

COOL IT



## The story of refrigerators and freezers

Keeping food fresh and free from the attention of vermin was an everyday problem for our ancestors. Food had to be carefully covered, or hung in crates or nets from hooks in the ceiling to keep it away from rats, mice and insects. Bigger homes had stone larders with stone shelves and, until this century, kitchens were traditionally painted blue – a colour which was supposed to keep away flies.

*Previous page:*  
Electric refrigerator  
1935.

*Opposite page:*  
Ice house at  
Hatchlands  
(Surrey), a National  
Trust property.  
Dome and entrance  
roof would have  
been covered with a  
layer of earth to give  
extra insulation for  
the food stored in  
the underground  
chamber.

Keeping food cool prevented it from going “bad” – this was known centuries before there was an understanding of harmful bacteria. The Roman emperors had fast chariots that brought ice from the Alps, protected by thick sacks. The Romans were also credited with inventing the iced drink.

The ancient Greeks found that food kept fresh longer if stored in damp earthenware jars cooled by evaporation – a method still widely practised today in Third World countries.

Salting, pickling, smoking, and sun drying were – and still are – all methods of preserving foods but the results do not match storage at low temperatures.

From the end of the seventeenth century large country homes had ice houses built in their grounds for cool storage of perishable foods like meat and poultry. These were underground vaults lined with stone or cut into rock and the bottom half filled with ice collected in the winter from a nearby lake or pond and covered with a thick layer of straw. Well insulated from spring and summer temperatures, food kept cool for some time – the opposite of that other sensible idea where today we insulate the walls and roof of our home to keep in the warmth in winter!

The “ice box” – a hardwood, zinc lined cabinet usually insulated with felt – was the first refrigerator. It had to be constantly filled with fresh ice which until 1939 was sold from door to door from horse-drawn carts.

The ice was brought by boat from Norway, or by fast clipper ship from North America and Greenland, and, by the end of the last century, over half a million tons of ice a year in large blocks were being shipped into British ports.

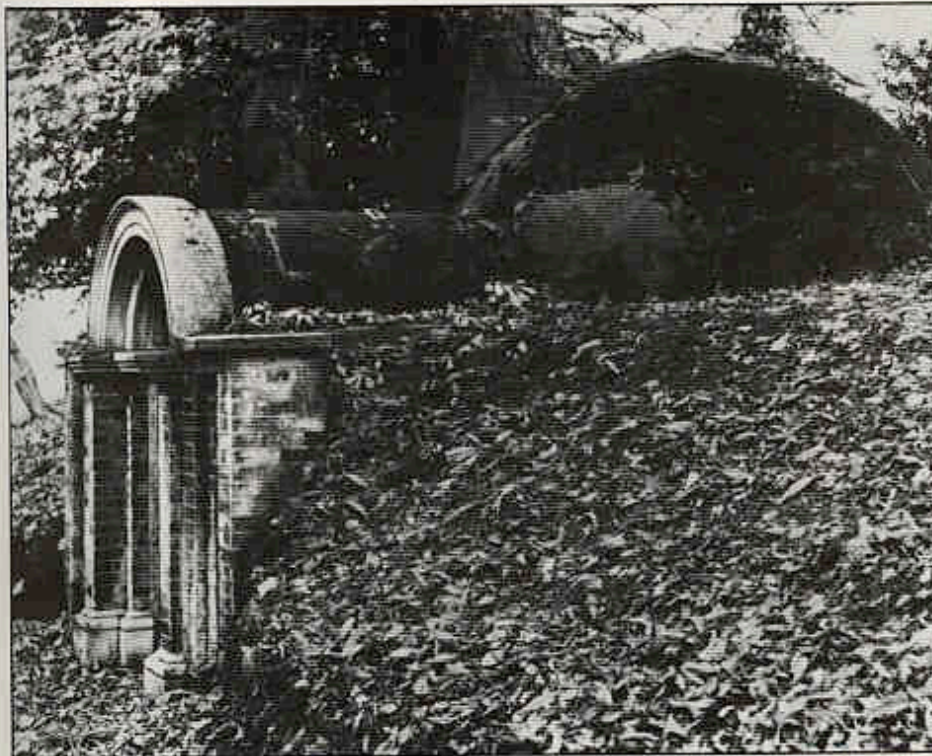
As it was a difficult, heavy and very perishable cargo, efforts were made to find mechanical methods of refrigeration. It was already known that when certain liquids were evaporated they



absorbed heat from their surroundings – in other words, cold was produced. Michael Faraday had noted this in 1823 when he was making a study of ammonia but just as with the electric motor, whose principle he discovered two years earlier, he was unable to see a practical application.

