DOMINION DEPARTMENT OF AGRICULTURE
Branch of the Dairy and Cold Storage Commissioner
OTTAWA, CANADA.

SIMPLE METHODS FOR THE STORAGE OF ICE

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ERRATA (Printer's Error)

The Illustrations on Pages 3 and 5 have been transposed.
Plan No. 1 should appear on Page 3 and Plan No. 2 on Page 5.

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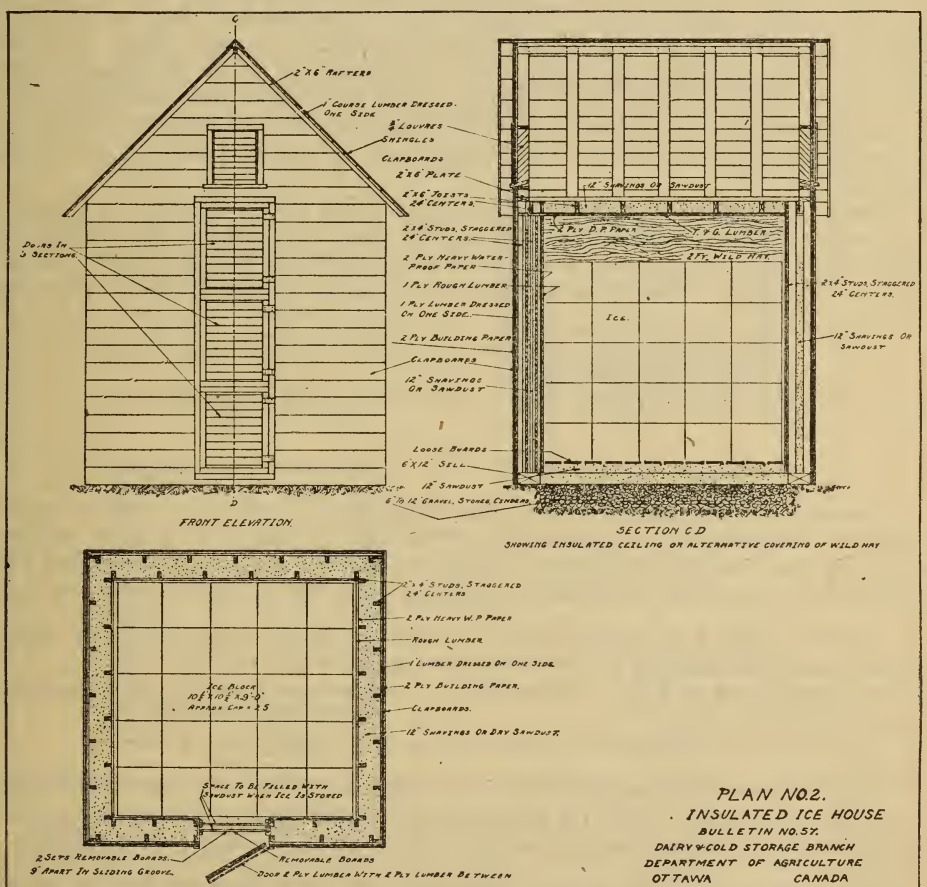
THE ORDINARY STORAGE OF ICE.

Plan No. 1.

The storage of a few blocks of ice for summer use is a very simple matter where the ice is readily available. Any unoccupied corner of a shed will serve for the purpose. A rough board enclosure ten feet square and eight feet high will hold enough ice to provide 50 pounds per day for 130 days, after allowing for a reasonable amount of wastage. The smaller the quantity stored, the larger is the proportion of waste.



The bottom of the enclosure should be covered with about one foot of sawdust. If the soil underneath is impervious clay, it will be all the better if there is a few inches of gravel under the sawdust. In putting in the ice the boards can be taken away from one side and replaced after the ice is in position. A space of one foot should be left between the ice and the boards to be filled with sawdust, and the ice should be covered with about the same thickness. It is the sawdust which keeps the ice from melting. The drier the sawdust is the better the ice will keep, and it is a

good plan, as the ice is removed during the summer, to throw out from time to time the driest of the sawdust where it will be under cover and continue to dry out and thus be in better condition to be used again the following year. The ice should be cut in blocks of uniform size and packed as closely together as possible.

