Putting an Edge on Knives

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Homemakers and food service people are frequently confronted with the problem of purchasing, sharpening, care, and/or storing of knives. Good knives are just as necessary for preparing food as tools are to any other master craftsman. Furthermore, good knives will help to accomplish many kitchen tasks with a minimum of time and effort.

In order to purchase a good knife, and care for it, one must first have a basic knowledge of the product. This fact sheet is intended to provide that basic information about knives, which will be useful to homemakers and personnel in the purchase, care, and storage of knives.

Construction—A knife consists of two parts; the handle and the blade. The handle may be made of rosewood, beechwood, packawood, hard rubber, nylon, or various other composition materials. The important features about handles are: the ease of sanitation, safety grip, balance, and resistance to strong detergents in automatic dishwashers.

Beechwood is soft and does not provide good material for knife handles. Rosewood, packawood, and other similar hard woods are not only more attractive, but provide a handle that will not readily absorb grease. These hard materials will usually wear well but cannot stand the punishment of an automatic dishwasher. Handles made from hard rubber or nylon, will not shrink, warp, splinter, or crack. However, this material will lose some of its luster when used with strong detergents in automatic dishwashers.

The shape of the handle is a matter of individual preference. People with large hands favor a thick handle, while others like a small thin one. The craftsman prefers one that is form-fitting. The safety factor and the smooth comfortable grip make this a desirable feature, since hand strain is reduced.

Tang—The section of the steel blade fitted inside the handle is called the tang. The tang may extend to the butt of the handle, or only part way. Usually knives are made with a full tang or half tang. A full-tang knife will be a little heavier than one with a partial tang. However, this is not readily noticeable if the knife is well balanced. Shortening the tang shifts the center of gravity of the knife toward the blade. Usually a heavier handle compensates for the weight difference.

The handle is fastened to the tang with three rivets or metal pins. The rivets securely lock the handle to the blade assuring a tight, smooth, sanitary union. If the handle does not remain closely fitted to the tang, food particles collect between the tang and handle. When this happens, moisture will accumulate and cause further expansion and cracking.

Blades—The important features of the blade are: Length, width, thickness, curve, and design. The blade of the knife should be substantially longer than the food that is to be cut. One cannot make a neat cut when a short knife is used on a large food item. Hacking, instead of slicing, usually results from such attempts. On the other hand, it wastes energy to use a knife that is too long.

Choose a knife of proper length for the job. Knives may be obtained with most any length blade ranging from 3 to 16 inches. A slicing or carving knife should have a 12-inch blade. One with a blade 11-inches long might be suitable, but anything less than 11 inches is too short for large roasts such as standing rib roast, whole ham, or large turkey. The blade on the average ham slicer is about $8^1/_2$ inches long. This is satisfactory for many cuts of meat, but it is not long enough for the larger cuts. A scimitar shaped knife with a 8- or 9-inch blade provide a good combination for various uses in the preparation of food.

An extremely important knife in the institutional kitchen is the Chef's knife which is more commonly known as the French knife with blades ranging in length from 4- to 14-inches. For institutional use the 12- to 16-inch blade is preferred.

The paring knife is the most universal type for the home kitchen. This knife is especially designed to utilize maximum blade working area with a minimum of hand tension. The blade on this knife should be no more than 3 to $3^1/_2$ inches long.

A knife with a wide blade (cutting edge to back) will wear longer than one with a narrow blade, but the greater width will cause more surface drag against the food item being cut. In addition, a wide blade is harder to turn than a narrow one in cutting meat or boning. Most household knives will have a narrow blade.

Knife blades vary greatly in thickness. A thin bladed knife is more flexible and will cut with less drag because there is less friction against the blade. This one feature often makes the difference in whether to choose a grinding stone or a sharpening stone to keep the blade in good cutting condition. A thin-bladed knife can be sharpened easily with only a triton (dry) hone or a small carborundum stone.

Curved bladed knives cut with less pressure than straight ones. This is generally true since the pressure is extended mainly on the lowest point of the curve. Usually a meat cutter will start the cut with the curved portion of the blade then finish with the straight portion. The reason for this is that the straight portion will make a more uniform cut.

Cutlery Steel—Carbon steel, stainless steel, and a chrome-vanadium steel are the three most commonly used. Each of these have a small percentage of carbon in their structure to give the basic material, "iron", its hard quality. Carbon cutlery steel has 60 to 120 points of carbon. The more carbon the tougher the steel and the more difficult it is to work into the finished blade. In addition, it will stain from use.

Stainless steel is carborn steel alloyed with chromium a non-corrosive metal with stain-resistant qualities. Modern metallurgical research has produced a high carbon stainless steel with edge-holding qualities equaling carbon steel of similar grade.

