Letter from Alexander Graham Bell to Mabel Hubbard Bell, November 19, 1909

Beinn Bhreagh, Near Baddeck, Nova Scotia. November 19, 1909. Mrs. Alexander Graham Bell, Twin Oaks, Woodley Lane, Washington, D.C. Dear Mabel:

Not having kept a letter press copy of the first batch of extracts from my Home Notes sent you by Miss McCurdy I am not sure whether she told you of the experiments made to test the paraffine idea. I shall therefore simply say that I boiled a tumbler of milk in a pot of boiling water and stuck a paraffine candle into the milk. Did the same thing with a tumbler of plane water. Also had another tumbler with meat in it filled up with water up to about half an inch from the top. The paraffine cnadles melted in the tumblers without mixing with the contents and the wicks were fished out and we had at the top of each tumbler a stratum of what looked like oil, perfectly clear and yellow or yellowish in colour. The tumblers were placed on the Library mantlepiece to cool and I looked at them next morning.

The following is from my note book:—

Nov. 18:— (see next page) for paraffine results)

Nov. 18:— Ascetylene plant has been giving very poor light for some days past. Byrnes began an inspection yesterday to ascertain the cause.

Baldwin and McCurdy still out at camp. Mrs. Baldwin has gone over the Bay this evening to attend a meeting of the Ladies' Club.

Nov. 18:— Results of yesterday's experiments with paraffine. The solid paraffine caps today are all concave on the top and of course convex below, showing the distorting effects produced by atmospheric pressure during the process of cooling. Paraffine itself evidently contracts when cooling, for the caps today only fit the tumblers loosely, and

the liquid below has ri risen by capillary action all round the edges of the paraffine plugs between the paraffine and the glass. Paraffine used in this way, does not produce an air-tight joint, and the experiment must be modified to insure success. AGB

Experiments with paraffine continued

Nov. 18:— Put some water w in a small porcelain jar which was placed on the bottom of a larger porcelain dish D . I then covered the little water vessel over with a glass tumbler, T , and set the whole thing over the kitchen stove in a pot to heat leaving a little water at the bottom of the pot to prevent the cracking of the porcelain dish. Having melted up some paraffine candles I poured the melted paraffine P into the porcelain dish.

After a few minutes the whole arrangement was taken upstairs to cool and was placed upon my Study table so that Mr. Davidson and I could watch the process of cooling (Sarah McDonald and Mr. Davidson helped me in making the experiment)

2

Result

We have apparently an air-tight joint. The depressed ring surrounding the tumbler seems to be due, at least in part, to the partial vacuum, formed in the tumbler, as some of the paraffine appears to have been sucked into the tumbler. The level of the interior paraffine is much less than I anticipated.

The most interesting feature to me is the apparent continuous deposition of moisture upon the interior of the tumbler during the cooling process.

The drops of moisture trickled down the sides and collected in the space between the sides of the tumbler and the little water vessel. After the lapse of half an hour or so the space around the water vessel was completely filled with water and began to overflow backwards into the interior.

Still deposition appears to go on and I am inclined to think that if the space outside the little jar was only large enough to hold all the water it contains, that we would find the deposition continued until finally all the water in the jar would be transferred to the space outside.

As I picture the process, the partial vacuum in the tumbler leads to evaporation from the central receptacle. Water vapour takes the place of some of the air expelled from the tumbler by the original heating.

But some of this vapour is deposited as water upon the coldest parts of the enclosure, that is up o n the sides and top 3 of the tumbler. This keeps up the partial vacuum, for the liquid drops, occupy much less space than the vapour from which they were condensed.

As fast then as vapour is condensed on the glass, fresh evaporation takes place from the warmer central receptacle to make good the loss; and I see no reason to doubt that this process would continue untill all the water appeared in the cooler parts of the chamber, leaving the central vessel dry.

I fancy I see here a process that may be applied to the solution of the problem of distillation of water at low temperatures, so as to arrive at a simple method of distilling fresh water from salt, without the necessity of fire. A partial vacuum may perhaps be able to do the business.

At all events I will at once repeat the above experiment, so as to secure sufficient space outside the central jar to hold all the water that may be condensed. I can then satisfy myself concerning the important point of continuous deposition which is suspected to take place. AGB

Later

Have made another experiment to test the point, but must postpo o ne description as bedtime has long since passed. (it is now almost 3 o'clock a.m. Friday Nov. 19).

PS, Nov. 19:— Sent you last night a specimen of the hektograph work showing original graphical curve with seven copies. The copies are certainly much clearer than the carbon copies of the Recorder. Think we will be able to make use of the process. AGB