

4 Revised 1968
3 Extension Bulletin 314

MN 2000
EB-314
c.2 (1968)

UNIVERSITY OF MINNESOTA
DOCUMENTS
JAN 16 1973
ST. AVE CAMPUS LIBRARY

Let's Have Eggs

Verna Mikesh and Robert Berg



This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>.

Agricultural Extension Service 2
University of Minnesota 1
U. S. Department of Agriculture

Let's Have Eggs

Verna Mikesh and Robert Berg

Yes—let's have eggs. Their versatility, economy, food value, ease of preparation, and taste appeal make them a good answer to the question "What shall I cook?"

Eggs make it possible for you to prepare satisfying nutritious main dishes with minimal time and effort. Few foods provide so wide a variety of valuable nutrients for so little money.

For maximum satisfaction from eggs:

- Choose and use good ones.
- Store and handle correctly.
- Cook properly.
- Serve often.

The best chef in the world cannot make a superior dish out of a low quality egg. Some knowledge of the structure of the egg is needed to understand the reasons behind correct handling and cooking methods.

Egg Structure

The hen's egg is an amazing masterpiece, because all the nutrients necessary for the development of a living organism are present within its shell. Its structure is unique and interesting. The next time you break open an egg, try to identify the parts shown in the figure on the following page. The egg not only develops a strong healthy chick, it also provides this chick with food for 96 hours after hatching. It is no wonder that eggs are such an important source of nutrients.

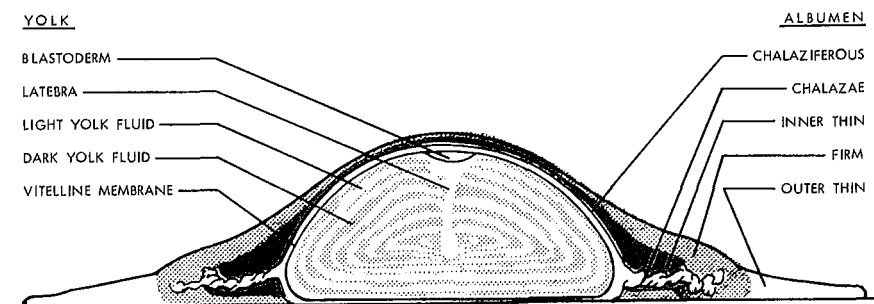
Note the egg's neat, convenient packaging. The shell and its membranes give the egg contents good protection from the time it is laid until you use it. If the egg is properly handled, there is little opportunity for contamination.

The albumen of the egg is made up of four parts—the chalaziferous layer, an inner thin layer, a firm gel-like layer, and the outer thin layer. This albumen constitutes 58 percent of the egg and is a good source of high quality protein.

The yolk consists of alternate layers of light and dark colored material surrounded by the vitelline membrane. It is held in place by a network of mucin fibers, the chalazae. These mucin fibers are much more noticeable in fresh high quality eggs than in eggs of poorer quality.

Eggs are well balanced in nutrients as shown in the figure on page 4, yet each egg has only 80 calories.

Verna Mikesh is an associate professor and extension nutritionist. Robert Berg is a professor and extension poultry specialist.



Diagrammatic cross-section of opened egg. Notice location of inner white surrounded by firm white layer; also note that chalazas are a portion of the egg white.

Nutritive Value of Eggs

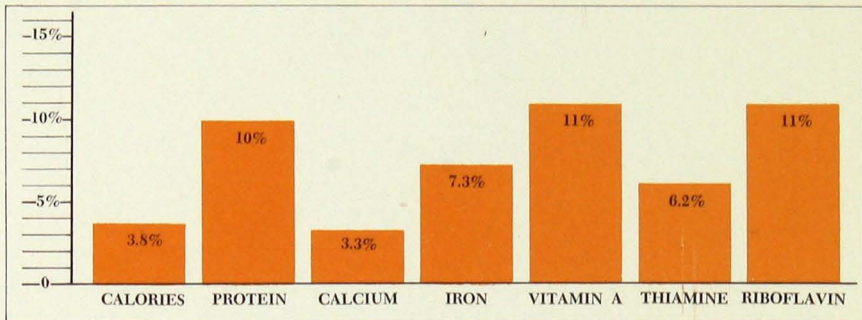
The egg is nature's convenience food—top quality nutrients in a handy package. When you're in a hurry, eggs can provide a satisfying main dish in less than 5 minutes.

