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technology



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- Turn: Les Thorne creates a stand for his wife's jewellery



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Welcome

The picture above shows UK Squad trainer Christian Notley floored by the achievement of the three young men, only one of whom, after a valiant nail-biting fight, will be representing his country at WorldSkills in August. Spoiler alert here: our cover star Edward Harringman, pictured far left, said: "Being selected for WorldSkills São Paulo 2015 is an incredible honour for all of us, and is something I've been working towards personally for over two years. I'm not sure I would be as hungry for success and driven to be the best I can be if it wasn't for exposure to competitions – and I would love to bring back the gold medal." Read about the selection, **p50**, then consider how important this competition is to the future of fine woodworking in the UK. *Good Woodworking* and sister magazine *The Woodworker* are pledged to support this competition, surely the benchmark of best practice for young woodworkers. Elsewhere I talk to an artist who uses laser-cut wood in his designs, **p66**, we look at the intricate carving of a Rajasthani family, **p62**, Michael Huntley makes drawers, **p30**, Martin Aplin recreates a Prairie House table, **p34**, and Mike Jordan constructs a windowed cottage door, **p41**.

Andrea Hargreaves, Editor



Andrea Hargreaves
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Consultant Editor



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Consultant Editor

We endeavour to ensure all techniques shown in *Good Woodworking* are safe, but take no responsibility for readers' actions. Take care when woodworking and always use guards, goggles, masks, hold-down devices and ear protection, and above all, plenty of common sense. Do remember to enjoy yourself, though.

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July 2015

Tools • Projects • Techniques • Advice



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Off to Brazil

Andrea Hargreaves watches the final nail-biting hours of the contest to choose the young man who will represent the UK at August's WorldSkills

Cover photograph by Mark Cass

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7 Piece Screwdriver &
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Blade runner

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...for the garden

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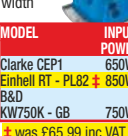
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CBG6RSC	HD	150mm	£47.99	£57.59
CBG6SB#	PRO	150mm	£49.98	£59.98
CBG6RWC	HD	150mm	£54.99	£65.99
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Bosch	1400	0-55	£74.99	£89.99

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RAGES1	55mm	79mm	£868.444	£269.00

*FURY power: 1500W (110V available)
*RAGE power: 1800W/230V (110V available)
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CS5400C	90w	550-1600	£99.98	£119.98

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Good Woodworking News

from the bench

Comment, insight, views and news of woodworkers from around the globe



Festool launches cordless saw

Festool is expanding its 18V cordless range with a compound mitre saw system, the HKC 55, which comes with a 5.2Ah battery pack and brushless EC-TEC motor. It is designed for work such as roofing.

The new FSK trimming rail comes in three lengths, and an integrated rubber spring automatically brings the saw back to the starting position ready for more cross-cutting.

For convenience and safety it is equipped with a hinged cover. An internal lever causes the pendulum hood to slide back, providing a clear view of the saw blade and enabling easy sawing, even when performing mitre cuts. The cross-cut, rip-cut and fine-cut saw blades are designed for fast changing thanks to the FastFix system. The starting price is £326.40. For more info go to www.festool.co.uk/hkc

Triton T12 range expands

Equipped with the latest Mabuchi motors and robust, all-metal gearing, Triton's T12 compact tools are powered by two 1.5Ah Li-ion Samsung-cell batteries. The included 1-hour charger delivers a 30-minute charge to 80% capacity.

Built-in LED worklights provide clear visibility in murky conditions, and moulded grips allow easy handling and control over extended periods.

The T12DD drill driver (£129.33 inc VAT) features a 10mm ($\frac{3}{8}$ in) removable single-sleeve keyless chuck and provides 22Nm torque with 17-stage

torque adjustment for a variety of materials and screw sizes.

The T12ID impact driver (£139.99) delivers 90Nm of sustained torque and 3000 impacts-per-minute, and the 6mm ($\frac{1}{4}$ in) hex bit holder allows rapid, single-handed bit changes.

The T12AD angle drill (£108.95) delivers 18Nm of torque through the 90° drill head with low-profile Sanou 10mm ($\frac{3}{8}$ in) keyless chuck.

Featuring a variable speed of 0-3,400spm with 12.2mm stroke length, the T12RS reciprocating saw (£107.12) comes with uni-directional blades suitable for single-handed operation, or bi-directional blades for higher speed 2-handed operation can be fitted. Benefits include easy tool-free blade change and a $\frac{1}{2}$ in universal shank to suit a wide range of saw blades.

The T12OT oscillating multitool (£108.63) features precision metal gearing and blade mounting, with variable oscillating speed from 6,300 to 16,000opm with six graduations.

For more info visit www.tritontools.com



Build your perfect plane

Axminster Tools & Machinery has just introduced a new and innovative range of Veritas bevel-down bench planes. The range, which is made in Canada but put together to make complete planes in the UK, is exclusive to Axminster and allows the craftsperson to select from a number of different components and build their own unique plane.

There are two blade options (O1 and PM-V11), six variations on a rear tote, three for the front knob and three for the frog. Number crunching the figures reveals that there are 108

different options that could be applied to just one plane. Multiply that by the five planes in the range (Nos. 4, 4½, 5, 5½ & 7) and it equals 540 different permutations. Plane parts can be purchased online at axminster.co.uk or from one of the company's seven stores. Once potential users have selected the components (body size, blade, frog, front knob and rear tote), trained staff at AT&M will assemble the customised plane. It can then be taken away from a store or will be dispatched. More info on

www.axminster.co.uk



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irwin.co.uk

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The Felder UK team on the mezzanine level of the new showroom and training centre

Felder opens new training centre

Huge success last year has fuelled Felder Group UK's growth and development with the opening of a state-of-the-art showroom giving its Milton Keynes HQ an extra 500sq ft in which to show off some great new machinery.

At an opening ceremony in April attended by Sales and Marketing Director Hansjörg Felder who had flown in from Austria, and UK MD Matthew Applegarth, Felder UK showcased a new extended showroom with a mezzanine floor, office and training centre.

The facilities are equipped with the latest technology, compressed air specialists Air Power UK providing the air supply and Woodwork Dust Control Company the dust extraction. The renovation also includes a brand new kitchen, boardroom table and reception desk, which were manufactured by Felder customers Edward Williams Furniture and Greenacre Property Ltd.

Edward Williams' owner Adam Howe commented: "The new

showroom is bright and effective and lets you focus on the machines. The whole renovation project has come together and the showroom looks amazing."

The first customers to use the new training facilities have recently purchased a Format 4 profit H08. Mr Bloo Ltd manager Ian Parkinson said: "The training is very interactive and we can't wait to use our H08 once we are back at our workshop."

On a more homely level Mark Kilroy treated himself to a C3 31 Comfort combi machine with which he has made kitchen components, a desk and a veneered chest of drawers. He said it was a decent and reliable saw with an amazing planer and spindle. "Doing it well is really important and this machine has enabled me to push myself to become better at what I do. With most machines there is always something that lets it down, but this one has no vices and is easy to operate."

For more info visit www.felder-group.co.uk or call 01908 635 000



Students at Peter Sefton's Furniture School learn on Felder's Hammer machines. Peter said he was very impressed with their engineering quality. The range includes the K3 panel saw, the F3 spindle moulder, the N4400 bandsaw and the A3 41 planer/thicknesser



The new reception desk shown off by Felder's Abra Nkrumah at the launch party was made by Edward Williams Furniture



Mark Kilroy with his combi



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10 Fine bowl turning (Axminster)

14 Pen making (Axminster)

16-17 Beginner routing (Axminster)

17 Pen making (Sittingbourne)

21-22 Beginner woodturning (Sittingbourne)

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3-4 Beginner woodturning (Axminster)

5 Pyrography (Axminster)

7 Sharpening with Tormek (Sittingbourne)

13-14 Beginner routing (Axminster)

24-25 Wood machining (Axminster)

28 Intro to turned boxes (Axminster)

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4-7 Veneering & laminating

10-11 Sharpening

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Showtime in Brighton

The list of big-brand exhibitors who will be at Tool Show 2015 at the American Express Stadium, Brighton on 25 and 26 July is staggering, from Bahco to Wera, and from Makita to Milwaukee. Bosch, for example, along with other companies, promises great show deals and an excellent array of mains and cordless power tools – watch out for its charging system. Expect to see lots of new tools and machines, like Fein's range of multitools that is getting its first airing at the show. You could also get a chance to win the new DeWalt 18V collated screwgun, and enjoy pitchside – this is the home of Brighton & Hove Albion FC after all – masterclasses from Festool and DeWalt.

Oh, and we'll be there too, along with sister mag *The Woodworker's* Editor Mark Cass, who



Busy scenes from last year's show

is threatening to make something while you look on, and will be sharing tips.

The show is being staged by the city's own tools, fixings, repair, workwear and hire company, PR Industrial. For more info go to www.prindustrial.co.uk

Anarchy in summer

New English Workshop, a group of professionals and enthusiasts passionate about furniture making, are repeating last year's summer school success with a different take on building the Anarchist's toolchest.

Once again Chris Schwartz will be building with only hand tools one of the lightweight chests with which woodworkers of old practised their craft, but says it will be a new version on an old theme. Joining him will be Deneb Puchalski, Roy Underhill, David Barron, Tom Fidgen and Peter Follansbee. There are courses to suit the genuine first timer on limited funds up to advanced practitioners looking to hone their skills. To be part of the hand-made revolution visit www.newenglishworkshop.co.uk and book a place at Bridgwater College, Somerset or Warwickshire College from 13 to 24 July.

Jorvik turners help injured troops

Jorvik (York) Woodturners have been working alongside the Phoenix House Recovery Centre in Catterick. This specialist centre is run by the charity Help for Heroes and forms part of the Defence Recovery Capability. The project was driven by Help for Heroes volunteer Chris Morgan who runs the recovery centre.

The club has been helping to set up the Woodshed woodturning shed at Phoenix House. The new workshop will provide a setting where injured troops and veterans can

work towards gaining woodworking skills and qualifications which may help them forge new careers. Part of the project involved renovating an old Axminster M950 lathe.

Earlier this year, the club approached Axminster for some spare parts for it and fortunately these were still available.

Axminster donated these to the club, enabling them to continue renovating the lathe ready for use.

The hard work and efforts of Chris Morgan and the Jorvik volunteers came to fruition when the opening ceremony was attended by the Master of the Worshipful Company of Turners, Colonel John Bridgeman.

Chris, together with three Jorvik volunteers, will supervise the workshop. Professional turners including Tony Wilson and Margaret Garrard have also pledged their support to provide assistance with the training.

Such has been the success of the project so far that there is now talk of other Woodsheds opening at Help for Heroes recovery centres in Colchester and Plymouth.



Interior of the new Woodshed

OFFCUTS

Warwickshire College furniture crafts students' work can be seen at the college until 3 July between 10am and 4pm on weekdays, with a preview evening on Friday 26 June, 6-8pm.



Silverline has been appointed official tool supplier of the Red Bull Soapbox Race, which returns to the UK on 12 July with an Industrial Revolution theme. The event takes place at Alexandra Palace, London and is expected to attract a global audience of 20,000 watching 70 teams race homemade soapboxes



The Turners Company is offering talented UK-resident turners bursaries worth up to a combined value of £10,000. Turners whose work is well regarded are invited to put forward a clear plan of how the award would advance their work, the boundaries of the craft of turning and raising the profile of the craft. For more info go to www.turnersco.com

New wood apprenticeship standard

James Latham and Proskills UK Group are to lead the development of a new wood apprenticeship standard as part of the government's Phase 4 Trailblazers – groups of leading large and small employers within a sector who work together to develop new apprenticeship standards.

The group will be chaired by Piers Latham and the new apprenticeships will be employer led and focused on quality. They will be graded on completion to mark the level of achievement.

Jonathan Ledger, Managing Director of Proskills UK Group, said: "It is fantastic that so many Wood employers have decided to lead the way in developing this new breed of apprenticeships. Employers are by far the best source of technical expertise and strategic direction needed to design the best apprenticeships for their industry."

Good Woodworking Free Reader Ads

Machinery

DeWalt DW1251 radial arm saw, excellent condition, hardly used, includes legstand, buyer collects, £250

David Banks, Cheshire ☎ 01606 551747

Scheppach Basato 3 bandsaw, 6in depth of cut, 13in width of cut, used lightly by hobby turner to cut mainly bowl blanks, as new condition, spare blades, £250

Davey, North Oxfordshire ☎ 07707 242948

Scheppach planer/thicknesser HMS 3200 CI, 12in cast-iron tables, very little use, perfect working order, possible delivery, £600

Mr K Hambridge, Warwickshire ☎ 01675 464074

Hand tools

Blades/cutters for Stanley 45 plough plane, prices on application

K Kay, Lancashire ☎ 01772 613044

Woodworking hand tools, various prices, collection only

Mrs M Cooper, Leicestershire ☎ 0116 278 3264

Woodturning

Graduate bowl lathe, c/w Axminster chuck, Varispeed, sundry faceplates, etc, £550 ovno, buyer collects

Franklin, Cambridgeshire ☎ 01353 663949

Coronet Major lathe, 30in between centres on metal stand with many extras, tools and wood, hobby use only, £350 ono

FW Bates, East Sussex ☎ 01424 882775

Record CL2 36-18 wood lathe plus bench, new condition, Axminster chucks, set Ashem Crafts rounding & trapping plane for chairmaking, set Record turning chisels, collet chuck system set, £500 **Mr JF Hall, Kent** ☎ 01304 268836

Miscellaneous

250 Good Woodworking magazines 1995 to 2007 mostly in sequence, mint condition, £20

Mr LJ Hall, Derby ☎ 01332 512228

Woodworker annuals, 1947-1949, 1951-1955, Volumes 60-69, 70-79, 80-89, 90-91, slight tears on dust jackets, good condition, sensible offers only please

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▲ The bench stone has plenty of surface area for honing chisels and planes



▲ The bench stone proved flat when tested with this pre-flattened chisel

The Trend diamond bench stone has been my 'go to' stone since I first reviewed it 10 years back. Those stones are pricey

though, so this new range, called Diamond Cross thanks to their relief pattern to help move the slurry and swarf, has been designed to offer the same more durable monocrystalline diamonds, but at a lower cost.

It offers stones suitable for honing small tools as well as a bigger 8 x 2 1/2 in bench stone that could interest those looking for a way into diamond honing of chisels and plane irons without breaking the bank – but it does have a cut-price construction compared with my trusty stone of old.

The Diamond Cross plate is a 3-part construction with a precision-ground tool steel core with two thin stainless steel plates

bonded with different grits of 1000 fine and 300 coarse diamonds equivalent to 15 and 50 microns.

However, this stone quickly raises a wire edge as well as backing off and polishing the backs but I guess the questions will be about durability and flatness compared with the original. The first is tricky to test in a short space of time, but checking the flatness against a chisel pre-flattened on my original Trend showed it to be of equally decent stead, maintaining the same flatness.

The smaller and more specialised stones all have a somewhat tacky small handle or two bolted to them, but each of the 1.5mm-thick stainless steel diamond-bonded plates is cut out to include lugs that are sandwiched by the plates and prove to be pretty useful.

I found the longer double-handed file type especially useful for going over a bigger edge where working over a stone is difficult; it worked a treat on my adze.

Conclusion

If you are looking for a good range of diamond honing options at an affordable price then Trend has hit the mark. The only issue is the durability of the diamonds to the stainless steel plate, but with a 3-year warranty on all the range, you have plenty of time to find out!

Good The Woodworking Verdict

+ Various profiles available; finger grips on smaller hones; big area on bench stone
– Finger grips look a little cheap; time will tell for durability

Rating ★★★★★

Typical price: £18.95 for smaller hones; £59.95 for 8in bench stone

Monocrystalline diamonds
Grit sizes in coarse and fine
Stainless steel plates

Prices

Our product prices reflect typical values as we go to press. We cannot guarantee these prices, though, and thoroughly recommend that you shop around.

How we rate...

- ★ Don't get your hopes up or your wallet out!
- ★★ Well, it works but really needs improvement
- ★★★ Performs well, but you will find better
- ★★★★ Great performance and value for money
- ★★★★★ So good, even Andy would get his wallet out!

Top performer it may be but Andy's in a bit of a quandary

Er, where does it fit?



▲ A top slider switches between the gears; max speed is nippy



▲ A worklight is activated by pulling the trigger



▲ Constructing some decking with 100 x 6mm screws was a breeze

Milwaukee's 18V platform comprises standard brushed machines and the brushless Fuel range so this new model is a bit of an oddity: it has a brushless motor but is not a Fuel tool. However, this is still a top performer built to the same external tank-like robustness.

The difference may be in the gearing: Fuels boast all-metal construction and the internal gearing here may not be.



▲ There's a single collar to switch between drill and torque control



▲ An auger into beech didn't stall the drill but it needs a side handle!

It doesn't shirk its responsibilities at the chuck end though; this is a 13mm-capacity all-metal single sleeve keyless version, and of excellent quality. The drill also has Milwaukee RedLink circuitry to monitor and optimise the drill and battery to prevent overload while still maintaining performance.

At only 174mm long this drill is pretty diminutive, the brushless motor trimming the length down but still able to put out 60Nm of torque.

With its second speed of 1800rpm it's no slouch for drilling smaller-diameter holes, and in its lower 450rpm gear it will drill 38mm holes in timber so it is good for chippies fitting Yale-type cylinder door locks for instance. It will also drill up to 13mm in steel, but this particular model is drill driver only; there's no hammer function although there is a slightly longer version with identical specifications that includes the hammer function.

The variable-speed trigger is responsive and it also acts as the switch for the bright worklight.

It performed well piloting and running in screws up to 100 x 6mm gauge on a decking and fencing project, and a swift change to a 30mm Forstner was equally impressive in both hard- and softwood.

Switching to a 32mm auger in beech showed the need for a side handle as the torque generated on the low speed is enough to pull and twist the drill from your grip, but it certainly is good testimony to the power it generates. Softwood was easier and I could control the pull without the high wrist strain.

Conclusion

This drill sits well if you want technology without increased weight, but with some trade-off of overall drilling capacities in timber. But is a standalone drill/driver valid nowadays? Before impact drivers, a drill/driver for the fastening work alongside a combi drill was more commonplace, but now the market seems to go for combi drill and impact packages the drill/driver could be a harder product to shift with the inclusion of the Milwaukee combi drill in the same configuration, and I'd err towards that just for the extra versatility. Either way, Milwaukee has a compact, powerful, well-made and competent drill here.

