A NOTE ON THE AUTHENTICITY OF HISTORIC TIMBER BUILDINGS WITH PARTICULAR REFERENCE TO JAPAN

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In this paper my aim is to discuss the criteria of **authenticity** in relation to historic buildings involving the use of wood as structural, protective and/or decorative material.[1] I was prompted to take up this subject by Japan's recent ratification of UNESCO's World Heritage Convention.

The wood conservation problem in historic buildings cannot be studied in isolation from the building as a whole, including its environment: If the joists in a brick building are decayed by fungal and insect attacks, the primary problem is not one of wood preservation but of building preservation. However, when the causes of the decay of the joists have been discovered, and water penetration into the structure has been prevented then we have a wood conservation problem: Should the joists be replaced by new timber; should they be replaced in entirety, or partly by jointing new timber to the healthy part of the old timber - by using traditional wood work joints or perhaps steel plates? Or should the joists be conserved **in situ** by contemporary techniques and methods - for instance by consolidating the decayed beam by fiberglass rods in epoxy resin? Which is the best method for preserving the historic building as an **authentic** artifact? The criteria of authenticity will be discussed in relation to the design, materials and workmanship of the building.[2]

The Criteria of Authenticity and the Consequences for Interventions in Historic Buildings

By referring to the yet unresolved dilemma of the ship of Theseus, David Low enthal[3] identifies the basic problem of all art ifact preservation:

"As long as form persists, authenticity veers between shape and substance."

According to Plutarch, the Athenians preserved Theseus's ship as timber struc-

tures of all kinds always had been preserved: by taking away the old planks as they decayed, replacing them by new and stronger timber. In Athens, the preservation of Theseus's ship became a standing example among philosophers for objects undergoing change: Was it still the original ship? If not, when did it cease to be?[4]

Object identity is still debated as a philosophical problem. The basic question remains: Can identity of form triumph over material authenticity?[5] Some philosophers claim that identity of parts and spatio-tem poral continuity of form are two independent, but defeasible sufficient conditions of identity of equal weight: either may be defeated by application of the other.[6] Another opinion has it that in cases of conflict, the continuity of form cannot be overruled by any other suffi-ciency condition for artifact identity, such as identity of parts, while the latter can be overruled by the former.[7]

The international preservation com munity (e.g. ICOMOS and ICCROM) does not support this conclusion. Retainment of existing materials is the major object of current building preservation theory: the building should, if structurally and functionally possible, be preserved as it has been handed down to us through history. The identity of the building is related to the substance acquired through its history.

This approach to the preservation of historic buildings goes back to the earliest days of modern monument preservation the-ory: Already A.N. Didron argued in 1839 that the least intervention is the best.[8] It was developed further by John Ruskin and the British Society for the Protection of Ancient Monuments in the latter part of the 19th century.[9] However, the theory has been opposed by the protagonists of restoration based on stylistic criteria.

Preserving the Identity of Form and Substance through Decay and Des truction

The Golden Hall **(Kondô)** of the famous Buddhist temple **Hôryû-ji** in Nara Prefecture, Japan, is called "the world's oldest wooden building". The history of the building is fascinating, and particularly interesting when interpreted in the perspective of object identity. The hall was erected in the latter part of the seventh century, immediately after a fire in 670 A.D. It looks as if it is two stories high, but the upper story only consists of structural members; it is not intended for use. As the building is standing in the temple compound today, most members of its lower part are new because the original timbers from the seventh century here were lost in a fire in 1949.

During the Second World War the roof structure and upper part of the hall were dismantled. But the dismantling was discontinued because the removal of the original interior wall paintings proved to be extremely difficult. These were mural paintings on plastered wooden lattice (wattle and daub) in the bay between the pillars. Painters had started to make a replica but the work was not completed.

Then, on January 26th in 1949 the terrible accident happened: The part of the Golden Hall which had not been dismantled, including the wall paintings, was severely damaged by fire. The timbers of pillars, lintels, and other members were charred up to three

centimeters deep. This meant that the damaged material could not be reused in a building which should still have sacred functions.

The members which were destroyed had been carefully measured and investigated before the fire. It was decided that the hall should be reinstated by using partly new materials of the same species of wood as used originally - **hinoki (Chamaecyparis obtusa**, Japanese cypress) - and that new members should be dressed by using the ancient tools and techniques. Further, the old existing members which had been removed during the dismantling should be used for the upper part of the hall. The work of rein statement which also included restoration of the hall back to its original state, was completed in 1954.

Of the upper part of the restored hall standing in the Hôryû-ji compound today, some members are original, from the seventh century, but many have also been replaced, as the structure was completely dismantled, repaired and reassembled at the beginning of the twelfth century, in 1374, and in 1603. Probably no more than 15-20 % of original materials exist in the present temple hall today.

Before the rebuilding of the present hall could start, the burnt lower part had to be removed: The charred surface of the members was extremely fragile and was consol idated by a synthetic resin; then the structure was carefully dismantled, and finally rebuilt within a fireproof concrete warehouse on the temple site. No new additions were made; the building stands inside the warehouse as a fragment, a ruin.

The Japanese have wisely solved the problem of identity by designating as "Important Cultural Property" (according to the "Law for the Protection of Cultural Properties") **both** buildings **as one building.** The "world 's oldest wooden building" is in reality today **two** buildings. The burnt one is continuous in form and substance, although as a fragment; the hall with contemporary sacred functions is partially continuous in materials, and also only partially in design as it was restored to its original design from the seventh century.

It must suffice to conclude here that this is a rare case - but still it can be regarded as an example of what may happen to timber buildings because they burn easily, and a fire may lead either to the complete loss of the materials or they may be destroyed so badly that it is not possible to use them.

The Concept of Authenticity in the Venice Charter fo ICOMOS and UNESCO's World Heritage Convention

Changing values have been attributed to historic buildings through history. David Lowenthal sums up some of the values as "...esthetic quality, symbolic import, patriotic inspiration, pedagogic utility, historical and archeological understanding, tourist and other revenues".[10] All these values are related to the historic building's form and substance.

