**Sharpening of Lathe Tools**

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**Introduction**

This section provides beginner-level instruction on how to sharpen each of the most commonly used types of traditional woodturning tools—roughing gouges, spindle gouges, bowl gouges, scrapers, skews, and parting tools. It covers other fundamental aspects of sharpening as well, including types of tool steel, equipment needed, and safety considerations.

Knowledge of how to sharpen lathe tools properly is critical to your success as a woodturner. Sharp tools are safer than unsharp ones; a dull tool will lead a turner to exert undue force against the wood being turned, which can result in dangerous tool slippages, catches, and the like. Also important is that the effective use of sharp tools will reduce tear-out and produce a smoother surface, requiring less sanding of your turned projects than if blunt-edged tools are used. Indeed, some turners pride themselves on how little, if any, sanding of their projects is required in consequence of their frequent sharpening in order to keep tool edges razor sharp. Thus, woodturners should heed this standard advice: sharpen frequently.

Beginning woodturners learn quickly that variety abounds in the methods for accomplishing a given woodturning task. Woodturner Smith, for example, uses a spindle gouge to create a bead but woodturner Jones prefers the skew. Woodturner Brown likes a U-shaped bowl gouge for finishing cuts on the inside of a bowl whereas woodturner Green insists that a scraper works best for that job. Differences of opinion such as these are rife in the domain of tool sharpening as well. We advise that you find a mentor to demonstrate techniques of tool sharpening and provide ongoing advice and guidance. Better: consult a number of experienced woodturners about their sharpening methods. Essential core practices will thereby be reinforced but you will also learn alternative ways of doing things, some major and some subtle, that will enrich your field of experience to draw upon as you gradually form your own sharpening protocols. Sharpening is an acquired skill. As with any such skill—throwing a football, for example, or driving a car or cooking a gourmet meal—the more you practice the faster you will improve, especially if you do so attentively and with informed guidance. Further, bear in mind that CVW owns a large library of books, magazines, and DVDs that include instruction on sharpening, and an abundance of helpful materials may be found online as well.

**Equipment Needed**

**Bench Grinder and Wheels**

A bench grinder fitted with appropriate abrasive wheels is the device most commonly used for sharpening lathe tools. Accordingly (and since CVW uses them for sharpening as well as to teach sharpening skills), this section provides an overview of their use. Be aware, however, that some turners use other types of equipment for sharpening, with excellent results. Alternative devices include wet grinders, which feature a water bath to prevent overheating of the tool steel, and belt grinders that use sanding belts as the operative abrasive surface.

Bench grinders are widely available with ½, ¾, and 1 horsepower motors, and with typical rpm speeds of low (1725), high (3450), low *and* high, and variable speeds from low to high. A ½ horsepower motor will suffice for most purposes but ¾ or 1 horsepower motors are fine as well, and may be advisable if you plan to make heavy use of the grinder for reshaping tools. Many turners prefer a slow-speed grinder in order to minimize the possibility of overheating the tool. In purchasing a grinder, be attentive to the size of wheel that it requires. Typically, grinders are manufactured to use 6-inch or 8-inch diameter wheels but wheels of other sizes are not unheard of. Opinions vary on which size of wheel works best for sharpening lathe tools. Some like larger wheels because in reshaping a tool’s bevel they remove material more quickly; others prefer smaller wheels because they produce a more pronounced hollow grind.

Remove the gray wheels that come with many grinders. These are suitable for sharpening a lawn mower blade, a shovel, or the like, but are ineffective for use on lathe tools. Instead, use aluminum oxide (AO) wheels, or CBN wheels, which are machined from steel or aluminum and coated with cubic boron nitride. Among woodturners, each of these types of grinder wheels have strong proponents. AO wheels are significantly cheaper than CBN wheels but they wear more quickly and so must be dressed to keep them flat, using a diamond-plated wheel truing tool. Sharpening with and dressing an AO wheel as necessary reduces its size over time, which requires adjustment of sharpening jigs and platforms in order to maintain a consistent bevel angle. And, eventually the wheel must be replaced. A CBN wheel, by contrast, does not wear and will last indefinitely. Another difference is that whereas an AO wheel may be used to grind or sharpen many kinds of metal, including high speed steel (HSS), **a CBN wheel should be used only for sharpening HSS; using it to grind or sharpen other types of steel or metal will ruin it**. Also, CBN wheels are noted for running cool; if they are operated at low speeds, as manufacturers recommend, they will not overheat your tool. AO wheels require caution as they can overheat metal. This is especially the case with fine-grit AO wheels. Further, unlike AO wheels, CBN wheels, because of their precise machining, are not prone to wobbling as they rotate on the grinder. Finally, for reasons that will be discussed in some detail below, if you plan to use lathe tools made of powder metal, you will be served better by CBN wheels rather than AO wheels.