If it is necessary to erect a special ice-house, the roughest kind of a shed that will keep out the weather is all that is necessary. Poles may be driven into the ground and lined up on the inside with rough lumber or slabs, leaving a space of about three-eighths of an inch between each board, and the whole covered with a roof to keep out the rain.

Plan No. 1 shows the construction of a building with 2 by 4-inch studding lined with rough lumber inside, and a space of three-eighths of an inch left between each board. If for any reason a building with a better finish and appearance is desired, the outside of the studs may be covered with clapboards, shiplap or other siding, with ample ventilation above the ice. Ventilation can be provided by leaving the spaces between the rafters open, or by placing louvre openings in the gable ends. It is also advisable to leave a two-inch space at the bottom and top of the clapboards, which will provide a circulation of air between the studs, and help to keep the sawdust dry.

If sawdust cannot be obtained, planer-mill shavings may be used for packing the ice, or in cases where neither is available, hay may be used as a packing or covering material.

Marsh or "slough" hay or any fine wild hay which grows in low places gives the best results. If hay is used, the space around the ice or between the ice and the walls instead of being only one foot, should be at least two feet, into which the hay must be well packed. The ice should also be covered with about two feet of the hay.

SPECIFICATIONS FOR AN INSULATED ICEHOUSE.

Plan No. 2.

Drainage.—If the ground is dry and porous, or of a gravel or sand formation, no special drainage need be provided, but if it is impervious clay or heavy soil, the area of the floor should be excavated and filled to a depth of six to twelve inches with small stone, coarse gravel or cinders, first laying drain tile to ensure proper drainage.

Framing.—Bed 4 by 12-inch sills in cinders or other filling and set on proper foundations. Half the sills at the corners and spike or bolt together.

Erect two rows of 2 by 4-inch studding, staggered, as shown in plan, spaced at 24-inch centres.

Lay a 2 by 6-inch plate with joints broken over outside row of studs.

Roof.—The roof rafters should be 2 by 6-inch set at 24-inch centres and heeled over plate and spiked. Cover the rafters with one-inch lumber dressed on one side, and shingles laid four and one-half inches to the weather, or other roofing material.

Walls.—Cover the studs on the inside with one ply of heavy waterproof paper, with joints well lapped, and one course of rough lumber. Cover the outside with one course hemlock lumber dressed on one side, two-ply building paper, and finish with either clapboards, shingles, metal or frame siding.

Filling for Spaces and Floor.—Fill spaces in the wall and cover the floor area with 12 inches planer-mill shavings or dry sawdust. The sawdust or shavings to be well packed so that there will be no possibility of settling.

