

Position Paper

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ABSTRACT

This paper describes the experiences of a Chilean professor obtained in academia and in practice in the restoration and conservation of architectural heritage in diverse sites in Chile, Latin America, Europe and Iran. These experiences reflect the advantages, disadvantages, advances and deficiencies learned over the course of 45 years. They include the perspective of the development of new strategies for the training of professionals and the implementation of appropriate technologies derived from scientific investigation. However, without a doubt, the most important lesson is the evolution of thinking in the realm of the conceptual values of heritage and the application of the appropriate criteria for interventions.

TRAINING IN CHILE IN THE 1960s

Since the 1960s, Chile has taken seriously the need for training professional architects in the realm of its architectural heritage at the Faculty of Architecture and Urbanism at the University of Chile. For example, the Institute of Patrimony was created there from which seminars and workshops are offered.

INTERNATIONAL REGIONAL COURSES IN THE 1980s

The specialized knowledge in heritage protection was partly acquired by those who had the opportunity to travel to and attend events and courses abroad. The first results of this external training materialized in the 1980s: the development of seminars, regional workshops and short courses was organized and undertaken by the PNUD with the support and collaboration of the ICCROM, the Getty Foundation and the Foundation Andes in Chile.

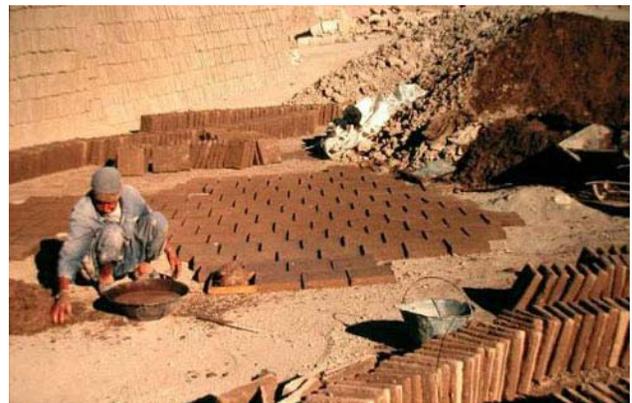
TRAINING ABROAD IN THE 1990s

The shortage of opportunities in Chile for heritage conservation training forced professionals such as me to look abroad. I obtained a place in the first course offered by the Center for the Research of Earth Architecture (CRATerre), PAT 89, at the School of Architecture of Grenoble (France); this was organized by the CRATerre and the ICCROM. This provided appropriate courses for participants of America, Europe, Asia and Africa. The topics offered were at a good level of scholarship, with suitable support in laboratories, outdoor testing and site visits. The course covered all aspects of the conservation of heritage, with special emphasis on earth constructions.

While many benefits were gained from attending the course, its weaknesses included:

- the short duration of only 30 days allowing little time for detailed discussion of the wide array of interesting subjects;
- the lack of topics related to the seismic resistance of earth structures, probably because it did not constitute a priority for the Centre; and,
- linguistic challenges for Hispanic participants as the official languages were English and French.

In subsequent years project GAIA was created, in collaboration with the organization TERRA. A biennial program was implemented for new editions of the PAT courses; this continued until 1999, when the last course was offered in Trujillo, Peru (Fig 1 & Fig.2). This project was done in collaboration with the CRATerre, ICCROM, UNESCO, US/ICOMOS, the PNUD and The Getty Institute.



Figures 1 and 2: Pan-American Pat Course, Trujillo, Perú, 1999.

PRESENT TRAINING IN CHILE

In the university curricula for schools of architecture and civil engineering in Chile, training in the subject of heritage remains something of a vocational or of a personal interest. In the best instances, two hours are available for optional choices in general extra-curricular training or as an elective of a history of architecture course.

My own experience was to teach a course on conservation and restoration of architectural heritage in the school of architecture at the local university in the City of Iquique in 2001. This region is privileged in the number of heritage buildings of different eras. Student interest was very apparent. As well as the main topics, coursework included:

- the evolution of the different technologies through history
- the modest materials available on the sites and the methods of working with them (best low cost response)
- the answers of contractors and architects
- the example of adaptation to the existing diverse climates in the Desert of Atacama
- use, function and behavior of adobe structures before natural disasters, with emphasis in the subject of seismic activity.

