: Basic Blackwell, 1992.
- [11] OECD (Organization for Economic Co-operation and Development). *Technology and the Economy: The Key Relationships*. Paris: OECD Publications, 1992.
- [12] Verganti, R. *Design-driven Innovation*. Harvard Business Press, Boston, 2009.
- [13] Ibid.

- [14] Utterback, J.; Vedin, B.; Alvarez, E.; Ekman, S.; Sanderson, S. W.; Tether, W. And Verganti, R. Design-Inspired Innovation. NJ: World Scientific, 2006.
- [15] Freeman, C., The Economics of Industrial Innovation, 2nd edition. Frances Pinter, London, 1982.
- [16] Shyu, J. Z.; Chiu, Y. and Yuo, C., op cit.
- [17] Verganti, R. op. cit.
- [18] ICSID (International Society of Industrial Design), <http://www.icsid.org/about/about/articles31> (23.2.2012)
- [19] Amir, S. Rethinking Design Policy in the Third World. Design Issues, Vol. 20, no. 4, pp.68-75, 2004.
- [20] Er, H. A. Does Design Policy Matter: The Case of Turkey in a Conceptual Framework. Design Policy and Global Network, Proceedings of World Design Forum. Eds: Lee Soon-in, Seongnam: Korea Institute of Design Promotion and ICSID, 2002.
- [21] Heskett, J. Creating Economic Value by Design. International Journal of Design, 3(1), 71-84, 2009.
- [22] Leipziger. D. M. and Thomas, V. An Overview of East Asian Experience. In Lessons from East Asia, Danny M. Leipziger (ed.), Michigan, 2003.
http://www.google.com.tr/books?id=B1Rw_hbN5NkC&printsec=frontcover&hl=tr&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (3/3/2012)
- [23] Jacobs, L. and Herbig, P. Japanese Product Development Strategies. Journal of Business and Industrial Marketing. Vol. 13, no.2, pp. 132-154, 1998.
- [24] Nezu, R. Industrial Policy in Japan. Journal of Industrial Competition and Trade. Vol. 7, pp. 229-243, 2007.
- [25] Sung, W. O.; Song, M. J.; Park, J. and Chung, K. W. Changing Roles of Design Promotion Organizations in the Global Context and a New Theoretical Model for a Design Promotion System. Proceedings of International Association of Societies of Design Research, Hong Kong, pp. 32-39, 12-15 November 2007.
- [26] Nezu, R. op. cit.
- [27] Bonsiepe, G. Industrial Design in the Periphery. In C. Pirovano (ed.) History of Industrial Design 1919-1990, Milan: Electra, 1991.
- [28] Tezel, E. Krizler ve Bir Değişim Aracı Olarak Tasarım Olgusuna Tutunabilmek. Proceedings of the 4th National Design Congress on Design or Crisis, H. Alpay Er, H. Hümanur Bağlı, L. N. Ece Arıburun, Özge Merzalı Çelikoğlu, Koray Gelmez (eds.), pp. 369-382, 8-9 October 2009. (In Turkish)
- [29] Er, H. A., Korkut, F. and Er, Ö. U.S. Involvement in the Development of Design in the Periphery: The Case History of Industrial Design Education in Turkey, 1950s-1970s. Design Issues. Vol. 19, no. 2, pp. 17-34, 2003.
- [30] Tezel, E. Industrial Design in Turkey: A Historical Segmentation in Policy, Industry and Design. In S. Okazaki (ed.) *Intercultural Understanding*, pp.99-103, 2011.
- [31] Hobday, M.; Boddington, A. And Grantham, A. Policies for Design and Policies for Innovation: Contrasting Perspectives and Remaining Challenges. Technovation, 2012, doi:10.1016/j.technovation.2011.12.002 (12/2/2011)

NATURAL VENTILATION AROUND OPEN GROUND FLOORS WITH PILOTIS IN HIGH-RISE RESIDENTIAL BUILDINGS IN TROPICAL AREAS: HARMONIZATION OF MODERN AND TRADITIONAL HOUSING IN TROPICAL AREAS

Abdul Razak Sopian¹, Noor Hanita Abdul Majid¹, Shuichi Hokoi^{2*}

¹ International Islamic University, Malaysia

² Kyoto University, Japan

*Presenting author

Keywords: tropical, traditional, city life, natural ventilation, pilotis, CFD

Introduction

In Malaysian villages, traditional Malay houses are the most common type of housing. One of the main features of these traditional houses, which are located in hot and humid areas of Malaysia, is an open ground floor created by using pilotis, which raises the first floor of the house, leaving the ground floor open (Fig. 1). Thus, a shaded free space with good air circulation is obtained, which can be used by residents and their neighbors for working and leisure activities.

These traditional Malay houses are not suitable for cities because the availability of land in urban areas is limited. Although high-rise residential buildings accommodate a large number of residents in a limited area, and the airflow on the higher floors of these buildings is adequate, the fact that sufficient airflow cannot be expected near the ground floor must be taken into consideration.

On the other hand, residents need space for many social activities, even in a city. The open ground floor is popular in Malaysia because it provides a common area for social activities, such as wedding receptions, a play area for children, social interactions, and so on (Fig. 2).

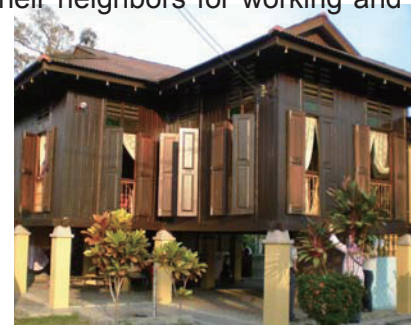


Fig. 1: Open ground floor of traditional Malay house



a. A wedding reception



b. A children's playground



c. A communal area

Fig. 2: An open ground floor underneath a high-rise residential building is used for multifunctional activities.

The open ground floor was first used by Le Caroubier in two of his well-known projects, (i.e., the Unité d'Habitation Marseilles [1] and Pavillion Sussie, Cité Universitaire, Paris [2]). The open ground floor was formed by constructing pilotis, which raises the first floor, and thus the ground floor remains open. The free space is designed to provide a shaded communal area with good air circulation, which can be used for parking vehicles or for other purposes. Like Le Caroubier, today's housing designers do not take into consideration cross ventilation when designing high-rise buildings. Airflow may be disadvantageous depending on the climate.

Object of Research

In this paper, we propose using pilotis in tropical urban areas to harmonize the benefits of modern and traditional housing.

The thermal and airflow conditions of a building that has pilotis are compared with those of a building that does not have pilotis, and we examine how the thermal and airflow conditions near the ground floor of the high-rise building can be improved by constructing the pilotis. Furthermore, the notion that natural ventilation on the upper floors is not seriously worsened by constructing pilotis is also examined by computational fluid dynamics (CFD) analysis.

Numerical Calculation of Flow Field around High-Rise Building

Simplified building configuration and CFD simulation

The simplified building configuration used in the CFD simulation was based on the basic typology of an existing high-rise building [3]. Two sets of simplified building configurations were prepared. The first building did not have pilotis and was identified as Test Building 1 (TB1), while the second building (Figs. 3 and 4) that had pilotis was identified as Test Building 2 (TB2). TB1 was used as the reference building to evaluate the effect of the pilotis.

The software used in this research was Star-CD. The building was located within an overall domain with a size of 318 m (width) × 450 m (length) × 240 m (height) (Fig. 5).

The conditions for a site located in the hot, humid, tropical Kuala Lumpur urban area are as follows:

- a. Both high-rise and low-rise buildings are present throughout the Kuala Lumpur urban area. Therefore, the empirical exponent (α) is 0.40–0.67, the roughness length (Z_o) is ≥ 2.0 m, and the gradient height (Z_g) is 460 m [4].
- b. The reference wind speed is considered to be 1.0 m/s at a reference height of 10 m. This reference wind is estimated using the log law equation and the corrected wind data of Subang meteorological station.

Kuala Lumpur can be described as a city center with high- and low-rise buildings. Therefore, Z_o of 2.0 is used [4]. The $k-\epsilon$ model (standard KE) is adopted [5].

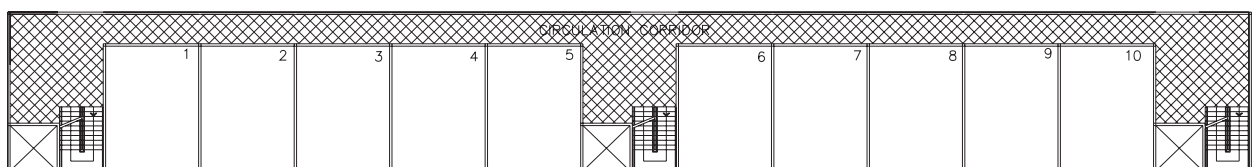


Fig. 3: Typical floor plan of test buildings, TB1 and TB2

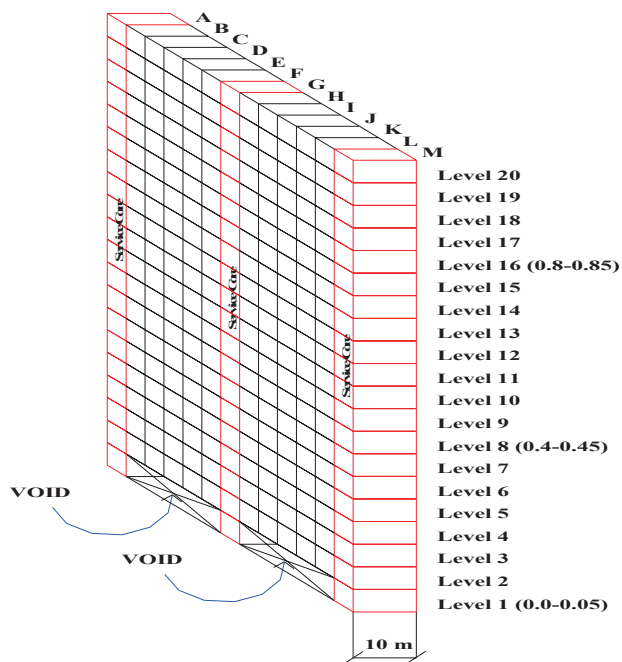


Fig. 4: Building with pilotis (TB2)

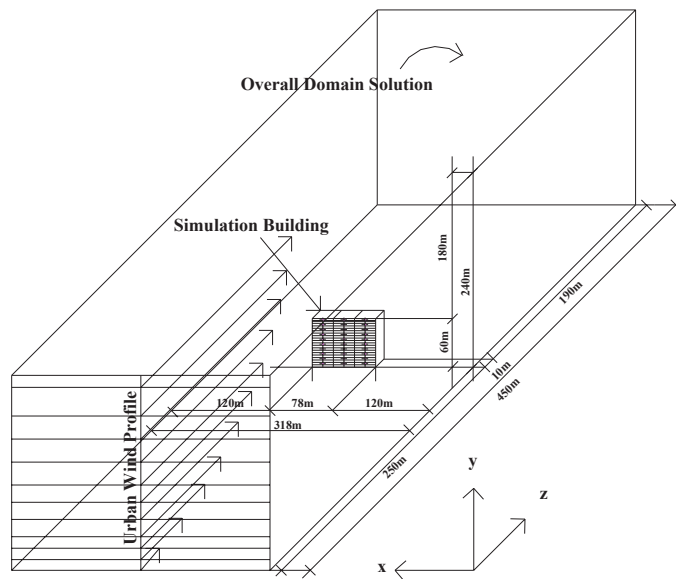


Fig. 5: Overall simulation modeling

Results of CFD Calculation

Horizontal airflow distribution at ground level around buildings with and without pilotis

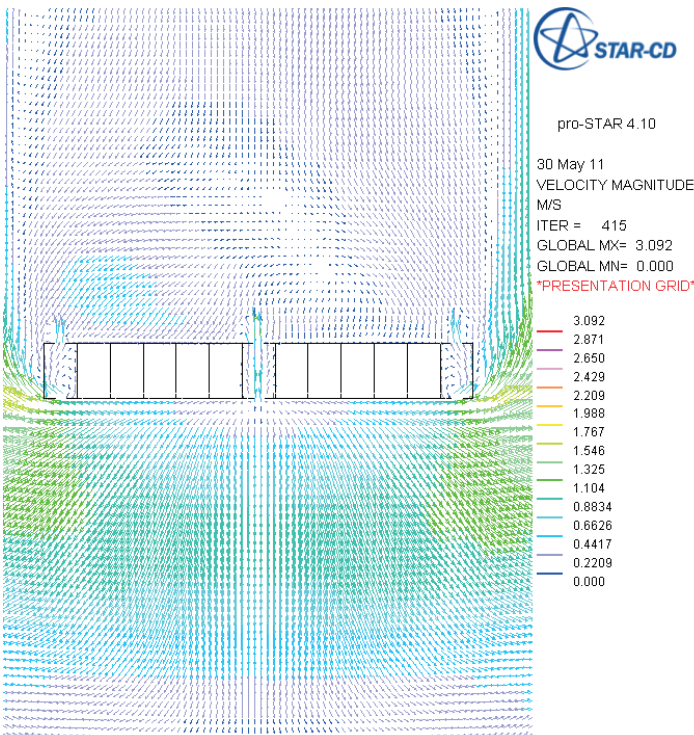
Figure 6 shows the wind speed distributions around the buildings. The left figure shows the results in a building without pilotis, while the right figure shows the results in a building with pilotis. In the building without pilotis, strong wind regions appear in the windward and both sides of the building. On the contrary, the air velocity in the leeward area is very low. Since most of the region in the vicinity of the building is exposed to very weak airflow; sufficient natural ventilation cannot be expected at ground level. At the same time, on both sides of the building, people may suffer from non-uniform wind velocity when walking.

In contrast, a relatively high speed of airflow can be expected at ground level in the building with pilotis. The narrow areas with non-uniform velocity distribution on both sides of the building disappear, and rather large areas with a relatively uniform air velocity distribution can be formed. Along with the ground level of the building, we can also find an area with a relatively strong and uniform airflow in the leeward. At certain times of the day when the sunlight is diminished, people can enjoy a breeze blowing through the shaded area [6].

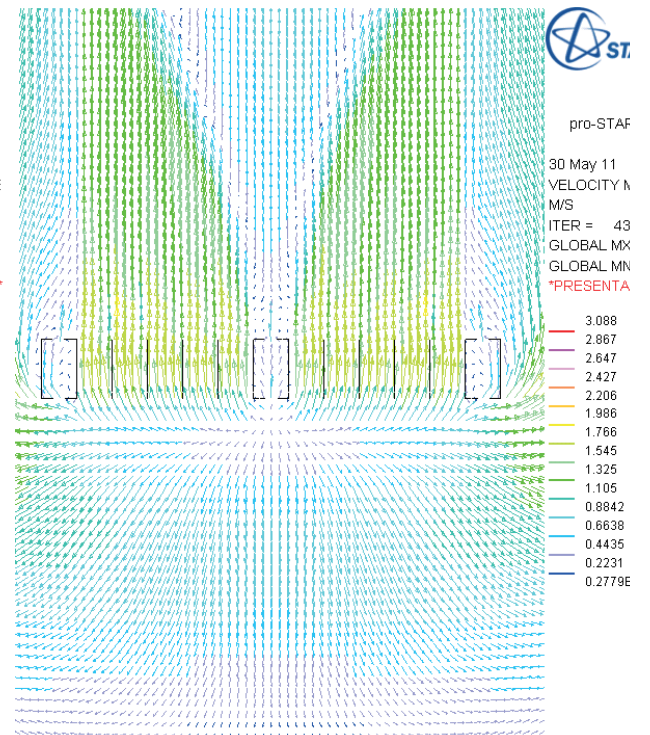
Vertical airflow distribution around buildings with and without pilotis

In Figure 7, the vertical distributions of airflow are shown around and inside both buildings without (left) and with (right) pilotis.

The air velocity in the windward rises higher in the building and is highest at the top of the building. Near the ground level, the wind becomes stronger in the building with pilotis than in the one without. The airflow inside the building with pilotis is only

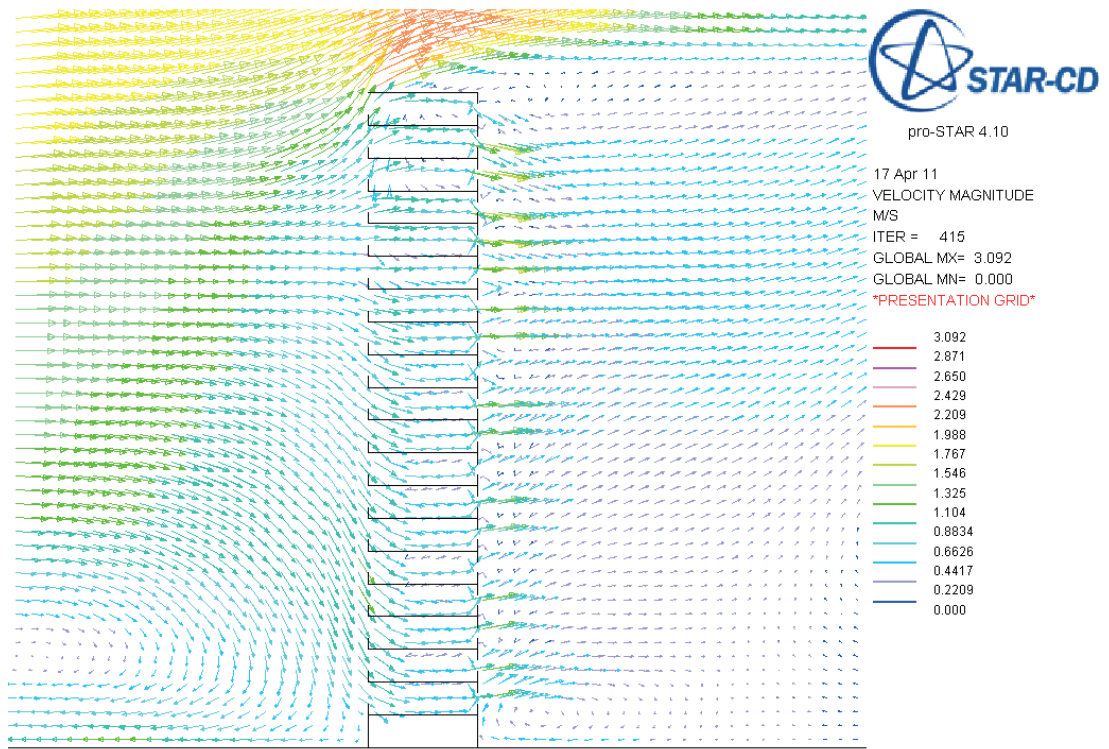


a. Without pilotis

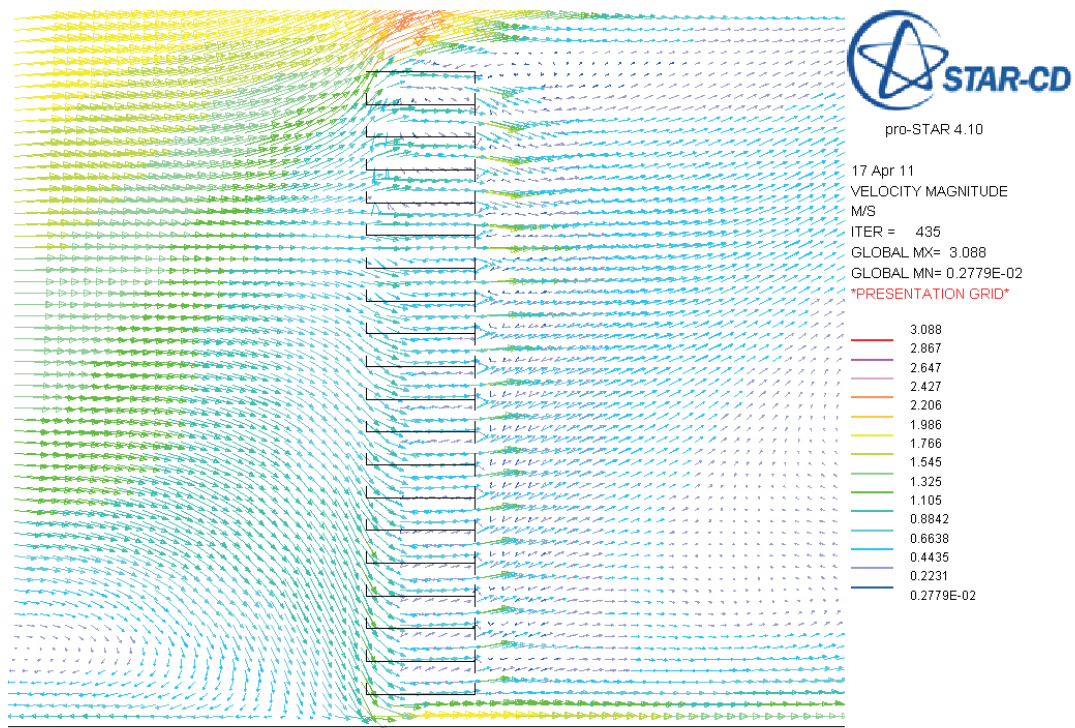


b. With pilotis

Fig. 6: Horizontal velocity distribution around building (1.5m above ground level)



a. Without pilotis



b. With pilotis

Fig. 7: Vertical distribution of airflow around and inside buildings

slightly different from that in the building without pilotis. A nearly uniform air velocity of approximately 1 m/s is obtained on all floors, and thus a sufficient natural ventilation can be expected. It means that the construction of the pilotis inflicts no serious damage on floors other than the ground floor.

The large amount of wind energy flowing on both sides of the building, which is not used for ventilation in buildings without pilotis, can be effectively utilized for natural ventilation on the ground floor by constructing the pilotis. The pilotis also works for reducing very strong airflow, which sometimes makes it difficult for pedestrians to walk around the building.

Conclusions

The concept of an open ground floor with pilotis, which was incorporated in traditional Malay houses and used by Carbousier in his first high-rise building, can be applied in the design of new modern high-rise residential buildings. By introducing pilotis in high-rise residential buildings, the microclimate of the space becomes pleasant because of the airflow, which can offset the heat; furthermore, the additional space on the ground floor is already shaded. Results of simulation show that the internal air velocity in areas near or above an open floor is better than that in buildings without an open floor. The air velocity is around 1.0 m/s, which is within the acceptable range for thermal comfort of the Malaysian people. Incorporating this traditional concept results in harmonization between modern high-rise building designs and traditional building designs of tropical areas. Furthermore, there is optimal utilization of the available space as public and common space for communal activities, which is not possible in the case of enclosed public spaces. This same concept

can also be applied in the design of high-rise buildings in regions in Asia, Africa, and America that have similar hot and humid climatic conditions.

References

- [1] Jenger, J. (1996). *Le Corbusier: Architect of A New Age*. London: Thames and Hudson.
- [2] Baker, G.H. (1996). *Le Corbusier: An Analysis of Form*. New York: Van Nostrand Reinhold.
- [3] Abdul Razak Sopian (2009), *Validation of The Computational Fluid Dynamics (CFD) Method for Predicting Wind Flow Around A High-Rise Building (HRB) in an Urban Boundary Layer Condition*. Journal of Construction in Developing Countries. ISSN: 1823-6499, eISSN: 1985-8329, Vol. 14 No. 2 (2009).
- [4] American Society of Civil Engineers (ASCE) (1999). *Wind Tunnel Studies of Buildings and Structures*. ASCE Manuals and Reports on Engineering Practice No. 67. USA.
- [5] Blocken B. and Carmeliet J. (2004), *A review of wind-driven rain research in building science*, Journal of Wind Engineering and Industrial Aerodynamics, 9213, PP.1079-1130.
- [6] Noor Hanita Abdul Majid & Abdul Razak Sopian (2000). *Air Movement Pattern and Behaviour at Tropical Urban Plazas Adjacent To Tall Buildings: A Case Study of Kuala Lumpur*. Proceedings Sustainable Environmental Architecture, International Seminar, 23 - 24 October 2000, Surabaya, Indonesia.

EVOLUTION OF TIMBER CONSTRUCTION IN TURKEY

Görün Arun

Yıldız Technical University, Turkey

Keywords: timber construction technique, timber dwellings, Anatolian timber architecture.

Introduction

Wood is known as one of the oldest structural materials used in many parts of the World. But remains of wood from antique period are seldom encountered in archaeological excavations. Turkey, connecting European and Asian continents with Anatolia peninsula, houses many historic structures, mostly of masonry from 12th century BC on. The rock reliefs, drawings, traces of timbers on stone masonry, and written sources show that timber construction was also highly appreciated in ancient Anatolia, especially in the densely wooded regions.

The heritage of timber structures in Anatolia is immense and the oldest examples, still being used date back to 12th century AD, The Seljuk Sultanate coming in 11th century to Anatolia built many mosques, public and military buildings of timber between 12th and 15th centuries (Fig. 1). Some of these buildings are still in good shape and perform their duties.

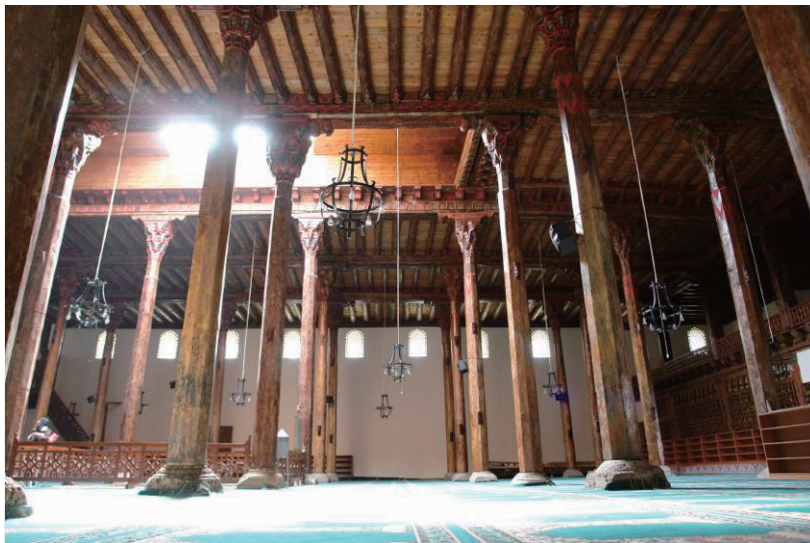


Fig. 1: Esrefoglu Mosque, 1296 AD

During Ottoman period, as masonry houses have suffered numerous intense and destructive earthquakes, wooden buildings gained importance to be safe especially among rich people. As several fires wiped out thousands of houses and even whole districts, masonry buildings were made obligatory by law in the form of building regulations known as Ebniye Regulations enacted in the early 19th century by the Ottoman government. Later however, due to many casualties and great damage caused by repeated earthquakes, timber for building was once again allowed under the law [1].

The traditional timber construction practice in Turkey can be encountered in east Europe, Egypt, Middle East and west Asia because the Ottoman Empire, which lasted for 650 years, had a broad cultural influence. These structures, depending on the carpenter know-how, were erected using traditional methods and rules-of-thumb passed from one generation to the other with an impressive empirical wisdom that was obtained with experience and great skill,

The timber houses were constructed until approximately 1950s. Afterwards, claiming that timber is expensive and burnable, timber buildings were almost forgotten, their building masters disappeared and these buildings were replaced with reinforced concrete. The ones still in good shape contribute to the visual vitality of historic Turkish towns.

Structural Properties of Timber Dwellings in Turkey

Traditionally, the wood used in timber houses was of the local predominance of species. The hard woods as walnut, oak, elm and juniper or soft woods as pine, beech tree and chestnut was used according to the structural or ornamental function. Generally for columns, studs, beams and joists; oak and yellow pine, for ceiling and floor coverings and windows; yellow or red pine and for balustrades and carved ceilings, red pine, walnut and linden were preferred. However, in the North Anatolia, in Black Sea region, the use of oak and chestnut is predominant for the structural elements in most buildings. In the rest of the country the use of pine predominates.

The foundations of timber walls were of masonry, later of concrete. The timber walls of one or more stories in height were supported on the foundation walls, on timber laced masonry walls of the ground floor or raised on cripple studs or post and beam supports (Fig.2). In the first two cases, the masonry wall top is covered with a layer of lime mortar where timber sill beam is placed forming a level set for the timber wall. The footings of the timber columns are either anchored in concrete or masonry foundations or placed on a big footing stone.



Fig. 2: Timber houses rise on foundation wall, on masonry wall and on columns

Timber houses were erected depending on the carpenter know-how, availability of the material and owner's financial power. In places with lots of wood, totally timber was used. If there were not enough woods, other methods using rough timber pieces or masonry was introduced

Timber Wall Construction

Traditional timber buildings in Anatolia can be classified and named according to the formation of their walls. The timber walls are composed of either block wood or framed structure with totally wood or composite with timber studs and masonry infill (Fig.3).

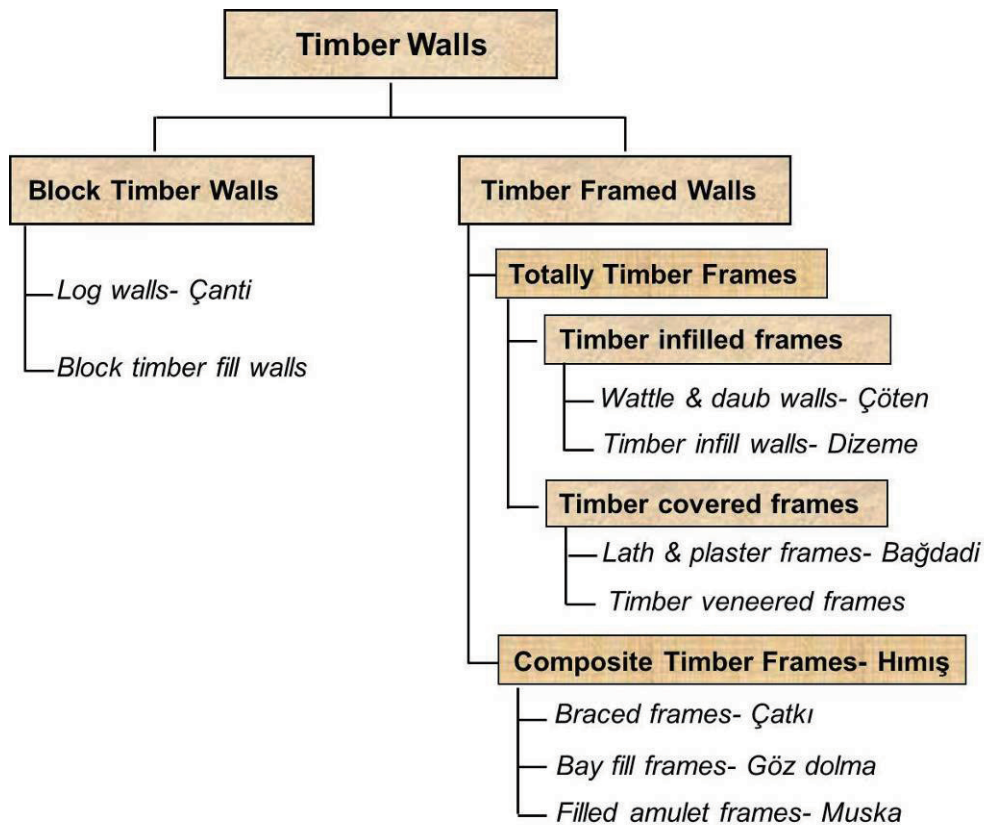


Fig. 3: Traditional Timber Wall Classification

Block timber walls

Block timber walls are constructed in Black Sea area where there are lots of wood. These walls may be classified as log walls and columns/studs with block timber infill.

Log Walls are constructed by piling up of rough round logs or solid sawn lumber laid horizontally and anchored at the ends with simple cross lap. The houses constructed with log walls are called "çanti = chanti" (Fig.2a). *Block Timber Fill Walls* are composed of columns placed at the corners and at the intersection of the partition walls and studs placed in between the columns considering the window and door openings (Fig.9). The space in between the columns/studs is then filled with horizontally laid rough round logs or solid sawn

timber anchored with groove and tongue joint to columns/studs. The horizontal timbers laid one over the other is connected to each other by tongue and groove joint in order to avoid rain water penetrating inside Fig.2b).

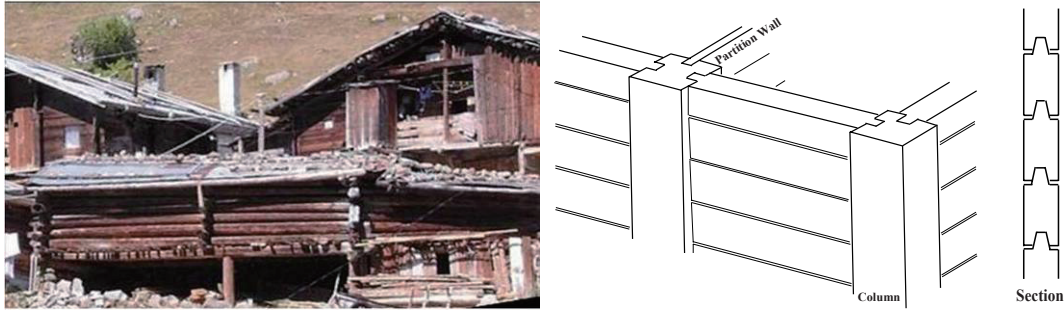


Fig. 8: a) Log house, b) Block timber fill wall formation

Timber Framed Walls

The load bearing framed timber walls are composed of columns or studs placed 0.20 - 1.50m apart resting on the lower chord beam and tied with the upper chord beam at each floor level by mortise and tenon joint. Columns are at the exterior corners and at the intersection of the walls. The rest of the wall is partitioned by studs, considering the window and door openings. The structural composition of the wall between the studs and columns and upper and lower chords are of wide ranging structural typologies depending on the ability of the carpenter and availability of building materials. The framed timber walls can be classified as totally timber framed and composite with masonry infill.

Totally timber framed walls' columns/studs spacing is either 40-150 cm. If the spacing is more than 60cm, the frame is braced horizontally and diagonally. Space between the studs are filled or covered with timber. When the studs are closely spaced, the space is woven with wattle and daub and called "çöten (choten)" walls (Fig.3a). The frame with widely spaced studs are filled with timber and called "dizeme (Fig.3b). If closely spaced laths are nailed on both sides of the frame's columns/studs and then plastered, the wall is called "bağdadi = lath" walls (Fig.4a). In timber veneered frame, the sawn timber planks are nailed on the outer side of the frame (Fig. 4b). The inner face of the wall may be covered by lath and plaster or timber veneered.

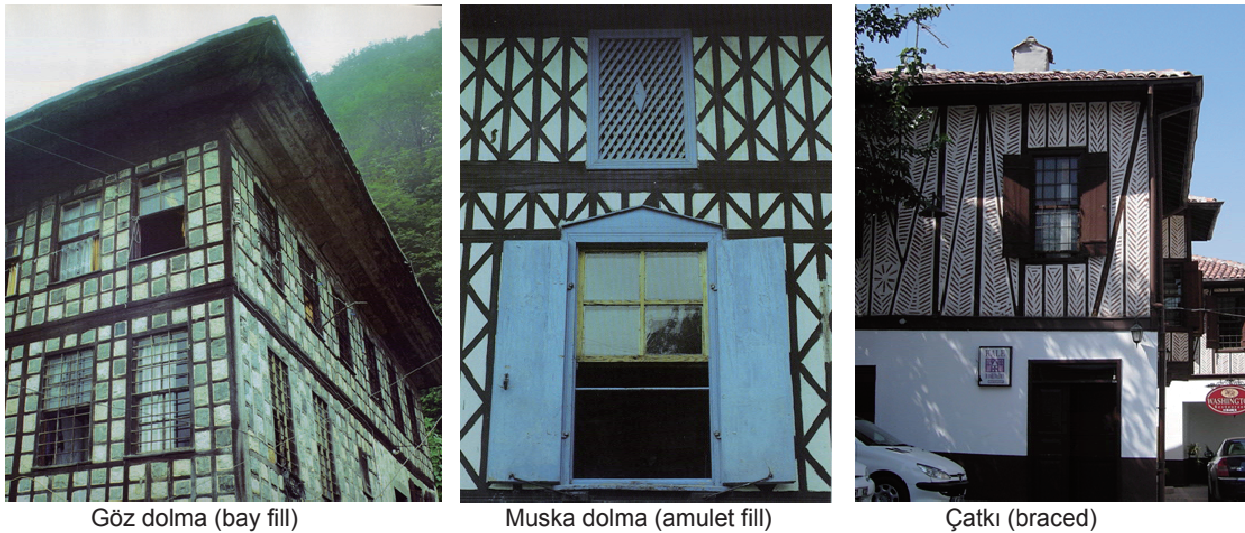


Fig. 3 Timber filled frames



Fig. 4: Timber covered frames

Composite timber frames are made of timber frame with stone, adobe or brick infill. The houses constructed with this system are called “hımiş” pronounced as humush. Depending on the available material and carpenter’s ability, such composite timber framed walls of wide ranging typology are composed by either 22-60 cm spaced columns / studs or 60-150 cm spaced columns with horizontal and diagonal bracings. Hımiş style houses generally rested on a heavy stone first floor wall and named according to their formation as *Göz dolma* (Bay fill), *Muska dolma* (amulet fill) and *Çatki*.(braced) frames (Fig.5)



Göz dolma (bay fill)

Muska dolma (amulet fill)

Çatki (braced)

Fig. 5: Hımiş (composite) frames

Timber House Organization

Timber dwellings in Turkey are generally constructed as single houses. However in cities with dense population, it is possible to encounter attached houses aligned side by side. These houses are formed with a floor platform completed at each level, and load bearing exterior walls are erected upon it. The attached buildings contain 50~60 cm thick continuous

masonry walls from foundation to roof in between the houses to prevent fire spreading to neighboring buildings [2]. The first floor framing supported directly on the masonry walled ground floor serves as storage or barn area of the structures.

The traditional multi-storey dwellings in seismic areas are constructed getting progressively lighter both with construction material and the thickness of the wall. These are constructed with a heavy wall as stone masonry at ground floor; timber frame filled with brick or adobe masonry solid then with cavity brick walls at intermediate level and wattle or lathed wall construction at upper floors. The building getting lighter at upper floors make the timber frame at top more ductile and therefore more able to meet the higher seismic demands that occur at upper levels.

Traditional timber building masters, being aware that moisture is a serious non-seismic threat to timber structure, have given high priority to drainage during construction. To control the seasonal and daily raise of underground water, traditional timber structures contained wells in the floor resting on soil, in basement or ground floor. The channels from the wells in underground discharged the water out of the building [3].

Conclusion

Traditional timber constructions with monotonous repetition of wooden joists, studs and rafters have numerous load paths and are considered structurally redundant in providing level of safety in earthquakes without loss of their integrity. Thus, this redundancy of elements with a high level of energy-dissipating capacity leads to the good performance during earthquakes. Masonry infill falling out of the frame and cracks in the plaster are considered a nonstructural damage that dissipates a lot of earthquake induced energy.

Traditional timber constructions with variety of materials and techniques in Turkey have suffered from continuous changes and repair of past works, and abundance during their lifetime. The timber architectural heritage to be preserved today necessitates architects and structural engineers for proper inspection, structural analysis, repair and monitoring and public awareness for maintenance.

References

- [1] Cezar, M. Fires and Natural Disasters that caused Distraction on Buildings in Istanbul During the Ottoman Period”, *Search and Investigations on Turkish Art History*, v.I, Berksoy Publication, pp. 327- 380.
- [2] Dişkaya, H. The Structural Effects of Firewalls on Traditional Timber Framed Structures in Earthquakes in Turkey, *Proceedings of SEWC2007 Structural Engineers World Congress*, 2-7 Oct. 2007, Bangalore, India
- [3] Arun, G.: Assessment of Ancient Building Foundations, SACoMaTIS 2008- *Proceedings of on Site Assessment of Concrete, Masonry and Timber Structures Symposium*, 1-2 Sept. 2008 2.Vol. Varenna, Italy

FLYING A 100m-LONG JUMBO KOINOBORI

Mamoru Kawaguchi

Kawaguchi & Engineers Inc., Japan

Keywords: Koinobori, fabric membrane carp, Jumbo fabric carp, dimensional analysis, Buckingham's theorem, Bernoulli's theorem, wind tunnel tests, Japanese traditional event

Prologue

Flying fabric carps called Koinobori has been a traditional event in Japan since long time ago (Fig.1). They have been flown in the breeze by very many Japanese families with children early in May every year, or more specifically, on the 5th of May, Children's Day, to celebrate the growth of their children and to pray for their health and success in future.

There is a small city in the suburb of Tokyo which is called Kazo that has been producing Koinoboris for a long time mainly using cotton as their material. Early in 1988 a group of volunteers of Kazo City had an innocent idea of making a fabric carp as big as 100m in length to advertize their city. They enlarged the pattern of a home-size carp to a size of 100m in length, cut the fabric along the pattern, sewed up the cut fragments of fabric to form a Jumbo carp, and painted it to finish the fabric fish.



Fig. 1: Koinoboris flying on Children's Day

When the carp was completed, the volunteers wanted to show it to the public, and, since they thought that the carp was too big to fly normally in the sky, they attempted to show the carp in a somewhat more moderate way. They put a wire rope through its stomach, and raised the rope by means of three cranes like the laundry being hung on the line. As soon as the hoist started, and the carp departed from the ground, it was fanned by the breeze, and suddenly its stomach skin was badly torn with a screaming noise (Fig. 2, from a



Fig. 2: The hoisted Jumbo Koinobori broken in the air

juvenile book). The reporters from several TV companies who had come to the site, expecting to witness the successful display of the carp, were all disappointed, and disappeared.

Will the Jumbo Koinobori Swim in the Breeze?

The volunteers of Kazo who had devoted themselves to making of the Jumbo Koinobori were very much discouraged by the failure, but they soon tried to recover from the shock, mending the broken Koinobori and starting to find an expert who might be able to advise them how they could display the carp more safely, and hopefully fly it in the air. After visiting those who were authorities in the fields of Fluid Mechanics and Applied Mathematics in vain, they finally came to the author in the middle of March of the same year for an advice.

Despite that the volunteers did not expect that the carp might fly normally in the air, after experiencing the miserable failure which occurred on just hoisting it for a display, their innocent and eager question to the author was if the Koinobori would swim normally in the air at all.

Dimensional Analysis

The author thought that this sort of questions might be answered most clearly by the theory of dimensions, or more specifically, the “dimensional analysis”, since we Japanese know very well that the carps of normal sizes (2 - 5m in length) celebrated at home swim in the mild breeze without problems, and the difference between the Jumbo carp and those home carps is only in their sizes, their shapes being “mathematically similar” to each other, to which we know that the dimensional analysis can be most conveniently applied.

Through application of the dimensional analysis the author could derive the following results (For details of the analysis refer to the reference [1]):

- 1) The Jumbo Koinobori swims in the breeze of the same speed as for the home carps, namely it begins to swim at the wind speed of 2 - 3m/sec.
- 2) The tensile stresses exerted on the skin of the flying Jumbo Koinobori is λ times as big as those for the home carps, λ being the ratio of the sizes. (If compared with a home carp of 5m in length, $\lambda = 100/5=20$)
- 3) The Jumbo Carp swims very slowly, taking the time of λ times as for the same action of the home carps.

The first result in the above was very welcome to those who were involved in the project. The second one was a serious caution that we should carefully examine the strength of the skin (fabric) of the Jumbo Koinobori where the stresses 20 – 50 times as high as those in the home carps may occur. The third was simple visual information about the movement of the Jumbo Carp.

Other Technical Issues

Among other technical problems to be solved before the Jumbo Koinobori was let in the sky the most important was the stresses that might occur in various part of its body. The

following three kinds of forces which might occur during the flight were foreseen to be most significant for design:

- 1) The circumferential forces that may occur in the skin of the carp due to the stomach air pressure.
- 2) The longitudinal forces that may occur in the skin due to the stomach air pressure and the wind flow along the carp.
- 3) The forces that may be produced in the mouth piece ring.

The first forces in the above are very essential, and most significant in design. A Koinobori is designed and manufactured in such a way that the diameter of the stomach is larger than that of its mouth for the purpose of inflating the stomach when swimming in the wind. The air stream which is separated from the main outside flow of the wind at the mouth goes through the stomach of the carp, and it joins again the outside stream of the wind at the tail. The speed of the airflow in the stomach is lower than that at the mouth and outside of the carp, since the sectional area of the stomach is bigger than that of the mouth. According to the Bernoulli's theorem the air pressure in the stomach is therefore bigger than that at the mouth which is the same as the outside air pressure. This means that the air pressure inside the stomach is bigger than that outside the carp. This was confirmed through a series of wind tunnel tests on 10m long model carp as shown in Fig. 3. This mechanism inflates the stomach of a carp swimming in the air, and the skin of the carp should stand the forces due to this pressure.

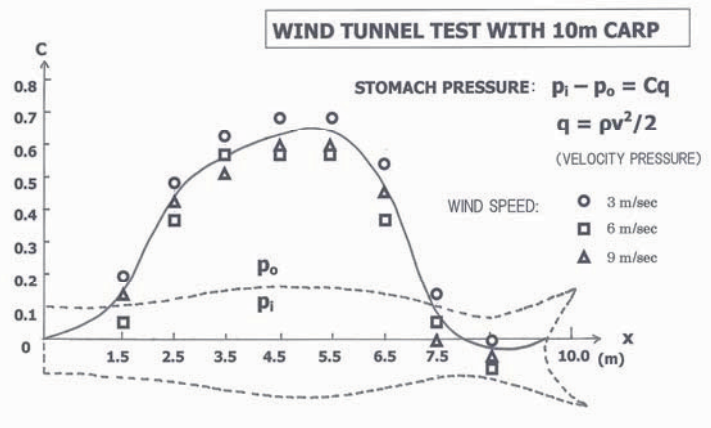


Fig. 3: Distribution of stomach air pressure coefficients

Assuming that the carp is in the shape of a cylinder, the circumferential as well as longitudinal stresses are found easily by membrane analysis. The results of calculation revealed that the fabric used for Kazo Jumbo Koinobori was strong enough to stand the stresses described above, but the strength of the seams was totally lacking. The seams were then re-sewn and consolidated by means of portable professional sewing machines voluntarily offered by a tent company.

The third forces which occur in the mouth piece were also important. The mouth piece is indispensable for a carp to introduce air stream smoothly into the stomach. For family-size carps the mouth pieces of bamboo are often used. As shown in Fig. 4, the ring for the mouth

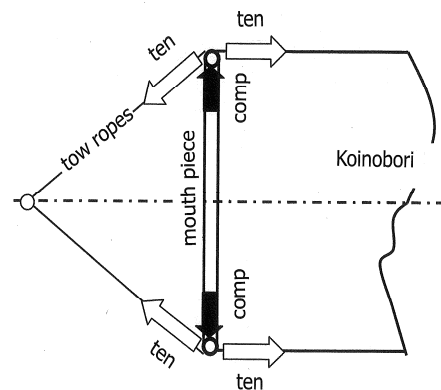


Fig. 4: Forces in a mouth piece

piece is subjected to a compressive force while the carp is swimming, and if we design the ring to avoid the danger of buckling due to the compression, we have to use a steel tube as heavy as some 300 kg which is nearly half the total weight of the Koinobori, making the whole project infeasible.

This problem was solved by adding twelve ropes arranged on the diameters of the mouth piece, and connected to the ring at their ends in a similar way to the spokes of a bicycle wheel. The resulted design was a ring of aluminum tube with a diameter of 50mm, the total weight of the mouthpiece being as light as 30kg (Fig. 5).

Launching the Jumbo Koinobori

For a Koinobori to fly in the air normally it should be hoisted to a height that is approximately the same as its length. So every family which celebrate flying home Koinoboris has a pole which is temporarily built in May every year for hoisting the carps.

For the Jumbo Koinobori of Kazo we did not design any pole to hoist it, but instead we decided to hire a crane that could hang up the Carp to the height of 100m. It was easy to find a crane which had a boom of sufficient length, capable of carrying the weight of the Carp, and standing the lateral forces due to the wind.

On a fine day toward the end of April in 1988, the Jumbo Koinobori was extended on the field beside the Tone River of Kazo City (Fig. 6). The weight of the Carp was some 700 kg, its length being 100m, namely ca. 1.5 times as long as a 747 Jumbo jet plane. The weather was really fine, but we had no wind in the morning. We had to wait for several hours before a gentle breeze began to blow on the field. When the speed of the breeze reached 3m/sec, the crane began to drive, slowly hoisting the mouth piece of the Carp. Then the Carp lying flatly on the field as if it had been sticking to the ground, began to take in the air, its stomach being slowly inflated to take a three dimensional shape. The crane continued to raise the mouth piece, and when the tail of the Koinobori took off the field, it began to fly elegantly in the air (Fig. 7). The spectators sitting on the field and waiting for the flight of the Koinobori were excited at the sight of its graceful swim high above in the sky, and a great clapping of hands was produced.



Fig. 5: Aluminum mouth piece set up in the site



Fig. 6: Jumbo Carp extended on the ground



Fig. 7: Jumbo Koinobori soaring in the breeze

Epilogue

Flying the Jumbo Koinobori was established thereafter as one of the most important annual events of Kazo City. It has been celebrated on the third of May, the Constitution Day, every year. The recorded flight of the Jumbo Koinobori has been telecast on the fifth of May, the Children's Day. The people of Kazo are very much proud of showing the graceful flight of the biggest flying thing in the world every year. The story of how the dream of flying the Jumbo Koinobori came true was recorded as a 45 minute TV program, and included in the archives of NHK, Japan Broadcasting Corporation, so that everybody could get an access to the information. The Jumbo Koinobori travelled abroad to successfully show its elegant flight, twice in Hawaii and once in Kaiserslautern, Germany [2].

References

- [1] Kawaguchi, M. Flying a Jumbo Carp in the Breeze. *Journal of Wind Engineering*, No.66, pp.53-58, 1996. (in Japanese)
- [2] Kawaguchi, M. Flying the Jumbo Koinobori in the German Sky. *Wind Engineers, JAWE*, Vol. 31, No. 4, pp. 205-211, 2006. (in Japanese)

SEISMIC RETROFIT OF HIGH-RISE BUILDING WITH DEFORMATION-DEPENDENT OIL DAMPERS

Osamu Hosozawa¹, Yuichi Kimura¹, Hideshi Aono¹

¹ Design Division, Taisei Corporation, Japan

Keywords: seismic retrofit, high-rise building, oil damper, long-period ground motions, The 2011 off the Pacific coast of Tohoku Earthquake

Long-Period Ground Motions

It is pointed out that great earthquakes such as the Tokai Earthquake, the Tonankai Earthquake, and the Nankai Earthquake, may occur in the near future. When such an earthquake occurs, long period ground motions will reach the Kanto, Nobi, and Osaka plains, where Japan's three major urban areas have developed, and shake high-rise buildings violently. Since some of old high-rise buildings were designed without considering long-period ground motions, reinforcing such buildings is an important issue.

Deformation-Dependent Oil Dampers

An effective method to reinforce existing high-rise buildings is installing additional dampers. However, a problem with ordinary damper is that they require reinforcement of surrounding columns and girders to support large reaction forces generated during earthquake. To solve this problem, we developed a deformation-dependent oil damper. The most attractive feature of this damper is to reduce the damping force at the moment when the frame deformation comes close to its maximum value. Allowing this feature, reinforcement of columns, girders, and foundations are no longer required.

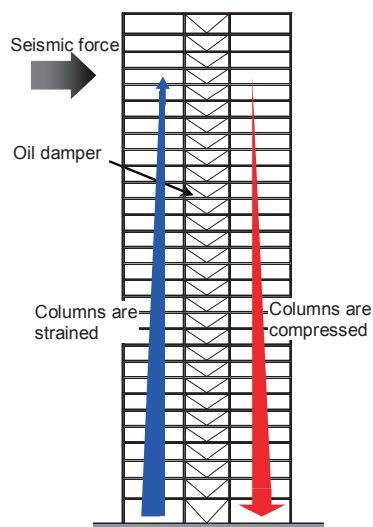


Fig. 1: Stress condition while seismic force is acting

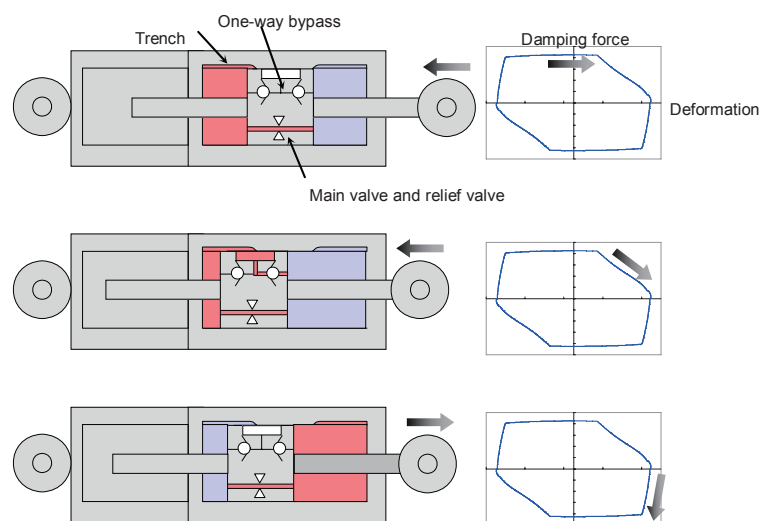


Fig. 2: Mechanism of a deformation-dependent oil damper

Application to Shinjuku Center Building

We applied the deformation-dependent oil dampers to an existing 54-story office building (Shinjuku Center Building) located at Tokyo. This building was completed in 1979. The part above the ground level is steel structure. First natural period of this building is 6.2 second along transverse (y) direction, 5.2 second along longitudinal (x) direction.

We set 12 deformation-dependent oil dampers in every 24 floors from 15th to 39th floor except for 27th floor. The total number is 288. Oil damper is installed between bottom of brace and base plate settled on the slab. The joint of brace and girder, and the joint of base plate and base plate are performed by press-bond with PC bar. No welding is required.



Fig. 3: Shinjuku Center Building

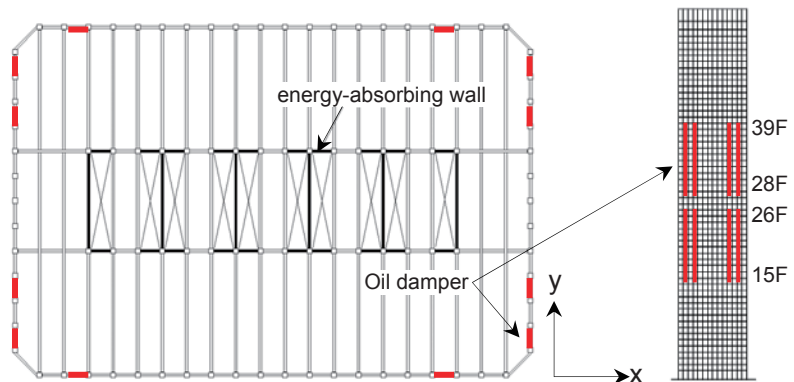


Fig. 4: Layout of oil dampers



Fig. 5: Picture of the damper

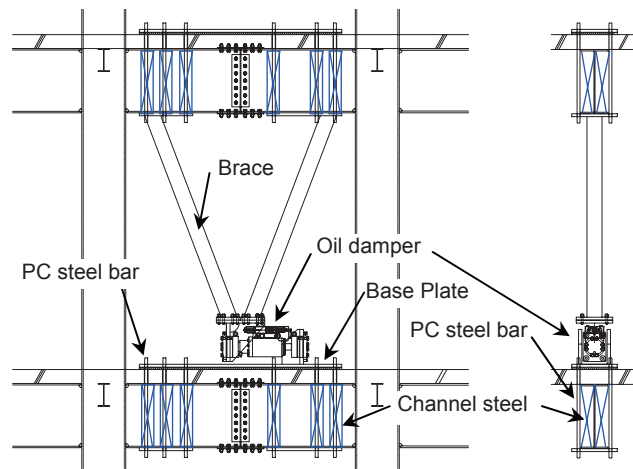


Fig. 6: Detail of attachment

Observation Results of The 2011 off the Pacific Coast of Tohoku Earthquake

Shinjuku Center Building has been recording earthquake motions since the completion of the building. The maximum values recorded from The 2011 off the Pacific coast of Tohoku Earthquake are summarized in Table 1. Figure 7-9 illustrates acceleration and relative displacement motion between RF and 1F. As shown in the figures, the earthquake motion

Table 1: Maximum observed responses

	Maximum acceleration (Gal)		Maximum deformation (cm)	
	Longitudinal (X)	Transverse (Y)	Longitudinal (X)	Transverse (Y)
RF	236.0	161.3	49.4	54.2
28F	112.7	171.3	26.3	33.3
1F	94.3	142.1	-	-

continued for long time and the building was shaking for longer than 10 minutes.

The average story drift angle which is figured out by dividing the maximum displacement of the top floor by the height of the building was 1/399. Therefore it is evaluated that there are no damages on the main structure such as columns and girders. In the inspection of the dampers after the earthquake, no abnormality was reported such as scratch, corrosion, peeled of paint or oil leakages.

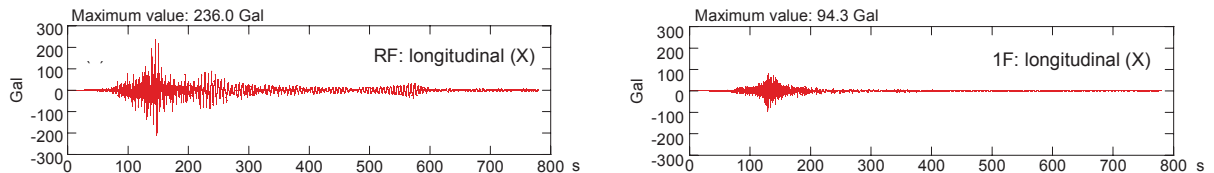


Fig. 7: Observed acceleration waveform (longitudinal direction)

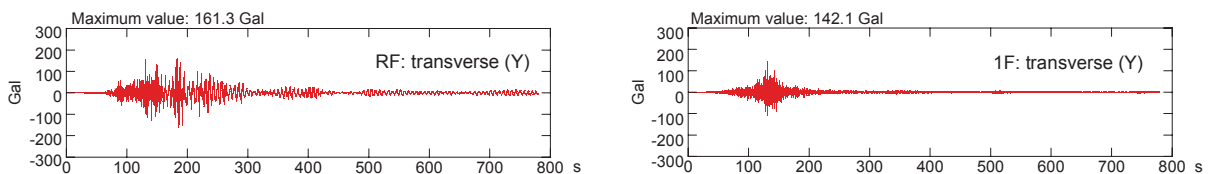


Fig. 8: Observed acceleration waveform (transverse direction)

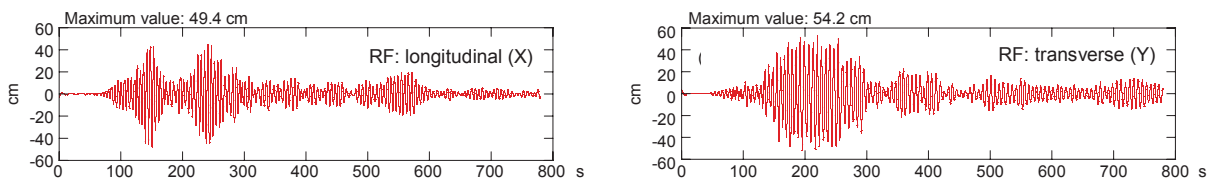


Fig. 9: Relative displacement waveform between RF and 1F

Performance Verifications

Figure 10 shows the damping ratio of 1st mode obtained from several earthquakes before / after installation of dampers and it is plotted against the amplitude of 1st modal accelerations. The damping ratios of the 1st mode for the longitudinal (x) direction and transverse (y) direction of the building were increased by these oil dampers about 0.3 and 1.4 percent, respectively.

The vibration control effect of this damper under The 2011 off the Pacific coast of Tohoku Earthquake was verified by simulation analysis. Figure 11 shows the simulated relative displacement in transverse (y) direction between RF and 1F with or without dampers. The maximum displacement at top floor was 69.8cm without the dampers and 54.5cm with the dampers (the actual observed result was 54.2cm). This indicates that the dampers reduced displacement by 22%. The maximum acceleration was 228.1 Gal without the dampers and 156.9 Gal with the dampers (the actual observed value was 161.3 Gal) and there is about 30% reduction.

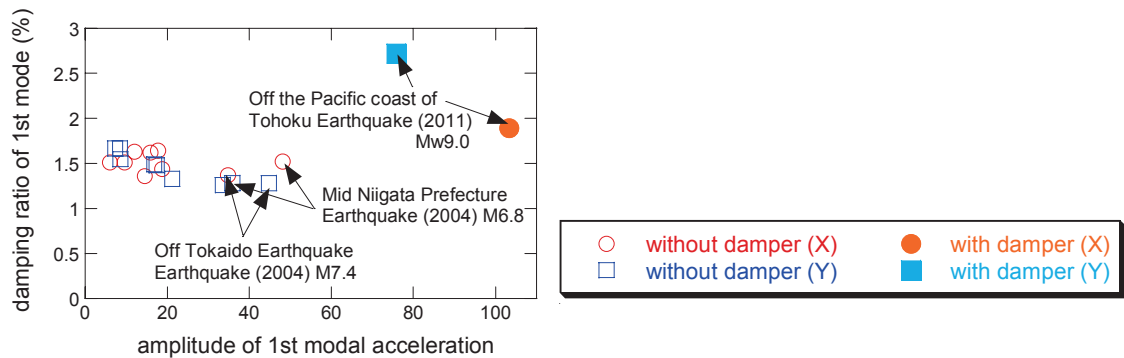


Fig. 10: Relationship between amplitude of 1st modal acceleration and damping ratio of 1st mode

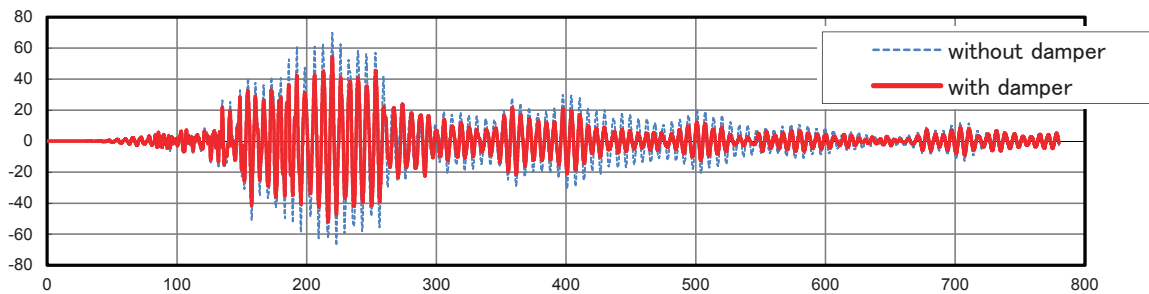


Fig. 11: The simulated relative displacement in transverse (y) direction between RF and 1F with or without dampers.

