

# A NEW SHIPPING OUTFIT FOR ICED WATER SAMPLES.

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The portable refrigerator and sample bottles shown in the accompanying illustrations were designed to meet the conditions incident to shipping samples long distances to the Kansas State Water Survey Laboratory and to conform to the requirements of the Standard Methods, American Public Health Association.

Pressed ground cork is the insulating material used in these containers and it is moulded in one piece. The inside lining is eight ounce tinned copper seamed and soldered. The outside protective covering is twenty-eight gauge galvanized iron. The copper box that carries the sample bottles is provided with a movable partition so that one, two three or four samples may be shipped safely. The box is suspended from the lid of the refrigerator by two hooks and a catch. When the catch is closed and the lid fastened in place, it is impossible for the catch to come unfastened until the lid is removed.

The bottles are held snugly in place in the upper portion of the container. The space below is large enough to hold six or seven pounds of ice. The outside dimensions of the refrigerator are sixteen inches high and twelve inches in diameter. The inside dimensions are twelve inches in depth and eight inches in diameter. The weight without ice or water samples is seventeen pounds. Packed for shipment with four samples, the case weighs twenty-four pounds, thereby coming under the thirty-cent limit of express tariff "K."

In case this container should be tipped over in shipment, there is sufficient space so that the water from the melted ice will not come in contact with the sample bottles.

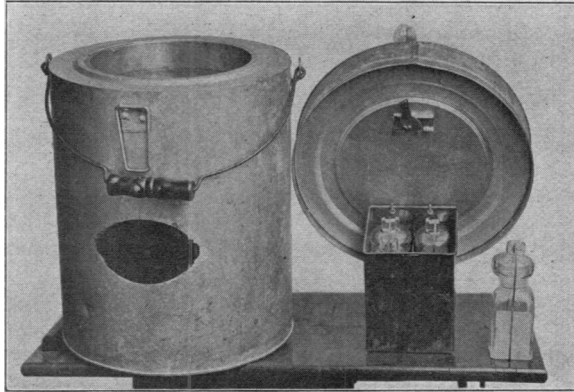
One of these refrigerators was placed in a 37° incubator, and it was found that six pounds of ice would keep samples under 10° for thirty-four to thirty-six hours, depending on the size of the pieces of ice used in packing.

The sample bottle holds six ounces. One face is ground so that the description of the sample can be written on the bottle. The top of the ground space serves as a graduation for four ounces of water, thus allowing for an air space above the sample. The stoppers and bottles are numbered and each stopper is ground to fit.

The special feature of this bottle is the design of the stopper. The stopper proper is partially protected by an overhanging hood. The hood,

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however, has for its chief purpose the protection of the neck of the bottle. The handle is notched to hold a strong rubber band and is heavy enough so that if the stopper is laid down, the portions coming in contact with



the water will be held away from the surface on which the stopper is placed.

Twelve dozen of these bottles have been in use three months. In that time only six have been broken in sterilizing, two in shipment and four in collecting samples. In practice the bottles are washed with chromic acid



cleaning mixture, rinsed, dried, and then sterilized in a dry oven at 180° to 200° C. for an hour.

Fifty of these outfits are in constant use by the laboratory at present.

Date.	City.	Distance from Lawrence.	Hours en route.	Maximum temp. at Lawrence.	Condition on arrival.	
June	5 Marysville . . . . .	134*	48	90.2° F.	Below 10° C.	
	5 Hutchinson . . . . .	194	24	90.2	Below 10° C.	
	5 McFarland . . . . .	53*	48	90.2	Below 10° C.	
	7 Burlington . . . . .	73*	48	76	Above 10° C.	
	10 Excelsior Springs . . . . .	55*	20	75	Ice.	
	11 Manhattan . . . . .	80	20	80	Ice.	
	13 Concordia . . . . .	171*	48	83	Below 10° C.	
	16 Bonner Springs . . . . .	22	10	93	Ice.	
	17 Clearwater . . . . .	219*	46	94	Below 10° C.	
	18 Marysville . . . . .	134*	12	102	Ice.	
	24 Ottawa . . . . .	27	10	93	Ice.	
	July	1 Chanute . . . . .	161*	36	87	Below 10° C.
		2 Medicine Lodge . . . . .	296*	24	91	Below 10° C.
		3 Norton . . . . .	292*	34	94	Above 10° C.
3 Piqua . . . . .		154*	24	94	Below 10° C.	
9 Leavenworth . . . . .		34	24	92.5	Below 10° C.	
11 Dodge City . . . . .		327	24	96	Ice.	
12 Lucas . . . . .		203*	24	91.5	Below 10° C.	
12 Lebanon . . . . .		207*	64	91.5	Above 10° C.	
15 Holton . . . . .		50*	24	103	Ice.	
15 Marysville . . . . .		134*	24	103	Ice.	
15 Kingman . . . . .		227*	24	103	Ice.	
16 Wilsey . . . . .		89*	36	102.5	Above 10° C.	
17 Atchison . . . . .		71*	48	101.5	Above 10° C.	
17 Burlington . . . . .		73*	24	101.5	Below 10° C.	
19 Pratt . . . . .		267*	48	88	Above 10° C.	
21 Ottawa . . . . .		27	10	86	Ice.	
22 Neodesha . . . . .		196	26	85	Ice.	
23 Paola . . . . .		82*	24	92	Ice.	
23 Great Bend . . . . .		244	24	92	Ice.	
24 Pittsburg . . . . .		216*	24	81.5	Ice.	
24 Humboldt, Nebr. . . . .		177*	24	81.5	Below 10° C.	
24 Cherokee . . . . .		175*	48	81.5	Below 10° C.	
24 Mankato . . . . .		198*	48	81.5	Below 10° C.	
24 Iola . . . . .		95*	24	81.5	Below 10° C.	
24 Larned . . . . .		267	24	81.5	Ice.	
24 Russell . . . . .		224	24	85	Ice.	
25 Wichita . . . . .		187	24	85	Ice.	
25 Osawatomie . . . . .		100*	24	85	Ice.	
26 El Dorado . . . . .		163*	24	96	Ice.	
28 Winfield . . . . .		217*	24	95.5	Ice.	
30 Caldwell . . . . .		234*	48	100.5	Below 10° C.	
30 Chanute . . . . .	161*	24	100.5	Below 10° C.		
30 Lansing . . . . .	39*	16	100.5	Ice.		
30 Burr Oak . . . . .	271*	28	100.5	Ice.		
30 Almena . . . . .	282*	24	100.5	Ice.		
31 Syracuse . . . . .	429	24	87	Ice.		
31 Onaga . . . . .	58*	24	87	Ice.		
31 Olathe . . . . .	58*	24	87	Ice.		
31 Florence . . . . .	132	24	87	Ice.		
31 Baileyville . . . . .	184*	24	87	Ice.		
31 Waterville . . . . .	170*	72	87	Above 10° C.		
31 Oswego . . . . .	191*	24	87	Ice.		