Everyone needs protein for body building and maintenance. Egg protein is of such high quality that it is used as a standard for measuring the value of all other proteins. Eggs rate right along with meat, milk, and fish in meal planning. Two eggs supply a fifth of the daily protein needs of the average woman and a sixth of those for the average man or 10-year-old child.

You get substantial amounts of iron and vitamin A from eggs. A variety of other nutrients, intended to nourish a baby chick, are also present in an unincubated egg.

Eggs are a valuable food throughout life. An infant's iron needs are met by adding egg yolk to his diet early in his life. By the time he is a year old, a baby may be given an entire cooked egg. Eggs are excellent for children and teenagers, as they contribute to the food needs of a rapidly developing body. As people grow older eggs continue to be valuable because of their varied nutrients and low number of calories. Eggs also score high with the elderly because of their low cost, easy digestibility, and taste appeal.

Physicians sometimes eliminate or limit the number of eggs in prescribing low cholesterol diets for people with circulatory diseases. This does not mean that eggs are harmful to the normal person; cholesterol in the blood is governed more by the amount we eat than by what we eat. Remember that special diets are for people who are not well. Any self-prescribing that eliminates foods from the diet is unwise.



Nutritive contribution of one egg to the daily food needs of a 25-year-old woman.

Minnesota consumer grades for eggs

Grade	Size
Grade AA	Extra large, large, and medium
Grade A	Jumbo, extra large, large, medium, and small
Grade B	Large

Relative value of eggs according to size (weight)

Size	Cents per dozen for each size												
Extra large	38	41	42	46	47	49	52	54	56	59			
Large	32	34	36	38	40	42	44	46	48	50	52		
Medium	26	28	29½	32	33	35	37	38	41	42	43	46	
Small	21	23	24	25½	27	28	30	32	33	35	36	37	39
Cost per lb.	19	20	21	22½	24	25	27	28	29	31	32	33	35

Size	Cents per dozen for each size												
Extra large	61	62	65	68	69	72	74	76	78½	81	83	85	88
Large	54	56	58	60	62	64	66	68	70	72	74	76	
Medium	47	49	50½	53	54	55½	58	59	61	63	64		
Small	41	42	43½	45	46	47½	50	51	52½	54			
Cost per lb.	36	37	38½	40	41	42½	44	45	46½	48	49	50½	52

Example: Always compare eggs of the same quality grade. With grade A large eggs at 60 cents a dozen any price below 53 cents for grade A medium, below 68 cents for grade A extra large, or below 45 cents for grade A small indicates a better buy.

Basic Egg Cookery

You can master the art of egg cookery by remembering two things, choose high quality eggs and cook them at moderate temperatures.

Look for Minnesota certified grade AA or grade A eggs at your market. These eggs, with their upstanding well-centered yolks and thick whites, hold their shape when poached or fried. Whites from these eggs beat up to a fine volume for cakes and meringues.

Grade B eggs are satisfactory for scrambling or for baked products such as breads and cookies. They have the same nutritive value as higher grades. Since the white is more watery and the yolk slightly flattened, they will not look as nice when cooked.

Many people confuse size and grade. In checking egg cartons, you may find small eggs marked grade A, while large eggs are grade B. This is because grading pertains largely to interior egg quality, not size.

Proteins become tough and leathery when cooked at high temperatures. Since eggs are rich in protein, use moderate temperatures when preparing them. Egg protein remains tender when cooked at simmering (185°) rather than boiling temperatures. Fried eggs will be tender if you cover them as they fry. The steam produced will set the surface.

For a guide to egg quality standards, see pages 8-9.

Eggs in Cooking

Eggs perform so many functions that they are sometimes called the foundation of cooking. Eggs are served soft cooked, poached, fried, scrambled, deviled, baked, or as an omelet. But they play more roles than this. When heated the proteins in eggs coagulate and thicken the liquid with which they are mixed. In pudding, pie filling, salad dressing, and sauces they give a characteristic smoothness to the mixture as well as acting as thickeners. One egg is equivalent to 1 tablespoon of flour in thickening power.