Conclusions

The authors have developed a deformation-dependent oil damper and applied to 54-story r high-rise building to reduce the vibration induced long-period earthquake ground motion. The seismic responses were observed in The 2011 off the Pacific coast of Tohoku Earthquake and simulation analyses were conducted to estimate the control performance of damper. It is clarified that the damping ratio was higher and the relative displacement lower by 22% as compared to the building without dampers, and the observed responses of the buildings are mostly well simulated, thereby confirming the performance of the seismic retrofitting of super high-rise building with damper.

References

- [1] Kimura, Y., Aono, H., Hosozawa, O., "Seismic retrofit of high-rise building with deformation dependent oil dampers, Part 1~Part 2", *Transactions of AIJ annual meeting*, B2, pp.515-518,2008. (in Japanese)
- [2] Kimura, Y., Aono, H., Hosozawa, O. "Seismic retrofit of high-rise building with deformation dependent oil dampers, Part 3~Part 4", *Transactions of AIJ annual meeting*, B2, pp.523-526,2009. (in Japanese)
- [3] Nii, I., Maseki, R., Nagashima, I., et al. (2011), "Development of seismic and wind observation monitoring system and its application to the high-rised building", *Transactions of AIJ annual meeting*, B2, pp.365-366,2011. (in Japanese)

SEISMIC PERFORMANCE AND REINFORCEMENT OF JAPANESE HIGH-RISE BUILDINGS FACING SUBDUCTION EARTHQUAKE: E-DEFENSE SHAKE TABLE TESTS

Takuya Nagae¹, Masayoshi Nakashima²

¹ National Research Institute for Earth Science and Disaster Prevention, Japan

² Kyoto University, Japan

Keywords: Subduction earthquake, high-rise building, large-scale test.

Introduction

Periodical occurrences of large ocean-ridge earthquakes having a magnitude over eight along the subduction zones in the southwest part of Japan have been documented in historical materials. Such earthquakes are known to generate long-period ground motions on land, especially in the basin areas where large cities such as Tokyo, Nagaya and Osaka are located. Their predominant periods range from several to ten seconds, and the durations of primary motion extend over several minutes. Long-period ground motions tend to resonate high-rise buildings whose fundamental natural periods are several seconds. Because high-rise buildings, which concentrate in large cities, perform very important roles in the Japanese economy, severe damage to them shall cause extreme difficulties throughout Japan. The seismic performance of existing high-rise buildings should be evaluated with urgency. However because the high-rise buildings have never experienced long-period ground motions before, no actual data have been available on possible seismic damage. This is the primary motivation of this study.

Capacity of the E-Defense shaking table and design of the test specimen

The E-Defense shaking table is 20 m by 15 m in plan dimension and can produce a velocity of 2.0 m/s and a displacement of 1.0 m in two horizontal directions simultaneously. It can accommodate a specimen up to a weight of 1,200 metric tons and a height of 22 m.

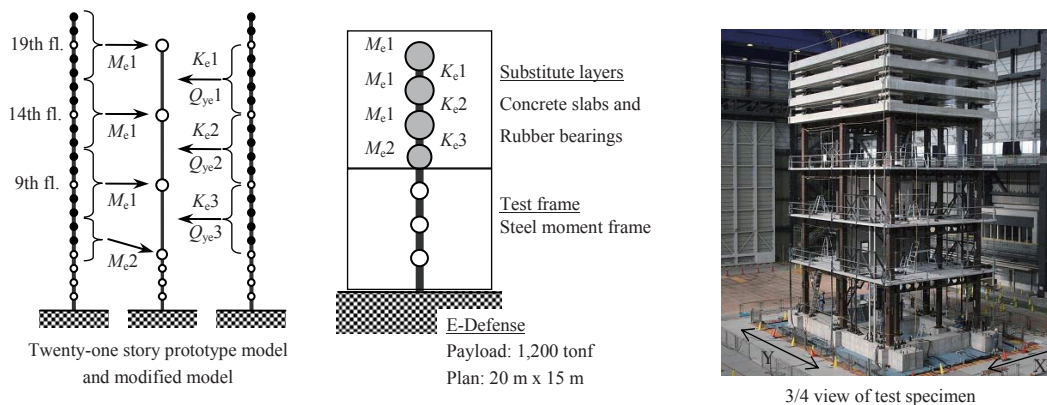


Fig. 1: Development of test method

Fig. 1 shows the test method employed in this study. The concept adopted for this test was to establish a partial frame structure having full-scale steel members and being able to reproduce the possible seismic responses of a prototype building that has twenty-one stories with a total height of 80 m. The test specimen consists of a four-story, two-span by one-bay steel moment frame and three substitute layers placed on top of the moment frame. The substitute layers, which consist of concrete slabs and rubber bearings, are arranged to represent the upper stories of the prototype. From preliminary vibration tests, equivalence between the test specimen and the prototype was verified in terms of the lower mode natural periods and corresponding mode shapes. The natural period of the test specimen was 2.1 sec. By using this test method, a series of large-scale shaking table tests were planned for a high-rise building subjected to long-period ground motions.

Seismic performance of existing high-rise steel buildings (The 2008 E-Defense test)

Fig. 2 shows the beam-to-column connection details. Typical design and detailing in the 1970's are incorporated in a four-story, steel moment frame specimen. For the tests, two synthesized long period ground motions were adopted. The HOG-wave (PGA=1.45 m/s², PGV= 0.40 m/s) was predicted at a Kawasaki site, where is next to Tokyo, and rupture of the Tokai trough was supposed. The SAN-wave (PGA=1.86 m/s², PGV= 0.51 m/s) was predicted at a Nagoya site, and simultaneous ruptures of the Tokai and Tounankai troughs were supposed. In addition, EL2-wave scaled to PGV of 0.5 m/s was adopted, as that has been used as the level 2 seismic force in the Japanese seismic design.

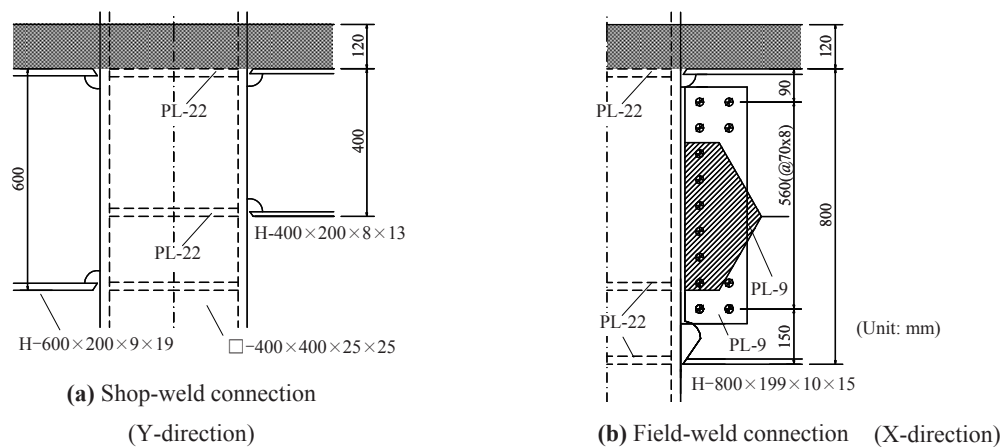


Fig. 2: Beam-to-column connections

First, the EL-2 wave was applied, and then the HOG wave and the SAN-wave were applied sequentially. Fig. 3 shows the seismic response of the test specimen. For the EL2-wave, the maximum inter-story drift was slightly smaller than the design limit of 0.01 rad. For the HOG-wave and SAN-wave, the maximum inter-story drifts was 0.011 rad and 0.017 rad. On the other hand, the test specimen when subjected to the HOG-wave and SAN-wave exhibits large input energy more than four times that of the EL2-wave in the durations of 200 and 320 sec. Fig. 4 shows bending moment versus rotation relations (M-θ relations) at beam ends. In the first test of SAN-wave, fractures of beam ends occurred at three field-weld connections (WUF-B) arranged in the X-direction, while no obvious damage was observed in the shop

weld connections placed in the Y-direction. Eventually, two more tests were conducted for the fracture of the shop weld connection in Y-direction. As the maximum strain value at the bottom flange was confirmed as significantly larger than the upper flange, the bottom flange fracture was attributed to the amplified strains due to the composite effect of the RC floor slabs as well as the large cumulative inelastic deformations.

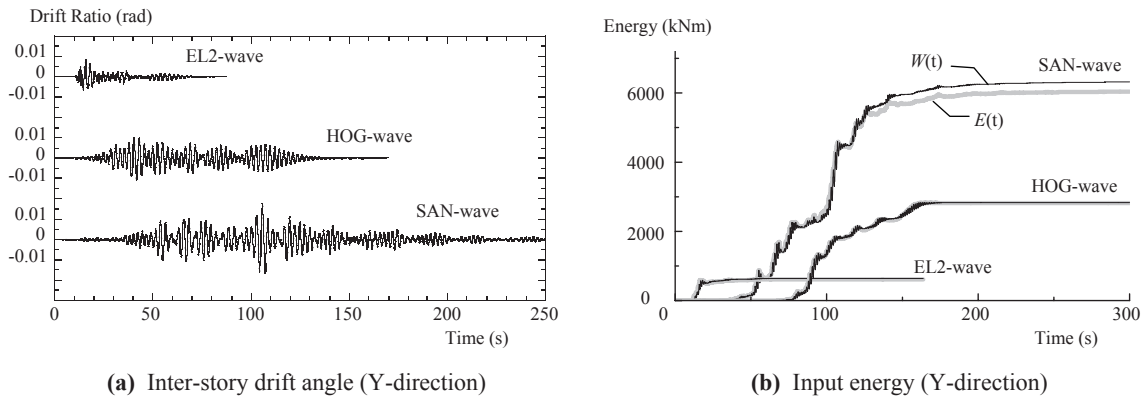


Fig. 3: Seismic response of test specimen

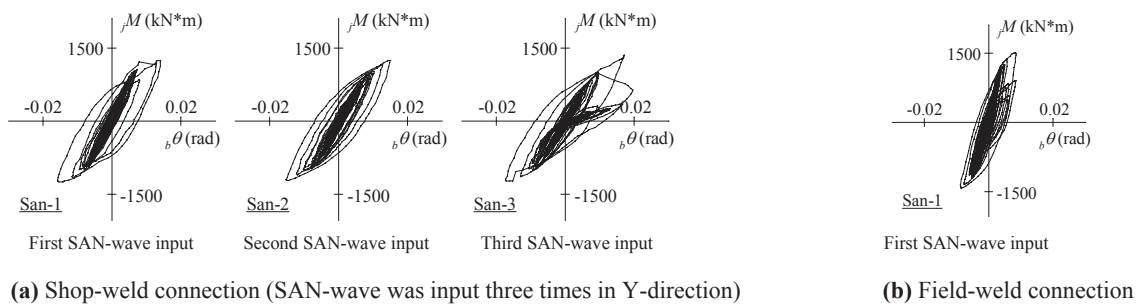


Fig. 4: Bending moment versus rotation relationships (M - θ relationships) at the beam ends

Reinforcement of high-rise steel buildings (The 2009 E-Defense test)

Fig. 5 shows the concept of the 2009 E-Defense test, in which the test specimen was reinforced with seismic dampers system. In the Case-I and Case-II for steel damper series, Buckling-Restrained Brace dampers were incorporated in the lower steel frame, and modeled steel dampers were utilized for the substitute layers. In the Case-III for oil damper series, oil dampers in diagonal braces were incorporated in the lower steel frame. In the SAN-wave, the maximum story drift angles of specimen were reduced to less than 1 % by dampers. Fig. 6 shows the force-deformation hysteresis and energy absorption of dampers. In the test frame, the energy was absorbed more than 70 % by the steel dampers or the oil dampers. As for the BRB damper, the cumulative inelastic strain capacity was estimated about ten times larger than the seismic demand in SAN-wave.

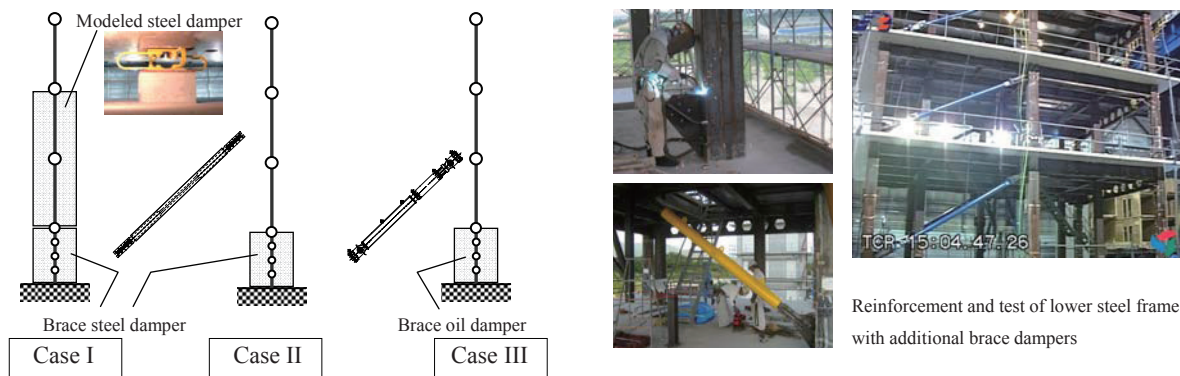


Fig. 5: Concept of the 2009 test on high-rise building reinforced by dampers

In the end, seismic performance of reinforced beam-to-column connections were examined in the test frame with no damper. Fig. 7 shows three types of reinforcement for field-weld beam-to-column connection. The deformation capacity was highly enhanced by those applicable reinforcement methods as shown in Fig. 8.

Fig. 9 shows the energy spectrum of input waves. The spectrum was given by the elastic SDOF with the damping ratio of 10 %. In this test series, the HOG-wave and the SAN-wave were adopted as the typical long period ground motion. These two waves had predominant magnitudes at around three seconds, while EL2-wave had a flat shape. The total input energies of the test specimen with no dampers as well as the test specimens characterized by Case-I, Case-II and Case-III reasonably correspond to the estimations of energy spectra at each natural period.

According to the test results, the reinforcement policies of existing high-rise buildings are derived;

- (1) Estimate input energy demand from energy spectra of long period ground motions
- (2) Reduce energy absorption of steel frame by reinforcement with dampers
- (3) Increase of cumulative inelastic deformation capacity of steel frame by reinforcing beam-to column connections (especially field-weld connections)

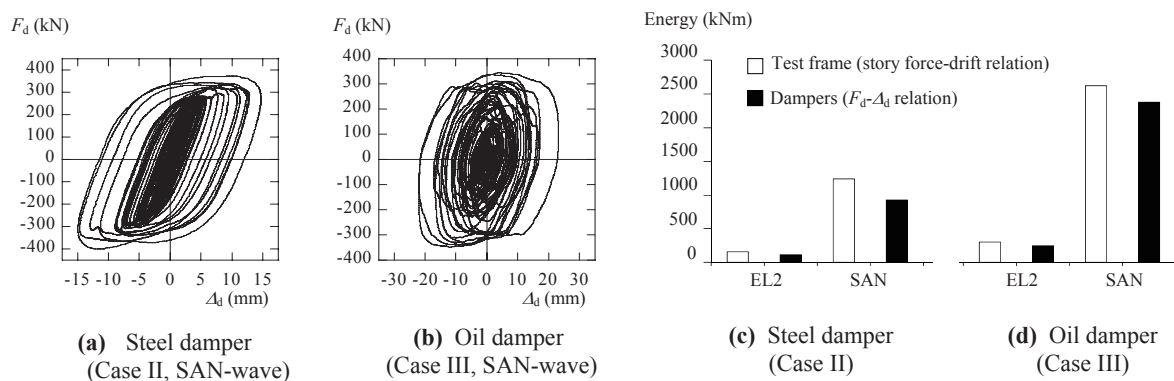


Fig. 6: Force-deformation relationship of dampers ((a), (b)), energy absorption of test frame and dampers ((c), (d))

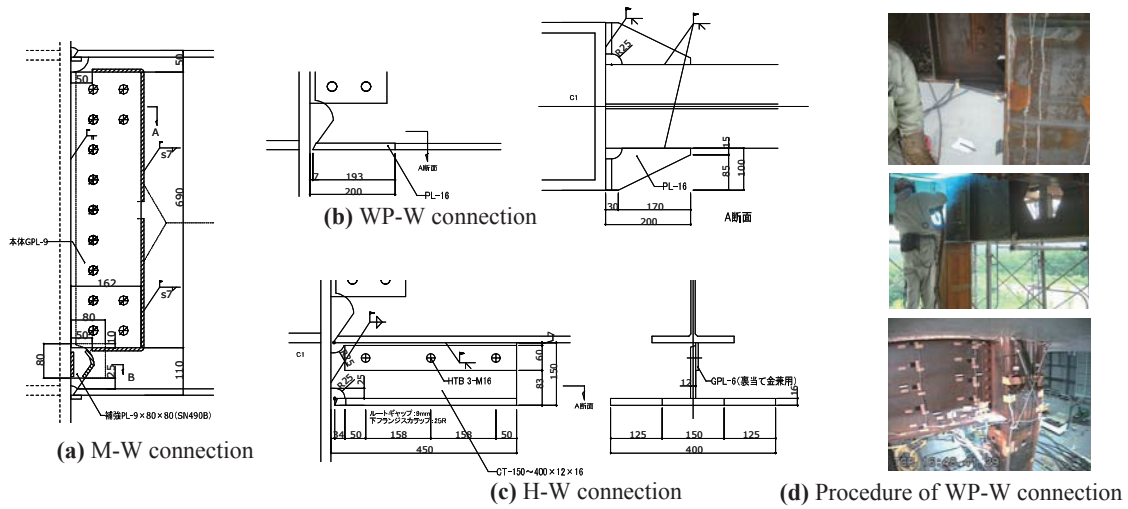


Fig. 7: Reinforcement of field-welded beam-to-column connection

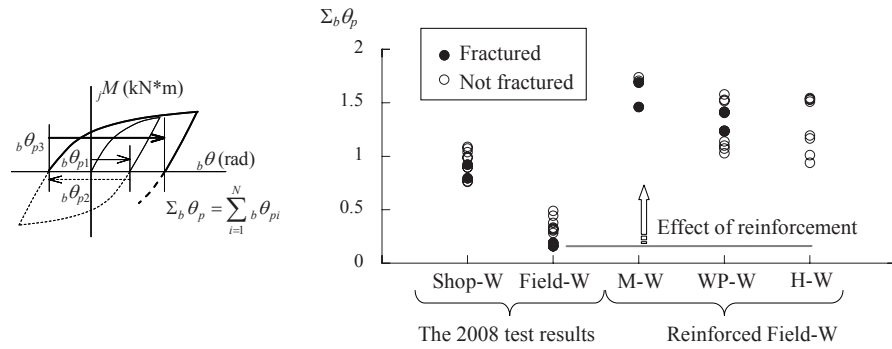


Fig. 8: Cumulative deformation capacity of beam-to-column

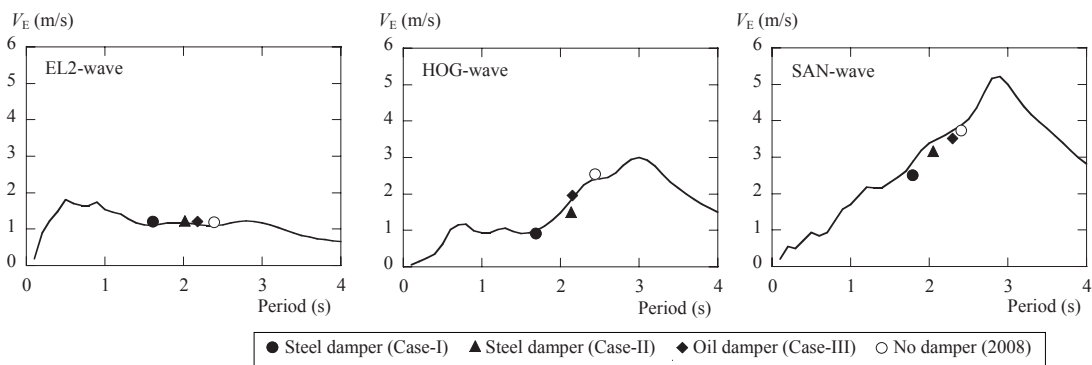


Fig. 9: Energy spectra and test results

THE 2011 VAN EARTHQUAKES OCURRED IN TURKEY

Baris Denizer¹, Takuya Nagae²

¹ *Volunteer Civil Engineer, Turkey*

² *National Research Institute for Earth Science and Disaster Prevention, Japan*

Keywords: Turkey East, Van Earthquake, Government and Municipality Crisis after Disaster

Geology of Turkey

Turkey's most severe earthquake in the twentieth century occurred in Erzincan on the night of 1939-12-27; it devastated most of the city and caused an estimated 33.000 deaths. Earthquakes of moderate intensity often continue with sporadic aftershocks over periods of several days or even weeks. The most earthquake-prone part of Turkey is an arc-shaped region stretching from the general vicinity of Kocaeli to the area north of Lake Van on the border with Armenia and Georgia.

Anatolian Plate

The Anatolian Plate is a continental tectonic plate consisting primarily of the country of Turkey. The easterly side is a boundary with the Arabian Plate, the East Anatolian Fault, a left lateral transform fault.[1]



Fig.1: Anatolian Plate

The southerly and southwesterly sides comprise a convergent boundary with the African Plate, manifest in compressive features of the oceanic crust beneath the Mediterranean as well as within the continental crust of Anatolia itself, and also by what are generally considered to be subduction zones along the Hellenic and Cyprus Arcs.

The northerly side is a transform boundary with the Eurasian Plate forming the North Anatolian Fault Zone (NAFZ).

Research indicates that the Anatolian Plate is rotating counterclockwise as it is being pushed west by the Arabian Plate, impeded from any northerly movement by the Eurasian Plate.

In some references, the Anatolian Plate is referred to as a "block" of continental crust still coupled to the Eurasian Plate. But studies of the North Anatolian Fault indicate that Anatolia is de-coupled from the Eurasian Plate. It is now being squeezed by the Arabian Plate from the east and forced toward the west as the Eurasian Plate to its north is blocking motion in that direction. The African Plate is subducting beneath the Anatolian Plate along the Cyprus and Hellenic Arcs offshore in the Mediterranean Sea.

Van City

Van city is a province in eastern Turkey, between Lake Van and the Iranian border. It is 19,069 km² in area and had a population of 1.022.532.[2] This area was the heartland of Armenians, who lived in these areas from the time of Hayk in the 3rd millennium BCE right up to the late 19th century when the Ottoman Empire seized all the land from the natives[3] In the 9th century BC the Van area was the center of the Urartian kingdom [4]. The area was a major Armenian population center. The region came under the control of the Armenian Orontids in the 7th century BC and later Persians in the mid 6th century BC. By the early 2nd century BC it was part of the Kingdom of Armenia. It became an important center during the reign of the Armenian king, Tigranes II, who founded the city of Tigranakert in the 1st century BC⁴. This region was ruled by the Arsacid Dynasty of Armenia before 4th century AD. In 908-1021 was central part of Armenian Kingdom of Vaspurakan, then joined Byzantine Empire. With the Seljuq victory at the Battle of Malazgirt in 1071, just north of Lake Van, it became a part of Seljuq Empire and later the Ottoman Empire.



Fig.2: Location of Van City in Turkey

Van Earthquake

Van earthquake was a destructive magnitude 7.2 Mw earthquake that struck eastern Turkey near the city of Van on Sunday, 23 October 2011 at 13:41:21 local time. It occurred at a shallow depth of 20 kilometers, causing heavy shaking across much of eastern Turkey and lighter tremors across neighboring parts of the South Caucasus and Levant. This earthquake was mostly destructive on Erceğir District where is 40km air distance north of Van City. For this earthquake, the people who living around Van City says First Earthquake or Erceğir Earthquake.

According to Disasters and Emergency Situations Directorate of Turkey (AFAD) on 28 November 2011, the earthquake killed 604 and injured are 4,152. At least 11,232 buildings sustained damage in the region, 6,017 of which were found to be uninhabitable. The uninhabitable homes left as much as 8,321 households with an average household population of around 7.6 homeless in the province; this could mean that at least around 60,000 people were left homeless. The other 5,215 have been damaged but are habitable [5] [6] [7] [8].

Another earthquake with magnitude Mw 5.7 and a depth of 9.4 kilometers [9] hit near Van on 9 November 2011 at 21:23 local time, causing 40 deaths and hundreds injured.[10] It was centered 16 kilometers south of Van.[11] Among the buildings collapsed by the 9 November earthquake was the Bayram Hotel, which hosted some journalists and rescue workers. Some journalists trapped in the rubble sent text messages asking to be rescued.[12] And also a Japanese aid volunteer Dr. Atsushi Miyazaki was reported dead on 10 November 2011. It is not clear yet if the earthquake of November 9 was an aftershock of the October 23 earthquake,[13] while the Kandilli earthquake center of Turkey said that the November 9 earthquake was an independent earthquake.[14]

Rescue workers were able to pull out 25 survivors from the rubble of the collapsed buildings. The earthquake toppled 25 buildings, said Deputy Prime Minister Besir Atalay. Since most buildings were evacuated after the October 2011 earthquake, only 3 buildings were occupied, otherwise the death toll could have been worse.[15]

The First Earthquake (23 October)

The First Earthquake were recorded by different seismic stations. The nearest station was Muradiye Station where located 42 km away from the epicenter. The maximum acceleration was recorded as 178.5 gal North-South direction by this station.

The Second Earthquake (9 November)

After the First Earthquake, some new seismic stations were setup around the Van City. The Second Earthquake was recorded by these new stations. The nearest station was Edremit Station where located 2.9 km away from the epicenter. The maximum acceleration was recorded as 102.6 gal East-West direction by this station, however the maximum acceleration was also recorded as 245.9 gal by Van Merkez Station where was located 12.7 km away from the epicenter.

The First Earthquake
The First Earthquake on 23 October has been mostly affected around Erciş District. Magnitude of the First Earthquake is declared as ML=6.7 by the KOERI-NEMC, however they revised as MW=7.2 after hours from the earthquake.



Fig.3: A Photo from 1st Earthquake

The Second Earthquake
The Second Earthquake on 9 November has been mostly affected Van City. Magnitude of the Second Earthquake is declared as aftershock and ML=5.6 by the KOERI-NEMC. They changed as independent earthquake after days from the shake.



Fig.4: A Photo from 2nd Earthquake

The Third Earthquake
The Third Earthquake on 30.11.2011 has been affected Van City however no destruction. Only damages of some buildings were increased.



Fig. 5: Increased Damages due to 3rd Earthquake

Notes

1. Magnitude of the First Earthquake changed as $M_W=7.2$ by KOERI-NEMC after hours from shake.
2. The Second Earthquake has been declared as aftershock by KOERI-NEMC and changed as independent earthquake days after the shake.
3. The Third Earthquake according to people, there was no destruction, but there was some extra damage to some buildings.

References

- [1] Dwivedi S.K., and Hayashi, D., 2010. "Modeling the contemporary stress field and deformation pattern of eastern Mediterranean". Journal of Earth Science Published by Springer
- [2] TUIK: Turkish Statistical Institute 2011
- [3] Hofmann (ed.), Tessa (2004). Persecution, Expulsion and Annihilation of the Christian Population in the Ottoman Empire 1912-1922
- [4] European History in a World Perspective - Page 68 by Shepard Bancroft Clough
- [5] The Journal of Roman Studies – Page 124 by Society for the Promotion of Roman Studies
- [6] AFAD: Disasters and Emergency Situations Directorate of Turkey (28 November 2011)
- [7] "Earthquake Van – Ercis, Turkey". earthquake-report.com. Retrieved October 30, 2011
- [8] "Death toll rises to 582 in quake-hit Turkey". Xinhua. October 29, 2011. Retrieved October 30, 2011
- [9] "Magnitude 5.6 - EASTERN TURKEY". USGS. 8 November 2011. Retrieved 13 November 2011
- [10] "At least 5 dead in quake in eastern Turkey - CNN.com". CNN. 10 November 2011
- [11] "Turkey earthquake: Seven dead in toppled Van hotel". BBC. 10 November 2011. Retrieved November 10, 2011
- [12] <http://www.chron.com/news/article/Report-At-least-3-killed-in-Turkey-earthquake-2260519.php>
- [13] http://www.sofiaecho.com/2011/11/10/1200927_earthquake-of-57-magnitude-hits-eastern-turkey-kills-seven
- [14] Champion, Marc (10 November 2011). "Powerful Quake Ravages Turkey City". The Wall Street Journal
- [15] "Turkey: Earthquake kills at least 7, dozens trapped in area hit by deadly temblor last month". Associated Press. Ankara: The Washington Post. Retrieved 10 November 2011
- [16] http://www.van.gov.tr/default_B0.aspx?id=1809
- [17] http://www.van.gov.tr/default_B0.aspx?id=1812
- [18] <http://www.sondakikahaberleri.com.tr/vanda-kesin-hasar-tespit-calismalari-tamamlandi>
- [19] www.hasar.vandepremi.org.tr

5

Sustainability and global environment

SUSTAINABLE SOCIETY: ENERGY SAVING CONSTRUCTION

Shushi Sugiura

Mukogawa Women's University, Japan

Key Words: sustainable construction, energy saving technology, & global environment

Introduction

Japan has suffered from an unprecedented disaster because of the 3.11 earthquake and tsunami. A big accident rated as Level 7 took place at the Fukushima No. 1 nuclear power plant, resulted in the suspension of all of the nuclear power plants in Japan scheduled in April of 2012. This accident has led to electricity shortage, giving a huge impact to our comfortable life. At the same time, the future of energy has become a public concern. This accident has reminded us how energy is essential to our life and how important it is to develop a sustainable infrastructure.

Accordingly, I thought it is significant to examine the direction of future energy supply and to recognize the importance of energy saving activities. For this purpose, I carried out a field survey of energy consumption change and energy saving activities in one of office buildings, which have consumed more and more energy, so as to estimate the potential of future energy saving.

For this estimation, Umeda Center Building was picked up, which was completed in 1987. This building is the first example and defined the concept of intelligent building reflecting the social situation of those days, equipped with various kinds of latest energy saving technology. After recent replacement of facilities such as lighting and air conditioning systems a few years ago, this building is positioned as one of the most advanced energy saving building even now.

Methods: Saving and Selection of Energy

Now that the myth of the safety of nuclear power plants was shattered, this is a turning point of selecting energy. Nuclear power generation was attractive for Japan, which is poor in fossil fuel, in the way that inexpensive, stable electricity is supplied and almost no CO² is emitted. At the 1st and 2nd oil crises in the 1970', Japan drastically changed its

energy policy from dependence of the primary energy on oil to pro-nuclear-energy policy and extrication from dependence on oil. As a result, the dependency rate dropped to 46% in 2008 from the original level of 77%. Nuclear power generation has developed so much that it covers one fourth of electricity peak and one third of electricity energy. However, the issue of disposing radioactive waste has not been solved and left to the next generation. Future direction has to wait decision by the government after the summary of the nuclear power plant accident and enough discussion for reflecting public opinion on the future energy.

On the other hand, for reducing energy consumption in buildings, it is most important to decrease usage irrespective of electricity generation method. As a professional of construction, I believe energy saving is the first step for attaining sustainable construction. With less energy use and further technological innovation, the environment could be preserved with recyclable energy while comfortable life would be enjoyed in a sustainable way.

There are three key stages for saving energy.

1) When Building is Completed = Design Performance

When designing by adopting the latest energy saving technology based on the social situation and the building needs, the performance influenced by the architectural elements such as heat insulation and opening portions like glass surface and ventilation holes is important. This performance will be kept until the building is torn down.

2) When Facilities are Replaced

Because of the end of the life, facilities such as lighting and air conditioning systems are replaced around 20 years after the installation. 20 years is enough long for technological advancement. During such a period, efficiency can improve and a new facility system can appear. This is the time for reviewing energy saving considering the next 20 years.

3) Daily Operation Stage

It is determined by operation if the energy saving technology introduced in 1) and 2) works efficiently. The Energy Saving Act requires saving 1% of energy on an annual basis. On top of that, it is significant to attain comfortable environment based on the needs of the user and to eliminate waste by careful operation and fine tuning of facilities for saving energy. Also, the results of such daily efforts are utilized in the replacement in 2).

Result: Investigation Results of Umeda Center Building

Umeda Center Building is an office building completed in March of 1987. Fig.1 is a picture of the building and Table 1 the building specification.



Location	Kita-ku, Osaka city
Total Floor Area	80,108.8m ²
Size	32F B2F
Design	Takenaka Corporation
Maintenance	Asahi Facilities Inc.
Lighting	FL40W, 500lx
Air Conditioning	
Lower Floors	Air Chilling Heat Pump Chiller Ice Thermal Storage Gas Absorption Chiller
Standard Floors	Pakaged air conditioning system
Other Facilities	Fuel Cell 200Kw Water Recycling Facility

Fig.1: Umeda Center Building

Table 1: Building Specification (when Completed)

At the time of designing, it is required to improve office productivity, use more OA equipment, and make the building available around the clock due to globalization. As a result, packaged air conditioning system was developed and installed in the building as the first application to a skyscraper because individual air conditioning system was considered reasonable to control the time and space of air conditioning. Based on the concept of energy saving is deep rooted in Japan, which is not rich in natural resources, leading edge energy saving technology was adopted such as heat reflecting glass for the exterior and 200kw phosphoric acid fuel cell cogeneration system for looking for the future of urban energy.

Fig.2 shows the energy consumption change and renovation history after the completion. From the completion to 2001, electricity demand and energy consumption increased because more and more OA equipment was rapidly installed at that time. 2001 to 2003, energy consumption decreased because major tenants using much amount of electricity such as an IT company left the building and the number of people in the building declined accordingly. Then, energy consumption and electricity demand gradually went down because of the renovation of the air conditioning systems at the standard floors 2007 to 2009 and the renovation of the heat source at the lower floors.

The fuel cell cogeneration system was removed in 2008 because of the end of the life. More specifically, the system was not efficiently run because 80% of the generated heat was wasted due to changes in the tenants who use the hot water from the system. Currently, electricity demand is lower than the time of completion after the air condition system renovation. Also, primary energy consumption is lower than the peak time of 2001 by 30% to lower than 1,800MJ/m²/year. This is a favorable situation as an energy saving building.

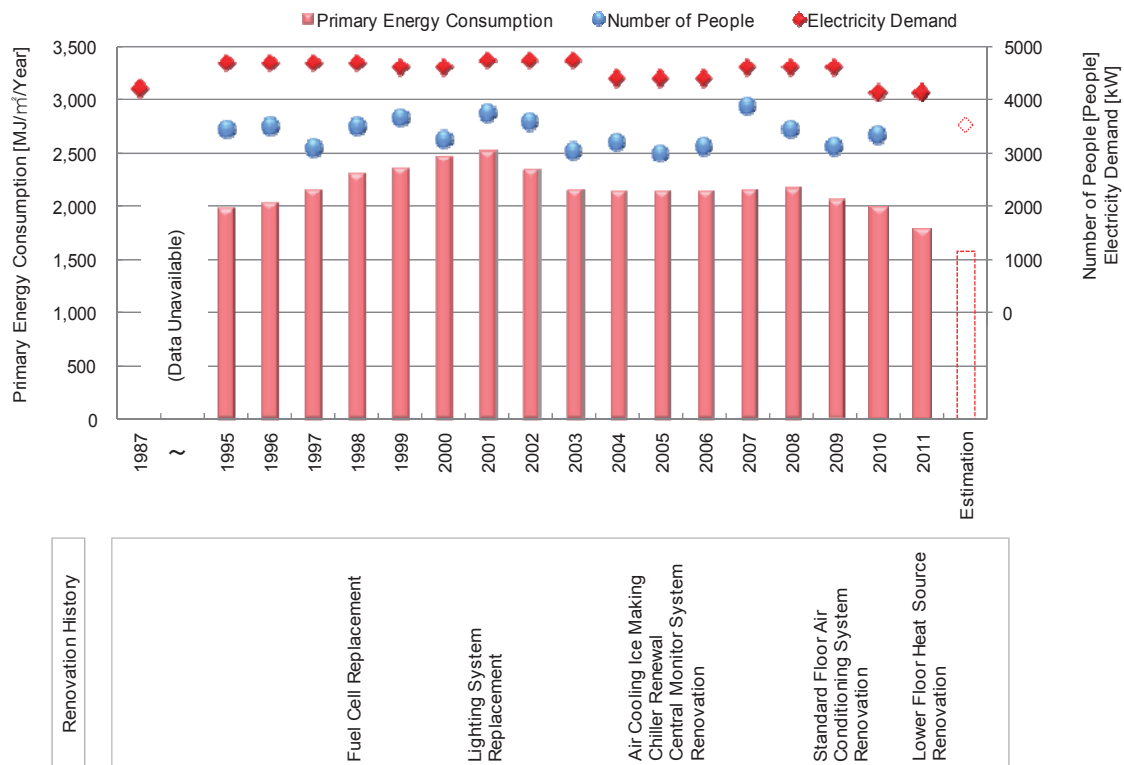


Fig.1: Energy Consumption Change and Renovation History

Discussion: Study of Potential of Future Energy Saving

Umeda Center Building has finished renovating its major facilities relating to energy consumption. Fig.3 is the breakdown of the energy consumption in 2011. This chart shows the lighting sockets consume a lot of electricity. In the next renovation, further energy saving should be attained through lighting system and OA equipment.

(1) Estimation of Energy Saving with Lighting System

LED lighting system has been required to improve its efficiency. Over the past year, this system has become accessible to the public because of drastic initial cost decline and wider variety of products. LED lighting is more efficient than fluorescent lighting in not only the rating but also in dimming control.

Also, the same criterion has been used for deciding the lighting intensity at the desk and aisle spaces in the office. Rather, different lighting intensity should be adopted for desk (task) space and room (ambient) space.

When estimating with the assumption that LED lighting system is installed, the lighting intensity is set at 400Lx for ambient space and 700Lx task space, and daylight and motion sensor controls are combined, 65% of the electricity for lighting, 505kW of the electricity demand, and 184MJ/m²/year of the primary energy consumption could be reduced. In addition, LED lighting system would reduce internal heat generation and cooling load, resulting in around 10% of decrease in annual air conditioning load, 111kW in the electricity demand, and 25MJ/m²/year in the primary energy consumption. Accordingly, it is expected to reduce the electricity demand by 616kW and the primary energy consumption by 209MJ/m²/year in total.

(2) Estimation of Energy Saving with IT Technology

The electricity consumption for using IT devices at the tenants would be reduced by 50% resulting from wider use of thin client systems due to higher access to Cloud computing. Visualization driven by BEMS (Building Energy Management System) is expected to contribute to further energy saving through elimination of waste.

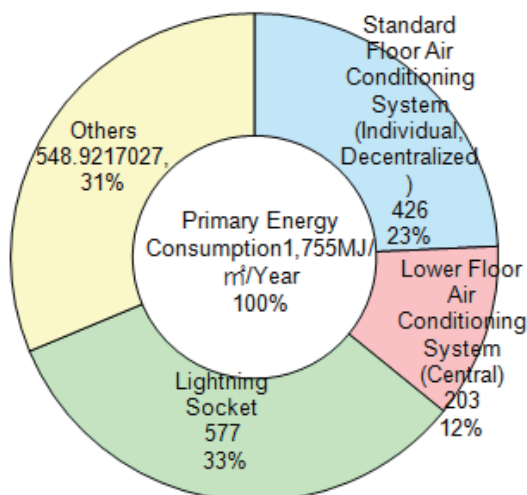


Fig.3 the breakdown of the energy consumption in 2011

Conclusion

Although this is the energy consumption only in one office building, the actual operation performance over 24 years is presented. It was estimated that energy consumption can be surely reduced without damaging comfortable environment through further energy saving efforts to the level lower than the time of completion of the building (in terms of peak and consumption).

So far it has been believed that energy consumption in office buildings would increase so as to improve productivity and comfortability. However, energy consumption will go down for sure. This is a turning point of the energy policy for attaining a sustainable society. It is important to make thorough efforts for realizing sustainable construction. In conclusion, I would like to express appreciation to Umeda Center Building Inc., Asahi Facilities Inc., and Takanaka Corporation for having provided me with materials of energy consumption.

References

[1] Kaya, Y., Akimono, K., & Nagata Y. *Teitanso Ekonomi [Low Carbon Economy]*. Nikkei Publishing Inc., 2008

[2] Ida, T. *Deta de Kensho, Chikyu no Shigen [Verification with Data, Resource of the Earth]*. Kodansha Ltd., 2011

NATURE AS A SOURCE OF SUSTAINABLE DESIGN IN ARCHITECTURE OF ORIENTAL COUNTRIES (CASE STUDY: TRADITIONAL ARCHITECTURE OF IRAN)

Shaghayegh Afrasiabian¹, Mohammadjavad Mahdavinejad², Negar Badri¹

¹ *Tehran University, Iran.*

² *Tarbiat Modares University, Iran.*

Keywords: Nature, oriental architecture, eastern philosophies, Iran traditional architecture.

Abstract. Nature as one the most important architectures` guidelines continuously presenting in designing process, affects various aspect of architecture and buildings formation especially in oriental architecture emanating from Eastern philosophies. Following the review, in this field, the major questions are what is the impact of nature in traditional Iranian architecture as one of the subdirectories in Eastern architecture and on which factors, the variety of nature utilization in aforementioned subcategory depends?

To answer the questions, the used research method is logical argumentation with librarical searching and physical studies. Twenty survived ample samples of Iranian traditional architecture are selected to study on. As the result, the way nature utilized in case studies is classified in 8 categories and the frequency rate of each method is described in tables.

1. Introduction

The study on previous architecture as a reliable reference in contemporary designing is always considered the guidelines toward further architecture. In another word, Application of traditional architecture in contemporary age is an undeniable part of the journey in the direction of achieving admitted and sustainable architecture goals based on truly examined experiences; So that even modern architecture mostly intents to utilize earlier taught in a recent format; it means, he follows the light of past experience to illuminate future path toward prosperity.

According to the review, presence of pure or inspired nature in previous architecture, namely in oriental one, has always been an inspiration source for architecture namely eastern ones based on its ancient history and civilization in different ages to take lesson from which is representative of human attention to creation and temperament.

Nature and natural elements of the architecture mostly used in countries of Eastern Culture including Japan, Iran, India, China and so on shows that the traditional relation between oriental man and nature had been established based on an innate sense which is definitely appreciated through architecture.

Correspondingly, considering the Oriental culture and philosophy, the paper comparatively studies on Iran traditional architecture samples as a country lying on the Silk Road route displaying great variety, both structural and aesthetic, developing gradually and coherently out of earlier traditions and experience [1] and surveys nature role on Persian architecture formation.

2. Nature in Oriental Philosophies

Naturalism commonly refers to the viewpoint that laws of nature (as opposed to supernatural ones) operate in the universe, and that nothing exists beyond the natural universe or, if it does, it does not affect the natural universe. [2] The study of different schools of thought in historical periods is the typical of the claim that nature and naturalism play more important role in oriental minds including the various philosophies of Asia, namely Indian philosophy, Chinese philosophy, Iranian philosophy, Japanese philosophy, Korean philosophy, Arab philosophy, Jewish philosophy in comparison to other ideologies.

“Consequential Spiritual Ideals believe discovering how human beings should act is a matter of discovering how nature acts, so man’s actions can be in accord with nature....human life (physical, mental, moral, and spiritual) is an ordinary event--attributable in all respects to the ordinary operations of nature.” [3]

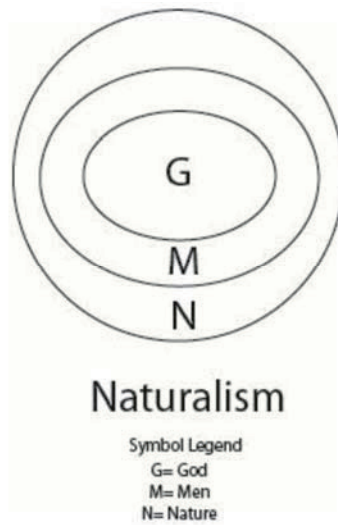


Fig. 1: Naturalism place in oriental Philosophies

Thus, in parallel with oriental beliefs, the concepts come to existence through the architecture. “Construction is established on encroachment on nature...there had always been a close relation between man and nature in most eastern cultures in past ...The oriental believes that he stems from nature; So that he makes a multiple relation facing nature in different eras”[4]

Table 1: Nature and Architecture Relation in Oriental Culture

Time	Human & Nature (Approach)	Architecture & Nature (Approach)	Theoretical schools	Discription
Pre-Modern	Unification	Sacredness of Nature	China Japan Ancient Iran	Nature Discription as “temperament” through Architecture
Post-Modern	Coordination	Conservation of Nature	Contemporary Era	To maintain natural ecosystems and improve modern thought crisis by Architecture

3. Research Questions and Methods

3.1. Questions

- What is the nature role in Iran traditional architecture?
- The variety of nature utilization in Iran traditional architecture depends on which factors?







3.2. Research Method

Research approach is logical argumentation and applied techniques are descriptive analysis complemented with comparison between Samples recorded in the national heritage of Iran. Information gathering method is librarial searching. [5]

4. Case Studies

As previously mentioned, the following paper intents to present and interpret the decisive role of nature in traditional Iranian architecture and to explain the agents affecting the variety of nature utilization in the architecture. To achieve the purpose, twenty survived species of Iranian traditional architecture are selected to study on. Introduced in detail, each sample and the way the nature utilized are presented in following table format.

Table 2: Borujerdis' house and nature utilization, designed by authors

Construction Name	Borujerdis' House	
Place/Time	Kashan/1857	
Inspired by Nature	Natural Oriental Elements	
Pure Nature Presense	Central Courtyard (Water and plants axis)	
	Badgir to control wind energy	
	Skylight window to use natural light	
	Vernacular materials (adobe)	

To explain more light on the issue, according to further research, in some cases naming Qavam House (Shiraz), El-gölü palace (Tabriz), Fin Garden (Kashan) and Dolat-abad Garden (Yazd), there lie natural axes in architecture including water and plants which lead the complex to convert to a microclimatic region provide the user with pleasant climate to live in. Moreover, sometimes, the presence of nature in a monument come to appearance through abstract ornamental components inspired from natural forms like tiling on Sardar Mosque's dome (Urmia) and Kermanshah Jameh Mosque or carving in Persepolis complex (Shiraz), Alavian Dome (Hamadan), Taq-e Bostan rock relief (Kermānshāh) . Thus, there are architectural elements exposed to natural phenomenon namely wind, solar radiation and water to restrain energy and improve a sustainable design in survived samples like wind-tunnels utilized in Bani-Kazemi, Borujerdis' and Al-Isfahani houses in Kashan. As a result, it could be mentioned that nature presents in various forms to meet a necessity or obtain to sustainable goals.

5. Discussion and Conclusion

Evaluation of the Iranian historical samples in purpose of nature role perception, the way nature utilized in case studies is classified in 8 categories and the frequency rate of each method is described in table.

Table 3: Frequency rate of nature utilization in buildings, designed by authors

Construction Name	Prominent nature elements	Natural forms	Architecture in nature	Nature in Architecture	Conceptual naturalism	integrated architecture with nature	Energy Sodality	Vernacular materials
Qavam House (Persian garden)	✓	✓	✓		✓	✓		✓
Fin Garden (Persian garden)	✓	✓	✓		✓	✓	✓	✓
Shazdeh Garden (Persian garden)	✓	✓	✓		✓	✓	✓	✓
Dolat-abad Garden (Persian garden)	✓	✓	✓		✓	✓	✓	✓
El-gölü palace	✓		✓			✓	✓	✓
Sardar Mosque's dome		✓			✓			✓
Kermanshah Jameh Mosque dome		✓			✓			✓
Persepolis complex Carving		✓			✓			✓
Bani-Kazemi house	✓	✓		✓		✓	✓	✓
Borujerdis' house	✓	✓		✓		✓	✓	✓
Al-Isfahani house	✓	✓		✓		✓	✓	✓
Behnam house	✓	✓		✓		✓		✓
Alavi house	✓	✓		✓		✓		✓
Ghadaki house	✓	✓		✓		✓		✓
Salmasi house	✓	✓		✓		✓		✓
Fahraj Village Ab-anbar							✓	✓
Taq-e-Bostan		✓			✓			✓
Alavian Dome		✓			✓			✓
Khaju Bridge			✓					✓

The previous table is final assessment of nature use in architecture. As it can be derived from the table, following classification is more common among the prominent samples.

1. The application of prominent nature elements: The use is more common in residential types and gardens applying natural elements like water, plants and so on to provide microclimate and perform a regular geometry.
2. The application of natural forms: The ornamental elements inspired from nature present in Iranian monuments mostly associated with conceptual naturalism to saint the nature.
3. The presence of architecture in nature: Nature and green space in Persian garden encompassing a palace is an obvious example of the classification. The method effectively improved the harsh climatic condition especially in hot and dry region and positively affected irrigation.
4. The presence of nature in architecture: To serve an example, central courtyard in historical architecture usually created regular geometry which encircled natural elements naming trees, flowers and plants, water and so on not only aesthetically improved the architecture but also provide the user with pleasant climatic condition.
5. Conceptual naturalism.
6. Integrating architecture with nature.
7. Natural energy and energy sodality (The utilization of wind, sun and natural energies): application of traditional architecture elements, wind tunnel (Badgir), Skylight windows embedded on house roof and mosque domes is typical of the mentioned method to restrain natural energies to maintain a sustainable design.
8. The application of natural and vernacular materials: As a clear-cut characteristic of Iranian previous architecture, the traditional architect had always used compatible and natural materials not only to decrease construction cost but also to achieve a sustainable design.

According to assessment and studies in the essay, nature always appears for the purpose of design in traditional samples not only in formal aspect but also it lies on architecture semantic aspects .Concluded by the table, nature mostly forms the past architecture in terms of construction which leads the monument toward a sustainable and compatible one with natural environment.

7. References

- [1] Arthur Upham Pope: Persian Architecture. George Braziller, p.266, New York, 1965.
- [2] Oxford English Dictionary Online naturalism.
- [3] Oriental Philosophy: Naturalism, Supernaturalism, and Humanism.
<http://philosophy.lander.edu/oriental/naturalism.html> (18/03/2012)
- [4] Hamzehnejad, M. The impact of 11th spiritual Isfahan philosophy on nature-oriented Architecture and Urbanism in Isfahan. *Congress of Isfahan School, the collection of essays on Architecture & Urban planning*.p.259,2008.(in Persian)
- [5] Linda Groat & David Wang. Architectural Research Methods. John Wiley & sons, pp. 275-325 Canada, 2002.

ROLE OF CULTURE IN SUSTAINABLE ARCHITECTURE

Sinem Kultur

Bahcesehir University, Turkey

Keywords: sustainable architecture, culture, local identity, eco-cultural

Introduction

“Sustainable architecture” being discussed in a great many publications is a highly controversial issue. In literature, various terminology is referred to express this kind of architecture such as; environmental design in 1970s, green design in 1980s, ecological design in late 1980s and 1990s and lastly sustainable architecture from mid-1990s until today. This proves the existence of an architecture that is building-oriented and has the main concern to be nature-responsive till mid-1990s. On the other hand, sustainable architecture including all the previous architectural approaches as a main heading can be considered as an environmental responsive architectural practice not only from morphological aspects but also with its contribution to social, cultural and economic infrastructure of the region. [1]

UNESCO (United Nations Educational Scientific and Cultural Organization) has coined the term “whole life sustainability” in order to expand the general meaning of sustainable architecture from *designing environmentally friendly buildings* to *architecture incorporating local identity into design process*. [2]

Frampton's notion of “critical regionalism” seeks to simultaneously address local conditions and contemporary global culture of architecture. In his essay, he underlines the importance of engaging sustainable architecture not only as technique or method, but as a cultural paradigm. [3]

The word “culture” is a determining of a very complicated concept which expresses all of the intellectual activities of a civilization. [4] The culture is; dynamic, expressed through the community as well as the individual, interpreted with each member of the community, shared with groups and transformed to new generation. It involves a system of rules, and also attitudes, values, beliefs and norms. It conveys the sustainability of vitality of the community, and has the potential to change. All these are Matsumoto's declaration of “culture” in his book “Culture and Psychology”. [5][6]

Aim of this paper is to discuss cultural dimensions of sustainable architecture. In this context, part 1 will introduce eco-cultural architecture from among different kinds of sustainable architecture. Then, part 2 will analyze the architectural practices well-known with their cultural components worldwide as practices adopting eco-cultural logic and part 3 will interpret the sustainable architectural approaches in Turkey considering the local issues.

Eco-Cultural Logic of Sustainable Architecture

Guy and Farmer [7] classify sustainable architecture under six different categories based on the main logic and methods as: eco-technic, eco-centric, eco-aesthetic, eco-cultural, eco-

medical and eco-social. The competing logics of the sustainable architecture are given as a summary in Table 1. [8] One or more logic can be found in a sustainable architecture according to the main environmental problem.

Definition of “sustainable” for an architecture changes depends on the logic. Eco-technic logic defines sustainable architecture as energy-sufficient architecture placing importance to the development of technology while in eco-centric logic, sustainable architecture is considered to be an architecture that is a part of nature through using natural materials and has zero ecological footprint. Sensuous, stylish and creative qualities make the green architecture as sustainable for eco-aesthetic logic. On the other side, architecture creating “healing environment” and supporting the healthy lifestyle of the people is considered as sustainable within eco-medical logic. Also, there is an eco-social logic defining the architecture that embodies the spirit of the society, freedom and togetherness as sustainable.

The eco-cultural logic highlights the preservation and conservation of the variety of the existing cultural archetypes with a concern for cultural continuity. This logic leads to transformation and reuse of traditional construction techniques, building typologies and settlement patterns for expression of the cultural sustainability. This approach denies universal and technologically based design methodologies that often fail to coincide with the cultural values of a particular place or people. [9]

Architectural Practices Adopting Eco-Cultural Logic

The concern for the cultural sustainability, continuity of space characteristics, use of local materials and proper responses to nature can be seen in regional approaches of the leading architects, Hassan Fathy from Egypt and Charles Correa from India. [10]

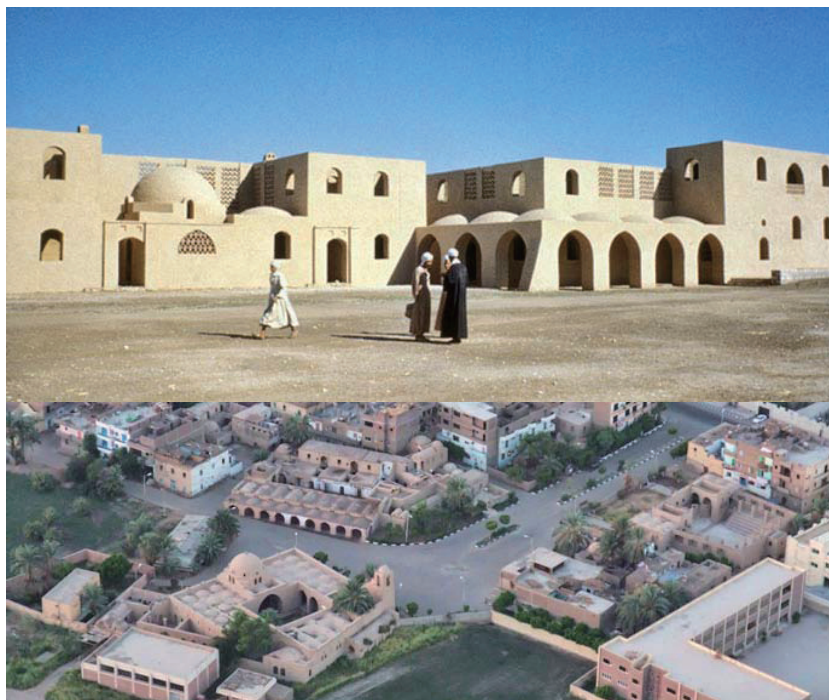


Fig. 1: Gournah Village in Egypt by Hassan Fathy [11]

New Gournia Village (Fig. 1) is a reinterpretation of a traditional urban and architectural setting by Hassan Fathy who is an early visionary of sustainable architecture. It provides sustainability both in culture through use of local materials and techniques and in environment with its extraordinary sensitivity to climatic problems. It is an outstanding example of the integration of vernacular technology with modern architectural principles. Fathy brought back the use of mud brick (adobe) and with special techniques keep building cooler during the day and warmer during the night. [12] [13]

Fathy believed that architecture was about bridging the gap between new architectural techniques and older techniques. These older techniques are sustainable and energy efficient, helping the villagers to reduce their reliance on modern technologies, which are not only expensive, but have negative effects on their culture and environment.[14]



Fig. 2: Kanchanjunga Apartments in India by Charles Correa [15]

Although it bears a strong resemblance to modern apartment buildings in the West with its concrete construction and large areas of white panels, the garden terraces of Kanchanjunga Apartments are a modern interpretation of “the verandah” in the traditional Indian bungalow. The garden verandah also provides a protection for the high-rise units against the effects of sun and monsoon rains. [16]

Interpreting Sustainable Architectural Practices/ Approaches in Turkey

The most common examples of sustainable architecture in Turkey are residential buildings. These are a broad range of houses including ecological ones that reject contemporary construction methods, harmonize with nature by interpreting the traditional architecture and smart ones that economize energy consumption and are rich in technology.

Sustainable architecture in Turkey, when analyzed within the framework of practices, it can be obviously seen that the concept “sustainability” and its keynotes are not well addressed and understood. In some practices, sustainable buildings are considered as high-tech, self-producing energy, low-energy, passive, energy-efficient, ecologic or smart building. In other saying, the architecture in Turkey deals with the concept from morphological aspects rather than social, cultural, environmental and economic realities of its place.

Indoor and outdoor spaces decorated with green elements, first digging virgin nature than willing to comply with it, ignoring locality in material selection (e.g. using wooden (natural) material), etc. all of them are indicatives of the formal perception of sustainability.[17]

Rapaport defines the cultural elements forming the house as; religion, language, family structure, child raising methods, settlement patterns, land division and land owning systems, nutrition habits, symbolic and traditional systems, status defining methods, social identity, cognitive maps; privacy, intensity, territoriality, behavioral organization in a house, working, business and trades. [18]

Unlike the contemporary architecture, the traditional architecture in Turkey houses the above mentioned local cultural elements as well as the proper approaches considering local climatic and geographic conditions. Therefore, most of the traditional practices in Turkey are in tendency to be regarded as sustainable.

Discussions and Conclusion

Emergence of the concept sustainability concurrently leads to discussions on the methodology of sustainable architecture. A variety of approaches going after different logics for sustainable design appeared, one of which is eco-cultural logic. This logic keynotes the significance of sustainability of the culture to be provided through design in architecture. It argues that the existence of a critical interaction between culture and environment through which they continually redefine each other.

Environmental and cultural sustainability could be achieved through adopting a regional design approach. [19] In regional approach, design regards the climate and topography and intends to sustain the culture of the region through considering the existing pattern of the region, the existing architectural features of the buildings, the existing lifestyles of the inhabitants and the existing cultural issues. In brief, regional design meets the goals of eco-cultural logic of sustainable architecture.

When examining the cases in Turkey, interpretation of the traditional and use of cultural elements in modern ways can be seen as the lacking parts of contemporary architectures intending to be sustainable.

In conclusion, the paper will contribute to comparison of different logics of sustainable architecture. It provides to review sustainable architectural practices worldwide and the remarkable influences of culture on architecture. The paper also enables to discuss the sustainable approaches in Turkey in terms of eco-cultural aspects.

