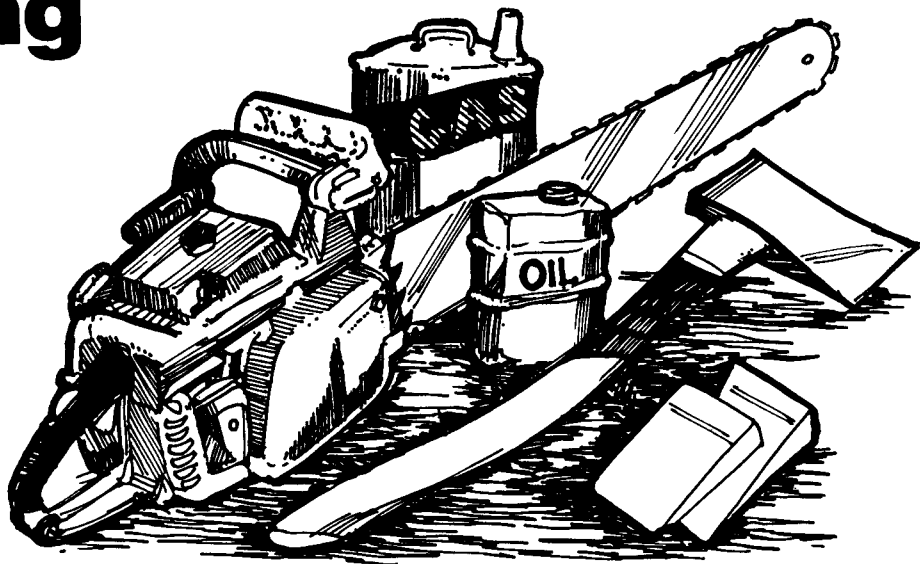


# Log Falling & Bucking



Falling a tree requires a great deal more consideration than merely bringing it to the ground.

## Considerations

1. Falling each tree in the safest possible manner.
2. Falling each tree with consideration being given to its subsequent safe bucking.

Before starting to fall timber, you should determine the best face or position to start the quarter or strip, generally with the timber stand's prevailing lean, if any, and in a manner which will allow the timber to fall into the clear. You should have knowledge of your falling position, in relation to roads in use, and to other equipment and workers in the area.

Finally you should have a thorough knowledge of the written procedures as explained on pages 120 to 125 inclusive.

1. Brush and debris adjacent to the tree to be felled shall be cleared away to permit the free and safe use of

tools and to allow a quick, safe, unobstructed path to safety.

2. Assess the tree or snag to determine the apparent situation with regard to:
  - a) Loose limbs, chunks, or other overhead material.
  - b) Logs, saplings, or chunks on the ground that could constitute a hazard.
  - c) Other trees or snags being involved by contact when the tree being cut falls.
  - d) The best escape route to a predetermined place of safety.
  - e) Lean, if any.

## Considerations at the Base of the Tree

A sufficient undercut shall be made in each tree being felled. You should ensure:

1. That the undercut is complete and cleaned out.
2. That appropriate measures are taken to control the fall of the tree.

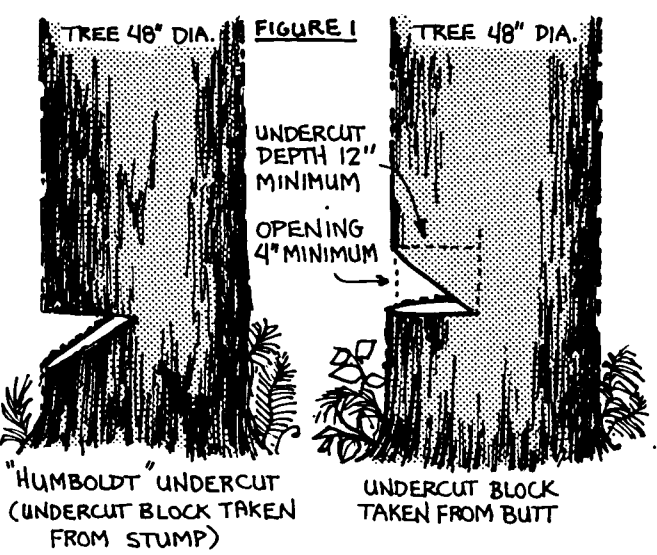
## The Undercut

Properly sawn, the undercut will allow the tree to fall freely in its chosen direction. A clean, uniform undercut should be used on all trees. The following guide is useful:

1. As a minimum, the undercut should be one-quarter of the tree's diameter.
2. As a minimum, the opening of the undercut should be one-third of the undercut's depth, or one inch vertical for every three inches horizontal.