The elastic framework in cream puffs and popovers is formed by eggs.

Soups and coffee are clear because egg collects and settles food particles.

Angel food and sponge cakes, souffles, popovers, and meringues owe their lightness to the air enclosed in beaten eggs.

Butter cakes and mayonnaise are possible because of the emulsifying quality of eggs. Globules of fat and liquid are held in suspension by the egg.

Meat loaves, noodles, casseroles, and quick breads are held together with eggs.

Frozen mixtures take on the desired texture when eggs are added.

Egg holds the coating on breaded meats, fish, and vegetables.

Eggs give flavor, texture, color, and food value to breads, pastries, sauces, and noodles.

Egg Preparation Techniques

Keep eggs in the refrigerator. Use the carton for storage, as it will hold them large end up, the preferred position. They will then retain their quality, because yolks will remain centered. Refrigerate them promptly after purchasing or gathering as eggs lose their quality rapidly at high temperatures. Eggs kept at room temperature lose as much freshness in 4 days as eggs kept in a refrigerator for several weeks.

Since about 75 percent of the eggs sold in this area are sanitized it is hardly necessary to wash them before storing. If you do wish to wash them, do so just before you use them, as eggs lose their protective film after washing. To limit the possibility of transmitting bacterial infection, do not use cracked or dirty eggs.

Eggs cook more evenly and whip more readily at room temperature, so take them out of the refrigerator about a half hour before using them. Since eggs separate more readily when cold, separate them immediately after removing them from the refrigerator and then let them warm before using.

To break an egg, tap it directly against the edge of a bowl or give it a sharp tap with a knife blade. When using a knife be careful not to penetrate the yolk. If you have reason to doubt the quality of an egg, break it into a separate dish and check.

You need two bowls to separate eggs, one for whites and one for yolks. Be sure the one for whites is absolutely free from grease. Avoid

Egg sizes

Size	Minimum weight per dozen
Jumbo	30 ounces or 1 lb. 14 oz.
Extra large	27 ounces or 1 lb. 11 oz.
Large	24 ounces or 1 lb. 8 oz.
Medium	21 ounces or 1 lb. 5 oz.
Small	18 ounces or 1 lb. 2 oz.

One dozen large eggs weigh a minimum of 1½ pounds. At 60 cents a dozen, large eggs cost you only 40 cents a pound. Eggs compare very favorably as an economical source of protein.

getting any yolk into the whites as the tiniest bit of fat will prevent their beating up. If necessary, use an eggshell for removing yolk particles. Its sharp edge will enable you to get all the yolk. When practical, avoid the need to wash your beaters twice by beating the whites first and then the yolks.

Beating Whole Eggs, Egg Yolks, and Egg Whites

Eggs may be beaten with an electric mixer, rotary beater, wire whisk, or a fork. Results with these vary depending upon the quality of the beater or whisk and your skill. Generally, whisks and rotary beaters with fine wires or blades incorporate the most air.

Slightly beaten egg is used for thickening, scrambling, or plain omelet. Use a fork with an over and under motion. About a half a minute of brisk work will slightly beat four eggs. Lift the fork out of the mixture. If there are only a few bubbles and the mixture runs freely the eggs have been beaten sufficiently.

Well beaten egg is used to leaven a mixture such as cake. Use a rotary or electric mixer. The eggs should be frothy and light in color. Egg yolk is well beaten when light and lemon colored.

Slightly beaten egg white is foamy with large air bubbles. It is used to clarify, emulsify, thicken, or as a coating.

Stiff foam white is used in soft meringue such as that used in pies and angel food made by the meringue method. With an electric mixer, rotary beater, or wire whisk, beat until the egg is shiny, glossy, and moist. When the beater is withdrawn, the whites should follow and form rounded peaks.

Stiff white is used in hard meringue, cake, torte, omelet, soufflé, cooked frosting, divinity, and marshmallows. The air cells are very small and white. To test for stiffness tip the bowl. The egg should no longer slide around. The white should be glossy and smooth. Dry flakes denote overbeating.