Table 1: The competing logics of sustainable architecture [8]

Logic	Image of space	Source of environmental knowledge	Building image	Technologies	Idealized concept of place
Eco-technic	global context macrophysical	technorational scientific	commercial modern future- oriented	integrated energy efficient high-tech intelligent	Integration of global environmental concerns into conventional building design strategies - Urban vision of the compact and dense city
Eco-centric	fragile microbiotic	systemic ecology metaphysical holism	polluter parasitic consumer	autonomous renewable recycled intermediate	Harmony with nature through decentralized, autonomous buildings with limited ecological footprints - Ensuring the stability, integrity and "flourishing of global and local diversity
Eco-aesthetic	alienating antropocentric	sensual postmodern science	iconic architectural New Age	pragmatic new non-linear organic	Universally reconstructed in the light of new ecologically knowledge and transforming our-consciousness of nature
Eco-cultural	Cultural context regional	phenomenology cultural ecology	authentic harmonious typological	local low-tech commonplace vernacular	Learning to "dwell" through buildings adapted to local and bioregional physical and cultural characteristics
Eco-medical	polluted hazardous	medical clinical ecology	healthy living caring	passive non- toxic natural tactile	A natural and tactile environment which ensures the health, well-being and quality of life for individuals
Eco-social	social context hierarchical	sociology social ecology	democratic home individual	flexible participatory appropriate locally managed	Reconciliation of individual and community in socially cohesive manner through decentralized "organic", nonhierarchical and participatory communities

References

- [1] Durmuş Arsan, Z. Türkiye’de Sürdürülebilir Mimari. *Mimarlık*, Vol. 340, pp. 21-30, 2008.
- [2] Tocher, I. *Review: Not quite Vegemite: An architectural resistance to the icon.* <http://www.vam.ac.uk/content/journals/research-journal/issue-03/review-not-quite-vegemite-an-architectural-resistance-to-the-icon/> (20.03.2012).
- [3] McMinn, J. and Polo, M. Sustainable Architecture as A Cultural Project. *Proceedings of the Conference on World Sustainable Building*, pp.4537-4544, Tokyo, Japan, 27-29 September 2005.
- [4] İncedayı, D. Sürdürülebilirliğin Kültürel Boyutu. *Sürdürülebilirlik: Kent ve Mimarlık*, Bülten 51, pp. 30-35, 2007.
- [5] Ayalp, N. Cultural Identity and Place Identity in House Environment. *2nd International Conference on Arts and Culture*, pp. 64-69, Montreux, Switzerland, 2011.
- [6] Matsumoto D.R. and Juang, L. *Culture and Psychology*. Wadsworth Publishing, San Francisco, 2003.
- [7] Guy, S. and Farmer, G. Reinterpreting Sustainable Architecture: The Place of Technology. *Journal of Architectural Education*, Vol. 54, No. 3, pp. 140-148, 2001.
- [8] Ryan, A. Competing Logics of Sustainable Architecture in a New Zealand Competition. <http://www.cmsl.co.nz/assets/sm/5939/61/2.PN062Ryan.pdf> (18.03.2012).
- [9] Guy and Farmer, op.cit.
- [10] Ibid.
- [11] UNESCO WHC. *Safeguarding Project of Hassan Fathy’s New Gourna Village.* <http://whc.unesco.org/en/activities/637/> (20.03.2012).
- [12] Ibid.
- [13] Schoeman, A. *Hassan Fathy: An Early Visionary of Sustainable Architecture.* <http://www.theinnovationdiaries.com/2613/hassan-fathy-an-early-visionary-of-sustainable-architecture/> (20.03.2012).
- [14] Ibid.
- [15] Ibid.
- [16] Pagnotta, B. *AD Classics: Kanchanjunga Apartments / Charles Correa.* <http://www.archdaily.com/151844/ad-classics-kanchanjunga-apartments-charles-correa/> (20.03.2012).
- [17] Durmuş Arsan, op.cit.
- [18] Rapoport, A. *House, Form and Culture*. Prentice Hall, 1969.
- [19] Sezer, M. *Housing as a Sustainable Architecture in Turkey/ A Research on TOKI Housing*. Master of Science Thesis, METU, Ankara, 2009.

OYA PROJECT OF SYNCHRONIZED CAVE COMPLEX: UNDERGROUND REVITALIZATION PLAN UTILIZING ABANDONED MINES

Itsuo Kamiya

Itsuo Kamiya and Associates, Japan

Keywords: Oya, Oya stone, urban, eco city, clean city, primitive, resource

Introduction

History of Oya

A focusing area of the “Oya project” is the town of Oya located approx. Four kilometers north-east from the center of Utsunomiya city, Tochigi prefecture, also neighboring the National Park of Nikko.

The area has a 400-year-long history of rock quarries. A type of rock quarried in this area is tuff, or tufa, produced by the earth’s historical activities such as volcanic eruptions, and it is locally called “Oya stone” derived from the place of Oya.

One of the most famous architectures using Oya stones is the Imperial Hotel, Tokyo, designed by Frank Lloyd Wright, a worldwide renowned architect. The building is preserved as a historical architecture.

Dormant Underground Space

The usage of Oya stone has been decreasing with its demand getting lower due to changes of society’s development. Worse, the production of Oya stone was lately tumbled spurred by the 1990’s cave-in accident that happened from long time, reckless quarrying. The underground space quarried from 400 years ago and remained until now. It has been alienated from the society and is idle now.



Fig.1 : Focusing area of Oya



Fig.2 : Inside of quarries

Huge Space Under the Ground and Industrial Waste

The capacity of the underground space, which became abandoned mines and neglected, reaches some million cubic meters.

Various proposals including utilizing the space for an industrial waste or an incinerator, however, were unacceptable to inhabitants there. The course of measures for the place is still undecided.

Methods

Proposal for Creating Brand-new City

The project we propose faces the environment problems that today's world includes, and it is also unavoidable for us to tackle safety measures against cave-in of Oya region. We have come to a conclusion that we should consider about not only partial but total optimization for the whole central area of Oya region from the filtered viewpoints of countermeasures against cave-in and environmental pollution. It will be 2,000 x 2,000 meters in area. Considering the size, we should take it as a 'city'.

It is unique, and its uniqueness will bring us a brand-new creativity of the 21st century. We are convinced that the project we propose is best suited to its name, "Synchronized Cave Complex". It is to be developing an ecological city, a new theme of the 21st century.

The proposed plan is to foster people's lives, industries, cultures and arts in the area so as to be able to contribute to the 21st century, and through those a new economy market will be established from here. Considering the plan's concept of 'Eco City', the natural resource of light, water and wind is taking a pivotal role to realize it.

Results

Master Plan

Key gist of our plan is following: The existing scenery of tourism resources and settlements alongside the current roads are to be maintained. The existing ground level of the area where abandoned mines are concentrated under the ground is to be excavated for more depth. The planned grade is expected to be 60-80 meters beneath the current level. In the ground of the area, there are columns and tunnels left in net-like structure as quarried as in the past, so that excavating as planned could lead to expose tunnels. They are to be reused as 'Stone Corridor' after reinforced or rebuilt, which will be attracted and crowded places in the city.

Stone Corridors are planned mainly to be a functional zone for commerce facilities and logistics, collection and storage facilities, and the bottom level as excavated will be a cultural zone for people's living, education, amusement, common places and so on. An urban space will be generated filled with about 30 thousand people in a daytime.

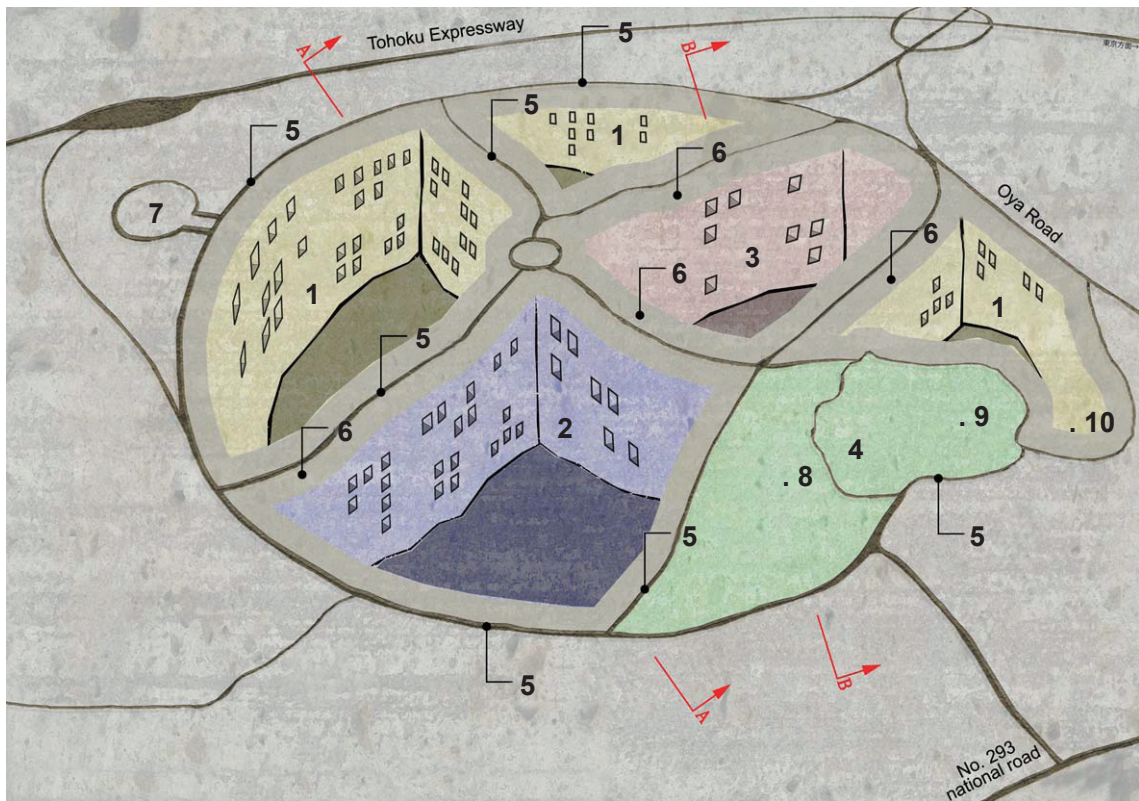


Fig.3: Plan of excavating area (approx. two kilometers square)

- 1) Residential zone 2) Culture/Government zone 3) Amenity zone 4) Tourism resources zone
- 5) Core roads (ground level) 6) Stone Corridor (under the ground) 7) Arena
- 8) Oya Museum 9) Oya Temple 10) Oya Kannon

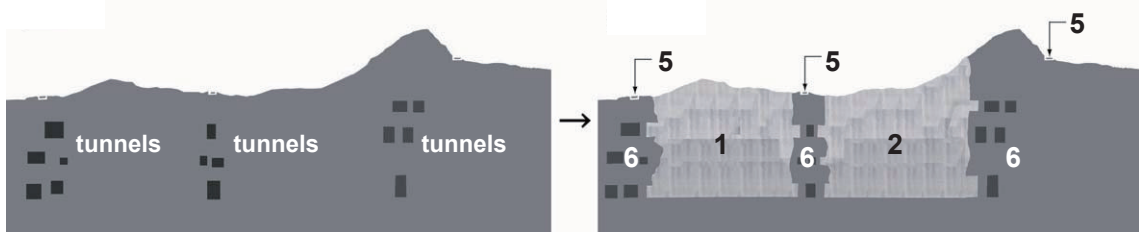


Fig.4: A-A' section view (current)

(After excavated)

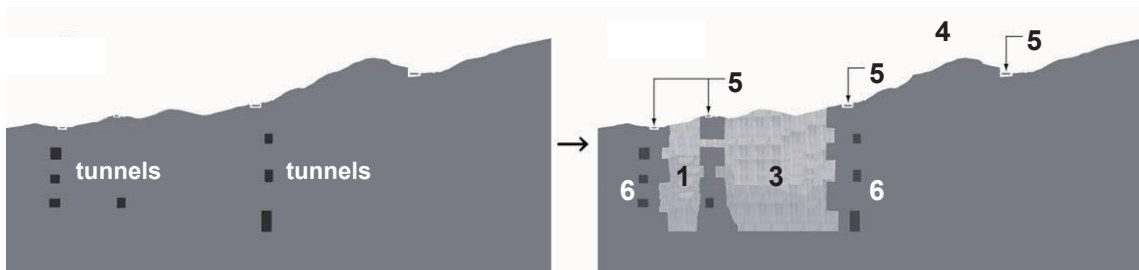


Fig.5: B-B' section view (current)

(After excavated)



Fig.6: Master plan (Ground level)



Fig.7: Master plan (Under 60-meter level)

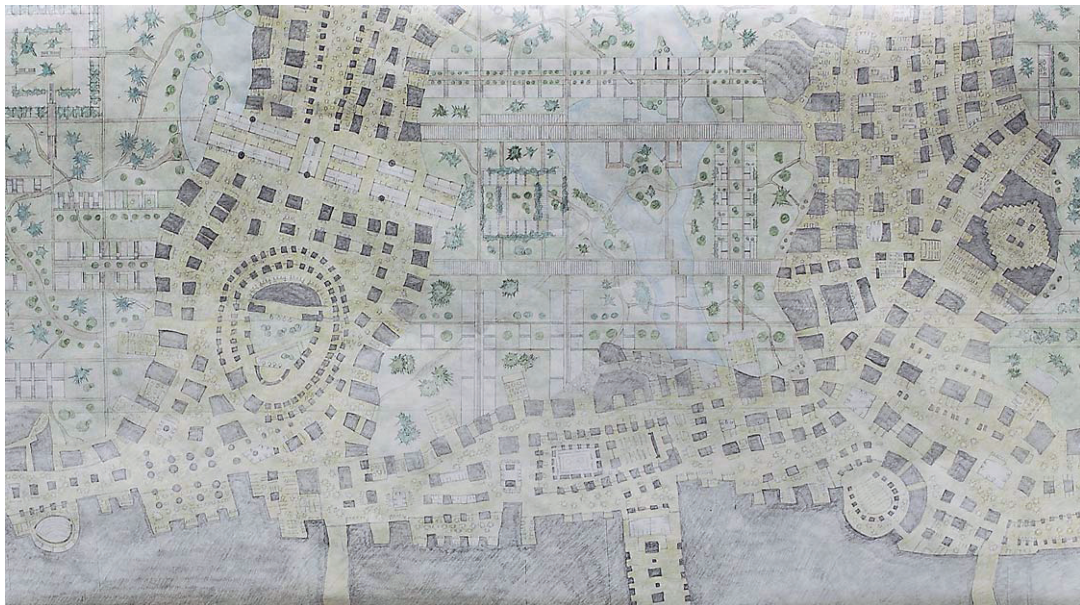


Fig.8: Plan (Underground, stone corridor)



Fig.9: Vertical section (Underground, stone corridor)



Fig.10: Replica (Underground, stone corridor)



Fig.11: Exposed tunnels after rebuilt

Energy Resources of Ecological City

The planned city, a 21st century's eco city, will be coping with environmental concerns. Natural resources as a driving force, e.g., light, water and wind, are to be used in an active manner as follows.

Light supports the space of the basement and underground by direct sun shining or through fiber-optic illumination. Water supports the city by a recycling-based power generator using groundwater, which enables waterfront and lush greenery to be placed at the bottom. Natural convection wind brings holistically well-controlled condition in terms of air-flow, temperature and humidity.

Discussion

Why under the ground? Why cave complex? Answers to those questions are not that it is simply because there are abandoned mines existing under the ground.

A factor of most motivated for this project originates in something primitive. Imagine a livelihood space when human-beings appeared on earth, it was cave dwellings. There was a mixed feeling of fear and reverence for nature. Moreover, underground or under the ground is the best place to survive from outside enemies.

From a historical standpoint, we must refer to the caves of Bamiyan's Archaeological Site, Afghanistan, closely associated with the Silk Road. Also, Ellora Temples, India, were built for the communities under the ground as a result of digging side by side in the wall of a cliff, where people lived their lives mingling with Buddhism, Hinduism and Islam. As for other prior cases, there are the Rock Sites of Cappadocia, Turkey, where the underground cities were built for the purpose of defense. These places are all associated closely with the Silk Road. Today, they are exploited as world historical heritages and tourism resources.



Fig.12: Bamiyan's Archaeological Site, Afghanistan [1] Fig.13: Ellora Temples, India [2]

Conclusion

Synchronized with the existence and thought of these historical architectures, the “Oya Project” is to develop a today’s cave complex, where there will be a visible real life of people living there. This is a brand-new, 21st century’s project that concurrently includes an intention of reusing the abandoned, idle space as an ancestors’ gift. We are aiming at realizing a “Clean City”, which is planned to give less impact on environment and to consist of collection, storage, advanced technology and information facilities. It is included to establish a new city of arts, culture and living facilities.

This project has a concept of building a unique architecture with the totally different structure from once populated modern, contemporary ones. We are convinced that this project will bring us effective countermeasures against global warming our current society concerns. We will broadly announce this project to the world. Any arguments or suggestions would be appreciated in advance from those who are going to join us.



Fig.14: Master plan

References

[1] http://en.wikipedia.org/wiki/Buddhas_of_Bamiyan

[2] http://en.wikipedia.org/wiki/Ellora_Caves

SUSTAINABLE BIODIVERSITY AND COMMUNITY DESIGN IN HYOGO JAPAN

Mayumi Hayashi

University of Hyogo, Japan

Keywords: Biodiversity, Hyogo, sustainability, Amagasaki forest, Stork Bird, ALPHA(Awaji Landscape Planning & Horticulture Academy)

Introduction

In these days, it is discussed so much about environment and biological diversity, and, in the world, various actions are going to be accomplished, there had never been such as before. However, it becomes a big issue what kind of result each action can achieve from now on. In this paper, I would like to introduce some projects which are aiming the sustainable biological diversity worked in Hyogo and consider the results of those and direction for the future development.

Methods

I introduce three actions in Hyogo and inspected each technique and result. The first one to introduce is "the stork promotion project" in Toyooka-city. This is the program that the Institute of the University of Hyogo is trying for several years. The second program, "Forest design of Amagasaki" is carried out in Amagasaki-city. This reproduces the plants of the Mukogawa basin and performs the tree planting that adjusted to the area by civic participation in planning and activity itself. The third is "the education system" which includes the advocacy of biological diversity in the citizen lecture in Awaji Landscape Planning & Horticulture academy where I belong to.

Results

If I show the characteristics of these three actions, these will be as follows. As for the "stork promotion project", it can be said that the large numbers of civic participation is promoted in the field where organic agricultural methods are trying and the storks inhabit is planned. As for "the forest project of Amagasaki", citizens gather the seeds of plants which grow along the Mukogawa basin. Professionals, the administration, NPO and citizen's groups collaborate together, bringing up cultivation, and can be brought up in a forest. The last example which is in Awaji Island held by Awaji Landscape Planning & Horticulture Academy(University of Hyogo) aim the sustainable biological diversity in the upbringing lecture to raise the leader for community design among the citizens.

Discussion

From the compares of these three trials, I can notice the trial to seek from the farming industry to be sustainable, the trial to grow the forest by citizen participation to be sustainable, and the trial to raise the leaders of the citizens to support the community design for the sustainability. We can see the plural layers of the projects. The issue is

how these trials can make networking and collaboration.

Conclusion

As for the projects which I show on the top, administration in Hyogo, NPO, a citizen's group and an expert cooperate each. Such a cooperation and reinforcement of the partnership are expected more in future.



Fig. 1 Picture of stork in 2005



Fig. 2 Picture of last wild stork in 1920' which disappeared after the modern agriculture raised)
<http://www.stork.u-hyogo.ac.jp/rekishi/rekishi13.php>



Fig.3 Glowing forest in Amagasaki
(bv H. Akaszawa)



Fig. 4 Plants and buildings of ALPHA



Fig. 5 Workshop lecture in ALPHA

References

1. Seeking the field of stork bird's home town, (2001), The Committee for vision of Tajima area
2. The report of growing the forest in Amagasaki, (2010), Hyogo prefecture, Amagasaki city
3. Mayumi HAYASHI, (2001),Landscape management and educational programs for citizens, Journal of the Korean Institute of Landscape Architecture, pp159-166

AKSARAY SULTANHAN CARAVANSERAI: A STUDY OF CULTURAL INTERACTIONS AND SUSTAINABILITY ALONG THE SILK ROAD

F. Yesim Gurani¹, Tulay Ozdemir Canbolat¹

¹ Cukurova University, Turkey

Keywords: Aksaray Sultan Han, han, caravanserais, accommodation, architecture, interior architecture, Seljuk architecture, sustainability, sustainable tourism, Anatolian Seljuk Caravanserais.

Introduction

As one of the most important trade routes in history, the Silk Road connected the East and West in many ways: economically, socially, culturally and demographically. Societies along the Silk Road not only transmitted their language, traditions, belief systems, arts and artifacts to others, they in turn took elements of those cultures as well. Trade and commerce have been key drivers in these exchanges. As distances were vast, and means of transport were limited to draft animals (mostly camels), trade and travel between cities, regions and territories along the Silk Road could not have been accomplished without the Caravanserais, which acted as resting places for both travelers and their animals. Caravanserais, in other words, were akin to today's hotels and motels, providing secure venues for accommodation, food, bathing and rest. But they also provided something beyond, and more important, than these: a platform for social and cultural interaction and exchange amongst travelers that happened to be there. Travelers often took time to rest, talk to, and listen to the news and stories of other travelers.

This study will examine the role of the Aksaray Sultanhan Caravanserai in this continuous cultural exchange, with a view of its contribution to the transmission of values, traditions, language, arts, know-how and other elements of culture. It will be shown that, Sultanhan Caravanserai, like others along the Silk Road, had a vital role in the sustainability of trade and cultural interactions, hence a vital contribution to the progress of societies through history.

Material

The main subject of this study is the Aksaray Sultanhan Caravanserai, which was built by the Seljuk Sultan Alaaddin Keykubad I in 1229 (Fig. 1-2). It takes its name from the town of Sultanhan, located on the Konya-Aksaray road, about 40km from Aksaray. It holds an important place in the history of Seljuk architecture. The building has an arcaded courtyard, majestic twin portals, and a covered section in the entry vestibule. The vaulting system is supported by pillars. A free-standing kiosk mosque rises on four pillars in the middle of the courtyard (Fig. 3-4). The stone decoration of the mosque and the portals is noteworthy for its elegance and artistic mastery. Total external area is 4,500 square meters, excluding the towers and portals (Fig. 7-8).

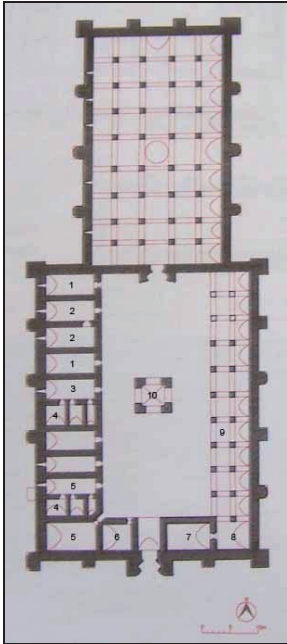


Fig. 1: Aksaray Sultanhan Caravanserai plan (1: Lodging, 2: Refectory and kitchen, 3: Women's bath, 4: Bath's furnace, 5: Men's bath, 6: Guards room, 7: Treasury, 8: Latrines, 9: Open cells, 10: Kiosk Mosque) [1] [2]

Fig. 2: Aksaray Sultanhan Caravanserai elevation.



Fig. 3: Courtyard



Fig. 4: Open cells in the courtyard

This study will examine not only the structural characteristics of the Caravanserai, but also how the structure lent itself to facilitate social interactions? Where, and how, did the travelers eat, bath and sleep? How long they stayed? What role did the courtyard play? What were the praying arrangements for people of different religions, etc? These aspects will be studied from traveler diaries and other records kept at the Caravanserai.



Fig. 5: Covered space for traveler
Fig. 6: Stone decoration on the entry vestibule

Methods

- Investigation of the Sultanhan Caravanserai's drawings and photos
- Analysis of the Caravanserai's space organization
- Study of Caravanserai's official records and travelers diaries

Conclusion

Even though cultures emerged in different parts of the world, they often interacted with each other for commercial and other imperatives throughout history, In the Middle Ages, the Silk Road was a powerful phenomenon that connected Europe and Western Asia with Central and Eastern Asia, all the way to Japan. Of the many elements that made this process possible, caravanserais were perhaps the most important link, which provided accommodation, safety and social interaction to travelers. In this regard, it is clear that Caravanserais, including the Sultan Han, were instrumental in the sustainability of the Silk Road, and hence, cultures, for many centuries.

References

- [1] Kuban, D., Selçuklu Çağında Anadolu Sanatı. *Yapı Kredi Yayınları*, İstanbul, Türkiye, 2002.
- [2] <http://www.turkishhan.org/sultanaksaray.htm>
- [3] Acun, H., Anadolul Selçuklu Dönemi Kervansarayları. *T.C. Kültür ve Turizm Bakanlığı Yayınları*, Ankara, Türkiye, 2007.
- [4] Aksoy, Y., Si-An'dan Tiran'a Tarihi İpekyolu. *Kripto Basım ve Yayıncılık. No:13*, Ankara, Türkiye, 2009
- [5] http://anadoluselcuklumimarisi.com/kronoloji_13yy.asp
- [6] Önge, M., Caravanserais as Symbols of Power in Seljuk Anatolia. *Power and culture : identity, ideology, representation*. Pisa University Press, P: 49-69.
- [7] Peker, U.A., Bilici, K., Anadolu Selçukluları ve Beylikler Dönemi. *T.C. Kültür ve Turizm Bakanlığı Yayınları*, Ankara, Türkiye, 2006.
- [8] Kefeli, E., Taşağıl, A., Karagür, N.S., Yılmaz, Ö.D., Dünden Bugüne İpekyolu Beklentiler Gerçekler. *T.C. Kültür ve Turizm Bakanlığı Yayınları*, Ankara, Türkiye, 2008.
- [9] Aslanapa, O., Türk Sanatı. *Remzi Kitabevi*, İstanbul, Türkiye, 1989.
- [10] Sev, A., Sürdürülebilir Mimarlık. *Yem Yayınevi*, İstanbul, Türkiye, 2009.

PERSIAN GARDENS ARE SUSTAINABLE GARDENS: SCRUTINIZE THE SUSTAINABILITY FEATURES IN PERSIAN GARDENS

Hirbod Norouzian Pour¹, Mehri Motahari Rad², Samane Motaghi Pishe²

¹*Tehran University, Iran*

²*ShahidBeheshti University, Iran*

Keywords: Sustainability, Persian Garden, Environment, Microclimate, Culture, Arid

Abstract:

Nowadays sustainability is well known ethic that influenced all of our life aspects. Landscape has powerful connection with environment therefore it may have more influence on it. Sustainability is one of main concepts that formed Persian gardens. One of the reasons that makes Persian garden's concept followed in more than 2000 years is sustainability. Therefore, Persian garden concept even in contemporary Persian life and passing through different periods of times does not change comprehensively.

Diverse collection of Persian gardens is inherited. This pattern of garden designing is determining especial cultural and historical background. One of the important principles of the historical landscape designs, which affected many regions through the Silk Road was Persian garden. This makes better understanding of Persian garden very important. These especial places contain their own identity and social behavior. Hence, understanding the sustainability factors in the Persian gardens by modeling in accordance with contemporary paradigms can be beneficial to achieve sustainable development. First, the principles and aspects of sustainability in landscapes will be mentioned for better understanding of Persian gardens, and then some evidence of it in traditional Persian gardens will be described.

Research Methodology:

This research has been performed based on a descriptive – analytical method using articles, studies, reports and related documents (the library documents). Three main orders which shape the Persian garden is described according to previous researches. Then in four gardens in arid climate this three orders will be analyzed and evaluated with two evaluation systems in sustainability, BREEM and LEED.

Goals:

The purpose of this paper is to recognize the Persian garden, from the viewpoint of ecological sustainability to understand advantage of that legacy and to reach the desired patterns in modern design.

Introduction:

The concept of sustainability in the Persian garden is a multifaceted concept. This issue is alive and has a powerful presence in the Persian gardens. We can determine three main *Orders* each including different aspects of sustainability:

- 1- Cultural and society acceptance by concerning today and future generations.
- 2- Respect ecosystem and environment by preserving and improving them.

3- Improving human life aspects by producing food, desirable climate and optimum energy usage.

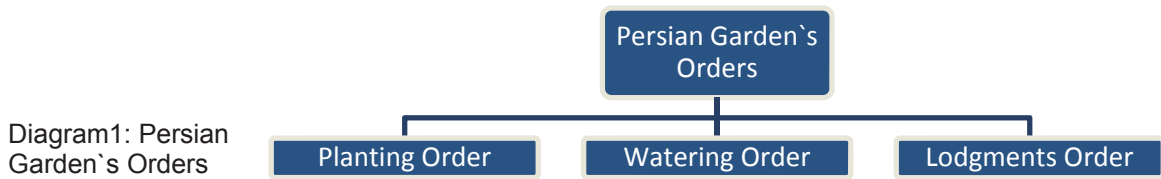
The first item mentioned above is based on cultural and social manners which formed Persian gardens. Sustainability in the Persian Garden is involved with myth, philosophical, cultural, social and religious backgrounds of this region. It will be mentioned but since it has lots of interactions with other Persian life aspects we will not get deep in to it.

The second one is somehow related to the first one in Persian life, because of zarousterian beliefs based on Persian gardens and from another point of view, this kind of manner is expected because of limited sources..

The third one also called ecological sustainability is the main part of this article. One of the most important sustainability factors in gardens is manner of providing desirable micro climate by ecological consideration. In Persian gardens, there is a fundamental difference between the garden and surrounding environment. The difference between inside and outside of garden formed the whole garden aspects and concepts. Third classification may have some sub classification determined to study Persian gardens.

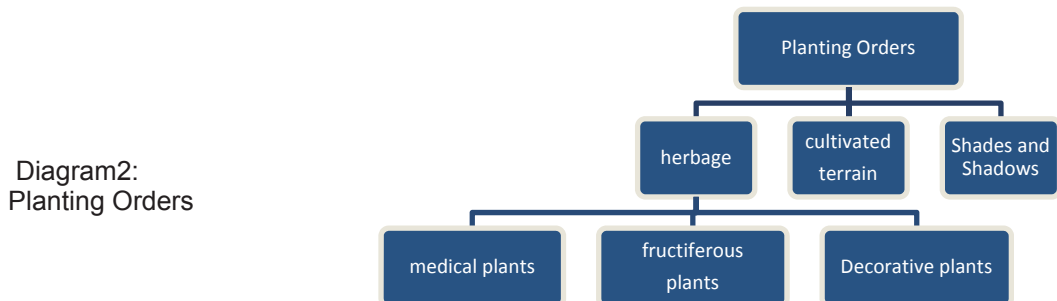
Persian gardens paradigms and orders:

There are three main orders in designing gardens: planting principles, constructions and lodgments principle and water principle.



1-Planting Order:

The concept of planting in Persian garden is based on agricultural fruit gardens. Therefore, it is mostly filled with fruit trees and is formed in geometrical separation. As Persian esthetic in main axis the ever green trees and long acarpous trees are planted. All part of the garden, even tree planting, has square patterns. The plants are placed in gardens in the way that they can adopt with their context and needs. Selection of the trees is referred to provide medicine, food or any product that can be useful for them, not only esthetic aspects of them are concerned.[3] The plants are coordinated with water resources that they can use in order to make shadows and shades as much as they can.



2-Lodgment Orders:

Lodgment orders are about human artificial additions to his environments. By a primary classification, the outside and inside world of garden can be distinguished. The outside world is involved with the placement of a garden in its context in accordance to its needs

and possibilities. However, the inside world of garden is mostly focuses on lodgment of kiosk or pavilion and other structures of garden.

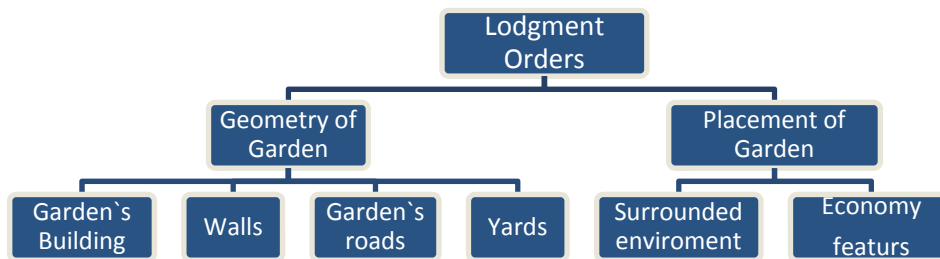


Diagram3: Lodgment Orders

3-Watering Orders:

One of the main features of Persian gardens is having great appetite for showing and performing water [6]. In all parts of Persian gardens, it is tried to use the optimum of site, environment and recourses. Since Iran is in arid region, one of the goals of Persian gardens is to reach a better microclimate for habitants. Therefore, water streams seem to be necessary in those gardens [2]. By strait canalling; the water wastages will be reduced dividing the garden in geometrical shapes. This geometrical design principle has continued in all periods [5].

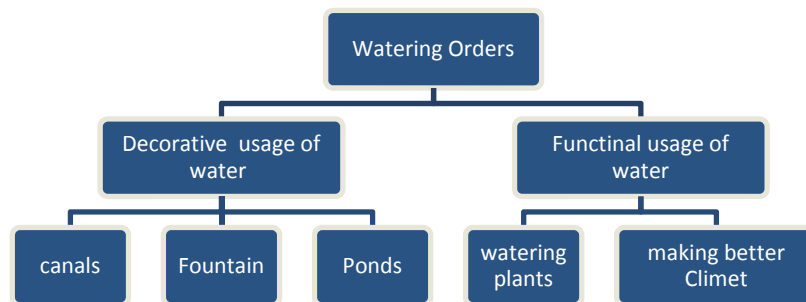


Diagram4: Watering Orders

Sustainability in landscape

After the report of the United Nations World Commission on Environment and Development, titled "Our Common Future" to the UN General Assembly, sustainable development was defined as; "A development that meets the needs of the present without compromising the ability of future generations to meet their own needs."¹

Sustainability is the interaction of three general aspects and will not be obtained without considering social, environmental, and economic feasibility.

Designing, construction, operations and maintenance sustainability should be considered.

Another criterion of sustainability in landscapes is supporting natural ecological functions by protecting existing ecosystems and regenerating ecological .

*Sustainable Sites Initiative*² partnership of the American Society of Landscape Architects determines some principles and paradigms for sustainable landscape which they used as criteria for probing them in Persian gardens:

1-Do not harm

2-Precautionary principle

3-Design with nature and culture

4-Use a decision-making hierarchy of preservation, conservation, and regeneration

5-Provide regenerative systems as intergenerational equity

- 6-Support a living process**
- 7-Use a systems thinking approach**
- 8-Use a collaborative and ethical approach**
- 9-Foster environmental stewardship [10]**

Ecological Sustainability in Persian Gardens:

Supporting a living process, not harming and using a decision-making hierarchy of preservation, conservation, and regeneration are covered in this term. The gardens were usually built as the outlet of karez that been dug for that, before then that part had low water sources. By this new source of water and garden design, beneath fields may reach lots of benefit, using the extra water of garden which will prevent them from wind and sandstorms and environment moisture will excise. Therefore, the new situation will attract many animals especially birds and insects. In those places where water resources exist, by reducing the evaporation huge amount of water source will be saved and by covering streams with stone or ceramics it will not sink into the ground so it can irrigate larger areas.

Improving human life aspects by producing food, desirable climate and optimum energy usage in order of Persian garden:

For reaching sustainability, concerning societies and environment having the benefits for human life is necessary. The improving of human life in sustain manner does not mean omitting any life access but it means finding best answers for nowadays problem in a way that does not cause further problems. As it mentioned above, the aspect of this term is divided and they will be explained:

1-Select a place for Persian Garden

The place of the garden depends on its environment. They work together although they have great paradox to each other, but this is not in order to conquest the nature, it just changes an isolate part of it and makes environment durable for human kind.

2-Access to water resources:

Water sources usually are built in the arid region so it may bring life to new places. These new courses are usually sustainable bequest they not extra pressure to reach to the limited sub sources.

3-Patterns of water used in Persian Garden:

In Persian garden, it is tried to show water in different ways and also increase the volume of it virtually to increase the desirability of it feeling water. This will be feasible by different accessories such as Partridge Chest Stone or wide falls and narrow fountains.

Water pound and streams started from pavilion to the gate to increase moisture and reduce the temperature [3].

4-Select the geometry and shape garden:

The geometrical shape of garden is based on agriculture rout of it which makes it optimized. Therefore, watering and cultivation of it is easier and has more benefits [2].

5-How the components of garden work together:

In these gardens, different elements of gardening support each other. For , in the corner of the wall which is safer than other parts of from the wind the sensitive tree were planted. In Bonegah³ the plants wear planted to make the bugs get away.

6 - In case of selecting plants and planting:

In selecting the plants and trees, the esthetical aspects are not the reason for choosing a plant. In this case, each of them should have another benefits such as medical, commercial and providing food for human or animals.

The order of planting affects the depth of the plants root. Thus, they can gain the moist in all of earth levels preventing water wastage.

7- How to create micro-climates in a manner consistent with the needs of the Iran region.

Inside of walls of Persian garden the new climate created to reduce the harmless of environment. This appeal is obtained by increasing shadows, air moister and preventing dry winds.

BREEAM and LEED

BREEAM is the world's foremost environmental assessment method and rating system for buildings. BREEAM sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognized measures of a building's environmental performance [9].

LEED, or Leadership in Energy and Environmental Design, is redefining the way we think about the places where we live, work and learn. As an internationally recognized mark of excellence, LEED provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions [8].

Issus and parameters that are mentioned in this to evaluation system (BREEAM,LEED),were ordered in a table. Six main title chosen from those titles:

1. Land Use and Ecology

1.1 Site selection 1.2 Ecological value of site and protection of ecological features 1.3 Mitigating ecological impact 1.4 Enhancing site ecology 1.5 Sustainable procurement 1.6 Construction site impacts

2. Energy & Atmosphere

2.1 On-Site Renewable Energy 2.2 Low and zero carbon technologies

3. Water Efficiency

3.1 Water monitoring 3.2 Water leak detection and prevention 3.3 Water efficient equipment 3.4 Storm water Design: Quantity and Quality Control

4. Pollution

4.1 Reduction of night time light pollution 4.2 Noise attenuation

5. Health and Wellbeing

5.1 Visual comfort 5.2 Indoor air quality & Thermal comfort 5.3 Water quality 5.4 Acoustic performance 5.5 Increased Ventilation 5.6 Low-Emitting Materials

6. Materials & Resources

6.1 Storage & Collection of Recyclables 6.2 Regional Materials: Extracted, Processed & Manufactured Regionally 6.3 Rapidly Renewable Materials 6.4 Recycled Materials 6.5 Heat Island Effect

After that, in separated columns general manners of these issues in Persian Gardens are surveyed. In last columns, four examples of Persian Gardens in arid places are analyzed.

Conclusion:

As mentioned above, sustainability concern is about the development that meets the needs of the present. Studying the succeeded principles that act sustainable in long terms, may lead us to the nowadays principles. Persian garden is sustainable if used in its own contexts. Copying it to another region with different climate and manner is not sustainable any more as was experienced in India and South Europe. Although Persian garden has paradigms and principles, its remarkable flexibility has given it an opportunity to be followed in contemporary. There are some problems such as the user which is changed. However, it doesn't mean it is useless.

Notes:

1. UN General Assembly, Our Common Future: Report of the World Commission on Environment and Development, 1987, chap. 2, "Towards Sustainable Development,"
2. The Sustainable Sites Initiative is a partnership of the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, and the United States Botanic Garden in conjunction with a diverse group of stakeholder organizations to establish and encourage sustainable practices in landscape design, construction, operations, and maintenance.
3. one of the most significant ruling dynasties of Iran in 16th and 17th centuries.
4. Garden with lattice walls
5. kareez (Persian: کاریز) (also spelt kareez / karez / kariz and later called qanat in Arabic). Kariz was an ancient water pipe system laid from the source of spring water in the mountain valleys to places where it could be used. (www.wikipedia.com)

References:

- [1] Abbas, M. *Recognition of the Persian garden: Shazdeh garden*. Faza, Tehran, 2010
- [2] A.Reza, A. *Research on Persian gardens and historic gardens of Shiraz*. arhangsara, Tehran, 1986
- [3] Azade, Sh. *Paradigms of paradise*. jahad daneshgahi, Tehran, 2010
- [4] Donald, N,W. *Persian gardens and garden pavilions*. Dumbarton Oaks, 1979
- [5] H. Reza, J. *Fin Garden*. Institute for Cultural Heritage, Handicrafts and Tourism, Tehran, 2007
- [6] M. Karim, P. Baghhaye Irani [*Persian Garden*]. *Journal of Abadi*, vol.1, No.15 ,pp.4-9, 1994.(In Iran)
- [7] Mehdi, Kh.,& M. Reza, M., M,Y. *The Persiangarden: echoes of paradise*. MagePublishers, Tehran, 1999
- [8] U .S .GREEN BUILDING COUNCIL.
<http://www.usgbc.org/leed.html> (2/06/2012)
- [9] The world leading design and assessment method for sustainable building.
<http://www.breeam.org.html> (2/06/2012)
- [10] American Society of Landscape Architects: The Sustainable Sites Initiative
<http://www.asla.org.html> (11/07/2011)

6

Religion and art

A STUDY OF THE LANDSCAPE AT THE WANG RIVER VILLA THROUGH ANALYSIS OF THE POEM “DEER PARK” BY WANG WEI

Akira Tanaka

Mukogawa Women's University, Japan

Keywords: Wang Wei, the Wang River Villa, “Wang River Collection”, “Deer Park”, landscape, poem, architecture

Introduction

This paper examines the Wang River Villa of the Tang Dynasty. It was owned by the poet Wang Wei and is written about in his “Wang River Collection,” an anthology of twenty landscapes that creates an experience in architectural space. Each landscape is the title of a poem and all of these poems are composed of a five-character Chinese quatrain, which is a traditional style of Chinese fixed verse. These are mainly nature poems that concern natural landscapes. What is also a feature of Wang Wei’s “Wang River Collection” is that the poetic contents are not fictitious landscapes. They are the real landscapes of a real villa. This fact is especially important for this paper's architectural research.

Previous research on the Wang River Villa has pointed out the desire for a pure land as an escape from everyday life, while noting Wang Wei's use of the Buddhist concept [1]. Wang Wei created original landscapes under the influence of Xie Lingyun, Tao Yuanming, and others. The nature composed by Wang Wei was not a threatening object like ancient China nor was the pastoral of the city suburb composed by him a place of production. It was a Utopia of escape from reality that is embodied in the architecture.

On the other hand, the characteristics of “escaping” and “leaving” are also general features of the villa. For example, in Japanese villas, the concept of leaving reality far behind is referenced. In the case of the Shugakuin Imperial Villa, the classical literature of Kenko Yoshida and other anchorites was referenced by the emperors [2]. In the Kawara Imperial Villa of Empress Meisho, leisure activity was a representation of the fictional classic world [3]. An ideological background for a villa is somewhat common in East Asia.

This author does not know whether this common characteristic of East Asian villas is originally from China or is based on Buddhist thought. However, the similarity between such foreign cultures is as important as the cultural differences. This symposium is an opportunity to discuss the identity of culture. This author expects that this paper is suitable for the theme of this symposium and will inspire positive argument.

In the former study [1], the author classified prior researches on the landscape of the Wang River Villa, although the individual landscape could not be studied. In other words, poetic decipherment and consideration were not undertaken. In this research, the author will closely observe one landscape of the Wang River Villa and examine it in detail with the aim of clarifying the concrete features of the villa landscape.

This study researches the landscape in the field of architecture using the method of poetic decipherment. As mentioned above, it is important that a realistic place is the basis of the poetry. Wang Wei’s Wang River Collection is a precious text that describes historical architecture, specifically, the Wang River Villa.

Essentially, reading a poem is an act of creation similar to composing a poem. The Japanese term “yo-mu (よむ)” has two meanings, “reading (読む)” and “composing (詠む).”

Weinberger said [4]:

The point is that translation is more than a leap from dictionary to dictionary; it is a reimagining of the poem. As such, every reading of every poem, regardless of language, is an act of translation: translation into the reader’s intellectual and emotional life. As no individual reader remains the same, each reading becomes a different—not merely another—reading. The same poem cannot be read twice.

When reading a poem, we read it in a new way every time. The reader’s mental condition changes the meaning of the poem. Does the interpretation of poetry in which a meaning wavers in such a manner become the method of research?

Furthermore, what is the “space” of architecture? The “space” mentioned here does not mean a static and measurable space, nor a fixed physical space. It is a “space” of lively experience.

The Japanese poet Tachihara writes [5]:

The experience of space is one time only. The same cannot be experienced again; the same space is not there even when turning back.

The space referred to by Tachihara is the same as Weinberger's poem. The experience of space is an act of creation akin to the poetical experience.

The author describes space concretely through poetic decipherment. Of course, this method does not describe every aspect of the Wang River Villa; the author merely tries to describe a part of the spatial experience and thus it is not a useful study for all researchers. However, if the research is honest, we are able to describe an instance of space, making the conclusion obtained useful for certain research. It is quite significant to this author.

Wang Wei, the Wang River Villa and the “Wang River Collection”

Wang Wei is known as a poet, but he was originally a government official. There are several theories regarding the date of his birth, but the consensus is that he was born around 700 A.D., which is during the same period as Li Po and Du Fu. Du Fu actually wrote about Wang Wei.

The Wang River Villa was owned by Wang Wei. It originally belonged to Sung Chih-Wen. It was located in Lantian County about fifty kilometers southeast of Chang’an.

Information about the villa is limited. Except for some descriptions, the “Wang River Collection” by Wang Wei is the only historical record that provides a means of envisioning it. The collection consists of twenty titles and each title corresponds to viewpoints in the villa. “Deer Park,” one of the titles of the collection, is the subject of this paper.

An Interpretation of “Deer Park” and its Landscape

“Deer Park” is a famous poem, as is “Bamboo-Midst Cottage,” of the “Wang River Collection.” It is a sample of Wang Wei's poetry contained in “Selection of Tang Poems” and is well known in Japan. It composes a scene through natural poetry, a recurrent feature of Wang Wei's poetry.

Weinberger put forth the following figure (Fig. 1) and described the intricacies of Chinese characters [4]. Translations by Paz and Hinton are included for reference.

(text)				
空 山 不 見 人				
但 聞 人 語 響				
返 景 入 深 林				
復 照 青 苔 上				
(character-by-character translation)				
Empty	mountain(s) hill(s)	(negative)	to see	person people
But	to hear	person people	words conversation	sound to echo
To return	bright(ness) shadow(s)	to enter	deep	forest
To return Again	to shine to reflect	green blue black	moss lichen	above on (top of) top

Fig. 1

In the Deer Park Hermitage (translation by Paz)

No people are seen on this mountain.

Only voices, far off, are heard.

Light breaks through the branches.

Spread among the grass it shines green.

Deer Park (translation by Hinton)

No one seen. Among empty mountains,
Hints of drifting voice, faint, no more.

Entering these deep woods, last sunlight
Flares on green moss again, and rises.

A single character may be noun, verb, and adjective. It may even have contradictory readings: character 2 of line 3 is either jing (brightness) or ying (shadow). Again, context is all. Of particular difficulty to the Western translator is the absence of tense in Chinese verbs: in the poem, what is happening has happened and will happen. Similarly, nouns have no number: rose is a rose is all roses.

Contrary to the evidence of most translations, the first person singular rarely appears in Chinese poetry. By eliminating the controlling individual mind of the poet, the experience becomes both universal and immediate to the reader.

The Chinese characters make it difficult to translate Wang Wei's poem into other languages. If a landscape is a view with meaning, the interpretation of the meaning is based on language. Weinberger quotes the opinion of Paz [4]:

The translation of this poem is particularly difficult, for the poem carries to an extreme the characteristics of Chinese poetry: universality, impersonality, absence of time, absence of subject. In Wang Wei's poem, the solitude of the mountain is so great that not even the poet himself is present.

Paz raises "universality, impersonality, absence of time, absence of subject," etc. as poetic features. The meaning of the landscape is experienced through these Chinese features.

In this paper, while seeing the impression received when reading "Deer Park," or its perception in retrospect, poetic scenery is considered while paying attention to "the absence of the poet."

Poetic decipherment of "Deer Park" in Japan

The Japanese take a special approach to reading Chinese poetry: A Japanese kana suffix is given to the Chinese character, changing it to Japanese. Since this method requires some interpretation, different results may arise, but it becomes fundamentally similar text translated

into Japanese. It is translation peculiar to the kanji cultural sphere into Japanese and is not correct "translation."

Kobayashi describes his impression of "Deer Park:" [6]

Sound that is transmitted through air from a distance. Reflection of the deeply inserted setting sun. This poetry expresses a profound and remote atmosphere in a mountain well.

Watanabe also points out the quiet atmosphere of this poetry [7]:

In two lines of the first half, the quiet world at the time of evening is composed. Sound is made in order to express quietness. It is an effective expression of poetry to use sound...Two lines of the second half have caught momentary beauty...Wang Wei, the father of Southern painting (nanga), sketched the scene before his eyes as it was.

While Watanabe points out a quiet atmosphere, the expressed scene is called sketching. This is a feature characteristic of Wang Wei as a nature poet. However, on one side, Watanabe also points out his poetry is affected by Buddhism [7].

This poetry is unrelated to real deer; rather, Wang Wei is conscious of the "Sarnath." The Sarnath is the first place for Gautama Buddha to culture a person practicing asceticism and is a holy place for Buddhists. We should consider the influence of Buddhism on this poetry.

While interpreting in this fashion, we must be conscious of Iritani's analysis as well. Iritani observes, "Light breaks through the branches" in "Deer Park:" [8]

In the "Wang River Collection," Wang Wei is not composing a realistic landscape of the Wang River Villa...what he tried to compose was surreal, moreover, a sketch of a quiet world of rest. Wang Wei is not a poet who composes fantasy by fantasy. Wang Wei is a poet who makes readers remember fantasy through realistic expression...this is not expressing the landscape of paradise directly, but expressing a realistic scene. However, it recalls the image of paradise in the Pure Land and impresses an atmosphere of the Pure Land on the Wang River Villa.

When these aspects are considered synthetically, the landscape of "Deer Park" is observed as a strictly realistic scene, while reflecting the Buddhistic concept. In other words, the Buddhistic concept is dependent on the Buddhistic concept. The Buddhistic concept is dependent on an actual landscape. First, reality is real and Buddhistic scenery is recalled there. People are not seen in "Deer Park." It is a quiet landscape with no sound by sound.

Poetic decipherment of "Deer Park" in the West

The Japanese interpretation of "Deer Park" consists of a landscape of quiet with no people. This interpretation is common also in the West. In his book "19 Ways of Looking at Wang Wei," Weinberger compares and considers many Western "Deer Park" translations. There are sixteen different translations. When translating to each language, a subtle difference of translation is discerned. The Chinese view of the landscape differs from the Western view.

For example, Fletcher translated "Deer Park" as follows: [4]

So lone seem the hills; there is no one in sight there.
But whence is the echo of voices I hear?
The rays of the sunset pierce slanting the forest,
And in their reflection green mosses appear.

Weinberger comments: [4]

Fletcher, like all early (and many later) translators, feels he must explain and "improve" the original poem. Where Wang's sunlight *enters* the forest, Fletcher's rays *pierce slanting*; where Wang states simply that voices are heard, Fletcher invents a first-person narrator who asks where the sounds are coming from. (And if the hills are *there*, where is the narrator?)

Thus, in Fletcher's version, a *narrator* appears. Such *narrator* does not appear in the poetry of Wang Wei and the subject who hears the echo of voices is not clarified either. It is not known whether the sound is even heard by Wang Wei. Moreover, Weinberger says, "And if the hills are there, where is the narrator?" In Wang Wei's poetry, we do not know where the narrator is and, even more, there is no telling what "the hills" indicate. The landscape, which should be individual, is composed universally. When translating the poetry of Wang Wei into English, Weinberger points out that many methods of using the first person subject are seen in older translations, such as Bynner & Kang-hu (1929), Jenyns (1944), and Chen & Bullock (1960). On the other hand, Weinberger evaluates the absence of "I" in the translation by Liu (1962). Except for a few, "I", the narrator-observer, does not appear in later translations. The first part of the translation by Rexroth (1970) is as follows: [4]

Deep in the mountain wilderness
Where nobody ever comes
Only once in a great while
Something like the sound of a far off voice.

Weinberger critiques this translation: [4]

In line 2, by using *comes* rather than the more obvious *goes* he has created an implicit narrator-observer (i.e., "comes here where I am") without using the first person.

Weinberger appraises Rexroth for not using the first person. However, Weinberger finds that "the philosophical *empty mountain* becomes the empirical *mountain wilderness*" and thus the translation is empirical in expression and indicates that the ideological background of Wang Wei is insufficient.

It is Paz that points out Wang Wei's Buddhist background. Paz evaluates Wang Wei's poetry as follows: [4]

This is nature poetry, but a Buddhist nature poetry: does not the quatrain reflect, even more than the naturalistic aestheticism traditional in this kind of composition, a spiritual experience? ... An allusion to the Amida Buddha: at the end of the afternoon the adept meditates and, like the moss in the forest, receives illumination. Poetry perfectly objective, impersonal, far from the mysticism of St. John of the Cross, but no less authentic or profound than that of the Spanish poet. Transformation of man and nature before the divine light, although in a sense inverse to that of Western tradition. In place of the humanization of the world that surrounds us, the Original spirit is impregnated with the objectivity, passivity and impersonality of the trees, grass and rocks, so that, impersonally, it receives the impartial light of a revelation that is also impersonal. Without losing the reality of the trees, rocks and earth, Wang Wei's mountain and forest are emblems of the void.

According to Paz, Wang Wei's poetry is "perfectly objective, impersonal" and a "Transformation of man and nature before the divine light." The landscape is an object that exists before it is given a meaning by man and is an ordinary phenomenon. The landscape is simply an echo of light and sound. It is, for Wang Wei, one landscape of the Wang River Villa.

Conclusion: The Landscape at the Wang River Villa: The Absence of People

The landscape of Wang Wei is scenery before humanization. The absence of people in the landscape does not simply mean it is uninhabited. The human voice is there; it is only expressed that there is no human figure. Researchers indicate the influence of Buddhism in Wang Wei's poetry; however it is not a religious concept. It is rather the most realistic landscape of the Wang River Villa, which reflects the soul of Wang Wei.

References

- [1] Tanaka, A, A Study of the Classical Landscape at the Wang River Villa of Wang Wei. *Intecultural Understanding*, Vol. 2 (submitted), 2012.
- [2] Tanaka, A., & Maeda, T., Study on the Shugakuin Imperial "Villa" through the Itinerary of Retired Emperor Reigen. *J.Archit. Plann., AIJ*, No. 601, pp. 217-224, Mar., 2006. (In Japanese)
- [3] Tanaka, A., A Study on Some Aspects of "Seeing" in the Imperial Villa: in the case of the Kawara Imperial Villa. *Summaries of technical papers of Annual Meeting Architectural Institute of Japan. F-2, History and theory of architecture*, pp. 471-472, 2006. (In Japanese)
- [4] Weinberger, E. & Paz, O. *Nineteen ways of looking at Wang Wei: how a Chinese poem is translated*. London, Great Britain, Asphodel Press. 1987.
- [5] Tachihara, M., Houhouron [methodology]. *Tachihara Michizo Zensyu [Complete Works of Michizo Tachihara]*, Vol. 4, 2009. (In Japanese)
- [6] Kobayashi, T., *Ou I no syougai to geijyutsu [Life and Art of Wang Wei]*. Osaka, Japan, Zenkoku Shobou. 1944. (In Japanese)
- [7] Watanabe, H., *Shizen shijin Ou I no sekai [The World of Wang Wei a Nature Poet]*. Tokyo, Japan, Meiji Shoin. 2010. (In Japanese)
- [8] Iritani, S., *Ou I kenkyu [A Study of Wang Wei]* Oriental Studies Library No. 11. Tokyo, Japan, Sobunsha. 1976. (In Japanese)

THE STUDY ON THE SOUNDSCAPE OF THREE JAPANESE GARDENS

Haruyoshi Sowa

Kyoto University of Art & Design, Japan

Keywords: soundscape, landscape, Japanese garden, garden art, Katsura imperial villa, Shisen-do garden, Tairyu-villa garden, sound of stream, sound ecology, sonic research

Introduction

Recently, studies on the sound environment have been increasing, because of the influence of the studies of soundscape by R. Murray Schafer [1]. However, the studies about the soundscape of the gardens [2] have not. Through the case studies of the soundscape of Katsura imperial villa garden¹, Tairyu-villa garden², and Shisendo garden³, this study aims to clarify the structure of sonic environment and the gardeners' technique to design the soundscapes of Japanese gardens mainly by the grading and the sound of water.

The method of investigation

To investigate the soundscape profiles of three Japanese gardens, we used the sound level meter. With the sound level meter, we measured A-Weighted Sound Pressure Levels such as, Laeq⁴, Lp⁵, and L50⁶. In these soundscape investigations in each garden, 30 through 75 measurement points had been set, according to the limitations indicated by the owner of each garden. In order to verify the measurement results, investigation on the hearing of environmental sounds were conducted.

The soundscape profiles of 3 Japanese gardens

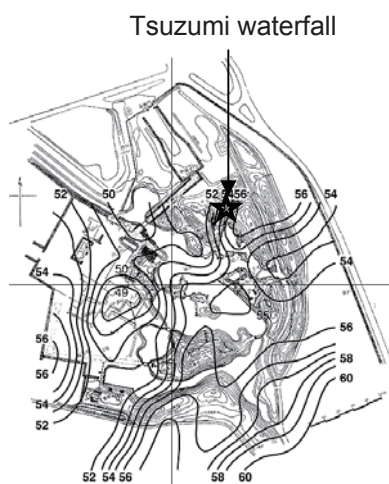


Fig. 1: The contour map of Katsura imperial villa garden



Fig. 2: The contour map of Tairyu-villa garden



Fig. 3: The contour map of Shisen-do garden

From the measurement results, three maps of the sound level contour of each garden have been drawn. Fig.1 is the contour map of Katsura Imperial Villa Garden, Fig.2 is Tairyu-villa Garden, and Fig.3 is Shisendo Garden.

The risk of traffic noise intrusion

With respect to the risk of the vehicle and train noise intrusion, Katsura imperial villa garden was revealed to be higher exposure by traffic noise, for Tairyu-villa garden and Shisendo garden are low. More over, it was found that the noise of the adjacent roadway penetrates easily to the quietness of all three gardens.

The presence of the characteristic sonic space of the each garden

1) Katsura imperial villa garden: There exists a quiet area around the waterfall and the sonic space of “Tsuzumi-waterfall”. (Fig.4) 2) Tairyu-villa garden: We named this garden as a "garden of water sounds". The sonic space of north of the pond showed the noise levels along the sequential design of scenery point. Auditory reinforcement by the invisible waterfall under the floor is found at “Tairyu-dai” guest room. (Fig.5) 3) Shisendo garden: There is the high-density sonic space consists from “Shishi-odoshi”, waterfall, and stream (Fig.6). More over, it was found that the style to listen the invisible sound of “Shishi-odoshi” is Japanese unique method to enjoy various nature sounds.

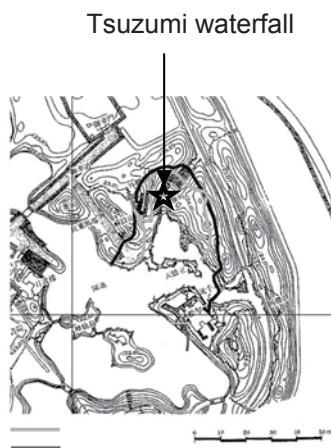


Fig. 4: The sonic space of “Tsuzumi-waterfall”

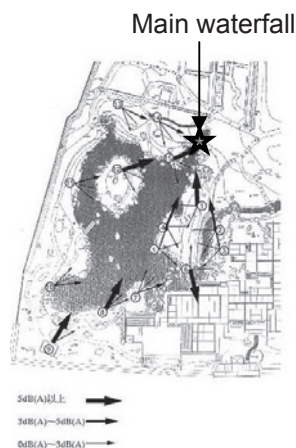


Fig. 5: The sonic space of North pond



Fig. 6: The high-density sonic space

The soundscape design by the Japanese garden designer

1) Katsura imperial villa: To make the sonic space of “Tsuzumi waterfall”, Prince Hachijō Toshihito and Prince Hachijō Toshitada must have designed the soundscape using the artificial terrain. 2) Tairyu-villa garden: With presence of the characteristic soundscape such as the sonic space of north pond, Jihei Ogawa must have controlled the soundscape of this garden. 3) Shisendo Garden: To select the location like the sunken garden, and, to set the “Shishi-odoshi” to the invisible place, Jozan Ishikawa must have controlled the soundscape of this garden.

Conclusion

From the viewpoint of relationships with the surrounding environment, the arrangements of sonic elements, such as waterfalls, streams, “Shishi-odoshi”, the topography and architectural placement, it is found that there are unique soundscapes in each gardens investigated. It is pointed out strongly from the results of the investigation for three historical gardens of our own time should have a technical skill to design the soundscape of gardens, with making best use of water and grading the surrounding terrain.

Notes

1. The Japanese stroll garden. Constructed during 1620~1649, by Prince Hachijō Toshihito and Prince Hachijō Toshitada.
2. Natural landscape garden. Reconstructed from 1901 to 1906, by Jihei OGAWA.
3. Japanese dry landscape garden. Constructed in early edo period, by Jozan ISHIKAWA.
4. Equivalent continuous A-weighted sound pressure Level.
5. Instantaneous value of A-weighted sound pressure Level.
6. Fifty Percent Level of A-weighted sound pressure Level

References

- [1] Murray Shafer, R., The music of environment series, No2.The Vancouver Soundscape. No4.Five village soundscape, etc. *A.R.C.Publications*, 1975 - 1978.
- [2] Xiaomei, Y., Shuoxian, X., On the soundscape of traditional Chinese garden, *China Architectural Journal*, vol2, pp70-72, 2007., Xiaomei, Y., Shuoxian, X., Sound Environment Planning in Chinese Classical Gardens, *Inter-noise2008*, pp.130-132, 2008. etc.

BUDDHIST ATTITUDE TOWARDS CULTURE AND OTHER RELIGIONS

Rev. Satyananda Sraman

Buddhasartwittaya School Watsutthawas, Thailand

Keywords: Culture and Buddhism.

Culture and religion are closely interwoven in any society. Culture is part and parcel of human life. Human values, skill, intelligence and aesthetic beauty can be seen through cultural practices. Culture is the expression of refined and beautified traditions adapted either to influence or to promote fine arts as a means to entertain. Cultural practices inspire the human mind. Human passions can be calmed, gratified and ennobled through cultural practices. The glory of Asia depends a great deal on its culture and in this respect, Buddhist culture has played a prominent role. Culture can also protect and promote a religion.