Which grits on wheels should be used for sharpening lathe tools? Available options present a large array of choices that will be shaped by your sharpening preferences and budget. Many turners make do with one grinder (two wheels), while some use two (four wheels). Probably, most beginning turners, at least at first, will want to work with one grinder, in which case a sensible strategy would be to purchase one wheel of a rather coarse grit to use for reshaping and producing a rough edge, and one wheel of a finer grit to yield a sharp edge. If purchasing CBN wheels, one could begin with one wheel having a medium grit of 80 and the second wheel a fine grit of 180 (or a superfine of 320). If AO wheels are preferred, 46 or 60 grit would serve well for regrinding to adjust the shape or bevel of a tool, while 80 grit would provide a sharp edge. Or, if the need exists, you could purchase a 46- or 60-grit AO wheel for grinding metals other than HSS as well as for reshaping HSS, and a CBN wheel in 180 or 320 grit in order to produce a fine edge on your lathe tool.

The sharpening station located in the CVW Skills Center includes two bench grinders. One, a two-speed (1725 and 3450 rpm), with a ¾ horsepower motor, is fitted with 8-inch AO wheels of 46 grit and 180 grit. The second, a slow-speed (1750 rpm), with a ½ horsepower motor, is fitted with 8-inch CBN wheels of 80 grit and 180 grit. Two spare AO wheels are stored at the sharpening station: an 80-grit wheel and a 180-grit wheel.

**Sharpening Jig**

Although some turners sharpen tools free-hand on a bench grinder, beginners are advised to use a sharpening jig, which makes it relatively easy to achieve reliably consistent, repeatable results. Numerous commercially sold jigs give good results but a very popular one is the Oneway Wolverine Sharpening System, with the Vari-Grind jig and skew grinding jig. CVW uses this system for teaching beginning woodturners how to sharpen their tools. Accordingly, the focus here is on how to use this particular sharpening system.

The Wolverine system includes two bases, one of which is installed under the left wheel of the bench grinder and the other under the right wheel. Each of these bases will hold, interchangeably, one of two devices—a V-arm or an adjustable platform—that slide forward or backward within the base. The V-arm, used for sharpening bowl and spindle gouges, cradles the leg of the Vari-Grind jig which, in turn, holds the shaft of a tool as its beveled edge is rotated (lightly) against the grinder wheel for sharpening. The adjustable platform, sometimes in combination with the skew grinding jig, is used for grinding flat surfaces such as are needed on a skew chisel, for example, free of a hollow grind. At the CVW Skills Center, Raptor Setup Tools may be used in conjunction with the Wolverine system to determine the precise placement within the base, of the V-Arm, the adjustable platform, or the skew grinding jig, in order to sharpen a bevel at a specific cutting angle of 35, 40, 45, 50, or 60 degrees.

**Hones**

Some woodturners prefer to hone the edges of their lathe tools after resharpening on the grinder in order to create a finer edge than can be obtained on the grinding wheel alone. For this, you can purchase a grinder wheel designed specifically for honing, or a buffing wheel that you would impregnate with a commercially available finishing compound. One can also hone with a hand-held device such as a diamond-plated stone or paddle.

It should be noted, however, that many woodturners do not hone; rather, they sharpen a given tool on a bench grinder and then immediately return to the lathe to continue turning. Turners adhering to this practice view honing as unnecessary because they regard the edge produced by grinding as sufficiently sharp. Also, for some tools, grinding creates a desirable burr on their edges that honing would remove.

Many turners use a hand-held honing device for touching-up a tool edge between sharpenings at the grinder. By honing in this way, they freshen the tool edge but save tool metal that would be wasted by grinding more frequently than necessary. Honing for this purpose typically can be done three to five times before resharpening on the grinder, the actual number of times depending on a host of factors including the hardness and other characteristics of the wood being turned.