To Add Hot Liquid to Beaten Eggs Either:

1.) Add the hot liquid a little at a time while stirring eggs constantly. If done in reverse order the large quantity of hot mixture will cook the egg immediately resulting in a lumpy or "curdled" mixture. With most foods the mixture is returned to the heat for further cooking. Stir constantly as it thickens.

2.) If you're making cream pie filling, pudding, or cooked salad dressing you should reserve 2 tablespoons of cold liquid for each egg in the recipe. Blend this with the beaten egg and when the rest of the liquid is thick add the egg mixture all at once, stirring constantly and rapidly.

Folding Ingredients into Egg Whites

Two things are important, a light touch and a gradual addition of ingredients. When making angel food, divide the dry ingredients into

EGG QUALITY STANDARDS

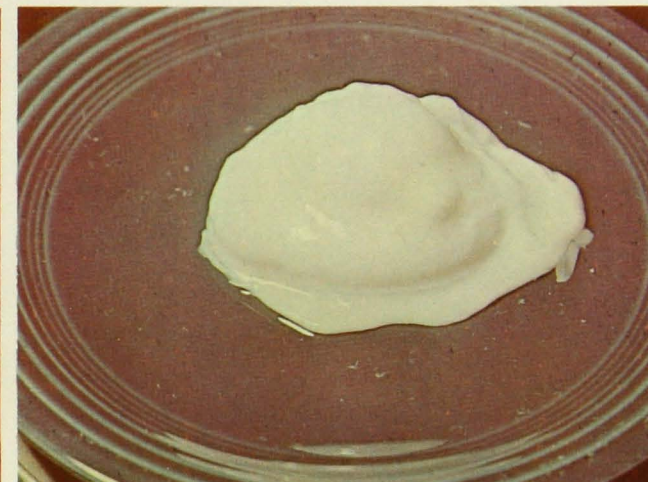
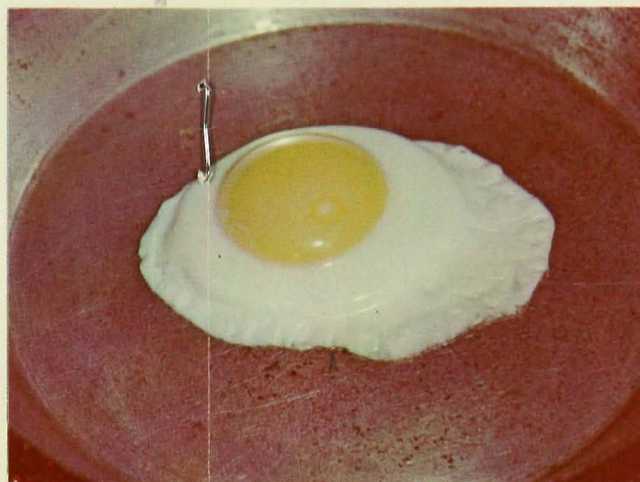
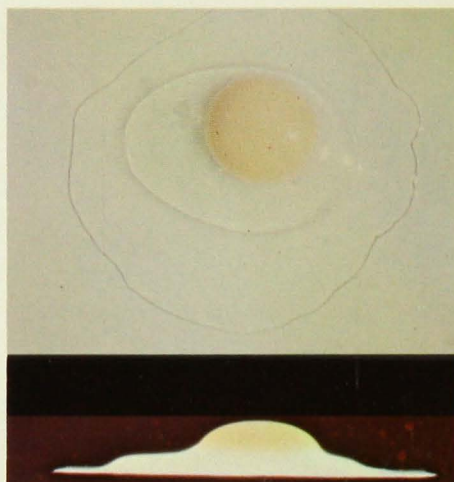
BROKEN OUT