According to the Venice Charter it is our duty to hand historic buildings ("ancient monuments") on to future generations

"...in the full richness of their authenticity".[11]

Particularly through articles 3 and 9 of the Venice Charter it becomes evident that the **authenticity** relates to the **aesthetic and**

historic values which we can attribute to a historic building because the historic building ("Historic (Ancient) Monument") have a dual property: as **work of art** and as **historical evidence**. The aim of preservation is therefore to define the aesthetic and historic values of the historic buildings and then select the best method to keep them for posterity.

Both the Venice Charter and the World Heritage Convention asserts that human values are universal:

"People are becoming more and more conscious of the unity of human values and regard ancient monuments as a common heritage. The common responsibility to safeguard them for future generations is recognized."[12]

Consequently, what is universally accepted to be necessary to preserve is the historic building as authentic work of art and as authentic historic evidence. However, it is not the original formal concept which is regarded as the authentic, but the building as it has been handed down to us through history with all its modifications and additions due to repair caused by decay of the structure and its materials and by modifications for func tional reasons. The enclosed diagram 1 illustrateds a typical development of a building which have acquired the status of "historic".

According to Article 11 of the Venice charter :

"The valid contributions of all periods to the building of a monument must be respected, since unity of style is not the aim of a restoration."

The "Operational Guidelines for the Implementation of the World Heritage Convention" emphasizes that the evaluation of the authenticity

"...does not limit consideration to original form and structure but includes all subsequent modifications and additions over the course of time, which them selves possesses artistic or historic value."[13]

The question of "valid contributions" in Article 11 of the Venice Charter is disputable and can only be decided by an expert intimately familiar with the architectural history and cultural values of the country or region where the building is located. Japan has a well developed professional and administrative system to decide such problems for buildings which are designated according to the Japanese "Law for the Protection of Cultural Properties".[14]

The Venice Charter, Article 11, confirms that not all additions or changes which have occurred to the building necessarily not must be of equal value but the removal of later additions in order to reveal an underlying state or layer is justified only under "...exceptional circumstances". Unity of style - **"stylistic restoration"** - is not a desirable goal. In other words, the building should be conserved in its existing state.

This way of thinking was introduced by Alois Riegl in 1903.[15] He

"...distinguishes between the values of the past and the values of the present which do not coincide but may even disagree with each other."[16]

Riegl's concept of "age value" **(Alterswert)** implies that we

"...have to assume that everything which history has changed is irreversible and as such has become part of the monument".[17]

The aesthetic value of the historic building is according to this theory intimately linked

to its value as historical document. Further, the beauty of the building is not only related to its form but also to the weather-worn look - the "patina" - of its materials. Only by retaining its old materials does the building appeal to us emotionally as a historic building. Both the artistic and historic value of the monument is related to its authenticity in substance. This implies that in preservation work

"...as much of the old material as is economically possible must be re-used".[18]

Bernard Feilden has summed up the considerations which should be given to in terventions in historic buildings in order to maximize the preservation of existing material.[19] Any proposed intervention should:

"a) be reversible, if technically possible; or

b) at least not prejudice a future intervention whenever this may become necessary;

c) not hinder the possibility of later access to all evidence incorporated in the object,

d) allow the maximum amount of existing mate rial to be retained.

e) be harmonious in colour, tone, texture, form and scale, if additions are necessary, but should be less noticeable than original material, while at the same time being identifiable..."

(This is according Article 12 of the Venice Charter).[20]

As long as the structural integrity of the historic building is secured, the theorem " Do as little as possible" neatly sums up the overruling norm in contemporary preservation philosophy. By this modest approach the material authenticity of the historic building as it has been left us from history is retained. How does this apply to timber buildings?

General Properties of Wood and the Durability of Timber Buildings

As one of the primary building mat erials wood has been widely used in buildings all over the world. In some regions, for instance in Scandinavia and Japan, small-scale wooden buildings are still preferred for new dwellings and residences. Hence wood had and still has various levels of importance in a building as structural, protective and decor ative material. The various used of wood in historic buildings are illustrated in the enclosed diagram 2.[21]

Wood is an organic building material which decays rapidly by fungal and insect attacks and other biological decay agents. Moreover, wood burns readily.[22] The resistance to decay in different types of wood varies widely, depending on species (parti cular problems related to hardwoods/ softwoods), the grading of the materials, and natural defects. Under favorable circumstances wood with a medium rating will last over a thousand years. One of the main reas ons why many Norwegian timber buildings built of pine **(Pinus sylvestris)** in the 12th and 13 th centuries have survived with most of the original members intact is the well selected timber, seasoned by different tech niques in order to increase the section of heartwood before the tree was felt. Also the Norwegian climate which is generally relati vely cold and dry, and an appropriate design, must be considered as contributing to the long life of the Norwegian Medieval timber buildings.

In particular in tropical countries, or in general, where the climate is characterized by continuous high temperatures and high relative humidity, the working life of wood can

be short.

The durability of wood in buildings relies on five general criteria:[23] 1) the quality of the materials; 2) the techniques and tools used for dressing the materials; 3) the design of the building (designed in such a way that it does not carry the seed of its own decline); 4) soil conditions of the building site, including the building's foundations; 5) the external and internal environment of the building (relative humidity and temperature; seismic activity; wind). All these factors are interrelated; an example on the importance of the relation ship between good quality wood and the craf tsman's tools and techniques for the durability of wood, will be given later.

The "patina" of unadorned wood which have been exposed to the elements for generations is caused by 1) radiation of the sun in combination with humidity; and 2) fungi growing on the surface of wood, e.g. "blue stain fungi" (possibly also metal compounds in the atmosphere combined with water) Both factors cause color changes to the wood: The color will differ depending on the orientation of the exposed wall. In particular the effect of light on exposed wood leads to decomposition of the wood fibre. Humidity accelerates the process. Year by year, the surface of unador ned wood erodes at a pace estimated from 1 mm to 12 mm per year.[24] In Japan it is estimated that the surface of exposed wood decreases, in average, by 3 mm per year.

