

Experiments in Fireless Cookery.

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1906.

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The art of fireless cookery seems to have originated in Germany, where the housewives are noted for their many domestic virtues and especially for the economy of their cooking arrangements.

The idea is not new. A fireless stove was exhibited in Paris as early as 1867 under the name of the Norwegian automatic cooker. No notice was taken of it however and the next heard of such an arrangement was from a German housewife who constructed one with a packing of hay for the purpose of keeping food, which had been already cooked, warm for some time. She soon found that the cooking temperature was maintained for several hours and that food which was only partially cooked could be completed in the box.

Upon further experimentation it was discovered that for many articles of food from three to five minutes actual boiling on the stove was all that was required as the process would be completed in the box. Other foods, such as cracked wheat, navy beans, and meats require at least one-half hour at the boiling temperature.

Many foods are warm enough to serve after ten hours in the box but others require heating through. Some foods, as baked beans, meat and so forth may be partially prepared in the box and then browned in the oven.

Of course, the box cannot be used for broiling, frying, baking nor for preparing any food that requires crispness, as the heat necessary to cook the food must be supplied in the food itself or in water surrounding it. Foods cooked in water, as cereals, fruits and vegetables, or those set into a can of water, as custards and brown bread, are most successful in this method of cooking.

All that is required in the construction of a fireless stove is a tight box packed well with some non-conducting material. Almost

anything which is a non-conductor of heat may be used. Hay, straw, newspapers, asbestos, animal and mineral wool, felt and some specially prepared paper have been used. Asbestos wool must not be packed too tightly as there will be no air space and it loses heat more readily than when put in loosely.

Any kind of cooking utensils may be used if they have tightly fitted covers, the closer the better, but those of heavy material, as earthenware, will hold heat better than tin or granite. It is better ordinarily to use granite ware as the tin rusts while left standing so long with moisture.

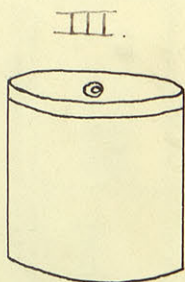
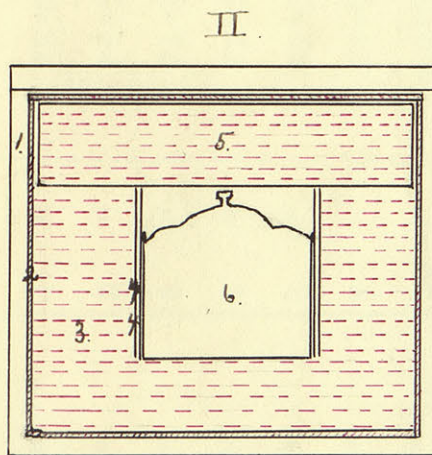
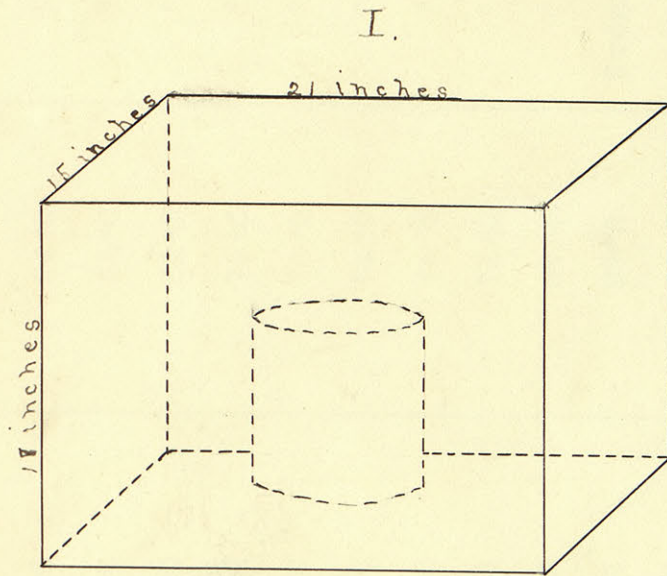
The essentials of cooking are to have the food heated to the boiling point and to have the tightly covered vessel filled with steam. The box must not be opened until the food is thought to be done.

Three boxes were used in conducting the following experiments, each lined closely with asbestos cardboard, with a sheet of the cardboard for the top, and packed with mineral wool, asbestos wool, and animal wool, respectively. In the center of each was a circle of the cardboard in which to set the cooking utensil. For the mineral and asbestos wool boxes, pillows of the packing material about two or three inches in thickness were made for the top.