The Good Woodworking Verdict

+ All metal chuck; brushless motor for longer runtime; bright worklight

– Drill/driver functions only are limiting; description of metal gear casing implies internal gearing may not be; no side handle

Rating ★★★★★

Typical price: £179.00 (body only)

Weight: 2kg with battery fitted

Speeds: 0-450, 0-1800rpm

Chuck capacity: 13mm

Torque: 60Nm

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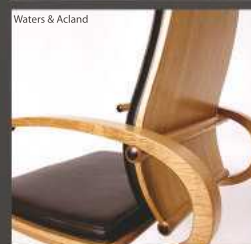


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Bearing up well

Designed for light use, this machine nevertheless sports some good engineering

Falling into the price band that errs towards affordability over robustness, Charnwood has a range of three saws sharing identical components and design to suit both budget and capacity needs.

You still get a good bandsaw for your money, and a good blade – far too often companies make do with a cheap one that comes with the saw, only to get complaints that the saw doesn't work properly.

The one fitted on all three of these is British made, and in my testing of the biggest model it made short work of the 175mm-thick oak off which I sliced a few 3mm-thick veneers without struggle.

Aluminium features heavily in its build, from the band wheels to the guide post and fence assembly so this saw will be more at home in a less demanding environment. The two bigger machines are targeted as Light Trade and the entry level one as Hobby.

Double bearings

The main difference over any bandsaw I've looked at over the years is the use of double bearings for the side support. This now gives four bearings on the upper guide, and it's replicated below; this is a decent feature as the lower guides are often more simplistic. By doubling up the bearings the blade has additional support on wider blades to minimise any twist as you turn tighter corners as well as better support on standard straight cutting.

Adjustments are a combination of small knobs and hex key. I thought these to be a little on the small side for a really good nip up to ensure the settings remain constant, more so for older or less strong fingers.

The guide post itself has a double-function locking knob, the internal ring acting as the lock, with the outer adjusting the height accordingly. This works well, although the overall quality of all the adjusters is where cost savings have been made, plastic being used instead of nylon.

Blade tensioning is the now almost standard tensioning wheel and tracking knob backed up with a quick-release tensioning lever for fast blade swaps. You have to remove the fence running rail to remove the blade but the wingnut release below it makes it a doddle to do so, so you can swap a blade in a matter of a minute or so.

Good The Woodworking Verdict

+ Twin roller bearings; worklight; neat dust collector; two speeds

– Light build; cheap plastic knobs

Rating ★★★★★

Typical price: £579.00

Max cutting depth: 225mm

Throat width: 340mm

Motor: 1100W

Blades: 6mm-25mm

Cutting speeds: 800 & 370mpm

Weight: 75kg

Web: www.charnwood.net

Through the doors

A basic indicator needle shows the tension as a ballpark figure, which can be read through a small window in the upper door so you don't need to open it to check the setting.

A look inside the upper door reveals a spoked aluminium wheel with a small spring and bracket to tension the blade; certainly not as beefy as some, but about par for this price band.

Open the lower door – both are micro-switched for safety while working with them open – and the



Charnwood BS350 Premium bandsaw



▲ A neat feature is the use of double bearings for blade support



▲ Twin trunions support the table and allow quick angle setting



▲ This post allows the table to be set perfectly square to the blade



▲ A tensioning lever allows fast blade swaps



▲ Tensioning can be assessed with the indicator



▲ You can check the setting through the viewing window in the top door



▲ Initial tensioning is achieved with the top adjuster



▲ The height post is set with the double-function knob



▲ The fence rail removes easily for blade swapping



▲ The blade dealt with oak consistently and cleanly



▲ As an indication of the collection feature, this is from one rip cut



▲ Using the basic mitre fence it's very easy to cut a tenon in a minute or so

lower wheel is linked to an external knob that slackens the drive belt for a second speed option when working in other materials. It also reveals a neat feature shared by all three saws in the range: slots in the bottom of the saw allowing the dust to drop into a small drawer in the base.

The rear dust port has a cover cap to keep the dust within the base so that it drops into the drawer if you don't use an extractor. It does a decent job although there was a bit of dust on the floor.

A further handy feature common to all the saws is the switchable worklight on a handy flexible stem. The final area to consider is the cast-iron work table. This is flat and well finished with mitre slots for the supplied mitre fence, which along with the sliding fence allows a variety of cuts to be easily made. I did a few quick tenons to check out both fence options and was pleased enough with the results although there is some play in the mitre slot as the fence isn't of top-end

standard, but is sufficient for general use.

The slots aren't standard though, so an aftermarket fence won't fit if you are looking to upgrade.

Conclusion

So although not the heaviest of builds out there, nonetheless the Charnwood pulls its weight and comes up with decent performance, but it needs to be looked after in the more robust light trade environment for which it is badged as suitable.

They have the technology

Being given the opportunity to see how Irwin makes its saw blades was right up Andy's street. Better still, he had to travel to Italy to see the setup!



Initial work starts with flat plates that are laser or plasma cut to the correct parameters

Irwin enrolled the manufacturing expertise of saw blade specialists FLAI to make its premium blades in Udine, north-east Italy, taking control of the facility around three years ago, and has invested in new and specialist own-designed machines; around 60% of the machinery has been installed since the acquisition, with around \$10m of investment.

Responsible for designing many of the blades is Ken Hall who guided us around the process.



This machine runs a tensioning ring into each blade to keep its tracking true

It all starts with the steel, bought in from Germany as plate thicknesses and widths to suit specific blade diameters and designs. The factory's 35 or so employees turn out around 1.2m blades per year.

First, the blades are cut to their respective diameters, arbor bores, tooth count and additional work such as expansion slots and resin holes for sound deadening, on CNC-guided plasma cutting machines or the newer and quicker laser cutters.

Once the blades are cut, each is put through a machine that presses a groove into them. This gives the blade tension under load, but still needs to be checked for true to prevent it wobbling or binding as it cuts.

Each type and diameter of blade needs a different tension ring position as well as different pressure to get it right and it took around seven months of researching to come up with the data to get each blade correctly tensioned.

The process of running the groove imparts a minute dishing to the blade, so each is assessed for true, a display indicating any anomalies after the laser has scanned it. Then it's down to the expertise of the operator to fine-tune any discrepancies with a deft tap or two of a planishing hammer to tweak it to within the tolerances set up.

A further check for trueness on another machine shows any imbalance around the blade edge, which is again deftly managed by grinding away minute amounts to balance it before it moves on to the next stage.



Blades go onto this machine to check them for true after tensioning

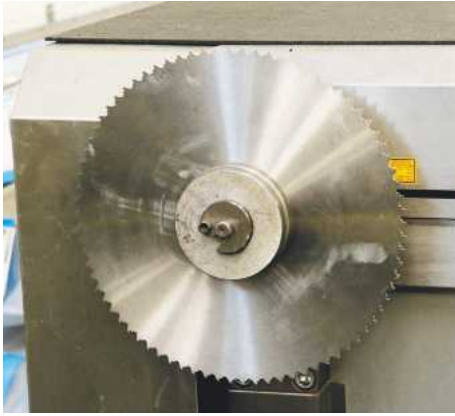
Tipping the blades

Tipping the blades is next with either a direct weld or brazing used to achieve the bond, with differing types of tips utilised depending on the material that the blade is designed to be used on.

There are some big investments here with a new machine costing around €250,000 sitting alongside some of the older ones, but capable of faster and more complex operations.

I asked why some blades were brazed while others were welded, a technology that was ported over from tipped bandsaw blades. Ken explained: "Brazed teeth allow for a larger grain of carbide which is ideal for stationary machines where resharping can be important. Welding is a stronger bond so is more effective on handheld machines where blades are seen as a more disposable item."

Irwin saw blade manufacture



Close up of blade on machine



A laser reads to blade surface indicating any minute anomalies, shown up on screen as a different colour



The skill of the workforce then comes into play by tapping the blade to address any irregularity



If you need to know anything about saw blades, Ken Hall is your man! Here he's talking Teflon

Sharpening & profiling

Irwin has also invested heavily in tip sharpening and profiling. Alongside older machines that grind the tips in a more basic style, newer fully automated robotic-armed machines were spinning and moving the blades through the machining processes to make all the grinds that set up a blade for a particular cut.

If the blade is to be a standard bare metal finish it goes through aluminium oxide blasting and cleaning processes to clean off any oxides and to remove the discoloration from the brazing and welding process for a uniform and bright finish.

Elsewhere, other blades go into a huge carousel for the Teflon coating and baking process, Teflon helping prevent resin build up, helping to dispel heat build up and being a brilliant rust proofer.

This particular area of the factory was off limits to my camera, but we were allowed to go inside where a huge snaking train of blades was slowly weaving its way through the unit to gain their slick coatings.

Although the blades go into the Teflon plant unfinished, complete with oxides and other contaminants on them, the facility does a pre-wash, scrub and steam-clean operation before the Teflon is sprayed on. It takes around two hours for each blade to go from its bare



No, not an industrial washing machine, but an oven for annealing the blades

metal state to emerge in the bright Irwin blue Teflon coating.

The blades are tempered in an annealing oven over 18 hours, then left to cool overnight. This process is to balance the steel as it has localised hardening from the laser and plasma cutting processes that make the steel brittle in key areas such as the gullets.

Blades on test

A small woodworking workshop is used to check blades. While I'm pretty *au fait* with the usual tooth pitch, geometry and what they are designed to do, there was one that was new to me. Although it was an alternate top bevel, as is the standard for the majority of blades we



Each tip is induction heated to form a solid bond to the blade



Various machines tip the blades, some more complex than others in their ability

use on a daily basis, this one has a really sharp almost needle point, akin to a fleam-sharpened handsaw.

Pushing through both melamine board and cross-cutting veneered MDF, the finish was so clean and free of chipping and feathering it looked like it had been planed rather than sawn.

It's here where you see the true investment, with such a high-quality finish within the blades' construction as well as from the finish and performance they achieve.

I came away with a new insight into how high-quality blade manufacturing revolves around embracing technology, using quality materials and attention to detail; all are in abundance here.



Close up of a blade being ground

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Basa 5.0	Professional	457mm / 305mm	-20° to +47°	3.8 / 4.9	£1,662.50	£1,995.00
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** Basato 4.0 (Go online for full details) is designed by Scheppach in Germany but made in China where Scheppach resident engineers oversee manufacturing quality control. Scheppach Basato 4.0 bandsaws has a 2 year warranty. All Scheppach bandsaws have been sold and serviced in the UK by NMA since 1972. Go to nmatools.co.uk and see what users say about NMA unprecedented service.

Good Woodworking Solutions



I've recently been chatting to a company that specialises not so much in building illusions as making the improbable real, and the part that wood plays in its work, about all of which more next month – with luck and a following wind. During the course of the conversation, however, one of the points made was that, “things don't need to be what they appear to be,” which, when you think about it, is the charter for creativity that underlies all sorts of woodworking practices, from veneering or using man-made boards for carcassing, say...



Dave Roberts, Consultant Editor

A higher plane?

To hiding secret drawers and compartments in bureaux. In a similar way, it's tempting to think of the fluidity of the 'cloth' represented in linenfold decoration on panels as the freehand work of a wood carver, but received opinion seems to be that, from the outset, the addition of this design has been more of a cabinetmaking operation. Just as panelling (or wainscoting) began to be 'productionised' in the 15th century through the development of frame-and-panel construction, so the use of moulding planes made the creation of linenfold reliefs more a matter of machining than craft.

Its relative ease and speed of production may go some way to explaining why it featured so widely in north European woodwork between the 14th and 16th centuries. Or then again, maybe people just liked it: perhaps linenfold was the perennially popular Laura Ashley print of its day? After all, oak, in which linenfold was frequently used, has a distinctive grain that suggests the play of light on a woven fabric; moreover, oak – especially when it's figured with medullary rays – doesn't require the level of detail that's needed to bring, say, a fruitwood's grain to life, meaning that linenfold is a relatively simple way to create a striking effect. And 600 years later, the router has only made that effect even easier to achieve.

Drape made easy

Now, I've read an account explaining how linenfold's peaks and troughs can be built up on panels using a large-diameter cutter to create the hollows and crests, a dovetail cutter to undercut the folds, and a V-groove bit to chamfer edges. After removing the waste from



Linenfold created courtesy of Wealden Tool Company's cutters

around these folds, their ends then need to be shaped with chisel and gouge to complete the impression of loosely gathered fabric.

Juggling act though it sounds, this combination of cutters affords complete freedom in designing variety into those folds, but when applied to solid timber panels it's also a process that commits you to reducing a lot of that timber – quartersawn oak, perhaps, if you're after maximum stability and brightest figuring – to woodchips. And if you're making folds that are, say, 10-12mm deep, that's quite a lot of heat and wasted material. The alternative would be create the moulding in thinner stock and then glue it to the panel, but it's still a procedure that involves a lot of bit-swapping, setting out and handwork – drawbacks, as some would see them, that are neatly resolved by the linenfold cutter from Wealden Tool Company, the Kent-based producer of router and moulding plane cutters



Too good to burn: rescued from the bonfire, this desk pedestal scrubbed up quite well, and the freshly applied workshop livery doesn't look too bad against the wall's new paint, either, don't you think? It's gone from '70s office to '80s Docklands

(www.wealdentool.com).

Intended for use in a router table, Wealden's linenfold cutter (T2931, available with either 8mm and 1/2in shanks) combines the effect of the wide and V-profile bits above in a single profile that will mould strips of material 3in/76mm wide; along with the cutter come templates and instructions for making the necessary jigs to trim the ends of the strips – though there's nothing to say you can't cut them square – and, using its linen radius cutter (T2932), shape the ends of the mouldings to complete the 'gathered' effect.

While Wealden's profile won't create the dramatically undercut fold produced by a dovetail cutter – though with a little thought this could be selectively applied in a further pass over the table using a second bit – the beauty of Wealden's approach is that the strips its cutter produces can be made quickly, then butted together to build up a run of linenfold of the required width, and glued to the panel; Wealden suggests using odd numbers of strips to build up the effect, but it'd also be possible to introduce narrower strip to break the step of a long run of linenfolds, and so avoid too obvious a repetition of the pattern. Moreover, while the mouldings can be made from solid timber, there's nothing to say that the panel itself can't be a man-made material veneered to match the strips.

In fairness, Wealden Tools would be the first to point out that this cutter isn't the newest profile in its extensive catalogue, but it's new to me, and – simple soul that I am – I'm always excited to discover a tool for a job that I haven't yet thought of trying.



A few bob for some new handles, a bit of elbow grease – it's the stuff that early evening television is made of



The second pedestal in preparation: the carcass's materials and construction – three-layer ply, solid timber edging (rather than tape), and veneer – are visible here

Waifs & chipboard strays

I'm not sure who Andrea had in mind last month when she referred to, 'hoarders of offcuts and strange stain experiments in jam jars' in her leader, but I'm sure that I heard something that sounded rather pointed ricochet around my own workshop walls while I was messing about with my latest piece of 'hoardage'.

Living as I do not unadjacent to some business units whose tenants change from time to time, I'm sometimes amazed by what appears on the farm bonfire. The latest jetsam was a pair of three-drawer pedestals and a desk top, the sort of oak-veneered furniture that's been the unremarkable mainstay of office decor for decades. What struck me, though, is the soundness of its construction: 3-layer particleboard edged with 1/2in oak, and veneered with bookmatched leaves of oak. The



The drawer boxes are tidily built from drawerside ply with machine-cut dovetails and Blum runners

drawer boxes, meanwhile, are made of drawerside ply (hardwood ply the grain of whose layers runs in the same direction rather than alternating), are fitted with Blum runners, and have fronts of hefty birch ply and more oak veneer.

OK, so it's only mass-produced officeware, but these pieces, which had been thrown out, are not only in good shape even after a period of service and their unceremonious dismissal, but better made than some of the things I've seen being carried into homes let alone offices. What interested me most was the particleboard (or chipboard, or whatever it's called this week): the three-layer variety has a core of coarse strands that's sandwiched between two layers of finely chopped particles bound – and here I refer to my copy of Jackson & Day – in a resin so as to create a surface whose smoothness and stability makes an ideal veneering substrate. It is, as the venerable Ernest Joyce said in the late 20th century, a 'valid material in its own right, well worthy of new methods and applications'. Some things are much more than what I lazily supposed them to be.

Suffice to say, I invited this homeless furniture back to my workshop where – for the price of eight castors, half a dozen drawer handles and the labour required to effect a few repairs, convert the desktop into bases, make a pair of new tops, and prepare the whole lot for painting to match my workshop livery – they're ready to do robust service as moveable storage units for more of my stuff.

And did you notice that I managed to tell you all that without saying 'upcycling'. Go me.

Sound principles

The watch phrase for dealing with drawers is 'one at a time', advises **Stephen Simmons**

Having fitted new bracket feet last month, I'm going to concentrate on the drawers this time. They are the heart of the matter and as they take a lot of stick their restoration has to be robust and based on sound principles.

But first, it's always best to reduce the number of loose pieces whenever logically possible. As I had a lovely old but rather fragile strip of mahogany for one section of side facing, that was the obvious candidate. The original facing was glued rather than pinned and so to follow suit gluing and clamping it had to be. G-clamps are ideal: they're far more effective than using clumsier sashes over the width of the cabinet side (**Pic.1**).

When working on drawers deal with one at a time: it saves a lot of clutter and avoids the risk of mixing the parts; note their position should they be the same size, especially the top left- and right-hand ones.

Seeing what you've got

There can be more constituent parts to a drawer than first meets the eye. Here there

Tip

When dealing with a complex project attention to detail is just as important as keeping your eye on the big picture. A good example is the method of fixing the cockbeading. Here it was just glued but sometimes it is pinned, or both, or fixed with pointed oak pegs, known as coaks. Always fit replacements as per the original.



▲ Little things matter: you don't meet coaks everyday but replace like with like when you do; note the mitre



▲ Pic.1 G-clamps: the right tool for the job but keep them well padded, even on the inside of the carcass



▲ Pic.2 Back to the future: likely originals are so much more elegant than Victorian replacements

► Pic.3 Vacuum power: the rub-joint is a wondrous thing for fixing runners, in one length or a number of shorter sections



were nine elements: the two linings (sides), back, front, slide-in base, runners, cockbeading, handles, escutcheons and locks.

The greatest relief was that the only things not needing attention – apart from cleaning – were the escutcheons, and I had decided from the outset not to bother about replacing missing locks.

Logic suggests that worn runners should be tackled first because, like the carcass, dismantling is involved. However, it's worth investigating the knobs/handles sooner rather than later so that you can start looking for appropriate replacements. You'll get clues about the originals in the form of holes for various forms of fixing and impressions of their outlines, hidden here behind the Victorian knobs. I was lucky to have some suitable candidates of exactly the right size and quality in pewter and brass... but only four. At least I knew what I had to look out for (**Pic.2**).

