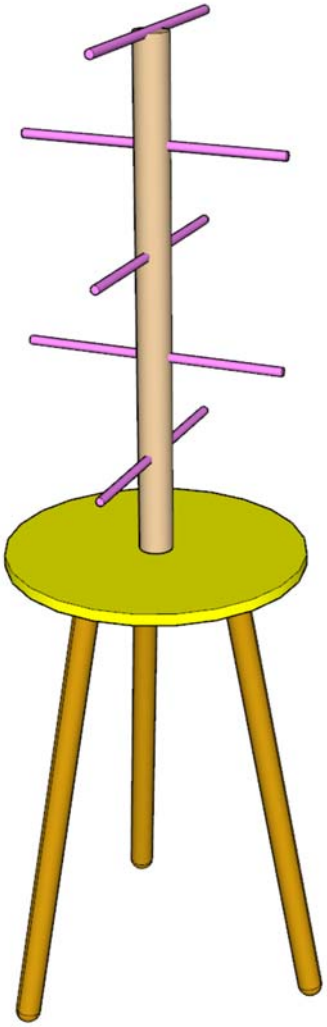
INSTRUCTIONS

for Building the

Bird Perch



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A Few Remarks About Making the Bird Perch

Robert Penoyer

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A WARNING – PLEASE READ

Woodworking can be dangerous! It's up to you to determine if you can safely use the tools and perform the tasks needed to complete this and any other woodworking project. If you are unsure, STOP! Get advice from someone knowledgeable or do some careful studying on your own. Be safe!

Always wear at least an appropriate N95 dust mask or respirator when sanding or spraying paint. For advice about dust masks and respirators, visit this link:
https://woodworkingtoolkit.com/best-dust-masks-respirators/

READ, UNDERSTAND, AND FOLLOW ALL OF THE INSTRUCTIONS AND WARNINGS THAT CAME WITH YOUR TOOLS. BE CAREFUL!

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Why Build This Project?

If you own birds or know someone who does, the Bird Perch is perfect for playing with them and handling them in the house. It's made from readily available materials and can be built in just a few days at a cost of about $120 if you have to buy all of the material.

Important Design Features of the Bird Perch

- Simple design and simple construction
- 3 legs prevent it from wobbling on the floor
- The legs and leg-mounting hardware are purchased items
- A total of ten 6 3/4" perches provides lots of space for the birds
- Each perch has a diameter of 1/2 inch
- An 18-inch diameter table below the perches stops the birds from leaving droppings on the floor
- The table is 30 inches high
- The post is 30 inches high for a total height of 5 feet
- Glue: Titebond II or equivalent
- Finish: That's up to you. See Apply a Finish—Or Not on page 20.

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Details of the SketchUp File and Equivalent PDF File

File *Perch_08.skp* is the SketchUp design for the Bird Perch. All of the dimensions and other necessary details are incorporated here. If you should find a dimension or other detail missing, it can be determined by examining this file. And, you can orbit and move the model around for a better look at everything.

File *Perch_08.pdf* contains all of the images and dimensions from the SketchUp file. Use this file if you're not familiar with, or don't use, SketchUp.

The descriptions that follow will help to make clear the details of some of the components and construction so that possible misunderstandings might be avoided.

Use the Included SketchUp or PDF File to Follow Along with These Descriptions

There are 5 pages in this design. The heading of each section below corresponds to the name of a particular SketchUp/PDF page.

<u>Assembly</u>

This is a perspective view of the entire assembly. Only two dimensions are shown in this view.

Each unique component has been given a unique color. The color of a given component is the same in every view.

Note that one component, called the Sub-Table, cannot be seen in this view. The Sub-Table is a round 13" diameter piece of 3/4" plywood to which the legs and leg hardware are mounted. The Sub-Table is attached to the bottom of the Table.

<u>Table and Sub-Table</u>

This is a bottom view showing the green Sub-Table and yellow Table. The leg hardware is attached to the Sub-Table and the legs are attached to the leg hardware. A 5/16" diameter center hole through both the Sub-Table and Table provides clearance for the 5/16"x6" lag screw that passes through the hole to secure the Post.

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Three other holes appear in the picture. These simply indicate the position of three clearance holes for the screws that secure the Sub-Table to the Table.

The legs and leg hardware are purchased items. I found the ones I used at Lowe's. The labels in Figure 1 and Figure 2 identify each item.

Figure 1. Label from Leg

Figure 2. Label from the Set of 4 Angle Table Plates Used for Mounting the Legs

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Notice in Figure 2 that it's labeled "Hardware B". This Angle Table Plate is slanted to put each leg at an angle. You need this for stability. *DO NOT* use "Hardware A," which is not slanted. You can see the built-in slant of "Hardware B" in Figure 3. You can also see the welded nut that mates with the threaded insert that's built into each leg.

