

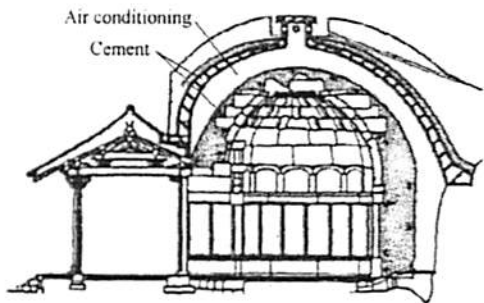
# Kyongju is the International Heat Transfer Conference site.

## It's also an Interesting Heat Transfer Cultural site!

### Sukkuram (Grotto): National Treasure #24

Designated as an International Cultural Heritage by UNESCO, *Sukkuram* is famous for an exquisitely beautiful statue of Buddah carved from a single piece of granite in 751. Protected by an intricately layered stone dome, the statue had survived for more than thirteen centuries in spite of high humidity in the area. However, it started to suffer rapid erosion ever since the dome was disassembled and then reassembled in 1913, after a failed attempt to smuggle the statue to Japan.

Two supposed improvements were made during the restoration. First, unable to completely reassemble the dome, cement was used for structural support. Secondly, a water stream, which was discovered to flow directly underneath the statue, was diverted. Later, additional cement dome with modern temperature and humidity control were added to halt erosion, but with limited success. Today, scientists suggest that the intricate dome aligned with the sun enabled efficient ventilation and the original cold stream of water acted as a condenser for humidity control. No wonder the stream was called *Gamnosoo* (sweet dew water). You can visit the place and still taste this sweet dew water.

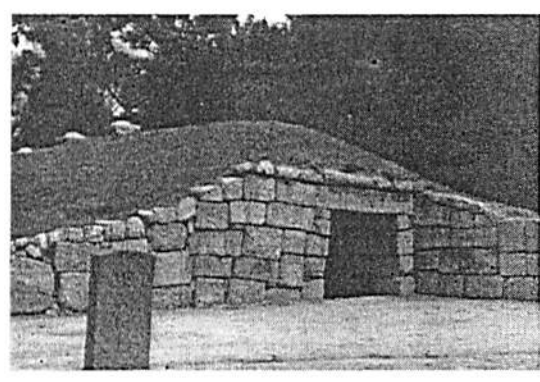


### Bell of King Songdok (Emile Bell): National Treasure #29

This bronze bell, created in 771, is not only one of the largest bells in the world (3.77 m high, 2.27 m in diameter and 21 tons in weight) but renowned for its beautiful tone. In addition to the fine graphics on its outer surface, *Emile* bell features many secondary structures to sustain the echoes, e.g., a unique sound pipe on the top. The controlled cooling required to successfully cast the massive, and yet complex, structure is no small technical achievement even by today's standards. It is said that a baby was sacrificed in the molten metal. The phosphor in human body supposedly made the bronze ductile enough to prevent cracking during the casting process. It is said that the name *Emile* takes after the sound heard when the bell is rang. Some say that *Emile* is actually the cry of the sacrificed baby shouting *emeea* (mommy). See if you also hear the cry.

### Sokbinggo (Ice Storage House): Treasure #66

Historical records show that ice storage houses were constructed as early as 505 in Korea. This particular one, constructed in 1738 for the royal family, stored ice blocks during winter months for consumption during summer months. A number of ingenious design allowed the ice to be stored for more than six months at a stretch. One is the unusual design of the entrance in which an uneven wall generates a whirlwind to maintain low pressure at the entrance region. Another is the multi-layered and stepped grooves on the ceiling, which suppress the formation of large-scale natural convection within the room. Can you identify any other design that would minimize heat transfer in the room?



### Posokjong (Circulating Water Channel): Historical Site #1

While not involving heat transfer, this site should interest the fluid dynamists among us. *Posokjong* was a royal picnic ground where kings entertained their courtiers by floating wine glasses on a winding water channel (10 m in length, 35 cm in width and 26 cm in depth). It is said that kings were able to send wine glasses to any designated person. Because of many recirculation zones along the winding water channel, it is probable that a wine glass could be made momentarily stationary at different locations depending on the water flow rate. Decoding its secret design may be a worthy project for any numerical analyst.