Drawer runners

All the drawer runners were worn and needed replacement; some were so bad that the drawers were jamming in the stops. When runners wear so do the drawer linings and it's always easier to build them up with the drawers dismantled. All but one drawer needed dismantling and these could be tapped apart quite easily but a couple needed water injecting into the joints to dissolve the glue. A bonus was that each bottom was only secured with a couple of pins and slid out readily after removal.

The best order of work is to build up the drawer linings first, reassemble front, back and sides and then slide the bottom back into place straight away so that everything is pulled square before the glue cures. The new runners are fitted last.

I find replacing drawer runners eminently satisfying. There's nothing more complicated



▲ Pic.4 Simple but effective: bent pins make excellent mini-clamps and after removal...



▲ Pic.5 ...wax the new runners so that they glide from the outset



▲ Pic.6 Utilitarian as well as decorative: there's a missing section of cockbeading to the left of the dead butterfly...and note the ghastly handle botch



▲ Pic.7 45° for security: new sections of beading are better fitted with a scarf rather than just butted; corners are mitred

than a rub joint in the angle formed by the bottom and sides, a little less than a right angle if a thick bottom is chamfered to fit into a narrower rebate (**Pic.3**).

The originals varied between a single length of oak and several short sections butted together which are much easier to work as rub joints. Don't be tempted to use pins rather than glue as the permanent fixing; you'll only be storing up trouble for the future as inevitable wear sets in and the pins begin to protrude and gouge.

Clamps and cockbeading

There is, however, a way of using pins as temporary clamps. Make some small squares of ply with a fine hole drilled through them, drill more holes through the runners themselves and when they are glued into place drive pins through the holes into the drawer bottom but bend the heads over onto the ply to apply pressure.

When the glue has cured remove the pins with pincers, illustrated here from a different

project (**Pic.4**). The remaining pin holes in the runners are immaterial and will soon fill up with beeswax or candle wax when you wax the runners (**Pic.5**).

Cockbeading is the protective strip round the drawers (**Pic.6**). It's advisable to work on it after the runners as it can get damaged when dismantling the drawers, but I treated myself to a few sections beforehand on the one that could remain intact (**Pic.7**). As last time, I like to splice in new sections at an angle of 45° for a more secure fit. I also like to fit them slightly proud and plane them down, only forming the rounded profile when the glue has cured. Colouring and polishing can be left until later, certainly after cleaning the drawer fronts, to ensure that you match to the right colour.

At long last...

With the drawers all but complete – I still only had four replacement handles – the end was in sight. To form the section of moulding for one side and the front of the base I used a scratch-stock rather than a router or moulding planes,

a decision based purely on personal preference and aptitude; use what you feel most comfortable with in similar circumstances.

I also decided to re-veneer the whole top rather than patch the original; it was too badly damaged and could be re-cycled for other projects. With animal glue, a steam iron and a veneer hammer there was no need for any form of clamping. Such a large area can be quite challenging as a first project; it's something that needs practice but it's not impossible and is definitely worth aspiring to.

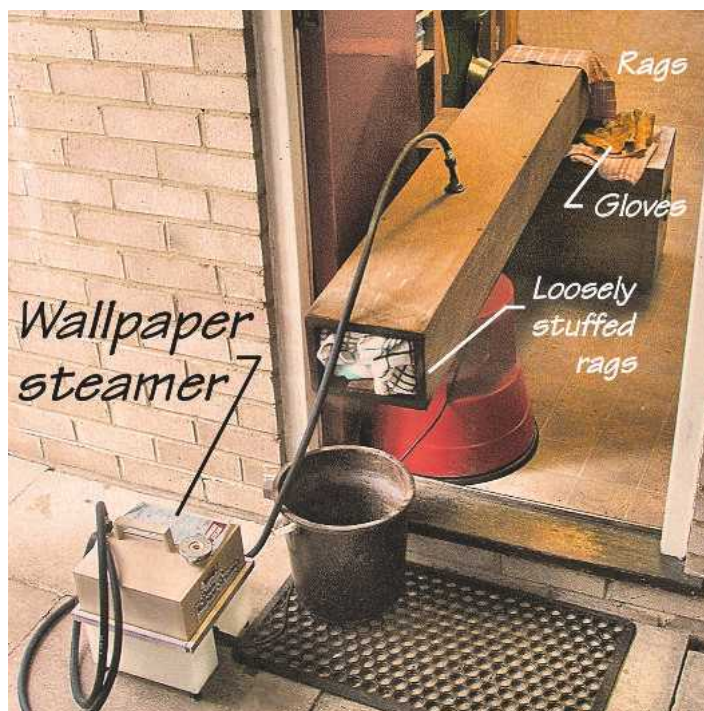
The whole project took seven years which isn't as daunting as it sounds. There were long periods of inactivity including a full 18 months while we packed up the workshop and moved to France... and remember that full-time professional restorers need to get out and do something else in their free time.

Next Month

Stephen looks at the restoration of animal and god figures

Bend it like Jeff

Jeff Gorman's chair-making project provides an exercise in steam bending



▲ Pic. 1 Working in the workshop doorway keeps most of the steam away from the tools

Bending the legs and rail of my design-as-you-go chair was a straightforward job (GW206:26), but making and obtaining the supporting kit took more time than the actual bending. Although my steaming chest (Pic.1) was made from 20mm water and boil-proof plywood, I could have used almost any poor heat conductor that could safely contain steam at atmospheric pressure.

I happened to fit the steam supply tube into a plumber's tank connector, though directly poking it through a snugly fitting hole would have served quite well. A pair of transverse bearers support the work and allow good circulation of the steam.

The guide for steaming time is roughly ¾ hour per inch of thickness (1.8 minutes per mm). To be certain of thorough heating, I allowed 1½ hours for the 1¼ in (32mm) diameter workpieces.

Bending principles

When a beam is bent, the material on the inside of the bend is compressed while the outer side is put under tension. Steam heating or boiling

Tip

Be safe — never use harmful fluids in anything that could possibly be mistaken for a drinking vessel.

(not wetting) certain woods render them compressible, but not stretchable. To prevent the outer fibres of some bends (like Windsor chair backs) from breaking out, they need to be pressed together by some means, though this is less essential on mild bends such as mine.

Bending in practice

To preserve the heat, the job needs to be done as swiftly as possible. When working single-handed on the earlier chair, I lost time while struggling with two G cramps needed to hold down the two curved blocks intended to hold down the fibres on the outside of each bend.



▲ Pic. 2 Hold the bending jig in the vice with a longitudinal batten screwed to its underside



▲ Pic. 3 The central divider helps to fold the webbing round the legs

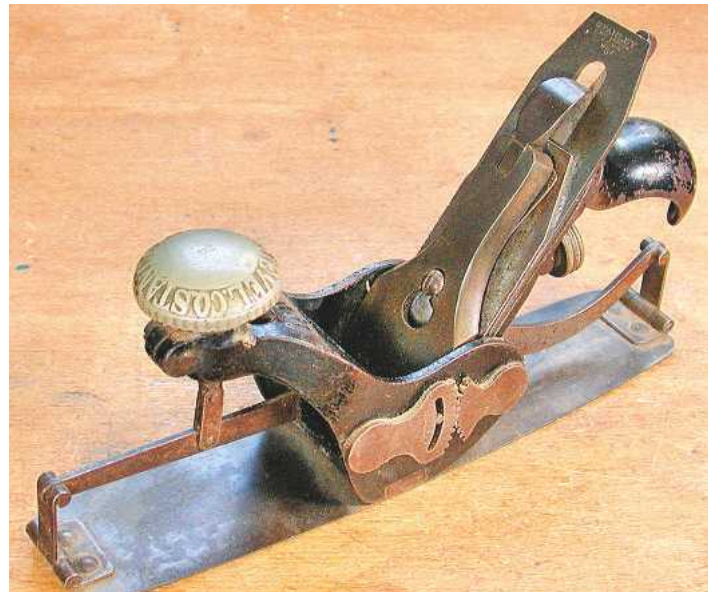
This time, I decided that since the tension on these fibres should not be very great, I'd try applying pressure to the bend by using a ratchet cargo strap (Pics.2 & 3).

Bending jig

Pic.3 shows how the central divider controlled the webbing. Screwing the ratchet mechanism to the jig helped to keep things under control. The webbing — which in the photo has gone a bit awry — wraps right round the jig, passing through a gap in the batten fixed to the jig's underside. The bending drill simply involves donning water and heat-resistant gloves, fishing



▲ Pic. 4 Here Jeff bends the steamed rails against a former



▲ Pic. 5 His Stanley 113 compass plane was made between 1912 and 1918



▲ Pic. 6 Adjusting this plane involved both hands as he worked

the legs from the steamer, slipping each under the strap, passing them through the fixed block (Pic.2), tightening the webbing, fitting the loose pad, bending the pair by operating the G clamp and then checking the tightness of the strap.

Bleaching

When the ash had thoroughly dried, I found that it had acquired a green tint that I removed by brushing with a mild wood bleach consisting of a solution of three teaspoons of oxalic crystals to 100ml of hot water. Oxalic acid is a well-known standby for other workshop jobs such as cleaning cramp and other stains from tannin-rich timbers such as oak, but being labelled 'harmful' it needs to be used with care (see the Information box, left).

The effect was not immediately observable, so I left the legs to dry and found that the green tint had disappeared while apparently having little effect on the colour of the ash itself. I found that the wood surface had acquired a coating of fine crystals that had to be washed away with plain water, otherwise sanding would have liberated the crystals into the air.



▲ Pic. 7 On the unfinished chair, spacing the back spindles raised an arithmetical problem

Back rails

There's not a great deal to report about the bending – Pic.4 almost says it all. Prior to steaming, the stuff was planed to size. I decided I could use the G clamps without protective pads since any marks from the metal shoes would be planed out when the rail ends were thinned to fit the leg mortises, or removed with the oxalic acid.

Pic.5 shows my compass plane smoothing the raised grain on the concave surface. Actually I mostly used it on the outside of the bend to taper the ends to fit directly into their mortises. As the taper developed, I found that I needed to modify both the setting of the front knob and the cut as I worked, and had to be careful not to turn the knob when I pressed down on the plane's toe. I sharpen the blade with the usual 30° sharpening angle.

Tip

To draw the curves on the back rail former, get somebody to bend a thin lath while you draw around it. Also, overtightening G cramps can permanently distort the frame.

Drilling for back spindles

Using a pair of dividers and starting with an estimated setting, I repeatedly walked the points from the left-hand tenon shoulder marks, adjusting their span until the final step landed on the right-hand shoulder, thereby dividing distances a-b (or c-d) in Pic.7 into six equal parts. This simple technique has, to some minds – and as you can readily see – the defect that when these points are used as hole centres, the outer spaces turn out wider than the others by half the diameter of the spindles.

I'm quite happy with this, but had I wanted even spacing, I would have calculated the distance a-b minus five times the spindle diameter, and divided the result by six. Let's say the result was 'X'mm. Starting from say, the left, I would have set out Xmm, then the spindle diameter, moving along Xmm again and so on.

Information

Previous Chair – <http://www.amgron.clara.net/projects/Chairs/TomSuttonChair.htm>

Oxalic Acid MSDS – http://ptcl.chem.ox.ac.uk/~hmc/hsci/chemicals/oxalic_acid.html

Next Month

Fine tenoning as Jeff's chair nears completion



No pressure...

The two Ds, dovetails and drawers, usually equate to Ds for difficult, but follow **Michael Huntley's** exercise and it's really not so bad...

There is a goodly number of ways that drawers are made. In historical terms one can often date a piece of furniture by the drawers. I am going to try to describe some of the varieties starting with the simplest – and oldest – and finishing with modern construction. It may take a couple of articles! But once you can make a carcass as described in GW293, then probably you would like to put

some doors on it or some drawers in it. Hinging doors will be covered in the future, but for now let's make a simple old-fashioned drawer.

Construction history

The earliest drawers were not really drawers but little compartments in coffer that were called tills. As coffers developed into chests with carcasses, compartments appeared with

larger openings divided by rails into which a small box could slide. Those boxes were actually drawers. Early drawers either sat on a floor of boards or were hung with a groove in the side that fitted into runners nailed to the carcass. The drawers themselves were usually nailed together, the sides being rebated into a thick front. Runners were sometimes added underneath to raise the drawer up above the

Dovetails & drawers



▲ Pic.1 Planing edges square on shooting board and, inset, showing bowed timber



▲ Pic.2 Marking tails



▲ Pic.3 Marking thickness of pin board on tail board



▲ Pic4 Cutting tails



▲ Pic5 Cutting shoulder of tails

Woodwork foundations



▲ Pic.6 Marking pin board



▲ Pic.7 Measuring thickness of tail board



▲ Pic.8 Transferring tail board thickness to pin board



▲ Pic.9 Marking perpendiculars on pin board

Tails or pins?

If you have already studied the making of dovetails you may have an opinion about which should come first, pins or tails. Well, I trained as a restorer and sometimes we had to cut replacement pins and sometimes replacement tails. It was no good saying, "Oh, I can't do it that way!" When teaching students I cut tails first because tails are easier for the beginner to visualise. You cannot pull a wedge-shaped tail through a hole; therefore you cannot pull the tail out. That is the purpose of dovetails, to be unable to pull the tails through the holes in the other board. Therefore, when pulling a loaded drawer out you won't pull the drawer front or the drawer back off the drawer side. In design terms dovetails are used to hold two components together mechanically.

boards and front carcass rail.

By 1700 large dovetails were being used to join the sides to the front and back. The drawers began to be fitted onto runners beneath the drawer sides and because the side grooves were no longer needed, drawer sides themselves could be thinner.

There was a problem though: even when you put a moulding or veneer on top of the 'through' dovetail it was still likely to show through. The answer was lapped dovetails, in which the tail is housed into the drawer front.

There is also an issue about drawer bottoms. In the early days they were nailed on. By the 18th century they were being rebated into the sides, the runners often being glued onto both the side and the bottom boards. There was still an issue about shrinkage though. The thin but solid bottom boards would shrink and pull away from the edges of the drawer. That was solved by gluing the drawer bottom to the front, running it in grooves on the sides and

fitting it to the drawer back in such a way that it could expand and contract by having the screws holding the base to the back in slots. In that situation the drawer boards ran from left to right not front to back.

In designing drawers you need to consider whether they are flush with the surface of the carcass or proud, perhaps to allow a finger grip on the underside of the drawer front or as a decorative feature because the drawer fronts are of particularly nice timber. Sides are usually about 12mm, backs a bit less and fronts about 20mm. Bottoms are 4 or 6mm ply these days but used to be solid. Cedar was used to repel the moths.

Your first drawer

As a first drawer, if you don't already have a carcass, why not try making a drawer to fit an existing opening in a chest of drawers that you do have? That way there is no pressure, it is just an exercise to get used to the techniques.



▲ Pic.10 Sawing waste with coping saw



▲ Pic.11 Cleaning up pin board

You can throw the practice pieces away.

Cut out the drawer front and bevel it slightly so that it will sit in the aperture without falling out. Cut the drawer-sides so that they just fit halfway. Don't forget to allow for any lap. The first drawer to make is a simple one-tail dovetail. There are lots of rules for setting out dovetails but as an introduction just make up your own proportions. It is better if you have a dovetail gauge, but it is not essential. The proportions are 1:8 for hardwood and 1:6 for softwood. As long as they match you could use any slope from 1:5 to 1:8 so don't be a slave to formulae.

The front and sides must be square (**Pic.1**); you can see in the inset picture that I am using an old veneered drawer front. This is because I like recycling and someone knocked apart a chest-of-drawers and left it for me on their drive. I would have preferred it if they hadn't smashed it apart but they thought that they were helping! Anyway, it serves to display some of the issues found in drawer making. Note that it has a top lipping which needs to be taken account of when designing. Also it is seriously bowed. This is what happens if you veneer on one side of a board and not the other. The veneer pulls the board into a cupped shape. Anyway, I ripped it back to cut off the cupping, but left the lipping for restoration practice.

Marking & cutting

Don't spend ages marking it up, but get into the habit of trying to cut a single dovetail in five minutes at the start of each day, date the dovetail and throw it in a bin. After a few weeks of doing this you can get them all out and see how much you have improved.

Mark the slope of the tail; cut a decent distance from the top edge, 20mm in my case (**Pic.2**). Do the same 20mm from the bottom edge. Set a gauge to the thickness of the front and mark all round, (**Pic.3**). Use a small square to take the lines over the end and mark the

slopes on the back. Set the side in a vice and cut the sloping tails down to the gauge line (**Pic.4**).

Then cut the shoulders (**Pic.5**), using a fine-toothed crosscut saw. Take care with your sawing; the dovetail should fit straight from the saw.

You now want to mark the pins from the tail board (**Pic.6**). It is customary to rest the tail board on a plane edge, but you could use any dead true surface. Line the shoulders up with the edge of the pin board over tight by a whisker. This will pull the joint up tight. Put a heavy weight on the board and mark with a pencil.

Set the gauge to the thickness of the tail board and transfer the line to the pin board (**Pics.8 & 9**). On the pin board, drop perpendiculars down to the gauge line (**Pic.9**). Saw down the perpendiculars with a fine rip saw, then cut out the waste with a coping or

piercing saw (**Pic.10**). Using a large chisel, clean up the waste (**Pic.11**). Don't try to go back to the gauge line in one chop, but creep up on it slowly until you are more practised at chisel work. It is OK to under-cut slightly in the middle of the board, but not at the outside faces. Finally, assemble your first through dovetail (**Pic.12**). Note that to get the lipping flush I would need to house out the top of the side board of my prospective drawer.

Now cut off the tails and pins and practise it all over and over again to give you lots of sawing practice.

NEXT MONTH

Michael makes a lapped dovetail drawer with more tails and pins, which is the modern way of doing things.



▲ Pic.12 Large old-fashioned dovetail assembled



Down on the Prairie

Martin Aplin makes a hall table that was inspired by the American Prairie Houses of Frank Lloyd Wright

“Make a small table in the style of Frank Lloyd Wright please,” we demanded of Martin, with typical (lack of) clarity. A quizzical expression leapt to his brow: “Who?”

For those in the dark, Frank Lloyd Wright was an early 20th century American architect, probably best known for designing the Guggenheim Museum in New York (completed, after his death, in 1959). Only that modernist style of design wasn't what we had in mind. Instead we were referring to Lloyd Wright's much earlier work, namely domestic residences, that came to be known as Prairie

Houses. We don't have any such houses here in the UK or Europe, but in the New World (America, Australia, and New Zealand particularly) the Lloyd Wright Prairie House style captured imaginations and would be copied and modified over and over.