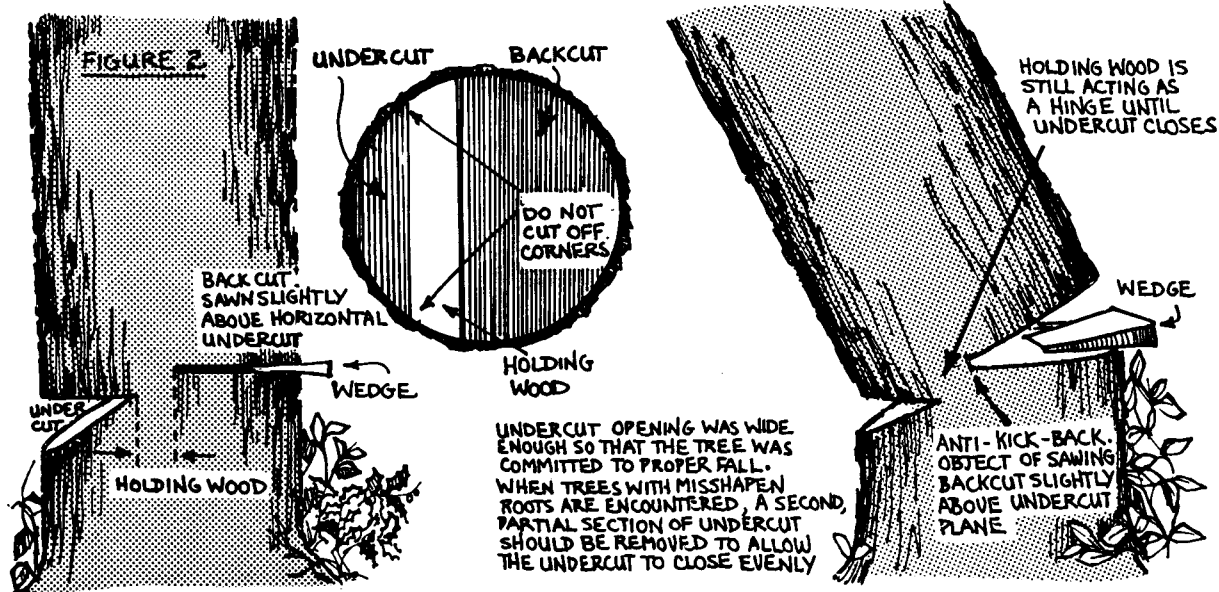
Note:

1. Both undercuts shown in Fig. 1 are correct. However, some people like the "Humboldt" undercut for closer utilization.
2. The horizontal part of the undercut must be level and well cleaned out where the cuts meet to prevent "barber-chair" and/or unintended "Dutchman".
3. The undercuts shown are based on a one-inch opening



"HUMBOLDT" UNDERCUT  
(UNDERCUT BLOCK TAKEN  
FROM STUMP)

UNDERCUT BLOCK  
TAKEN FROM BUTT



for three inches of horizontal cut.

4. The two cuts which form the undercut must not cross at that point where they meet, in order to prevent formation of "Dutchman".

### The Backcut

Sufficient holding wood must always remain to maintain control of the tree so that it does not break, slip, or twist off the stump, and fall in any direction other than that intended – no matter how heavy the lean.

1. The backcut must be level and sawn-in slightly above the horizontal plane of the undercut to form an anti-kick-back step.
2. Care must be taken not to saw the corners off when side notching (see Fig. 2).

### Falling Against the Lean May be Necessary on Occasion to:

1. Avoid unnecessary breakage
2. Place the tree in a favourable bucking position
3. Avoid falling a tree into other adjacent standing trees

4. Keep a tree from falling on a road grade, or
5. Avoid crossing the lead or falling pattern.

To establish hard and fast guidelines for falling a tree against its lean would be most difficult because of the variations in lean, height, diameter, species, etc. In extreme cold weather, frozen wood becomes brittle and undependable as holding wood.

Make a habit of plumbing the tree before commencing falling, even if you feel sure you know where the lean is.

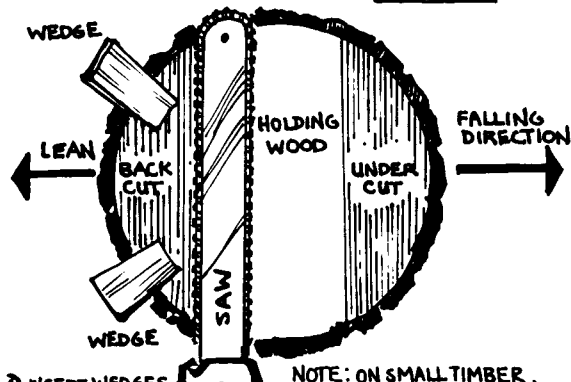
A large tree with heavy lean may be felled against its lean by inserting steel wedges in the kerf of the backcut, driving the wedges alternately as the backcut is sawn. (Always use eye protection when driving metal wedges, and keep your head above or below the wedge.)