**Miscellaneous Sharpening Tools**

You may find it helpful to have on hand a protractor or gauge for measuring bevel angles of tools. Also, a felt-tipped pen for marking the bevel of a tool before grinding is useful for testing whether a platform on the grinder is set properly for the wheel to abrade the entire surface of the bevel. After darkening a tool bevel with a felt pen, the user should position the tool for sharpening and for a moment hold the bevel lightly against the surface of the grinder wheel as they turn it by hand; any part of the bevel not making contact with the wheel will be revealed, which would necessitate an adjustment of the platform. (Keep in mind that in sharpening a tool you are not grinding its cutting edge; rather, you are abrading and grinding down the surface of the bevel in order to produce the sharp edge at its end).

**Safety**

Standard safety advice for woodturners is not to wear loose clothing that could be caught by the lathe’s rotating spindle, chuck, or the piece of wood mounted on it. For obvious reasons, the same advice applies to the use of a bench grinder. Also, turners with long hair should contain it under a hat (or face shield), or pin-up their hair to keep it close to their head. Clothing or hair caught by rotating equipment can lead to tragic consequences.

Sharpening with a bench grinder, regardless of the type of grinding wheel mounted on it, propels miniscule particles of metal into the air. Protect your eyes and lungs by wearing safety glasses and a dust mask. In order to reduce the amount of airborne metal particles and dust, consider mounting a magnet beneath each wheel of your grinder. You should not, however, use a dust collection system for vacuuming metal dust, as this could start a fire.

Ensure that your grinder and the nearby work area is well lit. Some bench grinders have a light bulb mounted on a flexible arm that is affixed to the motor. If your grinder does not include such lighting, consider purchasing a stand-alone light as an accessory.

Before switching on the grinder, ensure that all shields and guards are in place and that tool rests are close to the grinding wheel and securely tightened down. A tool caught by the rotating wheel and carried into the space between it and a tool rest or sharpening platform, is highly dangerous. Also, move away from the grinder and nearby working area any loose tools or objects not necessary for the sharpening operation at hand. Finally, as you switch-on the grinder, stand away from the direction of rotation of the wheel, as it is possible that a wheel, damaged in a way not visible and therefore unbeknownst to the operator, can shatter and send fragments flying.

**The Sharpening Process**

YouTube videos as well as printed instructional materials on how to use the Wolverine Sharpening System in conjunction with Raptor Setup Tools are widely available, but CVW endorses the use of two particular brochures for teaching beginners how to sharpen: “Your Ultimate Sharpening Guide,” produced and distributed by Carter and Son Toolworks, and “The Raptor Setup Tool,” produced and distributed by Craft Supplies USA. For convenience, both of these brochures are embedded in this document. Note also that videos demonstrating the use of these sharpening devices may be found on the websites of each of these companies.

The instructional guidance in these two brochures will set you on the path to success as a sharpener of lathe tools. In addition to basic instructions, the brochures include numerous photographs, charts, and advisory tips to assist the beginner. A number of key points included in them are of cardinal importance and therefore warrant emphasis here:

1) Take special care to ensure that the Wolverine sharpening system is installed so that the distance between the center of the grinder wheel arbor and the bottom edge of the clamping base is 6.25 to 6.50 inches (the Raptor Setup Tools will produce the correct bevel angle only at this distance);

2) Ensure that the leg of the Vari-Grind jig is set to 23 degrees. It should be tightened down securely and remain in this position (even if you do not use the Raptor tools);

 3) In sharpening, try not to overheat the tool. Hold the tool lightly against the grinder wheel. Too much pressure will heat the tool unnecessarily, which can compromise the quality of the tool steel. If your tool does become overheated—you will know this has happened if the edge of the tool turns blue—either set it aside for about 15 minutes to cool or, to save time, quench it in water. Pay attention to the color of the tool edge. If grinding has turned the tool-edge red or yellow, quenching will cause the edge to become brittle, in which case you should air-cool the tool and then slowly grind off the discolored metal and begin again (the edge is the thinnest part of the tool and will be the only part of the tool to have been damaged by overheating).