When we introduce religion through our cultural practices, our day- to-day religious activities will be more attractive and we will be able to influence others to follow it as a living religion. We can say that cultural practices that are religious in nature are the stepping stones to understanding the religious way of life. Those who are not religious minded at the beginning will eventually get used to attending and appreciating religious activities. By attending such activities people will gradually get the opportunity to improve proper religious knowledge and understanding .Otherwise they will tend to shun religion altogether.

If people are well-educated and have improved their understanding and are personally noble, it is not very important for them to actively participate in traditional or cultural activities to be religious. Religion can contribute a great deal to enrich culture. It may be true to say that in Asian countries generally, the practice of a religion is clearly linked to cultural activities. Dances, songs, art and drama very largely draw their inspiration from religious subjects. Without culture religious activities may turn out to be very dry and uninteresting. At the same time, when we practice Buddhism without disturbing other traditions or the followers of other religions, this form of tolerance and peaceful coexistence along with our respectable behavior and gentle attitude can also be regarded as a cultural aspect.

Today because of the atrocities that have been done and are still continuing in the name of the religion, many people have become disillusioned at the mention of the very word, "religion". Materialism, hypocrisy and fanaticism covered under the guise of religion have caused the greatest disaster in the history of mankind.

The true religious values are rapidly disappearing from the minds of men as they run in search of the occult and the mystical. The established great religions of the world are breaking into discrimination of forms and some people are even going all out to ridicule religion. The time has come for all religionists of today to get together to introduce religious values in their proper perspective, instead of merely arguing and quarrelling over the differences of religious ideologies and mythologies.

The aim of this article therefore is to assist in promoting a better understanding of the purpose of religion and religious tolerance from the Buddhist point of view. Hopefully through this we can show how Buddhism regards other religions and guide Buddhists on how to behave towards their followers. Hopefully non Buddhists will also gain a better understanding of what the Buddha taught on this subject.

The deep underlying purpose of all religions should be to encourage their followers to uphold and respect their own religion without in any way being disrespectful towards other religions .To this end , all enlightened and like minded fellow religionists must unite and must establish mutual understanding ,mutual co-operation and tolerance amongst ourselves in order to achieve religious harmony is fashionable nowadays to talk of religious tolerance and its importance but few , if any , ever pin-point a practical way to achieve it. It is to be hoped that in reading this article, the read would be able not only to obtain a clearer picture of religious tolerance but also attempt to promote it sincerely. The first step towards developing this attitude is to eradicate a sense of superiority about one's own religion ,to eliminate mutual suspicion ,religious prejudices and selfish motives, for the common good and upliftment of our respective religions .But before we go any further we should pause and reflect on this word “ tolerance” which is used very loosely nowadays. Tolerance implies ‘putting up with’ something we may dislike. An attitude like this can be very dangerous because it can lead to hypocrisy and a degree of religious chauvinism.

We cannot simply tolerate another religion and maintain our superior attitude with regard to our own .We must be able to deeply respect another view although we may not agree with it. It may be useful to recall the famous words of Lord Acton who said,” I may not agree with what you say, but I will defend to the death , your right to say it”. What this means is that mere tolerance is not enough. What we need most urgently for our society today is for everyone to believe what he or she wants to believe without any hindrances from any quarter. This goes far beyond mere tolerances. It involves a deep respect for the beliefs of others.

This respect can only come about when we are prepared to study the beliefs of others and try to understand why they believe what they believe. it is only by studying other ways of thinking that we can strengthen our own beliefs. The purpose of a religion is to give human beings a sense of self worth, to recognize the right of each individual to enjoy both spiritual and worldly happiness. Religion aims to help people not only live a meaningful life in this world, but also to prepare one for a life after death. All fellow-religionists are working to achieve this common cause of human emancipation and enlightenment. The search for emancipation and enlightenment is the search for Truth.

Unfortunately, in our very midst, there are many religious practices and beliefs ,which are depicted or passed off as the Truth , when in fact they are far from being the Truth. Many practices have their origins in our remote past and have very little relevance to modern ways of thinking and living. As true religious followers we must have the courage and conviction to admit what is evidently a misconception and try to rectify it to conform to science and reasoning to meet requirements of Truth. We would be failing in our duty if we try to cling on to something, which we know is not the Truth. We are even wrong, if in the practice of our religious tolerance, we tolerate it without pointing out its failings, which do not conform to Truth.

In seeking truth we should discard our competitive attitudes and unite to work hand-in hand to achieve our noble aim of religious harmony for the well being of mankind. In the very first sermon that He delivered after his Enlightenment the Buddha said that one should abandon the belief that the mere observance of rites and rituals could lead one to liberation from the problems of human existence. In doing so the Buddha was warning his followers against the reliance of so called devotional religious observances, but he did not say that such practices were altogether bad. What he meant was that religious practices must be used merely as a means to an end. Such practices prepare a person to carry out the more important spiritual task which is to rid the mind of the defilements which are the cause of our suffering, namely delusion, craving and ill-will.

However although the Buddha pointed out that there was no religious value in many of the practices in India during his time, he was careful to advise his followers to support the Brahmins and other monks irrespective of their beliefs provided of course they were sincere and harmless religious people.

The Buddha advised his followers not to hurt or to cause injury to Sramana (monk) or a Brahmin .Here he has recognised monks and Brahmin as religious people. Again the Buddha said that when a person deceives a Brahmin or a monk or pauper, by telling a lie, this is a cause of the downfall of the person .Thus in advising his followers in this manner the Buddha has treated people of all methods without any discrimination. Today we must extend our courtesy and respect to every holy man who sincerely tries to follow his religion to the best of his understanding.

The aim of Buddhism is to guide everyone to lead a noble life without harming anyone, to cultivate humane qualities in order to maintain human dignity, to radiate all-embracing kindness without any discrimination, and to train the mind to avoid evil and to purify the mind to gain peace and happiness.

Buddhism is a religion ,which teaches people to 'live and let live' in the history of the world, there is no evidence to show that Buddhists have interfered or done any damage to any other religion in any part of the world for the purpose of propagating their religion. Buddhists do not regard the existence of other religions as hindrance to worldly progress and peace.

We need to point out that this attitude contrast to the behavior of some religious followers who ridicule and condemn the practice and beliefs of others without bothering to study these other beliefs and what they really mean beyond the external appearances. Condemning others out of ignorance is hardly the mark of civilize behavior and is certainly out of place in this age where information on every subject is readily available. The Buddhist attitude is to allow others to follow their beliefs in peace, to recognize the rights of others to freedom of thought.

In Buddhism there are no religious laws, commandments and religious punishments but only advices given by the Buddha without using any divine power. The Buddha repeatedly declared that he was not interested in telling people to reach heaven. His aim was to explain suffering its cause, the extinction of suffering and the path which leads to that extinction.

This approach does not require Faith, but Understanding and Effort. Therefore in Buddhism there are no divinely ordained laws and there is also no concept of sin and punishment .The immediate goal in following the path is to develop a noble human being who understands the benefits of personal discipline and mental culture. Buddhists do not follow any religious

principles not because of the fear of the Buddha, punishment or reward but by knowing and experiencing the negative effects of bad actions and positive result of good ones. When they follow this method as a natural way of life they allow others to live peacefully and happily.

Buddhism does not create fear and temptation for people to practice a religion because it does not believe in punishment in hell or reward in heaven. The Buddha's message was an invitation to all to join the fold of universal brotherhood to work in harmony for the welfare and happiness of mankind. He had no chosen people, and he did not regard himself as a chosen one.

The Buddha's first missionaries were Arahantas-the Prefect and Holy ones. They were noble human beings who by the sheer effort of their renunciation and mental training had gained Perfection. By perfection we mean that state when all delusion, greed and hatred has been eradicated from the mind and there is not even the slightest tendency to experience negative states like anger, jealousy ,fear, worry, doubt , restlessness and so on. In short Arahantas experience 'divine' states not in heaven after their deaths but in this life itself. Before sending out the first Perfected disciples, he advised them in the following manner:

"Go ye,O Bhikkhus , and wander forth for the gain of the many , for the welfare of the many ,in compassion for the world: for the good ,for the gain ,for the welfare of gods and men .Proclaim ,O monks, the sublime doctrine, preach ye a life of holiness .perfect and pure".

The Buddha was only concerned about showing the path to ultimate happiness. He was not concerned with founding a religion in his name. The Buddha wanted to show the people the difference between good and evil; he wanted to teach humans how to lead a happy, peaceful and righteous way of life. He never advised his disciples to convert people from one religion to another. His idea of conversion was to introduce a righteous, noble and religious way of life. In fact he said that the greatest miracle one could perform was to convert a wicked person into a virtuous one.

In the same way ideas are subjected to constant change and what was considered acceptable only decade ago may become ridiculously out of date tomorrow. If we want to avoid causing suffering to ourselves and others we must adapt to changing ideas and changing circumstances.

RELIGIOUS HARMONY:

We must have religious harmony to live peacefully without any violence in this world. Religious principles are intended for the whole of mankind. If any particular section of humanity does not follow the great virtues taught by religion –such as kindness, patience, tolerance and understanding,

it would be difficult for others to live peacefully. For some reason, religion has constantly been blamed for a great deal of humanity's problems.

Religions have been blamed for War, Racism, Discrimination of women, persecution and so on. But this is not really fair because we must clearly distinguished between the religious principles taught by the founders and the interpretation of these principles by certain religious leaders to further their own ends. Sometimes these unscrupulous people even turn against the followers of their own religion because they entertain different opinions from theirs.

What is important is for the people in their own religions to speak up against wrong doing and misinterpretation especially if these interpretations condone terrorism and the slaughter of innocents. Often these religious leaders ally themselves to powerful political figures who have no hesitation to kill and incite hatred just to get what they want.

It is quite natural for cunning and cruel people to take advantage of any kind of virtue ,but let us –religionists of today ,bear in mind that those who fight and shed blood in the name of religion , do not follow religious principles and do not serve the cause of humanity. They fight for their own personal gain or power by using the name of a religion. Those who truly practice a religion have no grounds to fight. They should settle their problems in a peaceful manner.

Followers must know that a true religion never encourages any form of violence under any circumstances. At the same time, racial discrimination should not arise when we practice our respective religions. Buddhists can live and work with other religionists without any discrimination .Although Buddhists were divided into different sects nearly 2000 years ago, so far they never had any sectarian violence or discrimination amongst themselves in any part of the world. Buddhism is the only religion that didn't declare war to introduce religion. Each person has three natures: the Animal, the Human and the Divine. The purpose of religion is to help human beings realize their divine nature. Ever since the beginning of time man has moved through various stages of evolution.

At first he was merely concerned with his basic survival needs to find food, shelter and to ensure that there were children who would continue the line of descendants. But the nature of the human being was such that the satisfaction of mere survival need was not enough. Going through various stages from creating a sense of belonging, seeking knowledge, developing the arts he finally arrived at the ultimate questions about existence.

Man's longing for answers to the three questions who am I, am I need and what I am doing here gave rise to various answers which eventually led to the development of religion. That is the purpose of every religion; to explain the workings of the universe and man's place in that universe.

Unfortunately these noble aims were forgotten and religion simply became a jumble of rituals and superstitious practices in the hands of unscrupulous leaders who gained power over the people by exploiting their superstition and ignorance. The time has come for religion to serve its original purpose of providing answers to the problems regarding our existence .Government should not use religion to gain political power . At the same time religion should not use political power to introduce religion .Different religions may have different beliefs and views regarding the beginning and the end of life, as well as different interpretations regarding the nature of ultimate salvation. But we should not bring forward such attitude to create conflict, confrontation, clashes to create misunderstanding.

There are many common virtues for religionists to introduce in theory and practice in the name of religion, so that people may lead a righteous, peaceful and cultured way of life. There is no need for us to belittle one another. If we do so, we would only pave the way for the anti-religious groups who are waiting to ridicule and condemn all religions. We should not behave in such a way as to show our hostile attitude to our co-religionists. If we so, people will say that religions encourage mankind to be divided.

Buddhist are not forbidden to give due respect to other religious teachers , nor are they restricted from visiting places of worship and attending religious services , other than Buddhism . They can show their full respect for other belief systems while maintaining their basic Buddhist principles. Buddhism encourages co-operation and understanding amongst the various religious denominations. From the Buddhist point of view, religious labels are not the most important aspects for people to be considered religious, but any person leading a respectable and harmless way of life can be regarded as religious. The methods used to introduce the teachings of the Buddha are rational and reasonable. The Buddha made his appeal through reason and experience. The teachings were presented with clear and impressive simplicity and yet kept free from religious and national narrowness and fanaticism. They have produced clear and sober-minded people. This method of presentation cleared doubts and removed superstitious beliefs. Thus did the teachings of the Buddha enlightened the hearts and minds The of the earnest seekers of Truth .The Buddhist attitude of tolerance and understanding convinced many great thinkers , philosophers , rationalists ,freethinkers and even agnostics to appreciate Buddhism as a peaceful way of life devoid of fear and superstition . If we, the religionists of today cannot get together to work in harmony without discrimination or hostility towards one another, the peace that we talk of would only remain as a dream.

References

- 1.Vin 1.20
- 2.Dharmananda K
- 3.Sadharma Shikka nithi by Sudshan Barua.

STUDYING THE GRAPHICAL STRUCTURE ALTAR INSCRIPTIONS AND AROUND NEYRIZ GREAT MOSQUE

Azam Monazzah¹, Mohamad Khazaei^{1*}

¹*Tarbiat Modares University, Iran*

** Presenting author*

Keywords: Ney-Riz great mosque, Altar, Inscription, graphical structure

Abstract

Ney-Riz county is one of the oldest cities in the Fars province of Iran. Some believe that the history of this city is related to the Kianian and Median era (550-880 BC). But what is likely to be based on documentation is that the history of this city goes back to the Achaemenian era (330-559 BC).

Among the monuments of Ney-Riz is the Great Mosque which was built in the Khorasani Method. Some believe that this mosque was built in place of the old fire-temple in the era of Sassanid period (226-652 AC) and this sacred fire has been brought from Kariyan fire-temple. Earliest date on which the mosque has remained is the date of altar in the year of 974AC which of course the construction of mosque probably had returned before this date

Although the mosque has studied in the field of historical parts but in terms of graphical analysis it has not been studied. In this survey, graphical structure of inscriptions on this mosque has been introduced.

At first, the context of construction which is Ney-Riz city is studied briefly. Then, a general introduction of the mosque and utterances and the various narratives that exist regarding its construction date and the formation of its evolution is discussed. Then turn to the review the graphical structure of the altar and its inscriptions. The graphical structure of the altars is surveyed and reconstructed and have been used from the reconstructed inscriptions in graphic design (Logo, Poster and etc.). Decorations to be used in the Ney-Riz great mosque has been affected by Sassanian art but most decorations belong to inscriptions and arabesque motifs.

Introduction

The Friday mosque of Ney-Riz was built at least in three phases that span Buyid, Seljuk, Il-Khanid rule in the Fars province. An inscription on the great qibla iwan indicates that the mihrab was built in 973, which is probably the date when the qibla iwan and the minaret were also constructed and enclosed within precinct walls. Identified as "iwan-mosque," the pre-Islamic typology of the Masjid-i Jami' in Ney-Riz, Bamiyan and Nishapur has led some scholars to believe that their mihrabs and minarets may have been appended to Zoroastrian fire temples. At Ney-Riz, the northwest iwan facing the original sanctuary was erected at a later date, followed by the addition of two rows of lateral arcades along the courtyard and iwan walls. The portal, which bears the date 1472, commemorates the last known period of construction.

The mosque is rectangular in plan, measuring about forty-eight by thirty-four meters on the exterior. It is aligned with qibla along the northwest-southeast axis and is

centered on an arcaded courtyard that is fifteen meters long and eighteen and a half meters wide. Entered from a simple portal at the northern end of the northwest façade, the courtyard is dominated by the tall sanctuary iwan that occupies its southwest wing. Eleven meters wide and seventeen meters deep, the sanctuary iwan is vaulted at a height double that of the flat-roofed courtyard arcades that continue along its side walls. The archways connecting the iwan to the arcades were pierced when the latter were constructed. The sanctuary iwan also dominates the exterior appearance of the mosque with its projecting buttresses.

Across the courtyard from the sanctuary is the vaulted northeast iwan, which is seven meters square. It is flanked by passageways on either side that connect it with the main portal and with a secondary portal, which was added to the eastern corner of the mosque in 1472. It is adjoined by the modern addition of two halls that span the length of the southeast mosque wall; the southern of these halls contains ablution fountains and latrines. There's also an octagonal fountain at the center of the courtyard. A single minaret, with a round tapering shaft terminating at a parapet, rises alongside the main portal. The spiraling steps of the minaret are accessed from the northwest arcade.

The mosque is made of baked bricks, covered with clay on the exterior and plastered white on the interior. The courtyard façade of the great iwan is ornamented simply with polychrome tiles composed into geometric patterns. Inside, the decorative effort is focused on the mihrab niche on the qibla wall, which is framed with multiple bands of ornate arabesques and inscriptions carved in relief out of stucco. The original minbar, probably wooden, was since replaced.



Fig. 1:



Table 1: Restructuring plan

			The basic design
Design Logo 1	This sign is designed directly from the inscription.		
Design Logo 2	These signs are designed using symmetry and repetition		
Design Logo 3	These signs are designed using rotation and repetition		
Design Logo 4	These signs are designed using rotation and repetition		
Design Logo 5	These signs are designed using symmetry and repetition		
Design Gift wrap paper 6	Designing the gift wrap paper using the word of “Ali” in the Inscription which has been repeated with changing Form		
Design Pattern 7	This pattern using the word of “Ali” in the Inscription which has been created with repetition and adding form		

method

Case-study research method with Analytical-Descriptive. Used, direct observation and library

Conclusion

What we *can* conclude from this study is that the inscriptional elements and decorative motifs of this monument can aid artists especially graphic designers in enriching their artworks and unique productions. The ancient spirit of this monument can be revived in modern graphical art and moreover, it can prevent the destruction of such powerful designs and make them eternal. Hence, this study is relevantly significant especially got artists and researchers in the field of Persian art.

References

- Godard, André. 1965. *The Art of Iran*. New York: Frederick A. Praeger Publishers, 277, 283-284.
- Khamene'i, Seyed Ali, Seyed Mohammad Khatami, Neyriz Great Mosque, *Honar Quarterly*, 4 Series, pp. 188-189, Persian, Illustrated, Tehran Islamic Encyclopedia Foundation.
- Pirniya, Karim, *Iranian Architecture Stylistics*, Me'mariyan, Tehran:Me'mar, 2001.
- Pope, Arthur Upham. 1997. *A Survey of Persian Art from Prehistoric Times to the Present*. Tehran. Soroush Press, III, 939-940.
- O'Kane, Bernard. 1994. "Iran and Central Asia". In *The Mosque: History, Architectural, Development and Regional Diversity*. (Frishman, Martin and Hasan-Uddin Khan, eds.) London: Thames and Hudson, 121.
- Sajjadi, Ali, *The Evolution Process of Altar in Islamic Architecture of Iran*, M.A. Thesis in Archeology, Tarbiyat Modarres University, 1993.
- Zakeri, mohammad hosseyn, gholam hosseyn me'mariyan, *Neyriz Great Mosque, Fine Arts*, 24 Series, pp. 188-189, Persian, Illustrated, Tehran Islamic Encyclopedia Foundation.
- Zakeri, mohammad hosseyn, gholam hosseyn me'mariyan, *Neyriz Great Mosque, Fine Arts*, 24 Series, pp. 188-189, Persian, Illustrated, Tehran Islamic Encyclopedia Foundation.
- Sajjadi, Ali, *The Evolution Process of Altar in Islamic Architecture of Iran*, M.A. Thesis in Archeology, Tarbiyat Modarres University, 1993.
- Shams Neyrizi, Mohammad Javad, *Neyriz History and Culture*, Kowsar-I-Nur Artistic And Cultural Complex, Tehran, 2000
- Godar, Andre, *Iran's Works*, Sarvqad Moghaddam, Mashhad: Astan Qods Razavi, 1996

A STUDY ON THE ORNAMENT OF THE FORMER KOSHIEH HOTEL: ARATA ENDO'S PHILOSOPHY ON ARCHITECTURAL BEAUTY AND ITS DEVELOPMENT THROUGH ORNAMENT

Jun Sakakihara

Mukogawa Women's University, Japan

Keywords: Former Koshien Hotel, ornament, pattern, Arata Endo, 'An Essay on Architectural Art', Frank Lloyd Wright

1. Introduction

The Former Koshien Hotel (Koshien Hotel), designed by Arata Endo (Endo), a pupil of Frank Lloyd Wright (Wright) who had worked with him on the design of the Imperial Hotel, has been converted into 'Koshien Kaikan' of 'Mukogawa Gakuin.' Endo wrote 'An Essay on Architectural Art' ¹ in 1926. The K. H. was designed right after that time and was completed in 1930. It is thought that the Koshien Hotel fully represents Endo's philosophy on architecture at that time. The objective of this study is to clarify his philosophy on architectural beauty, determine how it is developed in the ornament of the Koshien Hotel, and clarify the meaning of this ornamentation.

2. Ornament of the Koshien Hotel

Through the survey, it becomes apparent that ornament is seen in more than forty parts of both the exterior and interior of the Koshien Hotel. The type of ornament, primary motif, location, method of expression, and classification in three categories (1. Motifs found in Wright's work, ^{2,3,4} 2. Traditional patterns in Japan, ^{5,6} 3. Silk Road patterns (patterns found in Silk Road countries) ^{5,6,7}) are shown in Table 1. More than twenty motifs were used.



Fig. 1: Koshien Hotel

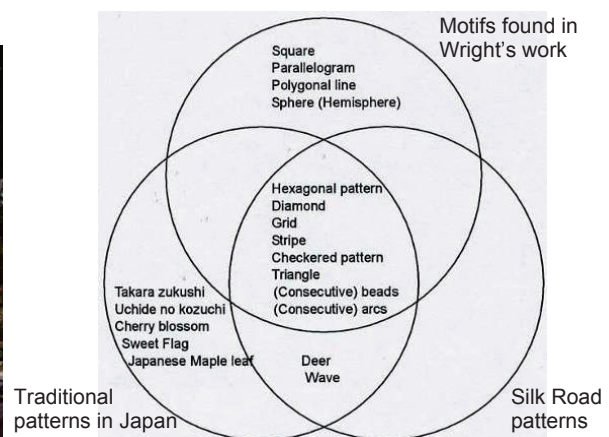


Fig. 2: Classification of ornament motifs

The patterns used as key characters are 'uchide no kozuchi' (small good luck hammer) and consecutive beads. 'Kikko' (hexagonal pattern), 'hishi' (diamond), '(ren) ju' ((consecutive) beads), '(ren) ko' ((consecutive) arcs), 'koshi' (grid), 'shima' (striped), 'ichimatsu' (checkered pattern), and triangle are common in these three categories.

Table 1: Ornament motifs of the Koshien Hotel

No	Area	Part	Main motif(s)	Material(s)/Expression	①	②	③	
1	Exterior	Pavillion roof	Base of ridge ornament	Takara zukushi, square	Pottery/Pattern	○	○	
2			Ridge ornament	Consecutive beads	Pottery/Pattern	○	○	○
3			Hip notch	Consecutive beads	Roof tile/Shape	○	○	○
4			Eaves end	Consecutive beads	Roof tile/Shape	○	○	○
5			Eaves	Lower end	Consecutive beads, Wave, Consecutive arcs	Nikkaseki/Relief	○	○
6		Exterior wall	Square tiles	Combination of square	Tile/Pattern	○		
7				Grid	Tile/Joint	○	○	○
8			Border tiles	Stripe	Tile/Joint	○	○	○
9			Standing table of roof garden	(Consecutive) diamonds, Consecutive arcs, Wave, Hemisphere	Nikkaseki/Relief	○	○	○
10			Stage of roof garden	Consecutive arcs	Nikkaseki/Relief	○	○	○
11			Upper part of reception room	Uchide no kozuchi, Square, Consecutive beads, Consecutive diamonds	Nikkaseki/Relief	○	○	○
12			Column of reception room	Consecutive beads, Consecutive arcs	Nikkaseki/Relief	○	○	○
13			Toilet, 4th Fl.	Hexagonal pattern	Window/Shape	○	○	○
14			Banquet hall	Consecutive beads, Checkered pattern, Squares, Arc, Consecutive triangles	Nikkaseki/Relief	○	○	○
15				Consecutive beads, Checkered pattern, Wave, (Consecutive) square, Consecutive triangles	Nikkaseki/Relief	○	○	○
16	Interior	Entrance hall	Column	Checkered pattern, Square, Wave, Arc, Hemisphere	Nikkaseki/Relief	○	○	
17			Chandelier	Arc, Consecutive beads	Glass/Molding, Metal/Molding	○	○	○
18		Hall, Ground. Fl.	Floor	Sweet Flag	Carpet/Pattern		○	
19		Corridor, Ground.Fl.	Floor	Wave	Carpet/Pattern		○	
20		Main corridor, Ground. Fl.	Chandelier	Arc, Consecutive beads	Glass/Molding, Metal/Molding	○	○	○
21			Bracket lamp	Arc	Glass/Molding, Metal/Molding	○	○	○
22		Reception room	Floor	Japanese Maple leaf	Carpet/Pattern		○	
23			Chandelier	Arc, Consecutive beads	Glass/Molding, Metal/Molding	○	○	○
24			Ceiling lamp	Arc	Glass/Molding, Metal/Molding	○	○	○
25			Radiator cover	Combination of squares	Iron/Casting	○		
26		Banquet hall	Ceiling	Checkered pattern	Wooden frame, Paper/Pattern	○	○	○
27			Raised ceiling	Consecutive beads, Consecutive diamonds, Consecutive kikko, Triangle, Parallelogram, Polygonal line, Hemisphere	Plaster/Molding	○	○	○
28			Transom decoration	Uchide no kozuchi, Square	Plaster/Molding	○	○	
29			Transom lamp cover	Checkered pattern	Wooden frame, Paper/Pattern	○	○	○
30			Radiator cover	Combination of squares	Iron/Casting	○		
31		Fountain	Groove,retaining wall	Consecutive uchide no kozuchi	Nikkaseki/Relief		○	
32		Grill	Raised ceiling	Polygonal line	Wooden frame, Paper	○		
33			Door window	Hexagonal pattern	Window of the door, Shape of the opening	○	○	○
34			Chandelier	Arc, Consecutive beads	Glass/Molding, Metal/Molding	○	○	○
35			Radiator cover	Combination of squares	Iron/Casting	○		
36		Accounting office	Window glass	Consecutive beads, Checkered pattern, Arc, Consecutive triangles	Glass window/Pattern	○	○	○
37		Bar	Fireplace	Consecutive beads, Consecutive arcs, Wave	Nikkaseki/Relief	○	○	○
38		Corridor, 2nd.Fl.	Floor	Cherry blossom	Caopet/Pattern		○	
39			Chandelier	Arc, Consecutive beads	Glass/Molding, Metal/Molding	○	○	○
40		Private diningroom	Fireplace	Uchide no kozuchi, Consecutive beads, arc	Nikkaseki/Relief	○	○	○
41		Library	Fireplace	Uchide no kozuchi	Nikkaseki/Relief		○	

2.1 Ornament motifs

(1) Motifs found in Wright's work

Consecutive diamonds, consecutive beads, squares, triangles, polygonal lines, and hemispheres were often used in Wright's work. All of these motifs were used in the design of the Imperial Hotel. Additionally, they were used for the Yamamura House and the 'Jiyu Gakuen' school in Japan, and the Millard House in the United States. Using these motifs in the Koshien Hotel evokes an atmosphere of Wright's architectural style.

(2) Traditional patterns in Japan

'Takara-zukushi' (Fig. 4 ④, a pattern that gathers eight happy things), 'uchide no kozuchi,' 'kikko' (hexagonal pattern), and deer are 'kitijo' patterns (patterns thought to bring good luck). 'Kikko' and 'hishi' (diamond) are 'yusoku' patterns (patterns used by the nobility). Cherry blossoms, Sweet Flag, Japanese Maple leaf, deer, and wave patterns express the seasons or tastes of Japan.

(3) Silk Road patterns

The hexagonal pattern, diamond, stripe, grid, checkered pattern, consecutive beads, deer, and wave designs were seen in Silk Road countries. The hexagonal pattern and diamond became established as the traditional Japanese patterns of 'kikko' and 'hishi' after their introduction into Japan.

2.2 Abstracted Ornament

Some of the ornaments are concrete, such as 'uchide no kozuchi' and cherry blossoms. Some patterns have clear meanings, such as 'takara zukushi' and 'kikko.' Some other motifs are thought to be abstracted. Through this investigation, some motifs are designated as abstracted motifs.

(1) Composition of squares (No. 6): 'Uchide no kozuchi' (Fig. 3 ①)

'Uchide no kozuchi', which is simplified and expressed by straight lines (Fig. 3 ②), is similar to the shape formed by the arrangement of four square tiles (Fig. 3 ③). In keeping with Wright's principle of 'one thing instead of many things'⁸ and Endo's attention to the organic unity of architecture⁹, 'uchide no kozuchi' is abstracted and integrated in the architectural design.

(2) Composition of arcs (No. 10): 'Uchide no kozuchi'

The statue of 'Daikokuten' (one of the Seven Deities of Good Fortune - the God of Wealth) was placed on a stone platform. Thus, this composition is thought to reference 'uchide no kozuchi' (the most famous possession of 'Daikokuten'). (Fig. 3 ④)

(3) Composition of squares (No. 11): Chinese character '甲' (kou)

The four squares and consecutive squares of the bottom center (Fig. 3 ⑤) are similar to the pattern of the exterior wall of the Coonley House (Fig. 3 ⑥)¹⁰. These squares are also similar to the Chinese character '甲,' the first character in the name of the Koshien Hotel, which also adorns the hotel's tableware. Thus, this is considered a motif of the Chinese character '甲' (ko).

(4) Composition of arcs (Nos. 17, 20, 21, 23, 33, and 38): Shell

The glass shades of the chandeliers and bracket lamps (Fig. 3 ⑦) are similar to a shell of 'Kuchibenimaimai' snail (Fig. 3 ⑧)¹¹ that used to inhabit many in Nishinomiya (The name of the city where the K. H. located) and in the grove of the Koshien Hotel site. Thus, this appears to be a shell motif.

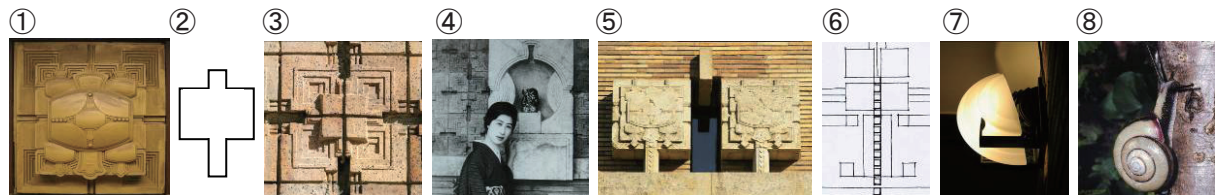


Fig. 3: Abstracted ornament

3. Endo's philosophy on architectural beauty and its development in ornament

Endo stated his philosophy on architectural beauty in 'An Essay on Architectural Art.' Here, how his philosophy was expressed through ornamentation is analyzed.

3.1. To be centrifugal

Endo explained that the important thing is to design 'organic architecture' (a term coined by Wright) to be centrifugal in order to harmonize architecture with nature, occupying a part of nature and becoming as one with it. He also commented that, at the same time, a center as the finishing stroke of a part is acceptable for that limited part.

The consecutive square pattern, which was often used by Wright to give unity to a building, is also used at the Koshien Hotel; specifically, square tiles for the exterior and interior walls (Fig. 3 ③). In the center of four tiles, a convex pattern with the 'uchide no kozuchi' motif appears. Furthermore, above and below/right and left of it, the 'uchide no kozuchi' motif appears. Although these shapes are the center of a part, consecutive patterns remove the center of

the whole and perform as a woven pattern from a distance and as a human scale grid and pattern on closer inspection. On the other hand, several partial centers for some limited parts are designed as the finishing stroke—a fountain in front of the banquet hall (Fig. 4 ①), ‘uchide no kozuchi’ at the stage of the roof garden (Fig. 3 ④), and fireplaces in seven rooms (Fig. 4 ②) and the bar—all of them are ornamented and their role is to brace spaces.

3.2. To be suggestive

Endo informed us that the psychological effect of the preparation of one part for another part is nothing but suggestion; therefore, handling a building psychologically is an important key to connecting life to architecture and, with these preparations of suggestion, the architect's idea easily becomes three dimensional.

‘Uchide no kozuchi’ and consecutive beads are motifs that characterize the Koshien Hotel. ‘Uchide no kozuchi,’ the small good luck hammer, is a possession of ‘Daikokuten’ (Fig. 4 ③)¹², the God of Wealth) and a symbol of happiness. The ‘Kinoene-Daikoku’ Festival is held on ‘Kinoene’ (甲子, the first day of the sexagenary cycle). Koshien Ground (presently Koshien Stadium), a symbol of the development of the Koshien area, was completed in 1924 (the year of ‘Kinoene,’ the first year of the sexagenary cycle) and was named ‘Koshien’ (甲子園)¹³. It is believed that ‘uchide no kozuchi’ was used as the symbol of the hotel based on these factors. Consecutive beads invoke images of water drops. Water drops (Fig. 4 ②, ④) are thought to be a symbol of protection for the guests and the hotel. Aisaku Hayashi (Hayashi), manager of the Koshien Hotel, was forced to resign as a result of a fire that occurred during his time as executive director and manager of the Imperial Hotel¹⁴. Because of this, water drops were chosen to be a symbol of protection against fire. Hayashi and Endo worked everyday toward the design of the Koshien Hotel at the cottage of the ‘Sakura Masamune’ (a famous brand of sake) brewery¹⁵. Because of this, ‘Yamamura House’ (the brewery owner's house, which was designed by Wright and supervised by Endo) and ‘Miyamizu’ (groundwater found by the sixth Tazaemon Yamamura in this area and suitable for sake brewing)¹⁶ are associated. The meaning of the blessing of water is thought to be represented by drops of water. Thus, Hayashi and Endo chose ‘uchide no kozuchi’ and drops of water as central characters of the hotel representing a desire for the peace and welfare of the guests and the prosperity of the hotel. On the carpets of the public spaces, patterns of waves, Sweet Flags, cherry blossoms, Japanese Maple leaves, and deer are woven, reminding us of the ripples of the ‘crystal-clear lake’ (mentioned in the hotel brochure), the Mukogawa River (which flows through the east of the Hotel), Sweet Flags around the lake (Fig.4 ⑤), painted in a hotel postcard), cherry blossoms at the Mukogawa riverside, and the ‘wooded hills of Rokko’ (also mentioned in the hotel brochure). It is thought that Endo used these references to encourage guests to reflect on the character of the site and the nature surrounding it.

3.3. Momentum is natural

Endo mentioned that momentum is felt in the transition of power between truth and falsehood. He described the momentum of temples expressed by the ridge, steep roof, columns, square flaring, and brackets. He further stated that the power of architecture is nothing but the appearance of this momentum.

Drops of water gush out from the conspicuous ornament of the ridge of the pavilion roof, fall down it in one breath, run down the roof with the rhythm of the hip notch, trickle from the eaves end roof tiles, come down to the horizontal eaves, fall down along the columns (Fig. 4 ⑥), and pour into the ‘crystal-clear lake’ in the front garden. A story with such momentum and rhythm is notably suitable for the Koshien Hotel. Endo may have given it this power.

3.4. The beauty of collapsed objects

Endo explained that, when he was asked why Wright had chosen 'Oyaishi' to carve, he always answered that, although the stone has holes and eruptions, Wright encouraged eruptions and unevenness. As it is too arrogant to attach a reserved beautiful pattern to it, he adopted modesty and persistency, helping the materials faithfully, thus giving them life.

The stone used for ornaments at the Koshien Hotel is a type of tuff called 'Nikkaseki' (Fig. 4 ①, ②). It is a tuff similar to the 'Oyaishi' that Wright used in the Imperial Hotel. Although it is more durable than 'Oyaishi,' it has partially cracked and broken over the past more than eighty years. However, its texture exudes warmth and reflects the blessing of earth. It is thought that Endo evaluated the nature of 'Oyaishi's' texture, but preferred to use materials that had higher endurance and would retain an elegant texture even if broken.

3.5. The third object

Endo explained that, with the addition of the third object to the first and second object as architectural elements, a composition results and becomes architecture. Endo explained the importance of the existence of third objects and that a sensible way of ornamentation is to add color, embroidery, or patterns not to the first or the second object, but to the third.

Around the roof, the ornament of the ridge of the roof and hip notch (Fig. 4 ④), and the eaves end roof tiles (Fig. 4 ⑥) are the third objects. Around the exterior wall, the reliefs, including 'uchide no kozuchi,' (Fig. 4 ⑦) are the third objects. Moreover, for detail, the deep joints of the border tiles also represent the third object, as Endo said that the brick wall of the Imperial Hotel was modeled like sculpture. About the interior of the hotel, the third objects are the ornaments of columns around the entrance hall and reliefs of 'uchide no kozuchi' in the banquet hall (Fig. 3 ①), and so on, and fireplaces in several rooms, including the bar. Furthermore, the coved ceiling of the banquet hall and grill (Fig. 4 ②), and the shell-shaped chandeliers (Fig. 4 ⑩) and bracket lamps (Fig. 4 ⑨) seem to correspond to the 'canopy coming down from the ceiling,' 'chandelier,' and 'hanging lantern.'

3.6. Toward the third dimension

Endo considered Wright a genius who could complete the sense of the three-dimensional form, finding that there was no lack of preparation for three dimensions in the basis of the plan, composition, and ornamentation. He explained that, when looking at the Imperial Hotel, we are surprised at the soft swelling of it in spite of the use of large lines, broadness of area, and great number of straight lines and angles.

Three-dimensional expressions of ornament are seen everywhere at the hotel. The expression of rich shade of the exterior wall by tiles and reliefs are examples. In the internal space, the ornaments of columns around the entrance hall, the composition of the ceiling of the banquet hall and grill with rich ornamentation, and the shell-shaped chandeliers (Fig.4 ⑩) and bracket lamps (Fig.3 ⑦) are also three-dimensional.





Fig. 4: Development of Endo's philosophy through ornament

4. Conclusion

Through the investigation and analysis in Chapter 2, it is apparent that the spaces of the Koshien Hotel are filled with rich ornament. Geometric ornamentation evokes the atmosphere of Wright-style architecture, while many traditional patterns in Japan are employed to express prosperity or the seasons in Koshien for guests. Patterns introduced to Japan via the Silk Road and patterns that occur naturally around the world are also used. That is, global ornament and patterns impart various meanings in spaces throughout the hotel. As investigated and analyzed in Chapter 3, Endo's philosophy on architectural beauty was developed in the ornament of the Koshien Hotel. It appears that, through the ornamentation integrated into its spaces, Endo sought to provoke guests into introspection of the site of the hotel and its surrounding area, and induce feelings of ease and enjoyment during their limited stay. *...I do not design what I want, but what is suitable for others.*¹⁷, *I only designed Hayashi's Koshien Hotel...*¹⁸. Endo contemplated how to achieve Hayashi's hotel management principles; "A hotel should have superior architecture, fine ornament, perfect facilities, and be a central sociable space. It is not only a place to stay, but also a place of comfort and peace of mind for its guests"¹⁹. The Koshien Hotel, with its rich use of ornament, was the result of Endo's philosophy based on deep understanding of Hayashi's principles.

References

- [1] Endo, A. (1926). *Kenchiku bijutu, Arusu dai bijutu koza vol. 6, Arusu*
- [2] Nobumichi, A. (1972). *Kyu Teikoku Hotel no Jissyoteki kenkyu, Tokodo*
- [3] Wright, F. L. (1955). *An American architecture*, HorizonPress, Inc. Kaufmann, E., Pomegranate Communications, Inc. (Revised ed. 2006)
- [4] Kruty, P. (1998). *Frank Lloyd Wright and Midway Gardens*, Board of Trustees of the University of Illinois
- [5] Sakakihara, J. (2011). *Patterns added to Japanese architecture and their relation to Patterns in Silkroad Countries, Archi-cultural translation through the Silkroad, Ugur Egitim Pazarlama ve Yayincilik A.S.*
- [6] Hayasaka, Y. (2000). *Nihon Tyugoku no monyo jiten, Shikaku Design Kenkyusyo*
- [7] Hayasaka, Y. (2000). *Yoroppa no monyo jiten, Shikaku Design Kenkyusyo*
- [8] Wright, op, cit., p.52
- [9] Endo, A. (1928). *Kenchikuron, Arusu kenchiku dai koza vol 4, Arusu, p.9*
- [10] Wright, op, cit., p223
- [11] Nishinomiya shell museum, *A postcard of a snail, Nishinomiya-syi*
- [12] Mitsuhashi, T. (2002). *Nihonjin to fukunokami, p. 93*
- [13] Zaidanhojin, *Nihon keieishi kenkyujo. (2005). Hanshin denki tetsudo hyakunenshi, Hanshin denki tetsudo, p.164*
- [14] *Teikoku Hotel Hyakunenshi, Teikoku Hotel, pp. 210-217*
- [15] Takeuchi, T. (2005). *Hayashi Aisaku Note V, Zai vol.18, Nishitani,S, p.60*
- [16] Tatsuuma, U. (1959). *Nishinomiya Shishi vol.1, Nishinomiya Shiyakusyo, pp. 69-71*
- [17] Endo, *Kenchikuron, op,cit., p17*
- [18] Endo, A. (1930). *Koshien Hotel ni tuite, Fujin no tomo vol.6, Fujinnotomosya, p31*
- [19] Takeuchi, T. (2005). *Hayashi Aisaku Note IV, Zai vol.16, Nishitani,S, p.49*

A STUDY OF THE SIGNIFICANT INFLUENCE BY SHIN-BUDDHISM TO THE TRUELY ORIGINAL JAPANESE CRAFTS DESIGN

Satoru Kiyosawa

Mukogawa Women's University, Japan

Keywords: Shin-Buddhism, mingei (folk-crafts), tariki (power contrary to our own intentional power), anonymous

Introduction

Shin-Buddhism ("Jodo-Shinshu" in Japanese, a school of Pure-Land Buddhism founded by Shinran in 12th century) which has been being developed and elaborated identically in Japan since then and its religious and spiritual way of thinking might be very deep, basic and influential factors for Japanese very original and traditional crafts-designs including architecture. Through Soetsu Yanagi's critics, thesis and writings, I would like to make it clear to a certain extent.

About Soetsu Ynagi

Soetsu Yanagi was born in 1889 and graduated from the literature department of Tokyo Imperial University in 1913, majoring psychology. Proficient in English and with a deep feeling for art, he became associated with the Shirakaba-literary-group in which he played a responsible part for interpreting Western art to Japan.

In 1936 he completed the present Japan Folk-craft Museum in Tokyo through his efforts. With the good company of the friendly and great potters such Kanjiro Kawai, Shoji Hamada and Bernard Leach, he sought out anonymous craftsman of all kinds throughout the country and encouraged their works. He also wrote prolifically and profoundly on all aspects of aesthetics, finding his inspiration in Japanese and Oriental folk-crafts, folk-cultures and religions especially Buddhism. His personal collection of folk-crafts is the nucleus of the Japan Folk-craft Museum-Collection. He died in Tokyo in 1961.

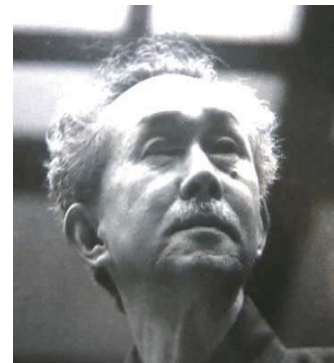


Fig.1: portrait of Soetsu Yanagi

Designs without designers

A genre of the identical and very original Japanese folk crafts designs which I try to deal with might be able to be said "design without designers", just like Bernard Rudofsky named a genre of certain very attractive and interesting architecture, "architecture without architects". This concept mostly fits to Yanagi's definition of "mingei" (Yanagis original words meaning folk-crafts for ordinary use made by unknown craftsman).

Generally speaking, observing the whole fields of crafts-designs, in contrast with “mingei”, we find another kind of crafts-designs which are typical world-famous “Japonesque”, authentic Japanese designs, refined and gorgeous, made by historically famous “meijin” great artists and craftsmen. Those works had been mainly for aristocrats, feudal lords and big temples. On the contrary, “mingei” have been characterized such as unknown, ordinary, vernacular, inexpensive, anonymous, and native,

About Shin-Buddhism

At first, I write a brief history of Shin-Buddhism. Shin-Buddhism was established by Shinran in 12th century. Historically Japan was the most eastern final point to which Buddhism had reached from India via China and Korea. Another route of Buddhism was bound for the south-east Asia, the teachings of which force believers and especially monks to experience hard training and to abandon their daily usual lives.

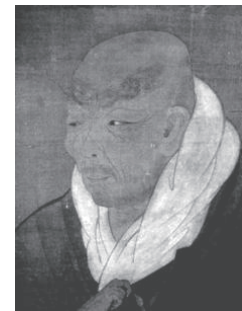


fig.2: Shinran

In contrast, the former Buddhism en route to the east is mainly for usual people. Its requests are very ordinary and easy so that people can be with it all through their daily lives. In China Buddhism was mainly elaborated and developed to Pure-Land Buddhism, the teaching of which is the basis for Shin-Buddhism by Shinran and his master Honen who studied Chinese Pure-Land Buddhism teachings.

Shin-Buddhism was so fit to Japanese ordinary people's minds and ways of lives that it spread quickly all over the country. Since then, Shin-Buddhism was rooted very deeply into Japanese people's ways of thinking, behaviors and lives. It was said that its believers were almost one third of national population until Meiji-era and even now it is the most powerful Buddhism sects with 10% of national populations (12 million believers and 80 thousand temples).

The main thing for Shin Buddhism-believers is just to chant a short phrase called “nenbutu”(namu-amidabutu) meaning one's whole trust, devotion and dependence to Amida Buddha (Amidanyorai), the main existence who are thought to support everything about one's birth to death in spiritual way. Amida's actions including encouragement and salvation were called “tariki” (another power which is very different from one's own) in contrast with “jiriki” (one's own intentional powers and endeavors).



Fig.3: Amida Buddha

Yanagi thought and theorized “tariki” as the main important factor to realize very attractive and beautiful crafts-designs we could find traditionally in our ordinary daily lives. Here I write about Yanagi's discoveries and analysis of Japanese one special aspect of the origin of design-creations through people's religious attitude and their ways of life. It was quite rare, I think, that to analyze real designed things through not objective factors such as technique, materials, functions, aesthetic standards and so on, but through spiritual factors especially religious minds and attitudes. In such sense, his writings are very unique and suggestive to study

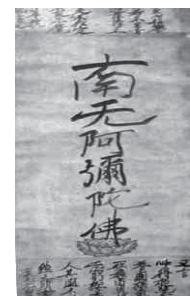


Fig.4:”nenbutsu”letters by Shinran

about the origins of creations of designs including architecture. Only John Ruskin who influenced and played the very important part for the beginning of that “arts and crafts movement” by William Morris in England has a kind of similarity in his insists for the Gothic Revival and appraised manufacturing by the pious middle age people.

Quoting Buddhism-word to develop the theory

Yanagi was a philosopher and scholar of religious theories especially versed into mysticism ones written by William Blake. Through his study about mysticism, and combining it with rather Japanese Buddhism ideas, he claims very important three factors to analyze and theorize the phenomenon and object. First is making much of the anti-rational ways of perceiving reality. Second is the concept of intuition, direct insight (tyokkan, jikige) and implicitness (sokunyo). He came to define these concepts as crucial for knowing reality and for perceiving true beauty, as he considered that a glimpse of reality is grasped by all the artistic creators. In his “mingei” theory, he argues that absolute beauty is perceived by intuition and not intellect. Third is the concept of nothingness (mu), void (kuu) and unknown (mumei). In “mingei” theory, he creatively adopted these words such as unknown (mumei) and no-thought (mushin), non-duality (funi) and other power (tariki) to define his last ideal situation in which the true beauty exists in the realm where there is no distinction between the beautiful and the ugly.

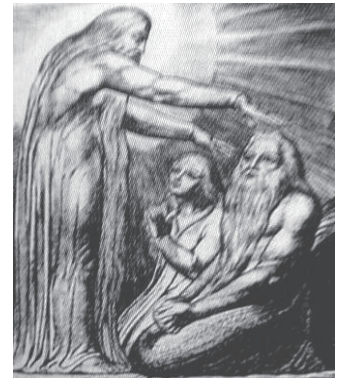


Fig.5: W.Blake's drawing

Open-eyes for Japanese folk-crafts “getemono”

In coincidence, he encountered a Korean white porcelain (hakuji) faceted jar presented by his friend. This encounter was absolutely decisive for him to open his eyes for attractiveness and interests in crafts-designs. In the development of the “mingei” movement, Yanagi's involvement with Korea is extremely significant, because his interests in Korean crafts preceded his interest in Japanese folk- crafts and predated his creation of the criterion of beauty. He wrote.

[The shape of the jar tells you more than just the shape. Through the beauty of the jar, you can understand the mind of the people, the culture of the period, its natural background and the relationship between the people and beauty.] He found in it the Korean people's sadness, beauty of sadness, which, he thought, is the original beauty of Korea.



Fig.6: Korean faceted jar

Then his interests were bound for quest what is the real original beauty of Japan, and after the quite considerations, he encountered with that common household-objects called “getemono” (means unskillfully handmade by local unknown craftsmen). Here I will show one typical example of “getemono”. It is a sansui-dobin, tea/soup pot with landscape patterns, from Mashiko-kiln, very old and traditional. About this sansui-dobin, Yanagi especially praised ones created by an illiterate and poor artisan called Mas Minagawa (1874-1960) who for more than sixty years had been decorating 500-1000 sansui dobbins a day with quick repetitive traditional patterns, as having extraordinary beauty. These pots are unsigned, inexpensive, ordinary kitchen-items without any intentional making of individuality.



Fig.7: sansui-dobin pot by M. Minagawa

Though such observations and researches, Yanagi summarized criterion of beauty as follows, beauty of handicraft, intimacy, function, health, naturalness, simplicity, tradition, irregularity, inexpensiveness, plurality, sincerity and honest toil, selflessness and anonymity.

He wrote. [Getemono clearly revealed the identity of our race with their beauty rising from nature and the blood of our homeland, not following foreign technique or imitating foreign countries. Probably these works show the most remarkable originality of Japan.]

By Yanagi and his companies and followers, getemono-crafts named “mingei”, which means “art of the people” now has become part of the Japanese language.

Bernard Leach who always supported and stimulated Yanagi’s studies wrote.

[Living beside a kiln deepened his interests and caused Yanagi to consider the issue of craftsmanship in our time, especially the transitions attendant upon the change from local folk-crafts to individual, or artist craftsmanship. Naturally the English movement under William Morris was the subject of many discussions, and I clear recollect how he questioned me about an equivalent term for peasant or folk art in Japanese. No word existed, and he finally composed the word “mingei”, which means “art of the people”.]

Buddhism and “mingei”

Combining Japanese art and his own Buddhist ideas, Yanagi began to develop the ideas of preaching his Buddhist aesthetics. His objective was to clarify what interpretation of the world of beauty is possible from a Buddhist point of view and to explain the Buddhist basis on which the nature of beauty stands.

He wrote. [I was most attracted to the part concerned with the relation between zen and nenbutsu-prayer in Suzuki Daisetsu’s writings and I am looking forward to reading more intensively.]

He was sharply drawn to Buddhism, particularly to nenbutsu or Shin-Buddhism, the Pure-Land School and “myokonin” (wondrous good men) who are the most humble and purest Shin-Buddhism nenbutsu-believers being particularly rich in faith. He began calling mingei-myokonin (wondrous good objects) drawing an analogue with “myokonin” to describe objects in stead of people, as if to suggest that folk-crafts made by unknown craftsmen had true beauty and were the most pure and ethical of all objects.

Conclusion

According to Yanagi, creativity is not recognized by most unknown craftsmen. It is rather, the divine power which he called “grace given by heaven”, expressed through craftsmen’s labor but not recognized by craftsmen themselves at the human level. Craftsmen are destined for labor-intensive repetitive work just like chanting “nenbutsu” again and again, and they unconsciously create beautiful things with the help of nature, tradition, and the divine power called “tariki” which works beyond the human level. Yanagi explains the power of unconscious creation by using such Buddhist ideas. Conscious artistic sense is a disease which prevents makers from creating supreme beauty. No-mindedness is the key factor that frees craftsmen from disease.

To attain this no-mindedness, Yanagi emphasized the power of discipline relying on nature and surroundings to the other power (“tariki”, the reliance on the grace of Buddha which is a

main idea of Shin-Buddhism Shinran preached) against the concept of “jiriki” (self power, attaining enlightenment through self-effort). [Craftsmen may be unlettered, uneducated and lacking any particular force of personality, but it is not from these causes that beauty is produced. He rests in the protecting hand of nature. The beauty of folk-crafts is the kind that comes from dependence on the other power” tariki”.]

During the formation of mingei-theory, Buddhist terms, “jikige” which he adapted into modern terms, “chokkan” (direct-insight) and “sokunyo” (implicitness), were emphasized as undifferentiated ways of perceiving beauty, instead of differentiated ways of perceiving beauty by intellects and logics. In the later stage of his Buddhism aesthetics, his emphasis was on undifferentiated states of beauty itself. These he called “funi” (non-dual entirety) and “bishu-mibun” (un-differentiation of beauty and ugliness).



Fig.8: typical mingei old pot

All the above sentences are the main part of my paper. And finally, I write briefly extending this study for architecture

Architecture and “mingei”

Yanagi’s studies and writings about mingei had a sort of influence to architecture. He wrote about Tea ceremony-aesthetic which established by tea-masters especially Sen-Rikyu in 16th century. The concept adopted into Tea-house architecture-design is natural, vernacular, unknown and humble which exactly fit to criterions for beauty of “mingei” proposed by Yanagi. Those kinds of tea-house-design originated in Korean peasants’ traditional houses. Japanese Tea-masters digested them and refined it by their own Japanese ways. And more original Japanese traditional naïve architecture might be Japanese peasants’ houses called “minka”(means peoples’ house), about which Yanagi almost did not write, also fit to his mingei-theory.



Fig.9: a minka in Tohoku

Studies about minka mainly had been done by folklorist such as Kunio Yanagida and were not analyzed through architectural or designing point of view. Only Wajirou Kon did it, but his studies were focused on just recording real documents and physical terms about them. He could not step forward to study about architectural and aesthetic meanings of them.

In 1974 American architect-historian Bernard Rudofsky’s “architectures without architects” was published. That book showed us beautiful, interesting and attractive architectures and landscapes all over the world. It was one of the important key to open architects’ and architectural researchers’ eyes to this kind of architectures, which eaded the new architectural study-theme such as design-survey-studies, conservation-studies, and also leded the publishing of progressive and suggestive books such as Vincent Scully’s “The shingle style today”, Robert Venturi’s “Learning from Las Vegas” and that “white and grey” arguments at MOMA NY. They had quite impacts on contemporary architectural design-movements and developments.



Fig.10: San Jimignano

Closing words

Yanagi's mingei-theory suggests us not only the true value of under-estimated and neglected folk-crafts designs, but also the importance of spiritual and religious factors, which lies behind actual, technical and intellectual way of designing.

From this point of view, considering of architectures today, significant, important and excellent works reflecting Yanagi's former suggestion might be Shosin Fujimori's, and reflecting his latter suggestion might be Louis Kahn's, Peter Zumthor's or Seichi Shirai's, which impressed and moved us not superficially but deeply.

In these days, such architectures are quite rare. So to quest true architecture, again we have to face more sincerely with a spiritual, philosophical and religious attitude toward its design like Soetsu Yanagi did toward folk-crafts and crafts-design.

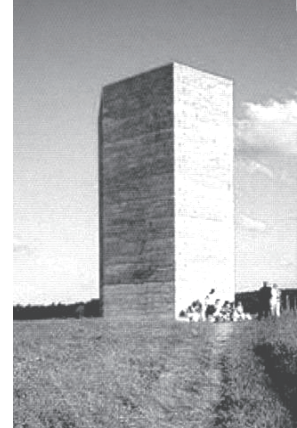


Fig11: Bruder Klaus Chapel by P. Zumthor

References

- [1]kougei no michi. 工芸の道
- [2]tyousenjin wo omou. 朝鮮人を想う
- [3]kougei bunka. 工芸文化
- [4]myokonin. 妙好人
- [5]getemono no bi. 下手物の美
- [6]bi no houmon. 美の法門
- [7]Unknown Craftsman. 民芸の美:英訳版



Fig.12: Akino Huku Museum by S. Fujimori

A BREIF SURVEY ON THE PRINCIPLES OF IRANIAN ISLAMIC ARCHITECTURE

Bahareh Hosseini¹, Atefe Zand Karimi¹

¹*Shahid Beheshti University, Iran*

Keywords: Iranian Islamic architecture, Culture, Principles of Iranian Islamic architecture, Iran, traditional buildings

Introduction:

This essay is a brief study on the principles of Iranian Islamic architecture, to extract the major points and challenge them from different points of view. After introducing Islam into Iranian territory outstanding architectural landmarks affected dramatically by this newborn religion. Iranian architecture did not lose its identity in confront with Islam ethic, but Iranian architects re-created the buildings based on local culture and civilization with adaption to Islamic point of view. Previous buildings changed to follow new orders and new ones such as mosques, Islamic schools and new kinds of tombs were created to join and enrich the architecture of Iran.

The word Islamic architecture refers to a kind of architecture that has been built in Islamic territories. This kind of architecture was created in the country of Iran when the religion of Islam was introduced to the world in around 600 A.C. and flourished in duration of almost thirteen centuries. [1] In spite of racial and cultural differences among people of different parts of the country, some new kind of architecture was created which had extensible unity in all of its parts. It means that all of the buildings in the category of Islamic architecture placed in different territories of Iran possessed similar features. However aside this unification, there are some slight differences which are derived from the local cultures and life style. [2]

So Iran as a country that is being intruded during centuries for its strategic location in the Silk Road find a new opportunity to develop its architecture and aesthetic fields. Efflorescence of cities such as Isfahan, Yazd, Kashan and Shiraz are signs of the huge impact of Islam on Iranian's life. Many different reigns have ruled Iran during this period. (1-13 century in Hijri calendar) [2] Consequently these political terms have had impacts on the architecture of this region of the world, but they do not mainly influence the architecture of Iran.

As it is mentioned above some principles dominate the Iranian Islamic architecture seem to be derived from beliefs that the religion of Islam brought and vernacular culture at the same time. Architecture in Iranian territories in which the climate is hot and arid possesses its own specifications. It is dependent on the climate, religion, worldview and above all culture that has had the greatest impact on its architectural features. Being humanistic and proportional, abstinence from inanity, having structure as aesthetic elements, self sufficiency, introversion, purity in shapes and volumes, having symmetry and being colorful are some of the origins that can be found in any building of Iranian Islamic architecture. All of these principles are legislated for one purpose and that is to build an excellent building. [2] Terminology wise if we concern the word "Architecture" that is driven from ancient Greek word defining something more than sheer to build a building, implicates on a higher meaning which is to build perfectly, like other aesthetic works. [3]

In the regard of some meaning-oriented critics like Henry Corbin (1973) that consider this world one of two which god has designed, the artist's main duty is to discover mysteries of the other and the so called hidden world. He should seek spiritualism in his works in order to disclose them. [4]

Considering this, the aforementioned features are accepted as uniform and essential principles for architecture in all parts of Iran. These principles exist from generalities to the smallest details of the design. It has been studied in this article to introduce these features in a concise and meaningful manner as follows:

1. Humanism and Proportionality

Humanism in Islamic architecture is the heed of human proportion between building elements and human body and his physical and emotional needs. The past architecture has always been an art that had tangible relation with daily life. In Iran architecture has been suitable for humans and respects his beliefs and personal ambitions. [5]

Humanism in Iranian architecture is obvious when we have a look at spaces and its details. For instance a single space like three-door room which is prevalent in traditional houses is as large as it is comfortable for an average family to live. Community spaces (called *talar* in Persian) are also designed to remind an Iranian family glory for the guests who are about to come in. (Fig. 1) Details are also designed proportionate for a person who utilizes the building, for example plinths in most mosques are high at a level that makes comfortable for a person to lead on.



Fig. 1: Interior of an Iranian House

2. Abstinance from Inanity

It has been tried to abstain from frivolling and building supernumerary in Iranian Islamic architecture. In holy Koran we see:" believers, who they abstain from inanity." If European countries have had arts pertaining to architecture such as painting figures or sculpturing or detailing just for the sake of beauty, in Iran architects never used them as sheer ornamentation. [1] They used everything for a certain reason in order to make the space suitable for living. Even when they used ornamentation under the vaults they want to have humanistic proportion by the means of it, or they built colorful windows in order to prevent sun glare and its heat enter the room. Therefore Iranian architects didn't just consider the beauty of elements but their efficiency and utility.

3. Structural Considerations

The Persian word "*Niaresh*" have been used in Iranian architecture a lot. It means the knowledge of static, building technology, and material science. Iranian traditional architects had a sensible notion of structure. They did not discrete structure from beauty. They have gained a lot of information about construction methods by experience and transfer it chest to chest. [6] The common usage of masonry walls, arch-shaped ceilings and the subtle double-layer vaults are well-known in Iranian architecture of that time. (Fig. 2-4)



Fig. 2: Seraglio (*Shabestan* in Persian) of the Nasir al-Mulk mosque, Shiraz

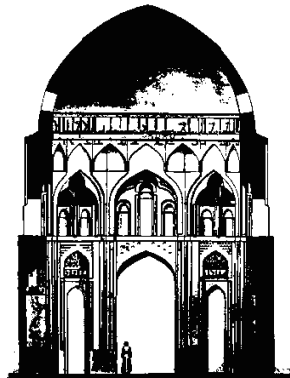


Fig. 3: The Tajol molki dome, Isfahan, one of the greatest examples of its kind.