Most trees can be felled away from their lean by using the normal falling wedges and by retaining additional holding wood as shown in Figs. 3 and 4.

"Dutchman" in the Undercut is caused by:

1. The undercut not being fully cleaned out, or
2. The two saw cuts of the undercut not meeting properly

FIGURE 3

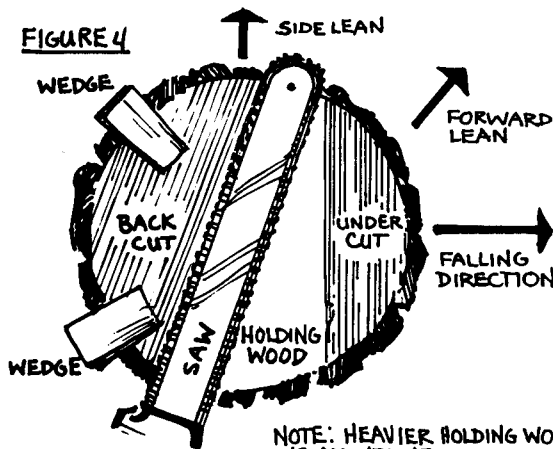


1) INSERT WEDGES AS SOON AS POSSIBLE

2) MAINTAIN AS MUCH HOLDING WOOD AS POSSIBLE.

NOTE: ON SMALL TIMBER, WHERE THERE MAY NOT BE ENOUGH ROOM FOR SAW-BAR AND WEDGES, THE BACKCUT SHOULD BE SAWN FIRST. REMOVE THE SAW AND DRIVE IN WEDGES BEFORE THE UNDERCUT IS SAWN OUT. FINISH FALLING WITH WEDGES.

FIGURE 4



1) CARE MUST BE TAKEN NOT TO CUT OFF THE HOLDING WOOD ON THE LEANING SIDE, AS THE TREE MAY SETTLE ON THE SAW BAR.

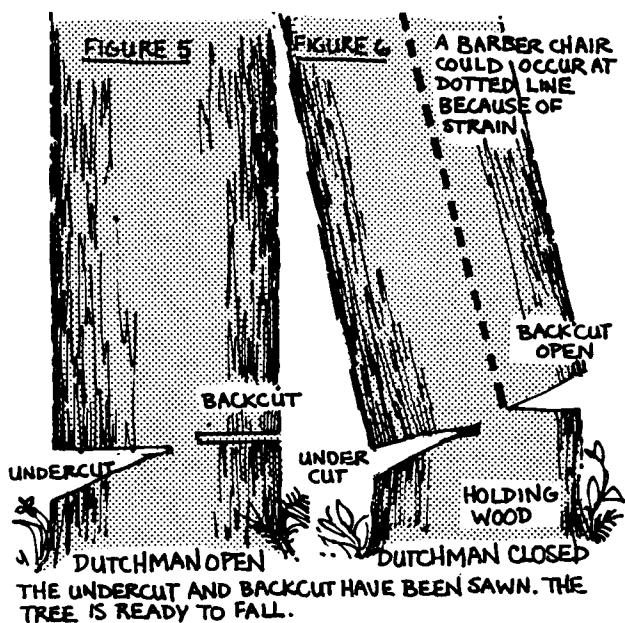
NOTE: HEAVIER HOLDING WOOD IS MAINTAINED OPPOSITE TO ANY SIDE LEAN. THIS WILL HELP DRAW THE TREE AWAY FROM ANY SIDE LEAN.

by allowing the top or bottom cut of the undercut to be sawn past the other.

The result is that, as the tree starts to fall, the Dutchman closes, usually throwing the tree away from its intended direction of fall. This action may allow the tree to fall among other adjacent standing trees or snags, creating a hazardous situation for you from broken limbs or tops being thrown back towards you.

**Intentional "Dutchman"** has been used by fallers to help them overcome a particular falling problem when the need to pull or throw a tree could not be achieved by other means; and then, only after understanding and evaluating the hazards involved.

Even for the most seasoned and skillful faller, the amount of pull or throw created by the Dutchman cannot always be determined – thus a lack of control could ensue. For this reason the use of Dutchman, even intentional, is not advocated (see Fig. 5).