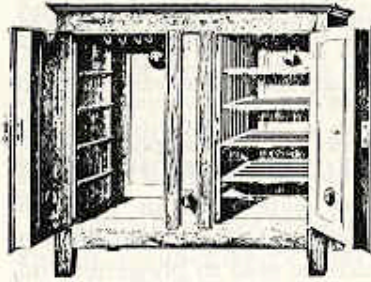
Fortunately, there were many who did see the possibilities, among them two Scotsmen who developed a chemical method of making ice by rapidly evaporating water and, in 1834, an American – Jacob Perkins – working in London, designed a compression/cooling machine which he sold to breweries and wholesale butchers.

James Harrison, a Scottish printer who had emigrated to Australia in 1837, became interested in Perkins' discovery along with the work of two Americans, John Gorrie and Alexander Twinning. Harrison, who had observed the cooling effect of



German zinc-lined refrigerator of 1880 needed daily ice placed in a central compartment. The tap provided iced water.

*Opposite page:* American ice box of 1895 took ice blocks in top left cupboard to provide cooling for the food.



ether, planned to make his fortune by shipping frozen meat to England but his method of refrigeration was mechanically unsound and the voyage in 1873 ended in failure. The entire rotting cargo had to be dumped at sea.

It was then the turn of a German schoolmaster, Carl Von Linde, who used compressed air to reduce the temperature in insulated compartments and, in 1880, the first cargo of refrigerated beef and mutton from Australia arrived in London, "in excellent fresh condition though it has been six months on the voyage".

The idea was so successful and "chilled, fresh meat" became so popular, that other versions were built for markets, warehouses, shops and hotels. Some of the refrigeration "compressors" were powered by steam but the arrival of electricity and the electric motor gave a more convenient power source – compact and reliable, needing little attention.

Railways, fast steamships, and a good road system meant there was a much wider choice of food available for storage in the new, large, commercial refrigerators. There were now many of the new food shops and markets which stayed open for twenty hours a day, seven-days a week and, as there was no shortage of servants to collect and prepare the food, a refrigerator for the home was, at first, thought unnecessary.

It was not until 1913 that a domestic version was designed, powered by an electric motor. This was called the "Domelre" (domestic electric refrigerator) and was made in Chicago. A version of this "expensive novelty", which was also bulky and heavy, appeared in London in 1919, to the annoyance of a British company who had designed something similar in 1912 without finding anyone to take a serious interest. A French company copied the American idea and perpetuated the name "refrigerator" rather than "ice box". Several wealthy families purchased models when they appeared in 1921 mainly because it was "an excellent way of cooling champagne"!





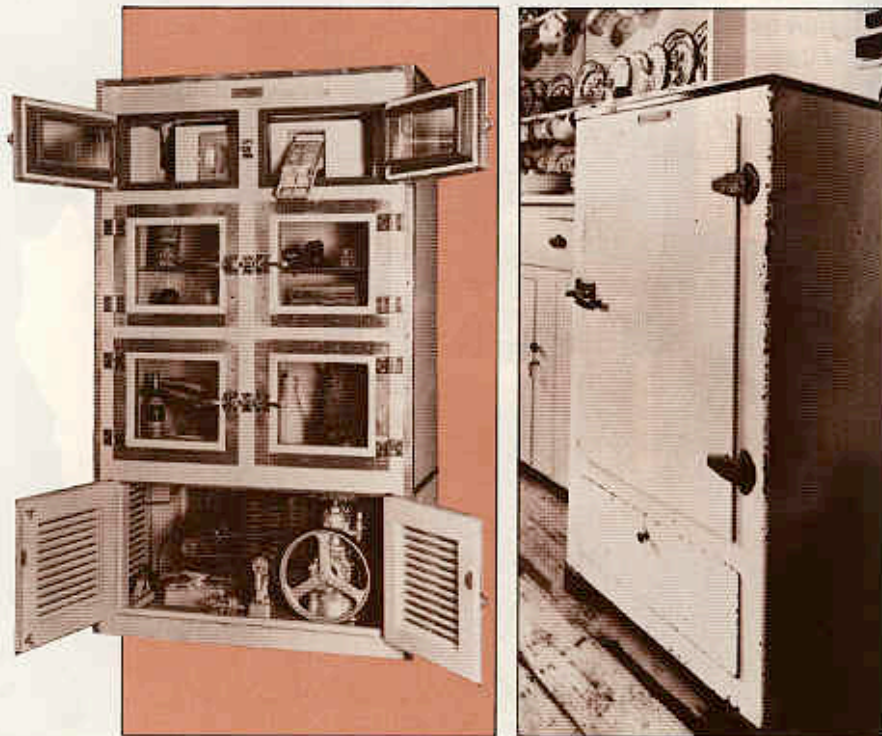
Then in 1923 the American firm, Frigidaire, introduced their "electric ice box" to Britain. It was popular because it was less expensive and smaller than its predecessors. Even so, at about £60 – the price of a secondhand car – it was only for the comparatively wealthy.