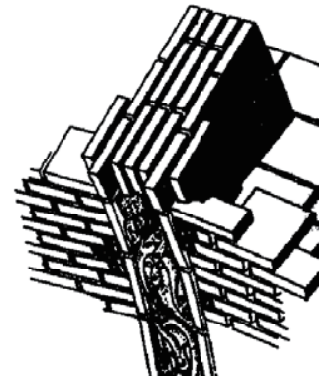
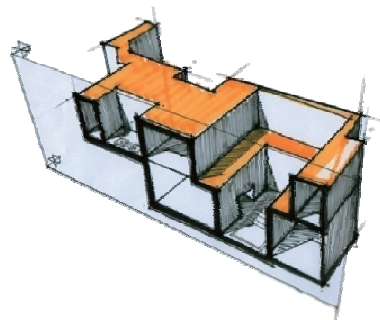


Fig. 4: The detail of the Nezamol molki dome, Isfahan

4. Self sufficiency

Iranian architects have always tried to procure essential materials from local areas and built the building in a way that it would not be dependent on getting material and method from somewhere else. So in this way the building procedure wouldn't take long and the building was more compatible with vernacular nature. As a result it was also always possible to obtain supplementary material in order to repair the building in the case of renovation. They believed that material should be indigenous and it should be tried to benefit the vernacular facilities as possible. [6] For instance the usage of clay which was the most available material in the plateau of Iran was the basis of multiple generations of bricks and tiles and different kinds of mortar used in the construction process. The optimization of formation according to available vernacular facilities is one of the other examples regarding to self sufficiency in these buildings. (Fig. 5, 6)

Fig. 5, 6: Vertical extension of one of the traditional houses in the city of Yazd in order to reach under ground water and supply lower stages sun light.



5. Introversion

Basically people beliefs had a great impact on establishing unified features in Iranian traditional architecture. The most stable and sturdy point about Iranian Islamic architecture is the issue of tendency to the inside and in general introversion. The main aim of the introspection is to divert the attention to the inside and refuse outside, in such a way that it is not possible to understand the building from outside. [7] In this status one should stand within the building in order to understand the main story of that building. For instance when one walk through Yazd or Kerman's streets he just recognizes the simple and earthen crust of the outer side of the buildings. (Fig. 7) But as soon as he enters one of them, he might

find highly decorated interior facades. The misleading point is that it seems that introversion is due to the need of having privacy in buildings such as houses, but we find this point also true about the public spaces such as mosques and forums (*bazzars*) which needed no tendency to get private. (Fig. 8, 9) In fact the notion of inviting the visitor to the inside provides the feasibility of augmenting the influence of the space to him since the when he wants to try the spatial experience he would find himself completely wrapped.



Fig. 7:
Outlook of
one of the
alleys in the
city of
kerman

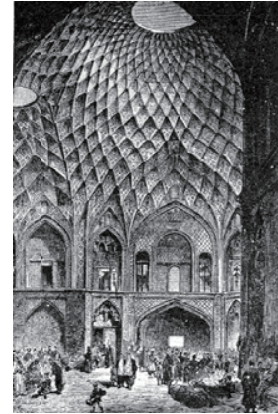
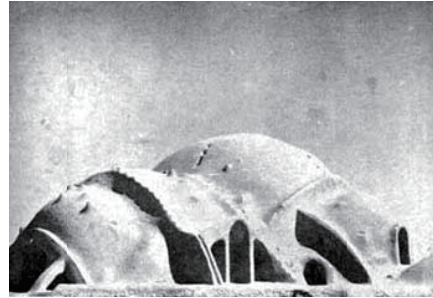


Fig. 8, 9: The exterior (left) and
interior (Right) of Amino dole forum,
Kashan

In the notion of subjectivism, the outside of the building has no appearance but the interior space has all the decorations and attractions. This organization manner of the buildings decrees some spatial disciplines and that is a central courtyard in Iranian Islamic architecture. The order of courtyard in the middle of the building and forming other spaces around it is famous in Islamic architecture for the privacy it brings. (Shown in figures 5 & 12) [8] But as mentioned above the impact of introversion is not only the privacy it brings; it causes the building to find two different aspects, two aspects that are totally in contrast with each other. This contrast is one of the features of Islamic architecture. Eventually it affects the space order for open and closed spaces that finally leads to separation of the buildings in two or in some cases three domains: public, private and in between spaces. [9] As a result the relation between inside and outside get more complicated. In traditional Iranian houses which the privacy is crucial the most intricate cases of access systems are seen. [10]

Consequently the perspective of the cities also changes because of the introspection. City textures became a collection of closed and open spaces that periodically duplicated as Figure 10 shows. [11] There is another prospect attributed to introversion that justifies it as a muniment against intruders. Having strategic situation between Middle Eastern countries cities in Iran never felt secure from attack. They usually beleaguer themselves behind great walls surrounded the city, let alone leaving their houses being exposed.



Fig. 10: Aerial view of traditional (right) and
contemporary (left) urban fabric of Yazd shows the
deterioration of spatial sequence in Iranian traditional
cities.

6. Purity in Shapes and Volumes

The Iranian traditional architecture had strict regulations in correspondence to using shapes and volumes. In the general form of Iranian Islamic architecture, seeking out perfection and achieving the best design is evident in the selection and combination of shapes. [12] Each used element in Islamic architecture is pure and geometrical. Elements like pool, garden, courtyard, elevation, plan and volumes of building are created with shapes that are geometrical and pure. Even when one could not design in "right angles" due to the limitations he would skillfully design the interior in a way that every single key space feels like being geometrical. The architect of the Friday mosque of Yazd masterly knew that. (Fig. 11, 12)

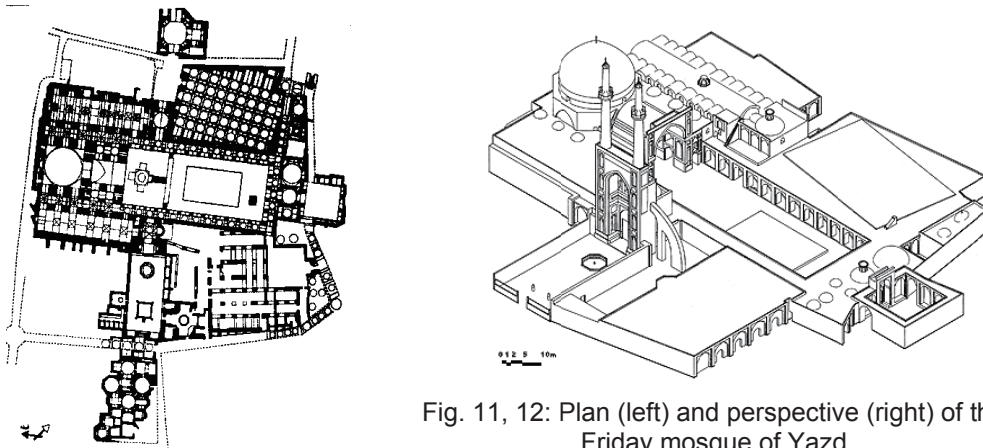


Fig. 11, 12: Plan (left) and perspective (right) of the Friday mosque of Yazd

Patterns in this kind of architecture may be divided in two groups: the geometrical patterns which mentioned, and the patterns of arabesque which is a combination of different signs in the form of round, soft, ringlets and is intertwined and wavy which at first glance seem to be herbal.

7. Symmetry

Having symmetry is one of the features of traditional Islamic architecture which the notion of modernism totally refuses. [13] In a space or plane with symmetry and perpendicular axes the central element seems more important than the other elements. (Fig. 13) The interesting thing is that not just physical elements makes symmetry. Ingenious Iranian architects have used water to bring another kind of symmetry in which the building and its virtual twin play the roles. (Fig. 14)

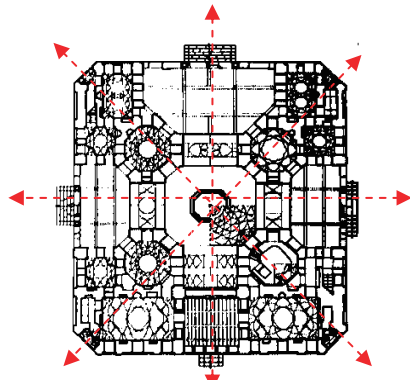


Fig. 13: The symmetrical plan of the Hasht-Behesht grange, Isfahan



Fig. 14: Reflection of Chehelstun Palace in the pool, Isfahan

8. colorful space

Another interesting feature of Iranian Islamic architecture is the extensive use of colors in the buildings. A variety of limited and splendid colors usually wraps the whole interior of the buildings. [12] This is not like what we call "decoration" today; it is like giving a final spatial quality to a world of strict regulations. The designer wishes to express his feelings through colorful and abstract patterns. By the means of a thin layer of color whether be painted on the wall or a tile the characteristic of the space changes hugely; what Iranian Islamic architects discovered in order to bring their imaginary gardens to their earthenware buildings.

Conclusion:

What has been set down in this article was a brief introduction of what is called Iranian Islamic architecture and some of its main principles. It is an architecture that pursues tranquil and peace by the means of using spiritualism in the buildings. The thing that led to different styles was the diversity of how architects and literally people looked at the space. An Iranian Islamic architect worships his God by the means of building. He pursues a space that is perfect, a fault-free and inconvertible space. He utilizes available elements in order to satisfy the hunger of tranquility of the people he builds for. As mentioned the priority of the interior over the exterior, the seeking of the complete and geometric pattern for forming spaces and shapes, the hidden contemplation behind the simplicity of the buildings, being from and for the local environment shows that the architecture is a cultural phenomenon, an art that is in a daily correspondence with the people. As a result Islamic architecture in Iran was greatly influenced by its traditional culture, and gradually adjusted itself to the new insight of Islam religion.

References:

- [1] Pirmia, M. *Sabk Shenacy (Methodology)*, Journal of Art and Architecture, No. 10-11, Tehran, pp. 20-36, 1971.
- [2] Haji GHasemi, K. *A contemplation in Iranian Islamic Architecture and the way of understanding that*, Softe Magazine, No. 52, pp. 2-14, 2012. (In Persian)
- [3] MadadPoor, M. *a Breif Survey on Architectural Spiritual Philosophy & The Future World*, Andish nameh, Shahid Beheshti University, 2008.
- [4] Corbin, H. *En Islam Iranien: Aspects spirituels et philosophiques*. Gallimard, Paris, 1973.
- [5] O'Gorman, K. and Prentice, R. *Iranian hospitality: from caravanserai to bazaar to reporting symbolic experience*. Proceedings of the Conference of EuroCHRIE 2008 Congress, Dubai, United Arab Emirates, 11-14 October, 2008.
- [6] Ghobadian, V. *Climatic Analysis of the Iranian Traditional Buildings*, Tehran University Publications, pp. 308-37, Tehran, 2001. (In Persian)
- [7] Memarian, GH. *Ashnaii ba Memari Maskooni Irani, Ghuneh Shenasi Darunghara (An introduction to house typology in Iran: Courtyard houses)*, Iran University of Science and Technology, Tehran, 1993. (In Persian)
- [8] Memarian GH, Brown, F. *The shared characteristics of Iranian and Arab courtyard houses. In SM. a. HM. Edward B (eds) Courtyard Housing*, Oxon, pp. 21-30, Taylor & Francis, 2006.
- [9] Ramezani, S. & Hamidi, S. *Privacy and Social Interaction in Traditional Towns to Contemporary Urban Design in Iran*, American Journal of Engineer and Applied Sciences, Vol.3, pp.501-508, 2010.
- [10] Memarian, GH. & Sadoughi, A. *Application of Access Graphs and Home Culture: Examining Factors Relative to Climate and Privacy in Iranian Houses*, Scientific Research and Essays, Vol. 6(30), pp. 6350-6363, 2011.
- [11] Shabani, M & Authors, *Achieving Privacy in the Iranian Contemporary Compact Apartment through Flexible Design*, University Kebangsaan, Malaysia, 2011.
- [12] Haji GHasemi, K. *Searching for Meaning in Persian Islamic Architecture*, Annual MESA Conference, Washington, 1999, <http://ilex.ilexfoundation.org/confer/mesa.html>
- [13] Meiss, P. *Elements of Architecture: from Form to Place*, E & FN Spon, London, 1992

ORIGINALITY OF CENTRAL COLUMN IN JAPANESE PAGODA

Fumie Ooi

Mukogawa Women's University, Japan

Keywords: Central-column, Pillar 1), Shim-bashira 2), Pagoda

Introduction

The Japanese word 'tou', means 'tower', is derived from 'stupa' in the ancient Indian language, Sanskrit. A stupa is a Buddhist pagoda. Buddhism has been part of Japanese culture since the 6th century and was transmitted to Japan from India through China and the Korean peninsula (Table 1). There are about two hundred and ten wooden pagodas in Japan, and almost all have. However, it has no structural purpose. It is surrounded by a small room situated between it and the 'roban' which is the lowest part of the 'sohrin' (Fig. 1). Therefore, it is not joined to another part of the surrounding structures [1]. The pillar is not an element of the building, but is symbolic of something. We can see pillars all around the world still now. In Japan, it is thought as a source of space, and used as counting gods unit. The purpose of this paper is to list pagodas and pillars in related countries, and to clear the needs researches. This is the groundwork for the final investigation. My final goal is to elucidate the reason for the wooden central column in Japanese pagodas.

Previous research

Studies from a variety of fields, e.g., philosophy, religion, archaeology, and history, have been done on the shim-bashira. There are also studies on the structural effect of pagodas in general. However, little is known about the architecture of the shim-bashira or central column itself.

Method

I investigated examples and the literature as well as discussing with researchers at the Japan National Museum of Ethnology on this subject. I have extracted features of pagodas and pillars in related countries, and searched for information on ceremonies and festivals held around pagodas.

Findings

1. Historical changes of pagoda and pillar

(1) India

In Rig-Veda, one of the oldest most important sacred texts, the Vedas(1200 BC), there is the praising pillars poet. The pillars were named 'Yupa', they were used to tie livestock to be sacrificed [2]. The pillars themselves were simply logs. We can see one with a height of 1.3 m, in Thailand now. In 6th century BC, King Asoka, who reigned from 268-232 BC, made about thirty pillars with a declaration of national governance. Asoka pillars were made of a single stone, and have a height of about 13 m. We can still see only sixteen stone pillars

including the remains which consist of only the top of pillars (Fig. 3). It is clear that the design of the top of pillars was influenced by Greek architecture, because there are plants and animal sculptures. However, Asoka pillars were made of a single block of stone but ancient Greek pillars were made by stonemasonry (Fig. 4). [3]. This is a distinctive feature of Indian pillars. Stupas were hemispherical structures (Fig. 2) and were constructed as burial sites for Buddha's ashes. These structures do not have a central column, but the top is similar to the top of the pagoda in related countries. They were not decorated because they were regarded as Buddha himself, and people decorated only the fence and gates around stupa about his life. The Sanchi first stupa is surrounded by four gates. There is Buddha foot prints sculptures on the side of the north gate pillar. Therefore, Buddha was symbolized as pillars [4].

(2) China

The oldest existing pagoda is in the Songyuesi Temple (AD 523) which is a brick structure. There is no central column, and the inside is empty (Fig. 5). A large number of brick pagodas were built in the Sui and Tang period. Buddhism took about 500 years to be transmitted to China (AD 2) from India. We have no definite information on pagodas in this period. During the prosperous year of 300 BC, Taoist literature described stories of how the xianren (3), immortals, liked to live in many storied buildings in Taoism. While further investigation is needed, this may have influenced the design of Chinese pagodas. It is clear that wooden pagodas existed at that time because the lowest part of the central column in the remains of the burned pagoda can be seen. Furthermore, there are stone pillars which imitate the wooden pagoda at Yungang Caves (Fig. 6). The only wooden pagoda remaining today is the Sakyamuni Pagoda (Fig. 7). There is no central column, and Buddhist statues are at its centre (Fig. 8). Visitors can take stairs to the upper floors and view the scenery. It should be also be added that there are some brick pagodas like this. This shows the influence of multi-storied buildings. Historically, pillars are wooden ones built for the funerals of civil war heroes and the pillars were changed to stone after five years(567~570) (Fig. 9)[5].

(3) Korean peninsula

The only current wooden pagoda is P'alsangjon Hall. There is a central column although it is too recent to be compared with a Japanese one. The pillar, *tokan*, is found in the temple garden (10–20 m in height). Its style is derived from that of northern nomads [6]. There are pair of 1.5-m-high wooden pillars at entrances of villages form gates, symbols of man and woman too [7]. They are remade every year.

(4) Japan

The first pagoda was in Asuka temple and built in 585. At that time people set Buddha's ashes in the top of the central column in *Nihonshoki* [8]. Later on various pagodas were built as the five storied pagoda in Horyu-ji temple (Fig. 10). It has a shim-bashira, but no staircase. The parts around the shim-bashira are merely for decoration. The Chinese pagodas are designed for viewing the surroundings, but the Japanese ones are designed as objects to be viewed in their own right.

2. Japanese pillar and central-column

(1) References in Kojiki ('Record of Ancient Matters')

Here, 'pillar' is used as a unit which counts spirits from ancient times. The description in Kojiki says that first of all, two spirits found out a pillar [9], and this is thought to be the start of world. Therefore, pillars have a special meaning for the Japanese.

(2) On-bashira festival

The Suwa Grand Shrine has a well known on-bashira. It is a festival in which people take large logs from the mountain and stand them as pillars on the corners of square in the shrine

area every seven years. There are two shrines in the Suwa-grand shrine: one in the south shrine, kamisha, and the other in the north, shimosha. People deify the mountain as the spirits of kamisha, and the large tree is deified as the spirits of the shimosha [10]. An interesting question is the purpose of the square. Hayashiya describes the square as an ancient shrine form, and even when the buildings of the shrine were built up on it, the square is kept as symbol of sanctuary [11].

(3) Shim-no-mi-hashira at Ise shrine

The central column of shrine is called Shim-no-mi-hashira. Ise shrine is rebuilt every twenty years alternating between two adjacent sites (Fig.11). It is unknown when the shrine was first built. The central column is under the floor of the main shrine. It is thought to be the resting place of the spirit. The offering ceremony at the main shrine is done under the floor. However, there is no a shim-no-mi-hashira at the Aramatsuri-no-miya shrine in Ise. Kuroda describes how the shim-no-mi-hashira has a degenerated central column to support the ridge beam, and its purpose is as a marker for rebuilding work [12].

(4) Shim-no-mi-hashira at Izumo-grand-shrine and Kamosu-shrine

At both shrines, the columns' gable sides support the ridge beam (Fig.12, 13), but the central column only reaches the beam. Inagaki describes the shim-no-mi-hashira as a structure that merely symbolizes spirit, as part of the style of grand shrines which deify the spirit at the center of a room [13].

Conclusions

1-(1) First stone pillars were built in India, the establishment of Maurya dynasty same stupa. It is very interesting that the gate pillar is symbolized as Buddha. Only the top of a stupa is similar to a pagoda in other countries with Buddhism backgrounds. The pillar is thought of as a symbolizing something valuable. Future research will be to compare them and show that the design of Japanese pillars is indeed original.

1-(2) Chinese pagodas differ from Indian ones as follows. Brick or wood structure, empty interior (no central column) and some pagodas have staircase leading to upper floors.

1-(3) Wooden pillars have been remade at the front of the entrances of various villages. Furthermore, the "tokan" is a pillar in the gardens of temples in Korea, and are influenced by the traditions northern nomads. Therefore, there appears to be another route of pillars propagation. This needs future research.

1-(4) The Chinese Pagodas are designed for viewing the surroundings, but the Japanese ones are designed as objects to be viewed in their own right. A Indian stupa was regarded as Buddha himself, and thus depictions of Buddha's life appear on only the fence and gates around a stupa. The shim-bashira is not joined with another part of the stupa and the surrounding parts are decorations of the shim-bashira. Thus, the center is the most important part. People set some of Buddha's ashes at the top of the shim-bashira at the pagoda in the Asuka temple. Later on other parts of his ashes were buried under the shim-bashira of the pagoda in the Horyu-ji temple. Inagaki describes similarities in belief about the meaning of the top of the central column, i.e., that spirits were present at its top [14].

2- (1) The pillar is used as a unit with which to count spirits. It is thought that the pillar has existed before the start of the world. Pillars have special meaning for the Japanese.

2-(2) The four pillars make a square area in the Suwa Grand Shrine. The square as an ancient shrine form, and even when the buildings of the shrine were built up on it, the square is kept as symbol of sanctuary

2-(3) In the Ise shrine, there is a central column under the floor of main building. The reason for this position has not been clarified

2-(4) The central column at the shine in Izumo and the one in Kamosu do not support the ridge beam. They are thought to be symbolized spirits. There are differences in the meaning of shim-bashira which remain to be investigated.

Figures

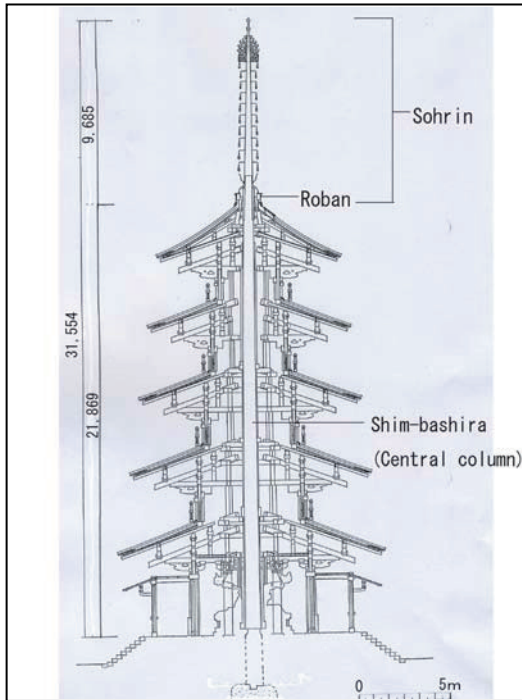


Fig. 1: Section of Horyu-ji Pagoda



Fig. 2: Stone Pillars

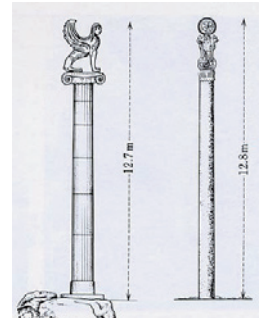


Fig. 3: Greek pillar (left) and Asoka pillar (right)

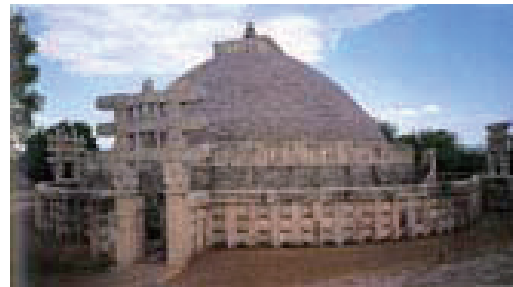


Fig. 4: Sanchi first Stupa



Fig.5 : Pagoda Songyuesi Temple



Fig.6: Central Pillar Yungang Caves



Fig. 7 and 8: S'akyamuni pagoda (1056)

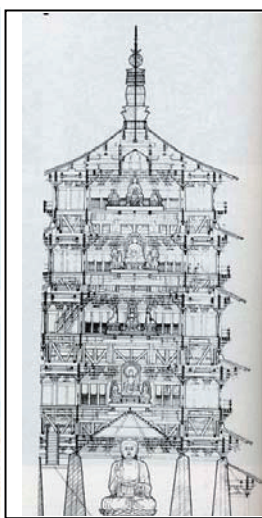


Fig.9:Yicahui, Stone pillar



Fig. 10: Horyu-ji pagoda

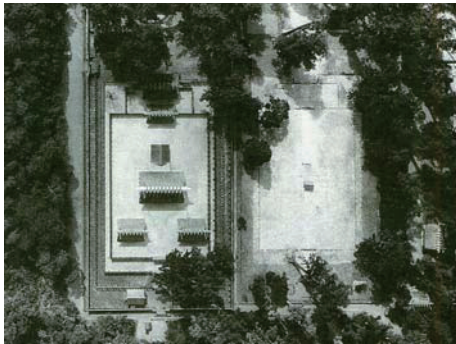


Fig. 11: Two sites of Ise shrine



Fig. 12: Kamosu shrine

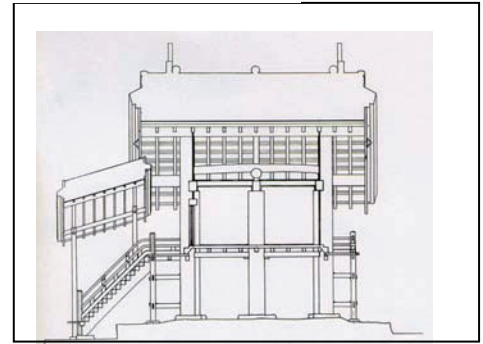


Fig. 13: Section of Kamosu shrine

Notes

- 1) Here, the term 'column' is a part of a building or pagoda, and the term 'pillar' is cylindrical structure. Articles on pillars appear in the two most ancient Japanese texts, Kojiki and Nihonshoki.
- 2) 'Shim-bashira' refers to the central column in a Japanese pagoda.
- 3) Xianren is thought of as being an ideal, immortal in the ancient Chinese belief system of Taoism.

References

- [1] Editorial supervision by Hamajima Masashi, Sakamoto Isao. *The lecture of five stories pagoda*. 2011 (In Japanese)
- [2] Translated by Tsuji Naoshiro. *Rig-Veda*. (In Japanese) 20th. Nov.1986
- [3] Akiyama Mitsufumi. Initial phase of Indian art — Discussion about Buddhist art — *New History of World Art Orient part vol.13 India (1)* (In Japanese) 2001
- [4] Miyaji Akira *Indian Art History* (In Japanese) 2009
- [5] Tanaka Tan. Architectures of Wei·Jin·Nanbei dynasty period. *New History of World Art Orient part vol.3 Three countries ·South and North dynasty* .2002 (In Japanese)
- [6] Tanaka Mitsuko. Columns of Pagoda in Korea. *Why doesn't a Five-storied pagoda fall?* 1996 (In Japanese)
- [7] Imoto Eichi *Boder·Religious Space* (In Japan) 1985
- [8] Notes and Translation. Kojima Noriyuki, Naoki Kohjiro, Nishimiya Kazutami, Kuranaka Susumu, Mohri Masamori. *Nihonsyoki*. New edition, Japan Classical Literature Complete Works Vol.3. (In Japanese) 1996
- [9] Notes and Translation. Yamaguchi Yoshinori, Kannoji Takamitsu. *Kojiki*. (In Japanese) 2009
- [10] <http://suwataisha.or.jp/simosya/akimiya/index.htm>, 9th. Mar.2012
- [11] Hayashiya Tatsusaburo. *Japanese Ancient Culture*. 2006 (In Japanese) No.1
- [12] Kuroda Ruji. Dawn of Shrines. *New History of Japanese Art vol.1 Ancient Art Jomon Yayoi Kofun period*. 1994 No.1. (In Japanese)
- [13] Inagaki Eizo. Izumo Shrine. *Japanese Architecture Photographs Anthology Vol.14 Ise Shrine · Izumo Shrine*. 1993. (In Japanese)
- [14] Inagaki Eizo. Shrines and Mausoleums. 1980. *Japanese Art Vol. 16*. (In Japanese)

Table 1: Chronology of existing pagodas

200	100	BC, AD.0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	
マカリア時代 Maurya			南北朝 南朝 北朝			南北朝 南朝 北朝			南北朝 南朝 北朝			南北朝 南朝 北朝			南北朝 南朝 北朝			南北朝 南朝 北朝			
新羅 shin			新羅 shin			新羅 shin			新羅 shin			新羅 shin			新羅 shin			新羅 shin			
India																					
China																					
Korean Peninsula																					
Japan																					

AN ARTUQID BUILDING: DUNAYSIR GREAT MOSQUE¹

Hilâl Aktur

Istanbul Technical University, Turkey

Keywords: Islamic Architecture, Dunaysır Great Mosque, Artuqids,

In this paper, the architectural features of Dunaysır Great Mosque and the restoration procedures the mosque has been through in the Republic Period are explored. The objective of this paper is to analyse the architectural features of Dunaysır Great Mosque, which one of the most beautiful examples of Artuqid architecture in Anatolia.

Dunaysır (Kızıltepe), lies to the south-west of Mardin. It is surrounded by Mardin and Nusaybin to the east, Derik and Ceylanpınar to the west, Mazıdağı to the north and with Syria to its south. In time, it acquired firstly the name “Koçhisar” instead of Dunaysır, and then Kızıltepe. As a consequence of its location over the fertile lands of Mesopotamia and over the crossroads of the Silk Road, the prominent trade route between Asia and Europe, Dunaysır remained a settlement that never lost its significance throughout history. (Figure 1) Due to this location, the town was witness to various wars and has been repeatedly sacked by various nations. [1] Dunaysır became an important centre for trade on the Diyarbakir – Musul and Urfa- Musul routes during the time of Artuqids, who have a prominent role in the Medieval Anatolian Turkish history, having taken great steps in the early stages of Turkification of Anatolia and enabled the Northern Syria and Anatolia connections. According to writers of the time, Dunaysır had become an international market town. Merchants from Syria, Diyarbakir and Anatolia (Rum), which was under the control of Sultan Mesud, would come together and trade here. In a short period of time, inns, bazaars, guest houses (*funduk*), public baths, mosques and madrasahs were built and people from various nations settled here. [2] İbn Cübeyr wrote that in 1184 Dunaysır was located on a caravan route and that the town had a new madrasah and baths. [3] Yakut Hamavi remarked that while a small village in 12th century, prior to the Mongol invasion, Dunaysır had become a large commercial town in 1225, had turned into a unequalled city with great bazaars. [2] [3] [4] Kuban [2], marks that this development was parallel to the completion of Dunaysır Great Mosque (1204). Moreover, during Necmeddin Alpi's reign (1154-1176), which is recounted in sources as the age of prosperity and development, Dunaysır became a cultural and commercial hub with the mosques, madrasahs, caravanserais, baths and bazaars, the construction of which the ruler had ordered. [2] [5] [6] Dunaysır was sacked by the Ayyubids in 13th century. Melik Kamil, who bore vengeance towards Sultan Alâeddin, annexed Urfa and Harran in 1236; after torturing Seljuk emirs, ravaged Dunaysır save for the mosque. Later on, in 1257, when the Mongols, who had besieged the Mardin Castle, gave up hope on taking hold of the city, they pillaged Mardin, Dunaysır and Erzen. [2] While Mongol commanders such as Togaçar, Baltu and Sülemiş, who were in revolt in Anatolia kept the Ilkhanates busy, Mamluks annexed the Artuk province in 1298. The Mamluks who could not penetrate the Mardin Castle looted the districts around the castle including the mosque and took the residents as hostages. From there, they passed on to Dunaysır and repeated the same acts. Mamluks continued their raids over the territories of Artuqids who remained loyal to the Ilkhanates; thus ransacking Mardin and Dunaysır many times. (Turan, 2001: 189-191) In this region, there also had been rather contentious conflicts between Aq Qoyunlu and Qara Qoyunlu rulers and in one of these, some of the enemy forces took refuge in the Koçhisar Mosque. [7] The town

subsequently passed on to Seljuk, Ilkhanate, Mamluk, Qara Qoyunlu, Artuqid, Timurid and Ottoman rule. Abdülgani Efendi [8], who lived in Diyarbakir during the final period of Ottoman Empire and the initial years of the Republic, had recounted having heard from reliable sources that while Dunaysır Great Mosque originally was a vast building with its double minaret madrasah, the madrasah had perished and the mosque remained in a state of disrepair only with walls and two thirds of the roof and its west minaret left; that during wartime its stones had been stolen by the Germans and some unscrupulous locals and also that the Armenians in the village of Tel Ermen used the stones in the church they were building. The Great Mosque, The Stone Bridge, Tasassut Tower, Sahkullubey Mausoleum, Hazren Taceddin Mesur Madrasah and Harzem Ruins are the monuments that made it to our day. Gabriel [9], reports that Dunaysır, which was a glorious, beautiful town in 12th century, had fallen into ruins through the Mongol annexation and others that followed and the ruins of the mosque, minaret and mausoleums were all that remained in the town.

Aslanapa [10] considers Dunaysır (Kızıltepe) Great Mosque, which displays all the architectural features of the region, to be the masterpiece of Artuqid mosque architecture. While it does not specify the architect, the inscription above the cusped arch that encloses the altar niche indicates the construction date of the mosque. The construction of the Great Mosque was initiated by Yavlak Arslan (1184-1200) of the Artuqids and it was later completed by Artuk Arslan (1200-1239) in 1204 (H.601).

"With the name of Allah, most gracious, most merciful. The completion of this building was fulfilled by Ebu'l Feth Artuk Arslan ,son of Ilgazi,son of Alpi, son of Timutaş, son of Ilgazi, son of Artuk who is in need of the mercy of almighty Allah and brother of Melik Said Hüsameddin Yavlak Arslan (may he rest in peace). May God find it acceptable. Muharrem 601" [9]

The building consists of the peribolus and to the north of the this, the courtyard, of which only the ruins of the wall remains. The rectangular plan of Great Mosque with a maksoorah, consists of three naves covered with barrel vaults parallel to the altar wall. The building spans an area of 63,40x16,35 metres and the walls are as thick as 2.15 metres in places. [11] Stonemasonry is rather prominent in the building and it is and the brickwork seen in the barrel vaults is rather remarkable. ² (Figure 2) The courtyard-type plan of the mosque indicates that it was designed with the Damascus Great Mosque as its basis. In this region, which is an extension of Northern Syria, both in terms of climate and culture, courtyards has always been an element of architectural design as a significant constituent of daily life. [3] The main area is linked to the courtyard to its north with seven doors. At the centre of this main area, two breathtaking, high, oval, brickwork, squinched domes are situated. The dome of which until 1980 only three quarters were present was then repaired and completed, and it was clad with "sheet iron in lead appearance" [12]. The dome in front of the sits altar on upside down T -shaped large piers on the north and on piers that bear the vaults and separate the naves in the middle. The weight of the T-shaped piers is balanced by the removal of one adjacent pier in each case and the expansion of the arch. Maksoorah, thus gaining spaciousness through the expansion of the arch, separates from the naves and is emphasised. Artun [11] evaluates this effect as the architectural accomplishment of the building. One of the striking features of the building is the squinches in the maksoorah (Figure 3). Here, instead of the squinches cleft with the stalactites seen in Iran, the potential and the unique characteristics of the stone have been exploited and the squinches have been clad with decorations. [13] The most striking element of the main area is the meticulously ornate stone altar (Figure 4). Completely covering the south wall of the maksoorah, altar is bordered by two vast frames. While Curatola [14] marks that the stone

altar, with its shell shaped slab shows Assyrian influence in terms of style and Seljuk influence with its geometric decorations; Aslanapa [10] states that the altar niche had been completed to a marine shell form with the influence of the Zengids. (see also [15]). Ögel [13] points out that the densest area of decoration is the altar; that the altar is very wide and covered with grid decorations and that this is the first obvious difference to Iran and that the Anatolian stone characteristics are primarily apparent. Syrian and Iraqi features blend in with these as well. According to Herzfeld, the cusped arch of the altar goes all the way back to Samarra and from there on to Sasanids. At the same time, the same arch is seen in Şah Fazlı Mausoleum in Uzgend as well. The marine shell form of the altar niche also evokes the façade of Syrian influenced Cairo El Ahmer from 1125. In addition, the oil lamp motif – hardly recognisable today – within the altar niche is also found in Iraq. [13] [16] Nonetheless, the border that circumscribes the altar of the Great Mosque with ornate geometric arabesque such as openwork, has led the way for other regions in Anatolia. [17] This rather symmetrically designed building is supported by buttresses on eastern, western and southern façades. While there are similarities between support buttresses, there are also variations in protrusion measurements and in their heights. Kuban (2008: 114), has marked that the façades with few windows in a block-like appearance, supported by buttresses have character akin to Northern Mesopotamian buildings of the period. The rather plain northern façade (Figure 5) is accentuated with ornate stonemasonry. On the façade, there are seven apertures and two altar niches, vertical contours of which extend almost all along the height of the wall, only to be horizontally confined by a moulding that forms a slightly higher level above the main door. In 1971 the top part of this moulding was completely renovated and the middle layer was entirely dismantled for repair purposes. [11] Out of the seven apertures, the high middle one serves as the main portal. The portal is of a completely different style; a practice which, though not yet well settled, is one that displays the immaculate sculptural quality of the stonemasonry traditions of the region. [3] This portal attracts the attention to the centre with its sumptuous masonry and its bi-chromatic, cusped arch. In the arch that consists of bi-chromatic stones, Zengid and Ayyubid influences are visible. Dunaysır Great Mosque, accepted in consensus to be completely “homogeneous”, has the transverse plan of three naves parallel to the dome in front of the altar, which is in turn cut through along two naves in front of the altar. This form of the main area, which was tried out in Meyyafarikîn Mosque and Mardin Great Mosque and further developed, is joined with the courtyard in the north. In 13th century Anatolian Seljuk Mosques, with the exception of Konya Alâeddin Mosque, the presence of the courtyard is not absolute. [11] Therefore, the presence of the Great Mosque courtyard is a significant point in the development of Anatolian Turkish architecture. With the presence of minarets on the corners of the courtyard becoming certain through the excavations in 1970s, the importance of the building in terms of the development of Anatolian Turkish architecture has once again emerged. Thus, Dunaysır Great Mosque, considered to be the most sophisticated expression of Artuqid mosque architecture, was one of the double minaret buildings.

The Great Mosque also stands out with the richness in its stonemasonry and its decorations. The architectural decoration of the building is particularly concentrated on the northern façade and on the squinches in the altar and in the maksoorah. The bi-chromatic stone arch of the portal, on the other hand, indicates the influence of Zengid architecture. The decoration of portal frieze on the eastern façade of the courtyard, constructed from rich plantal curves, is also striking in the way it exhibits a relevance to the art of the late antiquity. [11] The restoration work initiated by Vakıflar Genel Müdürlüğü (Directorate of Charitable Foundations) in 1972 was carried out with occasional interruptions and completed in 1986. The restoration of Dunaysır Great Mosque, which for centuries remained in ruins, was

concluded on 12.12.1986 and it was opened to worship. [18] A second restoration was undertaken by Vakıflar Genel Müdürlüğü in 2005. For this, with the decree 3454 dated 16/06/2004 by the Diyarbakır Kültür ve Tabiat Varlıklarını Koruma Kurulu (Diyarbakir Council for the Protection of Cultural and Natural Assets), the following were requested: The preparation of survey projects following the excavation work conducted in the courtyard of the mosque; restitution and restoration projects in compliance with the technique, all under the supervision of experts from Vakıflar Genel Müdürlüğü. [18] The first restoration practices in the Republic period, performed by Vakıflar Genel Müdürlüğü at the beginning of 1970s, included the re-erection of the building as well as repair. Later practices comprised small scale restoration work. In the recent practices, on the other hand, it has emerged that the building should be reconsidered and analysed together with its periphery. As for that, Aslanapa [10] notes that the recent restoration has not been successful.

In conclusion, as a result of the cultural diversity at its location, the influences of various different styles are observed in Dunaysır Great Mosque. With its plan, it is considered to be the most mature example of Artuqid mosque architecture. The fact that it emerged with this specific plan at the beginning of 13th century stresses its significance within Anatolian architecture.

Notes

The heading for notes should be printed in 12pt Arial, bold, set with an initial capital. Notes should be printed in 10 pt Arial and be numbered. Please conform to the following style:

1. I hereby give my sincere thanks to Vakıflar Diyarbakir Bölge Müdürlüğü (Diyarbakir Regional Directorate of Charitable Foundations) and Semra Hillez in particular for enabling the use of the documents from the Vakıflar Genel Müdürlüğü Arşivi (VGMA) (Directorate of Charitable Foundations Archive) in this study.
2. Dunaysır (Kızıltepe) Great Mosque is registered under Melik Mansur Foundation in landed estate records. VGMA.423:135

References

- [1] Anonymous, Taşın Belleği: Mardin, YKY, İstanbul, 2005.
- [2] Turan, Osman, Doğu Anadolu Türk Devletleri Târihi, Boğaziçi Yayınları, İstanbul, 2001.
- [3] Kuban, Doğan, Selçuklu Çağında Anadolu Sanatı, YKY, İstanbul, 2008.
- [4] Le Strange, The Lands of Eastern Caliphate, London, 1996.
- [5] Sauvaget, Jean ve Gabriel, Albert, Voyages Archéologiques dans la Turquie Oriental, Paris, 1940.
- [6] Ali Emiri, Mardin Mulûk-i Artukiyye Tarihi (kitabe ve vesikalar ile), İstanbul, 1931.
- [7] Tihrani, Ebu Bekr-i, Kitab-ı Diyarbekiriyye (Yayınlayan Mürsel Öztürk), Ankara, 2001.
- [8] Abdülgani Efendi, Mardin Tarihi, haz. Burhan Zengin, Ankara, 1999.
- [9] Gabriel, Albert, Voyages Archéologiques dans la Turquie Oriental, Paris: E. De Boccard, 1940.
- [10] Aslanapa, Oktay, Anadolu'da İlk Türk Mimarisi Başlangıç ve Gelişmesi, Atatürk Kültür Merkezi Yayınları, Ankara, 2007.
- [11] Altun, Ara, Anadolu'da Artuklu Devri Türk Mimarisinin Gelişimi, Kültür Bakanlığı, Ankara, 1978.

- [12] Güler, Mustafa, 12. Yüzyıl Anadolu Türk Camileri, Unpublished PhD Thesis, İstanbul Teknik Üniversitesi, İstanbul, 2005.
- [13] Ögel, Semra, Anadolu Selçuklularının Taş Teziniatı, Türk Tarih Kurumu, Ankara, 1987.
- [14] Curatola, Giovanni, Türkiye: Selçuklulardan Osmanlılara Sanat, YKY, İstanbul, 2010.
- [15] Ödekan, Ayla, Mimarlık ve Sanat Tarihi, Türkiye Tarihi 1 Osmanlı Devletine Kadar Türkler, yayın yönetmeni: Sina Akşin, Cem Yayınları, İstanbul, 2008.
- [16] Herzfeld, Ernst, Damascus: Studies in Architecture I-II. *Ars Islamica* IX-X, 1941-1942.
- [17] İltter, Fügen, Erken Devir Anadolu Türk Mimarisinde 12. ve 13. yüzyıl Artukoğulları Medreselerinin Yeri, *Vakıflar Dergisi*, 8/197-208, 1969.
- [18] Kılıcı, Ali, Kızıltepe (Koçhisar) Ulu Camii ve Onarımları, (Yapı Dünyası Dergisi'nda yayınlanmıştır), Vakıflar Genel Müdürlüğü Arşivi.

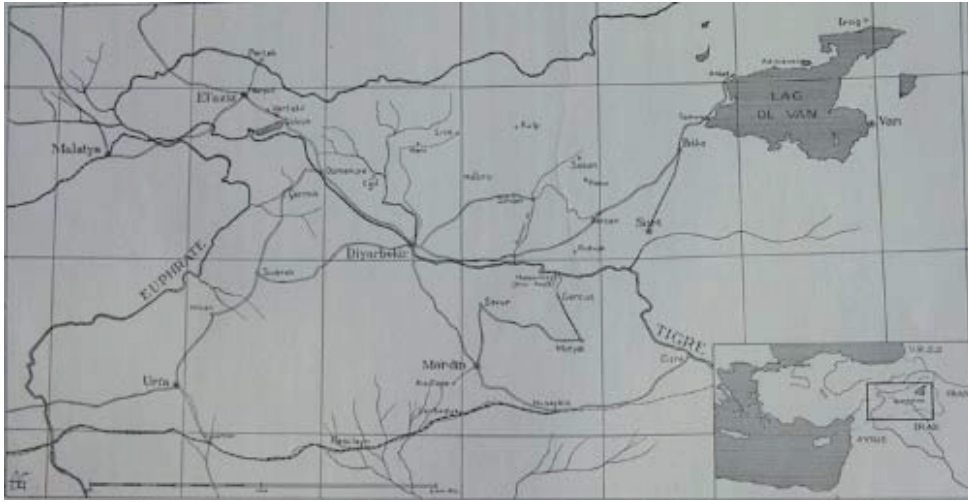


Figure 1 Gabriel, 1940.

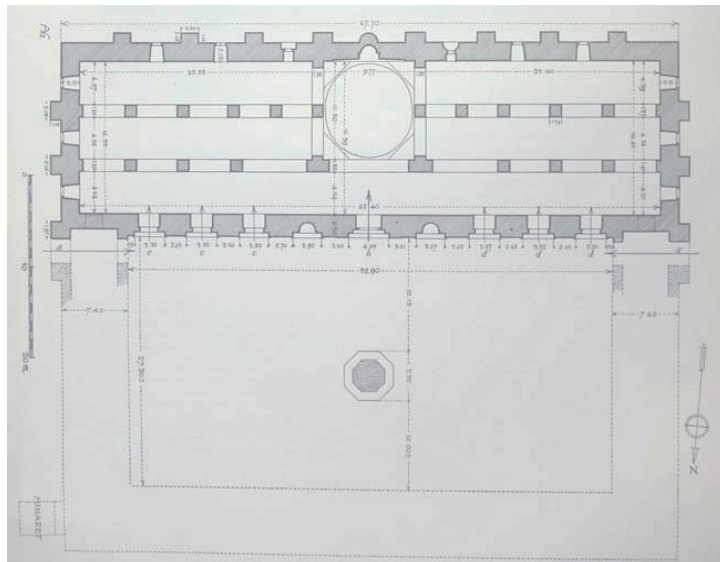


Figure 2 Dunaysır Great Mosque Plan, Gabriel, 1940.



Figure 3 Dunaysır Great Mosque Dome, Hilâl Aktur, 2009.

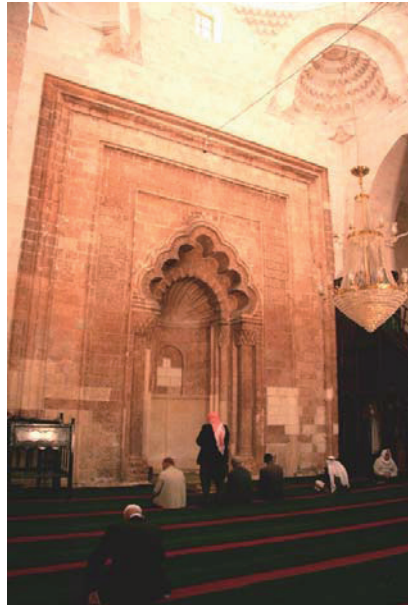


Figure 4 Dunaysır Great Mosque Portal, Hilâl Aktur, 2009.



Figure 5 Dunaysır Great Mosque, northern façade Hilâl Aktur, 2009.

CONSISTENCY THROUGH DIVERSITY IN TRADITIONAL ARCHITECTURE OF ORIENTAL COUNTRIES IN CASE OF IRAN, JAME MOSQUE OF QAZVIN

Mohammadjavad Mahdavejad¹, Nickta Pilbala^{2*}, Mostafa Shamshirband¹, Saeed Farmahin Farahani¹

¹ *Tarbiat Modares University, Iran*

² *Imam Khomeini International University, Iran*

* *Presenting author*

Keywords: Islamic architecture, Qazvin Jame mosque, Silk Road, unity, multiplicity, symbolic notion

1. Introduction

The most concise form of definition of the created world can be found in the sentence “once upon a time ...” [this expression in Persian is like once there was someone while there wasn't someone else], which indicates the promenade and journey from unity to multiplicity and the other journey from multiplicity to unity. In architecture as creating a manmade creature, as well, fashioning a multiplicity and uniting it in line and in interaction with the story character (man), or having an implicit hidden chant in the art-work, has always been a concern for the elegant and sophisticated Muslim architects of this land (Iran/Persia). The artistic works of this country are indications of this fact and evidence for its veracity. The mysteries derived from Islamic notions have led to the formation of worldview. The most fundamental of these concepts which is in a way the foundation of all past Islamic worldviews is the same notion of “Wahdat al-Wujud” –literally, unity of existence- or in other words the principle of “unity in multiplicity and multiplicity in unity”.

One of the fields in which Islamic worldview is well reflected in is the Islamic art and architecture where the guiding principles of the Islamic worldview are vividly revealed. Islamic worldview and therefore the Islamic architecture spread in the neighboring and non-neighboring countries in different ways including via one of the most vital communication-trade routes of east and west.

The Silk Road or the Silk Route which was an interrelated network of overland and sea routes for the purpose of business in Asia, and connected the east, west and south of Asia to each other and to the north of Africa and the east of Europe, was like a chain that each of its rings was the individual countries from which the road passed (Christian, 2000). Although, this protracted route has nowadays lost its flourish, a second overlook to that is in fact a review and a revitalization of the past culture and civilizations, since taking a more profound look to this route causes us to realize that this road was in effect the path for the transmission of cultures, dialects, and religions of different nationalities; the cultures which are ancient history of the Middle Earth and stretched their identity and worldview to the other civilizations and nationalities. The significance of scrutinizing this matter is for the following reasons:

1. Identification of Silk Road provides an opportunity to get to know the history and backgrounds of different countries.

2. It is one step forward to raise the people's awareness and acquaintance with each other and strengthening their ties with one another as well as dialogue among civilizations.
3. Creating new cultural and artistic prospects for the cultural progress of countries.



Fig. 1: The location of the cases studied along the Silk Route

2. Research Questions and Research Method

The aim of this article is to investigate the effect of the Silk Road course on the spread of the Islamic architecture and especially one of the most fundamental of its concepts i.e. the notion of unity and multiplicity in the neighboring countries which was made possible through the business relationships and the very significant and strategic communicating role of this road. For this purpose and in the studies carried out, the present article aims to answer the following questions:

- What is the main uniting component in the Islamic mosques architecture?
- How in the architecture of the Islamic mosques are unity and multiplicity put together and defining each other?
- Is the most fundamental concept of the Islamic architecture, i.e. the unity and multiplicity,
- reflected beyond its physical and temporal realm and flourished along the Silk Route?

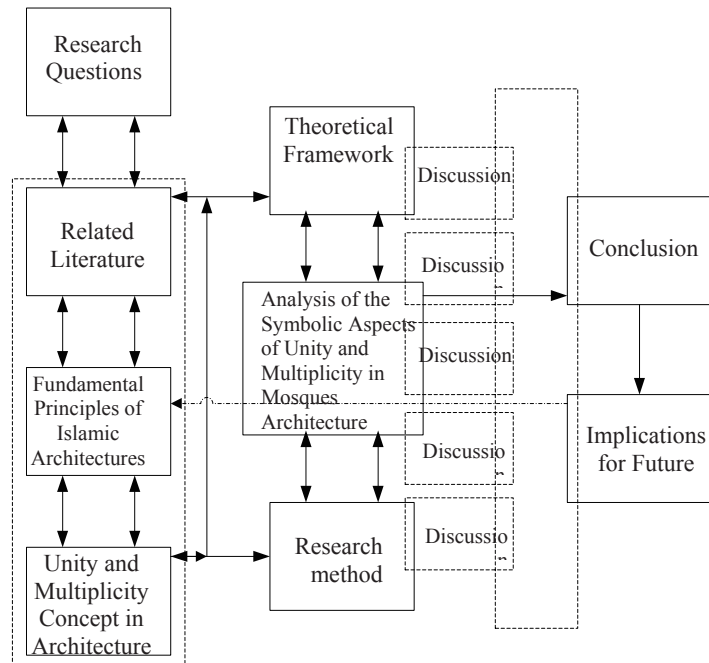
Hence, the research methodology of the present study is based on the recognition of the unity and multiplicity concept and the analysis of its physical realization in the architecture of the Islamic mosques through quantitative (descriptive-inferential) and qualitative (case study) methods. Beside the required data are the documents and library credentials as well as the structural/ground information which are gathered through field and library studies and interviewing the experts.

Also in the process of the present study first the literal definition of the unity and unity of existence are dealt with then the unity principle in the Islamic architecture doctrine and the way this worldview is represented and revealed in the physical space are emphasized. There are also a number of fundamental notions like divine monotheism, multiplicity, order, science and beauty that exist together and are always attended to in Islamic architecture. Afterwards, Isfahanism would be analyzed as the superior style of Islamic architecture and the heir of the Iranians ages of effort and hard-work in Khorasani, Razi, and Azari methods which bore fruit in Safavieh arena. Isfahanism is a practical instance of the interaction of the Iranian doctrine

and Islamic concepts and the most basic representation of the unity-oriented approaches and in particular unity of existence which is discussed in Islamic doctrine and theology. Then the physical-spatial realization of unity and multiplicity in this style would be thoroughly discussed and scrutinized in the Qazvin Jame mosque, as an Iranian model constructed in the Silk Road pathway, and Kalyan mosque in Uzbekistan, Xian Jame mosque in China, as well as the Jame mosque of India, as the non-Iranian counterparts. The non-Iranian models are chosen based on the congruence of the level and degree of function of the mosque in comparison to the domestic model and their location considering the location of the Silk Road, in the eastern Asia, (the Chinese Jame mosque, Xian), the middle east (the Uzbekistani Kaylan mosque), and the west Asia (the Jame mosque of Qazvin in Iran), as well as the south Asia (the Jame mosque of India).

Finally and considering the outcomes of the studies carried out, an analogical comparison between the discussed models is made and the answers are

provided for the research questions stated in the beginning of the present study. In the following diagram, various stages of the research are shown in a follow chart.



Flowchart 1. Different Stages of the Research
Source: the author

3. Case Study

As mentioned previously, the Iranian model which would be discussed and scrutinized is the Jame mosque of Qazvin, where the traces of the unity and multiplicity concept, as the topic of the present article, are followed. Qazvin Atigh Jame mosque is one of the largest mosques in Iran with the penthouse (Chahar-Eyvani) style in which the style of art and architecture of different eras can be pleasingly witnessed. Its oldest part belongs to the first centuries of Islam and during the later periods of time some changes appeared there gradually. The non-Iranian models also are chosen based on their function levels congruence with the Iranian model and on the basis of their location along the Silk Road.

3.1. Jame Mosque of Qazvin

The major Jame mosque is located in “Dabbaghan” neighborhood and in Sepah street, which is the oldest street of Qazvin, and with its magnificent minarets, its high porches, and exquisite tores, is one of the supreme art works of the Islamic era. The oldest part of the mosque, after the four-arched art works of Sassanid which are positioned under maghsooreh, is the Aaronic Arch which was built in “Aaron Al-Rashid” time in 192 A.H. The most important and the most stunning section of the mosque is the maghsooreh and the Seljuq dome in the

middle of the southern wall of it, an altar of smooth marble can be seen there with its both sides garnished with colorful tiles, and in its northeast there is a stony pulpit.

The other sections of mosque belong to the later eras by the end of the Qajar dynasty. The north porch and its two exquisite tiled minarets are built in time of Tahmasb Shah of Safavi dynasty and its west porch in the Soleiman Shah of Safavi. The south porch, the most beautiful porch of the mosque, was added at the time of the second Abbas Shah Safavi to the maghsooreh entrance. The exquisite arch, the luxurious minarets, the high porches, the elegant tower and its decorous building is the best case of the architecture style and the artistry of the Seljuq and Safavi eras.

3-2- Consistency and Diversity in the Mosque

The geometric graffiti and cornice are the manifest features of the Islamic architecture. The usage of the geometric graffiti in its symbolic and philosophical notion is for the purpose of the psychological effectiveness on the worshiper and strengthening the sense of monotheism in the mosque atmosphere. The tortuous geometric shapes repeating the proportions related to a single graffiti create a sense of discipline and coordination.

These two decorative components as the two basic features of Islamic architecture decoration in Qazvin Jame mosque are seen as intertwined and supplementary and through preserving their place have created novel and profound notions. As a matter of fact, the companionship of the virtual contents of the cornices with the sense of coordination and unity that the geometric graffiti create, has valuable and influential virtual and spiritual messages that penetrates into the soul and thought of the viewer.

The geometry of circle in the architecture of a dome house is also an indication of convergence and unity of the points. Even the curved lines dominating the majority of components and factors inspire a sense of compassion and magnetism and flexibility. A curved line means flexibility toward the surrounding environment and inviting others to oneself and opening the space for the others. The arch gives the mosque apron a special centrality. Beneath the arch that is the main representation of the rotation, conveyance, symmetry, and congruency can be clearly distinguished. In congruity we reach the center of unity; in other words, the brandenburg in the center is a field in which all graffiti are rooted, from which they get distant, and to which they return. This shape is made by circulating around a point and unity can be felt from the reverse manner in multiplicity of the graffiti (Guénon & Fohr, 2004).

4- Discussion

In the trend of the present studies, three approaches are identified when the subject is the unity of existence and are referred to in the following figure. (chart. 1)

In Islamic art there are some facts concentrated on that can be expressed through words like divine monotheism, unity, multiplicity, order and beauty all together. Unity has a particular place in this word collection in order to characterize the divine monotheism. From a historical perspective, architecture was the first art that could adopt itself with the Islamic concepts and be used by Muslims for recording and depicting their religious notions. This is because, the art of Islamic architecture is beyond the aesthetic experience and is in fact a symbolic representation of a premier fact that conveys the human from the multiplicity of the outside world to the divine unity and in fact this art places human in God's presence by creating a sacred atmosphere. Moreover, Isfahanism is the superior Islamic architecture style and the cause of pride in its different branches.

Put differently, Isfahanism is the era for the junction of Iranian doctrine, spirituality, and wisdom with the perpetual Islamic concepts and the most chief place of manifestation for the unity-oriented views and in particular the unity of existence, indicated in Islamic doctrine and theosophy in architecture.

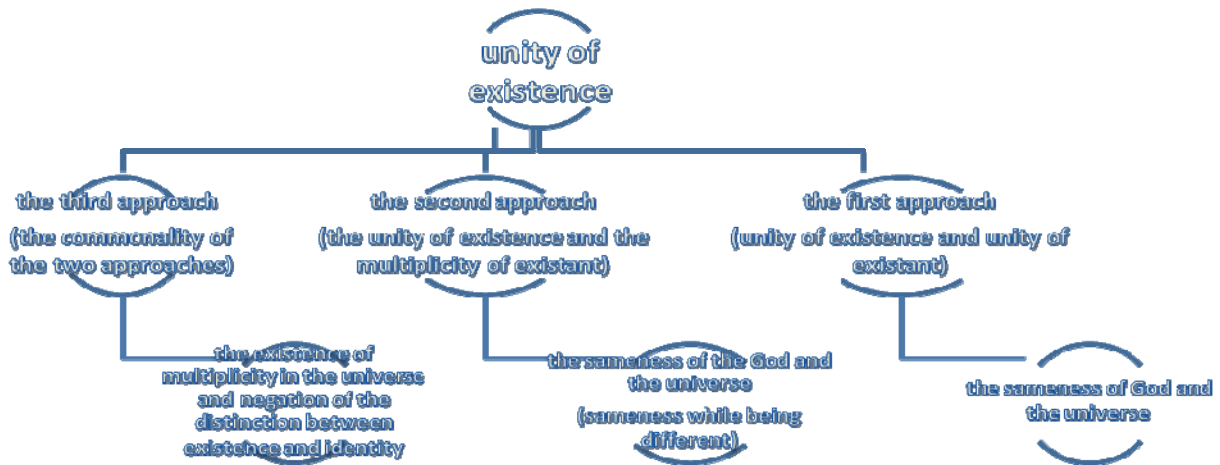


Chart 1. the approaches to unity of existence
Source: the author

5- Conclusion

The Iranian model, the Qazvin Jame mosque (Safavi era, 1736-1501 A.D.) is a mixture of Seljuq and Isfahanism architecture styles and the most significant outcome of Iranian architecture is exhibited vividly in its Isfahan style: that the architects and artists exerted the essence of the divine unity in the body of their works by worshiping God and abstaining from their very selves. The result of their deeds is incredibly dynamic, congruent, and adaptable so that it seems all of the components are part of a single body. This phenomenon is best seen in the dome house of Qazvin. Form the implementation of the circular form on the polygon plot in the dome house to the graffiti, colors, decoration, and tiles, each and every of the components are plural compartments that are united into a single whole. Investigation of the non-Iranian models of the Islamic mosques in the far east Asia and in middle Asia is also an indication of the veracity of the demonstration of unity while multiplicity principle in Islamic architecture and especially in mosques which are built in the Safavi governance era and the time of Isfahanism style in cities and stations along the Silk Road. Additionally, in the research trend the common concepts which are rooted in the same worldview are found in form, plans, graffiti, decoration,

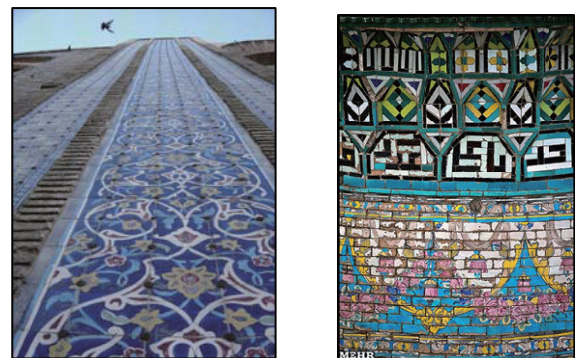


Fig. 2: The graffiti on the Qazvin Jame mosque minarets and porches, unity in multiplicity and multiplicity in unity
source: <http://en.vionto.com>

... of the cases under study and this is regardless of all of the differences and impressionability that are due to the effects of the background culture and architecture.