The cutting power and satisfaction of a knife blade depends on the temper, the way it is ground, and its uniformity. Good blades are made of steel possessing about 1% carbon. For extra fine quality, the steel will also contain chromium, vanadium, manganese, and tungsten. Blades made of low-alloy steel combining the properties of chromium and vanadium possesses a fine cutting edge that will last longer than blades made of regular steel.

Blades with stainless steel are satisfactory for household use. However, meat cutters do not use regular stainless steel knives because they are too hard to sharpen. Stainless steel must be tempered with special care or it becomes extremely hard and will not respond rapidly to the sharpening tools. Knife blades which have a Rockwell test of 57 are recommended. The metal is not too soft or too hard and provides a blade which will hold a good cutting edge.

Making the Blade—The metal made to exact specifications is rolled into strips, pressed to the desired thickness, and cut into the desired length for the various knife blades. These metal strips are then heated until they reach a cherry-red color over a coke fire. The heating process may be repeated several times depending upon the desired characteristics of the knife. Following this process, the general shape of the blade and tang are stamped out with the aid of a die and power press. The untempered blade is now tapered. Then forging, to further give it shape. The forged blades are further tempered by heating to 1400 to 1800 degrees F. and then quenched in various oils or melted salt.

Knives intended for different uses are tempered to different degrees of hardness. Consequently, it is not possible to judge the quality of a knife by hardness alone. The degree of temper should be related to the hardness of the sharpening stones. The knife blade should be softer than the sharpening stone, so that it can be beveled without excessive and prolonged efforts. The length of time a knife will hold its edge is dependent on three main factors; the quality of steel, the hardness, and the way it is ground. A knife accurately ground to a keen edge will cut with ease.

In grinding, the blade is first given a long bevel that tapers from the cutting edge to the back (see Figure 1.). A short bevel is made near the cutting edge and blended into the previous bevels. The bevel on a new knife will differ with the various manufacturers and according to the type of knife.

The angles of grind are normally measured with reference to the center line. The original steel blank is tapered to approximately an 8 degree angle as shown in Figure 1A. Then the bevel, as shown in Figure 1B, is ground to a 14 degree angle. The actual cutting edge has even a wider angle similar to that shown in Figure 1C. The bevel at the actual cutting edge of most knives is approximately a 20 degree angle. Even the knife with a serrated edge has a 20 degree angle bevel; however, this knife cannot be easily resharpened.

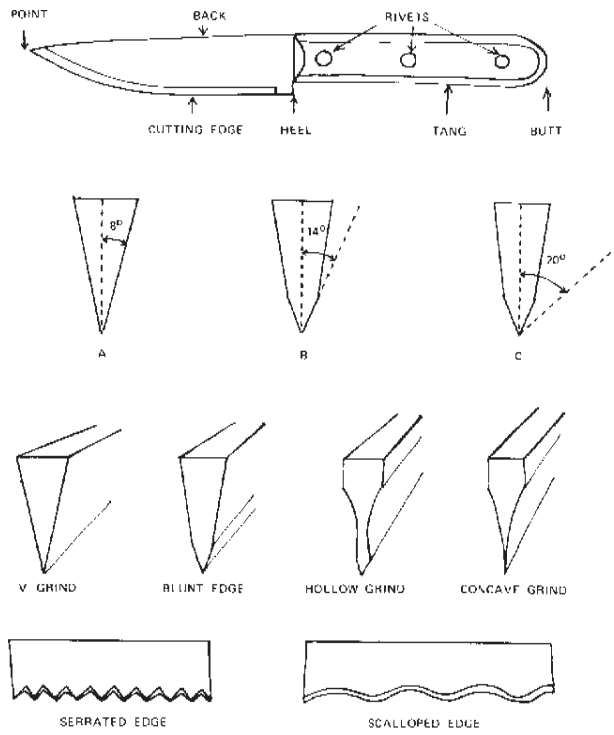

Figure 1. Grinding angles are shown above at A, B, and C.

Sharpening the Knife—A knife as it comes from the factory is not ready for use. It must be honed, steeled, and "broken in" before it has a satisfactory cutting edge. A sharp knife makes cutting efficient, more enjoyable, and according to national medical statistics it is much safer.

The purpose of sharpening a knife is to produce a perfect cutting edge, or one that is smooth and fine. Cutting edges are classified coarse, medium, or fine. A coarse edge is considered by many people to be satisfactory, but the individual who has pride in the craft prefers a fine edge, or one described as a "razor edge."

Stone or Hone—A carborundum stone may be used for the entire sharpening procedure. One side of the stone is coarse grit and should be used to put the proper bevel of the knife. The fine side of the stone is used to finish the knife sharpening so as to have a fine smooth cutting edge. Be sure the stone is perfectly level to ensure a smooth straight stroke of the knife. In case the stone does not have a wooden seat, place a damp paper towel or cloth between the stone and table to keep it from sliding.