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Date	City	Distance from Lawrence	Hours en route	Maximum temp. at Lawrence.	Condition on arrival
Aug. 4	Atchison	71*	36	103.5° F.	Below 10° C.
5	Topeka	27	8	104.5	Ice.
5	Burr Oak	271*	24	104.5	Below 10° C.
5	McPherson	179*	24	104.5	Ice.
5	Sabetha	86*	60	104.5	Below 10° C.
6	Wichita	187	20	99	Ice.
6	Sedan	202*	48	99	Above 10° C.
6	Abilene	124	16	99	Ice.
6	Chetopa	114*	24	99	Below 10° C.
6	Independence	127*	18	99	Ice.
6	Cherryvale	117	20	99	Ice.
7	Atchison	71*	10	105	Ice.
7	Ft. Scott	138*	24	105	Ice.
8	Washington	190*	24	103	Ice.
11	Garnett	44	10	104	Ice.
12	Wathena	110*	36	103	Below 10° C.
12	Kansas City, Kan.	39	10	103	Ice.
12	Marysville	134	24	103	Ice.
12	Neodesha	196	24	103	Ice.
12	Cherryvale	117	24	103	Below 10° C.
12	Waverly	54	24	103	Below 10° C.
12	Scammon	144*	24	103	Ice.
13	Independence	127*	24	101.5	Ice.
13	Atwood	309*	48	101.5	Above 10° C.
13	Hewins	175	24	101.5	Ice.
13	Mound City	154*	24	101.5	Ice.
13	Meade	331*	24	101.5	Below 10° C.
14	Marion	143*	24	102	Below 10° C.
14	Delphos	195*	24	102	Below 10° C.
14	Holyrood	226*	24	102	Below 10° C.
14	Burrton	285	24	102	Below 10° C.
14	Atchison	71*	16	102	Ice.
19	Chanute	161*	24	99	Ice.
19	Elsmore	142*	24	99	Ice.
19	Eureka	134*	24	99	Ice.
19	Salina	146	24	99	Ice.
20	Columbus	191*	24	100.5	Ice.
20	Frontenac	211	24	100.5	Ice.
20	Chanute	161*	24	100.5	Ice.
21	Beloit	217*	24	101	Below 10° C.
21	Concordia	170*	24	101	Below 10° C.
21	Holton	50*	24	101	Below 10° C.
26	Green	173*	24	102	Ice.
26	Arkansas City	220*	24	102	Ice.
26	Holton	50*	24	102	Below 10° C.
26	Hays	250	24	102	Below 10° C.
27	Goodland	399*	48	104	Above 10° C.
27	Manhattan	80	16	104	Ice.
27	Medicine Lodge	296*	24	104	Ice.
27	Ottawa	27	10	104	Ice.
29	Manhattan	80	16	94	Ice.

\*Transferred in shipment.

During the summer over one hundred and fifty shipments have been received at the laboratory. About fifty containers were sent in by the state sanitary engineer and members of the Survey staff, all of which arrived at the laboratory with the samples under 10° C.

Many of the samples examined at this laboratory are sent in by County health officers, city engineers and water works superintendents. From these sources over one hundred shipments have been received. Most of the men collecting the samples and packing the refrigerator had never seen the contrivance before. The results of one hundred and four shipments by city engineers, county and city health officers and water works superintendents follow:

All but ten of the containers reached the laboratory with samples below 10° C. Sixty contained ice, thirty-four had no ice, but were under 10° C.

Of the ten not in good condition, eight were en route forty-eight hours or over. Two were on the road only thirty-six hours, but the amount of water in the bottom showed that they were not properly packed.

From these results it is apparent that when properly iced, this container will keep samples under 10° for thirty-six hours in the hottest weather.

NOTE.—These containers were manufactured by the "3 H" Co., Lawrence, Kan. The bottles were furnished by Bausch & Lomb.