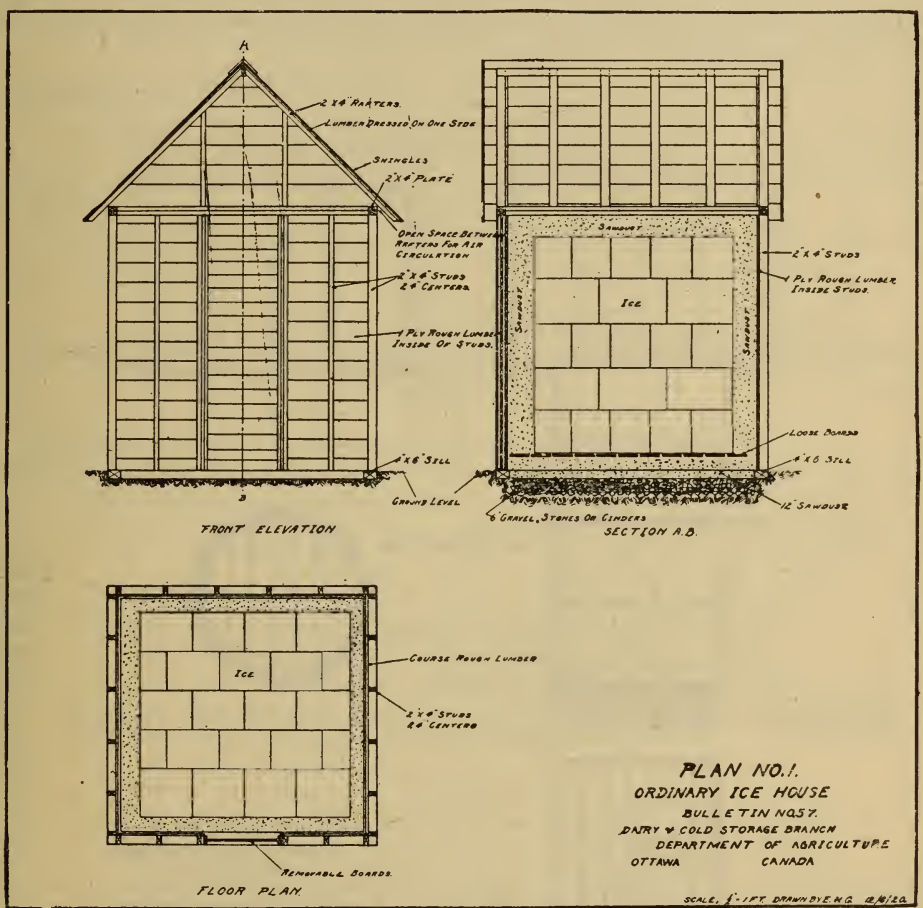
Ceiling or Covering for the Ice.—An insulated ceiling may be constructed with 6 or 8-inch joists lined underneath with two ply of damp-proof paper and one course

of matched lumber. The space between and over the joists should then be filled with not less than one foot of sawdust or planer shavings.

The ceiling may be dispensed with and the ice simply covered with about two feet of marsh or "slough" hay, or any fine wild hay grown in low places.

In filling the icehouse, pack the ice close to the walls.

Ventilation.—The gable ends of the building should have louvre openings about two feet square, to ventilate the space above the ice, or above the ceiling.



Doors.—Doors to be made in sections of 3 by 4 feet with double lumber and two-play paper between the lumber, and extend from the floor to the roof. The door frames to be fitted with two sets of removable boards inside the doors, allowing a space of about eight inches to be filled with sawdust or shavings after the ice is stowed.

NOTE.—Where planer-mill shavings or sawdust are not available for filling the spaces in the walls, wild hay may be substituted if the space in the walls is increased to at least two feet, and the hay well packed. Two feet of hay should also be placed underneath the ice.

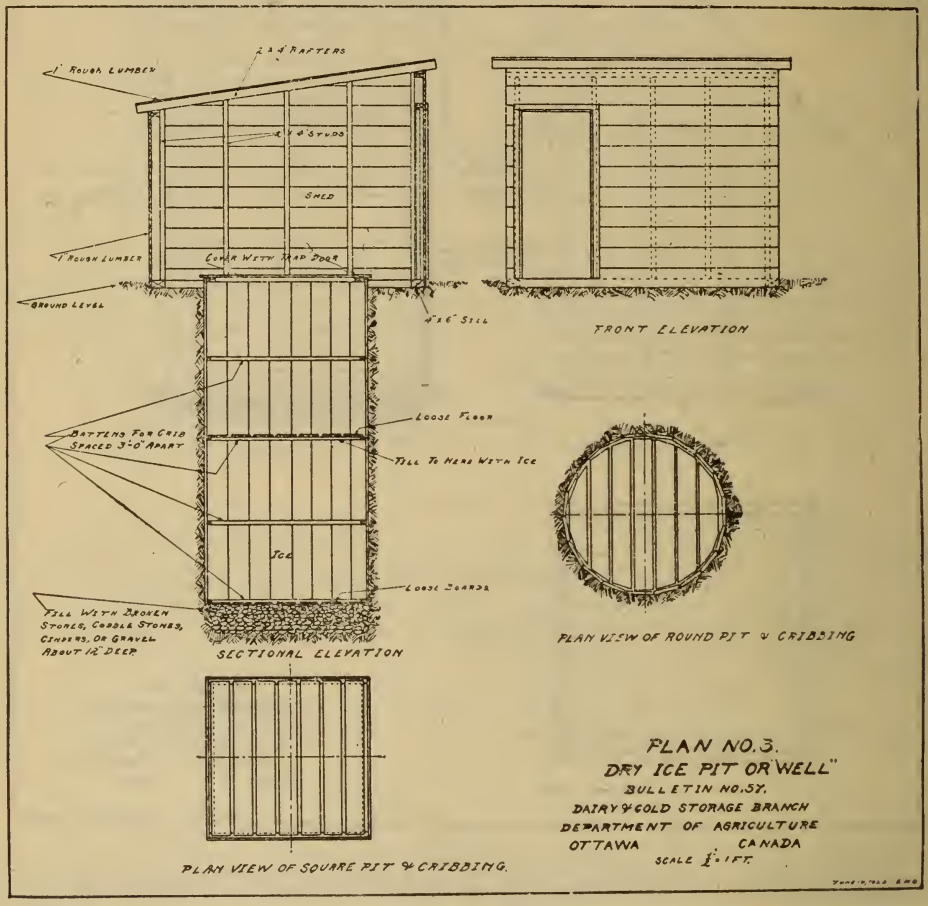
Size of Icehouse.—In estimating the size of the icehouse required, allow 40 cubic feet of space for each ton of ice to be stored, and at least 25 per cent for wastage.