A cautionary note: As discussed above (under Sharpening Jig), as well as in the two brochures referenced here, the V-arm of the Wolverine sharpening system is designed to accept and cradle the leg of the Vari-Grind jig which, in turn, is tightened down onto the shaft of the tool being sharpened. Some turners use the V-arm in a different way: they place the end of the tool handle into the V-arm and then adjust the length of the V-arm as necessary in order to grind the bevel of the tool. Although photographs and videos demonstrating this way of using the V-arm are widely available online, we urge extreme caution in using this method to sharpen. Experienced turners have found that sharpening a tool in this way can be highly dangerous because of the heightened possibility that the end of the tool may slip off the edge of the grinding wheel. In such cases, fingers can be trapped and forcefully pinched between the V-arm and the shaft of the tool.

**Types of Tool Steel**

**M2**

A beginning woodturner needing lathe tools will find a bewildering variety of brands and types of tools available. In making decisions about tool purchases, it’s probably wise to buy the best tools you can afford. But this raises the question of which tools are best? What are the qualities of a superior tool? Generally, in purchasing gouges, skews, scrapers or other traditional woodturning tools, experienced woodturners avoid carbon tools and, instead, look for ones made of HSS, a type of tool steel formed by heating and tempering the metal under tightly controlled conditions. M2, a HSS known widely for its capacity to take and hold a sharp edge, has become the conventional form of HSS used for the manufacture of traditional lathe tools. Woodturner Tom Wirsing holds that M2 “revolutionized woodturning,” and has been “the most successful steel for woodturning tools for many years.”[[1]](#endnote-1) Despite the popularity of M2 tools, however, their quality can be uneven. Woodturner Cindy Drozda’s explanation of why some M2 tools are of inferior quality is worth quoting in its entirety:

“… heat treating is what gives M2 its edge-holding ability. Proper heat-treating is a very exacting process involving heat, temperature, and time. Top quality tools made from M2 HSS are accurately heat treated according to precise specifications. Heat treating can easily be done poorly or improperly. A low quality M2 tool might have the correct alloy composition, but not have the edge holding performance that it would have gotten from proper heat treating. This is why when we buy “off brand” (usually low cost) turning tools, sometimes we get a good one and sometimes we don’t. What we get with top brand premium M2 tools is an alloy of the correct composition that also has been properly heat treated. This usually comes at a premium price. The easiest way to lower tool manufacturing costs is to make them in less developed countries and skimp on the heat treating.”[[2]](#endnote-2)

Drozda’s comments help us to understand the experiences of one woodturner who sometimes tests the quality of M2 HSS tools of Chinese origin and finds that “occasionally one is excellent, usually they are adequate, and frequently they are awful.”[[3]](#endnote-3) Putting aside this turner’s failure to distinguish between “usually” and “frequently,” his central point is clear enough: the quality of M2 tools manufactured in China or in other settings where quality control standards are sometimes not high, is uneven. Thus, in shopping for M2 tools, exercise caution and seek the advice of experienced woodturners. As Drozda suggests, a comparatively low price for a given tool can be a strong marker of the poor or uneven quality of that brand. Be wary, for example, of the quality of a set of a half-dozen or so off-brand M2 tools that can be purchased for one-third to one-half the price of a single tool manufactured by one of any number of reputable, well-known firms with manufacturing facilities in Sheffield, England. These include, for example, Henry Taylor, Robert Sorby, and Crown.

This discussion should not be read as a condemnation of M2 tools specifically or “cheap” tools generally. For, despite widespread commentary in woodturners’ online forums and blogs, and elsewhere, in which turners extol the pleasures of using superior tools made of high-performance steels that take sharp and durable cutting edges (about which more below), many woodturners report satisfactory and even fine experiences using tools of brands often disparaged as “cheap.”[[4]](#endnote-4) In purchasing tools, beginners must strike a balance among numerous factors including the tool brand’s reputation for taking and holding a sharp edge, their budget, and their tolerance for risk in spending money for a tool that ultimately may prove unsatisfactory.

