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This paper pertains to the formation of ice platters. To the writer's knowledge, this phenomenon has not been previously described; however, it is not unknown since Professor Backlund of Uppsala, Sweden, the first man to prepare geologic maps of the Arctic coast of Siberia, has stated that he saw similar formations in northern Angaraland, Siberia. Probably workers in the North American Arctic have also seen these curious platters.

The ice platters were discovered by the writer in the summer of 1955 when he worked on sites for the DEW (distant early warning) Line. The place where the observations were made cannot be located any more precisely than a part of Labrador where there are some pine trees. Four days and nights were spent in the area; observations were made over three mornings.

Statics of the Platters

Most platters are circular, a few are ellipsoidal, and on rare occasions one is found with an ellipsoidal outline and multiple rim at either one or both of the elongated ends (as can be seen in Figure 1). The bottoms are porous, being composed of relatively large ice crystals, up to 10x10 millimeters, which are loosely connected, and seem

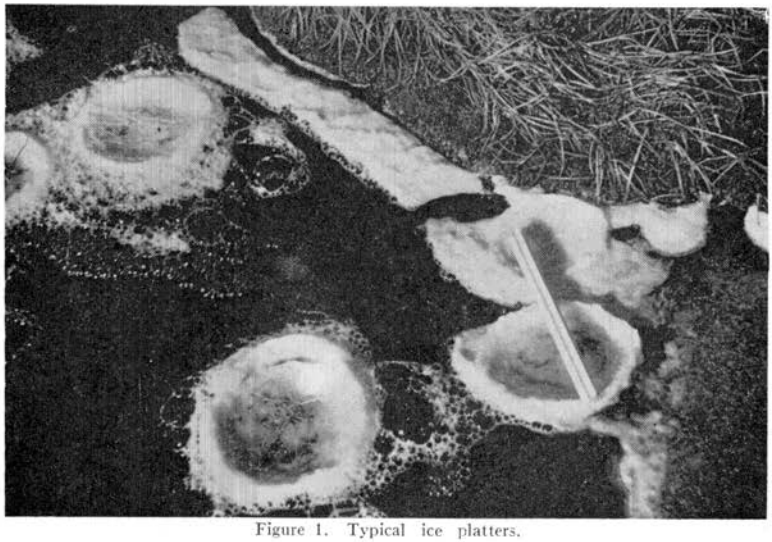

Figure 1. Typical ice platters.

to have their c-axes oriented perpendicular to the surface of the pool. The platters float on the water because of the bulk of their bottoms; they will not hold water if filled and lifted out of the pool. The lower surface of the bottoms tends to a hyperbolic shape; the upper surfaces are usually flat and clear with a film of water in them, though sometimes they may have a foamy hump in their centers. The rims of the platters are composed of a pure, white, foamy ice which contains occasional crystals of ice. The rims melt rather rapidly when a warm finger is pressed against them. On the first day, 52 platters were counted, on the second 48, on the third 67. Platters were counted by dropping tufts of straw into them as they went by. Specific measurements of the platters are given in Table 1.

Dimensions of the Pool

The pool was about 2 meters in radius, 5 centimeters deep at the edges, except where the waterfall entered and there it was about 30

Table 1

Measured Dimensions of the Ice Platters in Cm.

	Diameter of Platter	Thickness of Rim	Height of Rim	Character of Bottom
	5½	½	.3	Hump
	7	½	.3	Hump
	8½	.75	.75	Clear
	8	.6	.75	Flat
	5	.5	.2	Flat Foamy
	8	.8	.8	Flat Clear
	6	.75	.7	Flat Clear
	8	.5	.7	Flat Clear
Double Rim Ellipsoidal Shape	1.8 x 10	.5	.75	Flat Clear
	8	.5	.8	Flat Clear
Double Rim Ellipsoidal Shape	7 x 10	.5	1	Flat Clear
	5.5 x 9 x 11	.5, .5, .5	.5, .5, 1	Hump Clear Foamy
	7.5	.75	1	Clear
Ellipsoidal Shape	7 x 11	1 x .5	1	Flat Clear
	8.5	1	.5	Flat Foamy
	7.5	.33	1	Flat Clear
Triangular Shape	7 x 5	.25	.25	Flat Very Foamy
	7 x 8	.5	1	Flat Clear
	7	.5	1	Flat Clear
	7.5	1.5	1	Flat Clear
	8 x 10	1	1	Flat Clear
	9	1	.5	Flat Foamy
	7	.5	.75	Flat Clear
	7	.5	.75	Flat Clear
	8	.5	1	Flat Clear
	7.5	.5	.75	Flat Clear
	8	.5	.75	Flat Clear
	6	1.5	1	Flat Clear