The "patina" of untreated wood is in addition also made up by 1) cracks caused by expansion and contraction of the wood by variations in relative humidity; 2) warping; and 3) destruction of the surface by insect attacks (bore holes or exit holes). When a decayed member must be replaced by new timber, it is, as a result, problematic to achieve uniform aesthetic appearance so that the new addition are "...harmonious in colour, tone, texture, form and scale" with the surroundings.[25] Further, new members should be "...less noticeable than original material, while at the same time being iden tifiable". In wood buildings, the problem is the opposite: new material will inevitably be easily identifiable. Still, there are exceptions where one has to consider whether the form and decoration of new timber should contrast or be in harmony with the preserved parts.[26]

"Artificial patina" is in reality a concept without meaning for wood preservation. It is mainly the coloring which is possible to adjust to; to copy the natural decay and deformation of the timber is not a desirable and also hardly an attainable aim. However, coloring of unadorned wood by chemical or physical processes has been widely used all over the world.[27] According to the exper- ience of Japanese preservation specialists, if the new members are left untreated the adjustment of old and new members will take place naturally during a period of twenty to thirty years. However, the replace- ment of a large number of visible members during repair would leave the building with an unsightly appearance for a long period. Japanese preservation experts have observed that the problem of adjusting the aesthetic appearance of new members to old ones is facilitated if new members are made of similar species of wood with the same grading as the existing members, and, further, if they are dressed with the same

tools as was used originally.

Also in Japan architects and carpenters resort to different techniques to color new members. There is a long tradition even in new buildings for this: Already in the seventeenth century interior members of tea-rooms were treated in order to give them an old, rustic appearance. In Japanese preservation work today principally two methods are used for the coloring of new members of unadorned wood: 1) by applying some particular coating to the surface of the member (**koshoku nuri**, lit. 'old color paint'); or 2) by burning the surface of the new member with a torch followed by brushing with a steel brush **(fûshoku)**. As the methods used for making coloring on new members are considered to be an integrated part of the traditional carpentry techniques, no research has so far been done to decide which method is the best.

Burning and brushing normally give good results. Some architects are, however, reluctant to use this method as they believe that it shortens the durability of wood by perhaps as much as fifty years. Most architects and craftsmen in Japan favor the old recipes which generally include Indian ink mixed with clay or sand, and sometimes also a mineral pigment like umber is included. Some architects dissolve all the ingredients in animal glue or persimmon juice before applying it to the wood. The general idea is that the coloring should be rather weak and disappear in ten to fifteen years time, gradually allowing the new member to age naturally. In any case, new members or part of members should have the year marked on them by carving[28] or by marks burnt into the wood as they do in Japan today.

Authenticity in Relation to Traditional and Modern Repair Techniques

Article 10 of the Venice Charter seems rather weak in propagating traditional techniques in preservation work, although It expresses concern for the structural behavior and durability of modern materials:

> "Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modern technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience."

Harald Langberg, a Danish architectural historian and one of the co-signers of the Venice Charter in 1964, explains the background:[29] It was taken for granted that the same materials and techniques which were used during the previous construction work on the building also should be used in preservation work. However, in cases where traditional materials and techniques had proved to be unserviceable, one should not be committed to repeat the mistakes of the past. The skepticism towards contemporary materials was based on the insight that these could solve a given technical problem but could at the same time have un-conceived side effects that could cause serious problems in the future.

Today the majority of preservation experts in all parts of the world concerned with timber buildings subscribes to the same doctrine:

> "...wherever possible traditional methods of repair should be used".[30]

Traditional methods of repair presuppose: 1) availability of timber of the same species and

grading as the historic timber (the Japanese sometimes also try to obtain timber with the same natural defects in the new as in the old timber); 2) forest owners or loggers, familiar with traditional seasoning techniques; 3) craftsmen, in particular, carpenters who are familiar with the handling of traditional tools; and 4) availability of traditional tools. In addition, the conservation architect, and preferably also the carpenters, should have thorough knowledge of traditional design methods and construction techniques. It is an accepted fact in modern industrial societies that it is extremely difficult to fulfill all these conditions, even just a few of them.

Traditional versus contemporary techniques in relation to preservation of timber buildings can be classified as:

1) Structural repair by dismantling

Repair of individual members by:

A) replacing decayed timbers or decayed parts of timbers by new timber using

a) traditional jointing techniques

b) jointing by animal glue or epoxy resin, steel plates, straps, or any acceptable contemporary method

B) consolidating decayed members by filling cavities with epoxy resin

C) reinforcing decayed structural members by epoxy resin with metal plates or fiberglass rods inserted. (Several methods are marketed as commercial products in North America and Europe.)[31]

2) Structural repair **in situ.**

Also includes lifting the building or parts of it by hydraulic jacks

Repair of decayed members by the same methods as above under 1 A-C.

The selection of appropriate preservation method will depend on whether it is necessary to repair the historic building or part of it for structural or for cosmetic reasons. Also cultural traditions must be considered. In Japan it is documented that dismantling, repairing and reassembling has been the traditional method for repair and preservation since the ninth century. As traditional methods should be prioritized, it is important for the Japanese that the knowledge and techniques related to this method is preser ved. However, when members shall be repaired, the Japanese freely use all options (1 A - C above), but mostly relies on 1 Aa: traditional jointing techniques.

In addition, both buildings reassembled after dismantling-repairing and buildings conserved **in situ** can be structurally reinforced by steel members (posts or be ams) or steel trusses, different types of arm ature, turnbuckles, etc. The Japanese introduced structural steel reinforcement already at the beginning of this century, particularly in the restoration of the Great Buddha Hall **(Daibutsuden)** of **Tôdai-ji** 1906-1913.[32] Whereas England has many medieval timber buildings, there is still no documented evidence that dismantling and repairing has been used through the centuries. However, dismantling-repairing has been used in some cases quite recently, but mainly as a last resort to prevent complete destruction of historic buildings.[33] Admitting that dismantling-repairing sometimes may be necessary, the Society for Protection of Ancient Buildings is opposing the method. On the other hand, SPAB warns against uncritical use of epoxy resins.[34]

In Norway the Bureau for Protection of Cultural Properties has found that, with the

exception of the sill beam, the walls of Medieval log buildings have not been repaired since they were built. Dismantling has no tradition here. When the sill beam was replaced, the carpenters jacked up the building. Today, when it is necessary to repair a log in the middle of the wall, small hydraulic jacks are used to press two logs apart in order to give the carpenter access to repair the decayed part, or replacing the log. This method is quite convenient owing to the flexibility of the structure and the nature of the corner joints which give a log building its rigidity. The Bureau has also recently started a combined repair work/ training program for carpenters. Further, the Bureau is establishing "preservation banks" in several districts. The assets of these "banks" are high quality timber and other necessary materials for preservation work, like various types of wooden shingles and birch bark for roofing.[35]

Dismantling, Repairing, and Reassembling of Buildings is the Traditional Preservation Method in Japan

The attachment to natural materials in both the structure and roofing is one of the fundamental characteristics of Japanese traditional architecture. Japan's architectural history until the end of the nineteenth century is exclusively a history of wooden building.[36] The Japanese climate, characterized by hot and humid summers, is most unfavorable for wood preservation. Moreover, the frequent earthquakes and seasonal strong winds in Japan can be devastating for buildings. Thus, it is remarkable that almost half of the nearly 3,500 designated buildings were erected before the seventeenth century.