FRIED

POACHED

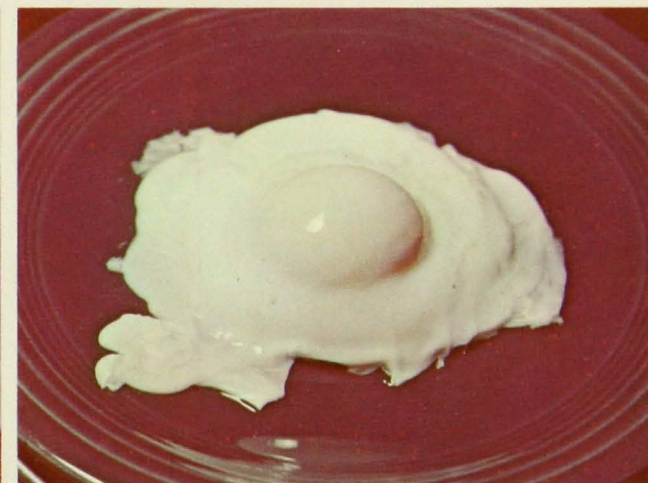
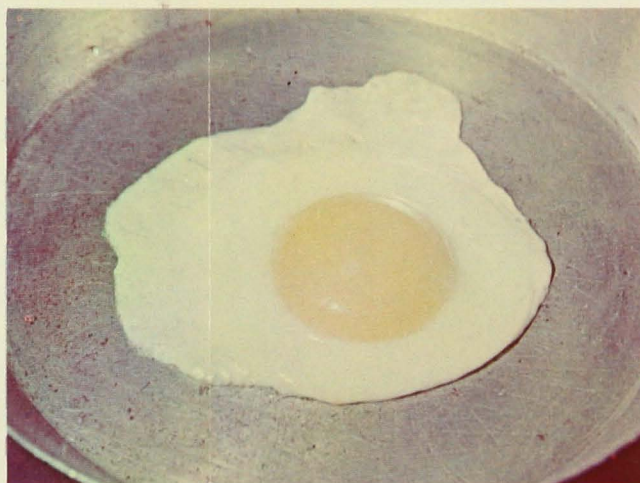
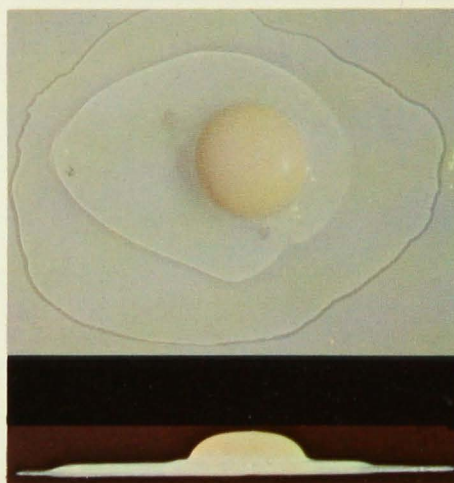
GRADE AA

Egg covers small area; white is thick, stands high; yolk is firm and high.



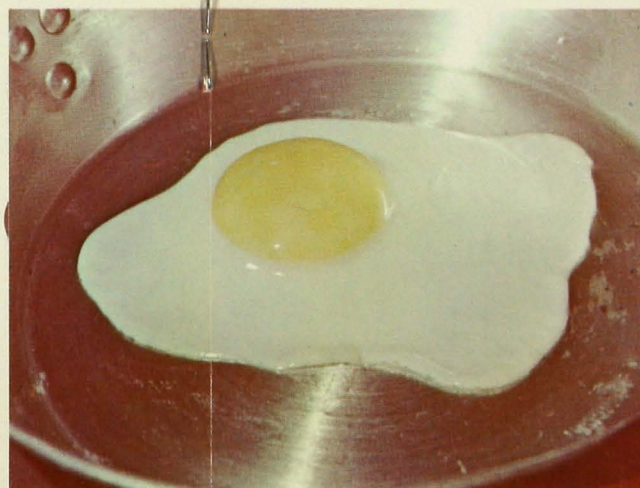
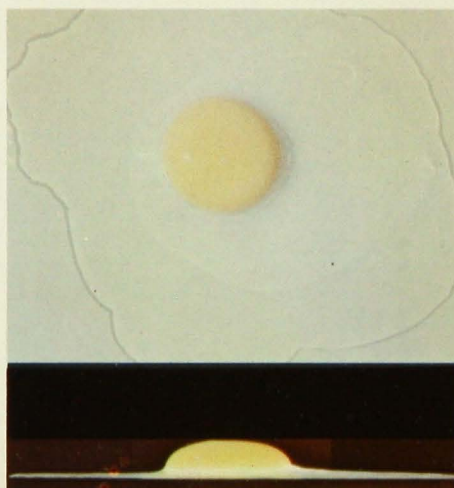
GRADE A

Egg covers moderate area; white is reasonably thick, stands fairly high; yolk is firm and high.