There's a hint of the Victorian villa in the Prairie Houses, but they are typified more by being long, low buildings with shallow, sloping roofs, covered terraces and porches. They further differ from villas by being ostensibly open plan – arguably the first open-plan buildings. They can be differentiated from Modernist houses by virtue of their comfortable, almost stately interiors. The style

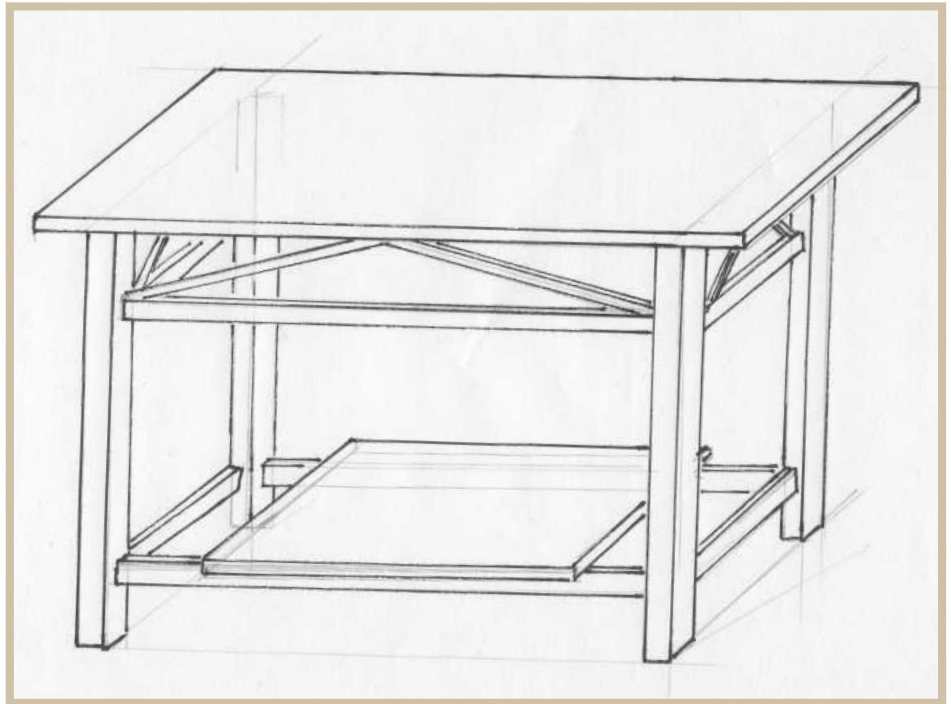
was often referred to as 'organic'.

While to find out all this was helpful it still wasn't the 'steer' we were looking for. Fortunately it turns out Lloyd Wright was one of those architects who also designed the interiors of his buildings, right down to the furniture. And so, thankfully, there are plenty of examples of Lloyd Wright-designed furniture to draw inspiration from. Like his houses, his furniture also seems to be a matter of long and low with shallow angles, clean in line, almost like Modernist furniture, only made using comfortable, warm timbers such as cherry.

So there we have it. We wanted an occasional table, probably in something that



▲ Pic.1 Draw the table out full size on a sheet of faced hardboard to produce a rod to aid the setting out of joints



▲ Pic.2 Edge-joint the boards for the top with a rubbed joint. Apply glue to one edge which then needs rubbing against the mating part



▲ Pic.3 Cramp the boards together, alternating each side to equalise the cramping force

approximates cherry, echoing the styles seen in comfortable middle-class American houses in and around the 1920s. Martin, can you give us what we want?

Architectural furniture

I can only try! The nice thing about a small console or hall table like this is that it fits in well with the modern home, matching up well with contemporary furniture. You can see aspects of Lloyd Wright's style in the strong rectilinear lines of my table; the comparatively large overhang of the table-top and the shallow roof pitch-line is echoed in the angled rails fitted between the rails of the frame.

One feature I have seen on some items of Lloyd Wright furniture is what I refer to as the collars, around the legs at mid rail level. They are often fitted around the legs at lower rail level but I thought this broke the line too much so decided not to fit them. I have also added more construction detail to the article as an encouragement for readers to attempt the table yourselves. It is quite straightforward but needs attention to detail, especially when fitting the leg decorative rails and collars.

Timber choice

I chose American cherry as was suggested earlier because of its warm look, the colour

being a salmon pink when first cut but soon darkening to a nutty brown, a fascinating transformation. It also has an interesting and attractive grain and is quite easy to work, though it can have a habit of splitting.

Cherry is quite expensive compared to say oak or ash, which I feel are too coarse-grained for such a light table as this. It is twice the price of oak or ash but as only about 1.5 cubic feet is needed for the table, the price was reasonable.

The problem with using cherry is that much of the sawn stock is good on one face only, with a fair amount of sapwood on the reverse. It is worth spending some time going through

The big project



▲ Pic.4 Having planed the legs to size, clamp them together and mark the positions for the joints



▲ Pic.5 The positions for the mortises were clearly scribed out with a mortise gauge



▲ Pic.6 Although the mortises are quite small, the bulk of the timber was removed with a drill



▲ Pic.7 Cut the mortises to finished sizes using chisels. The mortises will break into each other as they are cut into adjacent faces on the legs



the stock and looking at each face to select the best boards and minimise waste.

Having transported the timber home, the first task I like to handle is passing the boards through the planer/thicknesser, just enough to clean the boards up. This allows me to see the grain and any small defects and I can plan where to cut the boards.

Draw the table full size on a piece of board to produce the rod; this enables you to check the overall dimensions of the piece and is a valuable aid for setting out the positions of the joints.

The table-top and shelf...

... were made first, mainly so that after gluing-up it could be set aside while I worked on the table frame, allowing it to settle before finishing. Plane the boards, leaving them slightly oversize to allow for planing after gluing up, making sure the edges of the board are truly square to the faces. Lay the boards

◀ The rails and collars echo the roof lines and cornices seen on Lloyd Wright's Prairie Houses



▲ Pic.8 Having cut the joints, glue the front and rear frames together, being careful to ensure squareness



▲ Pic.9 Join the front and back rails together with end rails. Use a cramp across the diagonal to keep the frame square



▲ Pic.10 Carefully sand the infill rails to length and to the correct angles. Make sure the table is set square to the sanding disc

“ I have added more construction details to encourage readers to attempt the table ”

flat and arrange for best grain pattern, remembering to keep the growth rings alternating to minimise risk of cupping.

I jointed the boards with a simple rubbed joint, which means simply applying glue to one edge of a board, then rubbing the edge of the adjacent board against it to spread the glue. You soon feel more resistance to the movement as the glue is absorbed into the wood, causing suction which then pulls the boards together.

Cramp the boards together, making sure the faces of the boards are aligned. Alternate the cramps above and below the boards to equalise the cramping force.

When the glue is dry, set aside and finish in stages. I prefer to plane and scrape to finished size over a period of days, allowing the stresses in the board to stabilise, giving myself the best chance of keeping the table-top perfectly flat.

Legs and rails

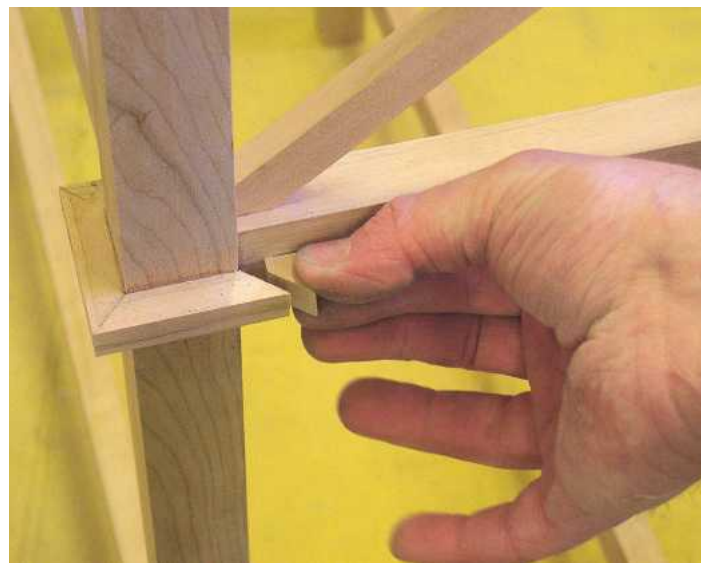
Next, it's time to tackle the legs, which are just lengths of cherry finished to 32mm square by 740mm long. Mark out the vertical positions of the mortises from the rod then scribe the mortises centrally



The big project



▲ Pic.11 The infill rails are inserted in pairs, and hold each other in place while the glue dries



▲ Pic.12 Prepare the segments around the legs on the disc sander using a mitre fence to ensure the segments fit neatly together

on adjacent faces, the width of these being 8mm. Although the joints are quite small, I find it easier to remove the bulk of the waste using a pillar drill, cleaning up the joints with chisels. As the mortises are meant to be cut from adjacent faces, allow them to break into each other.

Having cut the joints, I finished the legs by tapering the inside faces of the lower legs, which adds a little visual interest. It's not a feature I've seen on other Lloyd Wright furniture, but our interpretation is flexible.

The main front and rear rails are all the same length and section, with the side rails also of the same section but obviously much shorter.

Mark out for the tenons, the distance between the shoulders on the front and back rails being 634mm and those on the side rails being 216mm. Mark out the 20mm-long tenons centrally on the rails and carefully cut to size with a fine-cut saw, finishing to size with paring chisels.

Having cut the tenons, the ends need to be mitred or the rails will foul each other on assembly. With all the parts cut, assemble the frame dry, easing joints where necessary and cramping up to make sure all the joints pull up tight. Mark all the joints so the dismantled joints can be reassembled in the right order.

Also mark the inside faces of all the top rails and the front and back lower rails as these have small mortises cut in their inside faces for the buttons which will attach the top panel and shelf.

The top front and back rails have three mortises each, the end top rails have one each, and the lower rails have two each.

With all the rails cut and sanded smooth, the front and back frames can be glued, assembled and cramped, ensuring all is square and true. Once they are quite dry, these can be assembled together with the side rails. Again you need to check that all is perfectly square.



Simple decoration

The decorative infill rails are strips of cherry, planed to 18 x 10mm. Having lightly marked the mid position of the upper rails, I found the easiest and most accurate way to form the double angles on the ends was to offer the over-length rails against the frame, judging by eye where they intersected with it and each other and marking them with a pencil.

I trimmed the rails roughly to shape and then carefully free-hand sanded the final shape using a disc sander, repeatedly checking the fit of the rails against all the mating surfaces, until they were just long enough to spring into place. This way they would hold each other in place as the glue dried.

Having glued the parts, be careful to remove any glue residue. I use PVA glue and if the excess glue is not removed, it seals the

surface, preventing the Danish oil I use for finishing from penetrating the timber. Also with the intersection of all the pieces it makes it very awkward to clean up if excess glue is allowed to dry.

The collars around the legs are small sections of 10mm-square cherry, with the mitres formed on the sanding disc, but this time using a mitre guide. Glue these in place, applying the glue sparingly and ensuring they are perfectly level and the mitres are closely butted. Again, be careful to remove excess glue before it dries.

Assembly

The buttons that attach the table-top and shelf are the same size, being cut from 12mm-square stock, 30mm long. Saw to shape and drill a countersunk hole through. To attach the table top, lay it face down on the bench, protecting it with a piece of thick cloth, place the upturned

American hall table



▲ Pic.13 The buttons to hold the table top were prepared from square sections of timber. A small pull saw makes a neat job of removing the waste



▲ Pic.14 Having cut the step, part the button from the stock. Then drill a countersunk screw hole through



▲ Pic.15 The buttons fit into mortises cut into the inside faces of the rails. Eight are used to hold the table top



▲ Pic.16 Attach the lower shelf using four buttons

frame on it and centralise it before inserting the buttons in the mortises and fixing with screws.

Fixing the top by this method allows the top to move against the frame, reducing the risk of damage as the timber moves. The top could be fixed with slotted metal brackets if preferred. The shelf will need to be clamped in place while the buttons are fitted.

With all the assembly complete, remove the table-top and shelf and apply the finish. I used three coats of Danish oil, denibbing between each coat and finishing with a good-quality wax polish such as Briwax.

Have a go yourself

If you pop along to getwoodworking.com you'll be able to access a free download of a clear drawing of Martin's table replete with dimensions and a cutting list. The drawing gives the main dimensions for a well-proportioned table but these could easily be adjusted for a wider table.



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Back in GW192:18, I made a stable door for my woodworking friend, Paul, who lives in a one-up one-down former weaver's cottage in a small Derbyshire mill town. Ann, his wife, was so delighted with the result that Paul was encouraged to tackle the other external door in their cottage, which gave me the chance to try out a design that I'd had in mind for some time. 'Why not make a conventional full-height door,' I suggested to Paul, 'that opens inwards as normal, but which has an outward opening window light set into the top?' Now, I'm sure this isn't a new idea, but the only place that I've ever seen anything similar was at a tiny preserved railway station, which featured a small counter and hatch set into the door of the ticket office — and you can't buy one of these from your local timber merchant!

As with the stable door project, the appearance of the finished door needed to be in keeping with the period of the cottage, which is set within a conservation area. The door in question, however, is at the rear of the building and not on public view, which usually means that the rules applied to the appearance of replacement joinery are slightly less stringent. Paul and I decided, then, that the door would have bead-and-butt boarding in the bottom part, and four panes of glass in the opening top part; this pattern of glazing, we thought, would match the appearance of the vertical sliding sash windows. The good news was that the overall size and thickness of the door proved to be close to normal standard at 762 x 1981 x 44mm (30 x 78 x 1¾in).

Timber choice and preparation

I'm a fairly irregular user of softwoods, most of my output being in English or European hardwoods. However, when making anything in softwood, I generally buy unsorted grade Swedish pine. This is normally only available from a proper timber merchant in rough-sawn full lengths. I'm fortunate, however, in that my merchant also has unsorted grade boards that are planed all round, 22mm-thick, and available in a wide range of widths.

The 500 x 225mm boards that I selected were from a particularly good consignment with a high resin content, which also made it weightier. You can see from the 'photos that there is plenty of colour in the material. I am happy to pay a little more for the best available grade of softwood; it works much more easily and has far fewer knots.

Buying 225mm-wide boards also means that I can rip them down to give two 100 x 50mm sections for the stiles of the door, allowing me to remove the centre 25mm of the board where shakes and splits tend to be found, even in the best quality material. After cutting to length and width, the stock was surface-planed on one face and edge before being thickened (see cutting list).



Window on the world

Mike Jordan's ledged & braced version still has the *look* of a stable door

Marking out

The positions of the mortises in a framed ledged and braced door are dictated by the thickness of the boarding to be used. The thickness of the boarding and that of the rails at the bottom and centre of the door must add up to the thickness of the stiles. Bare faced tenons are used on these rails, and the mortise only needs to be set back from the face by the boarding thickness. In this instance, only the bottom rail has a bare faced tenon since it's only half of a framed ledged and braced door.

With the mortise positions marked on the stiles and squared around, the mortises and haunchings were cut on the machine using a 12mm chisel. The stopped rebate and groove

for the boards were also formed at this point, taking care that the stiles remained properly paired up. Wedge room was cut from the outside of the mortises by hand.

The tenons were cut on the rails using the cross-cut saw for the shoulders and the bandsaw for the cheeks; any final trimming of the tenon cheeks is best done with a rebate or badger plane. The top and bottom rails must have the haunchings cut before each of the joints is individually fitted. The assembly wedges are best cut from the waste parts of the tenons. Finally, the shoulder lengths on the top and centre rails were cut to the same size before the diminished shoulders on the outside of the centre rail were marked out and cut by hand.

Project



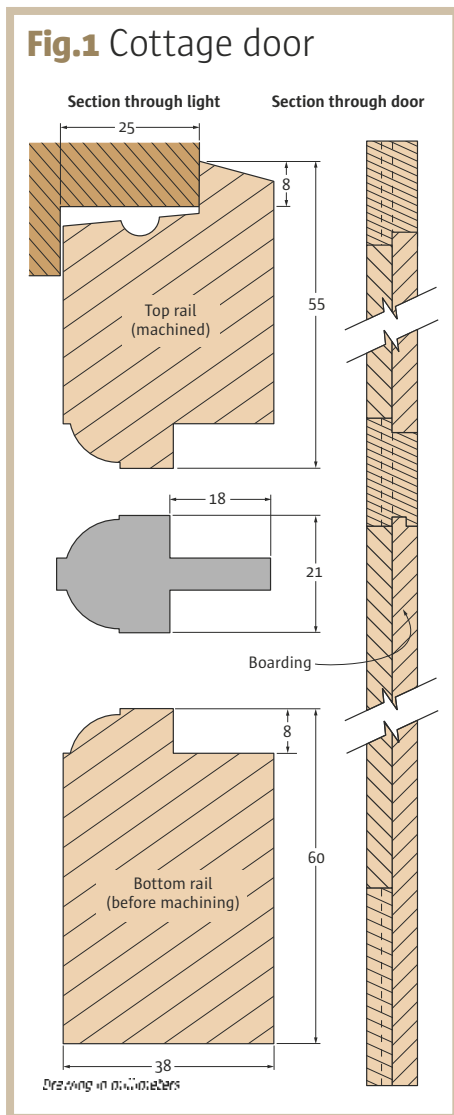
▲ Pic.1 Mike ripped down a 225mm-wide board to make two 100 x 50mm sections for the stiles



▲ Pic.2 The thickness of the boarding dictates the positions of the mortises...



▲ Pic.3 ...which Mike cut on the mortiser using a 12mm chisel, saving his chisel and mallet...



▲ Pic.4 ...to cut the wedge from the outside of the mortises by hand



▲ Pic.5 The wedges themselves were cut from the waste material



▲ Pic.6 The stopped rebates and grooves for the boards were also made at this point



▲ Pic.7 The diminished shoulder on the outside centre rail...



▲ Pic.8 ...is marked out and cut by hand



▲ Pic.9 The frame is now glued up, assembled, and the wedges are driven home

CUTTING LIST

Sizes shown are planed dimensions (mm)

Component	Number Req'd	Size	Length
The door			
Stiles	2	44 x 95	Door height + 50
Top rail	1	44 x 95	Exact door width
Centre rail	1	44 x 95	Exact door width
Bottom rail	1	22 x 175	Exact door width
Boarding	6	Ex 22 x 100 par	1100
The window light			
Stiles and top rail	3	55 x 38	
Bottom rail	1	60 x 38	
Glazing bars	2	21 x 38	

The door was now ready to be glued, assembled, cramped up, and the wedges driven home, before being left to set overnight. Once dry, the door was sanded prior to fitting the boards, where I found that softwood with its high resin content clogs up the sanding discs in record time!

