1973

Cooking

Carol Miller
Ouachita Baptist University

HONORS SPECIAL STUDY

COOKING

Fall, 1973

By: Carol Miller

Advisor: Mrs. Annette Hobgood

From my project this semester, I have gained an insight into cooking that I have never known before. I will be able to use what I have learned in my everyday life from now on. The different ways of preparing foods is what is emphasized in this project report but this isn't all that I have learned. I was also able to gather recipes which I have kept on file. I have enclosed only a few examples. With the help of my advisor, Mrs. Hobgood, this study has encouraged me to further my interests in this field.

BAKING

The term baking originally applied specifically to oven-cooking of bread and cake, but it is now extended to include pie, casseroles, potatoes and even ham. If you cook it in the oven, are not broiling, and it isn't a solid chunk of uncured meat, you are baking it. In the baking process, conditions must be regulated to allow cooking all the way through and to allow full raising, without causing burning or hard crusting on the outside. It is also important that the surface acquire whatever degree of coloring is appropriate. The two principal factors are the oven temperature and the bulk and shape of the individual loaves or pieces being baked. Important secondary factors are the moisture content of the dough, the reflecting qualities of the pans and the distribution of heat in the oven.

Baking is usually done at moderate to hot temperatures, 350 to 450 F. The proper temperature should be supplied by the recipe. If it is not, try 400 as a base point, and modify it up or down in accordance with the factors being discussed and results obtained. Recipe temperatures may also be adjusted. The length of the cooking period depends both on the time needed to accomplish the necessary chemical and physical changes at a given temperature, andthat needed to heat the food to that point. These are added together to obtain cooking time. The surface of dough starts to heat as soon as it is in a hot oven, but the temperature rise may be slow at first because of cooling by evaporation, reflection of heat by the pan and inward movement of surface heat. Heating of the interior will be later than at the surface in proportion to the distance and to the amount of moisture in the dough. The important distance is the shortest one--cookies $\frac{1}{4}$ inch thick will bake in almost the same time whether their width is one inch or four. A very wet dough may take much longer, perhaps twice as long to cook as a relatively dry one, because of the time and heat needed to evaporate and/or combine the extra moisture. Unless the oven is too hot, movement of moisture from the interior to the surface will prevent excessive drying out, crust formation or burning until the surface has cooked enough to block easy travel of the moisture. Recipes and pan sizes are usually balanced

so that interior cooking is completed very soon after that of the surface. But if you have a problem of wet insides and cooked out sides, turn the oven down to 300 or even 250 F and/or brush exposed surfaces lightly with milk or water.

The chief item when discussing pans is the reflecting qualities of the material. Radiant heat rays from burners and oven walls penetrate readily through clear glass, are retarded by china and dull metal, and are stopped and reflected back by bright metal. A bright new aluminum pan will therefore transmit less heat to the food than the other materials.

The result is that cooking is slower, and a larger share of the total heat enters the food through the top. At any one temperature, the bright pan causes more crusting and browning to occur on the top than on the sides and requires a longer cooking time. If your pans are dull you should use a temperature about 15 degrees lower than you would for bright pans, or you should make the cooking period a few minutes shorter.

The typical oven is heated from below for baking. The burners may be in a separate broiler compartment underneath or in the floor of the oven. There is a steady circulation because air heated at the bottom rises, transfers part of its heat to oven walls and roof and to the food, and then either goes out a vent or goes back to the bottome to be re-heated. If two pans are placed in contact with each other, the rising air will curl around their outer edges, heating them more than other parts and causing faster cooking. If they are left with a very small gap between them, or there is a narrow gap between a pan and an oven wall, the restricted air space will act like a flue, speeding up circulation and overheating those edges. With this in mind, you should keep a gap of at least an inch between pans, and 1½ inches between a pan and an oven wall. If pans fill an entire shelf the heat will betrapped underneath them, and very uneven and probably unsatisfactory baking will result. In addition to absorbing heat from circulating air, the food and pans absorb radiant heat from the burner and from the hot metal around them. This factor is helpful in producing more uniform cooking, except for the problem of shiny or not-shiny pans discussed earlier. The temperature is not exactly the same everywhere in an oven. The differences are slight in some, while in others they are very important. You get to

know your own oven by experimenting.

