

FURTHER PASSIVE SOLAR!

Ehud Ryden 15 Aug. 1984

As a follow-up on the report I gave at the March '84 Kinus on passive solar heated homes, I have been doing further research in the matter as it specifically relates to Har Chalutz. My own reading of experience with solar design here in the States and correspondence with informed persons in Israel lead me to the conclusion that probably the most viable building construction type for our mitzpeh will have concrete walls, either block or poured, insulated on the *exterior* with 1½" (4 cm) polystyrene rigid insulation covered by light colored stucco.

The mass provided by the walls and tiled concrete floors is adequate storage for heat gained from the sun through windows without supplemental storage systems such as water, which has its own problems, or additional concrete. It seems to me that a house designed to achieve a 16 hour time lag would be desirable. In such a house the heat retained in the floor and walls at sunset on a winter day would be dissipated (given off to the house interior) by around 10 a.m. the following day when the sun begins to warm the house effectively again. This is assuming there is sun; if not, supplemental heating is probably required. A house of this type in that climate can probably obtain from 50% to 85% of its heating requirements from the sun if properly designed.

During the past two years we have been able to evaluate the effects of a south-facing attached greenhouse on the interior climate of our house here in California (at an elevation of 540 m. or 1800 feet). During the winter the greenhouse has contributed to our comfort even though this house of wood frame construction, having a great deal of glass and largely uninsulated, is not equipped to really benefit to the maximum from passive solar heat. In the summer, when roll-out shades cover the translucent greenhouse roof, the result has been a much cooler house interior.

Though our climate here is very similar to that of Har Chalutz I was not sure such a greenhouse/sunspace/solarium would be applicable to Israel. So I was delighted to find our experience corroborated by a paper prepared by Dr. Milo Hoffman and Menachem Gideon of the Technion faculty. The data presented resulted from actual tests conducted under varying conditions and carried out primarily to explore the relative effects of light and heavy construction on passive heating and cooling.

The concrete construction mentioned above being both readily available in Israel and eminently suited to our site, thoughts of importing wood prefabs can be put to rest.

Concerning temporary housing, most of those thus far available have used asbestos-cement board on the exterior. The Ministry of Health issues a certificate stating the material used in this way is not hazardous to health. The material which is a possible substitute is "Bizon" board made of wood chips in cement and is made in Germany. The Technion Building Research Station intends doing testing of this material (for durability, etc.) this winter, according to a letter received from Dr. Rachel Becker of the Civil Engineering faculty.