**Beyond M2: Newer Tool Steels**

In recent years, the emergence of improved forms of HSS as well as innovations in the manufacture of tool steels have expanded possibilities for woodturners in search of high-quality lathe tools. Some manufacturers of conventional M2 tools have increased the hardness and wear-resistance of their tools through cryogenic treatment of the steel, which entails subjecting it to extremely cold temperatures as one stage of the manufacturing process. Tools made of this form of HSS, which is referred to as “Kryo,” feature significantly greater edge sharpness and durability than tools made of conventional M2.[[5]](#endnote-5)

Meanwhile, altogether new alloys as well as innovative manufacturing processes have led to the emergence of tool steels that take a sharper, more durable cutting edge than is possible with M2. Newer tool steels gaining popularity among woodturners include M42, and also M4 and A-11, which are powder metal steels (sometimes referred to as “particle metal” steels). An advantage of powder-metal manufacturing is that it enables the production of tool steel in which, at the molecular level, all elemental ingredients of the alloy are evenly distributed throughout. A detailed description of the chemical composition and molecular structure of these tool steels lies beyond the scope of this document, but a brief characterization of the main features of each will help readers distinguish one from the other. M42, as an alloy, includes many of the same constituent elements as M2, albeit in differing proportions, but its main distinguishing feature is the inclusion of 8 percent Cobalt, which increases the hardness of the alloy. According to one comparative test, the sharpness of the edge that M42 steel will take, as well as its durability, equals or exceeds that of all other tool steels.[[6]](#endnote-6)

M4 includes a relatively high proportion of Molybdenum, which results in tools with “excellent wear resistance, toughness, and strength.” A-11 steel, by contrast, includes a high proportion of Vanadium (at nearly 10 percent, more than double the amount in M4), which imparts to the steel “extremely high wear resistance” and “high impact toughness.”[[7]](#endnote-7) The quality of these tools is also enhanced by cryogenic treatment, as described above, and multiple highly regimented heat treatments.[[8]](#endnote-8)

It should be noted that improvements to the quality of lathe tools, as discussed above, are costly. Generally, you should expect to pay more for tools made of the newer steels than for ones made of M2.

**Sharpening Powder Metal Tools**

Manufacturers as well as end-users of powder metal tools routinely employ a host of grand superlatives to describe their quality and performance. They report that the cutting edges of these tools wear well and require far less frequent sharpening than is the case with tools made of more traditional steel tools. But the prime virtue of powder metal tools—that they take an exceedingly sharp and extremely hard and durable edge—can make sharpening them difficult; it requires an abrasive that is harder than the metal being sharpened. Wirsing argues that the advent of CBN grinding wheels has solved this problem:

“most conventional grinding wheels are unable to sharpen particle-metal tools to a keen edge. That’s why conventional wisdom says we cannot get particle-metal tools as sharp as HSS tools. But that’s no longer true—enter cubic boron nitride (CBN) grinding wheels.”[[9]](#endnote-9)

Drozda’s experiences are consistent with Wirsing’s observation. She finds that users who sharpen A-11 gouges and scrapers with CBN wheels “will love their performance.”[[10]](#endnote-10) Accordingly, if you anticipate using A-11 or M4 tools, plan to purchase a CBN wheel or two.

**Getting Started**

The CVW membership includes highly-experienced woodturners who are willing to help you learn how to sharpen lathe tools. They will provide advice and guidance on sources of tools and preferred grinds, and will demonstrate and give hands-on training. To arrange a meeting or work session with a CVW mentor, contact Jim Oates, Director of the Denny Martin Woodturning Skills Center at CVW.

**Further Reading**

A good place to begin as you look for further reading about sharpening is the “Resources” section of the Central Virginia Woodturners website.

Most books about woodturning include a section, if not a full chapter, on sharpening lathe tools. A few representative examples: Patrick Speilman, *The Art of the Lathe* (New York: Sterling Publishing Co., Inc., 1996); *Fundamentals of Woodturning* (East Petersburg, Pennsylvania: Fox Chapel Publishing, reprinted 2007); Richard Raffan, *Turning Wood with Richard Raffan* (Newtown, Connecticut: The Taunton Press, 2008); Keith Rowley, *Woodturning: A Foundation Course* (East Sussex, UK: Guild of Master Craftsman Publications LTD, Reprinted, 2000); and Dave Regester, *Woodturning: An Individual Approach* (East Sussex, UK: Guild of Master Craftsman Publications LTD, 2000). All of these are available in the CVW library.

A volume devoted specifically to sharpening (also available in the CVW library), is Ron Hock, *The Perfect Edge: The Ultimate Guide to Sharpening for Woodworkers* (Cincinnati: Popular Woodworking Books, 2009). It includes a chapter on tool steels as well as another devoted specifically to sharpening woodturning tools.

“Sharpening Turning Tools: Selected Readings from *American Woodturner*: *Journal of the American Association of Woodturners”* (2014), available online at mnwoodturners.com, is a collection of sixteen highly informative articles on a wide array of topics relating to sharpening, including safety, sharpening jigs, grinder wheels, and honing.