Two young Swedish students, von Platen and Munters, while still at college in 1922, developed a different type of refrigerator. They wanted to make something simpler and cheaper than the American ice box and looked back to an idea of a Frenchman, Ferdinand Carré. Carré had demonstrated in London back in 1862 an ice-maker that worked by compressing ammonia using, not a mechanical method, but heat. He had called his method "absorption" and the two young inventors kept this name.

In the modern refrigerator a liquid with a low boiling point is evaporated and then reliquified. In the process of evaporation it

*Left:* A multi door refrigerator 1937 designed for the small shopkeeper.

*Right:* This Electrolux water cooled refrigerator of 1929 was in daily use until 1970.





absorbs heat from its surroundings (the cabinet of the refrigerator) and when it condenses it gives up this heat. To make it evaporate it is compressed either by a motor (compressor) or a small electric heating element or gas flame which is the principle of the absorption models. In this evaporated state it is moved to the back of the refrigerator where it can expand to give up its heat. The liquid is then moved on to start the cycle all over again.

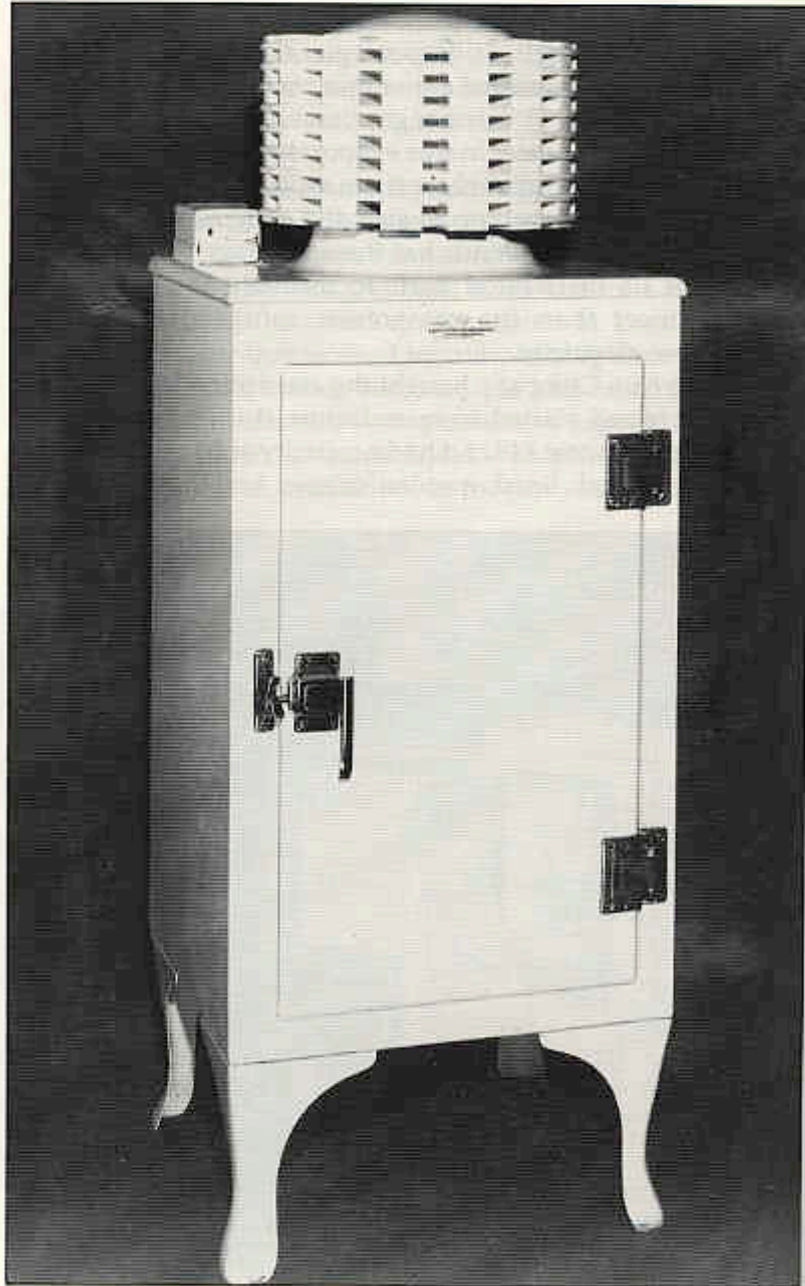
The absorption refrigerator has the advantage of being silent for it needs no mechanical parts to maintain the cycle. It is, though, slower than the compressor refrigerator and uses slightly more electricity.