Figure 3. Slanted Angle Table Plate "Hardware B"

Figure 4 shows the end of one of the purchased legs and the treaded insert that is part of the leg. The threaded insert screws into the welded nut in Figure 3.

Figure 4. Threaded Insert That is Part of the Purchased Leg

Another item like the one in Figure 3 is available from Van Dykes Restorers, sold in quantities of one each, so you would need 3:

https://www.vandykes.com/designs-of-distinction-angle-furniture-foot-mounting-plate/p/239156/

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Amazon also has the item in quantities of one each, so again, you would need 3:

https://www.amazon.com/Waddell-2752-Angle-Top-Plate/dp/B00MBW1WVG/ref=sr_1_4?dchild=1&keywords=waddell+2752&qid=1597618356&sr=8-4

Of course, you can use different legs and different angle top plates. Or, you can make your own legs.

Post

The Post is the most complex part of the Bird Perch. It's a 2" dowel cut 30" long. Its fabrication will be discussed later.

Perch

The five Perches are the simplest parts of the Bird Perch. I used 1/2" oak dowels. The oak is hard and will probably best resist any pecking by the birds. Each Perch simply passes through a hole in the Post and is glued into place.

Post Drilling Jig

The Post Drilling Jig is a fixture that helps you to accomplish three things:

1. The 1/2" guide holes in the Jig are centered on the Post
2. The 1/2" guide holes are set for the correct spacing between the holes for the Perches
3. The Trough of the Jig (that is, the bottom piece of the Jig) has a round, 1" radius groove cut along its length. This is the same radius as that of the 2" diameter Post. Thus, the Post will rest snuggly in a round trough that helps to center the Post. But, most importantly, *it provides a good backing for the Post while drilling, thus avoiding tear-out when the drill bit passes through the Post.*

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Building the Bird Perch

Figure 5. The Bird Perch

Forming the Table

The Table is a piece of 3/4" plywood cut into a circle with a diameter of 18". Baltic birch is best for this, but you can use whatever material you like. See A FINAL THOUGHT on page 20.

Consider a couple of ways to cut the circle.

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The Simplest Way to Cut the 18" Circle

The first and simplest way to cut the circle is to simply cut it out and sand it:

1. Determine the center
2. Scribe a circle using a compass set to a 9" radius
3. Cut the workpiece using a bandsaw or a jigsaw
4. Smooth the perimeter of the workpiece using sandpaper

The result might be acceptable but it's likely to have some unevenness which would detract from its appearance.

The Best Way to Cut the 18" Circle

The second and best way to cut the circle is to use a router and straight cutting bit with a circle-cutting jig.

1. Determine the center
2. Scribe a circle using a compass set to a 9" radius
3. Rough cut the workpiece using a bandsaw or a jigsaw, staying about 1/8" outside the pencil mark on the waste side
4. Set up a plunge router with a circle-cutting jig and a flush cutting bit. The inside edge of the bit should be located right on the pencil line.
5. Plunge the bit into the workpiece and let the circle-cutting jig guide the bit along the circle

The result should be smooth and require very little sanding, if any.

Round-over the Edges

Use a router with a 1/4" or 3/16" radius round-over bit to round over <u>both</u> edges of the Table.

Drill the Center Hole

Locate the center of the workpiece and drill a 5/16" hole through it. This will be the clearance hole for the 5/16" lag screw used to secure the Post.

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Forming the Sub-Table

Follow most of the procedure described above for Forming the Table, but make the radius 13". DO NOT drill the 5/16" hole yet and DO NOT round over EITHER edge.

Now is the time to mark the locations of the legs and 3 screw clearance holes. Using the center as a reference, mark radius lines from the center to the outside edge, all spaced 60° apart. You can do this by using one of at least two different techniques.

First Technique: Locate the Radius Lines Using a Protractor

Use a pencil to draw a diameter from edge to edge through the center. Now use a protractor to locate where the other two diameter lines will be offset from the first line by 60° and draw those. You should have formed 3 diameters, all 60° apart, or 6 radii all 60° apart.

Second Technique: Mark the Radius Lines Using a Compass

You might remember from your beginning geometry class, that when you draw a circle using a compass, you can place the point of the compass on the edge of the circle and use the pencil of the compass to place a tick mark on the circle. Then move the point of the compass to the new tick mark and place another tick mark on the circle. Keep repeating this until you're back where you started.