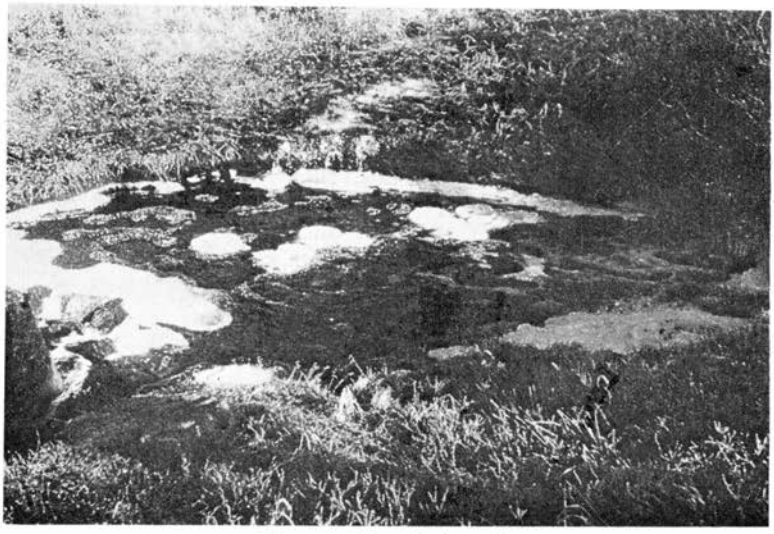

Figure 2. View of the pool.

centimeters deep; the depth at the center was about 50 centimeters. Water running over the spillway was never more than 2 centimeters deep.

Dynamics of the Pool

For some hours before platters formed, during the time of formation, and until they melted, the temperature of the pool seemed to remain at 0° C. The night air was as cold as —15° C; during the day the temperature of the air rose as high as 10° to 18° C when the sun was out. The earth above the permafrost usually had a temperature several degrees below zero after midnight and tended to freeze. Platters commenced to form after midnight and melted in the late morning.

Water in the pool rotated in a clockwise direction. Platters toward the periphery made a circuit about the pool in an average of 46 seconds (50 readings), and those near the center took an average of 30 seconds. Platters in the center and toward the outside edge of the pool rotated clockwise; while those in an intermediate zone often rotated in a counterclockwise direction due to a differential in the velocity of the current. Water at the entrance to the pool dropped some 40 centimeters; however, platters did not come directly below this falling water. The brook did not freeze either above or below the pool. The brook and its tributaries passed through extensive evergreen growths before reaching the pool and were charged with pine oil; this foamed at the entrance to the pool. The foam tended to form disc-like masses on the surface due to current differentials.

During the night and coldest part of the early morning some ice formed at the edge of the pool. Disc-shaped masses of foam tended to freeze. Irregularly shaped masses tended to be battered to discs. During each pass across the entrance to the pool, the foam masses were sprayed; this reduced their heights. On each pass across the entrance to the pool foam masses tended to gather more foam; this increased their lateral extent. Foam tended to be pressed upward between the larger masses of foam and ice thus commencing to form rims. In this manner the discs grew with the inner floor being flattened and its foam being removed by the spray, the outer edges growing laterally and vertically due to accumulation of foam, and pressure between platters. The larger discs do not pass as close to the entrance of the pool as the smaller and embryonic platters. Many disc-like aggregates of foam were destroyed before they could form platters. In the heat of the morning, the rims of the platters melted before the bottoms.

Summary and Conclusion

Ice platters formed in a fresh water pool fed by a small cascade. The water in this shallow bowl-like basin rotated once every 46 seconds at the outer edge and once every 30 seconds toward the center. Pine oil in the water foamed below the cascade and a fine spray formed where the water splashed against the rocks. The foam was spun into discs which froze, gathered more foam about their edges and thus enlarged. Spray tended to compact the foam by breaking larger bubbles. Large discs did not approach the spray as closely as the smaller ones; they tended to cluster. Foam was pressed up between them to form rims. Essentials to the formation of platters seem to be a pool with rotary motion, pine oil, a fine spray and the correct temperature.

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