Japan has a well-documented architectural history: an immensely rich collection of extant historic records, and, in addition, the carpenter's inscriptions on the members of a historic building can give important information about the construction. On this basis it is possible for the Japanese preservation exports to know fairly exactly the durability of wood in the different parts of a historic building, the durability of the roofing, and of other materials - and consequently when it is necessary to repair.

On this basis the Japanese experts have been able to conclude that timber buildings in their country, and in particular temple buildings, through history have at regular intervals been completely dismantled, repaired through the replacement of decayed members, and then reass embled. Today, this historical experience has been adopted in the administration of cultural properties in Japan following the historically based intervals for necessary interventions in timber buildings. The construction system in Japanese timber framed buildings make this method of repair particularly convenient as the members are connected longitudinally and at angles by sophisticated woodwork joints. Only to a limited extent are nails or cramps used to connect members.

Concerning a Buddhist temple building in Japan we may note the following points in its repair history; the building has been:

1) completely dismantled and repaired every 300 to 400 years. The complete

dismantling was necessary at regular intervals because the timber structure itself was failing by loosening of the joints, partial sinking of pillar stones, decay and warping of members. these defects caused the structure to incline. If the incline reached 3 degrees the complete dismantling was of utmost urgency.[37]

2) "half dismantled" every 150 to 200 years. It was necessary to dismantle the roof structure due to the sinking of the long projecting eaves, and decay of members in the upper part of the structure. The sinking of the cantilevered eaves made the curving up of eaves' corners disappear. Sometimes, the sinking also made the end of the eaves wavy. The impression of the building became greatly disturbed. It lost so to speak its architectural significance. On the other hand, English experts find the movement and distortion of a timber frame as adding "...greatly to their quality and character", provided the distortion is not structurally dangerous.[38]

3) partially repaired in the period bet ween the two major repairs (complete or half-dismantling): Some of the most deteriorated parts of the building, for instance the eaves, clay walls, or joists, were disman - tled and members repaired.

In addition, the roofing and exterior paint or coating of **urushi** must also be renewed regularly. Today, more than half of the buildings designated as "Important Cultural Property" have organic roofing materials like reed, cypress bark, and shingles. All have short durability, and the roofing was completely renewed at regular intervals from three to five decades depending on the material and local climatic conditions.

As Japanese timber buildings have been continuously dismantled and repaired, the oldest several times, in a process where decayed members or decayed parts of members have been replaced with new timber, we may wonder how many original members that exist in buildings which may be nearly 1,300 years old.

The actual amount of original material compared to material added through later repair was carefully investigated when the three-storied pagoda of Hokki-ji in Nara prefecture was repaired in 1972-1975. The pagoda was built at the end of the seventh or the beginning of the eighth century. Documents confirm that it has been repaired seven times, of which three involved complete dismantling.

The outstanding Japanese architectural historian, Dr. Masaru Sekino established the age of each member related to its position in the building.[39] Naturally, the largest proportion of original members was located in the lower story, and the amount was decreasing upwards. When considering the process of repair in this building, it is remarkable that nearly 50% of the original timber members still existed prior to the restoration in 1972-1975. It would be audacious to draw conclusions from one example. Still, Dr. Sekino's investigation indicates that throughout history the repair of Buddhist temple buildings in Japan has been executed with respect for the preservation of existing, perhaps in particular original, materials in the sense that they reused as much as possible of old material.

Preservation of Traditional Repair Techniques in Japan

A new approach to the use of traditional but outdated tools and techniques in repair work was initiated during the repair of the buildings of **Hôryû-ji** (Nara prefecture, Japan) between 1935 and 1955 (including the reinstatement of the Main Hall after the fire in 1949, mentioned above). The architect in charge of the project, Dr. Kiyoshi Asano, and the master carpenter, Tsunekazu Nishioka, carefully studied the surface of the timbers and old documents to decide what kinds of tools the carpenters had used in the seventh and eighth centuries, and which postures they had when handling the tools during dressing the timber. Their studies prompted a revival of historic tools which where by then out of use, particularly the spear-shaped plane **(yari-ganna)**. Their investigations showed that in the case of pillars, the timber had first been hewn with an adze **(chôna)**, and thereupon the surface had been finished with the spear-shaped plane.

The yari-ganna leaves a quite distinct surface pattern, resembling a bamboo leaf. According to Nishioka a wooden surface finished with yari-ganna stays smoother for a longer period than surfaces finished with ordinary planes. The cut is so clean across the cell walls of the wood that it prevents penetration of water and makes the wood more resistant to attacks by fungi.[40] Thus, the seventh century Japanese carpenters' skill with the yari-ganna when working with the supreme quality **hinoki** (Japanese cypress) goes a long way to explain why a large percentage of original timbers can still be found in the preserved buildings from he seventh and eighth centuries.

The method which Asano and Nishioka introduced through their work at Hôryû-ji has since been faithfully adopted by Japanese conservation architects: If a member in a timber structure must be replaced, they do not merely try to obtain the same species with the same grading and possible natural defects as was used origin ally, but the new member will also be dressed with the same tools as the original carpenters used, and, if possible, the carpenters use the same work postures when handling the tools in order to obtain the original surface texture. The conservation architects claim that if this approach is used, the new member will fit better into the original structure, both technically and aesthetically.