If everything went well, you should have 6 tick marks on the edge of the circle and *the last tick mark will land right on, or very close to, your starting point*. If your tick marks worked out this way, draw a radius line from each tick mark to the center of the circle. Each of the lines will be 60° away from the adjacent one.

If your last tick mark didn't land on or very near your starting point, adjust the compass a little bit and try it again. Then draw the radius lines as described in the previous paragraph.

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Mark the Locations of the 3 Screw Clearance Holes

Refer to the *Table and Sub-Table* page in the SketchUp/PDF drawing and notice that 3 screw hole locations are located 5" from the center of the Sub-Table. Pick one of the radius lines that you just drew and mark a point on it 5" from the center. Remembering that each of the radius lines is 60° from the next line, skip a radius line and mark another point 5" from the center. Do this one more time. You should end up with 3 points spaced 5" from the center and displaced 120° from each other.

Mark the Locations of the Angle Top Plate Leg Mounts

You should now have 3 marks on 3 alternate radius lines. The remaining 3 unmarked lines identify the locations where the angle top plates of Figure 3 will be located.

Place one of the angle top plates so that it's centered on one of the lines with the plate tilted away from the center. The two holes closest to the edge of the Sub-Table should be located about 1/2" from the edge. Once you're happy with its location, use a pencil to mark the 4 holes. Repeat the hole-marking process for the angle top plate locations on the two remaining radius lines.

Round Over <u>One</u> Edge of the Sub-Table

Round over only <u>*one*</u> edge with a router using a 1/4" or 3/16" radius round-over bit. This edge must be on the side where you've marked the radius lines and the hole locations. The non-rounded-over side will be secured against the bottom of the Table later.

<u>Drill Holes in the Sub-Table and Attach the Hardware</u>

Drill a 5/32" hole at each of the 3 hole locations in the Sub-Table. These will be clearance holes for #8x1 1/4" screws to be used later.

Drill pilot holes for the screws that came with the angle top plates.

Drill a 5/16" hole through the center of the Sub-Table. This will be the clearance hole for the 5/16" lag screw used to secure the Post.

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Remove all of the pencil lines from the Sub-Table. A simple and convenient way to do this is to wet a portion of a folded paper towel with either denatured alcohol or acetone and rub the wet area against the pencil marks. Add more alcohol or acetone to the paper towel as needed.

Sand one side of the Sub-Table with 120-grit or finer sandpaper. The side that should be sanded is the one that will be visible, that is, the side with the rounded edges.

Now attach all 3 of the angle top plates to the Sub-Table using the screws that came with the plates.

Attach the Sub-Table to the Table

First, sand both sides of the Table with 120-grit or finer sandpaper.

Pass a 5/16" lag screw through the center hole of the Table. The head of the screw should be on the *best* side of the Table.

Place the best side of the Table face down on a flat surface with the screw head between the flat surface and the Table. (Yes, the assembly will rock around a bit because of the screw head.) Now slip the center hole of the Sub-Table over the 5/16" screw so that the non-rounded edge of the Sub-Table rests against the Table. The lag screw will align the Table and the Sub-Table correctly.

Drive a #8x1 1/4" screw through each of the 3 clearance holes in the Sub-Table and into the Table so that the Table and Sub-Table are secured together.

Remove the 5/16" lag screw and lay it aside.

Attach the Legs

Sand the legs as needed until you're satisfied with the finish.

Screw a leg onto each angle top plate. It might be necessary to use a strap wrench to get each leg fully seated against each angle top plate as shown in Figure 6.

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NOTE: It's possible for the threaded rod that comes installed in each leg to extend far enough through the threaded nut in the angle top plate that it can press into the Sub-Table. You should drill a shallow relief hole in the Sub-Table at that point if that happens. Otherwise, the angle top plate might be forced away from the bottom of the Sub-Table.

Figure 6. Leg Fully Seated Against the Angle Table Plate

Turn the assembly upright on the legs. You're halfway done!

Prepare the Perches

Cut the Perches to Final Length

Cut 5 pieces of 1/2" dowel (preferably oak) such that each piece is 15 1/2" long.

Round-over the Ends of the Perches

Round over the ends of the Perches by hand sanding, sanding with a belt sander or disk sander, or by using a router table. A clever method for rounding over the end of a dowel using a router table is described on this webpage:

http://www.binkyswoodworking.com/PegTip.php

The ends of your dowels should look something like Figure 7.

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Figure 7. 1/2" Oak Dowel with 3/16" Round-over

Build the Post Drilling Jig

Refer to the *Post Drilling Jig* page in the SketchUp/PDF drawing.

You'll need a 1"x4" board (actual dimensions: 3/4"x3 1/2".) Cut one piece 27" long and another one 30" long.