SPECIFICATION FOR AN "ICE WELL".

Plan No. 3.

"Ice wells" are used in some parts of the western provinces, including Manitoba, Saskatchewan and Alberta, for making ice during the cold weather, and then utilizing the space over the ice for cooling purposes during the summer months.

In selecting a site it is advisable to keep away from any well which supplies drinking water, as the seepage from the "ice well" may contaminate the water and make it unfit for use. If possible, pick out a shady spot where there is some protection from the sun and winds.



The "ice well" should be about 12 feet deep and of a diameter to suit requirements. The larger it is the longer the ice will last. A well, six feet in diameter, filled six feet in depth with ice, will hold about four tons.

The well should be cribbed as shown in the drawing to prevent the walls from falling in. It is very essential that the earth in the bottom of the well should be dry and porous, or that drainage be provided, otherwise, the water that results from the ice melting will collect in the well and cause the ice to melt in a very short time.

A shed with a removable roof should be constructed over the well. In filling the well during the winter months, take off the roof of the shed to get the full benefit of the outside temperature, then sprinkle the cribbing with water until it is covered

with a coating of ice. This will make it hold the water. In filling the well put in about four to six inches of water at a time, and allow it to freeze solid before adding more, until the ice reaches within three or four feet from the top. If it is available, the well may be filled loosely with blocks of ice, and water added gradually to fill the spaces, and thus make a solid mass.

A loose floor should be placed on cleats fastened to the cribbage just over the ice, and the top of the well covered with a trap-door and straw.

The space between the loose floor and the top of the well can be used to advantage for cooling milk or cream, and other products. Care must be taken to keep this chamber as clean as possible. If milk or cream is spilled it should be cleaned up at once to prevent odours arising that would be injurious and would offset any benefit to be derived from cooling.

As a means of preserving ice for household use, the "ice well" has no advantage over the storage of ice in a rough shed, but it does provide facilities for holding cream and milk, and for the cool storage of other articles of food, where a supply of ice cut from a stream or pond is not available.

"Ice well" can be used successfully only in places where no water collects in the excavation.

LIST OF PUBLICATIONS OF THE DAIRY AND COLD STORAGE COMMISSIONER'S SERIES.

REPORTS.

Report of the Dairy Commissioner, January, 1905, to March, 1906.

† Reports of the Dairy and Cold Storage Commissioner for 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914 and 1915.

BULLETINS.