Bead and butt boarding

The bead and butt boarding was made, sanded, and fitted to the bottom part of the



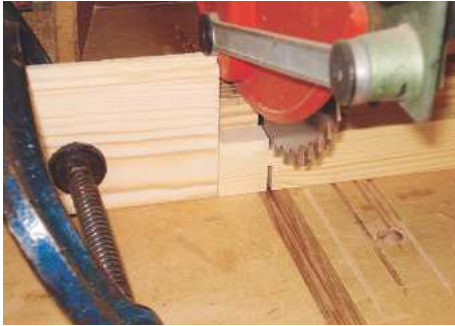
▲ Pic.10 The bead and butt boarding is secured with 38mm oval nails



▲ Pic.11 After planing and moulding the stiles and rails, the stiles are marked...



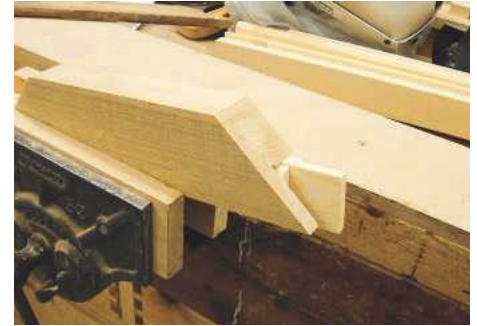
▲ Pic.12 ...ready for mortising, a task that Mike carried out on, well...the mortising machine!



▲ Pic.13 More machinery, this time to cut the tenon shoulders on the rails...



▲ Pic.14 ...followed by the cheeks



▲ Pic.15 A simple mitre block is used to guide the chisel...



▲ Pic.16 ...when cutting the ovolo profile on the window rails



▲ Pic.17 The job is finished with a short scribing cut, which...



▲ Pic.18 ...produces the correctly shaped rebate for the moulding on the stiles



▲ Pic.19 The rails are offered up to the stiles, which are marked...



▲ Pic.20 ...and the moulding cut to create...



▲ Pic.21 ...a flat area ready to receive the square shoulder of the rail

door using 38mm (1½in) oval nails punched below the surface ready for filling. The boards, which had been left slightly over-length, were then trimmed to size, and the horns on the top and bottom of the door were also cut away. I was then able to measure the aperture in the top of the door and start the opening light.

The opening light

I had already decided that the opening light would be made like a storm-proof window —

that's to say, it would overlap the opening by 8mm all round and stand 12mm proud of the face of the door. As a concession to the period of the house, the mouldings on the light were to be finished with an ovolo profile, and then jointed by scribing them by hand. This may be a rather old-fashioned method, but it's a quick and simple one, once you've made a mitre block to guide your chisel.

To start, the stiles and rails were planed up and moulded before being mortised and

tenoned; the tenon shoulders were then finished square and level. With this done, it was a simple task to mitre the end of the moulding and use the cut shape to guide the gouge, cutting a short scribe. The portion of the moulding next to the mortise is then cut flat to take the square shoulder. The glazing bars, meanwhile, are joined using a halving joint, which obviously meant relieving the upper bar to receive the profile of the lower bar.



▲ Pic.22 It may be an old-fashioned process, but the completed joint goes together neatly



▲ Pic.23 The glazing bars are fitted using halving joints, and the outer edges are moulded...



▲ Pic.24 ...to create the channel that prevents the ingress of water



▲ Pic.25 Fitting the light to the door — aren't cordless drills brilliant?

Fitting



▲ Pic.1 Paul got to use his new power planer for the first time. How was it? Effortless!



▲ Pic.2 Using a flat bit in the cordless drill to cut the mortise...



▲ Pic.3 ...which was then cleaned up with a chisel



▲ Pic.4 Having fitted the glazing it's time to hang the door...



▲ Pic.5 ...and it the weather moulding with screws that are hidden by pellets

After the glue had set on the light, it was sanded off and rebated round to fit as shown, (Fig.1). A pair of storm-proof hinges was used to hang the light in the door.

The glass for the light is 6.4mm-thick laminated glass, which provides both safety and security. I also made weather moulding for the top of the light and the bottom of the door, as well as an oak threshold strip.

The fitting of the window stay and locking fastener was left until after the door had been hung.

Fitting and fettling

Come the great day, the weather was bright and sunny, and I set out with the new door and my tool box in the back of the van. The tools were just going for a refreshing day in the country really; as before, my master plan was to supervise while Paul hung the door. I didn't expect to use my tools, then, but it is nice to show willing.

The door had been treated with a 'flood' coat of clear preservative as an alternative to priming paint. This had been allowed to dry for several days, but still managed to fill the van with a powerful smell reminiscent of a hospital ward. The need to keep the windows closed and the heater on ensured that I arrived in high spirits! The opening window, meanwhile, had been removed to make the door a little lighter to carry, and to allow the glazing to be installed on site.

The original door was removed and the hinges and handles set aside for reuse; the old lock was replaced with a new five-lever sash lock. Paul had treated himself to a new power planer, which now emerged from its wrappings for the first time. Suffice to say, we had the door planed to fit in a matter of minutes, and ready to be wedged in the opening while the hinge positions were transferred from the existing recesses in the frame.

After the hinges had been recessed into the door and the door hung in place, it was again removed to make fitting the lock easier.

A battery drill fitted with a flat bit was used to remove most of the waste from the lock mortise before cleaning up with a sharp chisel. After fitting the lock, the door was re-hung to allow the lock keeper plate to be correctly sited and cut into the frame. The mortise from the original keeper plate will be filled and painted over later.

The opening window was then reinstalled, and its casement stay and locking fastener were fitted. The weather moulding over the top of it was fitted using screws that were pelleted over, and the weather moulding and threshold strip at the foot of the door were the finishing touches.

I'm pleased to say that the finished result has been well received. It allows welcome natural light into a lobby area that previously relied on artificial lighting, and it can also be used to improve the ventilation when the warm weather arrives.

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American maple & cherry, steam-bent frame & woven strips

Sculptor Laura Ellen Bacon and furniture designer/maker Sebastian Cox collaborated to create an elaborate 3m-high installation out of American hardwood to stand in the archway in front of the Museum of the Order of St John, London during Clerkenwell Design Week

“The Invisible Store for me has become a store of many things. It started out as a store of our shared passion of making, but as the project unfolded it became a store of much more: education, ambition, pride, late nights, steam, experimentation, unknown quantities, passion, cups of tea, swear words and so on! The whole thing has been the biggest thing we’ve ever undertaken, and we couldn’t have done it without Laura’s creativity, experience and calm nature.”

Sebastian Cox,
www.sebastiancox.co.uk

“As a sculptor, I have enjoyed the refinement of form that has been possible with these woods; allowing the curves and stability formed in the head to find their feet in the finished, grounded form. I know this to be a true collaboration: both Sebastian and I have merged our language of form and function, like merging two colours to acquire a new shade. For my part, I was hoping to find a way to distill the act of making into a solid form of containment, perhaps a little like blending a perfume and pouring it into a vessel. With our use of scale, solidity and precision, we have been able to use the wood as the essence.”

Laura Ellen Bacon,
www.lauraellenbacon.com

“Working with Sebastian Cox, one of the UK’s foremost makers, challenges the way wood works in a way nobody else does. And Laura Ellen Bacon, with her artistic sensibility coupled with her wonderful sculptural work in willow wood, is the perfect complement to Sebastian’s approach. When we set this project in motion we had no idea quite what we would end up with but we knew one thing for sure, the result would be ambitious, perfectly executed and thought provoking.”

David Venables,
American Hardwood Export Council



Laura Ellen Bacon and Sebastian Cox



The weaving is intricate



How Laura's shoulders must have ached



Assembly posed many problems to be solved

The build called for many mortise & tenons

Problems & solutions

The maple and cherry have been crafted into an elliptical-shape frame with huge arcs of steam-bent cherry, hand jointed together in mostly glue-less draw-bore mortise & tenon joints.

Through complex machinery the components of this solid frame are effectively shredded into strips and made supple and weavable from time spent soaking in the River Thames beside Sebastian's Woolwich workshop. These strips were manipulated by hand, flowing and twisting into the space to create a whirlpool of texture and shape held within the external frame.

"The biggest challenge has been the sheer number of unknowns, which we broke down week by week using collective thinking and design-grounded problem solving. It was just relentless unanswered questions because of the nature of the piece," says Sebastian Cox. "Would the steam bending work? Yes, after week three and some new metal straps. Would the spindle moulder survive the constant use? Yes, after week two and a new circuit breaker. Would the mortises tear out as we mortised the arc? Resolved after week four and three jig prototypes. Would the scarf joints be strong enough? Resolved after week five."



You need a very good eye, but how many more to go are there?



The completed structure *in situ*



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Everyone's a winner but, left to right, Woody Harringman, Steve Pickton, trainer Christian Notley and Sam Brister still have an anxious 24 hours to wait

War of the Worlds

How do you choose between three of the best young furniture makers in the UK? **Andrea Hargreaves** witnessed the final nerve-wracking selection battle for August's WorldSkills competition in Brazil



A painter & decorator competes for his place in Brazil



Cleaning up the inlaid veneer panel of mahogany and burr walnut



Sam fits one of the two gull-wing doors



Under pressure, Steve checks the daunting list of marking criteria...



...before fixing the Soss hinges on one of the gull-wing doors

Edward (Woody) Harringman, Sam Brister and Steve Pickton had been building a fiendishly complicated cabinet on tapered legs, with sliding drawer, for nearly 22 hours over 3½ days when their trainer, Christian Notley, began the countdown that would determine who would go to Brazil to represent the UK and who would be left behind.

With 10 minutes to go Steve was cutting a notch for a handle on the gull-winged top, with four minutes to go he was fitting the handle, while Sam was making minute adjustments to

the lateral slide of his drawer. In the final 60 seconds Sam was checking and rechecking the dimensions of his piece, prepared to shave off the tiniest tad if necessary, Woody was paying particular attention to the taper on the legs, and then they were into the final 10-second countdown, still sanding with a mix of fury and extreme care to achieve absolute perfection.

The final whistle blew. To hand claps all round they wiped their sweaty faces with their smart UK Squad shirts and rictus frowns of concentration broke into grins of relief. It was all over. After months and months of training

Competing for success



Sam just has time to clean up the internal carcass end that also acts as a door stop



Final checking of overall measurements; note the block stop

Tomorrow the world



The world awaits: WorldSkills veterans Luke Griffiths and George Callow have a grand career plan



Could it involve any of the UK Squad 2015? Here, watched by its maker, Luke is scrutinising Woody's build

Watching the closing stages of the final on that tense Friday were George Callow, 23, and Luke Griffiths, 27. George had just celebrated his birthday with the best gift ever, the presentation of the British Empire Medal he won as a result of gaining Gold in Leipzig. While this year's finalists were waiting to see who had won through to represent the UK in Sao Paulo, Luke and George were waiting to hear confirmation from an investor that cash was being stumped up to enable them to hit the big time by setting up a company which will concentrate on high-end contract joinery for hotels and luxury houses.

They have both worked at Cimitree, near Chichester College, and Luke taught George at Chichester. Luke has also taught Woody and Steve, who is employed by Grech & Grech Interiors, Chichester.

Since winning WorldSkills George has attended World Wood Week, having been invited by the International Woodcraft Society, and worked in Perth, Australia doing everything from shop fitting to demolition to fund a backpacking trip to the Far East.

If this pair's career path follows its current trajectory it is likely they will be going on their own milk round. "We want to start with a young workforce, first me and Luke then up to, say, 20 people. It all depends on the investment bid," said this man who knew he wanted to do woodworking from the age of five, always pleased to help his family fix up their home and selling stuff to neighbours. "I've always known what I wanted. I've been to 34 countries now. Everyone always slates England but you have such good opportunities here."



Hinge access is awkward but doable

they'd done their best and had now only to wait an agonising day for the results to be totalled up. The only young men not applauding their achievement were the two joiners sharing the huge workshop, Dominic Hicks and Dale Hodgins, whose own competition, making a very curvy frame and a ladder fancy enough to merit the term furniture, had another fraught hour to run.

Competition setup

The WorldSkills selection finals took place at Burton College's modern construction academy at Swadlincote, Derbyshire alongside competitions for welders, stone masons, bricklayers, tilers and painters & decorators.



As Woody is all too aware, all surfaces have to be sanded to at least 240 grit

Other trades were judged at four other venues around the country to find the one representative from each discipline who will have the responsibility of representing their country in this remarkable competition, which is held only once every two years, with the winner up against the best from countries all over the globe.

Our cabinetmakers and joiners each had a workspace of 3 x 5m from which they had access to machines, but so devious is this competition that they had to calculate ahead when they would want to use those machines; any errors there would be precious time lost.

They knew to what the piece would approximate a month beforehand – the WorldSkills piece of two years ago – but were thrown a googly right at the start: 30% of the design and materials had been changed, with different stock and dimensions, particularly awkward being the gull wing that required differing angles to be worked out and cut. As Christian pointed out: the competition had to get progressively harder to keep stretching the candidates. This year the leg frame was tapered on the inside, the mitre on top meaning two different widths and angles of 48° and 47° required. To get within the laid-down dimensions they had to be within 0.9mm. “They should all get it,” he said with the confidence that comes from getting to know these young men so well over the training period leading up to regional heats, final sessions and this contest.

Because of the tropical hardwood likely to be used in Brazil sapele was chosen instead of oak.

Kit search for jigs

“They can use machines for anything they like but the drawer dovetail must be 100% hand cut. They have to make any jigs during the competition and most made a jig for the dim saw,” said Christian. Choices here came down to time constraints, he observed, adding that rather than the drug tests of sporting events, WorldSkills contestants would have their luggage and kit searched for jigs. And he wasn’t joking. A number of illicit jigs had been



Final touches on the door pull



Woody’s going for Gold...

Crowd training

We pussyfooted around the finalists as they worked, scared to do anything that would put them off, but Christian pooh-poohed our fears. “They’ve got to get used to people and cameras. This is nothing compared to what they’ll find in Brazil. This is all part of the training. They’ve got to get used to it.” Indeed, I’m not sure even a fire alarm would have interrupted the squad’s concentration as they beat the clock to finish.



The contestants were confined to a 3 x 5m space

Competing for success

Joinery winner

Watching the final stages of the joinery competition it seemed too close to call, but when the marks were totalled Dale Hodgins emerged the victor. He trained at what is now Banbury and Bicester College but was then known as Oxford & Cherwell Valley College (OCVC) and was sponsored by employers Oakleigh Joinery in Stroud, Gloucestershire. He won by a narrow margin from Dominic Hicks who trained at Pembrokeshire College and is employed by Keating Joinery, Narbeth, Pembrokeshire.



Dale Hodgins with his winning pieces

found in the kit of non-European contestants two years ago.

At each stage of the UK finals build the contestants were marked subjectively and objectively on very detailed marking sheets, which afterwards were scrutinised by Christian who studied them over 1½ hours. The markers, who included former squad trainer Peter Legg, awarded points for every key part of the construction process, from the start of the competition on the Tuesday to its completion on the Friday.

"If I'm happy that they are fair and valid on Saturday they will be brought into the room and someone on the other side of the room will tell them who's it. It's gruesome. I hate it. I know them. They're all nice guys and have put so much effort into it. I'll be in tears," said Christian.

Fine record

This man who heads up Chichester College's furniture-making department is only too familiar with this position, having previously trained the squad from which George Callow emerged triumphant at Leipzig in 2013. Not only did he teach George and, before that, Calgary (2011) competitor Luke Griffiths, at Chichester, but two of this year's contestants, Edward and Steve, both went to that college too.

Joinery trainer Andrew Pengelly said that each internal joint was marked for fit and cut and for assembly and finish before the external joints were examined.

"To get 100% they are allowed a 0.15mm gap."

Not so the furniture makers. "Cabinetmakers are not allowed any gap," Christian pointed out.

In São Paulo the winning joiner will be up against 27 competitors, with the triumphant cabinetmaker facing a field of 24 from nearly all the European countries and fierce competition from the Far East.

Thus all the training: "We don't set them up to fail," said Andrew. "Tomorrow there will be a lot of tears. The WorldSkills final is paid for by UKplc so we have to please a lot of people." Total kit shipping costs for the whole UK contingent will be around £100,000 – the UK furniture maker's toolbox will tip the scales at 250-300kg alone.

It's all over...

So after the final whistle how did the candidates, all aged 21, think they had done. Said Woody, who has already set up his own Battle, East Sussex-based workshop and won the national SkillBuild title: "I went to the second. I didn't want to go too fast. I was happy with the walnut over the oak. The two doors were a little bit trickier but it didn't make it any more difficult." And in the future: "I've got my own business, set up two years ago when I couldn't get an apprenticeship. I left college and got my own unit and now make everything from wardrobes to freestanding furniture."

Steve commented: "The drawer was quite hard to fit but overall I was quite happy with what I had done." And already the competition has enhanced his career, with an interview with top company Silverlining Furniture, lined up. This is a reference to how the lead up to WorldSkills is used as a milk round by top makers in search of new talent.

Sam, who trained at South Moulton College, is hoping that the Edward Barnsley Workshop will offer him a second year and in the long run wants to set up his own business.

And the winning cabinetmaker is, pause for heart-stopping televisual 10 seconds... Woody Harrington!

But let's congratulate the losers too because to have got this far signifies industry recognition and the chance to take their talents wherever they like. Meanwhile the instigation of the competition itself not only gives the trade crafts the boost in respect and regard that they so richly deserve, but creates an advancing benchmark for aspiration.

Phew! How did they work so quickly?

Editor of *The Woodworker*, Mark Cass, was gobsmacked at the speed of the squad. No slouch at woodworking skills embracing carpentry, joinery and furniture making, and with a successful business of his own, Mark confessed that he would probably need a week to accomplish what these young men achieved in only 22 hours.