You'll need a 1"x2" board (actual dimensions: 3/4"x1 1/2".) Cut two pieces, each 27" long.

Drill three 1/2" holes in the 1"x4" board that's 27" long as shown in the *Post Drilling Jig* page of the SketchUp/PDF drawing. A brad-point drill bit is best for this task. The holes must be centered exactly and drilled perfectly perpendicular to the board with the spacing as called out in the drawing.

Prepare the Trough

The Trough is the bottom board in the Post Drilling Jig. It's so named because it has a round groove cut along its length as shown on the *Post Drilling Jig* page of the SketchUp/PDF drawing.

I used a router table with a round-nose bit having a diameter of 2" (radius = 1") to cut the groove. That bit is shown in Figure 8. It must be centered on the board and cut to a total depth of exactly 1/2" deep.

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Figure 8. 2" Round Nose Bit

The particular Freud bit that I used is available from Amazon:

https://www.amazon.com/Freud-Radius-Round-Shank-18-138/dp/B00004T7DQ/ref=sr_1_1?dchild=1&keywords=freud+18-138&qid=1597534022&sr=8-1

The router bit is big so **be sure to slow your router down to a safe speed compatible with a 2" diameter bit**.

You'll be removing a lot of material so make several passes of the board over the bit advancing the depth only about 1/8" at a time until you achieve the final depth of *exactly* 1/2".

Assemble the Post Drilling Jig

Assemble all of the parts of the jig as shown in the *Post Drilling Jig* page of the SketchUp/PDF drawing. All of the pieces should fit together nicely if you bought standard-dimension boards. Be sure all the pieces are flush on their outside edges.

I used 18-gauge nails to assemble the Jig but you might want to use screws.

Fit the Post into the Post Drilling Jig

If you built the Post Drilling Jig carefully, and if the wood you used was of the correct size, the Jig should accommodate the 2" diameter Post so that it's a comfortable fit while being not too loose or too tight.

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You'll have to sand the Post if the fit is too tight. You'll have to use shims to secure it if it's too loose.

The Post's final length will be 30". I bought a 48" dowel. You might buy a 36" dowel. Either way, the 2" dowel will be longer than the final length of the Post.

Place the Post into the Jig with the Post extending roughly the same distance from each end. Clamp the Post to the extended end of the Trough so the Post can't rotate.

Drill the First Set of Holes Into the Post

You will need a drill press or a drill guide to ensure that the holes are drilled perpendicularly into the Post. You should use a 1/2" *brad-point* bit for the best results.

With the Post extending from both ends of the Post Drilling Jig and clamped to the extended end of the Trough, use the 3 holes in the jig to guide you in drilling 3 holes through the Post. Be sure to drill all the way through the Post.

The drill bit will probably pass through the bottom of the Jig, so be sure to use some backing.

Leave the Post clamped in place after you're done drilling the holes.

Drill the Second Set of Holes Into the Post

Before removing the clamp, make a pencil mark on the Post by scribing a pencil against the end of the Jig.

Once you've made the pencil mark, remove the clamp and slide the Post out of the Jig until the mark is exactly 6" from the Jig. Slide one of the Perches into one of the new holes.

Rotate the Post until the Perch has rotated about 90°. Lay another Perch across the Jig at the end closest to the Perch that's in the Post. Sight down the Jig and rotate the Post until the Perch in the Post appears to be exactly parallel to the Perch on the Jig.

With the dowels exactly parallel, and the pencil mark exactly 6" from the jig, clamp the Post to the extended end of the Trough on the Jig.

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Now use the holes in the Jig as guides to drill **just two** 1/2" holes. Use the guide holes in the Jig that are centered between the 3 holes that you drilled earlier.

Remove the Perch from the Post.

Remove the clamp and remove the Post from the Jig.

Do You Need Wood Filler?

The holes in the Post where the drill exited should be clean because the Jig should have provided good backing for the Post, but the holes where the drill entered the Post might have some tear-out. You might want to use some wood filler to improve the appearance.

Cut the Post to Final Length

The top of the Post must carry a Perch in a hole that is cut in half. So, make a right-angle cut across the Post through the center one of the end holes. The end of the Post should look like Figure 9 where a Perch is shown mounted in the half hole at the top.

Figure 9. Table of Post with Half Hole Holding the Table Perch

With the top hole cut through its center, measure and put a pencil mark 30" from the top end of the Post. Make a right-angle cut across the Post at the pencil mark.

The top of the Post can be identified by the half-hole at one end. The bottom can be identified by a plain cut with no hole at the other end.