A few drops of liquid soap diluted with equal parts of water should be applied to the carborundum stone to prevent heating and to wash away the grit. The multi-stone should be turned frequently to bring clean lubricant to the surface of the stone. Liquid soap is preferred to oil, since it is easy to wash from the stones and knives. The stones should be washed and put away after each use unless it is subject to frequent use.

Sharpening Procedure—Hold the handle of the knife in the right hand, with the fingers of the left hand resting On the center of the blade. The right hand should control the desired bevel, while the left hand applies the pressure and assures a true stroke. Place the heel of the knife blade on the stone so that the cutting edge forms a 20 degree angle with the stone. This is obtained by placing the knife flat on the hone or stone then raising the heel or the back of the knife approximately $^1/_2$ of an inch. With the pressure applied uniformly on the blade draw it across the stone front heel to point. A fine edge can be obtained by first stroking the blade several times across a coarse-grit stone to cut the steel more rapidly, then hone a fine stone until a smooth, sharp edge is produced. The finer the finishing stone that is used the smoother will be the cutting edge. Long-straight strokes sharpen more rapidly and uniformly than a short rotary stroke, and produce uniform wear on the stone. Short strokes wear hollows in the stone and shorten its usefulness.

The knife should be stroked from heel to point on one side, then turned over and stroked from heel to point on the other side. Several strokes on each side will be required to obtain a keen cutting edge. When the desired fineness of edge has been reached, the cutting edge should be straightened on a smooth steel by the same procedure as for sharpening.

Wire or Featheredge—Tools that have been ground or stroked on a coarse stone often have a ''feather'' edge. This unsuitable condition can be removed by drawing the edge gently against the smooth stone several times. The knife should then be returned to the stone for further sharpening and steel to true the edge.

Use of the Steel—A steel of the desired length should be used. A long steel is preferred for a steak knife, while a short 10-inch steel is sufficient for general use. The steel may be grooved or smooth; however, a finer edge is obtained with a smooth steel. Steeling helps keep a smooth cutting edge—it does not sharpen the knife.

Hold the steel diagonal to the body at about a 25 degree angle. Place the heel of the blade on the far end of the steel and at the same 20 degree angle as was used on the stone. Start each stroke at the heel of the blade and strike diagonally down the steel covering the entire length of the knife from heel to point with each stoke. Stroke first one side of the steel then the other. Usually six strokes on each side is sufficient. More is wasted time although it will not harm the blade. Frequent use of the steel will help maintain the edge, making cutting easier, and honing less frequent. A master meat cutter always has a knife with a razor edge.

Storage—Wash and dry each piece of cutlery before putting it away. For greatest efficiency, knives should be stored at the first place of use. Some good cutlery comes in a specially designed tray. These trays conveniently fit into any drawer, or may be hung on the wall. When no tray has been provided, a place in the drawer should be partitioned with hardwood and fitted with grooves for each knife. A magnet may be hung on the wall near the place of use for storing the knives rather than putting them in a drawer, if desired.

Always remember, a cheap dull knife may prove to be the most expensive and hazardous knife you own.

References and Suggested Readings

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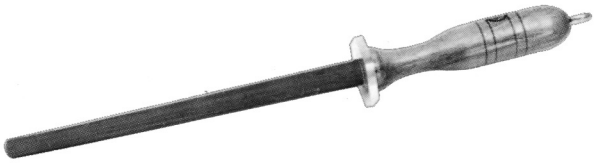
A 3 or 3 1/2-inch Paring Knife. This knife is designed to utilize maximum blade area with a minimum of hand tension.

A 6-inch Utility Knife. The ideal knife and favorite among many homemakers for slicing tomatoes, fruit, and vegetables.

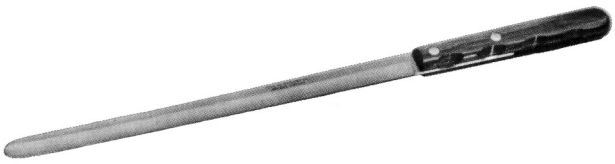
The 8-inch Heavy Duty Knife. This knife will take care of most tasks like dejointing chicken or turkey, cleaning fish, preparing roasts, or other meat items.

The 10-inch Chef's Knife. This knife is the time-saving favorite of the kitchen expert. It is designed for chopping or dicing vegetables, fruit, and nuts.

The 12-inch Carving Knife is a must for carving a standing rib roast, full ham, leg of lamb, or turkey. It may also serve as a cake slicer.



A 10-inch Triton Hone to be used in sharpening the knives.



An 8- or 9-inch Slicer. This is adequate for many roast meat items. It may also serve as a bread or cake knife.

The 10-inch smooth steel will provide a means of keeping a straight knife edge.

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