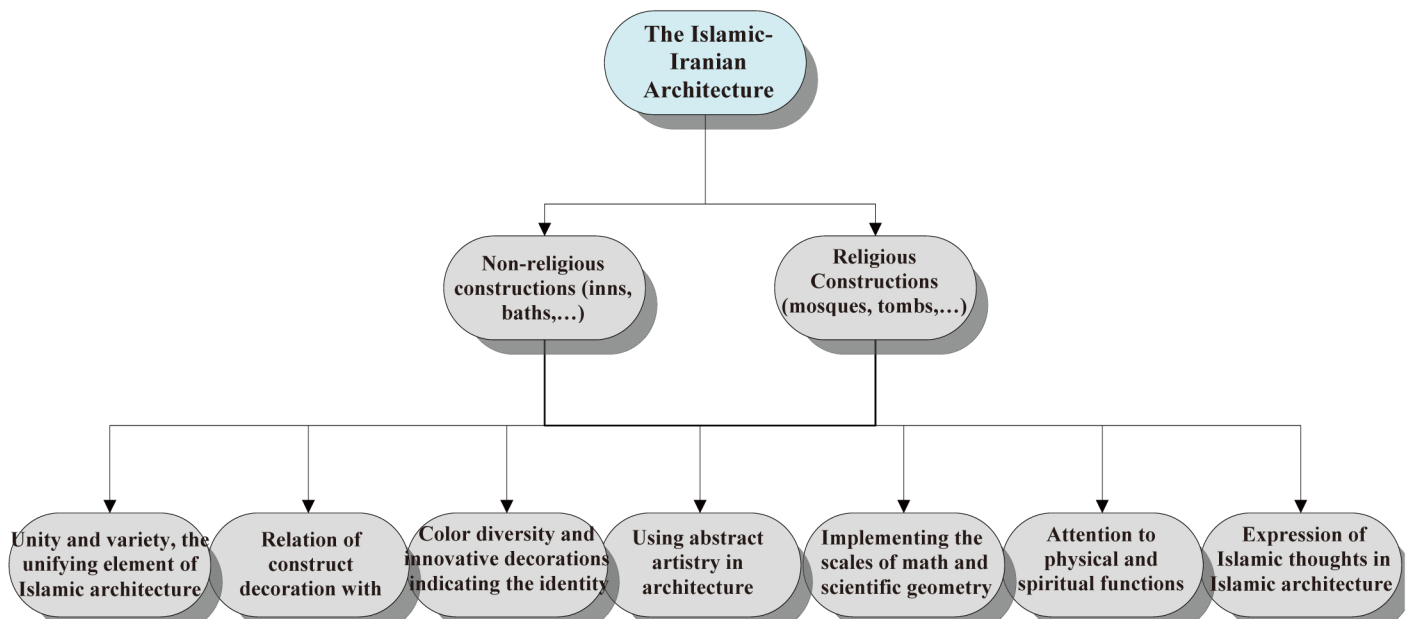


Chart 2. The main characteristics of Islamic-Iranian architecture
Source: the author

References:

1. Christian, David. Silk Roads or Steppe Roads? The Silk Road in World History. *Journal of World History* 11, no.1, pp. 1-26, 2000.
2. Grotenhuis, Elizabeth, *Along the Silk Road: Asian Art and Culture*, university of Washington Press, 2002
3. *Islamic Art and Architecture: The System Of Geometric Design*, Issam El-Said, Edited by tarek El-Bouri & Keith Crichlow, Garnet publishing Ltd, 1993
4. Burckhardt, Titus, *Sacred Art in East and West*, Wisdom Foundation Series, 1958
5. Guénon, René & Fohr, Henry. *Symbols of Sacred Science*, Sophia Perennis, 2004.
6. <http://dsr.nii.ac.jp/toyobunko/VIII-1-B-39/V-1/page/0052.html.en>
7. <http://www.orientalarchitecture.com>
8. <http://pics.loupal.ne>
9. <http://www.pagetour.org>
10. <http://en.vionto.com>
11. <http://www.silkroadproject.org>
12. <http://dsr.nii.ac.jp/toyobunko/VIII-5-A-a-2/V-1/page/0248.html.e>

MOUNTAINS PAINTED IN CHRISTIAN PAINTINGS IN THE MONASTERY OF HOSIOS LOUKAS

Keisuke Inomata¹, Shigeyuki Okazaki¹

¹ *Mukogawa Women's University, Japan*

Keywords: the monastery of Hosios Loukas, Christian painting, Byzantine, mountain, spatial characteristic, element, scene, background

Introduction

In Europe, people¹ were historically expressed as the main theme of paintings. In some Byzantine paintings nature was drawn, not as the main theme but in the background or along with something else. What meaning does nature have in Byzantine paintings? In "Mountains Painted in Christian Paintings in the Chora Church" [3], we analyzed and discussed the Christian paintings in the Chora Church (Turkey, the 14th century) because they are masterpieces of the Late Byzantine art and were drawn in the center of the Christianity world in medieval Europe. We identified the five types of spatial characteristics² of mountains in the Christian paintings in the Chora Church. The mountains are drawn to exist outside the living space of people as places with special meaning for connecting to the world of God.

In this paper, we studied the Christian paintings in the monastery of Hosios Loukas (Greece, the 10-11th century) which represents the Middle Byzantine art. This paper clarifies the spatial characteristics of the mountains in these paintings to discover the period's view of nature, weighs them against the spatial characteristics of the mountains of Christian paintings in the Chora Church. Clarifying and weighing the spatial characteristics of the mountains of Christian paintings in different ages and areas lead to learning their meaning in Byzantine paintings. These characteristics reflect a fundamental relationship between people and nature.

Research Method

Here, we analyzed 5 paintings that included mountains³ in the monastery of Hosios Loukas (Fig. 1). We made explanatory drawings and pattern diagrams of each painting and analyzed them. We derived the spatial characteristics of the mountains from analysis.

Analysis

We enumerated the elements⁴ of each painting, traced them, and made explanatory drawings (Fig. 2). In each explanatory drawing, we divided each painting into scenes⁵. Next, we made pattern diagrams (Fig. 2) to elucidate the relationships among persons, their backgrounds⁶, and the mountains.



1 Nativity



2 Entry into Jersalem



3 Crucifixion

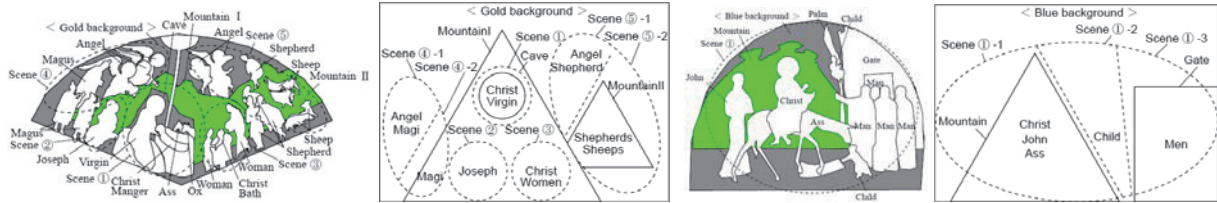


4 Descent from the Cross



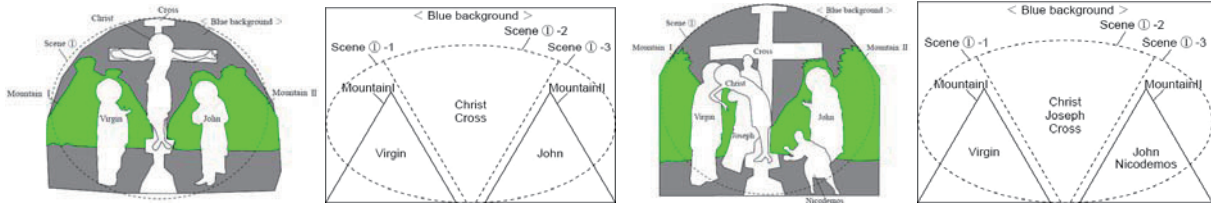
5 Entombment and the Women at the Empty Tomb

Fig. 1: Christian paintings that include mountains in the monastery of Hosios Loukas
(Chatzidakis, 1997)



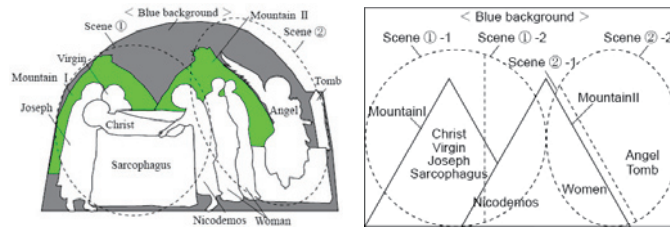
6,7 Nativity

8,9 Entry into Jerusalem



10,11 Crucifixion

12,13 Descent from the Cross



14,15 Entombment and the Women at the Empty Tomb

Fig. 2: Explanatory drawings (left) Pattern diagrams⁷ (right)

Results and Discussion

The spatial characteristics of the mountains were derived from elements, scene divisions, and the backgrounds. A list of the analysis objects and the results are summarized in Table 1. In addition, spatial characteristics of the mountains stated in Table 1 were made into diagrams (Fig. 3).

1) Mountain Surrounding Person

When a mountain is in the person's background and surrounds the person, we call it a "mountain surrounding person."

This type of mountain has ridge line that encloses a person. For example, in the "Entombment and the Women at the Empty Tomb" (Fig. 1-5), scene ①, mountain I is in the background behind the Virgin and Joseph burying Christ. The ridge line of this mountain functions as a frame, and the place enclosed might have a special meaning that differs from that of its surrounding.

2) Mountain Next to Person and Surrounding Other Person, Mountain Next to Person and Swallowing Other Person

When the elements feature a mountain and a person's background is gold or blue and when the mountain is in another person's background and surrounds the person, we call it a "mountain next to person and surrounding another person." And when a mountain with a cave is in another person's background and the person is inside the cave, we call it a "mountain next to person and swallowing another person."

These types of mountains overlap with mountains described in 1). A mountain is in the background behind a person, and the background behind another person is gold or blue⁸. Table 2 shows the relationship between the person and its background, in scenes with these types of mountains.

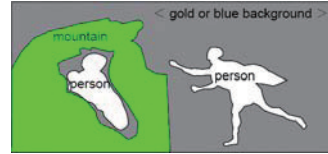
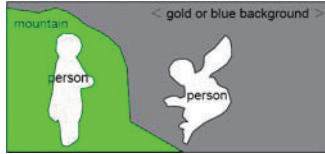
In "Entry into Jerusalem" (Fig.1-2), a mountain was possibly drawn to protect the saints. In the other scenes, the person whose background is either gold or blue is closer to the world of God than the person whose background is a mountain. These spatial characteristics of mountains overlap with "Mountain Next to Person" and "Mountain Swallowing Person" seen in the Chora Church [3]. Such mountains are drawn to exist outside the living space of people as places with special meaning for connecting to the world of God in the Christian paintings in the monastery of Hosios Loukas in the different age and the area from the Chora Church.

Table 1: List of analysis objects and results

Fig.1	Explanatory Drawing	Pattern Diagrams	Title	Scene	Elements		Person's Background	Spatial Characteristics of Mountains
					Person	Others		
1	6	7	Nativity	①	Christ, Virgin	Ox, Ass, Manger	MountainI (Cave)	MountainI : "Mountain Next to Person and Swallowing Other Person" MountainII : "Mountain Next to Person and Surrounding Other Person"
				②	Joseph		MountainI	
				③	Christ, Women	Bath	MountainI	
				④-1	Angel, Magi	MountainI	Gold background	
				④-2	Magi		MountainI	
			⑤-1	Angel, Shepherd	MountainII	Gold background		
			⑤-2	Shepherds	Sheep	MountainII		
2	8	9	Entry into Jerusalem	①-1	Christ, John	Ass	Mountain	Mountain : "Mountain Next to Person and Surrounding Other Person"
				①-2	Men	Mountain, Mountain, Palm	Gate Blue background	
				①-3	Child			
3	10	11	Crucifixion	①-1	Christ	Cross, MountainI, MountainII	Blue background	MountainI : "Mountain Next to Person and Surrounding Other Person" MountainII : "Mountain Next to Person and Surrounding Other Person"
				①-2	Virgin		MountainI	
				①-3	John		MountainII	
4	12	13	Descent from the Cross	①-1	Christ, Joseph	Cross, MountainI, MountainII	Blue background	MountainI : "Mountain Next to Person and Surrounding Other Person" MountainII : "Mountain Next to Person and Surrounding Other Person"
				①-2	Virgin		MountainI	
				①-3	John, Nicodemos		MountainII	
5	14	15	Entombment and the Women at the Empty Tomb	①-1	Christ, Virgin, Joseph	Sarcophagus	MountainI	MountainI : "Mountain Surrounding Person" MountainII : "Mountain Next to Person and Surrounding Other Person"
				①-2	Nicodemos		MountainII	
				①-1	Women		MountainII	
				①-2	Angel	MountainII, Tomb	Blue background	



Mountain surrounding person



Mountain next to person and surrounding another person Mountain next to person and swallowing another person

Fig. 3: Spatial characteristics of mountains

Table 2: Relationship between Person and Background

	Explanatory drawing	Pattern diagrams	scene	person whose background is mountain	person whose background is gold or blue
1	6	7	④ ⑤	Magi Shepherd	Angel, Magi Angel, Shepherd
2	8	9	①	Christ, John	Child
3	10	11	①	Virgin, John	Christ
4	12	13	①	Virgin, John, Nicodemos	Christ, Joseph
5	14	15	②	Women	Angel

Conclusion

We identified the following three types of spatial characteristics of mountains painted in the Christian paintings in the monastery of Hosios Loukas: “Mountain Surrounding Person,” “Mountain Next to Person and Surrounding Another Person,” and “Mountain Next to Person and Swallowing Another Person.” In the Christian paintings in the monastery of Hosios Loukas, as is the case in the Chora Church, the mountains are drawn as places with special meaning for connecting to the world of God.

Notes

1. In this paper, we treated Christ, the Virgin, and angels as “people” because they are drawn as human figures.
2. We identified the following five types of spatial characteristics of mountains painted in the Christian paintings in the Chora Church: “Mountain Next to Person,” “Mountain Surrounding Person,” “Mountain Swallowing Person,” “Mountain Next to Person and Surrounding Another Person,” and “Mountain Next to Person and Swallowing Another Person.”
3. In this paper, we defined a mountain as rugged ground that greatly rises and excluded smooth ground that only slightly rises.
4. One main purpose of Christian paintings in medieval Europe was to faithfully express Bible content. The kinds of drawn elements are comparatively few.
5. In Christian paintings, more than one scene might be drawn on a single painting to effectively explain a Bible story.
6. "Background" refers to what is drawn around the outline of a person.

7. In explanatory drawings and pattern diagrams, numbers such as "①" indicate different scenes. And when more than one mountain was drawn on a single painting, they are named as "mountain I" and so forth. In pattern diagrams, a triangle shows a mountain, a quadrangle shows town or a gate, a circle shows a cave or crack in a mountain, and a dashed circle indicates a scene. When there are more than one background behind persons in a single scene, they are indicated as, for example, "①-1" for the first background, and so forth.
8. In Fig. 1-1, the Magi and the shepherd listening to the angels protrude from the area of the mountain to the area of the gold background. In Fig. 1-4, the Virgin holding Christ's arm protrudes from the area of the mountain to the area of the blue background. A person whose background is the mountain protrudes from the area of the mountain to contact the person in the area of the gold or blue backgrounds.

References

- [1] Chatzidakis, N. *HOSIOS LOUKAS*. Melissa Publishing House, 1997
- [2] Connor, C. *Art and miracles in medieval Byzantium : the crypt at Hosios Loukas and its frescoes*. Princeton University Press, 1991
- [3] Inomata, K., Okazaki, S., & Yanagisawa, K. Mountains Painted in Christian Paintings in the Chora Church. *iaSU book "Archi-Cultural Translations through the Silkroad."*, 2011
- [4] Hall, J. *Dictionary of subjects and symbols in art*. J. Murray, 1974 (Supervised by Takashina, H. Translated by Takahashi, T, Takahashi, Y. and Ota, Y., et al. *Seiyo-bijutsu kaidoku jiten 西洋美術解説事典*, Kawade shobo shin-sha 河出書房新社, 1988, in Japanese)
- [5] Heinz-Mohr, G. *Lexikon der Symbole: Bilder und Zeichen der christlichen Kunst*. Diederichs, 1984 (Translated by Nomura, T. and Kobayashi, Y. *Seiyo Symbol jiten 西洋シンボル事典*, Yasaka Shobo 八坂書房, 1994, in Japanese)
- [6] Kanbayashi, T., Shioe, K. and Shimamoto, K., et al. *Geijutsu-gaku Handbook 芸術学ハンドブック*, Keisou Shobo 勁草書房, 1989. (in Japanese)
- [7] Lowden, J. *Early Christian & Byzantine Art*. Phaidon Press, 1997 (Translated by Masuda, T. *Shoki Christ-kyo bijutsu Byzantine bijutsu 初期キリスト教美術・ビザンティン美術*, Iwanami shoten 岩波書店, 2000, in Japanese)
- [8] Speake, J. *The dent dictionary of symbols in Christian art*. Dent, 1994 (Translated by Nakayama. O. *Christ-kyo Symbol jiten キリスト教美術シンボル事典*, Taishu-kan shoten 大修館書店, 1997, in Japanese)
- [9] Vries, A. *Dictionary of symbols and imagery*. North-Holland, 1974 (Translated by Yamashita, K and Ara, K., et al. *イメージ・シンボル事典 Image symbol jiten*, Taishu-kan shoten 大修館書店, 1984. (in Japanese)
- [10] Wakakuwa, M. *Image no rekishi イメージの歴史*. Hoso daigaku kyoiku shinko-kai 放送大学教育振興会, 2000. (in Japanese)
- [11] Yanagi, M. and Nakamori, Y. *Christ-kyo bijutsu-zuten キリスト教美術図典*. Yoshikawa Kobun-kan 吉川弘文館, 1990. (In Japanese)

Sources

The pictures in Figs. 1-5 are by HOSIOS LOUKAS (Chatzidakis, 1997) . The other figures and tables were made by the authors.

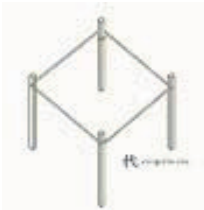
1 SILK PATH / 2 NAKAGAWA-MACHI MOUNTAIN PATH: 1 TO 2 COMPARISON CONTROVERSIES

Bojan Milan Koncarevic

University of Tokyo, Japan

Keywords: Shinto, Path, Pattern, Relationship, Nature, Human, Layer, *Kami*, Temple, *yorishiro*;

Abstract : 'Silk Road' influences onto '*Kami* Road'



If we assume with *Tao* postulate saying that *human* 'has' to obey to the Nature, Nature has to obey to the Sky and Sky to the *Tao*, we may coincide that the divine is coming out from the ordinary Japanese human life. This divine connection comes out through their high level of work wither they get more in touch with 'natural' existences as an inevitable environmental processes, while bringing fertility and prosperity to their lives. Therefore, certain survival natural elements - are presumed as dwellings for the divine (*yorishiro*, *iwakura*, *iwasaka*). These early Japanese (Jomon period) did not have the notion of anthropomorphic deities, but rather ones which come out through their link with the naturalness raising the Shinto as way of life to the way of belief.



Fig. 1: rope off for the praising *kami* to enter – Shimenawa; ceremony;
 Fig. 2, 3: Shimanawa shinto ceremony without shrine; roofed void for the possible presence of *kami*;
 Fig.4: Silk Road Countries Religion Spread and Confluence Diagram;



Term "*Shinto*" ("*Way of Gods*") was adopted from the written Chinese (*shen dao*, *tao*) combining 2 Chinese characters: "*shin*", meaning *kami*, and "*to*" (or "*do*") meaning a philosophical path. These early times Shintoism rituals were primarily performed outdoors without having any kind of house-style 'building' where

the rites would have been conducted. Nevertheless, a plot of purified land was chosen and roped off in a square (Fig.2) (with a special rope – *shimenawa* (Fig.1)) with the stand of 4 wooden poles where the spirit was invited. When 6th century Buddhism was introduced to Japan from China and India over the Korean peninsula "silk path" (Fig.4), people who were introduced into

Buddhism have begun worshipping images of Buddha placed inside of the temples or sacred places. Accordingly, being influenced by this manner, Shinto believers equally began to enshrine the *kami* spirit presence not only within *shimenawa* but rather a 'building' (roofed void as a nothingness potential for deities entrance and non determined presence) (Fig.3).

This kind of architecture introduced the structure whereas entrance portions – (*torii*) gates became very distinctive in their repetition and disposition with the clear relationship to the site and consequent nearby town likewise in the case of Batoh settlement. Primarily belief without any kind of artificial enshrinement, Shinto established firm architectural background.

In case of Batoh town macro-site in Tochigi prefecture we can find very equal contextual status created within the city itself and nearby *satoyama* (Fig. 5-6) hillside holding the Shinto structure posture. Its belonging micro-site, which in 2000 had been announced for newly imagined *ukiyo-e* art museum project, had very specific condition in relation to these terms.



However, one of the shrine pathways leading to *torii* and highly positioned temple had been striving directly through the site plot located exactly at the hillside bottom line. It is a pervasive coherence that could be found here. The Buddhist “silk road” macro cultural translations happened 14 centuries ago created micro conditions so local and specific due to enshrinement introductions. Its global background embraced continual but adapted local meaning that is finally defined as purely Japanese.



Fig. 5: *Satoyama* – hillside as a ‘village’ resource center ;
 Fig. 6: Hiroshige Museum Plateau Edge: frame 1;
 First view of the art complex at the *satoyama* bottom line;
 Fig.7: Museum Roof Material Pattern behavior as a response to the local site conditions: transition from central void to the bamboo wood portion linking the semi-outdoor hallway and temple pathway leading to *satoyama*;

This environment had been holding a gain with an origin issue emerged as a dominant one in the case of the Nakagawa-machi Hiroshige Ando museum that was built later on with its according design response. However, these micro levels of culture are embedded into the material behavior of the art center while holding the appropriate art programmatic and sacred pathway existence in both atmospheric and real definition of an independent building (Fig.7). Here lies the extinguished presupposition about following how once occurred immense cultural exchange between two territories created scaled up micro deviations in a real architectural discourse. Nevertheless, these deviations are in a sort of state of discordant continuity whereas each one is embraced with always changing local community. Hence, something that once was defined as a property of Buddhist priest missions has been adopted and adapted to the very specific Japanese taste emerging out of the life needs.

Here we witness how the Shinto as a “belief” in a proper life is an always different denominator of foreign cultural impacts. Hereby these impacts are getting into deviated statuses and losing its first meaning. The reason is the instantaneous response they need to conduct to the mere life needs and survival. Thus, their primary meaning had to adapt in order to survive.

1.0 Shinto Truth to Material Truth – Backward Loop

1.1 Makoto-no-Kokoro

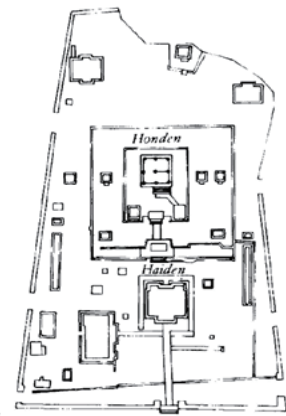


Shintoism does not encounter an absolute spirit but a single *kami* that represents the universe and the secondary *kami* of birth and growth. The latter ones gave the birth to various deities, land of Japan and their people. The proper and moral functioning of the macro-world is realized through the micro ceremonial acts among humans to these *kamis* embodiments which are following regular life artificial conductions. This basic attitude towards life emphasizes *makoto-no-kokoro*, a heart of truth, or *magokoro*, true heart.



This kind of simplicity and “weakness” from the ceremony to the architectures were coincided with Zen structured aesthetics spread from China and Korean peninsula. Accordingly, ‘weak’ *Shinto* had no conflict with Buddhism introduced in the 6th century. They even formed unique amalgamations in architectural and religious fusions. Buddha and kami nothingness were held under the same roof and in the same honden (sacred room). Even in the Imperial Palace, the Tenno Emperor of Japan revered them both. This fusion called ‘Shin-Butsu-Shugou’ continued until the late 19th century when their mutual distinction is initiated again. What was the cause of these statements is how the status of shintoism in may be defined as a weak even at the first cultural glance. It did not initiate any strong

Fig. 8: Plant *Pattern of the Growth*: to understand its behavior (*kami*) means to harvest it morally properly;
 Fig. 9: Natural object - *yorishiro*: Pine Trunk roped in *Shimenawa* holding the presence of a *kami deity*;



discourse in architectural field neither in writing an indoctrinate material. Its territorial pretensions had not been introduced equally. Its strong point was the relationship in between in the Japanese human and natural environment. Its richness was stated as a mental – intellectual and spiritual one. It means that its level of adaptation capability is at the highest level. It also means that even the most aggressive and different foreign influence cannot diminish its existence. O contrary, with each adaptation its gains deeper continuation in an experience which is going to be transcended to the next generation of how to respond to the ever transformative Japanese mainland macro context. Hence, the site conditions of the museum complex has been analyzed as like for the first time. The cause was to get the meaning, the truth of the vacant lot that has to be realized in a material construction as a response to the architectural and natural environment.

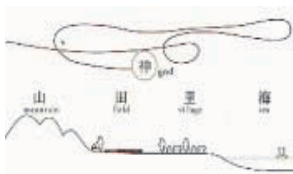


Fig. 10: Honden/Haiden With the Yorishiros and Worship Items;

Fig. 11: *Kami Spirit above the Hillside and Village;*

Fig. 12: *Torii: Kami Pathway and Human Pathway Overlapping;*

Fig. 13: *Nakagawa-machi Bato Shrine;*

Fig. 14: *Shrine: Haiden and Honden with the Kami Worship Items;*



2.0 Chreod- Vector of Truth (“Everything must move”, Plato: Timeus;)

Japanese ancestor knowledge is real and always present in the form of prayer and creative acts. It is used by their cultural followers as the very part of the everyday life skills inherited. They lived whither the dominant behavior of natural has been translated into its purest meaning and thus translated into formal acts of their living (agriculture for example). Here we

may setup a comparison among Wolfgang Goethe who wrote down in one of the first book on *The Metamorphosis of Plant* that he tried to decipher plant growth and shape with clear seed pattern potential whose mutations are mere adaptations to the context. Their formative force (*chreod*) (Fig.8) had been tried to be translated into mathematical diagrams whereas the boundary in between the divine and physical is questioned. However, Japanese humans understood the behavior of the materia *pattern* around them in the level of their technology of course and adapted their life activities and mere productiveness survival to these forces while harvesting them not more then they needed. Accordingly, their randomness of human life made no hierarchy within the Shinto architectural manifestations concentrated around Nature. Its religious response in a shape of *yorishiro* (Fig.9) was not of the smaller importance in comparison to the hill whereas both were prepared for meeting or celebrating the presence of *kami* (*natural vector*). Later on introduced temples as an objectifying act on the kami presence responded with a clear but always different shrine hierarchy which replied to the site conditions in its micro disposition.

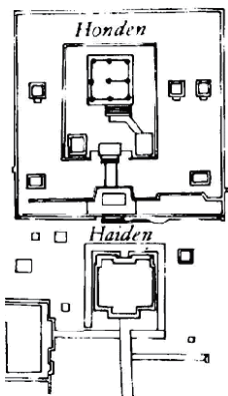
2.1 Weakness of the Shrine

Shinto complex structure and elements that we may differ in general are (Fig.11): 1 Torii - *Shinto gate (only one or a lineup of the gates depending on the topography)*, 2 Stone stairs (depending on the topography of the landscape), 3 Sandō - *the approach to the shrine (inhabit different topologies)*, 4 Chōzuya or temizuya - *purification font to cleanse one's hands and mouth*, 5 Kagura-den - *building dedicated to Noh or the sacred kagura dance*, 6 Shamusho - *the shrine's administrative office*, 7 Sessha/massha - *small auxiliary shrines*, 8 Komainu - *"lion dogs", guardians of the shrine*, 9Haiden - *hall of worship*, 10 Tamagaki - *fence surrounding the honden*, 11 Honden - *main hall, enshrining the kami*. Obviously, the path of the *kami*, the

human approach to the temple and the paths of harvesting the hill resources as the origin of the most important goods for the village survival (material, food, air, protection..etc) coincide with each other in real spatial directions or succeeding in a different time definitions (Fig.13). Firstly defined approach did not mark the *kami* direction but it could happen anywhere. After the Silk Road Buddhist cultural transitions its importance of symmetrical path through the temple that was also introduced has been involved. Nonetheless, Shinto temple transferred the symmetry into the directional response to the environment. At this point it was very important how the museum building was going to embed and link this pathway and its newly established program. In that sense the building may be observed as just one more *torii* on the “way” to the shrine.

3.0 Nakagawa-machi Village Pass - Hiroshige Ando Museum – to the Shrine

3.1 Mountain *Shintai*



The very center of the Shinto shrine is called *honden*. In the indigenous period this part didn't exist since the *shintai*, the object of worship, was indeed the mountain on which it stood. One of these kind is Nakagawa-machi hill Shrine since the divine symbol (mountain on which it stands) of this established complex is “too large” to be enshrined in a building. The rituals of worshipping its *satoyama* deity whom the *haiden* is dedicated are performed in the *haiden* which we may approach and perceive but cannot enter (Fig.16). O contraire its *honden* can't be neither visually neither physically approached but praised for the *kami* visit. In Nakagawa-machi *haiden* we also perceive the other *shintai* forms-mirror, jewel, clothes and sculptures of *kami* called *shinzo*. (Fig.15).

Fig.15: Nakagawa-machi Bato Shrine sample plan with *haiden* and *honden*;
 Fig.16: Shrine: *Haiden* and *engawa* with the *Kami* Worship Items;
 Fig.17: *Jichinsai* ceremony of Purifying the local site by praising local diety;



3.2 Approach ‘before’ and ‘after’ the Shrine



Kami that protects the locality is called ‘*Chinju no kami*’. The ceremony performed to calm this local deity is therefore known as a *jichinsai* (land pacifying ceremony) (Fig.17). It was performed before construction and land measuring. *Kami* which was prayed for start of the work and its significance was named *chonahajime* (*choshisai*). Accordingly, construction of the shrine may be distinguished into 2 kind of ‘approaches’. One becomes in intruding the nature and the second one is the established approach to the built *haiden* (*shakkei*).

Common Japanese word for human dominated landscape, *niwa*, first appears in Japanese literature in the *Nihon Shoki* where it was used to refer to a place purified for the worship of gods. When it becomes intruded by the human activity (raising the *haiden*) the ‘god’s presence redefines itself through establishing the intermediate zone among human and temple. The resulting precinct, or *kekkaï*, is a mediating zone of sanctified nature materialized in the mean of stairs and *torii* etc in between a piece of true wilderness occupied by the *kami* and the domesticated world of man – Bato village. Museum construction works kept the same “ceremony” in establishing design which will hold the gradual transition in between the Bato town as a human space and space of a god presence at the top of the hill.

This kind of gradual visual depth layering within different material realities has emerged as the art museum building envelope predominant design notion.

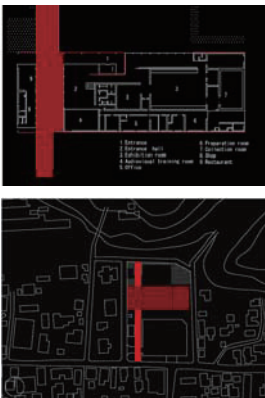
3.3 Weakness of the *Museum* means Strength of the *Shrine*



Fig. 18: Hiroshige Ando *ukiyo-e* Artwork: Evening Rain at Atake on the Great Bridge;

The construction lot for the Hiroshige Ando Art Museum (Kuma Kengo- KCAA) has been decided merely in between the Nakagawa-machi village and the *satoyama* shrine. Thus, if someone follows the purified path way up the hill from walking out the pedestrian and transportation network of the village it has to pass directly through the lot (future building). Accordingly the design issue has been how to intervene with the *ukiyo-e* art museum dedicated to Ando Hiroshige as one of the approach elements to the shrine but with its own program. *Ukiyo-e* as an 'indigenous' artwork of Japanese people and Hiroshige is a direct product of ordinary life. The depictions are the material trials to transfer the human anti-object and anti-perspective experience onto the wooden block mold (Fig.18). Hereby we might say that these artworks are pictorial depictions of *kami*. The shrine as an architectural field- complex setup with several layers of material elements is equally defined as the carving depth of the ukiyo-e wooden block. Both are transcending the experiential morality of the environmental beauty. This kind of layering of the physical and emotional approach to the shrine/artwork became the clear design strategy where the first goal was not to manipulate with the real status of design but rather its visual definition.

4.0 Pattern among Human and the Mountain



4.1 Line Formwork within the Shrine Approach

Main design aim was how to link the geometry of the passage and the program disposal to the landscape. The main entrance was not situated at the frontal part of the museum but rather at the switching point (corner) of the backside passage through the building (Fig.19). Hence, the subject of the future human experience was relying on how the visitor to the shrine or museum does not perceive the building

as a dominant layer of the visual spread in the portion of the temple approach that is in front of the museum. The measure of this spatial gradient was indeed the cognitive capability of human eye. Hereby we can state that the mere human life effort of walking from the bus station to the hill through the art center as just one more of the gates became the measure of the design sensibility and properness (Fig.20).

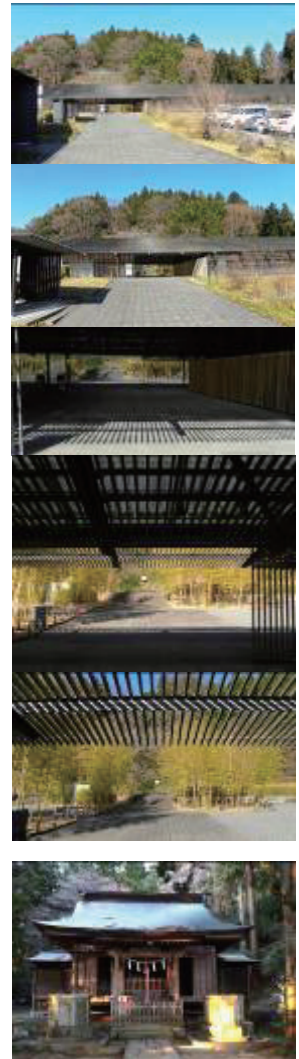
Fig.19: Hiroshige Ando Museum plan: program disposition and red color marked outdoor hall - Pathway;

Fig.20: Hiroshige Ando Museum site: human walking charge potential from the station to the hill shrine;

Fig. 21-1/6: Pattern transformation in relation to the human eye cone angle;

4.1 *Renjigoshi* among Human and the Mountain

The form of the vertical louver screen namely used is *renjigoshi*. Classifying fact is the holding substructure behind the vertical pattern



elements which do not have construction role. Hence, the latter is lightened with the usage of the thinner wire elements. In this manner new technology holding elements are diminished to the minimum of visual dominance. Its overall density appears different from the various walking points of human in relation to the building. This qualitative state of the building is transitioning in between the solidness to the mere transparency as the shrine hill is becoming closer. Therefore, the presence of the *Batoh museum* assumes 3 pairs of layer distances: in between the human body and the constructed entity, the environment and the constructed entity and in between the constructed entities among themselves. Accordingly, this wide range of visual experiences of the very same bar distance became the directly measurable and recordable in calibration to the various visual distances (Fig.21-1/6). Hereby they mutate depending on the human body closeness and eye cone physiology capabilities of translating the environmental reality.

4.2 Museum 'Standing There'

Human sight vision cone with the clear contrast carries the angle of around 30 degrees, whereas including peripheral vision with still possible recognition of the elements in the space, it measures 60 degrees. This 'rule' of human organism became a parameter used as a translative link among our bodies' cerebral processes and frontal lattice real size. Visually, we became belonging to the pattern field as an aiming space (Fig.21-3). Therefore, in this new closeness the interior atmosphere had been appearing more comprehensive and the backside bamboo wood pattern had become readable in its contrast of natural particles. Hereby we witnessed the meaningful switch in visual dominances among these entities depending on our closeness. It seemed that the lattice pattern was acting like a 'device' creating mutual coherence, visual and physical, among our bodies, museum program, greenery and shrine *kami pathway* (Fig.21-4) while their visual singularity wasn't possible without encompassing environmental otherness.

5.0 Re-enshrinement – Conclusion

However, while "standing there", museum entity included both – 'standing' of an object and 'there' of an environment. Inductive notice maybe be stated as: "What" (*tode*) of a thing is rendered to what it is this somewhat"(*tode ti*); and "the being what it is" of anything is what is *knowable* and not the thing itself. Therefore the whole patterned volume could not be neither seen nor cerebrally experienced without the environment as its constituting element. It means that the visible particles and the wholeness of the museum are decisively dissociated and there is no way of bridging them" since the Shinto pathway "otherness" (Fig.21-6) became a constant visual counterpart of the museum field. Therefore the main design issue had been an obvious manipulation over human cerebral images of these achieved with the lattice pattern introduction as an intelligent matter that brought up a powerful influence on human consciousness.

Bibliography

- 1 Robert E. Carter. *The Nothingness Beyond God, An Introduction to the Philosophy of Nishida Kitaro*, Second Edition, Paragon House, St Paul, 1997.
- 2 Kuma Kengo. *Anti-object*, AA Publications, London, 2008.
- 3 Kengo Kuma and Associates. *Studies in Organic*, TOTO, Tokyo, 2009.
- 4 Ching-Yu Chang. *Japanese Spatial Conception*, Excerpt from *The Japan Architect*, April 1984 through March 1985.
- 5 Nakagawa Takeshi. *The Japanese House, In Space, Memory, and Language*, I-House Press, Tokyo, 2006.
- 6 Sokyo Ono. *Shinto: The Kami Way*, Charles E. Tuttle Co, Tokyo, 1962.
- 7 Lafcadio Hearn. *Kokoro —Hints and Clues of Japanese Inner Life*, Charles E. Tuttle Co, Tokyo, 1972.

LINKING ROUTES FROM THE SILK ROAD THROUGH NEPAL – THE ANCIENT PASSAGE THROUGH MUSTANG AND ITS IMPORTANCE AS A BUDDHIST CULTURAL LANDSCAPE

Susanne von der Heide

Kathmandu University, Nepal

Keywords: Three passages through Nepal, connecting with the Silk Roads and Lumbini and Kapilvastu; most frequented route went through Mustang. Proof for early Buddhist art development in Mustang, radiating through the area of the Guge-Purang kingdom in West-Tibet

Introduction

Recently more evidences have been found that in ancient times three passages through Nepal presumedly have linked the Silk Roads with the Gangetic plains, especially with the Buddhist holy places and great Buddhist Universities of India particularly in the area of Magadha, today being part of the present State of Bihar with its capital Patna (formerly Pataliputra).

Many Chinese pilgrims and scholars attempted to visit these important Buddhist sites in Magadha, partly located in present Nepal, as for example, the city of Kapilvastu and in particular Lord Buddha's birthplace in Lumbini (Fig.1), as well as Ramagram. Not all have been as successful as, for example, the famous Chinese Buddhist monk Fa-Xian (337 – c. 422 AD.). He entered India from the north-west, visited the Buddhist sites around Kapilvastu in present Nepal and reached Pataliputra, the second capital of the Magadha kingdom, where most of the Buddhist sites are found (Legge 1965). During his seventeen year lasting overland journey to India another well known Chinese Buddhist scholar and translator, Hieun Tsiang (c. 602 – 664), was in Lumbini in 637, before he was heading to Kushinagar, the place where Buddha passed away, and to Sarnath in present India, where he had given his first sermon (Bernstein 2001, Wriggins 2004).

These pilgrims and scholars left the Silk Road at Kashgar or Khotan, traversing the Taklamakan and Gobi deserts, to travel through the Karakorum or the Himalayan massif further to India, to reach the so called Buddhist Route between Peshawar (in today's Pakistan) and Pataliputra, in order to get to the destination of their pilgrimage. Their travels to visit the holy places of Kapilvastu, Lumbini and Ramagram covered an approximate distance of around 100 kilometres in present Nepal.



Fig. 1: Lumbini, Birth place of Lord Buddha in Nepal, Maya Temple and Ashoka Pillar

Discussion

The presentation will highlight the importance of the religious relations that, beside trade, facilitated the establishment of connecting passages to the Silk Road through Nepal. In this regard the development of a Buddhist cultural landscape along the pilgrimage route through Mustang will be discussed: Iconographical and stylistical similarities of several recently discovered cave-temple sites in Mustang with early Buddhist foundations on the Silk Roads in Central Asia and on connecting routes through Ladakh and West Tibet will be examined, demonstrating the religious and artistic influence of places along the Silk road and of West Tibet on Mustang. The presentation will offer proof of the early Buddhist art development along the old trade path in Mustang, radiating from the Silk Roads through the area of the Guge-Purang kingdom in West-Tibet.

Three Passages through Nepal

Two decades after the visit of Hieun Tsiang in Lumbini the Chinese scholar Wang Huen Tse (approx. 643 AD.) travelled from the city of Xian via a shorter route. As it seems he came through Tharchindo and Thindafu/Sindafu (in present Sechuan), Lhasa and Shigatse across the Trans-Himalayan range. In this way he crossed also the Kathmandu valley, to become the Chinese envoy of the king of Magadha in Pataliputra (Chopra 2003). Since then the route connecting Kathmandu and Xian was in frequent use; in the thirteenth century the great Newari architect and artist Araniko (1245-1306 A.D.) took this traverse to work first in Lhasa and thenafter at the court of the Mongol emperor Kublai Khan. Until 1905 this connecting path was regularly used by business caravans and Nepalese Government officials on their way to the Beijing court. This was one out of three directly linking routes to the Silk Road through the present Nepal State.

Another traverse from the Silk Road to the Indian Buddhist route went presumedly through the Jumla and Humla area, particularly during the time of the Khas Malla Empire (c.12th-15th century AD) in West Nepal. Here, various, partly recently discoveries of copper plate inscriptions, stone steles and archaeological remains of Buddhist temple sites and sculptures have testified, that this as well seems to have been a regularly visited path between India, Tibet and the Silk Route (Hawkes, Alvey, Evans, Harward, Kunwar 2012). But yet, too less is

known about this area and despite the importance of the Khasa Malla, relatively little is known about this kingdom until now.

The most ancient and regularly used passage through present Nepal appears to have been the old pilgrimage and trading route along the Kali Gandaki river, with many evidences for the interaction between India, Tibet and Central Asia found in particular in the area of the former small kingdom of Mustang. This way was linking Varanasi and Bodhgaya in India with Kapilvastu, Lumbini, Bhutwal and Ridi in Central Nepal, leading further through the Mustang region in Nepal to West Tibet and the Brahmaputra valley, continuing from there to Khotan as well to Kashgar, partly via Ladakh.

Buddhist Cultural Landscape of Mustang

Mustang and the Kali Gandaki river valley are bearing all evidences of a highly frequented route through the Himalayas linking with the Silk Road, also due to its easy access, without high mountain passes, facilitating greater interactions between parts of India and Tibet through networks of communication, pilgrimage and trade. Petroglyphs found in Mustang, more than 3000 years old, confirm the early human habitation of this area (Pohle 2000).

As recent research revealed (see Thingo, v.d. Heide 1998a & b; v.d. Heide, 2006, 2010, 2011, 2012), especially since the 11th century a very important Buddhist cultural landscape evolved in this area, with influences partly from Central Asia, Kashmir, West Tibet and from Northern India. Over time, a close interaction between man and nature has shaped this cultural landscape, replete with centuries-old monasteries, temples and stupas, as well as recently rediscovered historically significant inhabited caves and cave-temple sites, dating from the 11th century onwards, with marvellously rendered wall paintings and numerous scriptures that have been found. These discoveries underline the importance of Mustang as a spiritual center, with a continuous religious and cultural development from the 11th onwards, culminating in the formation of an independent kingdom in the 15th century, demonstrating the close ties with West-Tibet, Ladakh and, as it seems, with places along the Silk Road.

Especially between the 11th and 13th century famous Buddhist scholars and saints like Atisha (982-1054), Marpa (1012-1097) and Milarepa (1040-1123) passed through Mustang, the southernmost border district of the area of Western Tibet rule, on their way to the kingdom of Purang-Guge, as late Dzongsar Ngari Thingo Rinpoche and the author were able to prove (Thingo, v.d. Heide 1998a & b, v.d.Heide 2011). They often remained in Mustang for a longer period and under their influence new temple sites arose and monastic complexes were built, containing impressively painted cult rooms and valuable ornamentation, contributing to the enormous intellectual and cultural process that paved the way for the second diffusion of Buddhism in Tibet (late 10th and 11th centuries).



Fig. 2: At Mentsun Temple, Mustang, 11th century.



Fig. 3: At Tumschuq, northern Silk Road, 7th Century



Fig. 4-6: Wall paintings with Asian traders at Menstun Cave-Temple in Mustang, 11th century

The studies and restoration work carried out by late Dzongsar Ngari Thingo Rinpoche and the author at the cliff cave site Mentsun Lhakhang in Mustang and the discovery of the cave temple of Dagrangjung, Konchog and Chodzong have cast new light on aspects of the continuous development of early Buddhist art in Mustang from the 11th century on, at a time when it was under the influence of the Purang-Guge rule in Western Tibet. At that particular period religious and artistic influences from places along the Silk Road in Central Asia, as well as through connecting routes via Kashmir and Ladakh found their way into the Western Tibetan kingdom and have been transferred to Mustang via the Trans-Himalayan paths.

References / Selected bibliography:

Bernstein, R. *Ultimate Journey: Retracing the Path of an Ancient Buddhist Monk (Xuanzang) who crossed Asia in Search of Enlightenment.* Alfred A. Knopf, New York.,2001.

Bista, J. S.P., Gyalchung of Mustang, & von der Heide, S.. An Account on Cultural Heritage and Nature Conservation in Mustang, Nepal, in *World Cultural Heritage- A Global Challenge. Documentation of the International Symposium for EXPO 2000 in Collaboration with UNESCO*, A. Geiger and A. Eggebrecht (eds), pp. 186-189. Hildesheim 1997.

Chopra, P.N. *A comprehensive history of Ancient India*. Sterling Publishers Pvt. Ltd., 2003

Goepper, R. and Poncar, J (photography). *Alchi: Ladakh's Hidden Buddhist Sanctuary: The Sumtsek*, Boston, London, 1996.

Niels Gutschow, Chörten in Mustang. *Ancient Nepal*, Nos. 130-133, 1993, pp. 59-62.

----- The Chörten of the Cave at Luri. *Ancient Nepal*, No. 136, 1994, pp. 137-45.

J.D.Hawkes, B. Alvey, C.Evans, T.Harward, R.B.Kunwar, Finding the Khassa Malla: Preliminary Investigations of the Surkhet Valley, West Nepal, in *Ancient Nepal*, No. 179, pp.1-14. January 2012,

von der Heide, S. Buddhistische Klosterlandschaft in Mustang, Nepal. H. Gaese and T. Boehler (eds), *Denken in Raeumen. Tagungsband zum Symposium, 03-05. November 2004 in Osnabrueck*, Deutsche Bundesstiftung Umwelt (DBU). Veranstaltet vom Institut fuer Tropentechnologie (ITT), FH Köln und DBU in Zusammenarbeit mit der Deutschen Unesco-Kommission. Köln, pp. 127-172, 2006,.

----- An Innovative Approach with Participation of Local Inhabitants for Restoration Work in Nepal, in Shobita Punja, ed., *Heritage Education*. INTACH. Papers of the Asian Regional Cooperation Conference, organised by INTACH in December 2008. New Delhi, pp. 57-66, 2008.

----- Aspects of Transcultural Movements along Ancient Trade Routes through the Himalaya – In, 'World Heritage and Cultural Diversity', Eds: German Commission for Unesco -Dieter Offenhausser, Brandenburg University of Technology - Walter Zimmerli, Unesco Chair in Heritage Studies - Marie-Theres Albert,. Publication regarding the International Conference on 'World Heritage and Cultural Diversity- Challenges for University Education' 23-25 October 2009 at the BTU. pp. 85-93, Cottbus 2010.

----- Hidden Gems Revealed: Clay Statues and Mural Paintings at the Mentsün Lhakhang Cave-temple in Mustang, Nepal, *Orientalia*, Vol. 42, No.5, pp. 41-49, June 2011.

----- Wall Paintings of Meditative Deities from the Mahāyoga Tantra in an Ancient Cave Temple in Upper Mustang, in Andrea Loseries, ed., *Proceedings of the 6th International Csoma de Körös Symposium on 'Hermeneutics of Tantric Literature and Culture'* at the Department for Buddhist Studies, University of Shantiniketan, West-Bengal, India, from 13th – 15th March 2009, Buddhist World Press, Delhi 2012.

Amy Heller, *Indian Style, Kashmiri Style: Aesthetics of Choice in Eleventh Century Tibet*, in *Orientalia*, pp. 18-23, December 2001.

S.L. and J.C. Huntington, *Leaves from the Bodhi Tree - The Art of Pala India (8th-12th centuries) and Its international Legacy*. Seattle, London, 1990.

David P.Jackson, *A Genealogy of the Kings of Lo (Mustang)*, in Michael Aris, ed., *Tibetan Studies in Honour of Hugh Richardson*, pp. 133-137, Oxford, 1979.

Deborah E. Klimburg-Salter, *Tabo - A Lamp for the Kingdom*, Milan, 1997.

Legge, J.A *Record of Buddhistic Kingdoms: Being an account by the Chinese Monk Fa-Hien of his travels in India and Ceylon (A.D. 399-414) in search of the Buddhist Books of Discipline*. Clarendon Press. Oxford 1886. Reprint: Paragon Book Reprint Corp. New York 1965.

Luczanitz, C. *Buddhist Sculpture in Clay – Early Western Himalayan Art, late 10th to early 13th Centuries*, Chicago 2004.

H.F. Neumann, *The Wall paintings of Luri Gompa*, in *Orientations*, pp. 79-91, November 1994,-----
-*Paintings of the Lori Stupa in Mustang*, in J.C. Singer and P. Denwood, eds., *Tibetan Art - Towards a Definition of Style*, pp.178-85, London, 1997,

Pohle, P., 2000: *Rock engravings of Mustang (Nepal) - a unique source for research in cultural history and geography*. In: Thapa, R.P. & Baaden, J. (eds): *Nepal - Myths & Realities: 521-536*. Delhi.

Samosyuk, K.F. *Eleven-faced, Eight-armed Avalokiteshvara, Manjusri*, in M. Piotrovsky, ed., *Lost Empire of the Silk Road - Buddhist Art from Khara Khoto (X-XIIIth century)*.. Thyssen-Bornemisza Foundation, p.128, p.139, Milano, 1993.

Shepherd Slusser M. and L. Bishop, *Another Luri: A Newly Discovered Cave Chorten in Mustang, Nepal*, in *Orientations*, pp. 18-27, February 1999.

Ajay K. Singh, *An Aethetic Voyage of Indo Tibetan Painting – Alchi and Tabo*, Varanasi, 2006.

Thingo, T.T. (Dzongsar Ngari Thingo Rinpoche) & von der Heide, S. *Bericht an die Gerda Henkel Stiftung über eine kunsthistorische Forschung und Dokumentation im Distrikt Mustang, Nepal, Phase I*. Gerda Henkel Stiftung, Düsseldorf, 1998a.

----- *Bericht an die Gerda Henkel Stiftung über eine kunsthistorische Forschung und Dokumentation im Distrikt Mustang, Nepal, Phase II*. Gerda Henkel Stiftung Düsseldorf, 1998b.

Wriggins, Sally Hovey (2004). *The Silk Road Journey with Xuanzang*. Boulder, Colorado: Westview Press. ISBN 0-8133-6599-6

TURKMEN RUG MOTIFS IN RENAISSANCE PAINTINGS: REFLECTIONS ON THE JOURNEY OF TURKMEN MOTIFS FROM EAST TO WEST

Mahnaz Shayestehfar¹, Mohammad Khazaie¹, Rezvan Khazaie¹, Erfan Khazaie²

¹*Tarbiat Modares University, Iran*

²*Higher Institute of Treasury of Arts (Ganjineh Honar), Iran*

Keywords: Turkmen, rugs, Renaissance paintings, Safavid dynasty, motifs and desigins

Introduction

Turkmen rugs are woven in extraordinary patterns; many of these unique patterns can be depicted on the Renaissance paintings of Europe. The commonality between these designs with origins so far apart is a delicate matter of discussion. Having studied the history and designs of Turkmen rugs we trace the apparent journey of these rugs and their designs from their initial origins to the western world. Since the eighteenth century; rugs have been always considered as items of great interest for researchers and art scholars especially in the Oriental world. Such researchers are often amazed by the designs and patterns woven artistically on such the rugs. Recently the attention of scholars has been engaged with a number of European paintings that are inspired with oriental rugs patterns. Holbein paintings of the fifteenth century illustrating Christian saints with Turkmen pattern rugs under their feet are very famous samples showing the influence of such oriental artwork in Europe. In the same sense, European painters used such unknown designs without any exact information about their origin to ornament their paintings. Kufic letters and Arabesque ornamentations are examples of such pragmatic copying.

However, as there is no written history on early rug export from east to west, one can give no firm reason for establishing such a relation between European paintings and Turkmen rugs. The first recorded rug export was no sooner than the sixteenth century. Shah Abbas the Great, the great ruler of the Safavid Empire and a savior of Persian art was among the first to export Persian rugs in large numbers to outside countries. Shah Abbas held numerous carpet fairs and exhibitions through Persia, Turkey and Europe.

Rug history prior to Shah Abbas is rather vague and dimmed. To survey rugs before the sixteenth century, we try to trace carpet origins through any plausible source, including western paintings before the sixteenth century, historical books and documents, and logical reasoning.

The paper is organized around three sections: section one deals with the history of Turkmens as well as their rug weaving background. We will see that these tribal people were among the first rug weavers and conceivably the pioneers of this art. Section two, the main body of this paper, deals with the trace of Turkmen patterns in European paintings especially those of the Renaissance era. Section four provides the reader with an overall conclusion and suggestions for further research.

Turkmen History and Turkmen Rugs

In order to discuss Turkmen origin, we must go back to the 2nd millennium B.C. According to Eiland, "Chinese accounts of barbarian incursions on northwestern frontier begin as early as 2nd millennium B.C." [8]. Barbarians are considered as the ancestors of nowadays Turkmens in Turkestan, and also of any Turk, Mongol and Baluchi origins.

As mentioned above, the barbarians invaded northwestern China; the Chinese had never resided in the area for it was unplanted and waterless, hence, the Barbarians were successful to form a nomadic culture in the region. During subsequent years they gradually penetrated into western Asia and even Europe. They kept coming forward in a gradual pace, until the 11th century when Seljuqs reached power in Transoxonia and defeated the Abbasid Khalifas. They moved forward through Persia and Anatolia and this was the beginning point of the Turks control over the east [8]. In the later decades, two waves of the Mongol invasions occurred by Genghis and Holaku Khan. Mongols, another descendant of the barbarians, established a Turkish theme within the area.[4]; they began as nomads engaged in animal farming and small agricultural workings; however, they became urbanized by invading Persia and minor Asia. The Mongols did not follow any particular ideology or religion; thus, they were ready and enthusiastic to accept any firm idea which seemed pleasing to them. Ghazan Khan was the first Ilkhanid man to convert to Islam. Previously, two ladies of Holaku's court had converted to Christianity and "Ghare Kilisa" in Azerbaijan was a monument built by their order.

Mongols were appreciators of art, they highly contributed to the art of Persia and added their own cultural features to it. Turks had started their gradual migration into Anatolia as soon as in fifth century (Huns Era) and even later in sixth century they were encouraged by Byzantines to unite against the Sassanids of Persia. The Bulgars as another group of Turks with their origins most likely traced to the Huns, defeated and killed the Byzantine Emperor Nice Phorus I in the eighth century. By the eleventh century, the northern kingdom of the Byzantine reign became ready for the dominant existence of Turks. Finally in 1090, Seljuqs conquered the area and the settlement of the Turks became finalized. Later Ottoman Turks migrated to Anatolia in thirteenth century and became the dominant power in Anatolia. Eiland suggests that this act is the main rationale for appearance of Middle Eastern tradition of pile rugs in Turkey [8]. It empowers us to firmly declare that pile rugs must not have existed in Anatolia before Seljuqs.

The first traces of rug designs have been distinguished in Timurid and Ilkhanid paintings. There are certain scenes in the various versions of the illustrated manuscripts of Shahnameh in which courtiers and kings are seen on the carpets with patterns currently known as Turkmen rugs. In the following we attempt to survey the probable origins of these patterns. However dealing with these paintings is beyond the scope of this paper. Those interested can refer to the further reading section [4, 5, 7].

The major motifs in Turkmen rugs are octagonal and hexagonal shapes complete with signs and symbols. No one knows for certain what they mean exactly; however, there are particular apparent meanings proposed by researchers. Some believe that these are Turkmen emblems each related to a tribe since Turkmens originally exist within the three tribes of Ersari, Yomud, and Saryk. According to some authors these polygonal medallions located at the middle of a Turkmen rug are special emblems resembling a tribe and is a categorization based on such weaver tribes [8&2]. The emblems and seals bring with themselves misunderstanding since researchers encounter rugs from a tribe bearing the

seals of another. In all sense, the main topic of this paper is far away from depicting and recognizing the special seals of each tribe.

Generally speaking, Turkmens have used flower-like patterns, animal designs, simplified shapes, and symbolic signs in decorating their rugs. Such designs were all derived from the nature and environment around the; particularly during the era when Islam had not reached the region yet. Turkmens lived with their cattle and the nature around them, hence, these elements were simplified and woven on their rugs since these elements were the only tangible possessions they saw and dealt with [9]. In the same sense, beautiful wild flowers, animals including mountain goats, dogs, horses and birds were among the main features of a Turkmen rug. It is also worthy to mention that the mountain goat native to the area was also a significant feature in Turkmen rugs in the case that even certain tribal seals were formed using the horns of a ram.¹

Dragon is a primary portrayal in Turkmen rugs. The reason may be the closeness of Mongols as the original weavers of such rugs with China and their acquaintance with Chinese illustrations in which dragon is a key element. Throughout the history of Turkmen rugs we can see a decline in the use of dragon illustrations and a growth of other ornamental features such as flowers and domestic animals. Another major element in these patterns are the accessories around the weaver. The comb and its profile in different angles is an example. Sometimes emotions and subjective concepts come in; for example, we were informed of a margin shape called "Chuicheh Brun", that is mother's finger or weaver's finger. These are all simplification of Turkmen women and their characteristics which had developed up to the highest level of quality [1].

Islam reached the area and since it was based on seemingly rule-governed and strict principals, the painting or weaving of human figs and even animals became forbidden; hence, Turkmen weavers altered their style of ornamentation and initiated a new trend by decorating their rugs with more abstract designs originated from Islam which they later called "Mihrab" or "prayer" pattern. In future, this pattern was used in large scales by Turks in Anatolia and became the major pattern of Turkish Rugs.

Another abstract pattern that prevailed under influence of Islam were Kufic scripts placed upon the margin of the rugs and enhanced within geometric shapes covering the structure of the carpet. Although this pattern was later known as the Holbein pattern –maybe since Holbein as a tradesman, tourist or anything encountered these patterns on Turkmen rugs and made use of their patterns in his paintings- almost all of Ilkhanid and Timurid paintings of the thirteenth century, quite prior to Holbein's era, would display the rugs with this pattern under the feet of their characters.² This pattern later was left in Iran but was kept being used in Anatolia and then became another characteristic pattern of Turkic rugs [8].

As mentioned earlier, Turkmen's way of life, including farming and nomadic departures, empowered this probability that such patterns are rooted in Turkmen tribal customs and their culture. Turkmens must have needed something to step and sleep on in their travels through the deserts and mountains.

¹ Mountain goat is a particular animal in Turkestan. When Marco Polo arrived at Amudarya in the thirteenth century he saw these goats and then describe them in detail in his book. In 1960 a famous zoologist named these animals as the "rams of Marco". [12]

² A very interesting point is that this pattern has been rather more common in Jalayirid School than Muzaffarid and Heart schools. Note that Jalayirids were Mongols who acquired Anatolia and Iraq.

Renaissance Painters and Rug Depiction

Renaissance as the name suggests was a golden era for rise of art and culture in the west. Europe had survived from two violent wars and had become acquainted with a new and unique culture and lifestyle. European artists took advantage of such a circumstances and gathered abundant resources and opportunities to create a metamorphosis in their works of art.

Conceptually speaking, the early works of renaissance were rather similar and associated with the classical masterpieces. Artists preferred to illustrate the same Christian personages as the classical paintings exhibited. However as time passed the artists dared to depict more objective and terrestrial motifs. They started to decorate the halos encircling the head of the saints and their garments with both classic ornamentations and new Islamic designs consequential of the influence of Islamic culture. Oriental rug motifs became another source of ornamentation which was later applied in European paintings.