### Poor Falling Practices

1. The practice of hanging one tree in another, deliberately, for the purpose of holding pressure to eliminate wedging while working on the forward tree is excessively hazardous and therefore prohibited.
2. Excessive pushing or "domino" falling. The practice of pushing one tree with another must only be done to overcome a falling difficulty, or where there is no better method.
3. Working within range of a tree which has been "cut-up" (except work processes required in order to get the tree down).
4. Standing under the lean or loose material while making the falling cuts.
5. Failing to move quickly away from the falling tree on a predetermined and prepared escape route.
6. Falling without having wedging equipment immediately available, or neglecting to place a wedge in the backcut as soon as possible.
7. Falling timber during periods of high wind, dense fog,

heavy snowfall, or when heavy snow is on the limbs.

8. Falling trees too close to adjacent fallers, other workers or equipment.

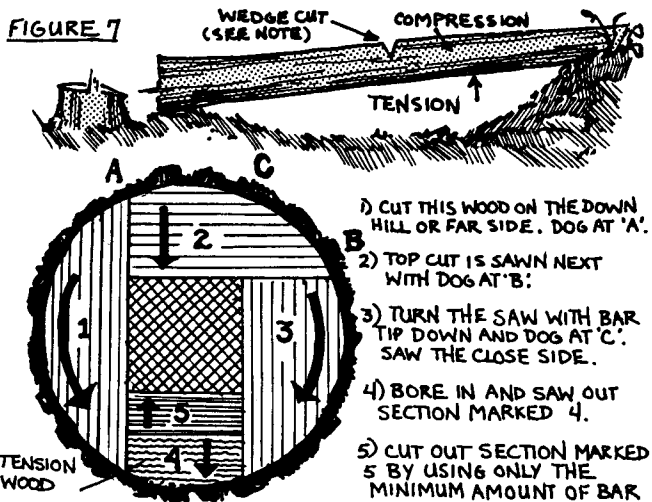
### Bucking

Before starting any bucking cut, buckers should plan the work by analyzing log movements and other hazards that may develop as a cut log is released, such as pivot points, natural skids, soundness of log being bucked, etc. You should:

1. Make sure of firm footing. Avoid standing on loose chunks or logs with bark or material that will roll when a log is sawn off. (Peel away loose bark underfoot.)
2. Stand to one side of the power saw while cutting. Avoid standing directly behind saw to prevent a blow to the body from a kick-back. Be able to handle a saw either right or left-handed.
3. When a falling tree brushes a snag, or other weak or unstable tree, leave the tree unbucked until the snag or defective tree is felled.
4. Always be on the look-out for limbs or other objects hanging above in standing timber.
5. When bucking blown-down trees, or where windfalls are present, fall the snags to prevent them being struck by rolling logs released during bucking.
6. Buck the bottom windfalls of a "jackpot" first, to avoid top logs or material from rolling.
7. Avoid bucking any windfalls on hillsides above the immediate falling area or face.
8. When working in a windfall area, be mindful of loose bark which could result in a serious fall.

### Top Bind

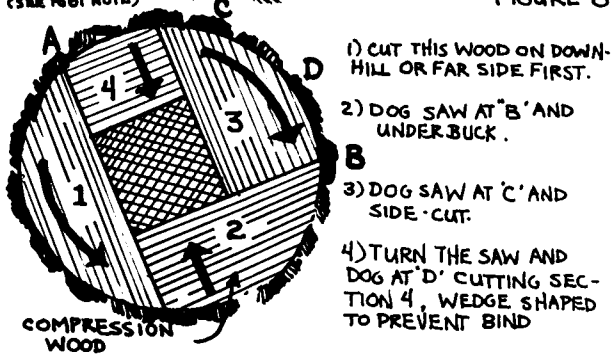
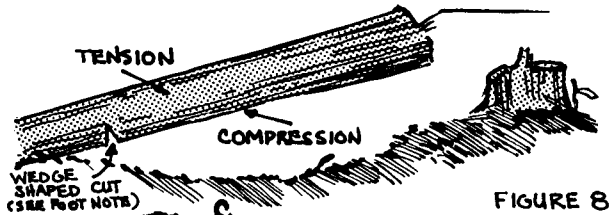
When a tree is lying in a position in which the top side is compressed while the bottom is under tension, the tree can be safely bucked without any wood splitting, or the saw bar being pinched, by making cuts in the following sequence:



**NOTE:** A WEDGE SECTION SHOULD BE REMOVED WHEN SAWING CUT 2. IF THE TOP BIND IS EXCESSIVE, TO ALLOW THE TREE CUT TO CLOSE AS CUTS 4 AND 5 ARE MADE. ARROWS INDICATE SAW TRAVEL DIRECTION AND CROSSHATCHING INDICATES THE HEARTWOOD WHICH WILL BREAK. DEPENDING UPON SOUNDNESS OF WOOD AND TIMBER LIE, IT MAY BE ADVANTAGEOUS TO USE THE END OF THE BAR AND BORE FROM POINT "C" IN MAKING CUTS NUMBER 1 AND NUMBER 3 IF IT APPEARS THERE MAY BE DANGER OF THE LOG SLABBING.