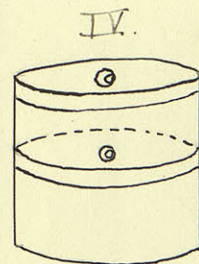
The packing in the mineral wool box was 5 inches thick on each end, 4 inches on each side, 1-1/2 inches on the bottom. That in the asbestos wool box was 4 inches on each end, 2-1/2 inches on each side, 2 inches on the bottom with a 3 inch pad for the top. The animal wool was tried in two boxes. In the first, the packing was 2 inches on the sides, 7 inches on each end, 2 inches on the bottom and 3 inches on top. The second box had 4 inches of packing on each end, 2-1/2 inches on each side, 2 inches on bottom and 3 inches on top. There was practically no difference in the cooking qualities of the two boxes.

The boxes used in the experiments were of $\frac{3}{4}$ inch material and the best size was 15 X 18 X 21 inches outside measurements. Each one could contain only one cooking utensil at a time or two small ones, one set on top of the other.

Of the accompanying illustrations, the first shows a view of one box as it contains the cylinder. The second gives a cross-section of the box showing the lining, packing and the cylinder containing the granite ware utensil. The third and fourth illustrations show one of the large tin utensils and the two small ones, one set on top of the other as they are when in the boxes. The earthenware utensil was just an ordinary bean-pot, and is not shown.



1. Wooden Box.
2. Asbestos Lining.
3. Packing.
4. Asbestos Cylinder.
5. Pillow of Packing.
6. Granite utensil.



Water Experiments.

Material	Amount of Material	Temperature when put into box	Time in box	Temperature when taken out of animal wool box	Temperature when taken out of asbestos wool box	Temperature when taken out of mineral wool box	Kind of utensil
Water	1 gallon	Boiling	1 hour	90°C.	86°C.	91°C.	Tin
"	"	"	2 hours	87°C	82°C	88°C	"
"	"	"	3 "	80°C	72°C	84°C	"
"	"	"	4 "	78°C	68°C	81°C	"
"	"	"	5 "	76°C	65°C	78°C	"
"	"	"	6 "	74°C	64°C	76°C	"
"	"	"	7 "	71°C	62°C	74°C	"
"	"	"	8 "	69°C	58°C	74°C	"
"	"	"	9 "	67°C	54°C	71°C	"
"	"	"	10 "	64°C	54°C	67°C	"
"	3 quarts	"	1 hour	89°C	78°C	89°C	Granite
"	"	"	1 "	89°C	81°C	89°C	Tin

Material	Amount of material	Amt. of water	Time cooked before put into box	Box	Time in box ----- hrs.	Temp. when taken out	Utensil	Cooked or not cooked	Notes.
Meat.	1-5/8 lb	1 qt.	15 min.	Animal wool	14	54°C	Tin	Done	Seared and put into boiling water
Cracked wheat	1 cup	6 c.	15 min.	Animal wool	14	53°C	Tin	Partially	
Brown bread			steamed 30 min.	Mineral wool	13-1/2	58°C	Tin	Partially	
Navy beans	1-1/4 c.	3 c.	30 min.	Animal wool	10	39°C	Tin	Partially	Soaked over night
Rice	6 oz.	3 c.	5 min.	Animal wool	13-1/2	45°C	Tin	Done	
Macaroni	6 oz.	3 c.	5 min.	Animal wool	13-1/2	44°C	Tin	Done	
Lima beans	1/2 lb.	3 c.	30 min.	Animal wool	10	39°C	Tin	Done	
Pot roast	4 lbs.	1 qt.	30 min.	Mineral wool	14	52°C	Tin	Partially	Seared and put into boiling water
Rolled oats	1 c.	3 c.	5 min.	Mineral wool	10	51°C	Tin	Well done	Cooked in small tin
Rice pudding	1 qt.		5 min.	Mineral wool	10	51°C	Tin	Well done	Cooked in small tin
Brown bread			steamed 30 min.	Animal wool	10	54°C	Tin	Not done	
Roast	4 lbs.		in oven 30 min.	Animal wool	10	38°C	Tin	Not done	Seared before put into roaster
Potatoes	2 lbs.		in oven 30 min.	Animal wool	10	38°C	Tin	Not done	Put in with roast
Pot roast	4 lbs.	1 qt.	30 min.	Mineral wool	10	54°C	Tin	Cooked rare	Seared and put into hot water
Navy beans	1/2 lb.	3 c.	30 min.	Mineral wool	10	51°C	Tin	Not done	Soaked over night
Dried prunes	1/2 lb.	2 c.	Boiling	Mineral wool	10	50°C	Tin	Done	Soaked over night
Dried peaches	1/2 lb.	2 c.	Boiling	Mineral wool	10	50°C	Tin	Done	Soaked over night