GRADE B

Egg covers wide area; has small amount of thick white; yolk is somewhat flattened and enlarged.



four equal parts. Use a plastic or rubber scraper, spatula, or wire whisk for folding. Sprinkle a portion of the ingredients over the top. Then with an under and over motion, starting at one side of the bowl and going down across the bottom, bring the whites up the opposite side and over the top. Turn the bowl a quarter turn between each completed step. Continue only until all the ingredients are blended into the white.

For some butter cakes and similar mixtures, the beaten white is placed on top of the batter. With the folding motion described above, bring the batter up over the eggs, folding only until the whites have been blended into the mixture.

To fill a standard 1-cup measure (8 fluid ounces)

Number	Extra large	Large	Medium	Small
Whole eggs	4	5	6	7
Egg whites	6	7-8	8-9	9-10
Egg yolks	12	12-14	14-16	15-19

Leftover Whites

Leftover whites will keep up to 10 days in the refrigerator in a covered jar. You may also freeze them. Place in a container, cover, label with quantity and date, and freeze. They will keep approximately 9 months.

Leftover Yolks

Gently pour enough water over the yolks to cover them. Refrigerate in a covered dish, and use within 2 or 3 days. To freeze egg yolks stir them slightly and add 2 tablespoons of sugar or corn syrup or 1 teaspoon of salt per cup. Place in a container that can be sealed, label with quantity and date, and freeze. They will also keep about 9 months. Yolks are very perishable, so use them immediately after thawing.

To poach yolks, drop them gently into enough simmering water to cover them. Cook until firm and sieve for the baby or use in sandwiches or as a garnish for salads and vegetables. Placed in a covered dish, cooked yolks will keep in the refrigerator for 4 to 5 days.

Eggs Cooked in the Shell

Method 1.—Cover eggs completely with cold water so they will cook evenly and bring gradually to simmering. Do not let the water boil. For soft cooked eggs simmer 3 to 5 minutes. Rinse in cold water for a second to make them easier to handle.

For hard cooked eggs simmer 25-30 minutes. Serve hot in the shell or plunge eggs into cold water. They will shell easily if you crack and roll them between your hands and begin peeling from the large end. Hold eggs under running water or dip in water to help ease off the shells.

Method 2.—Cover eggs with lukewarm water at least 1 inch above them. Bring rapidly to the boiling point. Cover pan and remove from

heat. For soft cooked eggs let stand from 2 to 4 minutes. For hard cooked, allow 15 minutes.

Results from these methods will vary somewhat with the number of eggs, amount of water, and size and material of pan used.

Baked (Shirred) Eggs

Butter shallow baking dishes generously. Break eggs into them and add a tablespoon of milk or cream for each egg. Season with salt and pepper. Place on a baking sheet, cover, and bake at 325° F. about 20 minutes, or until as firm as desired. For variation, line the baking dish with partially fried bacon or cereal crumbs or top with crumbs or shredded cheese.

Fried Eggs

Method 1.—Heat a thin layer of fat in a heavy skillet. Usually 1 or 2 tablespoons are enough. Use moderate heat. Break the eggs one at a time into a cup and slip them gently into the skillet. Baste with fat and cook slowly over low heat. Turn the eggs with a pancake turner or steam baste them by covering the pan. Only 3 or 4 minutes are needed for cooking.

Method 2.—Use just enough fat to grease the skillet bottom. Heat until it will sizzle a drop of water. Slip in the eggs and hold over low heat until the outer edges are cooked. Add ½ teaspoon of water for each egg. Cover the skillet and cook for 5 or 6 minutes or until eggs are firm. This method gives a fried egg flavor with a minimum of fat.

French Omelet

For best results use no more than six eggs for one omelet. (Egg mixture should be about ¼ inch deep in frying pan.) Allow 1 tablespoon water and ½ teaspoon salt for each egg. Beat eggs slightly with a fork. Heat a small amount of fat in a smooth frying pan until a drop of water sizzles. Pour in the entire egg mixture at once.