Lack of competent craftsmen, and the loss of knowledge of traditional building techniques would be particularly severe for Japanese preservation work because the design methods, construction techniques, and details in the traditional wooden architecture are so sophisticated. Acknowledging this problem, the Japanese government in 1975 included a new chapter in the Law for the Protection of Cultural Properties providing for "Protection of Traditional Techniques for Conservation of Cultural Properties". The basic idea is that it is not only objects as such that are worth preservation, but also the knowledge and methods which were used to produce them, and which are crucial for their preservation. Both individuals and organizations can

be recognized for their knowledge and competence as "Holders" of traditional conservation techniques.

Since 1975, the Agency for Cultural Affairs (ACA) has recognized five individuals and three organizations as "Holders of traditional conservation techniques for conservation of cultural properties" (in short "Holders") in relation to architectural preservation. These include: 1) traditional construction techniques and carpentry work; 2) traditional repair techniques; 3) ornamenting and coloring techniques; 4) roofing techniques for wooden shingles, cypress bark and reed; 5) traditional roof-tile production techniques; 6) the **kiku** technique - a sophisticated technique which originated in Japan in the 12th century for the design of the long projecting eaves.

The ACA takes active measures to preserve traditional conservation techniques by documenting them and by giving annual contributions to the organizational "Holders" to enable them to arrange training courses for conservation architects and artisans of various crafts.

The Japanese recognize that the traditional techniques are necessary in order to preserve the historic structures, and conversely, traditional techniques are being preserved through actual preservation work. The mutually dependent relationship between the preservation of buildings and the preservation of traditional techniques is extremely important, and represents the crux of contemporary architectural preservation endeavors in Japan.

The Respect for Later Additions - Authenticity in Design

For the past decades the main the orem in Japanese architectural preservation has been to consider the original state of the historic building as the best. Additions and members which have replaced original members through repairs have been given less attention than original members. This has led to restorations that are unacce ptable to Western specialists who aim at preserving the building with all later additions and alterations.[41]

Through history, buildings were often rebuilt in the fashion of the time during the reassembly after dismantling-repairing, or the structure was modified to suit new functional requirements. The new members were dressed and decorated according to the prevalent fashion. The Japanese experts have decided that members added through previous repair, almost without exceptions are of less value compared to original material. We may query if the Japanese approach of restoring buildings to a former state is analogous to the theory of "stylistic restoration" in Europe in the latter half of the 19th century? The restoration of medieval buildings in Europe at that time.

"...aimed at the completion and recreation of an architectural whole according to the original intentions or the most significant period, using historical research and analogy with other buildings of the same style as a reference...The 'historical' significance of a building was seen - not so much related to continuity and stratification in time - but rather to a particular moment or period in history, especially that of the first architectural concept".[42]

The European concept of protection of cultural properties was introduced to Japan

after the Meiji restoration in 1868. In the Meiji Period (1868-1912) the Japanese eagerly studied, adopted and adapted European and North American science, technology and culture. In the 1880s extensive field research was carried out all over Japan to record cultural properties. In 1897 the "Law for the Preservation of Ancient Temples and Shrines" was enacted. The content of the law was quite in line with contemporary European laws for the protection of cultural properties. Large-scale preserva tion works were carried out on many important historic buildings where the exterior of the buildings generally was restored to its original design, while contemporary European and North American building technology was introduced for the repair of invisible parts of the structures. For instance, steel roof trusses were used for the repair of roof structures.

Since the exterior of historic buildings was restored to the original state, it is likely to believe that this approach was a result of the adaption of the European theory of "stylistic restoration".[43] However, this is not documented. A theory, to the extent they were aware of it, which emphasized the significance of the original state must have suited the Japanese well, because it must have been difficult to comprehend a theory which accentuated preservation of the existing state: Because the traditional Japanese timber structure must be dismantled in order to be repaired, it is, **per se**, impossible to conserve the existing state.[44] Moreover, the theory of John Ruskin and William Morris which even implied that a ruin could be beautiful must have been absurd to the Japanese. A timber building can never become beautiful as a ruin.[45]

As it is technically impossible for structural reasons to conserve the existing state in Japanese historic buildings, the Japanese preservation experts as a consequence attribute less value to the additions and alterations compared to original material. Both the historic and artistic value becomes related to the original material and the presumed original form.[46]

The respect for the original state is also extended to comprise the conservation of paint and **urushi** on painted or coated buildings. External surfaces have quite obviously been repainted or recoated many times due to the short durability of the traditional glue paint and coating of urushi. Hence Japanese experts feel that repainting or recoating can be justified. However, interior paint or lacquer is generally original, and experts are reluctant to advise repainting here. Original interior paint-layers are therefore conserved by modern scientific conservation methods.

The Japanese have adhered to the theory of "stylistic restoration". To understand and appreciate this approach it is important to bear in mind that Japan has a rich architectural heritage. About 50,000 historic buildings have been designated by the Japanese government and local governments as cultural properties.[47] Most of these buildings were built during the last 400 years, mainly in the Edo Period (1615-1867). Earlier buildings are more rare. As there are many historic buildings from relatively recent times (in a Japanese historic perspective) but few from the earlier periods, the latter are

treasured as rare specimens. According to the Japanese view the restoration to the original design is the only way to reveal their artistic and historic significance.

To take an example: a building originally constructed in the Kamakura Period (1185-1333) may have been rebuilt during the Edo Period; many new members of contemporary style were added at that time, so that the building appeared like a typical Edo Period structure. If it is decided, through investigations during the dismantling, that the building's main significance is as a Kamakura Period building, members from the Edo Period will be removed and replaced by new timber shaped in Kamakura period style. If the members from the Edo Period are severely decayed and it is necessary to replace them anyway, why should new members be copies of these later additions and not be shaped in the Kamakura Period style?

The Japanese experts claim that the members which have been substituted through later repairs, and also later additions, are of value mainly for the architectural historian. If these are removed, the architectural historian can study the building's history in the reports which always are published after the completion of comprehensive interventions in historic buildings. The Japanese have set an international standard concerning the publication of repair reports as provided in Article 16 of the Venice Charter. These comprehensive reports, which today number more than one thousand, give detailed documentation in text, drawings and photographs of the building prior to and after repair, including the repair process and all historical evidence which has been revealed through the dismantling. These reports have been published continuously since the 1930s.[48]

The operational guidelines of the World Heritage Convention requires that reconstruction should be based on complete and detailed documentation and to no extent on conjecture.[49] The restoration of buildings to the original state in Japan is, in some cases, done on the basis of full documentation, but more frequently it is only possible to establish the original state to a limited extent. The Japanese experts claim to be satisfied when about 80% of the original design is ascertained; then a timber structure can be restored. The remaining part of the original design may be conceived with a high degree of accuracy because the buildings of each period have a distinct language of form. In addition, the complete shape of the building can be decided almost exactly if it is possible to establish the **kiwari** method (the Japanese proportioning system) and the **kiku** technique (a design technique for the eaves and the placement of the rafters) used in the original design. This argumentation is not mere conjecture.

