



YOUR MOVE!

Turn a Chess Set

Mike Peace

Have you thought of turning a chess set but dismissed it as too difficult? Look at this simple but elegant design, and you might just change your mind. Turning a chess set does not require a lathe duplicator; minor differences between like pieces are hardly noticeable and simply highlight that the pieces were handcrafted. Turning a chess set is not too difficult even for a beginner, as it can be a great skill-building project. Noted chess author Irving Chernev wrote, “Every chess master was once a beginner.” This applies to turners as well.

Design and materials

The design presented in this article is loosely based on the familiar Staunton style, which became popular in the

mid-1800s and has become the standard used in chess competition worldwide. But since most of us will not be playing competition chess, there are endless possibilities for design. This is a game played throughout the world, dating back more than 1,500 years. You can be as creative and original as you like, but there are some basic design parameters to consider (*see Design Considerations sidebar*).

If you want to design your own set from scratch, you might find inspiration in the pieces shown in the Chess Set Gallery, immediately following this article. And of course many more ideas can be found on the Internet.

I suggest using a dry, close-grained hardwood, as it will hold turned details well. A plain wood is generally preferred

because prominent grain patterns can confuse our perceptions of form. Historically, chess sets have been made of contrasting woods, with some fine sets having been made of boxwood and ebony. Imported exotics can be beautiful but also expensive. Walnut, a common domestic dark hardwood, is frequently used in making chessboards and the dark chess pieces for hand-turned sets. You could also use dye to distinguish the dark pieces in your set. Inexpensive wooden sets frequently come with black paint on their dark pieces. I used Bradford pear for all of the pieces in the set shown here and colored the dark pieces with black dye.

The design you see in this article appealed to me because of its elegance and simplicity. It does not have the complex beads, coves, and collars of the typical Staunton style, yet all of the pieces are readily identifiable. Moreover, the knights require no hand-carving.

Make a storyboard, or story stick, for each chess piece to mark the location of each feature on your turning blank. I typically make story sticks from thin plywood, but because chess pieces are so small, it is fine to use thin cardboard. *Figure 1* offers full-scale drawings, which you can photocopy and glue to a piece of thin cardboard. Then use scissors to cut out the diagram for each ►

Design Considerations

- Size the pieces in descending order of importance.
- Make each piece easily recognizable to prevent confusion when playing.
- Avoid delicate detail that leads to damage if you use the set often.
- Design the pieces with a chessboard size in mind. Competition sets are large, with chessboard spaces 2¼" (6cm) square and a king about 3¾" to 4¼" (10cm to 11cm) tall. A design like the one proposed here is about three-quarters that size, still large enough to play chess comfortably for casual home play. Moreover, its smaller board can fit on most coffee or side tables, unlike competition-sized boards.
- The base diameter of the king should be about 70% to 80% of the square/space size. Too large and they are more awkward to move; too small and they look out of proportion.
- Some extra weight in the base of each piece makes them more stable.
- A felt pad on the base makes them more elegant.

