

## Improvised Grain Mill

The average American may not realize that small daily amounts of a few unprocessed staple foods would enable him to survive for many months, or even for years. A healthy person if he is determined to live and if he learns how to prepare and use whole-grain wheat or corn can maintain his health for several months. If beans are also available and are substituted for some of the grain, the ration would be improved and could maintain health for many months. The nutritional information given in this chapter is taken from a July, 1979 publication, *Maintaining Nutritional Adequacy During a Prolonged Food Crisis*. This book brings together from worldwide sources the nutritional facts needed to help unprepared people use unaccustomed foods advantageously during the prolonged crisis. The practical know-how which will be given in this chapter regarding the expedient processing and cooking of basic grains and beans is based on old ways which are mostly unknown to modern Americans. These methods have been improved and field-tested by civil defense researchers at Oak Ridge National Laboratory.

During the first few weeks of a food crisis, lack of vitamins and other essentials of a well-balanced diet would not be of primary importance to previously well-nourished people. Healthful foods with enough calories to provide adequate energy would meet short-term needs. If water is in short supply, high-protein foods such as meat are best eaten only in moderation, since a person eating high-protein foods requires more water than is needed when consuming an equal number of calories from foods high in carbohydrates.

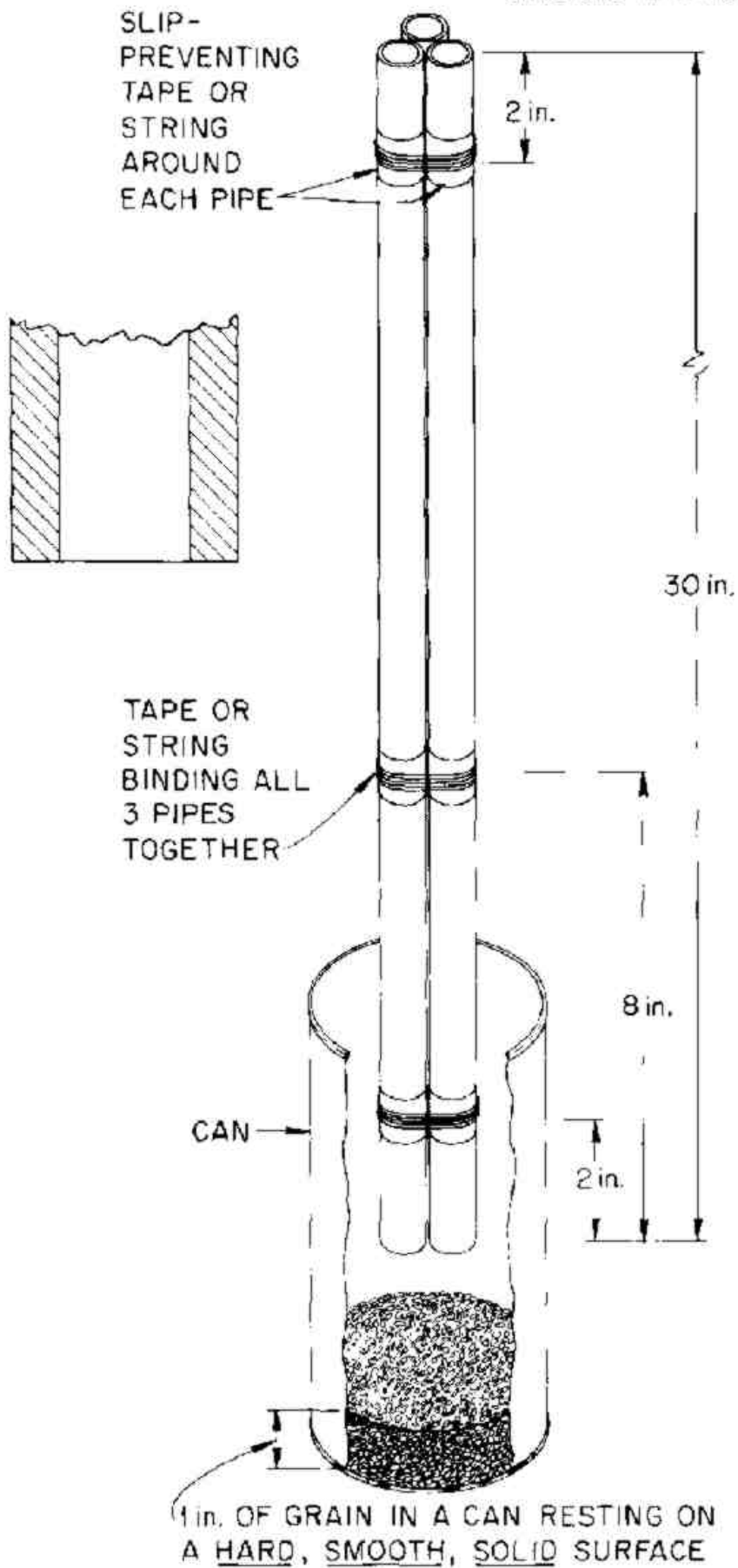
Whole-kernel grains or soybeans cannot be eaten in sufficient quantities to maintain vigor and health if merely boiled or parched. A little boiled whole-kernel wheat is a pleasantly chewy breakfast cereal, but experimenters at Oak Ridge got sore tongues and very loose bowels when they tried to eat enough boiled whole-kernel wheat to supply even half of their daily energy needs. Some pioneers, however, ate large quantities of whole-kernel wheat without harmful results after boiling and simmering it for many hours.