Renaissance paintings during the fifteenth and sixteenth centuries are full of rug designs. These paintings would use such patterns as decorative features to ornament the background of their paintings and objects within. "Such carpets were often integrated into Christian imagery as symbols of luxury and status of Middle-Eastern origin, and together with pseudo-Kufic script offer an interesting example of the integration of Eastern elements in Renaissance painting and Islamic influences on Christian art." [13]

These depictions can be categorized into groups. The first would include Kufic scripts used mainly on the margins and within geometrical pattern located in the middle of the design or painting; more famously known as the Holbein patterns (figs 2 and 6). The second group would include images of the cross in various designs (fig 7). Finally, the last group are prayer rug patterns (fig 9). Prior to Holbein (1498-1543), many other Christian painters, e.g. Memling (1433-1494) and Mategna (1431-1506), made use of oriental carpet designs in their divine and saint illustrations or even in still life works. However Holbein was the first who made use of these elements in a much larger perspective and encountered it as a worldly object.³

Conclusion

No forged and imitated work is able to survive for centuries and reach the peaks of quality and soundness where Turkmen rugs are now located; and it is the most persuasive point about Turkmen weavers. Turkmen rug pattern can be well assigned as the oldest and the most original thriving rug patterns in the world. The path has not completely illuminated yet, however dashed trace of these patterns suggests that the origin of rug weaving may be the Barbarians particularly Mongols or Transoxians. The invasion of Persia and Anatolia by the Seljuqs and Mongols is a significant turning point in the carpet history. Although it later

³ **Holbein carpets** are a type of Ottoman carpets taking their name from Hans Holbein the Younger, due to their depiction in European Renaissance paintings. Actually, these in fact are seen in paintings from many decades earlier than Holbein, and are sub-divided into four types (of which Holbein actually only painted two); they are the commonest designs of Anatolian carpet seen in Western Renaissance paintings, and continued to be produced for a long period. All are purely geometric and use a variety of arrangements of lozenges, crosses and octagonal motifs within the main field.[3]

⁴ Many Holbein rugs are Anatolian in essence. As Anatolia is a region under direct influence and power of Turks and Turkmens migrated from the east, we can assign these rug designs to original Turkestan.

became a major weaver in the region and became a route for the export of rugs to western markets; Turkey was not the originator of such rugs. Finally, it is worthy to mention that the tradition of Turk rug weaving is embedded with a treasury of Persian and Byzantium designs and motifs and with such unique designs it thrived in magnificence and splendor.

List of Illustrations

- 1- Jan Vayk Eyck, Virgin and Child with Canon van der Paele, 1436, Ref. No.6
- 2- Seljuk Carpet, 13th century, Konya
- 3- Hans Memling, Still Life with a Jug with Flowers. The reverse side of the Portrait of a Praying Man. c.1480- 1485. Oil on wood. Sammlung Thyssen-Bornemisza, Schloss Rohoncz, Castagnola, Spain
- 4- 19th century Uzbeki-Turkmen rug
- 5- Turkmen Gul, Ref. No. 4
- 6- Memling, Flemish School, 1477-1480, National Gallery of London
- 7- Hans Holbein-the Younger, The Ambassadors, 1533, oil on oak, National Gallery of London
- 8- Chador Gul, derived from Ref. No. 1
- 9- Jacob Cornelisz Van, Mary Magdalena, 1519, oil on panel, Saint Louis Art Museum, Missouri, United States
- 10- Oriental Rug, derived from Ref. 1
- 11- Pedro Berruguete (1450_1540), Annunciation, oil on panel, Monastery of Miraflores, Burgos
- 12- An old Turkmen rug woven in North of Afghanistan, derived from Ref. 1

References

- [1] Zadeh, A. (1994), *Customs Research Course*; Tehran: Tehran
- [2] Siawosch, A. (1975). *Turkmen Rugs*, Northampton: Crosby Press
- [3] Brown, D Peter, Humfrey, P.A. & Lucco, M. (1997) *Lorenzo Lotto: Rediscovered Master of the Renaissance*, New Haven, Yale University Press.
- [4] Canbey, S R. (2005) *Persian Painting*, Cambridge: Linked Publ.
- [5] Gantzhorn, V, (1998) *Oriental Carpets*, Taschen
- [6] O'Bannon G. (1974), *The Turkmen Carpets*, London: Gerald Duckworth Co.,
- [7] Grabar, Oleg (2001), *Mostly Miniatures: An Introduction to Persian Painting*, New York: Princeton University Press
- [8] Eiland, Murray L. (1981), *Oriental Rugs: A New Comprehensive Guide*, Bulfinch Press
- [9] Mirkatouli, J. (no date), *Social Causes for Quality Fall of Hand-Woven Carpet*, Tehran, Jihad.
- [10] Mirza Mohammad Heidar (2006), *History of Turkistan (Rashidi's History)*, Miras-e Maktoub, Tehran
- [11] Rogers, Michael (1976), *The Spread of Islam*, Book Thrift Co., California, Ministry of Iran

ZEYNEL BEY TOMB: THE UNIQUE PERSIAN TOMB IN ANATOLIAN PLATEAU

Ashkan Mansouri¹, Mustafa Cağhan keskin¹

¹ *Istanbul Technical University, Turkey*

Keywords: Tomb, Aq Qoyunlu, Silk Road.

Introduction

Zeynel Bey Tomb is the architectural result of political changes and power transitions along the Silk Road. It is located in, Hasankeyf region in Batman province, Southeastern Turkey near the border of Iran (West Azarbaijan province). The main reason leading to construct this tomb was the Battle of Otlukbeli which take place between Aq Qoyunlu and Ottoman Empire in 1472[3]. In 1453, Uzun Hasan has ascended the throne of Aq Qoyunlu in Diyarbakir and he unified the Roman Empire of Trabzon and the Safavids of Ardabil with his marriage which made him center of power in the region. These events caused problems with Sultan Mehmed II, ruler of the Ottoman Empire, but when Mehmet II toke over Roman Empire in Trabzon Uzun Hasan couldn't dare to come up against Ottoman army [7].

In 1467, Uzun hasan has defeated Jahan Shah, the king of Qara Qolunlu, who had good relations with Ottomans and destroyed the Qara Qounlu dynasty and became the king of Iran and Azarbaijan. Abu Said Gurkani, Timurid Khan, wanted to possess the lands which Qara Qolyunlus had lost after Jahan Shah's death, but he was arrested and killed by Uzun Hasan's son [7] [14]. Uzun Hasan claimed himself as an heir of Timur when he had the trait of being resolute of his sovereignty in Iran [7] and he was protecting all dynasties and tribes in Anatolia against Ottomans. So, he sent his representative to the Sultan Mehmed II and asked for all the unpaid taxes after Timur's death. After these events, Sultan Mehmed II was forced to have expedition against Aq Qoyunlu [1].

Finally, in 1473, both Ottoman and Aq Qoyunlu army were face to face in Otlukbeli region. Ottoman army defeat Aq Qoyunlu, but they did not continue the war to conquest and seize their lands. Uzun Hasan was not offensive to the Ottoman territory since the Battle of Otlukbeli until his death [7].

Method

This paper explores socio-cultural and political backgrounds along Silk Road leading to the construction of the Zeynel Bey Tomb. This tomb which was built in Aq Qoyunlu period in the Anatolian Plateau will be compared with the same architectural style of tombs of Azerbaijan era and Iran.

Discussion

According to the inscription, the tomb is made for the “Martyr” Zeynel Bey. The date of construction has not been written in the inscription of the monument, but considering the order of Uzun Hasan to build this monument, it should be built in between 1473 to 1478. (Fig.1)

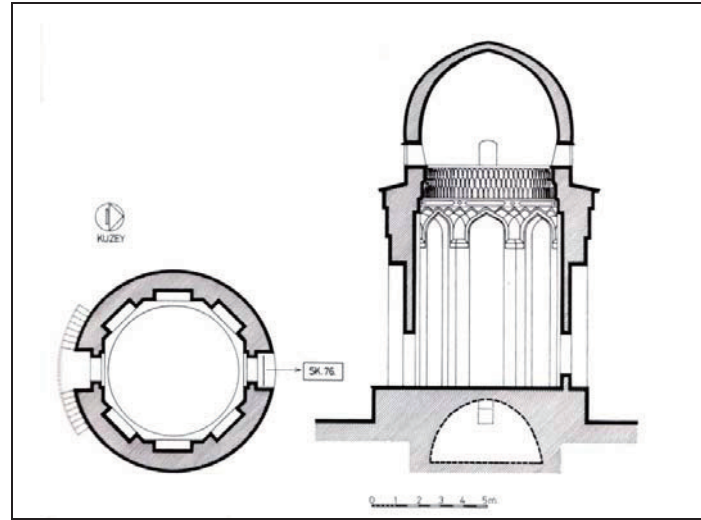


Fig. 1: Plan and Section of Zeynel Bey Tomb [12]

From outside the tomb has cylindrical form but from inside it has octagonal base covered with onion shaped dome and a ground which is designed to preserve mummy. The dome includes two openings, one is northern door another one is a window opens to the Southern facade. Each side of the prism with octagonal base has arches and niches inside, except the facade with door and window. The vaulted dome was placed on the ring of muqarnas, which contained four openings. (Fig.2)



Fig. 2: Zeynel Bey Tomb (Photo By: Ali Paşaoğlu)

Since some of the brick part of the building is fallen, it can be seen that the base of building has been implemented with stones. The exterior façade is decorated with double layer of brick which has blue glazed bricks at outer layer with Kufic calligraphy and repeated words (Allah, Mohammed and Ali). The lower part of the dome is consisted of a band of glazed brick with geometrical motifs and decorations. The dome is placed on a stone base and its facade has been performed with the glazed brick. The entrance doors and windows are very similar and all the frames of doors and windows are decorated with turquoise, yellow and black tiles with flowers and plants motifs. There are arches over doors and windows with inscription embedded into the tile on the arches. On the other hand, all doors and windows around the cylindrical base are decorated with brick frame from the outside. (Fig.3)



Fig. 3: Zeynel Bey Tomb, Interior View (Photo By: Ali Paşaoğlu)

The inscription is installed above the entrance door and "The agent of Building is the old master Pir Hassan ibn Abd Al Rahman" is written on it. Pir Hasan is known as an architect and master of tile works of the tomb, because except this inscription, there is not any available written explanation about the architect and his living place, but according to the architectural characteristics of buildings which were built in Hasan keyf at the same time, obvious differences could be seen which are also represent that Pir Hasan's building is non-endemic to this region.

This tomb has large difference with the other buildings constructed in the Aq Qoyunlu period in Anatolian Plateau and this form of dome cannot be seen in other monuments of Aq Qoyunlu or Anatolian traditional architecture. Moreover, this dome is the unique example in Anatolian architecture but the cylindrical shape of the tomb can be seen in Seljuk period in some tombs and religious buildings. Although, these tombs have dome-shaped roofs but the exterior shapes of domes have been implemented in conical shape and it is noticeable that most of the tombs and mausoleums in Anatolian architecture are built of stone. The glazed bricks and tiles used in the Zeynel Bey Tomb's facade are similar with architectural characteristics of Anatolian Minarets, but there are not any other similarities in Anatolian tombs and mausoleums with this case.

Although Zeynel Bey Tomb has similarities in appearance with the tomb of Sultan Mohammed Chalabi, the Ottoman Sultan, known as the Green Tomb in Bursa which façade is decorated by green tiles too, but observing the old images, it was originally decorated by bricks and its original facade does not have any resemblance with Zeynel Bey Tomb.

The Green Tomb (Yesil Türbe) is built between 1421 to 1425 and "Ali Ibn Haji Ahmad Tabrizi, Mohammad Majnoon and Tabrizi masters" is written on its inscription. However, the inscription mentions the name of Ali Ibn Ilyas who had gone to Samarkand with Timur after the Battle of Ankara and came back to Bursa after the death of Timur with a good experience of tiling works then, he began to work on art of tiling there. According to the masters and architects of the tomb, and observing the techniques used in tile works, it can be said that the Green Tomb is constructed by none Anatolian architects. It seems this tomb was constructed as a symbol of strength and bravery of Timur in Anatolia after the Battle of Ankara. However, the architectural style and techniques used in this tomb has not become prevalent in Ottoman architecture, but it has remained as the only foreign architecture and non-Ottoman tradition. (Fig.4)

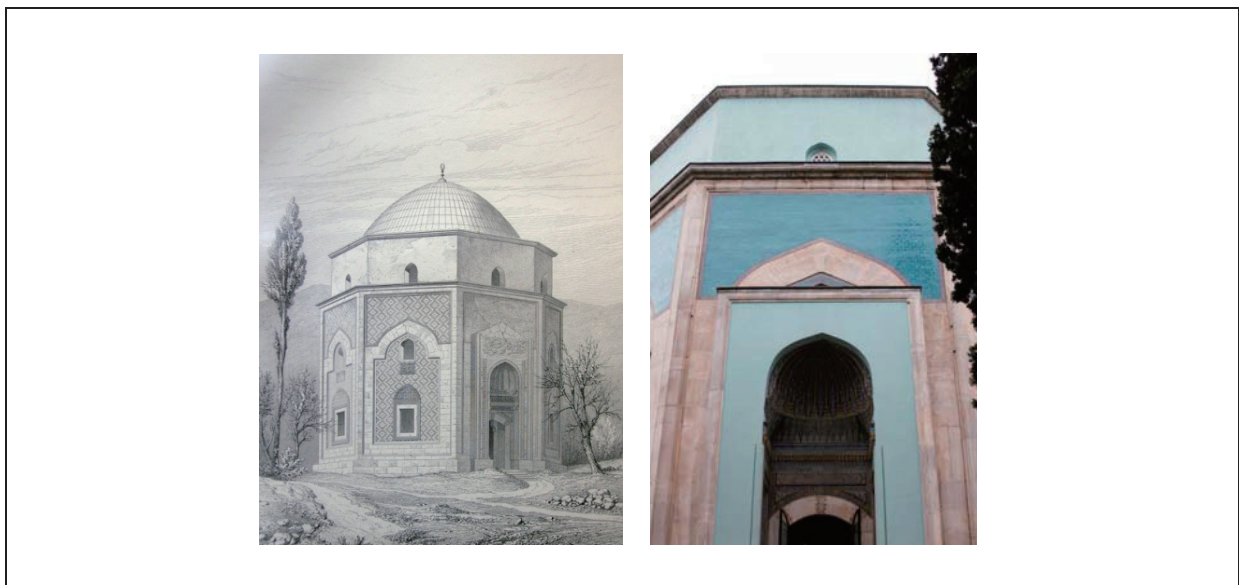


Fig. 4: Green Tomb (Yesil Türbe), Bursa, Turkey Left [5], Right (photo by: Ashkan Mansouri)

The Zeynel Bey Tomb has been built half a century later than the Green Tomb and it is another single example that its roots can be traced in architecture of out of Anatolia. Uzun Hasan returned to Tabriz after the Battle of Otlukbeli and moved his capital to Tabriz. Since Uzun Hasan has built tombs for his prince "Zeynel Bey" and regarding to the Pir Hasan architectural style which is similar to the Timurid architecture in Tabriz and Azerbaijan [3], it seems that Pir Hasan has been sent by Uzun Hasan from Tabriz to Hasankeyf to build the tomb and this hypothesis can be proved by the other similar specimens of Azerbaijan built forms.

In 1323, the Barda Tomb was built in Barda city in Azerbaijan and in 1335 to 1338 the Jahan Godi Khatun Tomb was built with same architectural characteristics like Zeynel Bey Tomb in Qara Baqlar in Azerbaijan. (Fig.5) The Sheykh Safi al-Din Tomb was constructed in 1335 in Ardabil is the similar sample with Zeynel Bey Tomb in terms of cylindrical form, dome and facade decorations. (Fig. 6) Also, the tomb of Sheikh Haydar one of the descendants of Sheikh Safi al-Din was constructed in 1330 in Meshgin Shahr. Although it is bigger than the Zeynel Bey Tomb in scale but it is another example of cylindrical form, dome-shape, brick works and Kufic inscriptions used in its facade. (Fig.7)



Fig. 5: Barda Tomb, Barda, Azerbaijan [15]

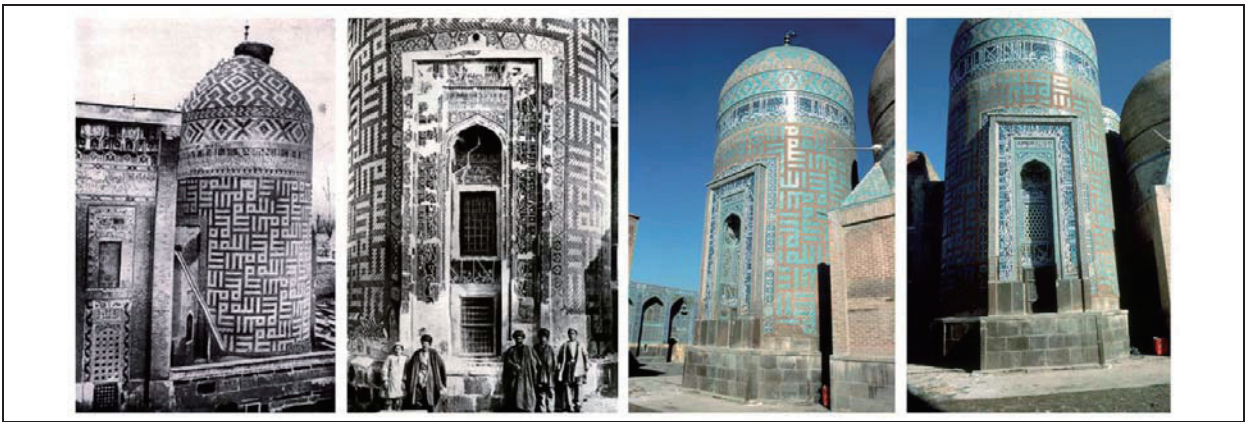


Fig. 6: Sheikh Safi al-Din Tomb, Ardabil, Iran [15]

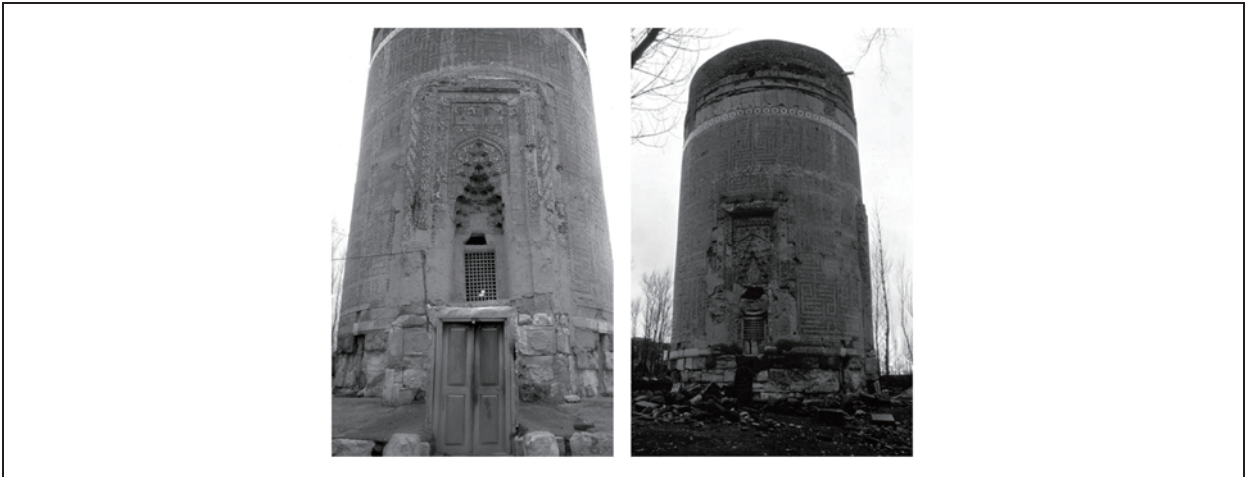


Fig. 7: Sheikh Haydar Tomb, Meshgin Shahr, Iran [15]

According to the time of construction of these traditional architecture samples of Azerbaijan region which were built at the same period, it seems that they can indicate the roots of the Zeynel Bey Tomb's architecture too. So, it can be asked, what caused the Zeynel Bey Tomb to be as a unique example of Persian architecture in Anatolian Plateau?

Conclusion

It's clear that local materials, techniques and native architects are not implemented in the construction of the tomb and it is built as entirely non-native style in this region. After the Battle of Otlukbeli the center of Aq Qoyunlu Empire moved to Tabriz. Uzun Hasan dropped his political claims in Anatolia and made the Aq Qoyunlu a Persian government. So, it can be said that Aq Qoyunlu government with a centrality in Azerbaijan has built Zeynel Bey Tomb as a governmental building in an area away from its power influence which represents the architectural style of Aq Qoyunlu. This action of Aq Qoyunlu government is like the interest of the Roman Empire to construct the buildings with the Roman architectural characteristics to create a harmonious all over their territory and also as like as the Roman Empire, the Ottoman Empire began to construct buildings with the Ottoman architecture style to demonstrate their authority and influence in all areas of the domain of the Ottoman Empire. Finally, it can be concluded; Zeynel Bey Tomb is an architectural symbol of Aq Qoyunlu, a Persian government, in the Anatolian Plateau, with all its characteristics as the Persian building has a special place in Anatolian architecture.

References

- [1] Andican, A. Osmanlı'dan Günümüze Türkiye ve Orta Asya Doğan Kitapçılık, İstanbul, 2009. (In Turkish)
- [2] Aslanapa, O. Türk Sanatı, İstanbul, 2007. (In Turkish)
- [3] Blair, S., Bloom, J. The Art and Architecture of Islam, 1250-1800, the Yale University Press, Pelican History of Art Series, 1996.
- [4] Erdem, I. "Ak-Koyun lu Kaynaklarına Göre Otlukbeli (Başkent) Savaşı", A.Ü. OTAM Dergisi, S.4, Ankara, 1993. (In Turkish)
- [5] Gasco, G. *Bruno Taut and The Program For The Protection of Monuments in Turkey (1937-38)/Three Case Studies: Ankara, Edirne and Bursa, METU Journal of The Faculty of Architecture*, Volume 27 - No 2, p.15-36, Ankara, 2010 .
- [6] Hillenbrand, R. Islamic architecture: form, function and meaning, Edinburgh: Edinburgh University Press, 1994.
- [7] Hinz, W. Uzun Hasan ve Şeyh Cüneyd, Ankara, 1992. (In Turkish)
- [8] Kiyani, M.Y. *Memari-i Iran dar Doreh Islami* [Iranian architecture in Islamic period], SAMT, Tehran, 2000. (In Farsi)
- [9] Pirnia, M. K. *Sabk Shenasi Memari Irani* [Study of styles in Iranian architecture], Soroush Press, Tehran, 2005. (In Farsi)
- [10] Pope, A. U. Introducing Persian Architecture, Tehran: Soroush Press, 1969.
- [11] Sönmez, Z. Başlangıcından 16. Yüzyıla Kadar Anadolu Türk-İslam Mimarisinde Sanatçılar, Ankara, 1995. (In Turkish)
- [12] Sözen, M. Anadolu'da Akkoyunlu Mimarisi, İstanbul, 1981. (In Turkish)
- [13] Sümer, F. Safevi Devletinin Kuruluşunda Türkmen Aşiretlerinin Rolü, Ankara, 1999. (In Turkish)
- [14] Uzunçarşılı, İ.H. Anadolu Beylikleri ve Akkoyunlu, Karakoyunlu Devletleri, Ankara, 2003. (In Turkish)
- [15] <http://archnet.org> (15/01/2012)

7

Case studies on cultural formation

BEHAVIOR OF STUDENTS IN A NEW TYPE OF JUNIOR HIGH SCHOOL IN JAPAN

Satoshi Matsushita

University of Fukui, Japan

Keywords: school, student, behavior, open Space

1 Objective of This Research

Countries along the Silk Road have their own culture, and they have developed their culture for thousands of years. Education is an important means to sustain and develop the culture in many countries. In Japan, education is gradually changing recently, and school design is changing according to the change of education in many areas. OECD(Organization for Economic Co-operation and Development) Program for International Student Assessment (PISA) assesses to what extent students near the end of compulsory education have acquired some of the knowledge and skills essential for full participation in society. The assessment is made in four subjects: Mathematical Literacy, Problem Solving, Reading Literacy, and Scientific Literacy. In 21st century, the ability required for students is not the simple accumulation of knowledge, but the ability of decision making and application of acquired knowledge to various stages in daily lives.

This research shows an example of an attempt of a new school education in a new type of school building in Fukui City. A new junior high school was constructed in 2008, then students in this district and teachers moved to the new school. In the old school before the move, the operation system was the existing system where students have their own classrooms to study usual subjects and they move to some special rooms when they have classes of music, art, science laboratory, and so on. However, school changed operation system from the existing system to departmentalized system where the school has only specialized rooms for each subject and students move from room to room every hour. Although students do not have their fixed classrooms, but they have their home bases used for their class meetings, lunches, self studies, and so on.

In this research, the behavior of students in the old school facility before the move and the behavior of students in the new school facility had been investigated and analyzed. The

change of behavior before and after the move has been analyzed. In this research, we are seeking for new type of school spaces for better quality of educational environment.

2 Outline of School Facility

The subject of this research was Fukui City Shimin Junior High School. The number of students of each class in 2007 is shown in Table 1. The age of students varies from 13 to 15.

Table 1: Number of Students in Each Class

1st year		2nd year		3rd year	
Class	Number of Students	Class	Number of Students	Class	Number of Students
1-1	28	2-1	27	3-1	31
1-2	27	2-2	28	3-2	31
1-3	28	2-3	27	3-3	31
1-4	27	2-4	26	3-4	30
1-5	27				
Total	137	Total	108	Total	123

Figure 1 shows the first floor plan of the old Shimin Junior High School before the move. This is a typical floor plan of junior high schools in Japan where classrooms are allocated along corridors. Students have their own classrooms and study most of subjects there. They move to some special classes when they study art, music, cooking, science, and so on.

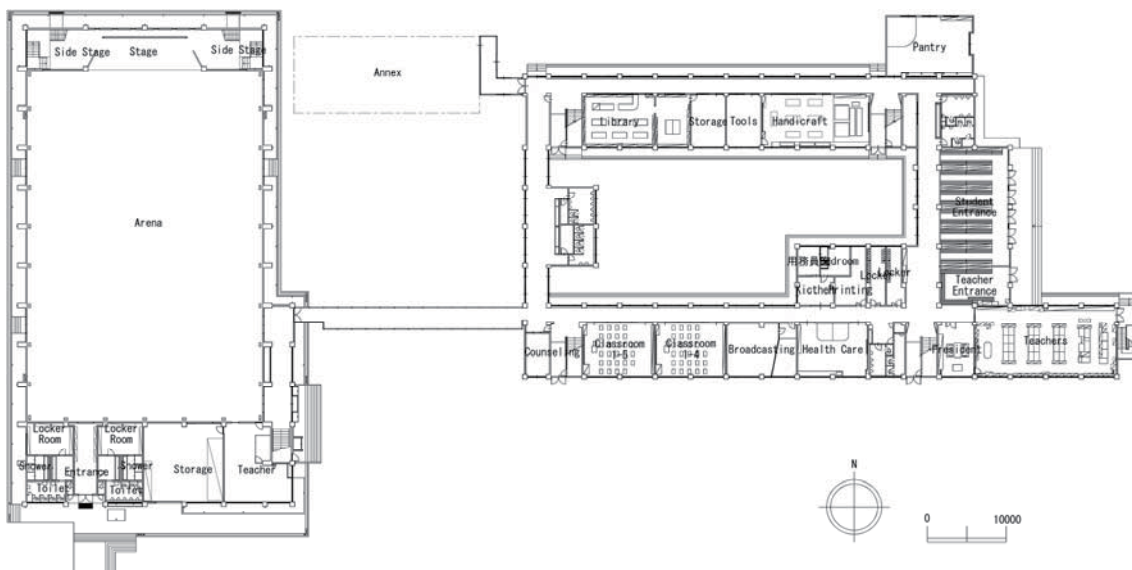


Figure 1: The First Floor Plan of The Old Shimin Junior High School

Figure 2 shows the first floor plan of the new Shimin Junior High School. The operation system of school changed from old type to departmentalized system. Students do not have their own fixed classrooms. School building have only specialized rooms for each subjects, and students move to specialized rooms according to their timetable. However, they have their home bases where they have their class meetings, have lunches, take breaks, and so on. They need such a place as they have no classrooms. At each subject area a teacher's room of each subject is located where teachers and students can communicate about their related subjects. Open spaces are located at each subject area which are used as multi purpose spaces for study, communication, meetings, and so on.

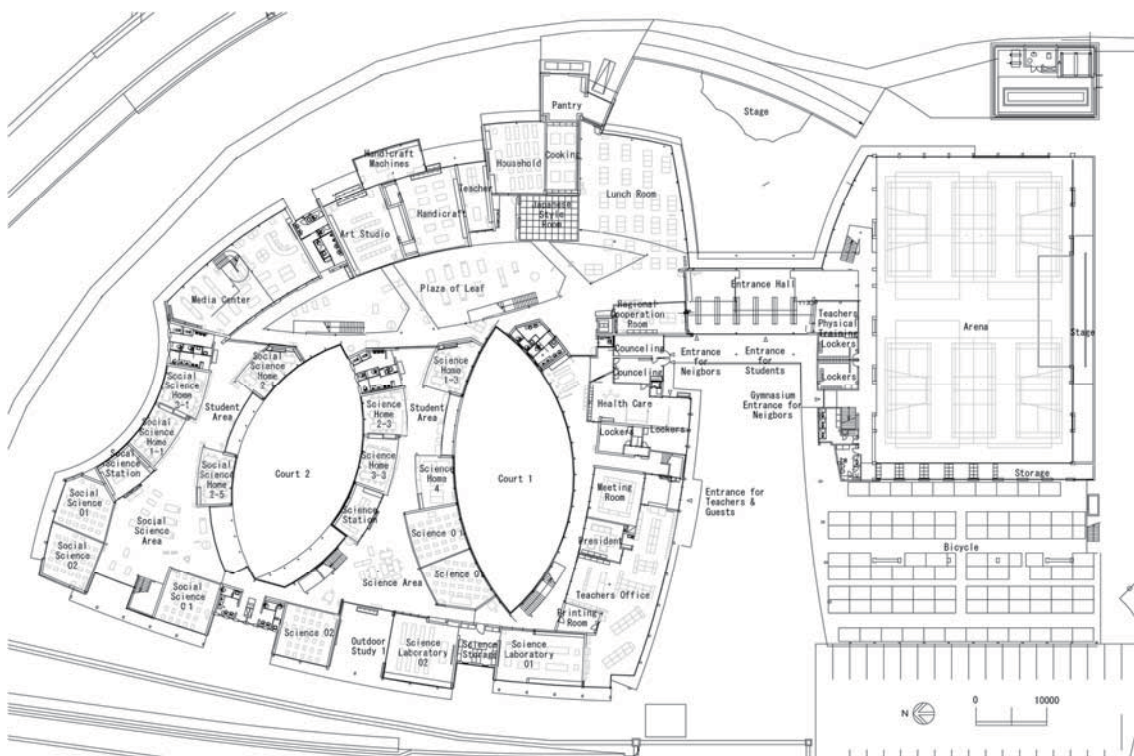


Figure 2: The First Floor Plan of New Shimin Junior High School

3 Method of Survey

In this research we surveyed the behavior of students in the school by three major concerns. One of the concerns was how the spaces in the school were used. Another concern was where students stay in the break times between class hours. The other concern was the movement of students when they move from a classroom to another room. This abstract focuses on the former two concerns about the use of spaces and places of students to stay. The method of this survey were hearing from some teachers, observation, taking photos,

taking videos, and enquires. In 2007, first, we heard from some teachers about the behavior of students and understood outline of the school. Then we surveyed by taking photos and videos in July, then we recognized the outline of behavior of students. In September, we made systematic survey using the result of former survey. We made schedule of taking videos at planned locations. On the other hand, we observed the location of students and plotted the location on the drawings of plans at each break time. Later we analyzed the result of these observation and photographs, and made an equate to provide with students in December. This procedure was repeated in 2008 after the move.

4 Behavior of Students in the Old School

In the old school before the move, students study most of subjects in their classrooms except for some specialized subjects like music, art, handicrafts, and science using laboratory. Photograph 1 shows a scene of a classroom in a study hour. Most of study is made only in classrooms. Figure 2 shows a scene in a break between study hours. Most of students stay in their classrooms or in the corridor around their classrooms. In the break after lunch time, many students play in the arena, and some other stay in library.¹



Photograph 1: A scene of a classroom in a study hour



Photograph 2: A scene of students in a break time

5 Behavior of Students in the New School

In the new school building, open space is used for various purposes like a part of class room, communication between students and teachers, self study, and meetings. Photograph 3 shows a scene of a study hour. In this scene, one class is studying in a room, and another is studying in the open space. They can choose the appropriate space according to what

type of study they need, for example individual study, group study, using some materials or tools, and so on.

Students move from one room to another at every break time between study hours. Students can choose various places to stay in break times. They choose classrooms, homes, open spaces, balconies, and library to stay in break times between study hours. In the break after lunchtime, many students play in the arena. The choice of spaces to stay in break times became wider than before. So teachers and students can have more choices of spaces to satisfy their needs than before.² Photograph 4 shows a scene of a break time between study hours. Some boys are looking at materials and talking with friends in the open space, and some girls are walking to the next class. Some study tools or materials of each subject are arranged in each open space.

6 Conclusion

The behavior of students has been changed according to the change of space. In this case, a lot of open and multi-purpose space have been allocated in many part of he school building. Then the possibility of choice of spaces became wider than before. This example of a school shows that the variety of space make some more possibility in variation of education. Architects should consider how users use the space of undertaking project. The behavior of students and the way of education changed in this school, then some teachers have noticed the relation between space and education.



Photograph 3: A scene in a study hour



Photograph 4: A scene in a break time between study hours

7 References

[1] Tsuyoshi Kawano, Satoshi Matsushita, and others. A Study on Place to Stay in a Junior High School - A Study on The Use of Fukui Shi S Junior High School Part 1 -, *Proceedings of Architectural Institute of Japan*, Vol. E1, pp.761-762, August, 2009

[2] Tsuyoshi Kawano, Satoshi Matsushita, and others. A Study on Place to Stay in a Junior High School with Departmentalized Classroom System - A Study on The Use of Fukui Shi S Junior High School Part 5 -, *Proceedings of Architectural Institute of Japan*, Vol. E1, pp.1073-1074, September, 2010

THE SPIRITUAL JOURNEY: A STUDY OF THE SPATIAL ATTRIBUTES FOUND BETWEEN CAR PARK AND INNER SHRINE

Luke Chalmers

Architectural Practice Academy, Australia

Keywords: Shinto, Shrine, Space, Japanese Urbanism, Japanese Architecture

1.0 INTRODUCTION

The space between Shinto shrine car park and the inner gate provides opportunity for development of the experience of the visitor [2][10][11][13]. Through the use of shadow, scale, sensual deprivation and progressive staging, the spatial qualities become more significant than architectural structures [24][22][50].

Research conducted focuses on the sequential experience of the spaces within the Shinto shrine complex [5][18]. Here the author intends to define a framework to explore the special qualities experienced within the grounds of the Shinto shrine. The author will explore significant relationships between movement and architecture [33][35].

This research examines and explores the relationship between the users and the use of spaces during the physical journey within the Shinto shrine grounds. This research proposes that such consecutive spaces can be more significant than built architecture [7][8][34][41][50]. Through deconstruction of these sequences a framework is proposed that can be further implemented into urban development [7][8][9]. Empirical research reiterated with case studies details a framework that outlines techniques used in the creation of significant space [38][55][58].

The selection of the car park as a starting point was chosen to define the extents of the shrine perimeter [1][16].

2.0 METHODOLOGY

Ise shrine and Meiji shrine were selected due to their locations, allowing exploration into site specific journeys experienced by the users [24]. The case study method was chosen to separate the Ise and Meiji Shrines from the relative events, spaces and adjacencies. Through comparison of the two similar shrines, any constant or contrast becomes clear. The use of case studies allows direct relationships between the two shrines to be examined.

Through the case studies, the journey is separated from any outside influence [20][24]. This is achieved through the contextual comparison of the Shrines. Using a literature review as data, identifiable factors of spatial design were analysed to form a framework consisting of; Space Making and Movement, Scale, Stimulation and Aesthetics [44].

3.0 ANALYSIS

Influences by western architects within Japan, along with the sudden modernization, the isolation policies, and a culmination of government upheaval and defeat in World War II, shaped an architecture that is iconic and easily recognized globally [7][16][17][21][39][43][59]. Although

the architecture in Japan ranges from simple to exorbitant, there remains an underlying commonality and steadiness that is globally recognised [8][39][52].

Since the early Nara period, Tokyo has been classified as a greatly urbanized city. Architecture in Japan has been dependent on the urban renewal, rapid urbanization, and seemingly unstructured layout of Japanese cities [7][8][9][39]. Through this, the architectural journey has been diluted [23][27][39].

Case studies of Ise and Meiji Shrines provide insight into the development of successful spaces that can be reused in urban architecture. Through an understanding of the processes of movement involved with the transitional spaces, the architectural journey can be reinstated [11][33][36][56]. It is important then to understand where Shinto architecture begins, and to what degree it can influence the lifestyle and experience of modern Japanese urban spaces.

4.0 ISE SHRINE

Ise shrine comprises two major shrines. Located within six and a half kilometres from each other [1][11][36], the inner shrine and outer shrine are connected via paths buried deep within *Cryptomeria* forest. These paths are barely visible from aerial maps [11]. Resembling palace garden walls, the forest guards the shrine [1][11][51]. The tension and expectation builds from the outside [14][15][19][25]. The depth and thickness of the surrounding forest creates a physical boundary bordering on man-made [51]. On passing through the first gates and over the river, visitors begin to feel welcome [11][12][41].

The carved paths meander through the forest, immediately influencing the user's sight lines. At Ise, there is no connection to the surrounding town, as such, the only markers of direction are architectural structures placed along this path. Spaces that are stacked progressively exaggerate Ito's theories on flow of spaces and users [24][25].

The importance of such spaces are enhanced through the revelation and layering of architectural moments [33][49][53]. Each rounding of a corner or passing through Ito's 'vortices' tends to slow movement [24]. The revelation of subsequent spaces is a process that historically signifies importance in city planning [7][8][9][39]. This coupled with Unwin's ideas on hierarchy and Le Corbusier's Architectural Promenade theory, reflect a disconnection to the outside world [54].

Architectural structure form points in which the flow of spaces is stemmed and a point to gather is formed [24]. In Shinto shrines the Torri gates mark the start of the journey, midpoints, and often the finish [11][19][22][48][58]. The gates, in terms of architecture are simple and unassuming. This anticipation of what is beyond is inbuilt as one passes through such thresholds [54].

Though large, the gates provide relief from the forest. When placed along the path, the gates provide a scale closer to that of the visitor [11]. When the sun is overhead the gates cast shadows that are clean and sharp, recognisably man made [51]. Most striking is this visual line, the crossing of which symbolises the progress of the journey [11]. These architectural structures often become encased in shadows, vanishing back into the natural environment. This in turn, reduces the scale of the structures [23] [58].

This extends to the removal of physical, mental and materialistic stimulation [3][45][46][47]. Removing the visual connection with the main shrine allows only the top to be seen and leads to further imagination of what lies beyond. This simple act of denying visitors the whole picture encourages further exploration by the visitor [33][54][57]. Similarly, the removal of audible stimulation creates an environment with only the sound of river stones underfoot, and the groan of the forest [11][42]. The user becomes acutely aware of their immediate surroundings [51]. Removing excess stimulation can be seen as a preparatory device for experiencing the most sacred places [26][35][58].

The contrast becomes significant between man-made and natural, and between light and dark [51]. The depth of the surrounding forest is exemplified in the darkness beneath the branches. The continuing depth of the forest enhances imaginative experiences [11]. To the visitor, the forest seems to continue unending. Once within the bounds of the shrine, spaces seem simpler and more powerful [57][58].

Simplicity is inbuilt into the shrine and can be seen throughout the Shinto style [6][13][19][21][37]. The Torii gates and bridges that dot the path are made from wood that is harvested from the forest that surrounds them [21]. Simplicity is evident from choice of material through to architectural elements. In Asian culture, simple objects often hold greater meaning and significance than the complex [29][51]. The basic necessity and importance of architecture is outlined in Tanizaki's thoughts where

"as long as a house keeps out the cold and as long as food keeps off starvation, it matters little what they look like" [51].

It can then be outlined that simple objects throughout Shinto shrines hold even greater meaning, particularly when they come from nature [58].

Ise is most successful in the progression of space. Shadow, movement, visual hierarchy, and personal hierarchy become important spatial qualities. At Ise, the element of scale has relevance along the path. In this manner, the space before one reaches the Shrine generates a perception of importance.

4.1 MEIJI SHRINE

At Meiji, paths carved through the dense forest provide an instant relief from the 'hodge podge' urbanised Tokyo [7][8][9][30][39]. This is achieved through natural repetition of trees and the same gravel ground found at Ise [11][28][31]. In the experience of the author, the paths at Meiji provide a softened edge, a contradiction to the surrounding city.

The paths cut into the forest provide a buffer zone between the shrine and the city, and reveal structures in a pragmatic way [34][54], much the same as in Le Corbusier's Architectural Promenade Theory [33]. Until the emergence on Meiji's main square, only glimpses of supporting architecture are visible. Rounding of corners and intersections provides sudden vistas, not expected when entering into the path.

Direct, wide and nearly completely paved, these paths of Meiji are similar to the streets of Tokyo [1]. Although the scale of the city buildings and forest are similar, Meiji forest does not overpower visitors. Instead, it is liberation from the density felt within the streets of Tokyo. This is in part due to the denying of visual stimulation [24][51]. As users move within and along the path, no direct visual feed between architectural structures is gained until reaching the main grounds of Meiji shrine. The open spaces present the main shrine at their far end. The scale of the squares is unexpected in the city of Tokyo.

The first and most significant sensory change noticed is the instant deprivation of noise from the city surrounds. Visitors to Meiji are shifted from a busy city to the still of the forest [11]. At Meiji, the paths are generally wide, gravel, and unenclosed. The crunch of gravel dissipates as user's transition to the paved main paths of Meiji. Quiet and simplicity stands out as significant at Meiji, providing seclusion and at the same time creating an escape from the crowded Tokyo city.

5.0 DISCUSSION

Shinto Shrines are classified as the indigenous architecture of Japan with links to modern Japanese architecture [9][10][37][39][55]. To deconstruct successful and recognizable spatial elements of Shinto shrines, the developed framework is examined in conjunction with the Ise and Meiji shrines. As the two shrines are placed differently within the fabric of the city, and as the same spatial experiences were discovered within the shrines grounds, all external stimulation can be regarded as insignificant to this study.

Bognar explores notions of an inward looking architectural style that creates a journey from the street to the inner workings of the residence [7][8]. The architecture of the journey, rather than the physical architecture becomes significant. This method is more successful combined with the removal of stimulation. Shinto architecture commonly places importance toward the centre of the shrine in effect turns the architecture inwards. This creates a desire to move within the gardens and to explore the grounds. The site then unfolds and reveals itself as the visitor advances. This is particularly evident in the Meiji shrine, of which is centred in a busy part of Tokyo. Regardless, it provides a sheltered site, when the spatial qualities are most significant when contrasted to the city. The resulting experience of both Ise and Meiji are seemingly private and sacred. As the majority of Shinto shrines consist of the same initial spatial acquisition [11][58], It has been noted that the transition from surrounding city to shrine is conducted in similar ways [23].

Removing stimulus identifies other methods used to make known the important, or separate the important sounds, sights and experiences. Removing overly ornate architecture in place of traditional Shinto structures enhances the textures of such structures that would not otherwise be noticed. Similarly, the creation of 'vortices' of which slow the flow of movement would not be noticed if wayward structures were erected for the sake of planned space creation [24].

6.0 CONCLUSION

Through empirical research reiterated with case studies conducted on the Japanese Shinto shrines of Ise and Meiji, a spatial framework is outlined. These spaces become the focus of further research regarding their success and what processes or techniques were used in their development. The question is posed as to why the journey Shinto shrine was experienced as significant, even to those who have no connection to Shinto belief.

Initial studies explored notions of religion, faith and belief, defining these relative to the Shinto architecture. Supplementary explorations revealed that the journey to the shrine was more spatially significant.

These spaces were analysed in terms of techniques employed. Such spaces were then defined in terms of four factors found between the car park and the Shinto shrine. This developed framework was analysed to discuss successes when composed with culturally significant architecture. It is hoped this research can be furthered and implemented into urban developments.

7.0 REFERENCE LIST

- [1] ADAMS, C. (1998). Japan's Ise Shrine and Its Thirteen-Hundred-Year-Old Reconstruction Tradition. *Journal of Architectural Education* (1984-), Vol. 52, No. 1, pp. 49-60 Published by: Blackwell Publishing on behalf of the Association of Collegiate Schools of Architecture, Inc.
- [2] ALEX, W. (1963). *Japanese Architecture*. George Braziller, Inc. London, England
- [3] ARMBRUSTERS, Robert F. (1997) ResToring brilliant ornamentation: The Bahá'í House of Worship (Louis Bourgeois, 1920-53). In *Docomomo Journal*, Apr97, p85-91
- [5] BALLANTYNE, A. (2002) *Architecture, A Very Short Introduction*. Oxford, New York
- [6] BEIN, A. (2008) *The Zen of Helping: Spiritual Principles for Mindful and Open-hearted Practice*. John Wiley and SonsInc. Hoboken.
- [7] BOGNAR, B. (1988a) *Archeology of a Fragmented Landscape*, In
- [8] BOGNAR, B. (1988b). *Between Reality and Fiction, Japanese Architecture in the 1990's or the New Fin de Siecle*. In
- [9] BOGNAR, B. (2008) *Beyond the Bubble, The New Japanese Architecture*, Phaidon Press Limited, London
- [10] CHILDRES, D. (1998) 'Understanding Shinto' *Calliope, March 1998, Vol.8, Issue.7, pp4*.
- [11] COULMAS, F. (1994) Eternal Change at the Grand Shrine of Ise In *Japan Quarterly*; Jan 1994; p36-43
- [12] DAY C. (2002). *Spirit & Place Healing our environment*, Architectural Press, Burlington, M.A.
- [13] EDAGAWA, Y. (2008) *Japanese Identities, Architecture Between Aesthetics and Nature*, JOVIS Verlag GmbH, Kurfurstenstrabe, Berlin.
- [14] FELLEPA, R. July (2009) 'Zen, Emotion, and Social Engagement' *Philosophy east and West* Volume 59, No. 3. Pg. 263-293.
- [15] FOGELIN L. (2003). "Ritual and Presentation in Early Buddhist Religious Architecture." *Asian Perspectives* 42(1): 26.
- [16] FRIDELL, W. M. (1975). "The Establishment of Shrine Shinto In Meiji Japan." *Japanese Journal of Religious Studies* 2(2-3 June - September): 32.
- [17] FUJIOKA, H. No date, Otherness and the Ripple of Modernism. In *Docomomo Journal*, No 36, p61-63
- [18] GRAPPARD, A. G. (1982). "Flying Mountains and Walkers of Emptiness: Toward a Definition of Sacred Space in Japanese Religions." *History of Religions* 21(3):
- [19] GRAPPARD, A. G. (1984). "Japan's Ignored Cultural Revolution: The Separation of Shinto and Buddhist Divinities in Meiji ("Shimbutsu Bunri") and a Case Study: Tonomine." *History of Religions* 23(3): 25.
- [20] HASEGAWA, I. (1992). 'SUMIDA' METAPHORICAL TOWNSCAPE, *TOKYO Architectural Design* 62(9/10): 4.
- [21] HIOKI, K. (2008). *From Japanese Tradition. Is Kura a Model for a Sustainable Preservation Environment* *Studies in Conservation* 53: 4.
- [22] ISOZAKI, A. (2006). *Japan-ness in Architecture*. Massachusetts, Massachusetts Institute of Technology.
- [23] ISOZAKI, A. (2010) *Erasing Architecture into the System*. Retrieved March 11, 2010, from QueenslandUniversity of Technology Course Materials Database.
- [24] ITO, T. (1992). *Vortex and Current, On Architecture as Phenomenalism*. *Architectural Design* 62(9/10): 2.
- [25] ITOH, T. (1978). Ed 2. *The Elegant Japanese House, Traditional Sukiya Architecture*. Weatherhill / Tankosha, New York.
- [26] JAMES J, S. (2000). Sacred Architecture as a Narrative for Defining Religion, Culture and Social and Educational Change: A Proposal for a series of workshops for Educators. HisTorical. Tokyo, Columbia University NY Teachers College.
- [27] JENCKS, C.A. (1984). Post - Modern Architecture - Historicism, the Beginning of PM [Electronic format In C.A. *The Language of Post-Modern Architecture* (pp. 80–90). New York: Rizzoli International Publications. Retrieved March 11, 2010, from Queensland University of Technology Course Materials Database.
- [28] KERR, A. (2001). *Dogs and Deamons, Tales From The Dark Side of Japan*. New York, Hill and Wank.
- [29] KINGSBURY, A. (2007). The Changing House of Worship. *U.S. News & World*. 143: 3.
- [30] KITANAKA, A. (2008) The End of Architecture? In *Japan-Inc* May I June 2008, p39-42
- [31] KOLLEENY, J, F. (2009) 'The Zen Garden House finds shelter under the sky.' *Architectural Record*, 0003858X, Jan2009, Vol. 197, Issue 1.Database: Academic Search Elite

- [32] KRONENBURG RH (2008) *Portable Architecture: Design and Technology*. 1st Birkhauser Verlag AG, Basel, Switzerland. Retrieved March 10, 2010, from Queensland University of Technology Course Material Database.
- [33] MADDEN, B. (2006). *The Architectural Promenade*. Brisbane, Queensland University of Technology: 127.
- [34] McCOLL. (2007). "Costa Rica's Churches: Keys to Place Identity, Navigation, and History." *FOCUS on Geography* 50(3): 5.
- [35] NELSON, J. K. (1996). "Freedom of Expression, The Very Modern Practice of Visiting a Shinto Shrine." *Japanese Journal of Religious Studies* 23(1-2): 37.
- [36] NISHI, K. Hozumi, K. (1983). *What is Japanese Architecture? A survey of traditional Japanese Architecture*. Shokokusha Publishing Co. Japan
- [37] NITOBE, I. (1929). *The Religious Sense of the Japanese People*. In *Pacific Affairs*, Vol. 2, No. 2 (Feb., 1929), pp. 58-64 Published by: Pacific Affairs, University of British Columbia
- [38] NORBERG-SCHULTZ, C. (1976) *The Phenomenon of Place* pp. 412-428 Princeton Architectural Press. NY. Retrieved March, 2010, from Queensland University of Technology Course Materials Database
- [39] MAKI, F. (1988) *Progress and Tradition in Japanese Architecture*. In
- [40] METEVELIS, P. (1994). *Shinto Shrines or Shinto Temples?* In *Asian Folklore Studies*, Vol. 53 Issue 2, P337-346
- [41] REYNOLDS, Jonathan M. (2001a), 'Ise Shrine and a Modernist Construction of Japanese Tradition' *The Art Bulletin*, June 1st 2001, pp. 317-341
- [42] REYNOLDS, Jonathan M. (2001b), *Maekawa Kunio and the Emergence of Japanese Modernist Architecture*, University of California Press, Ltd. London, England
- [43] REYNOLDS, J.M. (2002) 'Teaching Architectural History in Japan: Building a Context for Contemporary Practice' *Journal of the Society of Architectural Historians*. Vol. 61, No. 4, Dec 2002. pp. 530-536
- [44] RONALD, R. (2009). "Privatization, Commodification and Transformation in Japanese Housing: Ephemeral House - Eternal Home." *International Journal of Consumer Studies* 33: 7.
- [45] ROSHI, R, A. 2010, *Teisho, Some Words About Sesshin for Newcomers to Zen Practice*. Viewed March 2010. <http://www.sacred-texts.com/bud/zen/aitken-0.txt>
- [46] SHOJI Y (2010). "The Myth of Zen in the Art of Archery" (PDF). http://www.thezensite.com/ZenEssays/CriticalZen/The_Myth_of_Zen_in_the_Art_of_Archery.pdf. Retrieved March 2010
- [47] SUGISHITA, K. (2006) 'Anthropology and Japanese Modernity' *Theory Culture Society*, No.23, Pg 474-476.
- [48] SUZUKI, S. (1994), *Zen Mind, Beginner's Mind*. New York: Weatherhill,
- [49] TADA. K. Mehta. G, (2005) *Japan Style, Architecture + Interiors + Design*. Tuttle, HK.
- [50] TANGE, K. & Kawazoe, N. (1965) *Ise, Prototype of Japanese Architecture*. The M.I.T. Press, Cambridge, Massachusetts
- [51] TANIZAKI, J. I. (1977). In *Praise of Shadows*. Sedgwick, Leete's Island Books.
- [52] SMITH T. C. (1988) *Arai Hakuseki and the Premises of Tokugawa Rule* Native Sources of Japanese Industrialization, 1750-1920.
- [53] UEDA, A. (1990). *The Inner Harmony of the Japanese House*. Kodansha International, Tokyo.
- [54] UNWIN, S. (2005) *Analysing Architecture, Ed.2*. Routledge, New York.
- [55] USHER, R. (2008). "Reading Architecture: St. Andrew's Church, Dublin, 1670-1990." *Visual Resources* 24(2): 14.
- [56] VEAL, A. (2002) 'Time in Japanese Architecture: tradition and Tado Ando' In *arg*, Vol. 6, No. 4, pp. 349-362
- [57] WIRYOMARTONO B. (2009). "Postcard From The Field, A Historical View of Mosque Architecture In Indonesia." *The Asia Pacific Journal of Anthropology* 10(1): 12.
- [58] YAMAKAGE, M. (2006). *The Essence of Shinto, Japan's Spiritual Heart*. Kodansha International Ltd. Japan
- [59] YOUNG, D & M. (2007). *The Art of Japanese Architecture*. Tuttle Publishing, Tokyo.

CARAVANSARIES: THE ARCHITECTURAL TREASURES OF SILK ROAD AND THE CASE OF KAYSERI-SULTANHANI

Gonca Büyükmihçi

Erciyes University, Turkey

Keywords: Kayseri, Sultanhanı, Caravansaries, Silk Road, Conservation, Restoration

INTRODUCTION

The Silk Road, defined as a trade route in most of the platforms, is actually a special transportation and distribution system which is organized with the impact of many other dynamics and components. When the system analyzed in detail, it is seen that the road reflects not only commercial and economic structure but also educational, cultural, security, insurance, logistic, health, religious, maintenance and restoration problems within a organized, systematic and comprehensive model.

The Silk Road[1], which is also defined in many resources as the oldest trade route that connects the China to West, is not a linear route that becomes evident on a single axis but a road network composed of branch roads connected to the main axis or distinct axis with the impact of politic or commercial conditions of the Era. (Fig. 1).

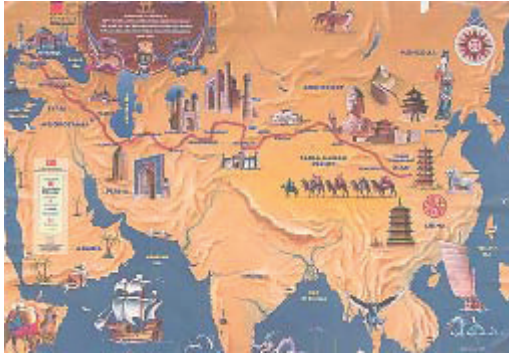


Figure 1: Silk Road Map [2], [3], [4]

These main arteries that become evident through north-west road, Middle-West Road, South-West Road and East Road had a significant role on the transaction of merchandise and thoughts between the two great civilizations, Rome and China. The road helps the transmission of wool, gold, and silver to East and silk to West. [1] The caravansaries on this road were not only used as shelters for passengers but also served as watch houses for the security of the road.

The caravansaries, emerged with respect to commercial potential of the nations on the international merchandise roads, have transformed to external trade centers in their regions and cultural and economic attraction centers and have generated the oldest cores of most of the existing settlements. [5]. It is indicated in various resources that there were 250-300 caravansaries on this road network at Seljuk's Era which is considered as the era of its heydays. [5].

CARAVANSARIES

These caravansaries, which are seen as a castle from a distance, were arranged in a way to include all the functions for the requirements of the caravan convoys inside and they are settled down in 30-40 km range which indicates the distance of caravans of Seljuk's sultans or important government officers in a day. [2]

entrance and 24 vaulted high-arches with quadratic bases at the borders are found. There are 60-70 cm high platforms at the feet of arches for the separation of human and animal spaces. The borders of walls are allocated for animals and the spaces near the central naïve for the people. The central naïve is used for the services. The winter place, which is constructed for the accommodation of the voyagers at nights, has a very attractive architectural atmosphere by the impact of the light coming from embrasures at the walls and lighting lanterns are settled on pendants at the central naïve

The domed bath at the northwest of the courtyard is comprised of five parts. The spaces with riwaqs in this part are allocated for the voyagers and their animals. Across this section there are also spaces with riwaqs used at summers. The portals at the main entrance winter space and the mansion masjid take part on the axis of symmetry. [12]



Figure.3. Ornamented, The Mansion Masjid and Gargoyle

Sultan Han, constructed with a simple and natural structural system, represents a classical Seljuks caravansary's characteristics in terms of façade and construction systems. The Han, structured with stone materials is constructed with rubble filling between cutting stones. The façade represents a plain appearance except the magnificent portal. The corner towers for the strengthening the structure and the buttresses zing up the massive facades. They constitute a monumental, attractive and reassuring façade profile by the integration of the embrasures and gutters which are not only functioning of the drainage of the rain water but also become an aesthetic facade element with their animal figures.

There is huge adornment program on the building. The façade of mansion masjid, the adornments on the arches, the badges, the double-knotted borders and the dragon portraits represents rich stone workmanship. The dragon figures on both arches of the masjid with their meandering bodies around the arch and faces meeting on the keystone also symbolize the special figures of the Seljuk's era [7].

The maintenances on the building/ existing situation and the problems

Unfortunately, the existing situation of the caravansary are not certified their previously important functions in terms of architectural features and social and cultural construction programs. In fact, as being the first public security and insurance system in the world they represent a very crucial role in the past. Most of these buildings were wholly demolished, some of them lost their important elements due to disrepairs, natural hazards, and the others lost their unique characteristics because of sloppy restorations which were done against the contemporary principles.



Figure.4. Photographs' before restoration [13]



Figure.5. Photographs' after restoration

Kayseri Sultan Han was left to the impact of the external factors for years. Even though, the first survey was drawn by Albert Gabriel between 1927 and 1929, technically the first ones were done by architect A. Salih Üngen in 1951 and presented to the Conservation Council [14].



Figure 6-7: Sultan Hanı-Albert Gabriel [15]

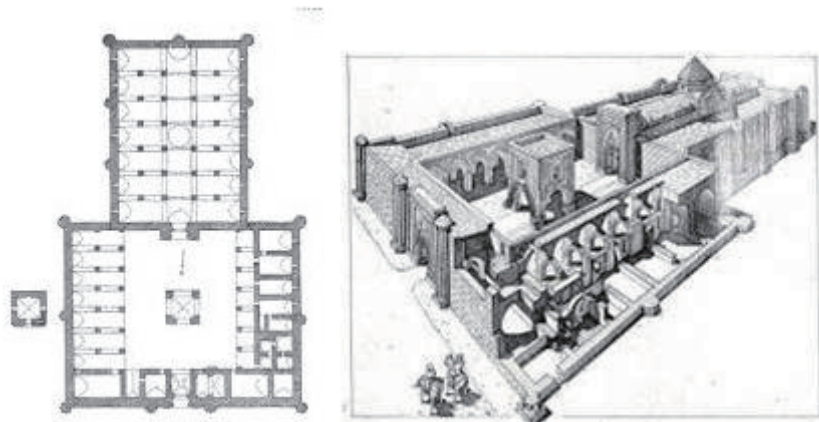


Figure 8: Sultan Hanı-Mahmut Akok [15]

The first comprehensive repair was realized by the regional directorates of Waqfs. By this restoration even though the building got rid of destruction but lost most of its unique characteristics because of the insufficiency of preliminary surveys and technical analysis. After this maintenance which was done against the principles of contemporary conservation, another restoration project was prepared for the time worn building and was approved in 2006. The main decisions of this restoration project are criticized in terms of the lack of adornment repetition and lack of integration between the stairs and the usage of contemporary material in some part of the building. Even though these applications do not have a contrast with contemporary restoration principles, they are not considered as a successful conservation in terms of the quality of the structural maintenance, unqualified materials, insufficiency of conservation implementations comprised of unique mortar and connective analysis

The new walls which are completed incompatibly with the unique walls, the discordant stones used on arches and vaults, illumination elements, the discordant appearance of cables and insurance boxes, overflow of grouting, and stairs exaggerated reinforcement applications at the foot of courtyard riwaqs, sloppy workmanship reduced to a special quality of the building and caused and a negative visual impact on the general appearance of the building. In addition to the negative impact of this conservation, some other technical problems such as intensive salination and discharges were occurred due to the construction of a new roof.



Figure.9. Sultanhan's restoration problems

Furthermore, the lack of new functions and being out of use are the main reasons which contradict with international conservation principles.

Evaluation and Results

Being the most important commercial and cultural buildings with their multi-functional structures the caravansary represented and active and crucial usage on the silk-road until 16th century. [5] The process beginning with their losing importance after 16th century has been considered as the main reason that causes the deterioration because of their locations being far away from settlements, it could not be possible to give new functions to those buildings and therefore some of them became ramshackle with natural impacts and the others still resists to all the negative impact of the years.

According to Kuban, there are two main difficulties to study on Seljuk's architecture. The first and the most important one is the bad quality of the restorations which cause the deterioration of the unique characteristics of the buildings and the other is aesthetical vacancy due to careless, loveless and ignorant usage of them [7]. Indeed, we face with these two reasons in Sultan Han, lying under the failure of restoration. As being the most important building of its era, Kayseri Sultan Han have lost its monumental impact which was created with a plain but an impressive way, the aesthetic and symbolic values of portals by the restoration which was done only with the aim of maintenance without any attention to the creative solutions lying under its constructions and decorations.

As emphasized by many researchers, it is known that the Seljuk's art and architecture have impressive aesthetic contents on the sensitive on the observers (Kuban)[7], however, when we look at Sultan Han very few elements remain left for such an impact.

By taking into consideration the sustainability problems due to the wrong functioning against economic, social and cultural characteristics, a new function recommendation is tried to be developed in this paper.

The solutions for the medieval French castles can also be suggested for Kayseri-Sultan Han which has similar characteristics with its monumental impacts, volumetric sizes and locational properties far from settlements.