Date Issued.	No.	Title.
1909	*22	The Cooling of Milk for Cheesemaking
1910	25	Coulommier Cheese, Some Notes on its Manufacture.
1911	27	Trial Shipments of Peaches, 1910.
1911	28	The Dairying Industry, an Historical and Descriptive Account.
1911	30	Cream Cheese. (Second Edition.)
1912	33	Cow Testing.
1913	36	Cold Storage for Creameries.
1913	37	The Island of Orleans Cheese.
1914	41	Cheese Factory and Creamery Plans with Specifications.
1914	43	The Cold Storage Act, 1907, as Amended in 1909, and Regulations.
1915	44	The Cold Storage of Food Products with Some Notes on Insulation and Warehouse Management.
1915	45	The Testing of Milk, Cream and Dairy By-Products by Means of the Babcock Test.
1915	46	Tests for the Specific Gravity, the Percentage of Acid and Casein, the Adulteration of Milk, the Percentage of Water and Salt in Butter and of Fat and Water in Cheese.
1916	47	The Grimsby Precooling and Experimental Fruit Storage Warehouse.
1916	48	Precooling, Shipment and Cold Storage of Tender Fruit with Notes on Packing and Packages.
1917	49	Small Cold Storages and Dairy Buildings.
1917	50	The Use of Brine Tank Refrigerator Cars for Fruit Shipment.
1917	51	The Rate of Precooling Fruit in Different Styles of Packages and at Different Temperatures.

Date Issued.	No.	Title.
1917	52	Methods of Handling Basket Fruits.
1917	53	Butter Making on the Farm.
1918	55	List of Cheese Factories, Creameries, Skimming Stations also Condensed Milk Manufacturers, City Milk Vendors and Ice Cream Manufacturers, etc., in Canada.
1920	55	The Finch Dairy Station. Report of Progress.
1920	56	Report of the Dominion Educational Butter Scoring Contest, 1919.

CIRCULARS.

1911	2	The Milk Test Act.
1912	6	Creamery Cold Storage Bonuses.
1914	10	Notes on Cow Testing.
1914	12	The Branding of Dairy Butter.
1915	13	Commercial Precooling and Storage of Fruit for the Season of 1915.
1915	*14	Causes of Variation in the Percentage of Fat in Hand Separator Cream.
1915	15	Cherry Precooling Possibilities.
1916	17	The Probable Scarcity of Rennet for the Manufacture of Cheese with some Directions for securing a Supply
1916	18	The Use of Pepsin as a Substitute or Partial Substitute for Rennet in the Manufacture of Cheese.
1916	19	Directions for Using Soluble Powdered Pepsin as a Substitute for Rennet
1917	21	Further Notes on the Use of Pepsin and Other Substitutes for Rennet in the Manufacture of Cheese.
1917	22	The Manufacture of Cottage and Buttermilk Cheese.
1917	23	The Manufacture of Buttermilk from Skimmed Milk.
1918	*25	Keeping Dairy Herd Records. (Supersedes Circulars Nos. 16, 20 and 24.)
1919	*26	The Care of Cream for Buttermaking. (Revised and Condensed from Bulletin No. 32.)
1919	27	Yield and Relative Value of Some Dairy Products.
1920	28	The Dairy Industry Act, 1914, and Regulations.

SPECIAL PUBLICATIONS.

1907		Map showing the Location of Cheese Factories and Creameries in Canada.
1911		Report of the Third Dominion Conference of Dairy Experts, December 6 and 7, 1911.
1918		Report of the Proceedings of a Dominion Dairy Conference, November 25, 26, 27 and 28, 1918.
1919	C. S. 1	List of Cold Storage Warehouses in Canada
1919	C. S. 2	List of Subsidized Cold Storage Warehouses in Canada.
1920		Plan and Specification for a Frost-proof Apple warehouse.

Any of these Publications will be sent free of charge on application to the Dairy and Cold Storage Commissioner, or to the Publications Branch, Department of Agriculture, Ottawa, Ont.

*A sufficient number of bulletins 22 and 57 and circulars 14, 25 and 26 will be sent to the manager of any cheese factory or creamery to supply one to each patron.

†Annual Reports of the Dairy and Cold Storage Commissioner discontinued since 1915.