## Bottom Bind

Cuts are made in almost the same manner as for top bind, except for the top and bottom cuts which are reversed.



- 1) CUT THIS WOOD ON DOWN-HILL OR FAR SIDE FIRST.
- 2) DOG SAW AT "B" AND UNDERBUCK.
- 3) DOG SAW AT "C" AND SIDE-CUT.
- 4) TURN THE SAW AND DOG AT "D" CUTTING SECTION 4, WEDGE SHAPED TO PREVENT BIND

NOTE: ARROWS INDICATE SAW TRAVEL DIRECTION AND CROSS-HATCHING INDICATES HEARTWOOD WHICH WILL BREAK. AS IN TOP BIND, A WEDGE SHAPED SECTION COULD BE TAKEN OUT WHEN SAWING CUT 2 TO ALLOW FOR CLOSING ON SEVERE BIND.

## Bucking Large Logs

In the cutting of big logs, buckers have a tendency to buck off as much of the far side of the log as they can by reaching over the side from the top of the log (see "B", No. 2 Position). This practice quite often results in a section of the lower left side of the cut remaining unbucked.

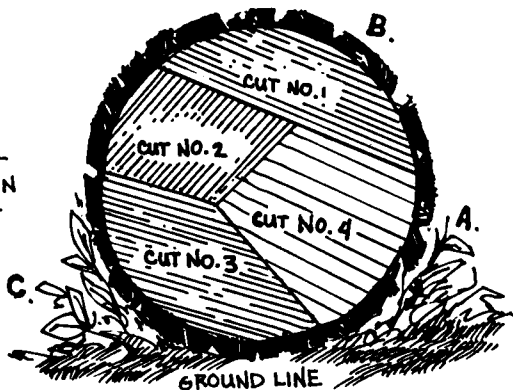
The diagram below indicates a safe method of bucking a large log.

1. Saw into the top of the log about 12-14 inches from Position "A".
2. From Position "B" cut off the lower side of the log right into the heart wood.
3. From Position "C" cut off all remaining wood on the low side of the cut.
4. Return to safe Position "A". Cut off balance of wood to complete the cut.

Note: You should carefully size up log lie and condition of log before adopting the third bucking position to ensure that no untoward event could take place which could endanger you.

FIGURE 9

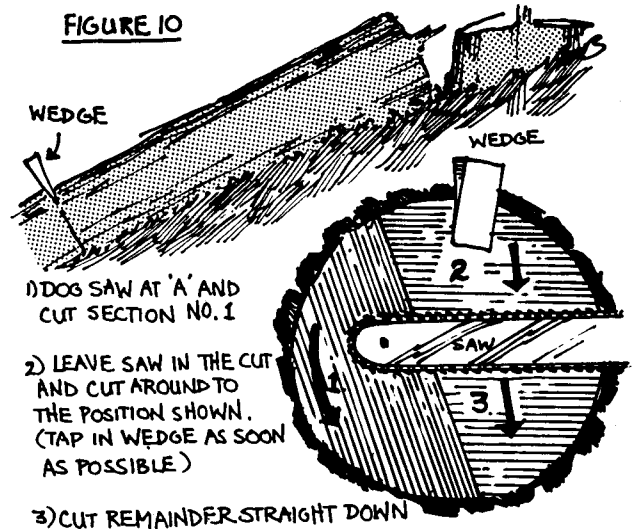
- A. FIRST AND LAST BUCKING POSITION
- B. SECOND BUCKING POSITION
- C. THIRD BUCKING POSITION



## End Pressure

When a tree is lying flat on steep terrain, straight up and down the slope, a bucked log would have a tendency to slide down, causing the bar to be pinched as the log was bucked off. Matching top and bottom cuts can be made without end pressure on the bar by inserting a wedge as shown in Fig. 10.

