4.5 Traditional Building

The local population usually knows how to adapt to harsh tropical climate conditions. One practical way to manage these climatic effects is found in the development of traditional building structures. For each of the different climate zones a suitable form of traditional building can be found, but for various reasons, new buildings and constructions are often not adapted to the local context. As a consequence, indigenous know-how and experience is lost in many areas (Gut et al., 1993). Traditional housing can be of great interest to designers of archive buildings particularly in respect of passive climate control. Sandra Rowoldt put it very clearly when she advised on domestic architecture and how it adapts to the regional climate, and then looked at most institutional buildings and how that adaptation is generally ignored (Rowoldt, 1993). Agrawal agreed when he wrote that traditional architecture is very much influenced by the climate. Analysis of traditional measures to counterbalance the extreme climate provides some solutions which can be adapted to the present conditions (Agrawal, 1974).

It has been established that buildings made by the indigenous inhabitants sustain less damage during natural disasters than those built by recent residents (see section on Disaster Preparedness). Purely traditional solutions, however, also assume a continuity of lifestyles and a kind of work, which seems unlikely to occur in many regions. A combination of traditional knowledge and advanced technology may therefore be necessary (Gut et al., 1993).

Some unique and excellent construction methods have been developed in Japan. In order to fight mure, i.e. a climatic condition arising from a combination of high temperature, high humidity and lack of air circulation, the Japanese constructed gable roofs, traditional soil walls and raised floors in the past. Gable roofs keep sunlight out, long eaves give shade to the walls and protect them from rain, and woods and soils are materials which absorb and give off moisture (Kathpalia, 1973; Kenjo, 1997 and 2000).

The Shoso-in, imperial repository, in Nara where the 1200 year old T’dai-ji treasure is kept also reflects the traditional Japanese understanding of how to preserve records (Banks, 1999). As still can be seen today in many Southeast Asian temple libraries, these well-shaded, tile-roofed wooden structures are raised about 2.5 meters off the ground to provide maximum air circulation (Noerlund et al., 1998). One explanation for the success of the protection offered by the Shoso-in is that the log-cabin style construction of the building allows the individual wooden elements to expand and contract with changes in humidity, thereby regulating the environment of the interior chambers by sealing and opening the wall according to the changes in the weather (Wills, 1987).

Many medieval Khmer religious complexes surviving in Cambodia and Thailand contain stone library buildings. In Pagan, a medieval capital of Burma, a twelfth-century building still survives with a deep central chamber buffered against atmospheric change where precious Buddhist manuscripts were kept in protective chests (Giese, 1995).

Sometimes very simple but effective solutions are found to ameliorate the worst effects. The strong room of one of the oldest Buddhist temples in Korea, Haesinsa, was built in 1488 and holds the complete collection of Buddhist sutras carved in wood. In order to improve the preservation of the books they designed the windows on the north and south side of the wall. This way the windows opposite each other stimulate the current of air and thereby control the temperature and the relative humidity (Lee, 1997). An archive building in Hanoi, Vietnam, which is an old French colonial building built as a repository, has open sections in the floors below each block of shelving to aid air circulation. In the roof, the floor has been covered in sand to act as insulation against the transfer of heat (Rhys-Lewis, 1999).

In restoring the leaky roof of a palace museum in Laos the builders noticed that the old tiles were not available any more, only one old craftsman still having the skills to make them. They set up an income generating project to revive this old tradition of making roof tiles (Hagemueller et al., 1991). Lack of demand is a serious problem in regard to the preservation of traditional conservation techniques. Orders are scarce even to the officially recognised holders of traditional conservation techniques, and they are often inadequate to maintain their living. In addition traditional materials are currently difficult to obtain (Iwasaki, 1979). Lack of technical information on the preparation and use of local building materials had already been noticed much earlier (Holdsworth, 1959).

The 16th century royal archive building Huang Shi Chen in Beijing, China is in a semibarrel vault structure, built completely of stone and brick, without beams and pillars; even the five huge doors are made of stone. Its surrounding walls are up to six metres thick. This way the temperature inside the structure was bearable in the heat of a Beijing summer and the cool of its winter. In the south of China strong-rooms are surrounded by an enclosed corridor to protect them from direct contact with the external atmosphere (Yao, 1986).

Another striking example of Chinese traditional building is the Tianyi Ge. This private library from 1566 is situated in a botanical garden. In front of the building a water pond leads to the Great Dongning Lake.
An ancient Chinese librarian studied and analysed the philosophical relationship between the raw materials of the book: water and fire. Not only can water control fire, it can also help plants grow hence the botanical garden. The owner of the library had his own residence built side by side with the library building, but separated them by two parallel walls. In this way, fire could be prevented from entering into the library building. Moreover, there was a specific and strict rule that fires and candles could never be allowed in the library building (Lin, 1999).

Good natural ventilation is provided in the Chancery Archives of Granada by the simple means of running air pipes from the basement into the repository and thence to the roof. The temperature difference between the roof and the basement ensures a good flow of cool air (Sanchez Belda, 1964). Passive cooling has also long been a feature of Iranian architecture: buildings were clustered together to reduce total surface area; walls were thick and there were few doors and windows while curved roofs provided insulation and encouraged the circulation of air (Bahadori, 1978).