Unfortunately, due to changes of direction at senior levels of the university, education plans were reduced and the importance given to these subjects diminished in subsequent years. In the schools of civil engineering, faculty professors refused to teach any of the traditional or vernacular technologies, considering them obsolete and without relevance for modern engineering.

POST-GRADUATE DEGREES IN CHILE

Since 2000, the opportunity to obtain a post-graduate degree in the restoration and conservation of architectural heritage is available in at least three Chilean universities. Although efforts have been made to improve the level of education with teachers bearing European degrees, and with some exceptions, most of the existing teachers do not have practical training in traditional materials such as adobe. Gaps have been observed in the knowledge of professors and in the available practical training relative to real conservation projects using traditional materials that form the greater part of Chile's traditional built heritage. The result is that the graduates gain a good theoretical base, but do not have the opportunity to experience the practical decision-making and compatible application of methodology and criteria with real world site work.

UPDATED TRAINING COURSES IN CHILE

In 2004, through a joint venture of the National Monuments Council of Chile and The Getty Institute, I was invited to teach an advanced training course on traditional construction techniques of the Central Zone of Chile. The objective of the initiative was to train various levels of contractors, professionals, technicians, government officials and teachers. Although the programs were centered fundamentally in earth structures and the application of lime stucco, the conceptual values of the built heritage and the necessity for their conservation were emphasized.

The advantages of the course included:

- the exposure and addition to the conservation knowledge that emphasized the principles and the values of the properties to be protected: aimed at contractors, professionals, technicians, craftsmen and teachers;
- the training of basic knowledge to professionals who, from their administrative positions, have responsibility to make decisions on the future of traditional heritage buildings within their jurisdiction; and,
- basic training in 'hands on' treatments for those that may actually intervene on buildings, for example technicians, craftsmen and teachers.

The disadvantages were:

- to deliver knowledge to people with different levels of education, and knowledge, on the theory and on the practical side (hands on) within the same classroom;
- the limited time of the course, thus necessitating general overviews; and,
- the lack of follow up which prevented the evaluation of the effects and impacts of the knowledge acquired in the conservation of these heritage properties.

In 2006 I was invited to another advanced practical/theoretical training course in the north of Chile. Organized by the CONADI (National Council for Indigenous Peoples), this course aimed to train and to help people of various ethnic groups in the basics of the maintenance of traditional vernacular technologies. Participants who were very interested were inhabitants of

the pre-mountain areas that suffered the effects of a 7.9° Richter scale earthquake in 2005, an event that seriously damaged their traditional houses, churches and chapels, many with significant heritage value.

With the assistance of specialist conservation professionals, the belief was that the local community itself could undertake the necessary repairs and restoration tasks. Nevertheless, it was not possible to have a good representative contingent of the original communities of indigenous peoples since other groups were invited. Students of architecture schools from diverse zones of the country took advantage of this opportunity, and they demonstrated great interest in the subject of traditional architecture, which had not been included in their curriculum.

Regrettably this part theoretical / part practical course did not really respond to the original idea of engaging the indigenous peoples, there were insufficient numbers to focus solely on their needs. However, it was successful for the students as they were introduced to traditional techniques and materials, subjects that the university does not include in its curriculum. The experience did inspire the students to request the university to provide more information in relation to the subject of heritage conservation. In informal exchanges, they have demonstrated their interest to obtain higher levels of knowledge and specialization in this field in the future.

Problems with this type of training include:

- they are isolated situations and are low profile without continuity;
- they are sometimes given simultaneously by different institutions, with a lack of official plans for training and communication among them: the result may be a waste of effort and resources; and,
- they can create confusing goals and also foster false expectations of participants, who presume that with the knowledge received they are prepared to execute proper heritage interventions.

ON-SITE TRAINING FOR WORKERS IN RESTORATION PROJECTS

This activity took effect between 1998 and 2003 in the region of Coquimbo (Chile), in which there was a request to restore eight 19th century adobe temples. These temples had been severely damaged as a result of an earthquake in 1997 (6.8° Richter).