Woody's selection-winning piece

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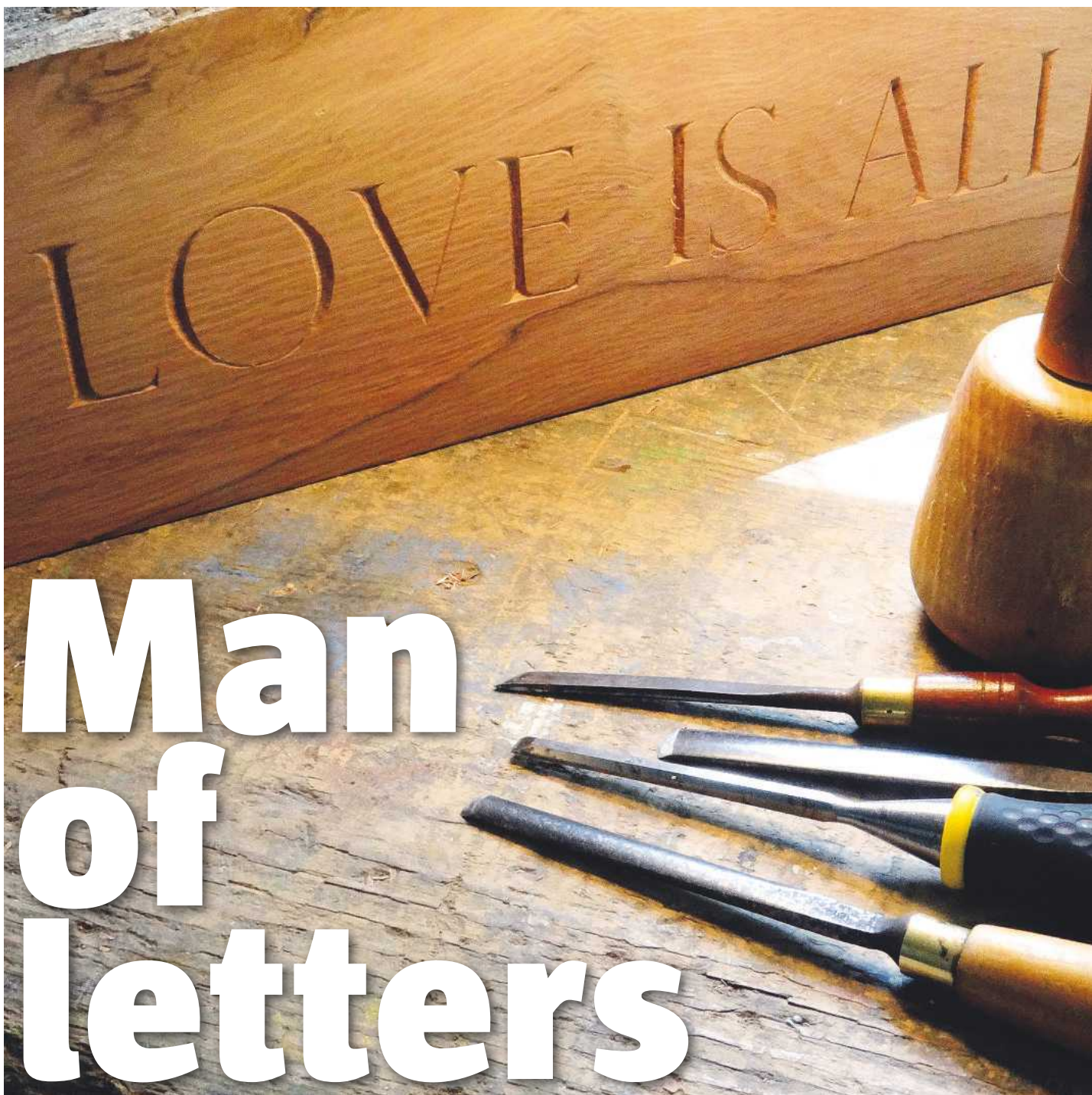
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Man of letters

Edward Hopkins carves his philosophy on a cradle and writes large

I blame David. He pushed me into the deep end more than once. "They can because they think they can," is his motto. If you believe it, it will be so. When, in the late 1970s, I hauled him over from Suffolk to Somerset to inspect my first tentative house purchase, he gaily announced that it would take me six months and £500 to put the building right. He was wrong on both counts by a factor of 15, but nevertheless, he gave me the confidence to get going. I'm eternally grateful.

I'd been restoring antiques for a couple of years when he told me that Caroline was expecting a baby and that I was going to make a cradle. He brought along a baulk of field oak and promised me a barrel of beer. I found some

plans, drew up a cutting list and took the timber to David Oldfield, a master maker who, with unbending kindness, followed my intricate directions and unpacked from the baulk a puzzle of components until I had everything I needed and nothing, but nothing, more.

William slept soundly in his cradle. Moons waxed and waned, leaves formed and fell; and now, as if by magic, he is a man about to marry. We're going to his wedding party under the pear tree that always was old, and the sprigs of yew that now are more like a garden wall.

Love conquers all

I want to give Will and Lucy a present; something pertinent and personal. I was 16

when Lennon and McCartney proclaimed 'All you need is love' and it rang in me like a bell. Around the same time, Chaucer's Nun told me *Amor vincit omnia* (Love conquers all). I believed her then and still do now. Either of these would have worked, but not worked well enough, for their associations, their origins, are too strong and distracting. Besides, I thought with indomitable arrogance, I can do better than that. Simplicity and brevity are the hallmarks not just of design, but of wisdom. Less is more. And so, as the briefest encapsulation of everything that William and Lucy will need to know and perhaps be reminded of gently, passively, tacitly over the years to come, I arrived at the words 'LOVE IS ALL'. Love is all we need and, on a deeper level, Love is everything; it is all there is.

I would carve these words in oak, but not in any oak. William is William Holmes, and so holm oak is the obvious candidate. It would be difficult to find holm oak in a yard, seasoned or not, but luckily I bought a small load probably 20 years ago. Some of it, I kid you not, is sitting



Repro it may be, but with no intent to deceive

in my hallway right now. It is heavy, dense and beautifully marked. It should be good.

I must say at the outset that I am no great carver. I've dabbled with it from time to time but I don't pretend to be an expert. This, I hope you'll find encouraging. If I can make a fist of it, anyone can.

The carving process

I didn't need many tools. A small gouge and two chisels did most of the work. A pointed chisel was good for scraping but I didn't want to do too much of that. I imagine that a professional carver would not scrape at all but leave the crisp cuts straight from the chisel. I found an amount of scraping useful but had to



The cradle was my first major piece of furniture and the only reproduction piece I have made. I think life is too short for copies, but David and Caroline live in a Tudor farmhouse that they have restored, so this was most appropriate. I'm not sure what those pawns are doing as finials – they might be acorns

be careful as the hardness of different fibres varies and the lines can go awry. I did think, years ago, that a V-shaped gouge (a veining chisel?) would cut the strokes in one swoop, but however I've ground it and honed it, I just cannot get on with it.

I aimed for a 45° cut on all lines. Any steeper and the gouge would mark the opposing slope. There are one or two places (like the top of the A) where it wasn't immediately apparent how

the grooves would intersect, but by keeping their sides to 45°, they sorted themselves out.

The horizontal lines were too thin to cut with a gouge. I had to go straight in with a chisel, almost on the final line. In the finished piece, depending on the light, they are hardly visible. The serifs punctuate the lines and maintain readability. This delicacy adds refinement to the lettering.

I fancy carving some more lettering but

Lettering is easier now. Half the job used to be draughtsmanship and setting out. Now computers offer dozens of fonts in any size you like. I chose Perpetua Titling MT, printed the words on three sheets of paper, then folded, cut and taped them together





Spacing and positioning is important. Nothing should snag the eye



I laid double-sided tape on the back of the lettering and pressed it down firmly. The tape gripped well and, at the end of play, could be peeled away leaving no residue



A gouge, not a chisel, is used to begin the straight cuts because the curve of the blade severs the fibres on either side and produces a clean cut. The first touches are a little timid as a central channel is established



Edward started with the broad verticals, stopping short of the serifs at either end



A chisel is necessary for the inside of the O. You might imagine that the O is the hardest letter to carve, but not so. Go round and round, inside and out, maintaining 45° and restraint, and the letter develops by itself. A light touch is needed with the chisel lest it mark the valley. Edward used a wider, flatter gouge to help clean the outer cut



Gouging from either side, not worrying too much about the valley bottom. Edging back to the lines but keeping clear of the serifs



Establishing the 45° slope of the serif. Moving backwards with the chisel, achieving the correct angle



Establishing the point where the three slopes intersect

these letters are about as small as I'm going to go. Some of the serifs involve tiny chisel cuts as light as a feather, but a greater limitation was my eyesight.

Gouges and chisels must be razor sharp. I spent some time rootling in my box of assorted tools, and attempted to clean off the rust of neglect. Then I ground them on a little wheel – not ideal – following this with a coarse diamond block so that the hollow was removed. I then revived an old fine water stone, polished the back and sides and then honed the bevel. The bevels on the gouges were accomplished with the tool held sideways and rocked with a twist of the wrist. The inside of the gouges had to be deburred with a small slipstone. It might seem extravagant to pay for something you use so little, but when you need it, nothing else will do.

Making mistakes

The serifs on the size of lettering I chose were tiny. It is a long time since I've cut letters so I had to re-teach myself. By the time I'd worked it out, I'd finished. I found it quite interesting though, so I thought I'd carve a bigger letter so as to show the process more clearly. I chose the letter 'I' partly because it is the easiest, but also because, if the result is any good, I might give it to Imogen. I chose an offcut of holm oak that tapered off to the bark like some mythical mountain. But by this stage, I had already made two major mistakes.

I said I'd made two serious mistakes. I lied: I made three. The first is that I used such decorative wood. The flecked grain pattern is so startling that unless it is under oblique light, the lines of the carving, and therefore the carving itself disappear. The second mistake was to use such hard wood. Something plain and relatively soft like lime would have been better. Evergreen oak is much harder than deciduous oak, and as you might see I had trouble cleaning the tool



Turning the corner

marks away. And that's my third mistake: I had trouble.

I might expect trouble. How can I hope to spring from a standing start and create exhibition-standard calligraphy, even if only one letter? This is a more dangerous sort of arrogance, not because it harms anyone else but because it harms me. It's OK to aim high but I mustn't be disappointed every time I fall short. I mustn't take myself too seriously.

Neither, of course, must Will and Lucy. I have a little more cleaning up to do on their piece, but I can't make it very much better. I might not have done it at all. I could have had it cut damn near perfectly by a computer-controlled router. In that case they'd have had 'printed matter' in wood. This way they have the human experience – my human experience – of hoping, aiming, learning... and accepting limitations. Such is life. They'll have their fair share of it too, but over and above everything, the words, the wisdom, 'LOVE IS ALL' will, I hope, stay with them. I wish them a long and happy life together.



Edward gets his giant I in

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Phil Meyers was sales director of record power, looking after the Startrite side of the business, previous to this he worked for many years for the original Startrite company in Gillingham.

Lee Tamsett was production manager for Startrite originally working in the Gillingham factory then moved with the company when it was sold and moved to the plant in Rochester.

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Lee Tamsett



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Mahesh Jangid with one of his intricate carvings

Carving without bounds

Using minuscule tools called ulis, the Jangid family from Rajasthan is carving incredibly intricate miniatures that celebrate deities and animals



Mohit Jangid with one of his super-miniatures

Indian carving



Rohit Janjird needs a keen eye for ultra-fine work

In the beautiful city of Jaipur a father and two sons are carving a living for themselves in walnut, rosewood, ebony, teak and sandalwood, working these woods into miniatures drawn from history, religion, wildlife and day-to-day living and using traditional craft techniques.

For Mahesh Jangid and his sons Mohit and Rohit it is what they were born to do, to follow the family's woodcarving heritage. Mahesh was learning to woodcarve at his grandfather's side at the age of seven and by the time he was 24 had been awarded a national carving prize for a hand fan. He also created what is claimed to be the smallest jointless chain from a solid piece of sandalwood. The chain is 10ft long, has 496 links and weighs 12g.

His work is celebrated throughout India and has also been seen at exhibitions in Europe, the Middle East and the Far East.

These deities were carved from Kadam wood, this tree featuring in Indian mythology and religion

Now his sons, both in their 20s, are following in the family tradition. Mohit says: "I prefer miniature work because I have seen this from my childhood and miniature work is the most important thing on our work because it makes our items more attractive. We can make all kinds of woodcarving products but miniature carving is my favourite."

Although he is a graduate he chose to quit his studies in favour of woodcarving. "I'm so addicted to my work that I think I can do best at it and if I do any other job then it will have limits, limited salary, limited time, limited work, all days the same things so I will continue this work all of my life. This work has no limits, it's all up to us, always new things, new designs, more miniature work etc.

Rohit adds: "I like miniature work in my art, and we are the only ones who make these kind of carving products with scenes in flipped lids. All scenes have their own story. And I like it when people are surprised when I show them my work and then I open lids for scenes because they don't expect this.

"We work at home so definitely I will teach this work to my future children, and then if they want to go with any other profession then I will support them. Because I also had these choices but I picked this carving work for my life. Because according to me if we force anyone to do any work he can't be the best in that work, so it's better that I will teach them and then they can continue this work, but if they want otherwise then I will always be there for them."

And what does Mahesh say? "I always enjoy all my carving work but the carving on the Rajasthani doll is my most favourite, because we are Rajasthani and this piece shows the story of Rajasthani freedom fighters. And it also

shows the beauty of the Rajasthani lady with our traditional jewellery.

"I feel so proud of both my sons. They are so dedicated to this work, they are always thinking about doing something new in this carving work to make it more attractive and beautiful. So I think they will both do much better in their life. They have already made this carving more miniature."

So how do they do this? Rohit explains: "First of all wood is cut into the desired shape and then very fine tools are used to carve out fine details of the design, giving immaculate attention to the minutest details. The fragrant wood is profusely carved with scenes from epics, nature and the craftsmen's own creative imagination.

"Woodcarving is not only an ancient but a very famous craft in Rajasthan. Different kinds of wood are used for carving depending upon the size and shape of the final product. First of all the wood is cut into regular sizes and a freehand drawing is made with a pencil on the wood surface, then the outline of the designs is made with the help of a chisel, and fine carving is done with minute tools called ulis. This minute carving involves engraving of the wood on the contours of the design with the utmost care."

And if even the uli is unsuitable for a particular task? Then the trio makes their own tools, using small iron sticks. It's ingenious solutions like this that not only keep ancient crafts alive but build upon them.

Contact information

For more information go to:

www.mrhandicrafts.com,

call Rohit on +918769599896

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Noah is delighted by his father's Puss in Boots puppet.

After Graham Carter has greeted me, and his wife Alice has gone to the kitchen to put the kettle on, he ushers me into the sitting room of his East Sussex home and introduces me to their son Noah. As you might expect with a 3-year-old in the house, there are toys on the floor, but not the usual garish plastic variety: Noah is playing with wooden bricks, from which the faces of imaginatively painted animals can be built. It's not that the Carters are in any way precious; it's just, says Graham, that he prefers the organic material to the manmade.

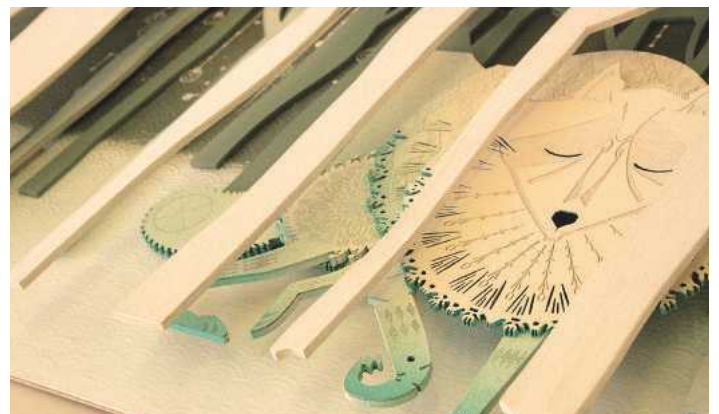
Originally from Gloucestershire, he now has a studio in Hove and has been earning his living from art for the past 20 years, in that time developing several different styles since training at Cheltenham, Brighton and St Martin's. He left the London college after two years of the course because he realised that he knew what he wanted to do and wanted to start hitting the world with it. So, with some friends from Brighton who wanted to do the same thing, they set up an illustration collective; although they were working from home at the time they shared expenses like the cost of exhibitions. "I was doing temping jobs to pay the bills," he recalls. "I started to get a good reaction from things. I'd been in London for two or three years when I got a commission from Saatchi & Saatchi. I had been in the right place at the right time – my flatmate's girlfriend was working there." They liked his cartoon-style presentation, which had to be whipped up in a day or two, and as a result he won advertisement work and got himself an agent. But, he agrees, he was following his head rather than his heart. "We were warned about that at uni, but you have pound signs before your eyes, then after three years you say 'is that what I want to do?' So I left London after four years. The group was still going well but I left because I wanted to do my own thing. I moved back to Gloucester where I met Alice. I'd lived in Brighton before so we upped sticks. Alice is a creative person who pushed me to do things."

Adventures in Toyland

Graham Carter's work, though never conventional, was two-dimensional until he discovered the joys of wood. **Andrea Hargreaves** meets him

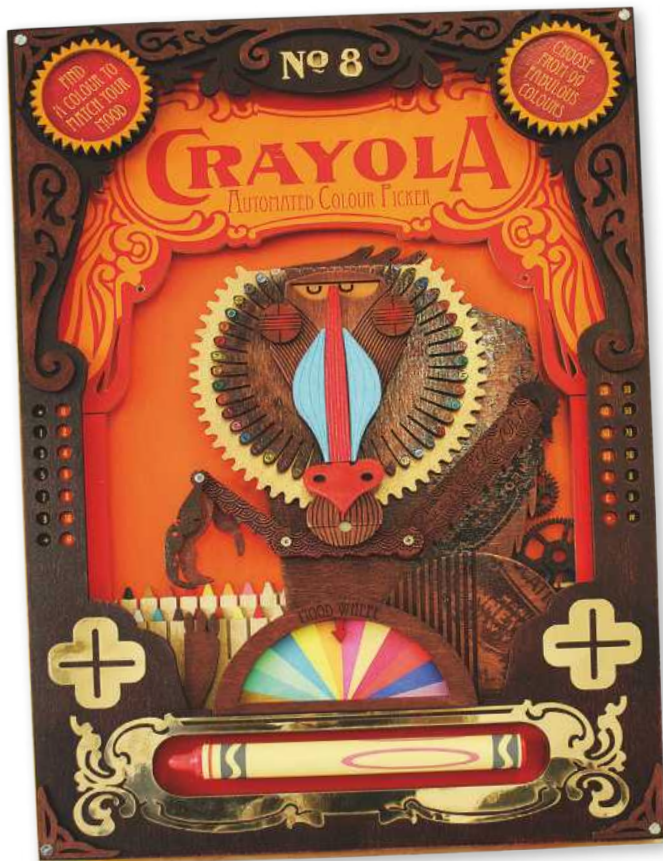
Turning point

He learnt how to screenprint and the turning point came in 2007 when they showed his



Detail from Arctic Fox, one of the first of his 3D pieces to sell at his successful Brighton Festival show

Graham got into laser-cut designs with pieces like New Yokyo Airbug



The Wood Baboon celebrates joyous colour

experimental work and found that it sold well and was picked up by Art Republic. At the same time his commissioned work dried up "so I took it as a sign and ran with it," developing his radical 3D multi-layered work using laser-cut wood. "I was gobsmacked with a friend's laser etchings," he says. "That opened my eyes to what you can do [with the process]."