The Electrolux Company bought the absorption idea from the two students and started to manufacture it in Britain in 1927. Their first models cost £48 and had a capacity of 10 cubic feet. The models had a cork lined wooden cabinet but they had to be

Kitchen of a London home 1937. A cast iron range has been replaced by an electric cooker and the family have a refrigerator with an ice making compartment, its motor compressor housed in the lower section.



Popular 'beehive' refrigerator of the early 1930s. The unit with its cooling coil was conveniently mounted on the top but the refrigerant contained sulphur dioxide which, if it leaked, gave off a repugnant smell.





permanently connected to a cold water tap to encourage the refrigerant to give off the heat collected from the cabinet. In hot summer weather considerable quantities of water were needed to keep the cabinet cool and many water boards insisted on making a charge.

In 1932 Electrolux produced at their new Luton factory the first popular domestic model that did not need cold water. It had a steel cabinet and had only one cubic foot capacity – “sufficient”, said the advert at the time, “for six pints of milk and two pounds of butter.” It cost £19. 15s. or “six pennies a week on easy terms”.

It was still a slow start for refrigerators, even though – in 1927 – the Food Preservatives Act limited the use of dangerous, chemical artificial preservers so that essential perishable foods had a short life and became more expensive. Then in 1934 there was a very hot summer, a phenomenon to be repeated in 1959, and in both years the sales of refrigerators boomed.

By 1939 200,000 homes had a refrigerator; in 1960 it was five million; today it is over sixteen million.

Except for a few small models designed for caravan use, most of the modern electric refrigerators are now of the compressor type. The refrigerant is dichlor-difluoro-methane – almost as difficult to say as it is to spell – so it is known as “R12”. All are much more compact than the early models. They have a frozen food compartment for low temperature storage (between  $-8^{\circ}\text{C}$  and  $-18^{\circ}\text{C}$  compared with the  $7^{\circ}\text{C}$  constant in the cabinet); are less bulky, using an insulation of expanded plastics, and many have push-button or automatic defrosting.

### **The food freezer**

Because food destroying bacteria will not readily multiply at low temperatures, freezing food and storing it at  $-18^{\circ}\text{C}$  is the most natural way of preserving it. This idea, it seems, occurred to Francis Bacon, the Elizabethan philosopher and scholar. It is reported that he died from a chill in 1626, caught after trying to freeze freshly killed chickens by stuffing them with snow.

The American inventor and explorer, Clarence Birdseye, while on a hunting trip in Labrador in 1923, noticed that fresh meat and fish exposed to the arctic temperatures tasted perfectly fresh when thawed and cooked months later. He spent the next seven

years developing a freezing process where cartons of perishable food were placed between refrigerator plates and in 1930 he began to sell frozen vegetables over the counter to the public – a new industry had begun.

The packets were designed to be taken from the shop which had a freezer and be eaten the same day, although homes with a refrigerator were able to store them for a day or two. Nobody realised it at the time but, as refrigeration and food freezing became more popular, they had no need to shop as often and they were able to go further to larger shopping centres. This was to reduce dependence on the small corner shop and be a factor in the development of chain stores and supermarkets.

The refrigerator and the food freezer also had a marked effect on our choice of foods. The consumption of fresh foods and dairy products increased (with benefits to our health) and the consumption of salted and dried foods declined.

After 1959, refrigerators specially designed with compartments for the storage of packets of frozen foods appeared. Earlier models had only a small evaporator shelf designed mainly for making ice cubes in trays.

Soon there were refrigerators with a choice of one of three different types of frozen food storage compartments – for one week's safe storage, or one month, or three months. Almost at the same time (1950) the food freezer for the home arrived. This was called a "Deep Freezer" after the name of the company that first marketed them extensively in the U.S.A., and most were versions of the food conservator cabinets designed for shops, hotels and restaurants.

Few of these early "Deep Freezers" were able to maintain temperature low enough to freeze fresh food. It was not until 1955 that food freezers were sold for the home, capable of maintaining  $-18^{\circ}\text{C}$ , and able to get down to  $-20^{\circ}\text{C}$  and below when needed. They appeared first in the U.S.A. and then in Britain from the following year.

The first food freezers were large chests with lift-up lids but by 1961 small front-opening models came on to the market, including a matching pair – refrigerator and freezer – that could be built into a kitchen. These were first shown in London in 1961 and the next year English Electric introduced the "Fresh 'n



# SOAP AND WATER



A modern cabinet that combines an automatic defrosting refrigerator mounted above a food freezer (Tricity).