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CLIMATE AND ARCHITECTURAL TRADITIONS IN JAMAICA

Climate is considered one of the principal factors which influence traditional building designs. In recent years, there has been an increasing awareness of the need for environmentally sensitive solutions in the aspect of building design. The Built Environment is instituted to provide shelter and comfort, with the strategic objective to reduce negative impacts to the environment.

In order to effectively and efficiently reduce the negative environmental impacts of erecting and operating buildings – without compromising thermal comfort or other functional and psychological priorities – architectural design concepts should adequately reflect environment concerns from their inception.

Climate responsive architecture takes advantage of free energy in the form of heat and light. Each region of the world uses its own techniques and designs in its buildings, which are best suited to that particular region and that encompass the region's cultural patterns.

Architectural design generally takes its point of departure from human-oriented purposes, as the architect typically has the primary purpose of the building in mind from the beginning of the design process. He then develops the building envelope with material and geometric properties that satisfy the demands of this purpose.

Olgyay is attributed with creating a bioclimatic chart that aids in the design of buildings so that they are conducive to the human requirements of comfort using the surrounding climatic conditions. It was called "Bioclimatic chart", shown in Fig.1.Olgyay's chart is a "zone of human comfort in relation to ambient air temperature and humidity, mean radiant temperature, wind speed, solar radiation, and evaporative cooling" (Givoni, p.280). The bioclimatic chart is important as it allows builders and architects to decipher the right specifications for design factors such aslocation, orientation, size, spatial composition, shading, and form.

A hot-humid climate is defined as a "region that receives more than 20 inches of annual precipitation" and either has 3,000 or more hours of 19°Ctemperature or 1,500 or more hours of 23°C temperature during the warmest six months of the year (Building Science Corporation).In this type of climate, the main function of the buildings is to simply moderate the daytime heating effects of the external air (Givoni, p. 290), and provide good ventilation.

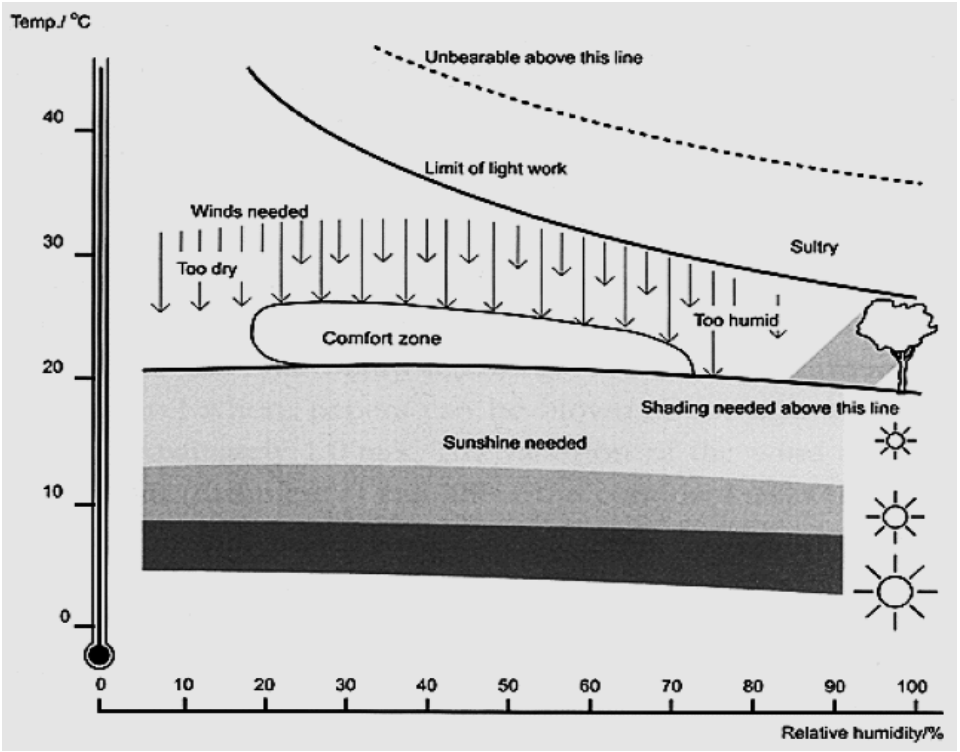

Figure 1: Bioclimatic chart representing comfort zone devised by Olgyay.