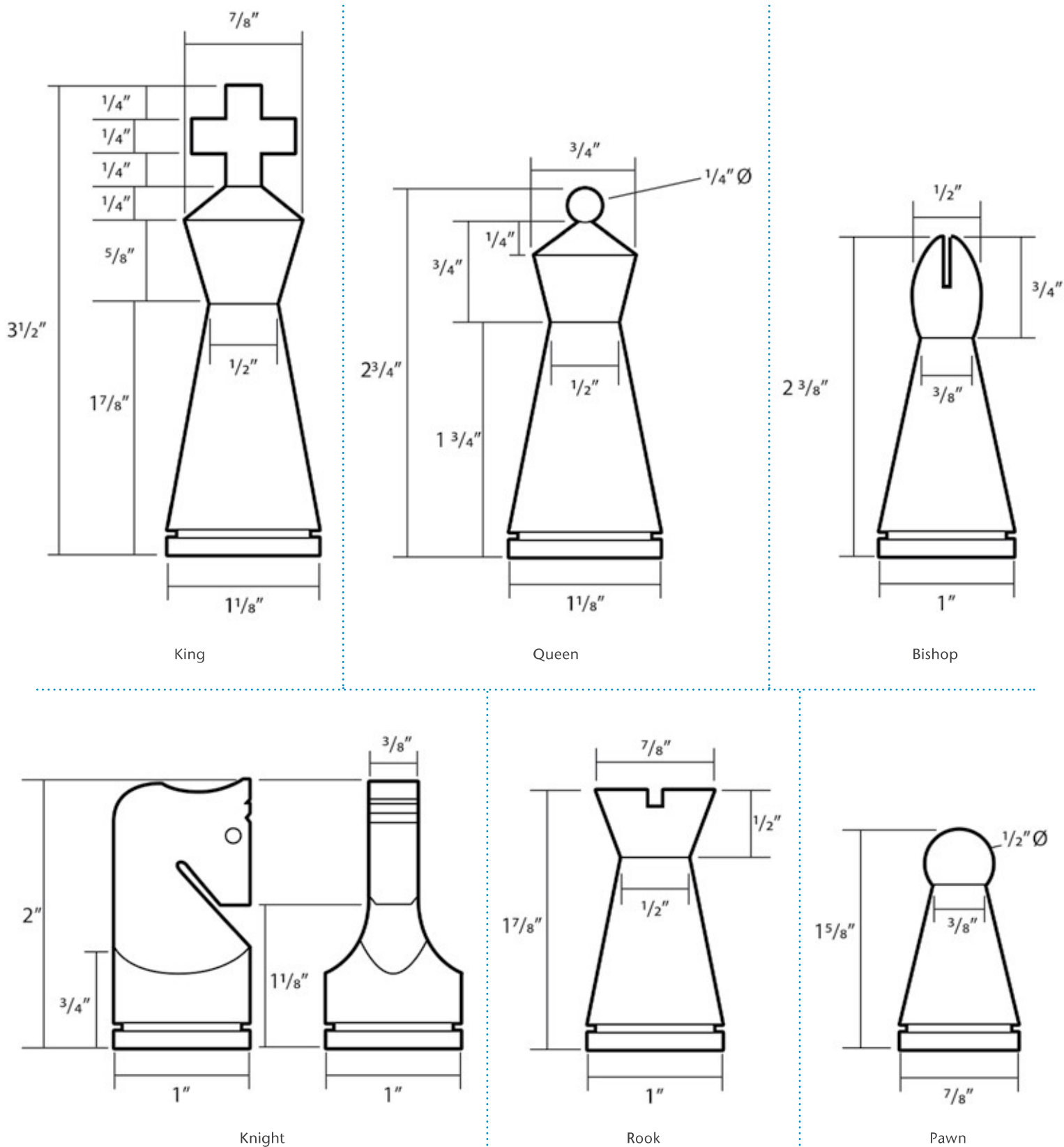


Figure 1. Photocopy these full-size drawings and glue to a thin sheet of cardboard. Use scissors to cut out each piece to use as a storyboard.

Illustrations: Robin Springett

Make story sticks from the drawings



1 Story sticks made from the drawings in *Figure 1* make it easy to mark major features and key diameters.

Drill the base



2 Use your lathe as a horizontal boring machine to drill a $\frac{3}{4}$ "-diameter hole for accommodating weight in the bottom of the chess pieces.



3 The author uses a hand drill to bore a smaller pilot hole for mounting the blank on a screw chuck.

piece, including the measurements, as a standalone storyboard (*Photo 1*).

Prepare the blanks

Mill your rough chess blanks about $\frac{1}{8}$ " (3mm) wider and longer than the finished dimensions.

I pre-drill each blank with two holes in the bottom, one to accommodate pennies for weight and one to fit the blank on a screw chuck (see *Make a Screw Chuck Mandrel sidebar*). I prefer to drill the first, larger hole on the lathe, as shown in *Photo 2*. I have also used a

drill press for this operation, securing the blank in a wooden handscrew with opposing 90-degree notches cut in each jaw to hold the blank square. For safety, always clamp the wooden handscrew to the drill press table. I first drill with a $\frac{3}{4}$ " (19mm) Forstner bit to accommodate the four pennies I will use later to weight each piece. Drill a little bit deeper than the depth of the pennies to allow space for glue. Then drill a smaller pilot hole sized for the screw chuck. I find a hand-held drill is best for the second, smaller hole. Center the bit in the dimple left

Make a Screw Chuck Mandrel

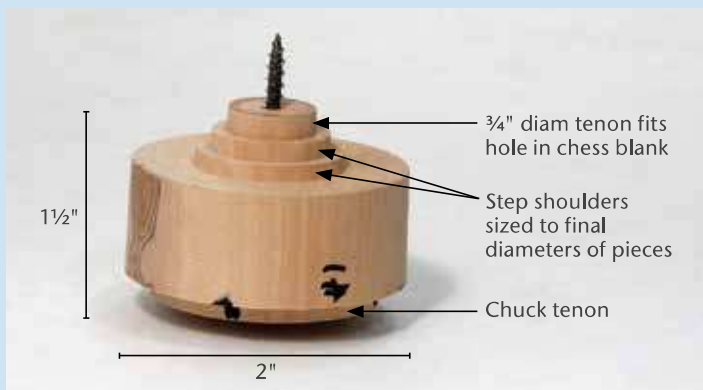
The best way I have found to hold chess blanks on the lathe is with a shopmade screw chuck mandrel. If you do not have a suitable endgrain spindle scrap, turn one to about 2" diameter and $1\frac{1}{2}$ " long, adding a tenon sized to fit your chuck.

