

## Refrigeration from stored cool

Among the various techniques offered for refrigeration, here is one that could serve when intermittent household electrical power is regularly available.

Besides the electrical power, this would require a conventional refrigerator and a well-insulated enclosure with a compartment for a frozen phase change substance. In other words, just add ice (one pound of ice will cool a hundred and forty four pounds of water by one degree Fahrenheit as it melts).

In the 1800's, many towns had "ice houses," in which tons of ice harvested in the winter were stored to provide refrigeration during the summer months. Household refrigeration was managed by an appliance called an "ice box," which contained a place to store ice purchased from the ice house, along with storage for milk and other perishables. Relics of these technologies remain in many towns.

Ice of course is only good for keeping temperatures near (but above) the freezing point, so it is useless if you are trying to freeze anything – however: When you add salt to ice the temperature can be taken down to zero degrees Fahrenheit. This is why Mr. Fahrenheit chose that temperature as zero on his scale. But then you wind up with having to separate salt from water and of making more ice if you want to do it again.

So now we're back to needing a refrigerator. In order to store at temperatures below freezing, our phase-change substance must be able to freeze at or below the minimum temperature our storage freezer will require. It will also, of course, need to freeze above the lowest temperature of our refrigerator.