Color is a critical problem with baked goods. They must be removed from the oven very soon after they are cooked through, as otherwise they will dry out. If the oven is not hot enough the outside may still be white or pale yellow, which gives an unappetizing look to most items. If the oven is too hot they may be brown andready to burn while the center is still uncooked. You can often correct poor color by checking about five minutes before cooking is completed. Color may be increased by making the oven hotter, or sometimes by painting or scattering on a small amount of milk or sugar. Browning may be checked by reducing the temperature, and/or putting aluminum foil over the dark parts if they are exposed.

BOILING

Boiling is a simple, basic and convenient method of cooking that is under such heavy and unjustified attack by modern cookbooks that even use of the word may be in poor taste. Boiling water is used as a medium to transfer heat from a pan into food.

Plain water boils at 212 degrees Fahrenheit at sea level when atmospheric pressure is normal. If it is in a pan heated from below, steam bubbles form on the bottom, rise to the surface and dissipate in the air. The formation of steam from water absorbs a large amount of heat and prevents the temperature of the water from rising much above the boiling point, as long as the steam is free to escape. The rising bubbles keep the water stirred or agitated. The rate of steam formation and agitation of the water is in proportion to the amount of heat coming up through the pan.

Freely boiling water provides the cook with a steady temperature, which will remain about the same until the water is all evaporated. Hot water is a very effective distributor of heat, transferring it into the food at a much faster rate than hot air can. The heat transfer takes place on all surfaces of the food, instead of being concentrated on one side or on a few high spots as in some other methods of cooking.

The temperature of the water is not affected by the rate of boiling. Rapid boiling, with many bubbles and much agitation, might cook the food a tiny bit faster because of more rapid and efficient heat transfer from the pan bottom to the food, but this possible small gain does not justify and increase in the risk of boiling over or going dry, nor the excessive consumption of fuel.

However, production of only a few small air bubbles which tend to stick to the pan bottom usually indicates a simmering temperature, substantially below boiling. If your timing depends on full boiling heat, make sure that at least a few bubbles are breaking steadily at the surface.

The preferred way to boil vegetables is to heat the water to a boil, add the vegetables, keep maximum heat until the water boils again, turn down the burner until bubbling is slow, put a lid over the pan, and cook until tender. You may have to adjust the flame again if the liquid boils over or stops boiling. You shouldcheck occasionally to make sure there is still water enough

to prevent burning.

The lid is optional. It serves a number of purposes. It slows the boiling away of fluids, may increase cooking temperature and thus reduce cooking time, slightly, provides for steam-cooking of any food projecting above the water and usually reduces cooking smells. But it may cause or increase trouble with boiling over, it interferes with watching the food, and it is accused of contributing to loss of green color in food and to the occasional creation of unpleasant odors.

For open boiling there should be enough water to cover the food, and it should not be allowed to drop much below the top pieces. But if covered, you can start with less water, or allow an original high water level to evaporate to a very low level, allowing steam to take care of most of the cooking. In this way you can obtain a concentrated juice for serving with the vegetable or for use in sauce, gravy or soup. But be sure not to let it go dry, as the food will then scorch and burn and develop unpleasant flavor and smell.

Cooking time varies among different vegetables and among different lots of the same vegetable. It is affected by their type age and condition, the size and shape of the pieces, and the thoroughness with which you want to cook them. There is also wide variation, due to both natural causes and special processing, in the cooking time of grains such as rice and oats, and pastas such as macaroni and spaghetti.

The boiling point of water is never exactly reached except under certain standard conditions. The water must be nearly pure, the container must be uncovered, the altitude very near sea level and atmospheric pressure normal. In addition, the temperature must be taken at the upper or free surface of the water. The boiling point is usually raised by dissolved substances, such as salt and sugar.