Superficially it may seems as if the restoration to the original state in Japan is similar to that of 19th century Western "stylistic restoration" ideas, but the practical design methods to achieve the aim cannot be compared with the restorations of Eugene Viollet-le-Duc in France and Sir Gilbert Scott in England. The Japanese approach to restoration is in reality more similar to the Italian theory for conservation of works of art developed after the Second

World War by Cesare Brandi and others. According to this theory, preservation

> "...aims at the re-establishment of the potential unity of the work of art so far as possible without committing an artistic or historic falsification. A fundamental pre-condition for restoration is the recognition and definition of an object as a work of art, considering its aesthetic and historic aspects. Restoration is the method for transmitting the work of art to the future."[50]

In Japan, architectural unity is generally the predominant aim. Removal of members or additions built at a later stage is not considered to be "artistic and historic falsification".

Conclusion

I have outlined some general problems relating to the **authenticity** of timber buildings according to the criteria of the Venice Charter and the World Heritage Convention. Some of the problems are common for timber buildings all over the world, but I am convinced that the final choice of options with regard to the necessary interventions in order to preserve the artistic and historic integrity of the historic building must be taken on the basis of national or regional cultural values and traditions. The universality of human values as expressed in the Venice Charter implies that we should accept local traditions as parts of a larger whole: We should follow the advice of the World Commission on Environment and Development to think globally and act locally.[51]

As a consequence, we may outline some basic characteristics of historic wooden buildings, and outline universally applicable guidelines for possible interventions to cope with the problems in herent in material and structure of timber buildings. However, the choice of appropriate method must be done on a national or regional basis according to the cultural values in each area. In the context of ICOMOS, general guidelines for the conservation of timber buildings is not sufficient. We also need national or regional guidelines to adapt the philosophy of the Venice Charter as well as that of the general guidelines for the preservation of timber buildings to the local problems.

The present state of architectural preservation work in Japan can be considered as an amalgam of two cultural phenomena. First, it is a continuation of age-old traditions of craftsmanship and technical knowledge. Second, it is an application of contemporary scientific conservation methods. Synthetic resins are carefully, and only in particular cases, used to prolong the life of original wooden members. Timber structures are reinforced with metal members like turnbuckles in order to conserve the original design. An understanding of the nature of architectural preservation efforts of Japan therefore gives a glimpse of a general trend in the development of Japanese culture: the import of foreign ideas and the refining of these by blending them with the best elements of the traditional culture.[52]

The logic inherent in the Japanese timber buildings and the necessity of ongoing repair by dismantling, call for a different approach to that of the preservation of timber buildings in other regions. In particular, the kiwari method and kiku

technique are most important elements in the architectural history of Japan, but they are perhaps not sufficiently understood by Western experts. Although some aspects of the Japanese approach to architectural preservation may seem alien to the Western observer, this should not lead him or her to criticize it solely on the basis of own experience. As the main purpose of architectural preservation is to sustain the cultural identity of a country and thereby enrich the culture of man, we have to accept diverse cultural expressions; we should not try to confine them within the framework of preconceived ideas.

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References:

Boutwood, James [1991] **The Repair of Timber Frames and Roofs.** London: Society for the Protection of Ancient Buildings. Tech nical pamphlet 12.

Boutwood, James [1992] Original Structure and the Effects of Alteration and Repair. In **ICOMOS UK: Timber Engineering Conference, Surrey University, 8 April 1992.** Proceedings.

Brown, S. Azby [1989] **The Genius of Japanese Carpentry.** Tokyo and New York: Kodansha International.

Chandler, Hugh S. [1984] Theseus' Clothes-Pin. In **Analysis**, 44. Pp. 55-58.

Charles, Fred W.B. [1984] **The Conservation of Timber Buildings.** London, Melbourne, Sydney, Auckland, Johannesburg: Hutchinson.

Charles, Fred W.B. [1992] Dismantling, Repairing and Rebuilding as a Means of Conservation. In **ICOMOS UK: Timber Engineering Conference, Surrey University, 8 April 1992.** Proceedings.

Davis, Lawrence H. [1972] Smart on Conditions of Identity. In **Analysis**, 33. Pp. 109-110.

Dawson, Jack [1992] How is the Structure Behaving? In **ICOMOS UK: Timber Engineering Conference, Surrey University, 8 April 1992.** Proceedings.

Feilden, Bernard M. [1977] A Possible Ethic for the Conservation of Timber Structures. Printed as appendix in F.W.B. Charles: **The Conservation of Timber Buildings** [1984]. London, Melbourne, Sydney, Auckland, Johannesburg: Hutchinson. Pp. 238-241.

Feilden, Bernard M. [1982] **Conservation of Historic Buildings.** London, Boston, Sydney, Wellington, Durban, Toronto: Butterworth Scientific.

Fitch, James Marston [1982] **Historic Preservation: Curatorial Management of the Built World.** New York: McGraw-Hill Book Company.

Gerner, Manfred [1979] **Fachwerk. Entwicklung, Gefüge, Instandsetzung.** Stuttgart: Deutsche Verlags Anstalt. (6th edition 1989)

Gutschow, Niels [1991] Restaurierung and Rekonstruktion. Gedanken zur Gültigkeit der Charta von Venedig im Kontext Südasiens. In **Deutsche Kunst und Denkmalpflege,** 1991 Heft 2. Pp. 156-160.

Haslestad, Anders [1992] Middelalderprogra mmet. In Kollandsrud, Mari (ed.) **Vern og Virke. Årsberetning fra Riksantikvaren 1991.** Oslo. Pp. 38-39.