FIGURE 10



- 1) DOG SAW AT "A" AND CUT SECTION NO. 1
- 2) LEAVE SAW IN THE CUT AND CUT AROUND TO THE POSITION SHOWN. (TAP IN WEDGE AS SOON AS POSSIBLE)
- 3) CUT REMAINDER STRAIGHT DOWN

NOTE: THE ENTIRE CUT CAN BE MADE WITHOUT REMOVING THE SAW. THE WEDGE CAN BE TAPPED OUT AFTER CUTTING IS COMPLETED.

## Pivot Points

As an example of unexpected action, a faller was killed when the windfallen tree he was bucking swung uphill, crushing him under the butt. The windfallen fir tree, 30 inches in diameter by 90 feet in length, was lying across a steep sidehill. The butt end was rooted while the small end was resting on chunks. The first cut was made 12 feet from the root. The faller, expecting both the tree and root to roll away from him, finished the cut from the uphill side. As the cut was released, the butt end of the tree swung uphill because of a small stump located under the windfallen tree.

## Bind

Bind can be expected in most trees that are felled because of uneven terrain and other material already on the ground. The bind can also be present in combinations of top bind and side bind, or bottom bind and side bind.

The best defence you can have in order to avoid personal injury or equipment damage caused by bind and/or poorly chosen cut is to examine the felled tree carefully and determine any bind which may be present, and what action will take place when, or as, the bucked log is released.

Many serious and fatal accidents have occurred because fallers or buckers failed to recognize side bind during bucking activities. They had positioned themselves on the side to which the bucked log "sprung" or swung upon release.

## Falling and Bucking Difficulties

### Tree Sits Back

Just as you are completing the backcut, the tree starts to sit back on the bar. This can happen because:

1. You misjudged the tree's lean.
2. The stump contained hidden rot.
3. An unexpected gust of wind took it backwards.
4. You neglected to place a wedge in the backcut as it was being sawn.

If sufficient holding wood remains, the tree may be wedged-over in its intended direction. Be sure to clean the bark away, above and below the back-cut, to allow wedges to bear on solid wood.

The tree may be leaning backwards heavily, and wedges cannot be started in the back-cut. You are left with several choices:

1. You may fall the tree over backwards.
2. You may use a hydraulic jack.
3. You may "push" this tree over by falling another tree into it.

### The Second Undercut

Fig. 11 depicts a large tree which has "sat back" heavily on the backcut. The faller has sawn a good-sized second undercut at an angle on the right or left side (depending on best lay and escape). The second undercut has been sawn from the stump, but the topcut of the new undercut is the original backcut. By sawing the second undercut at an angle, part of the backcut will remain intact to support the tree while the second undercut is sawn in. When the second undercut is well cleaned out, the faller should run the saw into the original undercut and saw off the holding wood.

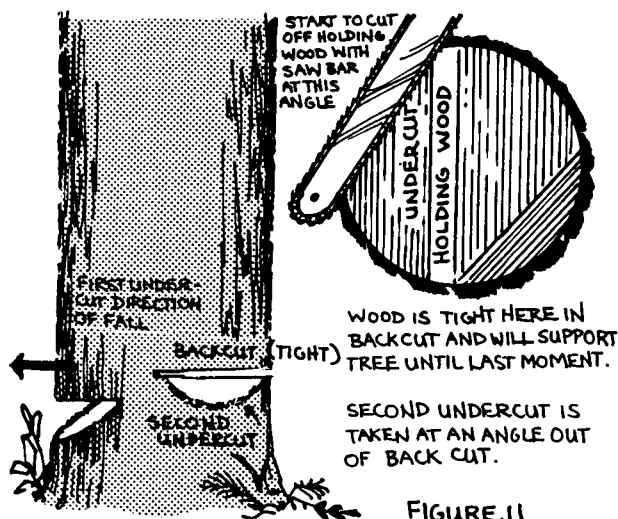


FIGURE 11

As the tree falls, very little control can be maintained because of the large "Dutchman" which developed, and because all the remaining holding wood has been sawn off.