The other factors relate to pressure on the liquid. Water is held together as a liquid by attraction between its molecules and to some extent by gravity, but the most important influence is usually atmospheric pressure. This is the weight of air over the water, which tends to keep its molecules swueezed together and in liquid form.

Pressure may be increased by depth of water and by tight-

fitting pan lids. This does not show much in temperature and cooking time, although it may have a spectacular effect on boil-overs. But a pressure cooker with a sealed lid may be operated with sufficient back pressure to speed up cooking greatly.

Parboiling means partial cooking by boiling. If the amount of cooking is quite small, it is called blanching. This is usually a preparation of vegetables for freezing, which destroys enzymes but is supposed to leave the food practically raw. Otherwise, parboiling is usually done to shorten time needed for another cooking process, or to provide an opportunity to absorb fluids before being mixed with other foods. It may also serve to remove overstrong tastes.

Pasta is frequently parboiled, as elbows for macaroni and cheese, or noodles for lasagne. On the other hand, some people cook them fully anyhow, before putting them in the casserole. Rice may be partly or wholly precooked before combining with other food, either in stuffings or casseroles.

BROILING

Broiling usually means cooking food by direct exposure across air space to open flame or some other source of intense heat. In the kitchen the food is usually under the heat on a special two-level pan, outdoors it is above it on a wire rack. If the article being cooked has no juice, the operation is called toasting. The most frequently broiled foods are meat, chicken and fish. Broiling is suited to relatively flat shapes such as steaks, chops, fish and open-face sandwiches. Very thick pieces cooked by the broiling method are usually rotated slowly to distribute the heat on all sides and reduce the run-off of drippings.

Broilers are usually preheated for about 10 minutes before use. Standard temperature in the compartment is 550 F, but it is really not necessary for it to reach this heat, as the greater part of the cooking is supposed to be done by exposure to the flame.

The speed of the broiling process depends largely on the size and intensity of the heat source and on the distance from it. When the heat is above the food, the food is supported on a broiler rack or pan, the exposed area of which is heated directly by the flame, while the bottom is heated by air in the oven or broiler compartment. The pan contributes an important but variable amount ot the cooking. To achieve the same rate of cooking, food may be near a small flame or further from a big one, but the effects are not just the same. Nearness usually means more crusting or burning in proportion to interior cooking. Increasing the distance evens the distribution of heat, so that food with a very irregular surface, such as cut-up chicken, is more likely to dry and burn on its high spots ifit is near a flame than if it is further away. Distance between the heat and the food may vary from 1½ inches for a thin steak to be cooked rare to 9 inches for a half chicken. It is selected so as to cook the foodto the proper depth in the same time it takes to brown the surface to the right degree. Moving nearer the flame increases the rate of browning, drying and perhaps burning more than it speeds the internal cooking. A thin article or one that is to be served rare inside can therefore be near the flame, a thick

and/or well done piece should be further away.

In the kitchen, broiler pans are used to hold food under a downward heating gas flame or electric unit. There are a number designs, since broiling can be done in any shallow pan or dish that can stand the heat, or any type of grate or open work metal if provision is made for catching the drippings. In a flat pan or a dish with a raised rim, juices forced out of the food by the cooking are held in the pan under it and alongside it. Depending on the juiciness of the food, the distance below the heat and the exposed area of pan, such juices may just keep the food moist, may accumulate enough to provide dish gravy, or stock for making a regular gravy; or spill over and mess up the oven. If such juices dry up they will leave a hard residue for the cleanup department.

On the average, cooked food in this manner will be somewhat more juicy than if it is broiled on a rack. The process is the true pan broiling. It may be used for any food, but seems particularly appropriate for fish. Such a pan may be of pleasing appearance so that it can be used as a serving dish also, with provision for preventing it from scorching the tablecloth or table. If designed for broiler use, it may have a sloped or channeled floor to drain juices into a gutter or sump from which they can be dipped, either during broiling or serving. Another method is to place a wire grid or rack over a pan to support the food, so that the pan serves only to hold drippings.