Due to the gaps in knowledge in the realm of earth structure technology, it was necessary to teach the workers a range of topics from adobe manufacturing to the different types of traditional masonry, mortars and stuccos, to the carpentry of complementary structural systems. The workers actually elevated their category to master levels (of instruction) thanks to this specialized restoration training. The benefit to the community is that these individuals can now restore their houses with the traditional technology and knowledge gained.

PAN-AMERICAN COURSE PAT 99

In 1999 I was included as an instructor in the PAT 99, a course organized by CRATerre, ICCROM, The Getty Institute and the INC. of Peru, in the city of Trujillo, which boasts the great archaeological deposits at Chan Chan.

As with the previous versions of the PAT courses, it relied mainly on the excellent organization of the Getty Institute. Over 45 days, the CRATerre provided an excellent form of education

using the deductive teaching method in order to approach and assess the problems. The practical part was always included as a complement to the theoretical part, with exercises based on condition assessment and evaluation, and the solution of problems from different viewpoints.

Without a doubt, the best contribution to the course was the inexhaustible source of conservation problems manifest in the monuments available in the region: the Ciudadela de Tshudy in Chan Chan; Huacas of the Sun and the Moon; Huaca of the Wizard; and the colonial architecture of the City of Trujillo. These monuments, with many interventions at different times, allowed for the observation and analysis of material pathologies and the observation of the behavior of different interventions over the course of at least 40 years from the initial applications. Therefore, it was very positive the big complex with numerous interventions: 40 years of experience in application; good place to learn both positive and negative lessons in situ.

It was also possible to appreciate the evolution of intervention criteria, updated with the tendency to the better understand the original materiality, its recovery and the restriction of the use of modern substances.

Great importance was given to the management and administration of both small and large monumental sites as an indispensable complement to the conservation and/or physical restoration of the structures.

The group of participants was comprised mainly of architects, with a few engineers, and archaeologists specialized in conservation. Most of the professionals from the academic sphere brought experience in conservation and restoration from their respective countries of origin. The remaining participants had public sector positions in the realm of architectural heritage. The mix of experiences made for a high level of content and a good discussion of relevant subjects.

One of the main ideas of this version of the course was to share it by means of partnership with the university in a continued collaboration with project TERRA. Alternatively, due to the good results of the training activities of project GAIA in 1998, this discipline was integrated into the earth architecture curriculum of UNESCO.

The weaknesses of the course:

- In my opinion, the course content re: seismic resistance of earth structures was insufficient. The intense seismicity of the Andean countries demands an on-going vigilance and learning process with this subject. As many countries do not have seismic problems, the international community has demonstrated little advance in the investigation of mitigative solutions to the devastating effects of earthquakes. While well-known experiences were offered in the understanding of the effects that cause movement in different types of masonry, there were no new contributions of measures and no mitigative solutions.
- Another negative aspect is the discontinuity of this initiative after PAT99. Project GAIA ceased its management, the ICCROM exited and the Terra project was relegated to one of the divisions of the Getty Institute. One of its missions was to cause academic advances in the university communities of the various countries, and to provide continuity to the improvement in the discipline to the highest academic levels, a situation that has not even been obtained, at least in Chile.

- The follow up of knowledgeable professionals was suspended and the PAT network (one of the project's main collateral objectives) has been interrupted. As a consequence, there have been few gains in learning since that initial decade, recognized as one of the most productive in the conservation of architectural heritage, in the realm of knowledge transfer and in the use of traditional vs. contemporary approaches.

CONSERVATION IN THE MIDDLE EAST

TERRA 2003 took place in Yazd, Iran, the ninth version of the international conference on the conservation and study of earth architecture. With a contingent of 250 international delegates, we were the only representatives of a Latin American country. The subject we presented focused on 19th century earth structures of great dimension from northern Chile: the focus was on conservation, restoration, preventive maintenance and seismic resistance. Aside from this communication, only one spoke about seismic issues in a total of 80 selected works.