Even the most primitive peoples who subsist primarily on grains grind or pound them into a meal or paste before cooking. (Rice is the only important exception.) Few Americans know how to process whole-kernel grains and soybeans (our largest food reserves) into meal. This ignorance could be fatal to survivors of a pandemic. The best expedient means developed and field-tested for pounding grain or beans into meal and flour is an improvised 3-pipe grain mill. Instructions for making and using this effective grain-pounding device follow. The grain mill described can efficiently pound whole-grain wheat, corn, etc., into meal and flour thereby greatly improving digestibility and avoiding the diarrhea and sore mouths that would result from eating large quantities of un-ground grain.

1. Cut 3 lengths of pipe, each 30 inches long; 3/4-inch-diameter steel pipe (such as ordinary water pipe) is best.
2. Cut the working ends of the pipe off squarely. Remove all roughness, leaving the full-wall thickness. Each working end should have the full diameter of the pipe.
3. In preparation for binding the three pieces of pipe together into a firm bundle, encircle each piece of pipe with cushioning, slip-preventing tape, string or cloth in the locations illustrated.
4. Tape or otherwise bind the 3 pipes into a secure bundle so that their working ends are as even as possible and are in the same plane resting evenly on a flat surface.
5. Cut the top smoothly out of a large can. A 4-inch-diameter, 7-inch-high fruit-juice can is ideal. If you do not have a can, improvise something to keep grain together while pounding it.

### Make Meal And Flour

1. Put clean, dry grain ONE INCH DEEP in the can.
2. To prevent blistering your hands, wear gloves, or wrap cloth around the upper part of the bundle of pipes.
3. Place the can (or open-ended cylinder) on a *hard, smooth, solid* surface, such as concrete.
4. To pound the grain, sit with the can held between your feet. Move the bundle of pipes straight up and down about 3 inches, with a rapid stroke.
5. If the can is 4 inches in diameter, in 4 minutes you should be able to pound 1-1/2 lb. (one cup) of whole-kernel wheat into 1/5 lb. of fine meal and flour, and 3/10 lb. of coarse meal and fine-cracked wheat.
6. To separate the pounded grain into fine meal, flour, coarse meal, and fine-cracked wheat, use a sieve made of window screen.
7. To separate flour for feeding small children, place some pounded grain in an 18 X 18-inch piece of fine nylon net, gather the edges of the net together so as to hold the grain, and shake this bag-like container.
8. To make flour fine enough for babies, pound fine meal and coarse flour still finer, and sieve it through a piece of cheesecloth or similar material.



Unlike wheat and corn, the kernels of barley, grain sorghums, and oats have rough, fibrous hulls that must be removed from the digestible parts to produce an acceptable food. Moistening the grain will toughen such hulls and make them easier to remove. If the grain is promptly pounded or ground into meal, the toughened hulls will break into larger pieces than will the hulls of un-dampened grain. A small amount of water, weighing about 2% of the weight of the grain, should be used to dampen the grain. For 3 pounds of grain (about 6 cups), sprinkle with about one ounce (28 grams, or about 2 tablespoons) of water, while stirring constantly to moisten all the kernels. After about 5 minutes of stirring, the grain will appear dry. The small amount of water will have dampened and toughened the hulls, but the edible parts- inside will have remained dry. Larger pieces of hull are easier to remove after grinding than smaller pieces.

One way to remove ground-up hulls from meal is by flotation. Put some of the meal-hulls mixture about 1 inch deep in a pan or pot, cover the mixture with water, and stir. Skim off the floating hulls, then pour off the water and more hulls. Sunken pieces of hulls that settle on top of the heavier meal can be removed with one's fingers as the last of the water is poured off. To produce a barley meal good for very small children, the small pieces of hulls must again be separated by flotation.

Figure 9.1 illustrates sieving fine, dry barley meal and the smaller pieces of hulls from the coarser meal and the larger pieces. The sieve was a piece of window screen that measured inches before its sides were folded up and form an open-topped box.

Fig. 9.1. Sieving ground barley through a window screen sieve.



To lessen their laxative effects, all grains should be ground as finely as possible, and most of the hulls should be removed. Grains also will be digested more easily if they are finely ground. The occupants of crowded shelters should be especially careful to avoid foods that cause diarrhea.