Within the scope of this recommendation, after the restorations according to contemporary conservation principles, the building can be equipped with all technical and technological opportunities and can be utilized as an important touristic point for the visitor for daily tours, as an impressive place for alternative courses and activities of artists and universities.

An ideal atmosphere for cultural activities and artistic workshops and shows can be formed when the architectural impact, which belongs geometrical sizes, light shadows and different rhythms, combined with technological infrastructure.

References

- [1] Bilgen, P. İpek Yolu Ticareti ve Erzurum [Commerce of Silk Road and Erzurum]. *Tarihi İncelemeler Dergisi [Journal of Historical Survey]*, Vol. XXII, No:2, 2007. (In Turkish)

- [2] Korkmaz, N., Anadolu Selçuklu Kervansarayları [Anatolian Seljuk Caravansaries], http://www.imo.org.tr/resimler/dosya_ekler/4060b7d80677274_ek.pdf?dergi=145 (15.03.2012) (In Turkish)
- [3] http://www.edebiyadvesanatakademisi.com/sanat/98-ipek_yolununtarihicesi_ve_%C3%B6nemi.html
- [4] <http://www.msxlabs.org/forum/tarih/11507-ipek-yolu.html>
- [5] Özcan, K. Anadolu'da Selçuklu Kentler Sistemi ve Mekansal Kademelenme [Seljuk Cities and Space Levels in Anatolia], *METU JFA*, Vol:2006/2 No.23:2, pp.21-61, 2006 (In Turkish)
- [6] Yıldızdağ, C., *VII.-X. Yy. 'larda İpek Yolu Ticaretinin Türk Tarihine Etkileri*, [Commerse of Silk Road and effects to Turkish History] Mimar Sinan, Güzel Sanatlar Üniversitesi, Sosyal Bilimler Enstitüsü, Tarih Anabilim Dalı, Ortaçağ Tarihi Programı, Yayınlanmamış Y. Lisans Tezi, İstanbul, 2005 (In Turkish)
- [7] Kuban, D., *Selçuklu Çağında Anadolu Sanatı*, Yapı Kredi Yayınları, İstanbul, 2002.
- [8] Bektaş, C., *Selçuklu Kervansarayları, Korunmaları ve Kullanımları Üzerine Bir Öneri*, Yapı Kredi Yayınları, İstanbul, 1999.
- [9] Özergin, M.K. *Anadolu Selçukluları Çağında Anadolu Yolları [Anatolian Roads in Anatolian Seljuk Period]*, Yayınlanmamış Doktora Tezi, İstanbul Üniversitesi Edebiyat, Fakültesi, İstanbul, 1959 (In Turkish)
- [10] http://www.atilaege.com/v3/pages/tr/adayliste/selcuk_kervansaraylari.pdf (12.03.2012)
- [11] Rogers, J.M, Waqfs and Patronage in the Seljuk Anatolia; The Epigraphic Evidence., *Anatolian Studies* Vol. XXVI, pp.69-103, 1976.
- [12] www.kayseriden.biz/içerik (21.03.2012)
- [13] Prof. Dr. Can Binan arşivi
- [14] Kayseri Kültür Varlıklarını Koruma Kurulu arşivi [Archives of The Ministry of Culture]
- [15] <http://www.turkishhan.org/sultankayseri.htm> (20.03.2012)

AN EXAMINATION OF THE USE OF THE CARAVANSERAI AT CAPPADOCIA ON THE SILK ROAD; SARUHAN CARAVANSERAI

Z. Ozlem PARLAK BICER¹, Fusun KOCATURK¹

¹ *Erciyes University, Turkey*

Keywords: Using, Inn, Capadocia, Saruhan

Abstract

Structures harbor the functions required by the period that they were built in. These functions may change and sometimes may even disappear within historical developments. The structures that harbor these functions remain standing even after losing their functions. The maintainability of the structures is ensured via restoration by giving new functions within the changing and developing life. In this study, the current status of the SARUHAN Caravanserai has been examined which is located in the Cappadocia Region, one of the most important locations of the Silk Road. Saruhan was built within the Cappadocia region of Silk Road on the Aksaray-Kayseri route. Built in 1249, Saruhan is one of the last examples of sultan inns. The structure which was initially used for the accommodation of caravans is now open to touristic and social use. Today, it is a structure in which tourist groups accommodate rather than commercial caravans. It is thought that this study epitomizes the usage and functionality differences of structures over time. It is important that the structure is still in use today.

1. Caravanserai

Caravanserai, which has entered Turkish language from Farsi as Kervansaray or Kervanhanı, is defined as the resting place of caravans on commercial roads [1]. Caravanserais were first built by Seljuq Khans in Central Asia towards the end of the 10th century. They were first thought to serve military defense, however, over time they were extended to cover the increasing commercial and religious needs [1, 2].

In caravanserais people were given food-drink for three days regardless of whether they are locals or foreigners. People of different religion, language and race made use of these places [1, 2]. Caravanserais provided a place for accommodation after a tiring journey. In addition, caravanserais contained places for dorms, eating houses, provision warehouses, storage areas, barns, prayer rooms (masdschid), fountains used for ritual ablutions, hamams, pharmacies, shoemaker and blacksmith and supplied all these services free of charge [1]. Köşk Mosque, which is generally located in the middle of the courtyards over an arched base, is the most important part of a caravanserai. Dorms, warehouses, hamam and toilets are located around the courtyard. Heating in these areas is provided by braziers and tandoors whereas lighting is provided by candles and oil lamps [2]. The dimensions of caravanserais varied in accordance with the commercial volume of the road they were built upon thus on the size of the caravans that were going to stay there along with the power of those who had the caravanserai built [1, 3].

2. Seljuq Caravanserais

The Seljuqs established a caravanserai web built on international commercial roads as charitable institutions with orders from the Sultan or government officials of eminence with social-economic and military functions to meet the accommodation-security-health needs of commercial caravans within the scope of the Iran-Islam and Central Asia-Turk national heritage in order to attract the north-south and east-west international commercial road that stretched from Southern Russia-Syria-Mesopotamia and Central Asia-India-Iran-Europe direction to Anatolian geography by way of establishing transportation contact between the harbors of Sinop and Samsun in the north with the harbors of Alanya and Antalya in the south [1]. The caravanserais in Anatolia stretch up to Turkistan passing through Erzurum-Tebriz by way of Antalya-Konya-Aksaray-Kayseri and up to Iraq from the Black Sea coast by way of Amasya-Tokat-Sivas-Malatya-Diyarbakır [2].

Caravanserais known as sultan inns were built during the Seljuk era enabling the caravans to rest safely at nights on the commercial roads. The distances between the Seljuk caravanserais built on important commercial roads were calculated using a standard of nine hours of camel walk that is about 40 kilometers. The caravanserais protected by the surrounding high walls were used as marketplaces during times of peace and as castles during times of war [1].

The number of caravanserais built increases especially during the reign of Kılıçarslan the 2nd and Alaaddin Keykubat the 1st and the security of the routes were provided by the government. The losses of the merchants that took place during the journey were compensated by the government. So there was a type of insurance system. This, in turn, has enabled the development of both local and international commerce. Thus, Seljuks who were strong economically gained political strength as well [2]. Caravanserais were built as foundations by the Seljuk Sultans and government officials. The legal and monetary mechanisms required to operate a caravanserai were defined by the endowments of the time [1, 3].

Seljuk caravanserais were outfitted with saddlers, rope sellers, blacksmiths, kitchens, hamam, medical aids, tea or coffee houses, bed chambers, a semi-closed area for mount and pack animals and some of them also had prayer rooms [1].

The Seljuk caravanserais were built pursuant to three general types. These were caravanserais with courtyard which were suited for use during summer, closed caravanserais suited for use during winter time and caravanserais which integrated the two [1]. Caravanserais had “open” and “closed” parts [4]. Accordingly, they were classified into three groups as; [1]

- “hall” inns with only closed parts
- Inns which had both open and closed parts
- Inns which only had “open” areas. [1]

In addition to this classification, “confocal” inns consisting of two nested plans were defined as another type [1, 5]. According to a function based typology; caravanserais can be separated into two main groups, mainly inns with only housing places and inns with housing and services [1]. The architect of the Seljuk Caravanserais was Kölük bin Abdullah and Kaluyan El-Konevi who were the most famous architects of the time[1].

3. Cappadocia Caravanserai Properties

Different than those in other regions, volcanic origin cut stones were used as construction material in Cappadocia Region caravanserais. Their walls resembled thick city walls for protection. The stonemasonry of the Seljuks can be seen in the entrances named as taç kapı or monumental gateways (portals). Even though they were built with motifs such as dragons, lions and plants, geometrical shapes were preferred more for those in the Cappadocia Region. Their doors which were as strong as castle doors were made of iron [2].

Cappadocia Region is at an intersection of east-west and south-west commercial roads. Hence; Aksaray/Sultanhanı, Aksaray/Ağzıkarahan, Nevşehir/Saruhan and Kayseri/Sultanhanı [2] Caravanserais were built on the Kayseri-Aksaray route.

4. Saruhan

Saruhan is located 5km. south of Nevşehir Avanos region. The inn is located on the East-West connection of Aksaray-Kayseri route. Saruhan, which was built in 1249 during the reign of İzzettin Keykavus the 2nd, covers an area of 2000 m². Tuff stones which are widely found in the Cappadocia region have been used as construction materials for Saruhan [6]. The stones used in Saruhan are good cut stones of yellow, reddish and light brown color. Two colored stones were used for the arches of both the monumental portal and the inner portal for decorative purposes [2, 6]. Geometric decorations were preferred more for the outer portal the upper parts of which have mostly been destroyed [2].

The domed hall prayer room has been built on the monumental portal in contradiction with the other caravanserais. The door of the prayer house opening out to the wide courtyard is decorated with muqarnas squinches. There is a portico with a fountain to the left of the wide courtyard and places for accommodation along with a hamam to the left. The small lines on some of the stones used on the portico are special signs of stonemasons. The skylight dome resting on pendants is quite plain [2].

The caravanserai is in the plan form of classic Sultan inns and is composed of summer and winter parts. There is a prayer room over the entrance iwan, a wide courtyard, a portico with a fountain to the left of the entrance, 6 bedrooms covered with barrel vaults around the courtyard, porticos resting on 5 bases, a closed space for winter months and a panoramic patio [6]. Seljuk Sultans did not order the building of any other sultan inns after Saruhan which is one of the last examples of Sultan Inns [2].

The inn, upper parts of which have partly been destroyed, was restored in 1991 [2, 6]. The restored caravanserai was rented to a private company by the General Directorate for Foundations for a period of 49 years. The building is being operated under the status of "Special Facility" as a conference hall in the supervision of the Ministry of Tourism and Culture [6]. Saruhan is still standing erect due to the decisions that were given to determine its usage. It is important that right decisions are given during the usage stage.

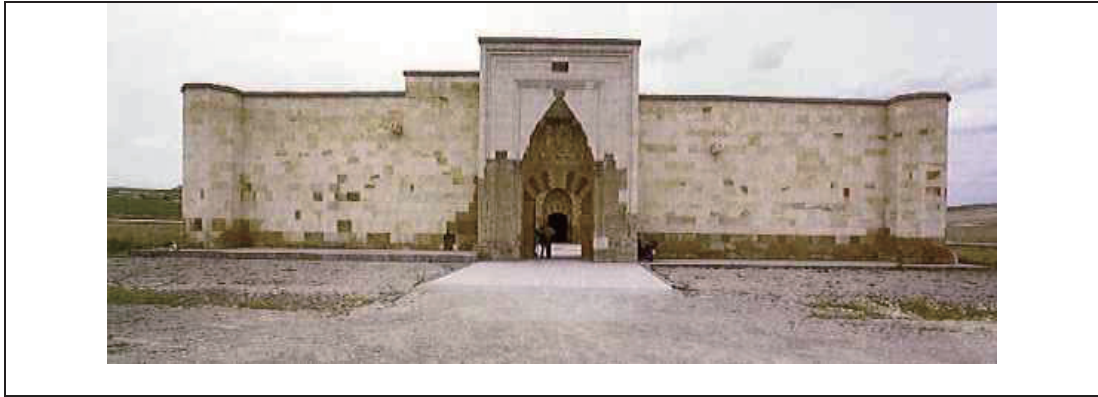


Fig. 1: Saruhan Entrance Portal



Fig. 2: Saruhan Courtyard



Fig. 3: Saruhan Courtyard Lighting

5. RESULT

Saruhan caravanserai is a building which is still being used today for a different purpose. It is important that historical structures are sustained by way of changing their uses suited to the period. Saruhan has been a successful example for the transformation of the structure to touristic use. It is necessary that architects internalize each usage stage of the buildings and transfer this knowledge to the design stage. This will be possible by way of an effective project management. Restoration works are important for structures. However they are not enough by themselves. It is important that the usage stages of structures are analyzed correctly.

References

[1] <http://tr.wikipedia.org/wiki/Kervansaray>

[2] <http://www.matiana.com/gocappadocia/saruhan.htm>,

[3] Kuban, D. (1965), *Anadolu Türk Mimarisi'nin Kaynak ve Sorunları*, İstanbul.

[4] Kurt Erdmann, *Das Anatolische Kervansaray Des 13. Jahrhunderts*, Verlag Grbr. Mann., Berlin, 1961, sayfa 21-22; Aysıl Tükel Yavuz, *Anadolu'da Eşodaklı Selçuklu Hanları*, ODTÜ Mimarlık Fakültesi Dergisi, (2:2), 187-204, 1976, sayfa 87.

[5] Aysıl Tükel Yavuz, *Anadolu'da Eşodaklı Selçuklu Hanları*, ODTÜ Mimarlık Fakültesi Dergisi, sayfa 87.; Haşim Karpuz, *Anadolu Selçuklu Mimarisi Yardımcı Ders Kitabı*, Selçuk Üniversitesi Yaşatma ve Geliştirme Vakfı, Konya, 2001, sayfa 81.

[6] <http://www.bedesten.net/kervansaraylar.html>.

RESEARCH FOR LAND USE PROCESSING OF TEA PLANTATIONS IN A MOUNTAINOUS REGION

Shinya Kimura¹, Shuichi Murakami¹

¹ The University of Shiga Prefecture, Japan

Keywords: tea plantation, land use processing, mountainous region, cultural landscape,

Introduction

Tea cultivation practiced in Japan at the eastern end of the Silk Road. The climate of hilly and mountainous areas is suitable for cultivating high-quality tea. In addition, soil unsuitable for other crops is suitable for tea trees [1]. Currently many tea plantations have been cultivated a large-scale intensively and using Yabukita¹. In the past, many tea plantations had scattered small-scale tea plantation using the Yamacha² in mountainous region [2], [3]. However the population in the mountainous region has been decreasing because of depopulation and aging. Some villages are brink of survival. Therefore, we figured out the feature of the tea plantation landscape in the mountainous region [4]. And the purpose of this study is to figure out the transformation of the tea plantation in the mountainous region.

Methods

We analyzed the 1978 and 2010 topographical map of Mandokoro Eigenji town, Higashiomi city, Shiga Prefecture, Japan (Fig. 1).

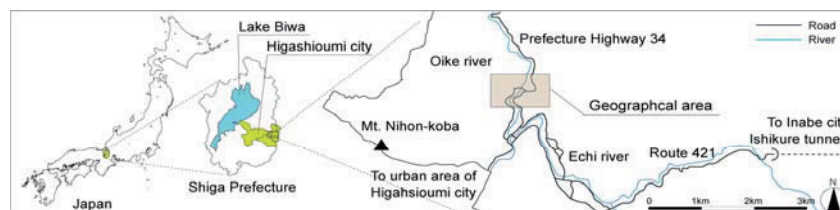


Fig. 1: Location of Mandokoro on the map.

For approximately 300 years, people of this area have been cultivating Yamacha² tea in traditional tea plantations (Fig. 2).



Fig. 2: A traditional tea plantation in Mandokoro.

We determined the number of tea plantations, the azimuth direction of the slope, the slope angle, the altitude of the tea plantations, the distance between the tea plantation and the house, and the difference in height between the tea plantation and the house by analyzing the 1978 and 2010 topographical maps. We confirmed the distribution of tea plantations in 2010 and the land that existed as tea plantations in 1978 through fieldwork.

Results

Tea plantations increased from 27 to 31 sheets between 1978 and 2010 (Fig. 3-4).

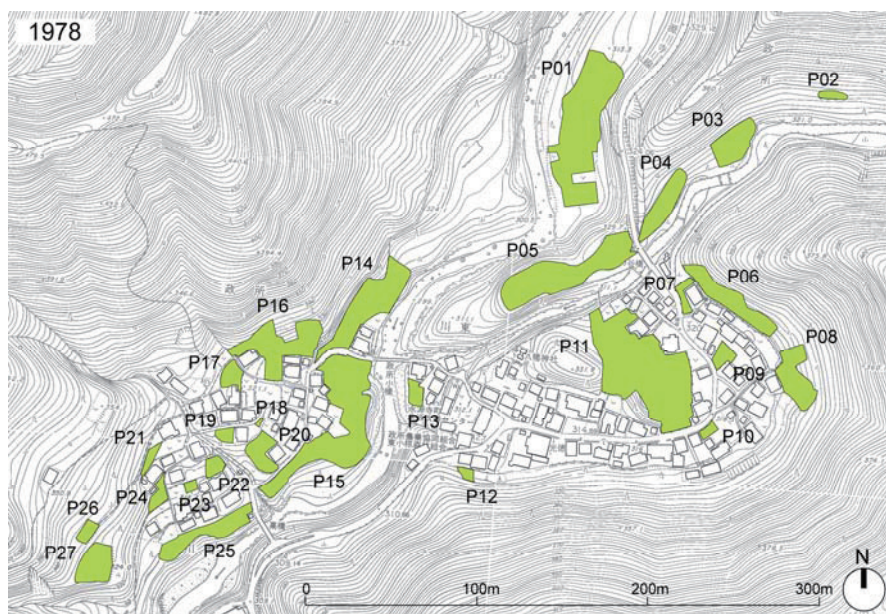


Fig. 3: Distribution of tea plantations in 1978.

(This topographical map was made by the Eigenji municipal government in 1978.)

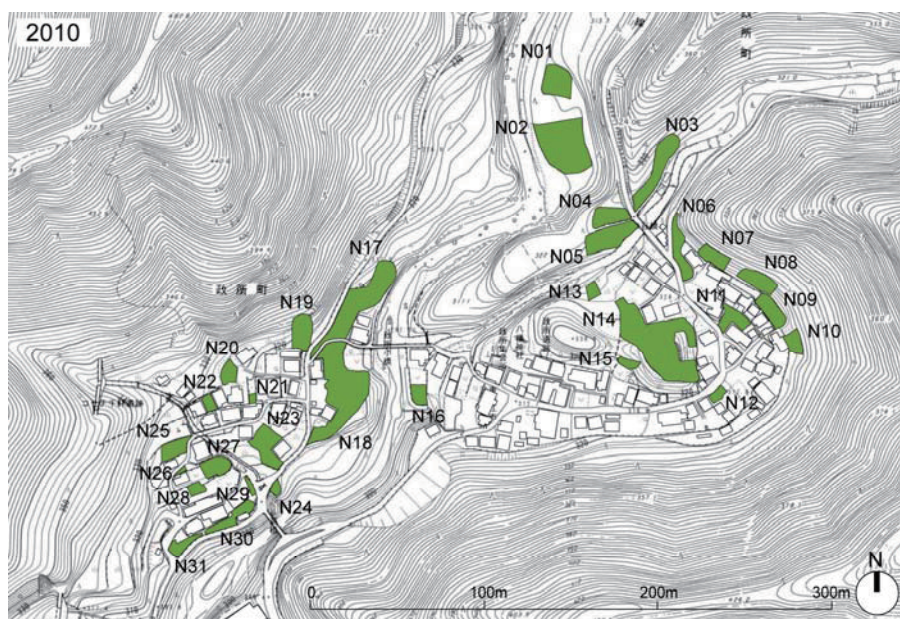


Fig. 4: Distribution of tea plantations in 2010.

(This topographical map was made by the Higashiomi municipal government in 2009.)

In 1978, the largest area of a tea plantation was 2,424 square meters, the average area was as 505 square meters in 1978. The largest area of a tea plantation was 1,138 square meters, the average area was 227 square meters in 2010 (Fig. 5). Therefore, the average area in 2010 was approximately half of that in 1978.

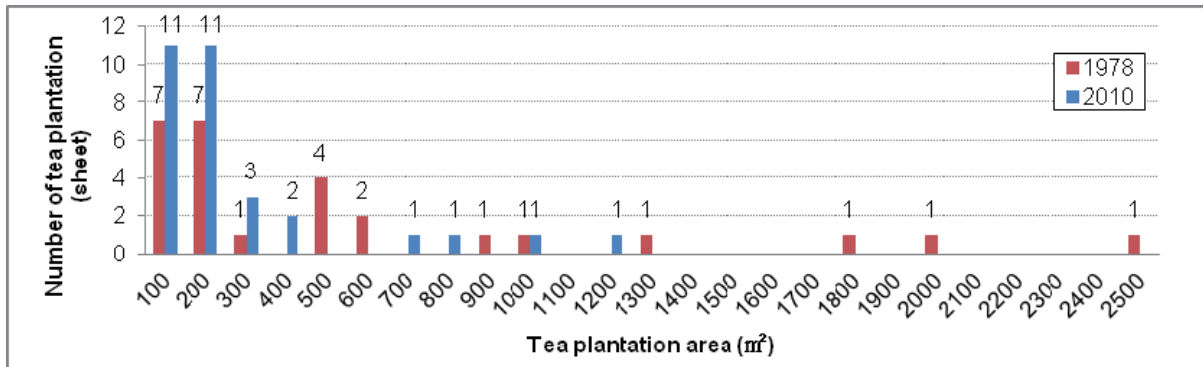


Fig. 5: Chart of tea plantation area.

The average slope angle in 1978 was 19°, whereas in 2010 it was 15° (Fig. 6).

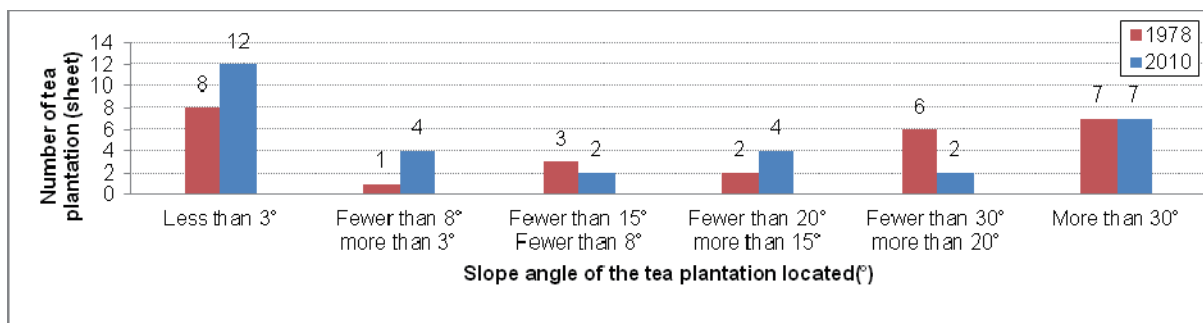


Fig. 6: Slope angle of the tea plantations present in 1978 and 2010.

Southeast was the most prominent azimuth direction in both 1978 and 2010 (Fig. 7).

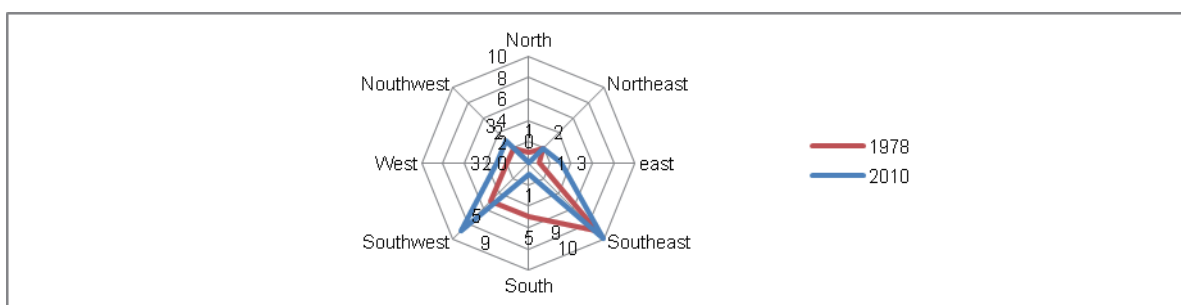


Fig. 7: Chart of azimuth direction of slope.

The altitude of the tea plantation parcels in 1978 was 300-339 m, whereas it was 302-332 m in 2010. Five types of transformations in tea plantations have been observed (Table. 1). First is the fragmentation type in which one parcel splits into many parcels. The disappearance type is a parcel that existed in 1978 and disappeared in 2010. The reduction type is a parcel that decreased in area over the years. In contrast, the expansion type is a parcel that increased in area over the years. The new generation type is a parcel that is newly confirmed in 2010.

Table.1: Types of transformations that were observed in the tea plantations.

Transformation type of tea plantation	Number of tea plantation (sheet)
Fragmentation	6
Disappearance	9
Reduction	8
Expansion	4
New generation	6

Places where a tea plantation existed in 1978 but has been transformed into another land use included vegetable gardens, grass-lands, coniferous forests, broadleaf forests, built-up areas, and roads or revetments in 2010 (Fig. 8).

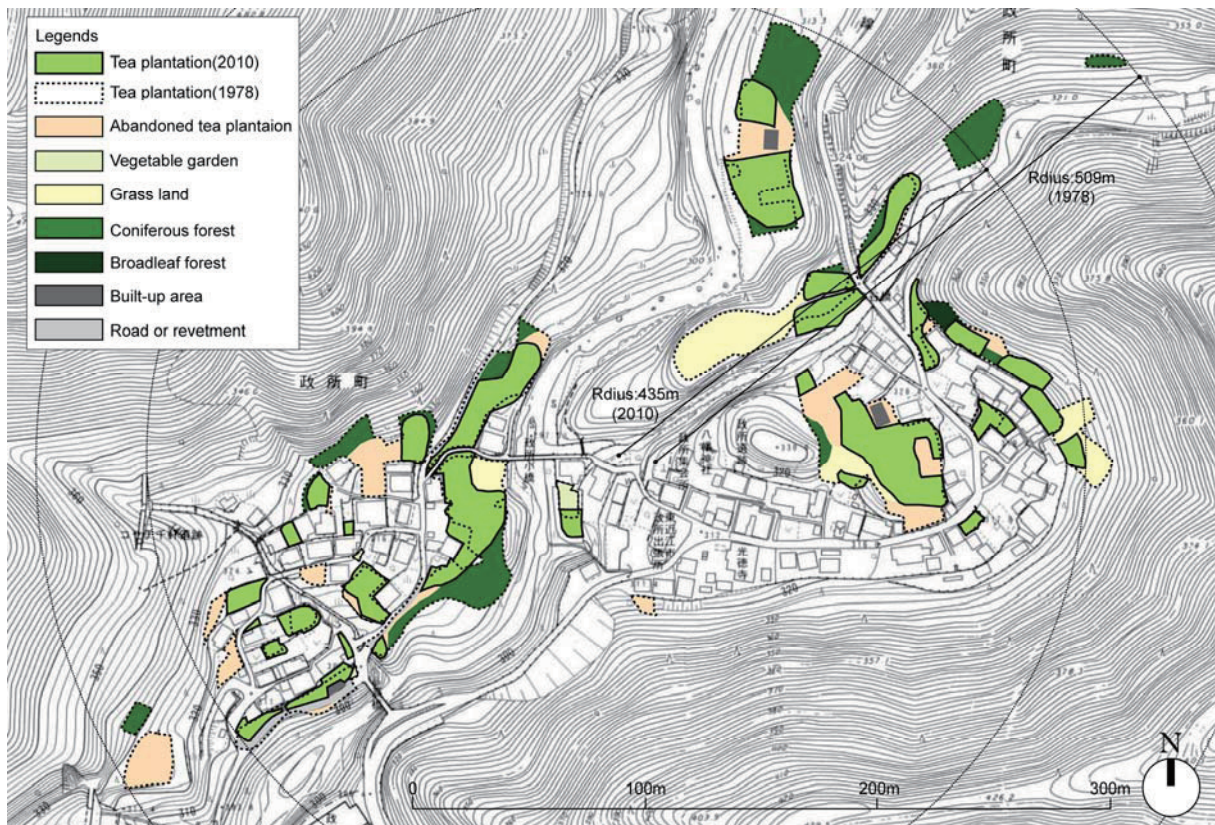


Fig. 8: Land use in 2010 of where was tea plantation in 1978.

Discussion

Many tea plantations are distributed on the inside and outside of the southern slope near the village. The number of tea plantations has increased, but the average area has been halved from 1978 to 2010. The radius of the distribution range has been reduced from 535 m and 409 m. Therefore, it is thought that each tea plantation has shrunk.

All parcels having an area of 1200 square meter or more in 1978 have fragmented (Fig. 9). Cultivating a tea plantation requires a significant amount of manual labor for activities such as untangling the whips of tea trees, applying fertilize, weeding, and harvesting each tea tree. Therefore, it is thought that a shortage of manual labor as a result of depopulation and aging has caused a reduction in the scale of tea plantations.

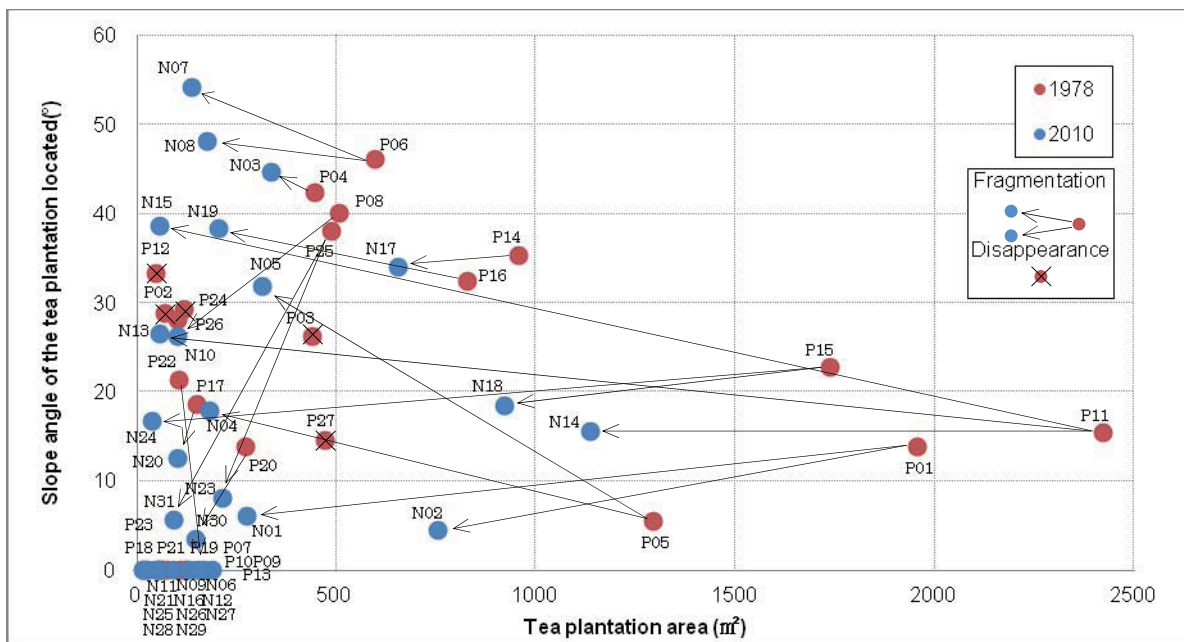


Fig. 9: Area and slope angle of tea plantation present in 1978 and 2010. (The numbers in this chart correspond to those in Fig. 3-4.)

Because tea plantations require managed maintenance activities on a daily basis, the physical relationship between the tea plantation and the house is important. Parcels in which the distance between the tea plantation and the house was 40 m or more have been transformed into the fragmented type or have disappeared. Furthermore, parcels in which the difference in height between the tea plantation and the house was 10 m or more have disappeared (Fig. 10). Therefore, it is thought that parcels located farther away from the house have been transformed, which is consistent with fact such as the narrowing of dimensions and reduction in the distribution range.

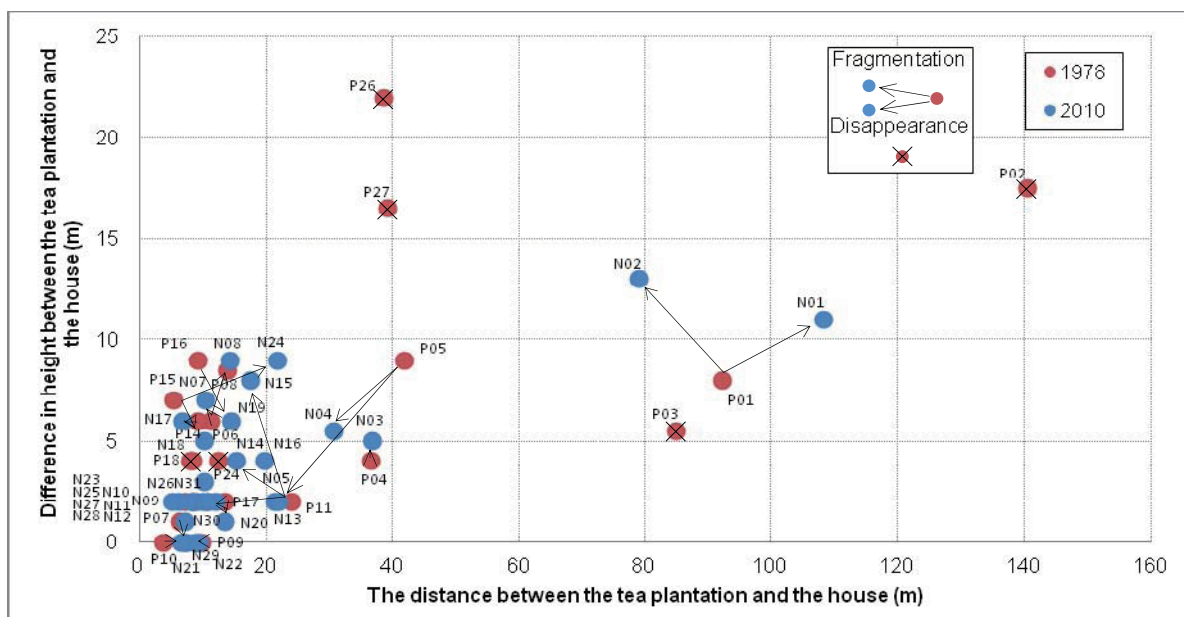


Fig. 10: Distance and difference in height between the house and tea plantation in 1978 and 2010. (The numbers in this chart correspond to those in Fig. 3-4.)

Locations where a tea plantation existed in 1978 have mainly been abandoned, and have become grass-lands and coniferous forests (Fig. 11). Currently, the grass-lands are used to obtain grass for fertilizer in the region near the house and the coniferous forests have been diverted from tea plantations by the afforestation program. It is thought that the transformation process of tea plantations has been affected by the change of bread-and-butter job, transportation, methods of cultivation, and age demographics.

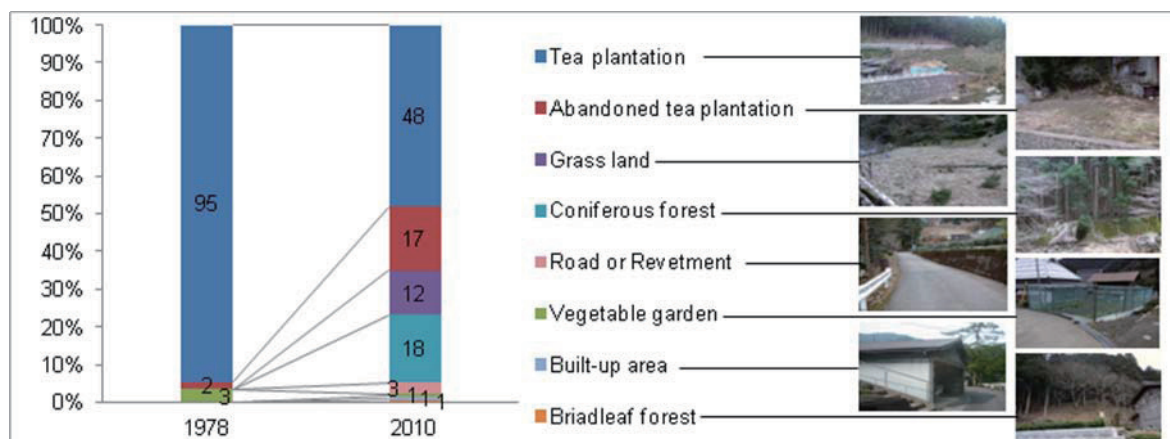


Fig. 11: Chat of percentage of land use

Conclusion

We determined that both the area of distribution and the size of tea plantations have decreased. Parcels that were located in places inaccessible to elders and large-scale tea plantations have fragmented or disappeared. The transformation of tea plantations has been affected by the change in human agency.

Depopulation and aging have progressed gradually in the mountainous region, indicating change in lifestyles of people in the mountainous region, furthermore affecting the disappearance of tea plantations. Therefore, we suggest that maintenance measures for tea plantations should be performed for the upkeep the cultural landscape in the mountainous region.

Note

1. "Yabukita" is the breed of tea tree most often cultivated in Japan. "Yamacha" comprises about 90% of the tea trees cultivated in Japan.
2. "Yamacha" is a breed of tea tree that was cultivated in many villages of Japan in the past. It has said that Yamacha grew naturally in the mountainous region. People used it to carried on tea industry.

References

- [1] Rural Culture Association. Cha Daihyakka 1, History • Culture/Quality • Functionality/Breed Variety/Tea Industry. p.270. 2008. (in Japanese)
- [2] Taniguchi, K. Report of research for Yamacha, *Nippon Tea Association*, 1936, (in Japanese)
- [3] Toriyao, T & Takeda, Y & matsushita, S & Kayumi, S & Kondo, S. Geographical Variation and Adaptability of Japanese Local Populations of Tea. *Bulletin of the National Institute of Vegetable and Tea Science B (Tea)*, pp.1-29, 1996. (in Japanese)
- [4] Kimura, S & Murakami, S. Research for Feature of Tea Plantation Landscape at Mountainous Region –In Oku Eigenji district, higashioumiCity, Shiga Prefecture-. *Papers on city planning*. 2011. (in Japanese)

A DELEUZEAN INTERPRETATION OF URBAN MORPHOLOGICAL TRANSFORMATION

Saeid Nazari Adli¹, Mohsen Mohamadzadeh¹

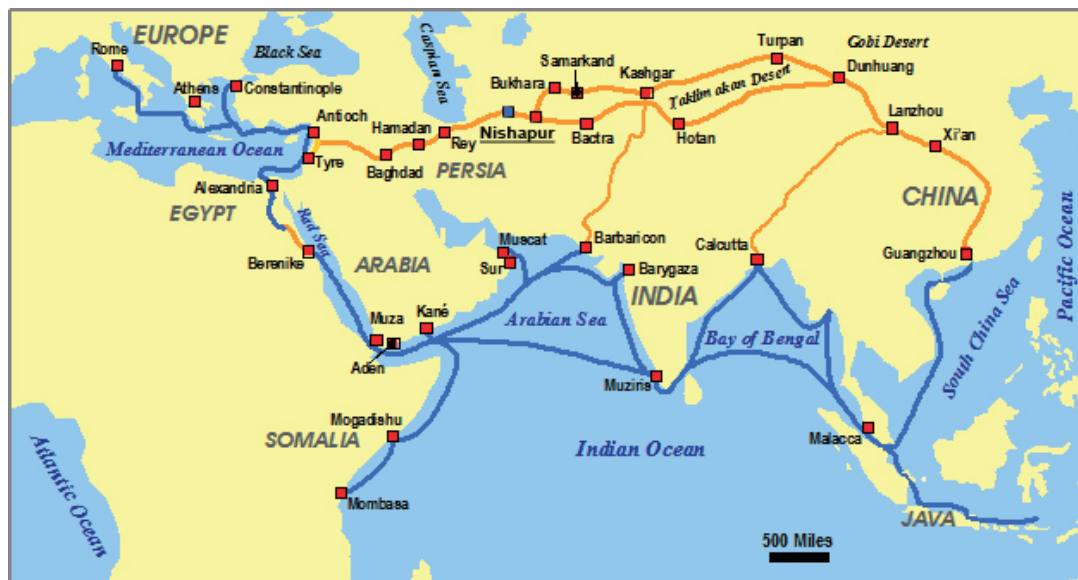
¹ University of Auckland, New Zealand

Keywords: Urban Morphology, Delouse, Nishapur

1 Background

Silk Road, also called The Silk Route which was an ancient trade route, linking China with the West, carried goods and ideas among three great civilizations of Rome, Persia and China. Originating at Xi'an (Sian), the 4,000-mile (6,400-km) road, actually a caravan tract; follows its route to west to Nishapur in Iran and goes to Levant; from there, merchandise was shipped across the Mediterranean to cities. Nishapur was important place on the Silk Road between Iran and Central Asia and at its glory was a rival to cities like Cairo and Baghdad in medieval ages. Nishapur was known as an economic center and was a source of turquoise and a center for producing silk and cotton textiles. The city of Nishapur was connected to other cities on Silk Road by trade and ideas flowing through the Silk Road.

Figure 1: The Silk Road and location of the city of *Nishapur*



(Britannica 2012)

2 Deleuzean definition of flows

City is not enclosure mechanism; but it inevitably relies on its connections with other cities through prominently flows (Brenner, Madden, and Wachsmuth 2011; Dovey 2005; Farias 2011; McFarlane 2011). “Through its multiplicity an assemblage is shaped by and acts on a wide range of flows” (Livesey 2010, 18). This definition is against the traditional utopias which have been mostly theorized as a delimit mechanism such as Plato’s ‘Republic’ and/or More’s ‘Utopia’ (Stavrakakis 2011, 301). Amin (2004, p. 34) states “cities . . . come with no automatic promise of territorial or systemic integrity, since they are made through the spatiality of flow, juxtaposition, porosity and relational connectivity”. However, the process of globalization extends interdependences of cities, the global flows such as financial, migration and information become indispensable for the existence of the contemporary cities operation (Jacobs 2011). Historic cities also had been largely relied on their connections; this seems more significant for cities such as Nishapur which located in the trading roads. Briefly, city is an assemblage with all characters, it is not predetermined or pre-formed, it is dynamic instead of static, but it is determined by flows (Dovey, 2005).

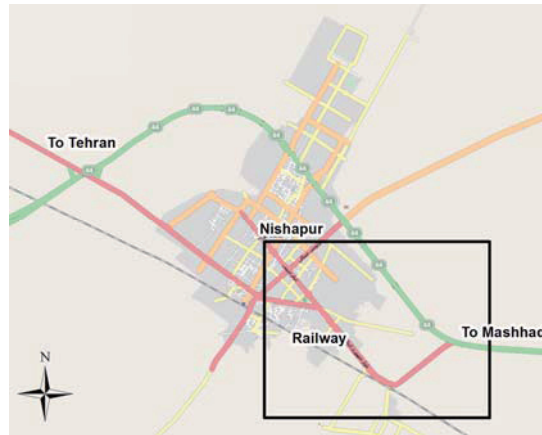
City is a product and also producer of flows (Dovey, 2005). Urban historians such as Morris (1994), and Mumford (1986), among the others, elucidate that the first human settlements, as collection of countable huts, were constituted in the middle of fertile lands beside the permanent rivers, when the Neolithic agricultural revolution created flows of surplus-food as an essential prerequisite to settle a larger number of people in a geographical point. Weber, in his foremost book “the City”(1958), extensively elucidates that how pedlars and traffickers rebuilt most of existing European cities beside of the Roman’s roads congestions in the Middle-Ages. The roads as veins facilitated the movements of commodities, people and even ideas which assisted to reshape socio-cultural, economic and political constitutions in the middle ages cities. Furthermore, the prosperous Italian city-states and most of cities in silk city were the intercontinental trading hubs which attract flows of luxurious goods such as silk, hemp and other fine fabrics, musk, spices, medicines and jewels from other continents and then redistributed the commodities around the their local urban regions and Europe. By discovering new sea routs alongside with discovering the new continents the direction of flows had been changed dramatically, these Mediterranean cities such as Venice and cities in the silk road lost the bargaining privilege in contesting with the new trading hubs such as Amsterdam and London (Martin and Romano 2000). Nevertheless, the connectivity of cities also was, and yet is, challenging for their existence of them. In between, roads particularly facilitate movement of armies and/or diseases. For instance, the Silk Road generated adequate circumstance to conquer Middle East for Turks tribes, Mongolians and lastly Tatars which mostly demolished cities. Thereupon, flows and connectivity are imperative for existence of cities and their operations. Also, they are problematic.

3 The history of Nishapur

Nishapur (Newshapureh) was a wide administrative area of the territory of the Sassanian dynasty. The origin of the city returns to 244 A.D. by building a military fortress (Kohan Dezh) and a Zoroastrian fire temple with hands of Roman captives (Fig. 3). Nevertheless, the main glorious time of Nishapur was after Islam. When Nishapur was conquered by Arab tribes, the fire temple was converted to a mosque and the city became the main city of the region as a military base and also administrative city (Fig. 4). In 823 AD Taher, the first local Iranian king after Isalm, got the control of this region and made Nishapur his capital city and

built many buildings in city as well as at suburbs of city which was called Shadiakh (Fig. 5). In his time Nishapur expanded and prospered and became one of the most important Islamic education centres at ninth century.

Figure 2: Current Nishapur Map and the magnified area



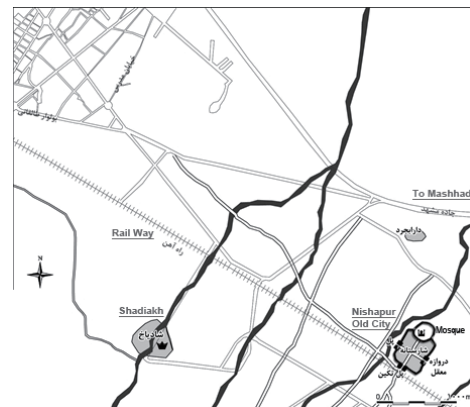
(Open Street Map 2012)

Figure 3: Nishapur before Islam



(Pakzad 2011)

Figure 4: Nishapur after Islam

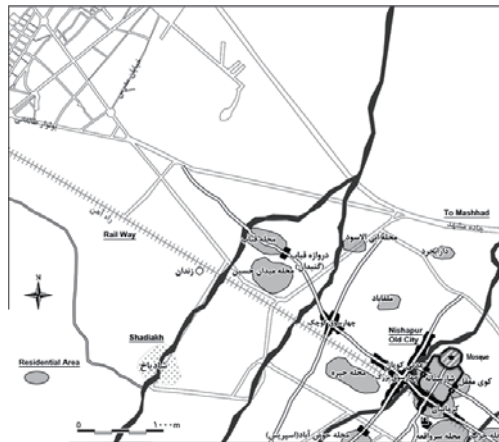


The world economy in the ninth century had two powerful engines. One was Tang dynasty China, an empire stretching from the South China Sea to the borders of Persia. The other economic engine was Baghdad, capital of the Abbasid dynasty from 762 A.D. onward. That dynasty inherited the Muslim world in the Middle East; by 750 it had spread as far as the Indus River to the east and Spain to the west, bringing with it trade, commerce, and the religion of Islam (the Prophet Muhammad himself had been a merchant) (Worrall 2009). All sorts of commodities, fauna and flora and ideas were also transmitted along the Silk Road between these two economic powers and the unique position of Nishapur on this flow brought prosperity and glory for it.

Minorsky mentions Bodalaf describing the ninth century Nishapur as a rectangular shape old city with area of around 16 km², surrounded by high walls, deep moats and huge towers (Minorsky 1978, 86). City was made from five important elements: the governmental castle

(Arg), the mosque (Masjed), the trade center (Bazar), the fortifications with four gates and the suburbs which were containing inns (Caravansary). New large scale constructions in the old city are representative of wealth and prosperity which has been obtained by trade. The caravansaries around the city were the rest and trade places for Caravans from China, India, Baghdad and Istanbul.

Figure 5: Nishapur at 9th century



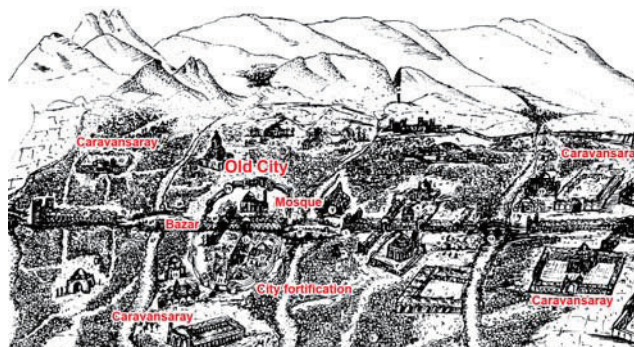
(Pakzad 2011)

Figure 6: Aerial photograph of Nishapur



(Einifar 2002)

Figure 7: Imaginary photo of Nishpur



At the end of 10th century and by attack of Sultan Mahmoud Ghaznavi followed by attack of Togrol the king of Seljuq dynasty, Nishapur entered its period of weakness. Even though it was no longer the capital city, retained its political and military importance. Some new buildings were built during this time like a new palace and school but the structure of city, more or less, remained the same. The control of city changed time to time between Ghaznavids and Seljuqs and weekend the city's commercial and educational position.

Both Ghaznavids and Seljuqs came from the same network of Silk Road. At this time the flow on Silk Road brought war and conflicts not only between two powerful dynasties but also between different religious. Both Ghaznavids and Seljuqs were Sunni while the people of city were Shiite. During 11th to 13th century clashes between Shiite and Sunni religious and also between different branches of Sunnis cased terrible killings and wildfires which followed by attach of Mongols and the city was totally destroyed.

Figure 8: Imaginary sketch of Nishapur after destruction

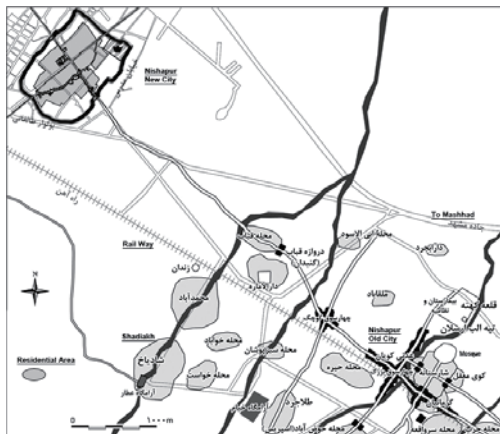


(The Popular science monthly. 1892)

The Mongols were an uncivilized nomadic confederation occupying eastern Mongolia and Manchuria. Their main conflict was with China; however, they could manage to use the network of routes on Silk Road to attach west and laid on a trace of destruction from China to Europe. Again this time the flow on Silk Road brought war and destruction but in a much larger scale in this time. The destruction was so great that the city could never be reconstructed and a new city was built in outskirts of old city.

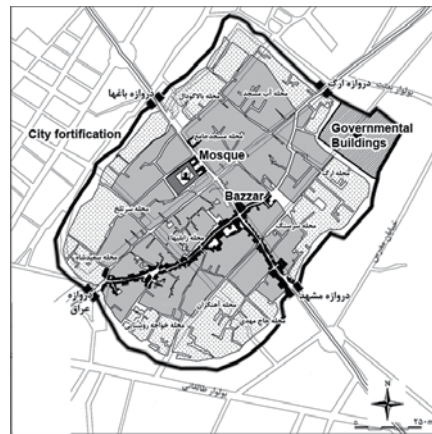
In 15th century the new city was built in today's location by King Shahrokh from Timurid dynasty which still remains and is the core of the current Nishapur. Despite the flow of goods and ideas were still on the Silk Road network, Emergence of a new maritime seafaring network brought a safer alternative for the transportation of goods. Nishapur not only could never rich its glory after that but also was almost a dead city with a small number of population until recent time. The layout of city and its morphological features are shown on figure 7.

Figure 9: Nishapur in 15th century



(Pakzad 2011)

Figure 10: Nishapur new city in 15 century



After First World War, Pahlavi dynasty came to power. Modernization was their main policies. Therefore, in beginning of 20th century the fortifications of city removed and city expanded to other side of moats around the city. A new national network of roads were built for the motor vehicles and after second world war the national rail way network expanded and passed from southern part of city. The flow on these new networks (railway and roads) has still kept the city alive so far.

4 Research question

This investigate will address the impacts of city's' connectivity and flows on its morphological transformation by deploying Deleuzean notions. It will consider the influence of Silk Road on shaping, development and death Neishpur. Thus, this paper conveys two research approaches, theoretical based on literature review and practical aspects by analysing existing historical maps, archaeological results from the site.

References

- [1] Brenner, N., David J. Madden, and David Wachsmuth. 2011. "Assemblage urbanism and the challenges of critical urban theory." *City* no. 15 (2):225-240. doi: 10.1080/13604813.2011.568717.
- [2] Britannica, Encyclopædia. 2012. *Silk Road* 2012 [cited March 2012]. Available from <http://www.britannica.com/EBchecked/media/14339/The-Silk-Road-was-a-major-thoroughfare-for-trade-and>.
- [3] Dovey, Kim. 2005. *Fluid city : transforming Melbourne's urban waterfront*. Sydney, NSW, Australia
- [4] Abingdon, Oxfordshire ; New York: University of New South Wales Press ;
- [5] Routledge.
- [6] Einifar, Alireza. 2002. "Redrawing the city image of Nishapur in Ghazani period." *Fine Arts* no. 11.
- [7] Fariás, Ignacio. 2011. "The politics of urban assemblages." *City* no. 15 (3-4):365-374. doi: 10.1080/13604813.2011.595110.
- [8] Jacobs, Jane M. 2011. "Urban geographies I: Still thinking cities relationally." *Progress in Human Geography*. doi: 10.1177/0309132511421715.
- [9] Livesey, G. 2010. "Assemblage." In *The Deleuze Dictionary*, edited by A Parr, 18-19. Edinburgh: Edinburgh University.
- [10] Martin, J, and D Romano. 2000. *Venice reconsidered: the history and civilization of an Italian city-state, 1297-1797*. Baltimore The John Hopkins University.
- [11] McFarlane, C. 2011. "The city as a machine for learning." *Transactions of the Institute of British Geographers* no. 36 (3):360-376. doi: 10.1111/j.1475-5661.2011.00430.x.
- [12] Minorsky, V. 1978. *The Turks, Iran and the Caucasus in the Middle Ages*: Variorum Reprints.
- [13] Mumford, L. 1986. *The City in History*. Harmondworth: Penguin.
- [14] Open Street Map. 2012. 2012 [cited March 2012]. Available from <http://www.openstreetmap.org/>.
- [15] Pakzad, Jahanshah. 2011. *History of Irainan City, From Begin to Qajar dynasty*. Tehran: CEUD.
- [16] The Popular science monthly. 1892. New York: Popular Science Pub. Co., etc.
- [17] Stavrakakis, Y. 2011. "The radical act: Towards a spatial critique." *PLanning Theory*.
- [18] Weber, Max. 1958. *The city*. Glencoe, Ill.,: Free Press.
- [19] Whitehand, J. W. R. 2007. Conzenian urban morphology and urban landscapes. Paper read at 6 th International Space Syntax Symposium, at Istanbul.
- [20] Worrall, Simon. 2009. Made in China, A 1,200-year-old shipwreck opens a window on ancient global trade. *National Geographic*.

iaSU2012 JAPAN Committees

ORGANIZING COMMITTEE

(hosted by the Institute of Turkish Culture Studies at Mukogawa Women's University)

Chair

Shigeyuki Okazaki, Mukogawa Women's University, Japan

Members

Takahiko Ohtani, Mukogawa Women's University, Japan

Jun Sakakihara, Mukogawa Women's University, Japan

Shushi Sugiura, Mukogawa Women's University, Japan

Yusei Tazaki, Mukogawa Women's University, Japan

Uzushi Nakamura, Mukogawa Women's University, Japan

Fumie Ooi, Mukogawa Women's University, Japan

Takashi Manda, Mukogawa Women's University, Japan

Kazuhiko Yanagisawa, Mukogawa Women's University, Japan

Noritoshi Sugiura, Mukogawa Women's University, Japan

Toshitomo Suzuki, Mukogawa Women's University, Japan

Keisuke Inomata, Mukogawa Women's University, Japan

Tomoko Uno, Mukogawa Women's University, Japan

Akira Tanaka, Mukogawa Women's University, Japan

Hideaki Tembata, Mukogawa Women's University, Japan

Sayaka Nishino, Mukogawa Women's University, Japan

Murat Dündar, Bahcesehir University, Turkey

Sezin Tanrıöver, Bahcesehir University, Turkey

ADVISORY COMMITTEE

Ahmet Eyüce, Bahcesehir University, Turkey

Bülent Uluengin, Bahcesehir University, Turkey

Hironobu Yoshida, Professor Emeritus at Kyoto University, Japan

SCIENTIFIC COMMITTEE

Yasushi Asami, The University of Tokyo, Japan

Mohamed Atalla, University of Aleppo, Syria

Gülsüm Baydar, Izmir University of Economics, Turkey

Gülden Erkut, Istanbul Technical University, Turkey

Özen Eyüce, Bahcesehir University, Turkey

Nilay Ü. Gülmez, Bahcesehir University, Turkey

Shuichi Hokoi, Kyoto University, Japan

Kunio Kato, Professor Emeritus at Kyoto University, Japan

Mamoru Kawaguchi, Professor Emeritus at Hosei University, Japan

Abdul Rehman, University of Engineering and Technology, Pakistan
Murat Şahin, Yeditepe University, Turkey
Mitsuo Takada, Kyoto University, Japan
Zuhal Ulusoy, Kadir Has University, Turkey
Türkan Ulusu Uraz, Eastern Mediterranean University, North Cyprus
Minako Mizuno Yamanlar, Ryukoku University, Japan
Hironobu Yoshida, Professor Emeritus at Kyoto University, Japan

STEERING COMMITTEE

(hosted by the Institute of Turkish Culture Studies at Mukogawa Women's University)

Kazuhiko Yanagisawa, Mukogawa Women's University, Japan
Noritoshi Sugiura, Mukogawa Women's University, Japan
Toshitomo Suzuki, Mukogawa Women's University, Japan
Keisuke Inomata, Mukogawa Women's University, Japan
Tomoko Uno, Mukogawa Women's University, Japan
Akira Tanaka, Mukogawa Women's University, Japan
Hideaki Tembata, Mukogawa Women's University, Japan
Sayaka Nishino, Mukogawa Women's University, Japan
Murat Dündar, Bahcesehir University, Turkey
Sezin Tanrıöver, Bahcesehir University, Turkey

PUBLICATION COMMITTEE

(hosted by the Institute of Turkish Culture Studies at Mukogawa Women's University)

Shigeyuki Okazaki, Mukogawa Women's University, Japan
Takahiko Ohtani, Mukogawa Women's University, Japan
Jun Sakakihara, Mukogawa Women's University, Japan
Shushi Sugiura, Mukogawa Women's University, Japan
Yusei Tazaki, Mukogawa Women's University, Japan
Uzushi Nakamura, Mukogawa Women's University, Japan
Fumie Ooi, Mukogawa Women's University, Japan
Takashi Manda, Mukogawa Women's University, Japan
Kazuhiko Yanagisawa, Mukogawa Women's University, Japan
Noritoshi Sugiura, Mukogawa Women's University, Japan
Toshitomo Suzuki, Mukogawa Women's University, Japan
Keisuke Inomata, Mukogawa Women's University, Japan
Tomoko Uno, Mukogawa Women's University, Japan
Akira Tanaka, Mukogawa Women's University, Japan
Hideaki Tembata, Mukogawa Women's University, Japan
Sayaka Nishino, Mukogawa Women's University, Japan

Financial Supporters

by alphabetical order

Aleph Networks Corporation	(株式会社アレフネット)
ASAHI KOGYOSHA CO., LTD.	(株式会社朝日工業社)
Choyo Co., Ltd.	(朝陽電気株式会社)
Daitoku Co., Ltd.	(株式会社ダイトク)
Daiwa Shuppan Printing Co., Ltd.	(大和出版印刷株式会社)
FutabakagakuShoukai Co., Ltd.	(株式会社双葉化学商会)
Interior NASU Inc.	(株式会社インテリアナス)
JTB Corp.	(株式会社ジェイティービー)
KAWACHI Corporation	(株式会社カワチ)
KINDEN CORPORATION	(株式会社きんでん)
Mitsubishi Electric Building Techno-Service Co., Ltd.	(三菱電機ビルテクノサービス株式会社)
NISSIN DENSETU INC.	(日新電設株式会社)
OBAYASHI CORPORATION	(株式会社大林組)
O-ENCE CO., LTD.	(株式会社オーエンス)
OKAMURA CORPORATION	(株式会社岡村製作所)
Osakashiroguchi Research Institute Ltd.	(株式会社大阪城口研究所)
SHIMIZU CORPORATION	(清水建設株式会社)
Takenaka Corporation	(株式会社竹中工務店)
Tsutomu Nakauchi Foundation	(中内力コンベンション振興財団)

Archi-Cultural Translations through the Silk Road

2nd International Conference, Mukogawa Women's University, Nishinomiya, Japan, July 14-16, 2012, Proceedings

2012年9月 第1刷発行

編集: iaSU2012 JAPAN Publication Committee

発行者: 大河原 量

発行所: 武庫川女子大学出版部

〒663-8558 兵庫県西宮市池開町 6-46

電話 0798-45-3522 ファックス 0798-45-3570

Printed in Japan

ISBN 978-4-9906255-1-1

本書を無断で複写複製(コピー)することは、著作権法上での例外を除き、禁じられています。



Koshien Hall Mukogawa Women's University, Kami-Koshien Campus



Mukogawa Women's University Press