The mixture should begin to cook immediately at the outer edges. Lower the heat, or lift up the pan, and with a fork pull and lift the cooked portion at the edges. Tilt the pan and let the uncooked portion flow underneath. When the mixture no longer flows freely increase heat to slightly brown the bottom. Roll the omelet onto a warm plate or platter by holding the skillet handle at a right angle to the plate and giving the omelet a start with a fork. If desired, spread with processed cheese, warm cottage cheese, grated Swiss cheese, or jelly before rolling.

Puffy Omelet

Method 1.—(Your electric fry pan is handy for this method.) Separate the eggs. Add 1 tablespoon of water and ½ teaspoon of salt for each egg to the whites and beat until stiff. Thoroughly beat the yolks. Fold egg yolks into whites. Heat a little fat in a frying pan until a drop of water sizzles. Pour in the egg mixture and cook over low heat until the

bottom is slightly browned. Cover and cook until set. Crease through the center, fold over, and roll the omelet onto a hot platter.

Method 2.—(Use an ordinary fry pan.) Proceed as above except after the omelet is browned on the bottom, finish cooking by baking in a moderate oven (350° F.) 10-15 minutes or until brown on top.

Serve puffy omelet with cheese, tomato, shrimp, or mushroom sauce.

Poached Eggs

Grease a shallow pan lightly. Add enough salted water to cover the eggs and bring water to a gentle boil. Break the eggs into a saucer and slip them one at a time into the water. Reheat water to simmering, take pan from heat, and cover. Let stand for 5 minutes or until eggs are as firm as desired. Remove from water with a slotted spoon. Season with salt and pepper. Eggs may also be poached in tomato juice, diluted cream soups, or milk. Serve them on toast, cooked greens, or hash.

Scrambled Eggs

Method 1.—Break eggs into a bowl. Allow $\frac{1}{8}$ teaspoon salt and 1 tablespoon liquid for each egg. Beat until yolks and whites are blended. Pour into a skillet containing 1 teaspoon of fat per egg, heated until a drop of water sizzles. Reduce the heat and scramble slowly and gently, lifting the thickened part so that the uncooked part runs underneath. Cook until set but moist and creamy. For variety add bits of cooked bacon, ham, chicken, mushrooms, or vegetables.

Method 2.—Pour egg mixture into the top of a well buttered double boiler. Place over hot water and cook, stirring occasionally until the mixture is set. Allow about 20 minutes for cooking, varying the time with the number of eggs and shape of the utensil.

Egg Cookery Problems

Whites Will Not Beat Up

This may be due to a small amount of fat in the bowl or beater or to a particle of yolk. Cold whites or whites from low quality eggs increase little in volume. For best results have whites at room temperature.

Tough Leathery Whites, Gummy Yolks

Cook eggs at low to moderate temperatures (185°) for maximum tenderness. For omelets, have eggs at high temperatures for a very short time.

Green or Gray Color on Outside of Hard Cooked Egg Yolk or on Bottom of Omelet

Intense, prolonged heat brings about the combination of iron and sulphur within the egg. This forms ferrous sulphide which produces the

greenish discoloration. Cook eggs at low to moderate temperatures and cool quickly in cold water.

Poached Eggs That Do Not Hold Their Shape

Use only top grade eggs for poaching. Poach in hot, not boiling, water as the motion of boiling water tends to break up eggs.

Cracked Shells on Eggs Cooked in Water

Warm eggs slightly before dropping them into hot water as the great change in temperature may cause breakage. Start them in cold water to minimize breakage.

Hard Cooked Eggs Will Not Peel Nicely

Freshly laid eggs will not peel, so use eggs that are at least 2 or 3 days old. Chill them in cold water immediately after cooking and crack the shells slightly. Eggs treated with oil film may be difficult to peel.

Gummy Hard Meringues

Make meringues on a dry day and store in a dry place or package in an airtight container and keep frozen until needed, as they readily absorb moisture.

Weeping, Beaded, or Tough Soft Meringue

Use 2 tablespoons of fine sugar for each egg white. Beat whites until very soft peaks form and add sugar gradually, beating thoroughly to dissolve it. Pile meringue on warm or hot filling, making sure that it touches the pie crust. Bake 15-20 minutes at 350° F. or until golden brown. Even with careful preparation, soft meringue is unstable and some breaking down can be expected after a couple of hours.