In spite of the ample call of specialists worldwide, the majority of participants held titles and degrees from American and European universities. The assembly was reticent to deal with the seismic subject in the course of the event. Our position was to alert those assembled about the limited attention on this subject, already evidenced in decline at the TERRA 2000 conference (England).

The updated systematic investigations, more on the effect of the earthquakes in the constructions of earth, were made by the Getty Conservation Institute in the decade of 1990. As case studies they used old missions and farms in California that had been constructed in earth, and that had endured the effects of earthquakes in both 1988 and 1994.

The situation described here caused us great concern, with the following results:

- It is not possible to maintain the earth structure heritage or to announce the advantages of the present use of this technology in seismic zones, without first developing methods of mitigation of the effects that, in most cases, may mean the loss of human lives.
- The development of the investigation of earth materiality is not reasonable either, using falsified levels in comparison to barely advanced seismic resistance.

Two weeks after TERRA 2003, an earthquake measuring 6,8° on the Richter scale destroyed the City of Bam located 130 kilometers to the south of Yazd. The result was the loss of 28,000 lives and the destruction of the walled city of Arge-Bam, which had been recently recovered. Understandably, this terrible event affected the scientific community worried about monumental heritage and earth architecture.

Iranian authorities immediately put out a call to reconstruct the City of Bam, which would respect the traditional earth structures, but would add seismic resistant elements. The objective was to maintain the identified heritage values of this Iranian town that are opposed to the international architecture of the West.

In September 2004, CRA Terre and the Getty Institute organized the Symposium of Bam in Ville Fontaine, France. This meeting of worldwide experts, to which we were invited, focused on the seismic subject for earth architecture.

The meeting had a strong presence of Iranian professionals who demonstrated the inefficiency of the known restoration solutions in the strengthening the main structures of Arge-Bam. The professionals who participated in the projects and works, seemed to be unaware of the mechanics of earth walls before seismic activities, a reason why their collapse would be imminent with a seismic event.

With respect to traditional residential architecture, we observed that the disastrous effects of the earthquake to a large extent resulted from:

- the typical problems of the discontinuity of the traditional earth construction technology: the present generation has little or no knowledge about it;
- the modernization of rooms, with the incorporation of electrical energy, potable water and hygienic services, ultimately altered and damaged the earth walls (Fig.3);
- the conducted repairs, with limited knowledge and with superficial adjustments, did not have the desired effect to ensure the integrity of the walls before the seismic activity (Fig. 4); and,
- the living ancestral wisdom developed on the great Iranian desert plain no longer exists.



Figures 3 and 4: Terra 2003, Yazd, Iran.

Furthermore, the passivity of the professionals of Iran who have not fully assumed the challenge to deepen and to recover the knowledge on the great patrimony constructed in inhabited earth, which still they have.

Interestingly, the first conference on earth architecture took place in Yazd in 1970. TERRA 2003 is the second time that Iran has hosted this event, looking after their earth structure heritage.

Nevertheless, in events of international qualification have almost always had Iranian participants. The problem is the lack of follow-up with those who have become qualified.

COMPARATIVE ASPECTS

In comparison to the Western world, the Islamic peoples have had a persistent will to inhabit traditional structures and cities that date from ancestral times, with little variations in the form of

their housing. Therefore, these structures are considered to be complexes of high cultural value, which constitute living heritage.

The qualities of this architecture, aside from their coherence and adaptation to the local climate, reinforce the ways of life and faith according to traditions and beliefs. Nevertheless, this attitude, mainly centered in spiritual values, has generated adverse situations for its conservation:

- gradual lost of knowledge of the material and the technological part of the old cities.
- alterations and incorporation of medical facilities and other functions necessary for contemporary life, but without the necessary adaptations to protect earth structures.
- the generation of damages by the defective function of the incorporated equipment, threatens the integrity of the buildings before the natural disasters that inevitably take place.

Therefore, these structures become very vulnerable with the occurrence of natural disasters.

The Pan-American situation for its traditional and vernacular architecture heritage, aims at the problems of:

- technological discontinuity and poverty: the result of these factors is the inadequate use of methods to conserve, to recover or to construct.
- loss of the identified values: the imitation of the models of universal architecture, plus the combined incorporation of their technology, turns out to be incompatible with the methods and traditional materials used to construct.