Shape the mandrel per the photo below. The smallest, forward-most tenon is sized to fit snugly into the hole drilled in the chess blanks. This requires parallel sides and a slight chamfer on the end for easy insertion. Make the tenon shorter than the depth of the hole so when fully mounted, the blank will not bottom out in the hole; the blank's base should register against the shoulder of the mandrel. I mark a line on each side of the number 1 jaw chuck, which allows me to remount the chuck in the same position each time so it has a greater chance of running true.

You can speed up chess blank prep by sizing a second tenon, or step, at the shoulder of the mandrel to the exact finished diameter of the

chess piece. This serves as a visual gauge so you can turn the piece round without having to measure its diameter. You can make several mandrels to accommodate various base sizes or, as in the photo, add a third, larger tenon so you can use one mandrel for two different-diameter pieces.

Drill a pilot hole all the way through to accept the screw. Use a drill bit slightly smaller than the screw you will use. I drill a $\frac{9}{64}$ " (3.5mm) hole to accept a #8 screw $2\frac{1}{2}$ " (6cm). Centering the screw hole on the mandrel can be a challenge, so it is best to use a center drill to make a starter hole. With the screw chuck removed from the lathe, insert the screw from the back and mount the chess piece blank. Tightening the screw will pull the blank tight onto the tenon. Note that the screw head does not need to seat against the back of the mandrel, as much of the hold's strength comes from friction and the chess piece base making solid contact against the screw chuck.



The author's shopmade screw chuck mandrel holds chess blanks securely. Note the smallest tenon is sized to fit into the $\frac{3}{4}$ "-diameter hole in each blank, with the screw pulling it tight. The step shoulders are sized to match the final diameters of the chess pieces and act as a visual gauge.

by the Forstner bit and drill about $\frac{3}{8}$ " (10mm) deep (*Photo 3*).

The pawn

I encourage you to start with the pawn. It is the easiest piece to turn, and for less-experienced turners, turning all the pawns first will give you experience with tool selection and tool control, as well as confidence that will carry over to the more difficult pieces.

Mount a blank on your screw chuck. It is important to have cut the chess blanks square so they will register fully against the screw mandrel. I like to use tailstock support as much as possible, but especially when roughing, to prevent chatter/vibration. Prevent damage from the live center point by making a "soft touch" center out of wood or high-density polyethylene (HDPE), as shown in *Photo 4*.

Turn the blank round using a spindle-roughing gouge. With pieces of this size, I run the lathe faster than I usually do—1800 to 2800 rpm. Keep your tools sharp and don't be too aggressive with your cuts. The screw chuck mandrel does not hold as securely as steel chuck jaws.

Use your pawn story stick and a sharp pencil to mark locations of key features: the base recess and the bottom of the ball. Part down $\frac{1}{16}$ " (1.5mm) for the recess using a thin parting tool. I do not measure the depth but simply make it as deep as it is wide by sight. Next, I use the thin parting tool to part down almost to the depth of the neck. You can size the desired diameters with a caliper or even an open-end wrench of the correct size. But you can also download a PDF with full-scale, ready-to-print sizing templates from the AAW website (woodturner.org). Log in to your AAW account and visit tiny.cc/Chess. After you print these templates, you can glue them to thin cardboard, trim with scissors, and use them to measure critical diameters for all of the chess pieces. Check turned diameters with the lathe off.

Non-marring live centers



4

A "soft touch" of wood or HDPE provides tailstock support without damaging the wood.

Make sanding sticks for crisp edges



5

The author's shopmade sanding sticks, thin strips of wood with sandpaper glued to them, help sand details like the taper joints.

Rook crenellations



6

The author cuts the rook crenellation slots on a table saw prior to mounting the work on the lathe.



7

An alternative method is to first turn the rook, then form the crenellations, or notches, with a small round rasp or chainsaw file.