Fig. 12 depicts the same situation, except that a bit

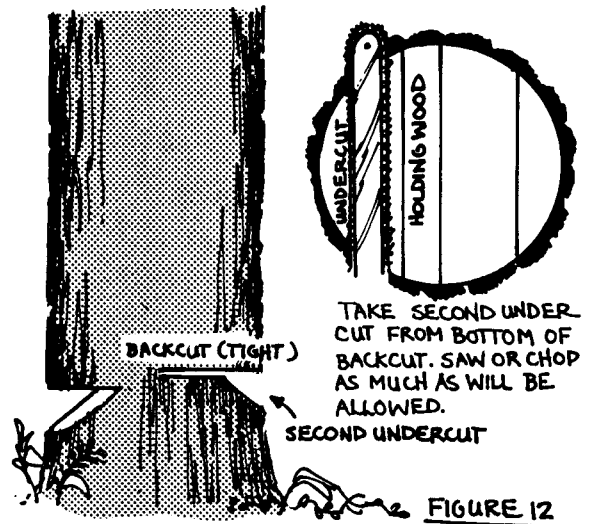


FIGURE 12

more control can be maintained by sawing the holding wood over its entire width. The small undercut would act as a lip to help prevent the butt from sliding backwards. The choice of these two methods would depend largely on the direction in which the tree appears to be leaning, obstructions to its free fall, steepness of terrain, and the location of the new escape path.

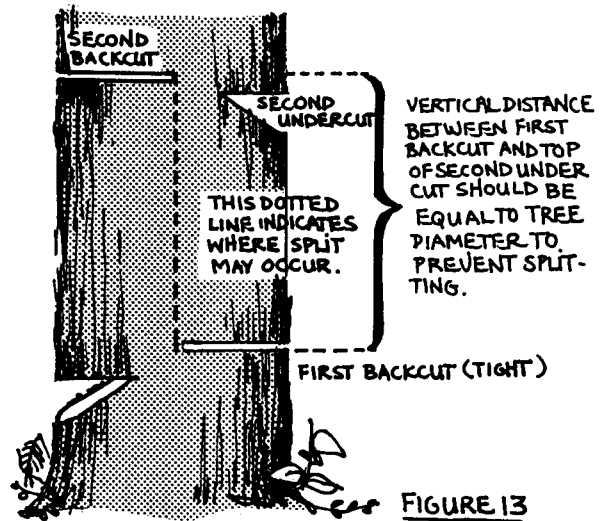


FIGURE 13

Figure 13 will allow for most control being maintained as a proper undercut, backcut and holding wood can be sawn in above the original cuts. Maintain as much vertical distance between the first falling cuts and the new falling cuts — at least the measurement of the tree's diameter. A danger exists that a vertical split may occur between the first and second set of cuts.

### Pushing One Tree by Falling Another Into It

Because of the hazards involved, this practice should only be done to overcome a falling difficulty when:

1. The tree may be limb-tied to another.
2. The tree may be leaning against another.
3. The tree has settled backwards and you are unable to start wedges.

### Hazards

1. You may only brush the tree being pushed, which may sway and fall over into the area where you are standing.
2. A dry top or limbs may be broken off and thrown back towards you.

If pushing becomes necessary, ensure that:

1. The pushing tree is at a good angle — no more than 20 degrees off the imaginary centre line behind the tree being pushed.
2. Extra protection with regard to the undercuts and holding wood of both trees is taken.
3. An unobstructed get-away path is located and the surroundings well sized-up.

When difficulties arise with an incompletely felled tree, you should direct all your efforts to getting the tree down safely. Under no circumstances should you continue with unrelated work in the area of the “cut-up” tree.

### Heavy Leaners

A tree with a heavy lean develops enormous tension in the wood directly behind the lean. When an undercut is put into the tree, in the direction of the lean, then the tension is further aggravated. As soon as a conventional backcut is started, this tension is immediately relieved and the tree starts to fall. However, too much holding wood remains, and instead of the holding wood breaking off normally, the tree trunk will split vertically from where the backcut is started. A huge slab will develop and kick backward at the same time, causing the “barber-chair”.

To prevent barber-chairing it is necessary to leave that part of the wood which is most under tension, located behind the lean, until more of the holding wood is sawn out. Several methods may be employed in removing the excessive holding wood.