Most food is broiled on both sides, the principal exception being fish in the form of halves or fillets. For turning, you wait until the upper side of the steak, chicken or other food looks pleasantly browned, then pull the broiler pan part way out of the compartment, being careful not to drop it off its slides. You can then get at it with a turner, forks or whatever your preferred tool may be, and turn each piece over, so the browned side is down. You should then be ½ to 2/3 through the cooking as the second side often takes only half the time of the first. If you miscalculate, you can always turn it back to the first side, although you may get into complications if you follow a seasoning routine. Fish is usually not turned if it is broiled in a pan. If broiled on a rack, fillets are usually not turned,

but thicker pieces are. Fish is very tender, and is quite likely to stick to the broiler rack. It is advisable to use two turners, with careful manipulation, to loosen and turn or remove it.

Broiled food is tested mostly by appearance. If it looks done, it usually is, unless you have put it too close to the heat. Steaks are the food most often broiled, and the problem with them may be to see that they do not get cooked, or at least not much. The only sure test is to pull out the tray part way, make a small cut in an average part of the food, and look. Chicken becomes tender as it cooks, so you can test it for doneness with a fork. Small or thin pieces cook most rapidly, and are often removed before the thicker parts. Wings are sometimes protected with foil for the last few minutes.

FRYING

In frying, a heated pan or other container transmits heat to food by a layer or bath of oil or melted fat, which may vary from a thin film to a depth of a foot or more. The term is stretched to cover cooking on dry ungreased pans, where it overlaps on another term, pan broiling. Neither name is really appropriate, since the essence of frying is the presence of grease,and the distinguishing feature of broiling is direct across-air heating from flame or some other intense source.

In pan frying, also called shallow frying and sauteeing, the food rests on the pan bottom, while in deep frying it either floats in the fat or is supported in a strainer or basket that holds it above the bottom. It follows that use of an inch or two of fat would be shallow frying, provided the food did not float and deep frying if it did. It seems to be the general custom to use either a thin layer or a considerable depth, with no in between stages. If a small amount of water mixes with or replaces the fat in pan frying, and the pan is covered, the operation is called braising.

Frying is a faster method of cooking than either boiling or roasting. Fat temperature is kept much higher than the boiling point of water, and it conducts heat far more efficiently than the air in an oven. It also can and should produce excellent flavor, blending taste of fast-cooked food with that of the cooking oil, and of various secondary products formed by reactions between food and oil. On the other hand, fried food can easily become hard and dried-out, and it is usually more or less oily or greasy. Many digestions will not tolerate much or sometimes any grease, so that fried foods have to be avoided partly or entirely. Hardness and greasiness can both be largely controlled by proper cooking and draining.

At frying temperatures, fat, grease and oil substances are liquid, and the three names can be used interchangeably. The fat used in frying serves three important purposes. It prevents, or tends to prevent, the food from sticking to the pan; it provides an efficient medium for conducting heat from the pan bottom to the food and it flavors the food. Oil froms a slippery film over the metal surface, which holds the food away from it a few mole-

cule-widths, and thus prevents sticking. The film may be reduced by boiling away, or by absorption by the food, so that it must be renewed by more oil creeping into the space, or by moving the food to pick up more oil.

Most fats can be hot enough to brown most food before they reach their boiling point. Breakdowns of their film on hot metal will allow variable degrees of sticking, and additional browning and burning, which can be regulated by scraping with a turner and adjusting burner heat, to produce the color desired. Butter and some margarines turn brown themselves at moderate heat, adding color. Complicated reactions go on inside the fats and in their combinations with the food, to produce the variety of tasty flavors associated with frying.

Food that is to be fried is frequently breaded. This usually means that it is coated with flour, crumbs or corn meal, which may be held on by the dampness of the food, or by an added film of water, milk or raw egg. Breading is used principally to provide a richer fried flavor, and to improve appearance. It may also serve to prevent pieces of food from sticking together. When it includes egg, it is hardened immediately by contact with hot grease, and forms a skin that resists soaking-in and that helps to hold tender food together.