Itô, Nobuo [1992] **Wooden Buildings in Japan.** Lecture paper for the 5th International Course on Wood Conservation Technology; Norway 1992.

Jokilehto, Jukka [1985] Authenticity in Restoration Principles and Practices. In **The Association for Preservation Technology Bulletin,** vol. XVII no. 3 & 4. Pp. 5-11.

Jokilehto, Jukka [1986] **Conservation Principles and their Theoretical Background.** Lecture paper, ICCROM.

Kaila, Panu [1987] Sunshine - the worst enemy of wooden facades. In **ICOMOS 8th General Assembly and International Symposium.** Symposium Papers, vol. 1. Pp. 333-338.

Kaila, Panu; T. Vihavainen & P. Ekbom [1987,2] **Byggnadskonservering. Handbook för restaurering av byggnader som bevaras för museiändamål.** Helsinki: Finlands museiförbunds publikationer 33.

Kaneta, Kiyoshi [1978] Structural Reinforcement of Wooden Buildings. In **International Symposium on the Conservation and Restoration of Cultural Property - Conservation of Wood.** Proceedings. Tokyo National Research Institute of Cultural Properties. Pp. 95-125.

Langberg, Harald [1975] **Venezia-charteret om bevaringsarbejde.** Kbenhavn: Fonden for Dansk Bygningskultur.

Lowenthal, David [1985] **The Past is a Foreign Country.** Cambridge, New York, New Rochelle, Melbourne, Sydney: Cambridge University Press.

Lowenthal David [1987] Where Does our Heritage Belong? In **ICOMOS 8th General Assembly and International Symposium.** Symposium Papers, vol.2. Pp. 685-692.

Lowenthal, David [1992] Counterfeit Art: Authentic Fakes? In **International Journal of Cultural Property,** no. 1, vol.1. Pp. 79-103.

Martin, Ernest [1983] Introduction a une discussion et a une étude sur "L' Authenticité" dans le processus de conservation des structures et constructions en bois.**In ICOMOS Wood Committee.** Proceedings of the V. International Symposium, Norway 1983. Pp. 22-29.

Moore, Charles A. [1967] Editor's Supplement: The Enigmatic Japanese Mind. In C.A. Moore (ed.), **The Japanese Mind. Essentials of Japanese Philosophy and Culture.** Honolulu: East-West Center Press.

Mori, Hachiro & Hideo Arai: Biodeterioration of Cultural Properties and its Control. In **International Symposium on the Conservation and Restoration of Cultural Property - Conservation of Wood.** Proceedings. Tokyo National Research Institute of Cultural Properties. Pp. 1-16.

Murtagh, William J. [1988] **Keeping Time. The History and Theory of Preservation in America** Pittstown, New Jersey: The main Street Press.

Nakamura, Hajime [1964] **Ways of Thinking of Eastern Peoples.** (Last reprinted 1985). Honolulu: University of Hawaii Press.

Neuwirth, Franz [1987] Values of a Monument in a New World. In **ICOMOS 8th General Assembly and International Symposium.** Symposium Papers. vol.1. Pp. 127-133.

Scaltsas, Theodore [1980] The Ship of Theseus. In **Analysis**, 40. Pp. 152-157.

Sekino, Masaru [1978] Principles of Conservation and Restoration Regarding Wooden Buildings in Japan. In **International Symposium on the Conservation and Restoration of Cultural Property - Conservation of Wood.** Proceedings. Tokyo National Research Institute of Cultural Properties. Pp. 127-142.

Smart, Brian [1972] How to reidentify the ship of Theseus. In **Analysis**, 32. Pp. 145-148.

Suzuki, Kakichi [1983] Restoration of Wooden Buildings. In **International Symposium on the Conservation and Restoration of Cultural Property - The Conservation of Wooden Cultural Property.** Proceedings. Tokyo National Research Institute of Cultural Properties. Pp. 157-170.

Tschudi Madsen, Stephan [1985] Principles in Practice: Reflections on the Conservation of Wooden Architecture. In **ICOMOS information,** 4. Pp. 18-24.

World Commission on Environment and Development [1987] **Our Common Future.** Oxford, New York: Oxford University Press.

Notes

1. The etymology of **authenticity** is quite straightforward: the word derives from the Greek term authenti which means "genuine". [Tschudi Madsen, 1985, 20]

2. The 'Operational Guidelines for the Implementation of the World Heritage Convention' (pp.8-9) requires documentation that a historic building which shall be inscribed in the World Heritage List meets:

'the test of authenticity in design, mat erials, workmanship or setting.'

3. Lowenthal 1992, 82.

4. Lowenthal 1992, 82-3; Chandler 1984, 55.

5. Lowenthal 1992, 82-3.

6. Smart, 1972; Davis 1972, 109.

7. Scaltsas 1980, 152.

8. According to Didron: "...it is better to preserve than to restore and better to restore than to reconstruct". [Murtagh 1988, 18]

9. According to David Lowenthal [1992, 82]: "Our culture is addicted to preserving substance, but erosion, accretion, and chemical change incessantly alter all things; no artifact remains as it was created. All art eventually decays or shatters..."

See also Alfred Wys [Cited in Martin,1983, 23]:

"Jedes von Menschen geschaffene Werk trägt den Todeskeim in sich".

10. Lowenthal 1987, 689

11. From the Introduction to the Venice Charter.

12. Ibid.

13. Jokilehto 1985, 5.

14. When a conservation architect in charge of preservation work on a designated building intends to propose alterations of the existing state of the building, he must submit full documentation of the building including the proposed intervention to an expert committee of 12 members appointed by the Agency for Cultural Affairs (ACA), the government bureau responsible for the administration of cultural properties in Japan. The recommendations of this Committee is submitted to the Council for the Protection of Cultural Properties - a committee consisting of 5 persons chosen for their eminent knowledge of Japanese history and culture. The final decision is made by the highest administrative officer of the ACA.

15. Alois Riegl, an Austrian art historian and conservator general of the Royal Central Commission for the Investigation and Preservation of Monuments formulated in 1903 the values related to historic buildings in an essay called: Der Moderne

Denkmalskultus. Sein Wesen und seine Entstehung. (Published in his Gesammelte Aufsätze in 1928).