Also helpful is *Getting Started in Woodturning: 18 Practical Projects & Expert Advice on Safety, Tools & Techniques, Selected Readings from American Woodturner, Journal of the American Association of Woodturners* (Nashville: Spring House Press, 2014). See, especially, the following chapters: “Learn to Sharpen All Your Turning Tools,” “Sharpening Jigs,” and “Grinder Wheels.” Also, note that chapters in Section 2, on “Tools,” suggest grind angles as well as methods of sharpening for each type of commonly used lathe tools.

A wealth of helpful information on sharpening lathe tools and equipment for doing so is available on the websites of companies that sell woodturning supplies. Look for written descriptions of their products, as well as videos on their use. Examples follow, in no particular order (this is not a comprehensive listing): Craft Supply USA (woodturnerscatalog.com); WoodTurners Wonders (woodturnerswonders.com); TWS The Woodturning Store (thewoodturningstore.com); Packard Woodworks Inc. (packardwoodworks.com); Thompson Lathe Tools (thompsonlathetools.com); D-Way Tools (d-waytools.com); Oneway Manufacturing (oneway.ca); and Carter and Son Toolworks (carterandsontoolworks.com). Three general woodworking supply houses that market turning equipment are Lee Valley (leevalley.com), Highland Woodworking (highlandwoodworking.com), and Woodcraft (woodcraft.com).

**Endnotes**

1. Tom Wirsing, “Modern Steels and Grinders,” *American Woodturner* (June 2018), 38, 41. [↑](#endnote-ref-1)
2. Cindy Drozda, at cindydrozda.com, “M2 Steel Tools vs. 10V Steel Tools.” [↑](#endnote-ref-2)
3. Alan Hollar, sawmillcreek.org, Forum> Woodworking by Hand and Specialties> Turner’s Forum> Thread: “How often should I expect to sharpen my tools?” (02-23-2016. For further helpful commentary on the issue of the quality of M2 HSS manufactured in Sheffield, England versus that of M2 tools manufactured in China, see Don Orr, sawmillcreek.org, Sawmill Creek Woodworking Community> Woodworking by Hand and Specialties> Turner’s Forum> Thread: “Is all M2 created equal?” (01-29-2008). [↑](#endnote-ref-3)
4. As but one example, see aawforum.org, Forums> Woodturning Forums> Woodturning Discussion Forum> “Turning Tool Steels” (Oct. 4, 2017-Oct. 29, 2017). [↑](#endnote-ref-4)
5. YouTube video, “Comparing Woodturning Tool Steels,” woodturnerscatalog.com, Craft Supplies USA, January 4, 2017. [↑](#endnote-ref-5)
6. YouTube video, “Comparing Woodturning Tool Steels.” [↑](#endnote-ref-6)
7. Griggs Steel Company, griggssteel.com> PM A11 High Speed Steel. [↑](#endnote-ref-7)
8. The content of this and the previous paragraph relies heavily upon the following: Wirsing, “Modern Steels”; 38-39, Drozda, at cindydrozda.com, “M2 Steel Tools vs. 10V Steel Tools”; Craft Supplies USA, Video, “Comparing Woodturning Steel Tools”; Sawmill Creek, sawmillcreek.org> Forum> Woodworking by Hand and Specialties> Turner’s Forum> M42 lathe tools compared to …,”; and Horizon Technology, horizontechnology.biz, “Powder Metallurgy and Sintering Processes 101: 6 Fascinating Facts (March 19, 2020). [↑](#endnote-ref-8)
9. Wirsing, 39. [↑](#endnote-ref-9)
10. Drozda, cindydrozda.com, “M2 Steel Tools vs. 10V Steel Tools,” “Sharpening,” “How Do I Choose between M2 Steel Tools and 10V Steel Tools?”; and “Here’s My Recommendation” (Note that Drozda refers to “10V tools”—these are proprietary versions of A-11 manufactured and marketed by Thompson Lathe Tools). Also informative on the superiority of CBN wheels for sharpening A-11 steel, is sawmillcreek.org> Sawmill Creek Woodworking Community> Woodworking by Hand and Specialties> Turner’s Forum> “Is CBN simply worth the extra cost?” [↑](#endnote-ref-10)