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### Recorded temperature in two unheated buildings Tibbetts, D. C.

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# NATIONAL RESEARCH COUNCIL OF CANADA

## DIVISION OF BUILDING RESEARCH

No.

394

# TECHNICAL NOTE

NOT FOR PUBLICATION

RESTRICTED CIRCULATION

FOR INTERNAL USE

PREPARED BY D. C. Tibbetts CHECKED BY

APPROVED BY NBH

DATE April 1963

PREPARED FOR Record Purposes

SUBJECT RECORDED TEMPERATURE IN TWO UNHEATED BUILDINGS

In October 1961, buildings in three of the National Parks of the Maritime Provinces were instrumented to obtain information on indoor temperature and humidity in heated, unheated, and partially heated buildings. Included in this group of buildings were two unoccupied unheated buildings, one in Fundy National Park at Alma, N.B., and one in the Prince Edward Island National Park at Cavendish.

The officers of the Parks Branch were interested in the conditions existing in unheated unoccupied buildings during the winter months. Heating of some previously unheated buildings had resulted in severe wood checking in buildings and furnishings. Some buildings require heat because of frost effects on the foundations; nevertheless, many buildings of wood construction can safely be left unheated with consequent fuel savings in spite of some foundation movement. A knowledge of typical inside conditions in winter might also prove useful in assessing the performance of protective coatings on wood sidings when comparing unheated unoccupied buildings with those having normal occupancy.

While much remains to be known about wind and solar effects on building temperatures, a knowledge of temperatures existing in unheated buildings during winter is useful because some recording and telemetering equipment does not perform satisfactorily below certain temperatures.

More recently, the basement fallout shelter program has made it necessary to know how best to maintain normal temperatures for limited periods in buildings where heating services have been interrupted.

The purpose of this note is to record the temperature data collected for the two unheated buildings related to the outdoor temperature recorded for each area. A more extensive report has been prepared (1) which includes information on the relative humidity, absolute humidity and temperatures for all buildings included in the study in three park areas.

The building under observation at Fundy National Park in New Brunswick was the Golf Clubhouse (Figure 1). It can be described as a massive one-storey wood structure with dark side walls and a dark roof. The instrument used to record the temperature was located in a large room normally used as a restaurant during the summer.

The building at Cavendish in the Prince Edward Island National Park was the famous "Green Gables" house (Figure 2). This building could be considered to be of traditional two-storey wood frame construction with white side walls and a dark roof. The instrument used to record temperature in this building was located on the first floor in the room adjacent to the kitchen.

The indoor temperatures were recorded on hygro-thermographs (Figure 3) and the charts were changed weekly. Charts were processed to obtain average weekly temperatures. Temperature records for each of the park areas were obtained from the Meteorological Branch of the Department of Transport. The records for the Fundy site were taken less than half a mile from the building under observation. The records for the P.E.I. site were taken at Stanhope which is about 18 air miles away from the building under observation at Cavendish, but along the same shore of the Island.

The data collected are presented in graph form (Figure 4). From an examination of these graphs it is evident that the average weekly temperatures in the buildings under consideration do not fall as low as the outdoor average weekly temperature. This is more noticeable on the graph for the Fundy park area than for the P.E.I. park area. The fact that there is a greater difference between the indoor and outdoor temperature in the Fundy park area could be explained by the fact that the building under observation is darker in colour and more massive with a probable greater heat storage capacity than the one in the P.E.I. park.



Besides, the distance between the building site and the weather station in the P.E.I. park should also be taken into consideration.

#### SUMMARY

Temperature records kept in two unheated buildings in different geographical areas from October 1961 to May 1962 indicate an appreciable difference between inside and outside temperatures over most of that period. For the coldest recorded minimum temperature at Stanhope, P.E.I. ( $-15^{\circ}\text{F}$ ) the minimum inside temperature in the "Green Gables" house at Cavendish was  $+6^{\circ}\text{F}$ . On the same day (6 February) the minimum outside temperature at Alma, N.B., was  $-23^{\circ}\text{F}$ , while the minimum inside temperature recorded in the Clubhouse at Fundy Park was  $+11^{\circ}\text{F}$ .

It is hoped that a future study would include, in at least one building, temperature records in the basement and related ground temperatures beneath the basement floor level and in the ground a few feet away from the building, but to the same depths.

The help and interest of the staff at each of the National Parks included in this study is gratefully acknowledged. Without their co-operation this project would not have been possible.

#### REFERENCE

1. Tibbetts, D. C. and D. R. Robson. Temperature and relative humidity in park buildings - Maritime Provinces. National Research Council, Division of Building Research, Internal Report No. 268, April 1963.



Figure 1

Fundy Park - Golf  
Clubhouse



Figure 2

Cavendish - Green Gables

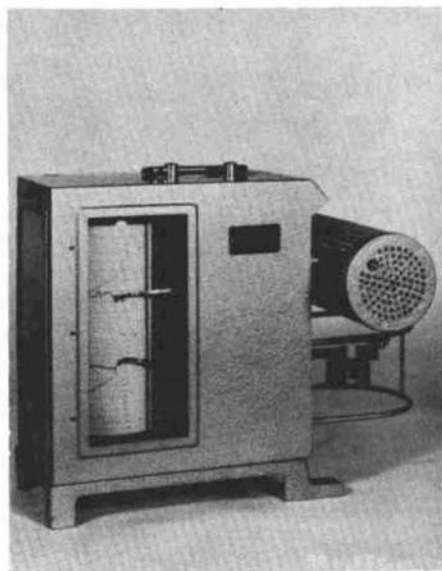


Figure 3

Hygrothermograph