Graham starts off by using Photoshop and Illustrator to design in multi-layers and then translates this into actual 3D pictures. "Wood lends itself to this very well." He likes to give the flavor of old-fashioned wooden toys that can be screen-printed for an aged look.

"I design a piece on Photoshop, separate it then gauge the distance in the real world. I made a few mistakes getting the distances and thicknesses right. I normally work in 3-4mm plywood and MDF that is made specially for laser cutting by Hindley and by Hobarts. I go to a company called Heritage Inlay in Brighton and he has a CNC machine the size of a photocopier. There are some hand-sawn parts using a jigsaw and a Dremel. I was doing a piece for a show

last year, seaside characters heavy petting in a saucy postcard look which really lent itself to hand cutting for a cruder look. I paint the pieces and sand them back, then paint again. I might do some more of those.

"For laser cutting you have to trace all the lines onto a Vector format. The shape has to be traced in Illustrator and I send the Vector files to the laser guy."

When I visited Graham he was in the middle of a successful month-long show at Brighton's Ink_d gallery as part of Brighton Festival, and the 3D work at £1000+ a pop, on his favourite quirky animal theme, was selling well along with his more affordable screen prints. "I experimented with different varnishes to get a penny arcade look to it. I find it fun to play with modern ideas but set it in a vintage setting."

More in wood

And for the future? It'll be a-changing. "I'm hoping to get involved in marquetry with furniture makers. I would be interested to see how we can work together," he says, before

musings on the constant need for change in the race to offer something different. "Technology advances and there are more people doing what you're doing." For instance, going back to the screenprinting, he was one of the first people to realise you could buy your own giclée printer at a reasonable price...

Now he fancies taking his 3D work a stage further by learning to carve wood in the round. "Because my work is eclectic it would suit the old-fashioned toy look on a bigger scale," he says, referring to a suggestion by a blogger to make a puppet on a fairytales and folklore theme. Loosely based on Puss in Boots, Graham's sports a bionic arm for a modern twist, and eyebrows that can be moved multi-directionally for the amusement factor. On cue, Noah, who has been eating his supper in the kitchen, runs in, seizes the puppet with delight, happily removes its head and wiggles its expressive eyebrows. Who needs plastic when wooden toys are so much more delightful?

Contacts

Graham Carter, www.graham-carter.co.uk
Heritage Inlay, www.heritageinlay.com
Hindleys, www.hindleys.com
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Bee Revival depicts the lifecycle of the honey bee



Detail from Bug Lady



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Letters

Write to: Good Woodworking,
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Men in their Shed

The Ash, near Aldershot, Shed provides warmth, woodworking facilities and company for men, mostly retired, who like to make things. Many of our projects are communal, designed for sale in the local pet shop or supermarket, where generous managers have offered us display space. The bird tables are hot items, and someone is likely to be producing parts, or assembling one of them at any given time. The hedgehog 'retreats' are being prepared for next autumn, with dimensions supplied by the Hedgehog Protection Society website; production models will probably feature pitched roofs to match those of our bird tables. A sort of 'house style', you might say.

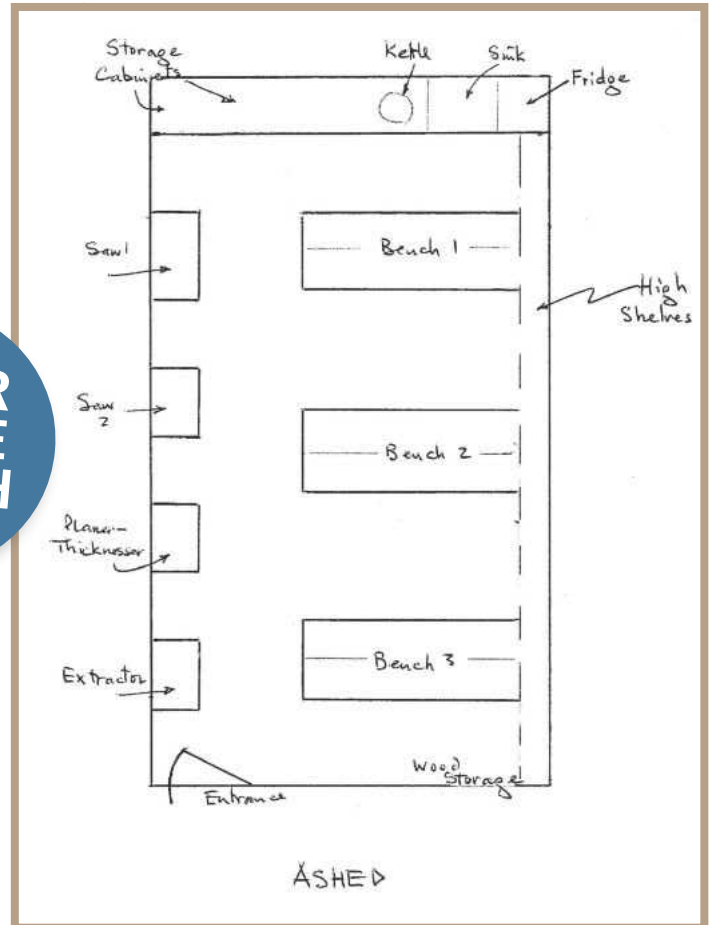
Donated tools

Some of the materials and tools have been donated by local supporters, and the remainder are bought by John Fairs, the coordinator of and expert tutor to the Shed. John, also retired, had a career working in joinery and colleges, and used to be in charge of the Joinery section at Guildford College; now he is employed on a part-time basis by Age UK to supervise and encourage up to six men in each of four sessions per week. His profound knowledge and woodworking skills are essential to the men, but his patient, caring nature is just as important.

The group offers repair work, an offer that has been taken up on behalf of community garden furniture, and the damaged council sign for a local park. Reclamation, reuse and restoration feature strongly – maybe that's true of the men too!

The small machines, neatly established down one side of the 'shop, are very important when modifying and repairing – working to non-standard dimensions. They are noisy, as is the dust extractor, but our work is unpressured, and those who do not want to don ear protectors can usually go outside for a few minutes with a mug of tea. At 20p per mug, tea is about the only thing that members need

LETTER OF THE MONTH



to pay for.

A comprehensive collection of electric drills, saws and routers, and a generous arsenal of hand tools are neatly stored around the benches and in the cupboards. The drill stand, heat gun and chapsaw all live in their allocated homes, two of them with specially made jigs to make them fit the bench and be safe.

The whole 'shop, including the benches, was designed and converted by John Fairs and his friend Bill, ingeniously converting a former minibus garage into a purpose-built workshop.

Wood storage is provided below the benches, and on shelves high on the walls with captive ladder; beside the benches are several small but key machines – saws and planer-thicknesser, which can be rolled out when needed, and the dust extractor. Age UK, Surrey arranged with the local council for running water, heating and electricity to be installed. And, since the 'shop is in the grounds of the Shawfield Day Centre, Ash, this provides facilities such as parking, toilets, café, even computers. I wonder how long before one of us boots up a SketchUp design programme on one of those?

John worked on the project for most of a year, drawing it all out on AutoCad initially, and always struggling to fit everything into a rather small space. The only external 'extra' is some space for wood storage in a neighbouring garage.



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WRITE & WIN!

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The Shed concept was first realised in this country by Age Concern, Cheshire in 2009. Now there are over 80 Sheds open in the UK, with many others planned. While many of them are focused on woodworking, the specific task is selected by the men involved. We are all finding ways of working alongside others towards a chosen purpose – helping, co-operating, sharing, discussing and offering additional materials. For some it could be a 3-hour tea break, while others feel a need to create something in a well-designed facility. We've got the space and equipment to do things most men can't do in their homes. And usually, a man working in his shed is all alone, and even family members tend to leave them to it, reluctant to disturb the creative process or scared of the tools and machinery they might encounter.

The movement began in Australia when men realised they could come together around practical tasks on a regular basis, if they had a designated place where tools and work-in-process could be stored. Its success indicates what can be done to alleviate much of the feeling of social isolation which can occur later in life, as one loses a working role, status, workmates and long-time partner. Research by Age UK shows social isolation can affect health and quality of life, with drinking problems, smoking and over-eating all connected to them.

Making their own contribution, the Ash Shed last year saw them receive a well-deserved Award

for Living Well and Ageing Well in Surrey, 2014. Not bad for their first year of operation, and a real recognition for the founders, their foresight and meticulous preparation.

In the community

An important function of the current year's activities is to participate at the Community Rural Activities Day. The exact nature of our participation has yet to be finalised – democracy in action! – but last year the members prepared components for youngsters to assemble into models which they could take home. A possible introduction to woodworking as a hobby or career? Who knows, but it is certainly helpful in triggering local support, materials to be recycled, or tools ready for re-use after their owner lost interest in using them.

The organisers are keen to expand activities, and perhaps to include young men, veterans and/or unemployed, who could gain skills, experience and self-confidence. The movement has much potential.

Peter Benson, by email

How great it would be to have this project rolled out all over the UK, so there is a Shed where men – and women – can go to enjoy woodwork in the company of others, and with shared machines. Peter refers readers to www.bettershedthandead and remarks that the first half is excellent.

Andrea Hargreaves

MDF tests to follow

I must comment on the reader's letter from Geoffrey Laycock concerning my homemade Dust Deputy.

Geoffrey mentions the ratio of the cone to the pipes are wrong but I took the measurement details from Oneida's website and followed them almost exactly. The details are freely published on many websites.

I take his point on the inlet pipe not being tangential but on the inside there is a right angle joint pointing down and at an angle to create a spinning cyclone effect. I just found it easier to follow the contour of the cone and deal with fixing the problem on the inside.

Oneida name their Dust Deputy as a cyclone and are one of the leading dust extraction manufacturers.

I hope this clears up any confusion and the unit is now fitted to my new dust extraction system and working really well. I intend to do some

empirical tests soon using MDF dust to see how much gets trapped in the container and how much gets through to the extractor.

The extractor is one of Numatics' professional range, twin motor with double filtration so I cannot see any airborne dust problem, but as the system is very new I will keep an eye on it.

Ted Hughes, by email

Thanks for the clarification, Ted. This correspondence is now closed.

Andrea Hargreaves



Ted's homemade Dust Deputy is working well

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Around the House

with Phil Davy



I'd almost forgotten just how efficient a Tormek wetstone grinder can be, with no risk of

overheating any edge tool in contact with the wheel. Less intimidating than a fast dry bench grinder, too. A need to restore the bevels on a couple of chisels the other day resulted in a mammoth sharpening session. With the grinder set up on a Workmate outdoors, the weather was too good to be indoors. What could be better than fettling a few tools outside in the sunshine? Apart from walking the South West coastal path in glorious weather, that is...

Phil Davy, Consultant Editor

Q&A

Biscuits or pocket screws?

Q When making a framed door for a cupboard from softwood or hardwood with a plywood panel in the middle, how do you decide how wide to make the rails and stiles? Is there a formula that you can use to calculate these dimensions, such as a percentage of the width or length of the door? For example, if I'm making a door 500mm long x 300mm wide, what should the width of rails and stiles be?

K Nairn, London

A It's always best to make a scale drawing before cutting any timber, no matter how simple the design. That way you can get a pretty good idea if rails and stiles will look too heavy, too narrow or generally out of proportion. There's no hard and fast rule, though when using softwood for joinery work it's traditional to use stock sizes, planed timber (PAR) you can buy off the shelf. For a cupboard door I'd suggest 75mm or 50mm timber would be suitable. These sizes are nominal and are dimensions before planing. So, 75 x 25mm sawn timber actually finishes at about 70 x 20mm after machining, while 50mm softwood finishes at about 45mm. With this in mind, try drawing rails and stiles at 70mm or 45mm to gauge the overall effect. You may find a compromise (say 60mm) looks better.

If using hardwood then stock sizes are less relevant, as here it's only board thickness which is standard. That said, stick to nominal softwood sizes and you won't go too far wrong. If you have access to a planer/thicknesser, life becomes easier as you can prepare material to whatever size you like. Of course, you can still plane up components by hand.

The top rail and stiles should be the same width, while visually it's better if the bottom rail is wider. In both softwood and hardwood rails and stiles usually finish about 20mm thick (from 25mm sawn timber), though you may want to reduce this thickness on a small cabinet. Assuming the panel is about 6mm



thick it will take up about one third the timber depth if using 20mm material.

You also need to consider the type of hinges used to hang the door. If using concealed cabinet hinges (eg Blum), these require 35mm-diameter holes, which can affect stile width. If using butt hinges stile width is not an issue as you only need to think about timber thickness.

Summer project

Takes: **one weekend**

OAK GARDEN TRAY



**Tools
you'll need**
Router, jigsaw, sander,
drillstand

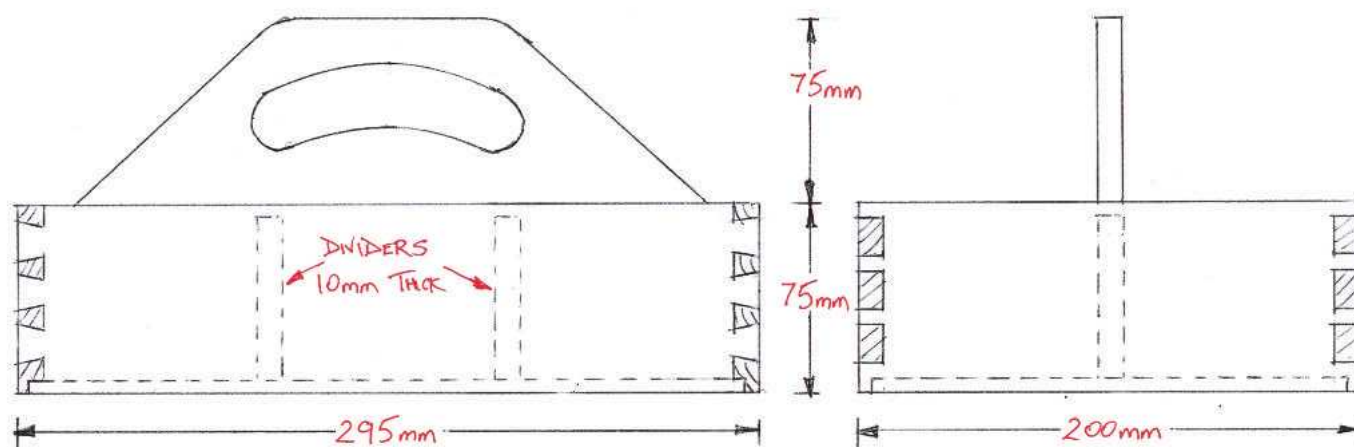
Going potty

Phil Davy's tray is made from recycled oak which will now have a new life in his garden



During a major clear out last year I unearthed an old plans chest that had definitely seen better days. Although made from oak, it had been exposed to the elements and most of it had rotted away. Fortunately, I was able to salvage a few drawer fronts and sides, the timber displaying some lovely figure. It was limited in dimensions, and I wondered how best to use this attractive oak. The answer was this garden tray, compact enough not to take up too much space but with

Fig 1: Garden tray



sufficient capacity for transferring plants to the garden or holding a few small tools.

Slats for the base mean drainage from damp plants or soil should not be a problem, though these could be fitted closer together to make a multi-purpose tray. Great for the home office or kitchen, though you may want to reduce overall size for indoor use, or adjust the divider spacings. As it is, you can just fit a 76mm-

diameter plastic pot in each compartment.

If you don't enjoy cutting dovetails this project is ideal for finger jointing the corners. A dedicated finger-jointing router jig makes the technique straightforward, though if you have a decent router table, a sliding fence and sacrificial board will still make it feasible. Dividers and handle fit into housings a third the thickness of the outer tray timber. To get a

snug fit it's best to rout the housings first, then thickness the divider material so this is a sliding fit. That way you're thicknessing to match the router bit diameter exactly.

Stop the housings 5mm below the top edges of the tray. The handle and dividers are cross-halved so they slot together. Use brass or copper pins to secure them to the tray sides, though pre-drill holes first.



1 When recycling timber always remove old screws or nails first. If rusted, plan saw cuts to avoid defect



2 Inspect all surfaces closely for defects and cut off damaged ends. Thickness clean timber to 10mm



3 True up face edge of side and end pieces with bench plane and shooting board. Check with straightedge



4 Trim ends square on shooting board. Cramp pieces together, face edge down, and plane to width



5 Mark each tray component for width and cramp together. Place on flat surface and plane to width



6 Saw sides and ends 2mm over-length for trimming joints later. Scribe shoulder lines for dovetails with marking knife

Summer project

Takes: **one weekend**

OAK GARDEN TRAY



7 Space dovetails to allow for 5mm rebate at lower edge. Cramp boards together and square lines across



8 Mark out tails with sliding bevel set at 1:8 angle (for hardwood). Alternatively, use dovetail marker gauge



9 Set gauge to 5mm and mark rebate for bottom slats. Pencil in waste to be removed between tails



10 Secure both tail boards tightly in vice at an angle. Cut down sides of tails with dovetail saw



11 Remove waste between tails with coping saw, keeping blade teeth clear of shoulder line



12 Cramp square timber block along shoulder line to keep chisel upright when paring back between tails



13 Cramp pin board in vice and lay tail piece across horizontally. Carefully mark out pins from cut tails



14 Pencil in waste between pins. Saw down sides of pins to form sockets, keeping the blade level



15 Remove waste with coping saw as before. Pare back to shoulder line with bevel-edge chisel



16 Holding chisel at correct angle, trim sides of pins (sockets) as necessary. Check joints fit, and adjust



17 Create 5mm-deep rebate along bottom edges for slats. Cut this on router table for accuracy



18 Cramp parts together and cut 3mm-deep housings for dividers. Run router against guide batten



19 Housings are stopped 5mm below top edges. Square rounded ends neatly with chisel



20 Clean up inner surfaces and check for fit. Glue and cramp up tray, checking for square



21 Once glue has dried, trim protruding dovetails flush with finely set block plane



22 If required, glue boards together to achieve sufficient width for carrying handle. Thickness when dry



23 Draw handle cutout with flexible curve or arched steel rule. Allow enough width for sanding drum



24 Mark hole centres and cramp board to backing material. Bore ends of cutout with 25mm flat bit



25 Remove remaining waste between holes with jigsaw. Use this for sawing tapered edges of handle



26 Clean up cutout with 25mm sanding drum or rasp and file. Smooth edges with abrasives



27 Handle and dividers are slotted together. Mark out halving joints and carefully cut away waste



28 Thickness slats to 24 x 5mm and saw to length. These can be pinned or screwed into rebates



29 Rout small decorative chamfer along edges of tray and dividers. Sand with 180grit abrasive



30 Brush on two coats of finishing oil, wiping off after a few minutes. Alternatively, add wax if for indoor use



Useful kit: Skil Fox 2 in 1 sander

Foxy fixed speeds



There seems to be a growing number of budget 240V multi-purpose sanders available these days.

