ARCHITECTURE IN THE NEGEV DESERT

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Despite the limited resources the desert can offer, Nabateans used to settle on the spices trade routes. One of the examples of such ancient settlements is Ovdat in the Negev, Israel, surrounded by ancient cisterns and wells as well as an agricultural land that was irrigated by run-off water collected from the surrounding hills after the limited number of floods. During the Roman and Byzantine eras Ovdat continued to flourish until the Arabs conquered the city.
(http://www.boker.org.il/english/ovdatcity.htm).
Today, Desert Architecture and Urban Planning Unit, Department of Men in the Desert, J. Blaustein Institutes for Desert Research, Ben-Gurion University Negev, Israel continues experimental research on sustainable architecture in hot and dry climate. The Adobe house is the first pilot project of the Desert Architecture and Urban Planning Unit and constructed entirely with mud bricks that were produced on site from local soil. Summer night ventilation is provided via a cooling tower with a wind catcher oriented towards the prevailing wind. The living area is heated passively by direct solar gain in winter, and shaded by deciduous vines in summer. "Of particular interest is a rotating prism wall, installed in the south facade of the house's bedroom. During winter, the prism's dark face captures solar energy during the daytime, and at night it is rotated inwards, releasing stored energy to the building interior. In the summer, the prisms' light-colored, insulated faces are directed outward to avoid overheating". (http://www.bgu.ac.il/CDAUP/adobe.html)
The central courtyard of the Blaustein International Center for Desert Studies incorporates an evaporative cooling tower utilizing high air temperatures and low relative humidity to create a mild indoor environment. Water sprayers and a downward blowing fan placed at top of the tower helps to achieve fast and intensive evaporation and lower the air temperature. On a typical summer day the cooling potential of the tower is approximately 950kWh/day. "The courtyard is covered by a prismatic glazing material, which acts as a seasonally-selective solar interface. In summer, when incident rays are normal to the surface, most radiation is reflected - creating a broad shading canopy. In winter, low-angle sun is mostly transmitted - turning the courtyard into a solar greenhouse".
(http://www.bgu.ac.il/CDAUP/updates2001/bic1_files/frame.htm)
The Neve Zin Residential neighborhood was designed according the guidelines that were prepared by the Desert Architecture and Urban Planning Unit. Building solar rights were ensured, meaning lots are designed so that each house will benefit from direct solar gain during winter. North-south orientated and 2.5 meters wide pedestrian walkways are shaded by adjacent building mass during morning and afternoon hours on a summer day. A common design language identifies morphological characteristics such as: geometry of the openings, thermal properties of the buildings and finishing materials (http://www.bgu.ac.il/CDAUP/).

Location: Ovdat City, Negev (beginning of 300 BCE)
Adobe house (1980), Sede Boqer campus, Negev (1990)
Neve Zin Housing (1990)

Sustainability Concepts:Passive solar heating and cooling in hot and dry climate

RANGER'S FACILITIES IN CUZCO

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Title of the project: Sustainable Control and Lookout Post for The Natural Reserve Areas of the Camisea Gas Project in Cusco
Location: La Convencion, Echarate, Cuzco, Peru. 2005.
THE PROJECT-This project was on designing for the Peru's Ministry of Energy and Mines and the Inter American Development Bank Program. Each one of them is a strategically localized ranger facility that contemplates typological, constructive system, natural climates, and community managing-involving criteria.
TYPOLOGY-This architectural object was conceptualized as a "place" of control-management and shelter; seemingly opposing actions (quiet vs. constant rouse). A landmark firmly incorporated with its surroundings, a warm inner space, as well as an authority nerve center. That is why there are two volumes, the administrative area is the "face" and the private area go off outsider's looks. Both related by a common entrance hall area as an inner pivot which looks as a control tower and characterizes the Ranger's Facilities.
CLIMATE CONFORT
-Ventilation: Under hot/humid weather conditions, ventilation is the main factor on which comfort sensation depends. Wood made lengthy volumes and the Stack Effect (affected by atmospheric conditions such as temperature and wind) were considered for the design.
-Sun lighting: North-south oriented, the absorbing and transmitting heat surfaces are reduced. Windows will act as sun blocks/ parasol especially on summer time, when eaves are not enough. On the other hand, large windows surfaces reduce the energetic lighting consume.
-Air quality and smell comfort: Cesspit is sealed and located considering wind direction and other measures (human activities are considered the main source of air contamination).
CONSTRUCTIVE SYSTEM-Sustainable concept&modulated structure design had been considered.
-Wood as shihuahuaco, quinina and capirona, abundant in the surroundings and its commercialization have been already regulated.
-Fiber-cement, because of its inflammable - no humidity properties;
-Polypropylene because of its insulating properties and the fact that the palm eaves are scare in the area nowadays.
SANITARY FACILITIES-Alternative rain water harvest time is really short (half a year), so the water is directly taken from the river. The cesspit and the water treatment tank could last up to 15 years minimum.
ELECTRICAL FACILITIES-The administrative office should decide the equipment according to their necessities. Solar panels were suggested.
COMMUNITY MANAGING-INVOLVING CRITERIA
The communities must have been involved in the whole process as a way to compensate their territory and way of life abrupt invasion. Therefore, the training period and their carpentry skills improvement will lead them to apply this knowledge for better life expectations.