16. Neuwirth 1987, 127.

17. Op.cit., 128.

18. Feilden 1982, 301. In addition: "All historical evidence must be recorded before work is begun".

19. Feilden, 1977. However, his scope is wider: Any intervention in a historic building "...must be governed by unswerving respect for the aesthetic, historical and physical integrity of cultural property."

20. Bernard Feilden also adds a sixth point to be remembered: interventions should

> "...not be undertaken by conservators/ restorers who are insufficiently trained or experienced, unless they obtain competent advice. However, it must be recognized that some problems are unique and have to be solved from first principle on a trial-and-error basis".

21. According to Martin 1983, 28, the problem of conservation of wood in buildings should be analyzed in relation to the three principal categories where wood plays an important role in the monument:

- the architectural form (buildings totally or partially of wood)
- the structural elements: the framing; joists
- facings: ceilings, panelling, floors, etc.

22. An effective way of removing ongoing biological attacks and to some extent prevent future ones without interventions in the historic building, is to fumigate the whole building under cover **in situ.** This method is well known in for instance Japan, the USA and Norway. (See Fitch 1982, 109-110; Mori & Arai 1978, 13-14.) The chemical used in various countries are without exceptions extremely toxic substances. The fumigation under cover does not exclude the necessity of subsequent interventions, particularly in cases where fungal and/or insect attacks have caused structural failure.

23. These criteria are not particular to wooden buildings but are also relevant for buildings made of other materials.

24. Kaila, 1987, 333-337.

25. According to Article 12 of the Venice Charter and Bernard Feilden's considerations of interventions cited above.

26. See for instance: Gutschow 1991.

27. Kaila 1987(2), 33.

28. Feilden 1982, 301.

29. Langberg 1975, 17.

30. Boutwood 1991, 5.
See also Gerner 1979, 76:

> "Alle Instandsetzungsarbeiten an Fachwerken sollen in erster Linie in zimmermannsmässiger Ausführung erfolgen, das heisst, im Normalfall sind die tradierten Techniken und originalen Holzverbindungen zu

verwenden".

Below is a more profound discussion of the Japanese efforts to preserve traditional techniques.

31. All three methods described in Feilden 1982, 302-4; Fitch 1982, 110-11; Gerner 1979, 70-81.

32. Kaneta 1978; Dawson 1992. (Bernard Feilden is skeptic to steel plates in connection with wood because of condensation problems which lead to decay. [Letter to the author, 1991.])

33. Charles 1988; 1992.

34. Boutwood 1991, 5; Boutwood 1992.

35. Haslestad 1992.

36. As of March 1990, the Japanese Government had designated 3,335 ancient buildings and other structures as Important Cultural Properties. About 90% of these are timber buildings. Of the remaining 10%, most are small stone pagodas, and some are buildings erected after the Meiji Restoration in 1868. At that time the Japanese eagerly studied and used Western building traditions and construction methods in brick and iron.

37. Itô 1992, 21.

38. Boutwood 1991, 3.

39. Sekino 1977. Dr. Sekino was in 1987 awarded the prestigiuos Gazzola Prize of ICOMOS.

40. Cited by Brown 1989, 76.

41. The removal of later additions (or "layers") is, as mentioned previously, acceptable according to Article 11 of the Venice Charter, but only under certain circumstances:

> "...when what is removed is of little interest and the material which is brought to light is of great historical, archaeolo gical or aesthetic value, and its state of preservation good enough to justify the action".

It has been pointed out previously that the decisions for removing later additions are taken very seriously in Japan. In fact, the Japanese system for evaluating proposals from conservation architects to alter the existing state of historic buildings could well serve as a model for other countries.

42. Jokilehto 1986, 1-2.

43. Through history the Japanese have not adhered slavishly to foreign models. Moore [1967, 295] claims that this phenomenon should be described as the adaption rather than the adoption of alien points of view. According to Nakamura [1964, 400] the Japanese

> 'are extremely sensitive to adopting and absorbing foreign cultures. But, in fact, a foreign culture is adopted as a constituent element of the Japanese culture.'

Further, Nakamura [ibid., 562] claims that

> 'They are apt not to try to understand a foreign culture through an abstract

study of the general principles and structure. They import precipitately only those parts which can be put into practical use.'

44. Further, later additions are often technically impossible to keep during reassembly after dismantling. A structure which was sagging prior to the dismantling, will be realigned when reassembled because a sagging structure will eventually collapse. At this stage the conservator is forced to remove all or some of the later additions, because if the addition was built at a time when the main structure was in a sagging position, it will be impossible to fit it to a realigned structure due to the woodwork joints which often were used to connect the addition and the original structure. (Suzuki 1983, 169-170.)

45. The taste for decay of buildings is intimately linked with late nineteenth century European preservation philosophy, and in particular to the ideas of John Ruskin and William Morris. Morris argued that the reason not to renovate ancient buildings was that restoration takes away "...the appearance of antiquity...from such old parts of the fabric as are left". (As cited in Lowenthal 1985, 151.) It is obvious, both from literary evidence, and from the careful preservation of existing materials in buildings through history, that the Japanese also value old weatherworn, **authentic** materials. On the other hand, they know that the rapid decay of wood in the Japanese climate makes the replacement of timbers at intervals inevitable.

46. It cannot be denied that the restoration to the original state in Japan today has a strong element of aesthetical preferences. The significance of aesthetical considerations in Japanese architectural preservation is also reflected in the criteria for the designation of buildings as Important Cultural Properties, emphasizing the buildings which are excellent in design. Aesthetical assessment also allows deviations from the rule to restore to the original state: In some cases it is not the original but the most magnificent state which is the ideal for restoration. A significant example is the "Dream Hall" **(Yumedono)** of the eastern precinct of **Hôryû-ji** (Nara prefecture). The hall was originally built in the eighth century but was expanded and rebuilt in the 13th century. If the hall was to be dismantled and repaired today, the state of the 13th century would be retained.

47. The number also includes buildings in historic towns.

48. If the original state is not attainable, either for technical or functional reasons, elaborate scaled models are made of the building in its original state. Sometimes these models cost as much as the actual preservation work on the building.

49. 'Operational Guidelines for the Implementation of the World Heritage Convention'. p.9.

50. Jokilehto 1985, 7.

51. World Commission on Environment and Development 1987.

52. See for instance Nakamura 1964 and Moore 1967.