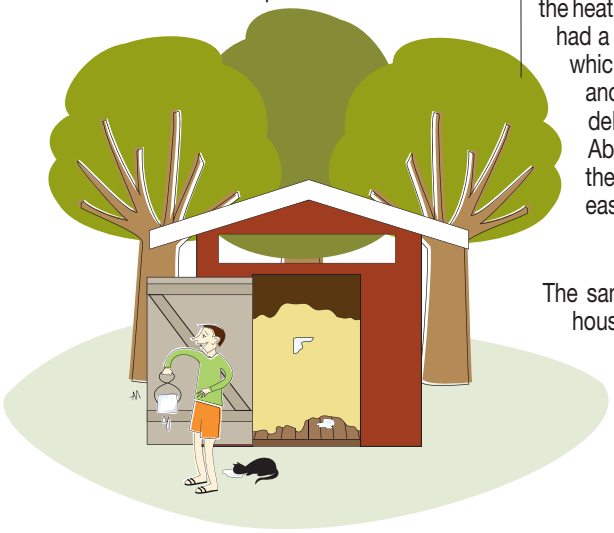
How an ice house worked

QUESTION: At a museum I saw something called an icebox, which seems to have been the forerunner of the refrigerator. Where did people get the ice from in the middle of summer?

Johan R

ANSWER: The ice for iceboxes was taken from frozen lakes in the late winter. People cut up the ice in large blocks, which were then stored in a storehouse called an ice house, which was insulated against the heat. The insulation consisted of sawdust and the ice house was located in a shaded place on a suitable north slope. Some of the thermal principles used in ice houses were:



- The insulation reduced the heat flow to the ice blocks as much as possible
- The remaining heat flow was counteracted by the melting of some of the ice
- As long as some ice continued to melt, the other stored ice blocks retained a temperature of 0 °C

How much ice people had to store in order to meet their cooling needs during the summer plus the required melting inside the ice house was based on experience, and presumably they did not do any formal calculations of the heat transfer process. Larger urban areas had a well-developed distribution system, which supplied industries, grocery shops and homes with ice. The person who delivered the ice was called an ice man. About 1950 iceboxes were replaced by the electric refrigerator, which was far easier to use.

COLD DRINKS

The same principle that worked in the ice houses can also be used to keep drinks cold when you have no access to a refrigerator. You can use a thermos and add a suitable number of ice cubes to the beverage. To avoid diluting the drink, you can put the ice cubes in a plastic bag and tie it. Use a steel thermos and not a traditional vacuum thermos with an inner glass liner, as the ice cubes can easily break the glass.

Questions should be of general interest and be about temperature measurement techniques and/or heat transfer.

QUESTIONS ANSWERS

FURNACE TRACKER

One purpose for which a furnace tracker thermometer can be used is to measure temperatures in a tunnel furnace to record the temperature profiling. The readings are stored in a data storage device or transmitted in real time via radio. The journey through the furnace can sometimes take several hours, during which time the measuring equipment must be kept at a temperature such that the electronic components "survive" the trip and take readings that are as accurate as possible. Here the same principle is used as the one in the ice house. A sheath contains high-temperature insulation, which contains a phase transition material, which in turn contains the electronic components. It is more practical to use water rather than ice, but often a wax compound is used that has a suitable melting range (about 60 °C). Water undergoes a phase transition into steam at 100 °C. Using low-temperature electronics is unsuitable for several reasons, one being the difficulty in predicting measurement errors.

To express viewpoints or ask questions, contact Professor Dan Loyd, Linköping University by e-mail to: dan.loyd@liu.se