

**MECHANICAL REFRIGERATION FOR  
DOMESTIC USE. A THESIS  
SUBMITTED FOR THE DEGREE OF  
BACHELOR OF SCIENCE,  
ELECTRICAL ENGINEERING COURSE**

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Mechanical Refrigeration for Domestic Use. A Thesis Submitted for the Degree of Bachelor of Science, Electrical Engineering Course by Donald Warren Nethercut

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DONALD WARREN NETHERCUT

A Thesis Submitted for the Degree of  
BACHELOR OF SCIENCE  
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UNIVERSITY OF WISCONSIN

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## INTRODUCTION.

Mechanical refrigeration, or the artificial production of cold is a development of the nineteenth century. Many methods have been tested out and only a few have survived. Some were discarded because of the inadequacy of apparatus, while others were proven commercially impracticable.

The trend of development has been toward large production and larger units. Many of these large machines are giving very satisfactory service in producing ice to compete with natural ice, or in the refrigerating of storage buildings and manufacturing processes. Many processes have been made practicable by mechanical refrigeration, that were impossible when natural ice was the only available cooling agent.

Little if any attention has been given, until recent years, to the development of a small refrigerating plant for domestic use. Methods used in large plants have proven impracticable or undesirable in small units. The advent and spread of the central station supply of electrical energy has placed at the disposal of the householder a cheap, clean and constant supply of power. This thesis was undertaken to test out some methods, suggested by Prof. M. C. Beebe, of the Electrical Engineering department, for the utilization of electric power in the operation of a small unit refrigerating plant for domestic use.



CHAPTER I  
HISTORICAL REVIEW.

The art of refrigeration is nearly as old as history. At first it consisted only of preserving or storing natural ice or snow for use in warm weather. This process was limited to climates where natural ice was found for at least a part of the year. There are a few historical references to the transportation of natural ice to warm climates for the use of royal families. Proper transportation facilities were lacking so that the expense was almost prohibitive.

Underground storage was one of the first methods used. A large circular excavation was made, usually about 30 feet deep and 30 feet in diameter at the top, tapering down to 10 or 15 feet in diameter at the bottom. Into this hole were packed alternate layers of snow and leaves. Over the top was built a thatch hut. Some means of removing the water from the bottom of the pit was often provided, either by natural drainage or manually.

Ice houses were soon built. Leaves and straw were used to pack and protect the ice but under the best of conditions it was almost impossible to store ice all summer.

In some localities the nights are cold even when the days are exceedingly hot. People soon discovered that if water was allowed to evaporate it was cooled, and that by exposing shallow pans of water to the cold night air ice would be formed. Considerable use was made of this method of ice making where