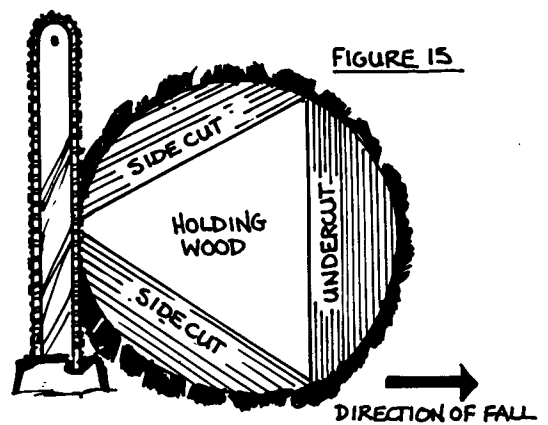


FIGURE 15

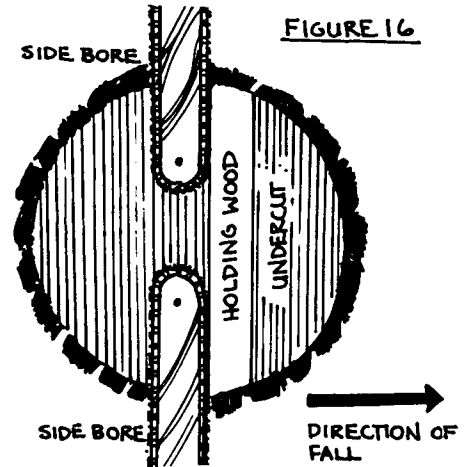


FIGURE 16

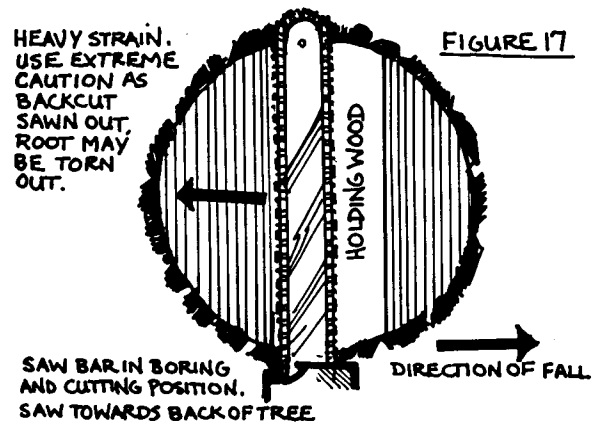


FIGURE 17

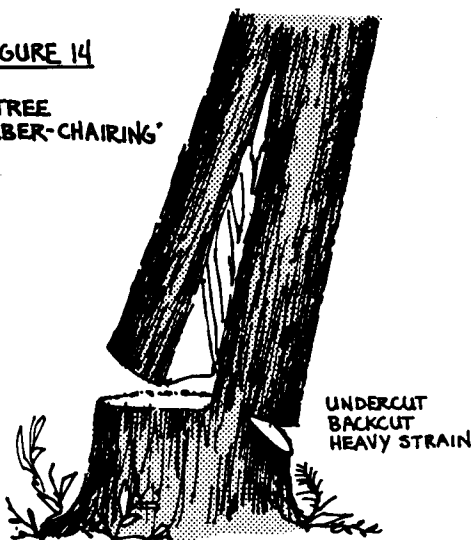
### Boring the Backcut

After the undercut block has been removed, the tip of the saw bar is bored into the tree on the same plane as the horizontal of the undercut. You must ensure that you leave a few inches of holding wood between the start of the boring cut and the back of the undercut. It may be necessary to bore in from both sides if the tree is wider than the length of the bar, (see Fig. 16). The saw is worked backwards, cutting from the inside out, until the point is reached where the normal backcut would have been started (see Fig. 17).

At this time, the wood directly behind the lean will be under enormous tension as all other holding wood has been severed. Trees have been known to fall at this time, before the saw has cut through, pulling a large section of root out of the ground.

FIGURE 14

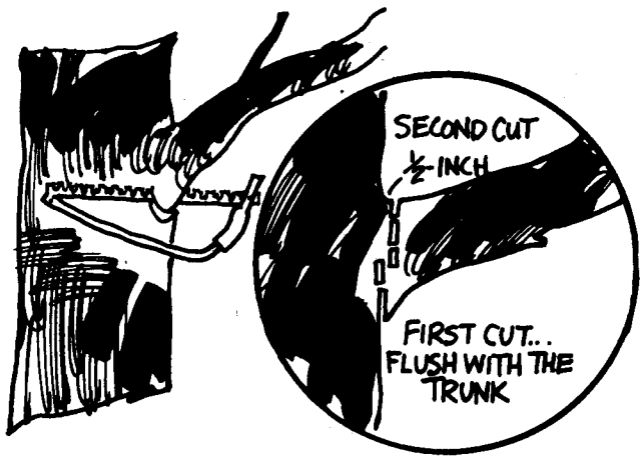
### TREE 'BARBER-CHAIRING'



### Side Notching

After the undercut block has been removed cleanly, the sides of the tree are side cut or side bored as shown in Fig. 15.

The remaining holding wood of the backcut will be sawn faster, with less likelihood of the tree splitting.



To prevent a limb from peeling down the side of a tree as it's removed, saw partway through the branch from the underside first. Make your upward cut close to the trunk and about one-third of the way through. Then start a second cut on top of the limb about one-half inch farther from the trunk than the first cut. When you have sawed down almost to the under cut the limb will break away cleanly.