Pan frying is another quick convenient way of cooking. It involves a frypan, skillet or griddle, usually a small or moderate amount of fat, and a surface burner. Dry frying on Teflon or black iron is similar except that no fat is used. There are many foods that provide enough grease, or more than enough, for their own cooking. Examples are bacon, sausage, and hamburger with a high fat content. The pan needs no advance oiling and there is usually an ample and rising grease level during cooking. Sometimes it is allowed to accumulate, at other times it is poured off at intervals, depending on the recipe and the cook's preference. Other foods tend to soak up grease, leaving the pan dry and themselves over-greasey. For them, the pan should be greased very lightly, and the coating renewed frequently or as necessary. Home fried potatoes take up a lot of fat, but most of it is held between pieces, rather than soaked in. Vegetables, fish and very lean meat take up grease, and breading soaks it inlike a sponge.

In deep frying, there is a considerable depth of oil, or at least enough to cover or float the food. In effect, food is simmered in oil. Most deep frying is done in a deep, straight-sided kettle with a capacity of at least 4 quarts. It may be a simple aluminum pan, looking somewhat like a pail; a special one that can sink down into a stove top on a deep fry burner; or a sepaprate unit that contains a heating unit and a thermostatic control. The last is the most important and satisfactory, if you have space for it and do enough frying to justify having it. Deep frying can of course be done in any pan deep enough for the oil, but it may not be safe. Tipping over is a disaster, a mess to clean up and possible severe injury, with fire danger. The pan should have a wide unwarped bottom for stability, there should be no long handle that might cause it to be knocked over and a tight lid should be available to cover it if it catches fire. Food that is to be deep fried should, so far as possible, be in pieces all about the same size and shape, so that they will cook in the same time. This presents just a few little problems when you are cutting big ones into small ones anyhow, as in french frying potatoes, egg plant chunks and similar articles. Fish fillets may vary widely in width and length, but only slightly in thickness, and it is this shortest dimension that counts most.

ROASTING

The popular meaning of the word "roast" as a verb is to cook large pieces of meat or poultry in an oven. As a noun, it means such pieces of meat, either before or after cooking. Roasting is called baking when applied to items such as bread, cake, pie, casseroles, meat loaf and, strangely, cured ham. The roasting process is fairly simple, but discussions of it are often confused and complicated by arguments that may be more closely associated with word meanings than with cooking.

Meat is usually roasted by putting it in either a covered or an open pan, and that into an oven kept at a temperature between 300 and 350 F. The meat may rest directly on the pan bottom, or on a shallow rack, which may be called a trivet. If the pan is open, hot air and radiation from the oven's inner surfaces heat the upper part of the meat directly, and reach its lower part through the pan and any fluid it may contain. Except for any contact with fluid on the bottom, this is dry heat.

If there is a cover on the pan, it is heated by air and radiation to nearly the temperature of the oven walls, and re-radiates this heat to the meat. In addition, it holds in part of the steam from the boiling meat juices. This is the feature that many writers find unendurable, apparently on the basis that you may legitimately use either dry heat or moist heat, but never a sombination of the two. The cover will cause faster cooking, to about the same extent as increasing oven temperature by 25°. It is said to increase the rate of loss of moisture from within the meat, but it is not clear whether this is more than would be due just to the faster cooking rate. It changes the character of the crust slightly, perhaps because less of the juice evaporates, and more goes down into the drippings. A crust under cover is likely to be lighter in color than an exposed one and to be less crisp. A cover offers an opportunity to adjust these qualities by putting it on or taking it off.

Tests made in experimental kitchens show clearly that the average quality of roasts is better with uncovered than covered cooking. However, home conditions differ from those in the laboratory, and possession and intelligent use of a roasting pan cover may still be recommended. A roast may also be covered by

a sheet of aluminum foil, usually tucked snugly around the upper parts. The effect is generally similar to that of a pan cover, although there are differences in detail.

Many cooks put a half cup to a cup of water in the pan before placing it in the oven. Water may be added from time to time during cooking if the drippings do not keep the pan bottom wet. Most cookbooks denounce this addtion of water vigorously, although it is of little importance. The water will prevent searing of the bottom of the roast, is insurance against its developing too heavy a crust and protects drippings against drying out and burning. In a moderate oven it is usually not needed for any of these purposes, but it is difficult to see what harm it does. If a trivet is used, it will not touch the meat. If not, the part of the meat that it touches may be said to be boiled instead of roasted, but it would be very difficult to confuse a piece of it with one taken out of a stew.