Eggs Three Times a Day and In Between

Although traditionally a breakfast dish, eggs have many menu possibilities. Use them for main dishes in lunches and dinners as well as for desserts. For snacks, serve hard cooked or deviled eggs or try them for variety in sandwich fillings.

Since eggs are high in protein, plan your meals around them. You can improve a low protein meal such as a vegetable plate by adding a protein rich dessert such as custard pie.

The following menus feature eggs:

Outdoor Grill Breakfast (or Supper)

Tomato Juice
Homestead Skillet Eggs
Warm Rolls
Beverage
Fresh Fruit

Lunch

Quiche Lorraine
Mixed Green Salad
Rolls
Fresh Grapes
Beverage

Dinner

Braised Pork Chops
Mashed Potatoes
Buttered Spinach or Chard
Celery and Radishes
Lemonade Souffle
Beverage

Snacks

Deviled Eggs
Pickled Eggs
Egg Salad Sandwiches
Olive Egg Spread for Sandwiches or Crackers

Quiche Lorraine

1 single pie crust or 1 stick pastry mix
6-8 slices bacon
4 eggs
1½ cups milk or light cream or half and half
1 cup grated Swiss cheese
1 teaspoon grated onion
Few grains cayenne or dash of tabasco sauce
½ teaspoon salt
⅓ teaspoon pepper

Line a 9-inch pie pan with crust. Fry bacon until crisp, break into small pieces, and put into the crust. Beat eggs slightly, stir in other ingredients. Pour into pastry shell. Bake 10 minutes at 450° F.; then reduce heat to 325° F. and bake until firm or when a silver knife inserted comes out clean, about 30 minutes. Serve slightly cooled.

Note: Bacon may be omitted. Just before taking from the oven, sprinkle with 6 or 8 canned French fried onion rings.



Lemonade souffle.

Lemonade Souffle (4 or 5 servings)

- 4 egg whites
- $\frac{1}{8}$ teaspoon salt
- $\frac{1}{3}$ cup sugar
- 4 egg yolks
- $\frac{1}{3}$ cup lemonade concentrate undiluted
- $\frac{1}{2}$ teaspoon grated lemon rind (optional)

Preheat oven to 325° F. Set a 1-quart ungreased baking dish in a shallow baking pan. Set in oven. Pour boiling water around baking dish to depth of at least 1 inch.

Add salt to egg whites and beat until frothy. Add sugar gradually, 1 tablespoon at a time and beat until stiff and glossy but not dry. Beat egg yolks until thick and lemon colored; blend in lemonade concentrate and lemon rind, if used. Fold whites gently but thoroughly into egg yolk mixture. Pour mixture into hot baking dish. Baking dish should be full.

With a spoon or spatula cut into mixture about 1 inch from side of dish, about 1 inch deep, to insure a nice "crown." Return baking dish to pan of hot water and bake at 325° F. until puffy and browned, about 60 minutes. A knife blade inserted between center and outside edge should come out clean. Serve immediately at the table from the baking dish.

Note: If souffle must be held for a short time turn oven temperature as low as possible and leave souffle in the water until serving time.

Homestead Skillet Eggs (4 servings)

- 2 boiled potatoes cubed
- 6 slices bacon cut in small pieces
- 1 medium onion chopped
- 6 eggs
- $\frac{1}{4}$ cup milk
- $\frac{1}{2}$ teaspoon salt
- $\frac{1}{4}$ teaspoon pepper
- Shake of tabasco sauce (optional)

Fry bacon over medium heat until crisp. If necessary, pour off some of the fat. Add chopped onion to bacon and cook a few minutes. Add potatoes and cook until slightly browned. Beat eggs slightly, add remaining ingredients. Pour over potato mixture. Cook, stirring often until eggs are set but creamy.

Note: Bacon and vegetables can be prepared in the kitchen, wrapped in foil, and carried to a picnic. Eggs may be beaten and carried in a glass jar.

The egg quality standards photos on pages 8-9 are used through the courtesy of the Consumer and Marketing Service, U.S. Department of Agriculture. The cover photo and recipes used in the bulletin are used through the courtesy of the Poultry and Egg National Board, Chicago, Illinois.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Roland H. Abraham, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55101.