I use a spindle gouge to shape the ball at the top of the pawn, after first reducing the ball area to the correct-diameter cylinder using a parting tool. Just as you would turn a bead, start with the flute up near the center and lift, twist, and roll the gouge as you approach the top or bottom of the ball. If this cut is new to you, you may want to practice the motion by doing a few beads on a practice piece. Don't worry if the balls do not look perfect. By the time you finish your last one, you can easily turn another pawn or two if necessary to replace the first ones.

Next, shape the body with a flat taper. Your spindle gouge is a good tool for this. I would work at shaping most of the taper at the base of the ball before taking the final taper cuts. Start your taper at the top of the base recess feature. Remember

to cut with the grain—in this case, from large to small diameter. If you have some experience using the skew, that is a great tool for making a flat planing cut from the base to the bottom of the ball.

Sand the piece. On the light-colored pieces, I sand to 320 grit, apply lacquer sanding sealer, and, when dry, sand again at my final grit. A paper-backed abrasive works better than a cloth backing to sand and keep edges crisp. Make some sanding sticks by gluing strips of sandpaper onto small, flat strips of wood such as craft sticks (*Photo 5*). This is a good tool for sanding the area on all the pieces where the top and bottom tapers meet.

The rook

The biggest challenge with the rooks is cutting the slots, or crenellations. ►

Pre-cut knight's top



8



9

Glue the front and side patterns on the knight blank and saw out the upper profile in two dimensions before turning only the base.

Pre-cut bishop's miter



10

Cut a partial vertical slot on top of the bishop prior to turning. This can be done safely on a bandsaw holding the work in a handscrew clamp.

I found it difficult to cut slots with a hand saw on small pieces of round hardwood without skipping or causing scratches or tearout. Cutting the slots on a table saw before turning solves this problem. I draw lines corner to corner on the drilled (base) end, being sure to cross the center of the hole, and clamp the piece in my notched handscrew for safe holding on a crosscut sled (*Photo 6*). I set the blade height at $\frac{3}{16}$ " (5mm) above the crosscut sled base. After cutting one slot, turn the blank 90 degrees, line up for the cut, and cut the other slot. There are other ways to cut the crenellations, such as on a bandsaw with a proper jig, but I prefer the kerf size from my table saw blade.

After mounting the blank on the screw chuck mandrel and turning the final rook shape, I hollow out the top. You can drill this with a Forstner bit, but that would leave an unsightly divot in the middle. So I hollow with a small spindle gouge, cutting from center to the left, and clean up the corners with a small square scraper.

A simple design option is to forget cutting slots with a saw. Instead, use a small round-nose scraper to hollow the top of the rook and then use a small round rasp or an old chain saw file to cut partial notches (*Photo 7*). Use a sharp knife first to make small starter V-cuts to keep the rasp from skating, and file the slots at about a 45-degree angle. This is the approach I used on the rooks in my

Russian chess set shown in the Chess Set Gallery (page 24).

The knight

I cut the basic knight outline using a scroll saw before I turn only the base on the lathe. First, glue the printed knight pattern onto the side and front of the pre-drilled square blank. It is critical to get these patterns centered on the large mandrel hole before cutting on a scroll saw or bandsaw (*Photo 8*).

With the front of the knight facing up, cut the excess off each side (*Photo 9*), then tape these scraps back in place with clear tape. These taped pieces are an essential safety measure, as they provide needed support on the scroll saw or bandsaw table when cutting the side profile. Now mount the piece on the lathe mandrel and turn the knight's base section.

See *Variations on the Knight sidebar* for alternatives to this method.

Bishop, queen, king

Prior to turning the bishops, I cut a vertical bandsaw slot about $\frac{3}{8}$ " deep for the traditional miter. Carefully draw a line down the center of one side of the blank. Be sure it centers on the large mandrel hole. To cut the slot on your bandsaw safely, use a hand clamp to hold the blank with the marked side up (*Photo 10*).

The queen design features a coronet topped with a tiny ball. Just as you

turned the ball on top of the pawn, turn a tiny cylinder on the end of the queen a bit longer than the ball and then shape the ball with a spindle gouge. One design variation is to simply omit the ball.

The cross pattée on the king's crown is quite simple to make. Use a parting tool to form a cylinder at the top of the king the size of the cross. Then turn a flat disk for the cross bar by taking parting cuts on each side with a thin parting tool (*Photo 11*). With the piece off the lathe, carefully cut away the excess using a chisel, sharp knife, or a belt sander, leaving only the cross pattée.

Finishing

Better chess sets are weighted to provide more stability. I have used lead shot sealed with epoxy, but pennies work well also. A penny weighs 0.1 ounces, and four pennies are about right for these chess pieces. Washers also work but may cost more. If you choose to add more weight to the larger pieces, you can make the mandrel tenon longer and drill a deeper hole in the blank before turning, creating a larger cavity for more weight. These days, imported chess pieces are typically weighted with a rod of iron or steel. If you go this route, just make sure you size your mandrel and matching hole to closely match the size of the weight. I use epoxy to seal in the weights (*Photo 12*).