Times for roasting are usually based on a preheated oven, which is considered a must in the average cookbook. It is convenient and efficient to preheat, but you can start cold if you are in a hurry, and you must do so if the oven is started by a timer when you are out. In this case, just add 2/3 of warmup time, which is about 15 minutes in an ordinary gas oven and 8 minutes in an electric, to the total cooking time. Meat is usually cooked at between 300 and 350°F, and tables of cooking times are good only in this range. If you want to be independent and use a hotter or a cooler oven, you are on your own. As a rough basis for figuring different temperature, if you increase it from 350 to 500, reduce cooking time by one-half.

RECIPES

Light-as-a-feather Doughnuts

3/4 cup milk
1/4 cup sugar
1 teaspoon salt
1/4 cup (½ stick) butter
1/4 cup warm water
1 package yeast
1 egg beaten
3 ¼ cup unsifted flour

Scald milk, stir in sugar, salt and butter. Cool —
Mix water and yeast into warm bowl. Add lukewarm milk mixture, egg and half the flour. Beat till smooth. Stir in enough additional flour to make a soft dough. Turn dough out onto lightly floured board. Knead till smooth (about 10 minutes)
Place in greased bowl, turning to grease all sides. Cover, let rise in warm place (about one hour)
Punch dough down. Roll out about half inch thick. Cut with 2½ inch doughnut cutter. Place on greased baking sheets. Cover, let rise in warm place, free from draft -- till doubled in bulk (about 1 hour)
Fry in deep fat (375 F) for 2 to 3 minutes. Drain--
While warm dip in icing.
Glaze: 2 cups sifted confectioners sugar, 1/3 cup milk and 1 teaspoon vanilla. Drain on wrack.

Chocolate Whipped Cream Cake

1 2/3 cup chilled whipping cream
3 eggs
3 oz. melted unsweetened chocolate (cool)
1 teaspoon almond extract
2 1/2 cupe cake flour or 2 1/4 cup all-purpose fl
1 1/2 cup sugar
2 1/4 teaspoon baking powder
1/2 teaspoon salt

Heat oven to 350 F. Grease and flour pan. In chilled bowl , beat cream till stiff. Beat eggs till thick and lemon-colored. Fold eggs, chocolate and almond into cream. Stir together left ingredients, fold gently into cream and egg mix till blended and batter is brown. Pour into pan.

Frosting

1/3 cup soft butter
2 oz. melted unsweetened chocolate (cool) or 1/3 cup cocoa
2 cup confectioners sugar
1 1/2 teaspoon vanilla
2 tablespoons milk

Mix butter and chocolate. Blend in sugar. Stir in vanilla and milk.

Meat Steaks

1½ lb. ground beef
1 medium onion chopped fine
½ cup toasted bread crumbs (4 slices)
1 teaspoon salt
¼ teaspoon pepper
dash of garlic salt
1 teaspoon worestershire sauce

Form this mixture into patties

Then flour and brown well in small amount of oil then lay on a paper towel. Place in foil-lined casserole dish. Make gravy of the grease left and add 3 tablespoons flour to thicken. Brown and add about 1 cup water and pepper and salt. Pour over meat. Seal in foil and bake at 375 F for 45 minutes.

Spiced Carrots

1 cup apple cider vinegar
1 cup sugar
½ stick of a cinnamon stick
a few cloves

Boil for 5 minutes. Pour over 1 #2 can of whole carrots (drained). Soak for 3 or 4 days in refrigerator.

Broccoli Dip

1 package chopped frozen broccoli
1 can cream of mushroom soup
½ medium chopped onion
1 roll garlic cheese
½ stick butter

Saute onion in butter till soft. Melt cheese and soup with onion. Add cooked and drained broccoli. Mix. Serve with any style of chips.