Material	Amount of Material	Amt. of water	Time cooked before put into box	Box	Time in box ----- hrs.	Temp. when taken out	Utensil	Cooked or not cooked	Notes
Brown bread			steamed 45 min.	Animal wool	10	54°C	Tin	Done	
Cracked wheat	1 c.	6 c.	30 min.	Mineral wool	10	47°C	Tin	Nearly done	
Custard	1 qt.			Animal wool	10	51°C	Tin	Done	Set into Boiling water
Rolled oats	1 c.	3 c.	5 min.	Asbestos	10	43°C	Tin	Done	
Vegetable soup	1-1/2 qt.		5 min.	Mineral wool	10	63°C	Granite	Done	
String beans	3/4 lbs.	2-1/2c	5 min.	Asbestos	10	47°C	Tin	Done	
Chicken	3 lbs.	5-1/2c	30 min.	Animal wool	10	51°C	Tin	Done	Cut into pieces and seared before cooking
Pot roast	4 lbs.	1 qt.	30 min.	Mineral wool	10	52°C	Tin	Done	
Macaroni	1 c.	3 c.	5 min.	Animal wool	10	43°C	Tin	Done	In small tin
Hominy	1/2 c.	3 c.	5 min.	Animal wool	10	42°C	Tin	Done	In small tin
Cabbage & Pork		1 qt.	5 min.	Mineral wool	10	45°C	Granite	Done	
Tapioca pudding	1 qt.		5 min.	Animal wool	14	34°C	Granite	Done	
Mutton									
Pot Roast	3 lbs.	3 c.	15 min.	Mineral wool	14	42°C	Granite	Done	Seared and put into boiling water
Barley	1 c.	4 c.	10 min.	Mineral wool	13	44°C	Granite	Not quite	
Rice	1/2 c.	2-1/2c.	5 min.	Animal wool	5	63°C	Granite	Done	
Dried peaches	1/2 lb.	1-1/2c.	Boiling	Mineral wool	5	62°C	Granite	Done	Soaked over night

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Material	Amount of Material	Amt. of water	Time cooked before put into box	Box	Time in box ----- hrs.	Temp. when taken out	Utensil	Cooked or not cooked	Notes
Vegetable soup	1 qt.		5 min.	Mineral wool	4	75°C	Granite	Done	
Navy beans	1 c.	3 c.	30 min.	Mineral wool	10-1/2	46°C	Earthenware	Done	Soaked over night
Meat	3 lbs.	3 c.	30 min.	Mineral wool	12	52°C	Earthenware	Done	
Barley	1/2 c.	3 c.	30 min.	Animal wool	10	33°C	Granite	Done	
Tapioca custard	1 qt.		steamed 10 min.	Mineral wool	13	54°C	Tin	Done	Milk scalded with tapioca and poured over eggs. Set into can of boiling water.

It will be seen from the above experiments that a variety of foods may be cooked by this method. Although everything was not tried that might be cooked in this way a few of each kind of foods and of the different methods of cooking were prepared. Potatoes and onions were not cooked alone but were cooked in a vegetable soup along with some meat and other vegetables and were thoroughly done, so it would be possible to cook them alone in various ways. A plain custard and a tapioca custard were made successfully, so many of the custard variations could be prepared.

The number of experiments was limited because of lack of time, but enough were done to show the possibilities and advantages of this method of cooking.

The asbestos cardboard used for lining the boxes and the mineral and asbestos wool used for packing cannot be purchased in some small towns, but if they are wanted they can be ordered from wholesale houses of hardware and plumber's supplies.

The cardboard lining is not necessary if the box is tight. The animal wool was one of the bats prepared for padding comforts and a piece was cut off to place over the top. About 25 lbs. of asbestos wool are required to pack a box of the size given. It costs 15¢ per lb. 15 lbs. of mineral wool were used. The exact price of this wool is not known, but \$1.00 was paid for the amount used in packing this box. The asbestos cardboard is 60¢ per sheet and the sheets are 40 X 42 inches.

Cooking without fire is a great saving of time, labor and fuel. The kitchen is not kept in disorder during the greater part of the day as in the old way, because the later meals may be prepared at breakfast time and then put into the box. This, to a great extent, does away with the kitchen odors, heat and other discomforts of cooking

during the summer months. It is easily seen that this method of cooking would be a great help to the housewife but it would be invaluable to the woman who must be away from home during the day, as are clerks, teachers, and women who work by the day. It is also of value to picnic parties, campers, dwellers in flats and others who have few conveniences for cooking.

It has proven very successful in army life as food could be cooked while they are on the march and so much time is not required to prepare the meals. They are also better cooked and articles requiring long cooking may be served.

Manufactured fireless stoves are now placed on the market and pails have been constructed on the plan of the double boiler, in which workmen are enabled to carry a hot meal to their work instead of having cold ones.

A modification of the fireless stove with a shelf in it was made by one woman for the purpose of keeping her bread warm enough to raise during the night in winter. A jug of hot water was placed beneath the shelf.

Many and varied are the uses to which these boxes have been put and each one will find new possibilities peculiar to their needs.