Therefore, these structures become very vulnerable with the occurrence of natural disasters.

CONCLUSION

Over the course of more than 45 years, the improvement in the qualification of professionals and technicians in conservation and monument restoration, has evolved but not without some problems. There were times during which global initiatives coming from international organizations were put in practice and significant numbers of resources were protected.

The successive reviews and changes have limited the results of some initiatives, and have affected the suspension of plans, programs, projects and the drastic reduction of financial contributions.

The changes in the strategies aimed to move the responsibility from the heritage conservation to the respective countries of the community of the United Nations, with the supervision of organizations such as UNESCO, ICOMOS and ICOM, ended the earlier paternalistic actions. The responsibility was downloaded to governments to create their own policies of performance and to allocate resources to take care of their own heritage conservation needs.

In my opinion this strategy has worked well in developed countries, with a strong identity. It has laid the foundation in the material testimonies of its history, where resources and efforts are not scrimped to achieve excellence in the conservation of properties inherited from earlier generations.

In comparison, the opposite has happened in poorer countries, where the great demand to find solutions to overcome poverty, supersedes the conservation of cultural heritage.

Of course exceptions occur in those countries that depend on their significant monuments to generate revenue through cultural tourism. Unfortunately this advantage is not taken in the qualification and development to optimize the discipline of the conservation in order to protect these places.

Amazing scientific advances, the product of rapid technological evolution, are increasingly making better resources available to optimize the quality of heritage conservation. Nevertheless, one does not notice that there is a parallel growth in the update of theoretical, conceptual bases to sustain and to improve the application of criteria and methodologies of intervention. This could be related to the increased occurrence of natural disasters that are happening more frequently these days.

The first impressions are surprise about the destructive violence of the phenomena, then a feeling of impotence to arrest the effects of the natural disaster.

There remains an endemic problem between the professionals in charge of the conservation of the architectural heritage, which has been generated among others, and the handling of high levels of technology. Knowledge is often missing at the condition assessment stage of the traditional buildings after the occurrence of natural disasters. While the simple, immediate solution is often useful, care must be used in addressing these situations, especially vis-à-vis protecting heritage values.

Direct observation and the meticulous documentation of case studies are irreplaceable methods to achieve a proper diagnosis, without the necessary support of new resources. The lack of reflection and missed diagnosis almost always leads to mistaken responses as opposed to a disaster, being increased artificially the damages caused by the nature (for example, the earthquake which happened recently in the city of Pisco, Peru) is added to the previous thing that, generally, the mass media magnify the fragility of the materiality or the obsolescence of the structural solutions, not knowing the antiquity of the constructions and the amount of opposite events to their conservation that have had to support.

I suggest that it is time to propose to UNESCO and to the Getty Institute to create a subcommittee of 'seismic resistance of earth structures', along with economic support for the proper scientific research. To establish cooperative systems that will allow for global solutions to the future challenges, I suggest the following goals:

- Develop a policy of qualification and improvement under new concepts, in order to develop options for pre and post degree on the subject at the university level.
- Create instances of commitments and cooperation between nations to elevate the discipline to a level of excellence, mainly in the poorest countries.
- Update regional courses and workshops in collaboration with recognized international institutions, surpassing the weaknesses that have been detected in past artifacts/structures, incorporating knowledge on the handling and monument/traditional/vernacular heritage administration and sites.

- Understanding of the root causes of the problems of traditional materials and structures and how to address these, using concepts and methodologies in order to compensate for seismic activities.
- Encourage scientific research on the seismic resistance of the traditional earth structures in the countries located in the zones of greatest risk, using existing university facilities or other resources that have otherwise been concentrated in the evaluation of contemporary materials (for example: seismic table at the School of Engineering at the University of Chile).
- Create instances of qualification for the handling of monuments in case of natural disasters (update of the UNESCO protocol).
- Harness the use of modern communications to maintain effective networks, and be able to act before the occurrence of natural disasters and other factors that could endanger our architectural heritage.