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Drill the Hole in the Base of the Post

Refer to the *Post* page in the SketchUp/PDF file for reference. Pay particular attention to the hole at the bottom.

Mark the center of the bottom of the Post. Indent the center using an awl or sharp nail to provide a place to guide your drill bit.

Drill a 5/16" hole 1/2" deep into the bottom of the Post being sure to align the drill bit along the internal centerline of the Post. A brad-point bit is preferable here.

NOTE: A 5/16"x6" lag screw typically has a plain 5/16" shank immediately next to the head of the screw. That plain shank will pass through two pieces of 3/4" plywood (the Sub-Table and the Table) and into the bottom of the Post. A 1/2" deep 5/16" hole was enough room to extend past the plain shank to the threaded portion of the screw. If the plain shank of your 5/16"x6" lag screw is longer, you should make the 5/16" hole deeper than 1/2".

Now extend the depth of the hole using a long 1/4" diameter drill bit. As per the dimensions in the *Post* page of the SketchUp/PDF file, drive the drill bit a total of 5" in from the bottom of the Post, being sure to align the drill bit with the internal centerline of the Post.

Sand the Post

Sand the Post using 120-grit sandpaper or finer. Be sure to soften the outer edges of the top of the Post but not the edges of the half-hole. DO NOT soften the edges of the bottom of the Post.

Assemble the Perches to the Post

When the 15 1/2" Perches are placed into the 2" diameter Post, and the length of one side is made equal to the other side, each Perch should extend 6 3/4" from the Post. That is, 6 3/4" + 2" + 6 3/4" = 15 1/2". So, place a small pencil mark exactly 6 3/4" from one end of each dowel.

With luck, the dowels should fit snuggly into the Post: not too tight and not too loose. Check the fit of your Perches in the Post. If necessary, you might want to sand some of the Perches, so they make a better fit. Make sure that a pencil mark is still visible 6 3/4" from the end of each post.

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Have these materials handy before inserting the Perches into the Post:

- Wood glue
- Paper towel
- Small amount of water
- Hammer

With the Post lying on its side at the edge of a flat surface such as a workbench, orient one set of holes in the vertical direction. Now follow these steps:

1. Push or hammer one of the Perches into one of the holes until the pencil mark is about 1/2" from the edge of the Post
2. Carefully apply a small amount of glue all the way around the Perch between the Post and the pencil mark
3. Press or hammer the Perch in until the pencil mark just passes into the hole
4. Immediately wet a piece of paper towel and use it to wipe away any excess glue. Dry the water from the wood.
5. Repeat Steps 1-4 for the other Perches but NOT for the Perch that will be mounted in the half-hole at the top. That will be added later.

Assemble the Post to the Table

Retrieve the 5/16"x6" lag screw. It's a good idea to apply wax to the threads of the screw to make its insertion easier.

Place a 5/16" flat washer on the screw. Insert the lag screw into the bottom of the center hole in the Sub-Table and through the Table. The flat washer should now be between the head of the screw and the Sub-Table.

Place the hole at the bottom of the Post over the lag screw. Use a socket and wrench or an impact driver to drive the screw all the way into the Post so that the Post is held securely against the Table. Make the screw tight but not tight enough to strip the hole in the Post or crack the Post.

I thought it was pleasing to align one set of Perches with one of the legs as in Figure 5, but that's just a matter of taste.

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Assemble the Top Perch to the Post

With the Bird Perch standing vertically on its own legs, now is a good time to mount the top Perch to the top of the Post.

Apply a small amount of glue in the half-hole at the top of the Post. Press the top Perch into the half-hole and the glue, making sure that the pencil mark is just inside the edge of the hole in the Post. Immediately use a wet paper towel to remove any glue squeeze-out. Then dry the wet wood with a dry paper towel without disturbing the top Perch.

YOU'RE DONE!

Let's talk about a finish.

Apply a Finish—Or Not

I chose to leave the Bird Perch unfinished. The person whom I'd built it for was concerned that the birds might peck at the wood and could have a bad reaction to any finish that they might ingest.

There are food-safe finishes such as food-safe mineral oil that might be satisfactory. But mineral oil will have to be reapplied from time to time to keep it fresh. And, I suppose it's possible that the birds might not like its taste, smell, or feel and could be repelled by it.

So, the decision to apply a finish is up to you. One concern that I have is the droppings that the birds could leave on the Perches and the Table. Those would leave stains, so it seems that a finish of some sort *is* called for.

You might want to investigate cutting board finishes.

A FINAL THOUGHT: If the Table were fabricated from melamine (3/4" fiberboard with a white or black plastic coating on both sides) the melamine would provide a smooth, stain-resistant coating for the Table.

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