The chart shows the boundary of comfort zone, which has been defined by air temperatures of 21-30°C and relative humidities at 30-65%.It is important for the buildings structures to have effective ventilation and an internal temperature below the outdoor level (Givoni,p. 285), as living in a hot climate like Jamaica, can quickly become uncomfortable for its inhabitants with the extreme heat that is built up by midday. The best type of building design is composed of narrow volume on posts, with open living spaces and converted walls. Also a ventilated roof is highly appreciated.

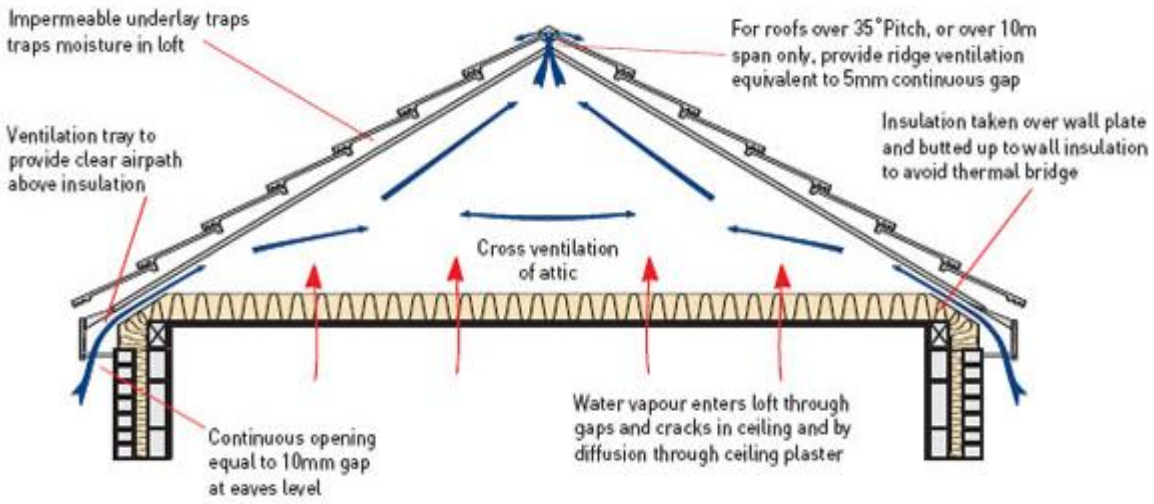

Figure 2: Ventilation of roof in hot climate.

An important function of the roof is its color. A white or light colored roof will stay approximately the same temperature as the outdoor air during the day and 6°C to 10°C cooler than the outside air at night (Givoni, p. 319).Windows are arranged so that equal areas are open on the windward and leeward sides of the building, so that the air stream can be directed into rooms, which need constant ventilation such as the bedroom (Givoni, p. 319). When one window is positioned higher than another, thermal force will direct the airflow from the high window to the lower window creating good ventilation.

Courtyards, patios, and verandas are other common features of buildings situated in hot climates.Concrete is the most common material used in the walls as it has low cost and high thermal capacity which in turn reduces internal temperatures (Givoni, p. 316).

The outside environment in hot regions is just as important as the inside because it is a daytime relief from the intense exposure or influence of climate. Shade is provided in a more aesthetically pleasing way through the use of greenery. For example, trees, shrubs, and bushes provide natural shade from the sun.

In designing a building in a hot climate, the architect has to consider the main building, a service building, and the outside area.The main building will contain the living room so as to make use of the cross ventilation from the windows and having a north-south orientation is preferable to deal with ventilation issues. The outside areas provide relief from heat with thick, concrete walls.

In today's society, architects are continuously expanding and creating new ideas that make use of the natural environment and its extraordinary effect on the way humans live comfortably in their homes and workplaces. With respect to the thermal performance of a building, it can only be stimulated

effectively if first the global setting is clearly defined, that is, if the climatic conditions specific to the geographic location, independent of the thermal envelope, are adequately modeled.

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