Hardly surprising when consumer brands compete to tempt the user who may only want to buy one sanding tool for occasional work. For finishing a variety of surfaces this can make such tools an attractive option, although whether they will perform as well as dedicated single-format sanders is perhaps open to question.

Unlike the Ryobi model we tested in GW291, the Skil Fox combines a disc sander format with a delta pattern. This time you only need remove one retaining screw to swap the bases, though. A hex key is provided for this and it takes no time at all. The delta base is unusual in that you can swivel it to any position, even pointing backwards. Like many sanders the front triangular pad is attached by Velcro and can be removed fast and rotated as the tip wears. All pads feature hook & loop fixing and a reasonable number of abrasive discs and sheets is supplied.



Bases are speedily swapped via a hex key



The delta base can be swivelled in any direction



The pads are secured with hook & loop fixings...



...and several discs and sheets are supplied

Electronic braking

Instead of variable speed, the Skil has two fixed speeds (9500 and 13,000rpm), activated by the 3-way power slider button. This works well and I found it more effective than relying on a speed dial, which invariably gets left set at maximum. You can instantly switch between speeds, which arguably is all you need. Electronic braking means the tool comes to a standstill quickly. With the 125mm-diameter pad fitted you have a fairly efficient sander for those larger flat surfaces. Although this is not a true random orbit mechanism – there are inevitable swirls left on the surface – it's still pretty effective.

Motor rating is 250W, while cable length is 2.8m. Weighing 1.3kg, this is a fairly lightweight tool, so not too tiring for vertical or overhead work. There's plenty of soft-grip rubber where it's needed, adding to the Fox's ergonomic credentials.

Dust collection is via a rigid plastic box which is a push-fit at the back of the tool. Inside appears to be a fabric filter, though you can't access this. Once the box is full you just



The fixed speeds are activated by a 3-way slider button



The 125mm pad copes with larger flat surfaces

tip out the contents. No adaptor is provided for hooking up a vacuum extractor, though this is an extra accessory.

Conclusion

Sanding performance was better than expected and it's a comfortable tool to operate. Having the disc sander option is

certainly an advantage. Don't forget that the Fox is not a professional power tool, so it can't be expected to work for extended periods without overheating.



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Gem of a design



When **Les Thorne** was asked to turn a necklace stand he knew it would have to hold other items too...

You must all think that 'management's' dressing table would be full by now, being home to all sorts of handy wooden turned items of treen, but no, the request for a necklace stand came in after seeing one made from wire at a shop.

I don't often have to design things from scratch because I can normally find something similar in books or on the net, but I struggled to find something that I liked. A couple of issues needed to be overcome while designing the piece. It needed to be of a height that allows longer items of jewellery to be hung; this means the base would have to be heavy enough and wide enough to stop it toppling over even when there was too much hung on one side.

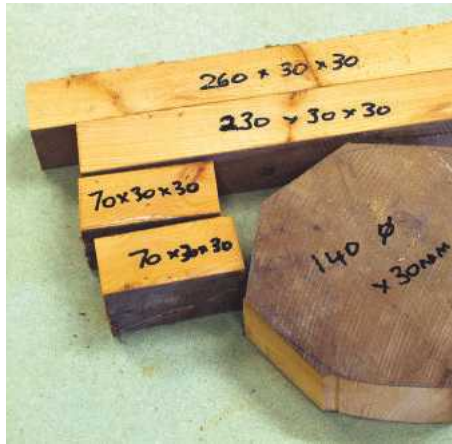
The other thing that I was requested was somewhere from which to hang bracelets. This meant that another pair of arms was needed lower down. The idea of making the base into a bowl was mine, allowing rings, earrings and brooches to be placed into it.

I think that it's really important to make this type of work stylish and elegant because too chunky a design would look terrible on a dressing table, and I hope I have got the balance of this piece just right. Feel free to copy it and do let me see your finished pieces.





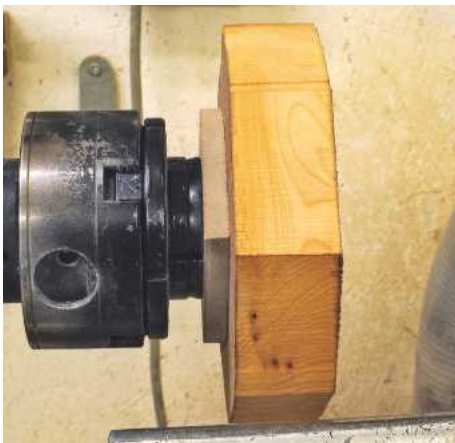
▲ Pic.1 A great piece of wood, this yew plank had been hanging around for a long time. There are some defects in it but Les should be able to work round them



▲ Pic.2 Instead of cutting the blank for the base round he has cut the piece into an octagon on the bandsaw. This saves wearing the set on your bandsaw blade unevenly



▲ Pic.3 One of the problems with yew is the appearance of faults like this. Silver shake appears naturally in the timber and is very difficult to fix, so is best turned away



▲ Pic.4 The shallow base means that Les has to use a spacer block to shorten the screw chuck. He could also have glued it onto a wooden faceplate



▲ Pic.5 True up the base with the bowl gouge. Keep the bevel pointing in the direction of the cut and keep the flute pointing at 10 o'clock to achieve the best finish



▲ Pic.6 Make the bottom flat or slightly concaved. A pull cut with the gouge or a light cut with a scraper is perfect, sliding your hand along the toolrest to guide the tool



▲ Pic.7 Les is marking the diameter of the chucking recess on the bottom. The left-hand point makes a scratch that will line up with the mark on the right when correctly aligned



▲ Pic.8 The recess depth is 3mm, allowing the hole to be plugged with hardboard before the baize is applied. The chuck's sharp dovetail jaws will grip the shallow hole



▲ Pic.9 Shape the base with a pull cut with the gouge, this being the quickest way to remove timber. If the flute of the tool is too shut you will blunt the tool quickly

Turning



▲ Pic.10 Any detailing such as this small fillet is cut with a skew used in scraping mode. The tool is flat on the rest and gently pushed into the wood



▲ Pic.11 The edge bead is rolled over using the wing of the gouge. The beads on a cross-grain piece like this are turned the opposite way to spindle work



▲ Pic.12 Before doing the shaping on the top, drill a 30mm stem hole with a saw-tooth bit. Slow the lathe down to about 400rpm when doing this



▲ Pic.13 Work the gouge in from the centre and then down from the edge. This is because Les decided to make a small bowl on the base



▲ Pic.14 He has swapped to the small Signature gouge because the bevel of this tool will fit perfectly in the tight curve on the edge of the base



▲ Pic.15 The finish left by this tool is perfect. When turning yew you really have to be careful about rubbing too much bevel as you can end up with ridges on the wood



▲ Pic.16 When sanding the shape don't round over the edges. The main benefit of hand turning is that you can achieve really crisp edges that cannot be done on most automatic lathes



▲ Pic.17 The stem is mounted between centres using a small Stebcentre. The spigot on the bottom has to be a really tight fit so use Verniers to gauge the right diameter



▲ Pic.18 Les has now marked on the fixed areas, like the overall length and where the small lower arms come out



▲ Pic.19 The 10mm skew is used for all the V cuts as it achieves really sharp deep grooves. Be careful about thinning the work down too much too quickly



▲ Pic.20 The small gouge is used for cutting the coves. The small bevel will only put a small amount of pressure onto the timber. A long stem can be built up with a series of these shapes



▲ Pic.21 When you have a large cove like this you can break it up with a bead in the middle. As the piece gets thin you can support the spindle with your finger as you are turning



▲ Pic.22 When turning coves keep the tool handle tucked into your body. As you cut this shape make your body go through to the right as you slide the tool through the cut



▲ Pic.23 Les really likes these tight little details. Turning such narrow coves you will have to be careful not to catch the right-hand side when cutting the left and vice versa



▲ Pic.24 The flat left in the shaft is for the arms to come out of. I thought about putting a cove here and in hindsight I should have – Mark II will have one



▲ Pic.25 Les is using the indexing on his lathe as well as a purpose-made drilling jig. He could have done it carefully freehand or using the banjo instead of the toolrest



▲ Pic.26 He is turning the top spigot down to 10mm to fit into the top cross member. It can be worth taking a little tailstock pressure off at this point to prevent splitting



▲ Pic.27 The small gouge is used to blend a cove into the spigot. This tends to hide the hole when it's all glued together. Don't be afraid of getting right up next to the centre



▲ Pic.28 The small arms are mounted between centres and roughed round to about 20mm. Turn the spigot on one end and take the waste down at the headstock end



▲ Pic.29 The bead is turned next to the drive centre. The 10mm skew is used, this tool allowing a good finish and only a little of the top to be finished by hand



▲ Pic.30 Les is happy with both of them. A good match has been achieved by marking out and measuring. The little gun barrel design on the right of the bead is particularly pleasing



▲ Pic.31 The top cross member is mounted up last. The dark area in the centre will be where the hole will be drilled. He marked out a series of coves by eye



▲ Pic.32 Cut a series of coves along the length, working from the tailstock end towards the headstock. Not only do they look decorative but they will also stop the jewellery falling off



▲ Pic.33 He decided to finish the ends in a mushroom-top shape. You can take down the shape just leaving a few millimetres of timber remaining



▲ Pic.34 Once it's all glued together you can put baize on the bottom. This is Les's new circle cutter, the benefit of which is that it doesn't make a hole in the middle



▲ Pic.35 For a glossy finish Les omits sanding sealer on this dense timber, and applies lacquer followed by burnishing cream when the lacquer is dry



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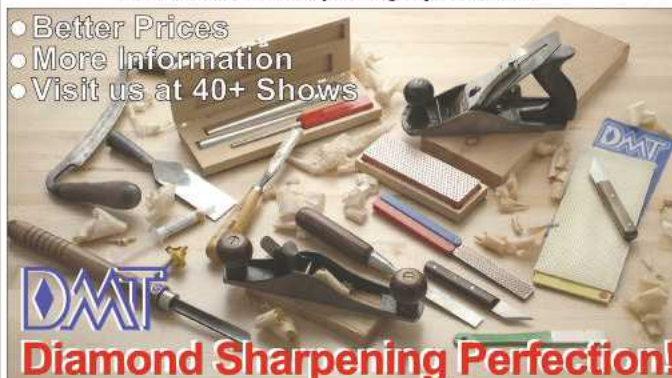
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MEET SCRUFFY DOG

Here we are slap bang in the middle of the festival season. Glasto's in full swing but there are lots more to enjoy this summer, and it's more than likely that an enterprising company called Scruffy Dog may well have had something to do with their set designs. Dave Roberts investigates

LAPPED DOVETAILS

In this latest instalment of his foundation course Michael Huntley pulls out all the stops – pardon the pun – to show you how to make lapped dovetails, the kind that are usually found on drawers, and details their setting out and cutting

PLUS...

Dave Roberts offers his unique take on wood-working problems and solutions, Andy King scrutinises the latest tools, Phil Davy has a weekend Around the House make and Les Thorne lets his lathe do the work



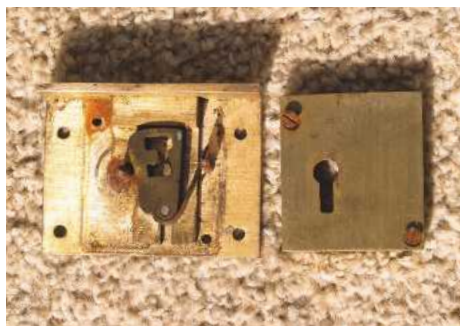
Finishing Touch

Origin of locks

Michael Huntley's history of locks



Two early 18th-century steel locks; the one on the left has a link plate



A George IV lock with cover plate removed to show levers and spring



A bureau lock and a small box lock



A tumbler lock similar to a Bramah lock

The earliest locks were pin tumbler locks, sometimes known as Egyptian locks, and date from about 2000BC. They consist of a bar and some pins; the pins drop to lock the bar and are pushed up with the 'key' to unlock. Roman locks were much more like modern locks. They had 'wards', little metal strips around the post that had to match the slots cut in the 'bit' of the key. From Roman times until 1778 locks had more and more complex wards, German metalworkers being very well known for their intricate locks on strong-boxes designed to hold money and jewels.

In 1778 Robert Baron invented a system using levers held against a spring, that had to be lifted a precise amount and in unison. These were much harder but not impossible to pick.

In the 18th century many locks were made in small-scale enterprises around the Midlands which sold to travellers who then sold on to retailers.

In 1818 Jeremiah Chubb made locks with a mechanism that detected interference with the levers by anyone trying to pick the lock. The lock then seized and couldn't be opened unless you had the correct key. From Chubb's improvements furniture locks remained very similar until the mid 20th century except for Bramah locks, which are a special type of tubular pin tumbler lock that is almost impossible to pick.

One or two specialist locks are worth mentioning. A bureau with a sloping front will require a lock with the fore edge sloping and a special keep that matches the slope. A box or chest lock will have a link plate that has hooks fitted to it, the lock itself having a specially designed bolt to secure the little hooks.

The Encyclopaedia of Locks by Joshiah Parkes listed 120 specialist locks in 1958.

Well-known manufacturer's names are Chubb, Goodwin, Parkes, Marshall, Showell, Vaughan.

Resources

Suppliers of locks for furniture,
www.j-shiner.co.uk

Forum about studying locks,
www.antique-locks.com/

Supplier and authority on locks and keys,
<http://emorlands.com/>

The Handyman's Book,
PN Hasluck, Cassell & Co.

The Complete Book of Locks and Locksmithing,
CA Roper, Blue Ridge Summit, Pennsylvania:
Tab Books, 1991.

Lock and Key,
Stephen Tchudi, New York: Scribner's, 1993.

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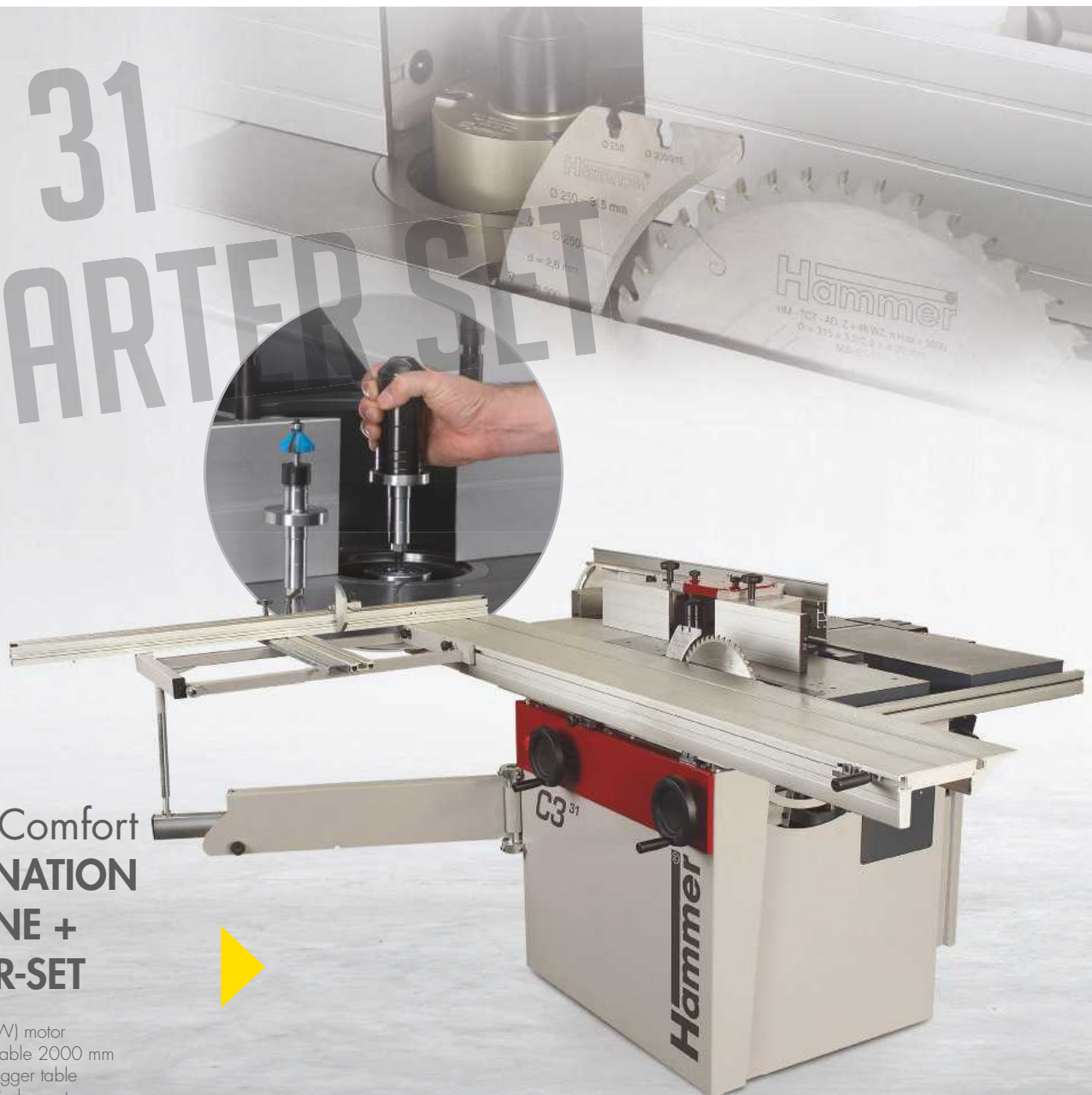
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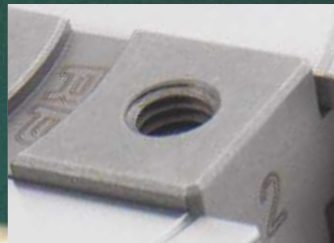
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