Add felt on the bottom to cover the glue and weight and to minimize the clacking sound during play. Felt bottoms also prevent scratching the board. Cut out a square of felt slightly larger than the base diameter and glue with white or yellow glue. Trim with scissors after the glue has dried.

Carnauba wax melted into the wood on the lathe and buffed is a traditional finish but dulls quickly with use. Lacquer is shiny and more durable. I apply lacquer with a brush while turning the lathe's handwheel to rotate the piece slowly. I sand lightly with 400 grit and apply two more coats of lacquer, allowing drying between coats. With each coat, I run the lathe at the slowest speed for a couple of minutes to prevent runs. Using several mandrels helps speed up your finishing. Simply remove the screw chuck with the piece still drying on it from the lathe and set it aside while finishing another piece. Twist the piece onto the mandrel tightly enough to hold it while turning at slow speed. You do need to bother tightening with a screwdriver if the piece is snug.

To dye the darker pieces, I sand the wood to 400 grit and apply an aniline dye mixed with alcohol. I then seal the surface with a brushed coat of shellac. After the shellac-sealing coat, I only need a couple of coats of lacquer.

Good luck turning your heirloom chess set!

*Mike Peace is active in three woodturning chapters in the Atlanta area. He is a frequent demonstrator and regularly uploads woodturning educational videos to his YouTube channel, Mike Peace Woodturning. **Visit Mike's YouTube channel to find a playlist of videos on turning this chess set.** Before retirement, Mike worked as a software project manager. After serving on active duty in the U.S. Army, he continued service in the reserves, retiring with the rank of Lieutenant Colonel. For more, visit mikepeacewoodturning.blogspot.com.*

King's cross pattée



Turn the king's cross pattée by starting with a cylinder on the end and then make parting cuts to create a disk. Carve away the excess after turning to create the cross bar.

A weighted and felted bottom



Glue lead shot or pennies into the bottom for added weight and then glue on a felt base.

Variations on the Knight

The knight, or horse, in the Staunton design, is usually the most time-consuming of chess pieces to make, often with detailed carving. Carved knights are often made of two pieces, a turned base and a separate, carved top. I used this technique when carving the knight in my Russian style set (*Photo a* and page 25). After carving, I cut the knight at the base and drilled a hole to fit the pin on the turned base.

Another variation is to mimic a stylized knight's helmet instead of a horse (*Photo b*). And yet another is to drill a hole through the blank before turning (*Photo c*). Multiaxis turning could also offer an alternative to carving.



Knights are often made with a carved head joined to a turned base with a peg.



An alternative to carving a horse is to represent a helmeted knight, such as the center three in this image. They were turned only, with no carving, except for the visor slots, which were cut with a coping saw.



An unusual knight, made by Doug Korn, loosely resembles a stylized helmet. Simply drill a hole through the blank prior to turning.

Chess Set *Gallery*



**Michael Kehs,
Pennsylvania**
2016, Wenge, sycamore,
tallest: 4" (10cm)

Hayes Rutherford, Indiana
2016, Birch and dyed birch, shellac,
tallest: 3 $\frac{7}{16}$ " (9cm)



**Allan Ferguson,
Washington**

2018, Claro walnut, maple,
Danish oil, tallest: 4 $\frac{1}{4}$ " (11cm)

Based on an 1800s Russian-style
set found in Mike Darlow's *Turned
Chessmen* (Stobart Davies, 2004).

Photo: Hall Brett



Photo: Tib Shaw/AAW

Michael Mode, Vermont

1993, Ebony, purpleheart, persimmon, tagua nut,
tallest (when lidded): 7" (18cm)

AAW Permanent Collection
Donated by Jerry and Deena Kaplan



**Gerald Lawrence,
Mississippi**

2016, Chessmen: walnut and maple; Board: padauk and birdseye maple

Mike Peace, Georgia
2017, Bradford pear, dyed persimmon, lacquer, tallest: 3½" (9cm)
Modeled after a Soviet-era chess set.



**Gidi Azar,
Kuranda, Australia**

2018, Pine, jarrah, OB Shine Juice, tallest: 4¾" (12cm)



**Luke Sellers,
Georgia**

2016, Chessmen: rosewood and maple; Board spaces: birdseye maple and rosewood veneer, polyurethane, tallest: 5" (13cm)

