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DESIGN WITHOUT BORDERS

The new look, relaunched *F&C* has gone down well with most readers with very few dissenters, overall it has had a very positive reception especially the features which show a global diversity of design and manufacturing talent. Down the aeons of time, designers and makers of both furniture and architecture have practised their art and their skills in many places around the world and we have picked up on those influences. The late Alan Peters OBE was latterly influenced by Japanese design in his thinking. Isokon Plus are still producing the Marcel Breuer plywood recliner. We often look to Swedish 20th-century design for ideas that exhibit clean, stylish lines. There are so many sources of good ideas, we certainly don't have a monopoly on them in this country. So in this issue we have features from the USA, UK, the Netherlands, Canada, Spain, Italy and Brazil. We think that's a good mix of influences that should appeal to all our readers.

'Simple can be harder than complex: you have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains.'

STEVE JOBS (1955-2011)

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F&C ISSUE 291

Furniture & Cabinetmaking magazine (ISSN 1365-4292) is published every eight weeks by Guild of Master Craftsman Publications Ltd, 86 High Street, Lewes, East Sussex BN7 1XN T: +44 (0) 1273 477374

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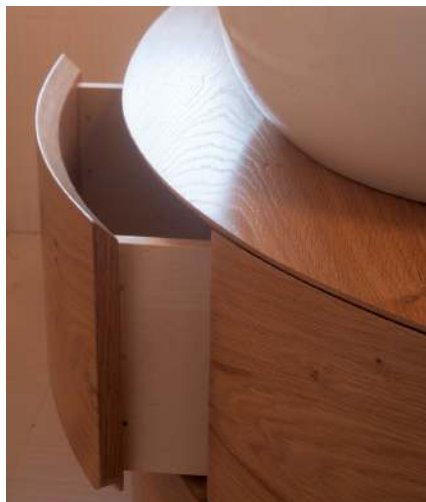
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COVER IMAGE Walter Hergt

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Woodworking is an inherently dangerous pursuit. Readers should not attempt the procedures described herein without seeking training and information on the safe use of tools and machines, and all readers should observe current safety legislation.



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FURNITURE & CABINETMAKING

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CREDENZA WITH BASIN

FRANCESCO CREMONINI APPLIES A MIX OF CLASSIC AND MODERN CABINETRY TECHNIQUES TO A PIECE OF FURNITURE WITH MANY SECRETS

Beyond its role as support for a sink, this piece of furniture is also a capacious sideboard, complete with drawers and doors, which can be used in other rooms of the house without seeming out of place. It has a sinuous shape composed of a few lines, the thickness of the components not showing through because the upper edge of the openable fronts is 45° in the plane.

The structure of the sideboard, measuring 2,000 x 640 x 550mm, is formed by four vertical panels between the upper and lower panels with wooden dividers, forming five cupboards. The first, a pseudo-triangular shape, has a central

shelf and two overlapping doors, one hinged to an upright on the wall to the side. The three cupboards to the left are divided vertically to accommodate two drawers on runners with soft-touch closure. The 10mm back is inserted in a groove formed all round 6mm from the rear edge with shallow slots to align the vertical panels.

The sideboard was designed to fit in the corner of the room and extend for 100mm into a recess formed by the second wall. The outline of the recess was copied on both surfaces and the small compartment shape created, closed with a fixed panel,



PHOTOGRAPHS BY FRANCESCO CREMONINI



can be used as a small hiding place. On the side there is an opening which can be accessed after removing the drawer. The piece of furniture is held by four metal squares screwed to the back panel and then to the wall with expansion plugs.

YOU WILL NEED

Wood and blockboard:

- Poplar blockboard with 19- and 25mm-thick oak veneer
- 2mm-thick oak veneer
- Solid oak in boards 30mm thick
- 15mm-thick birch phenolic plywood
- Poplar multilayer white bilaminate 10mm thick
- 100mm thick polystyrene panels

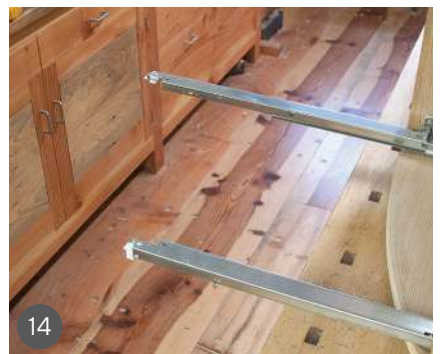
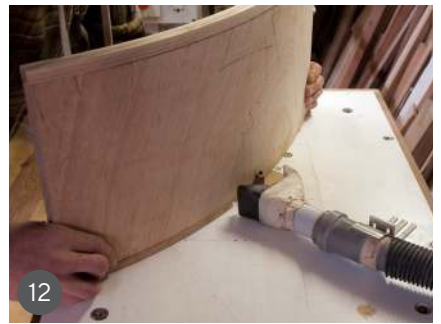
Hardware:

- 2 x runners Blum 460 x 450mm
- 2 x runners Blum 460 x 500mm
- 2 x runners Blum 460 x 550mm
- 4 x concealed hinges Koblenz Kubikina

- 4 x cylindrical neodymium magnets 6 x 6mm
- 4 x L-shaped brackets on 80 x 40mm sides
- 9 x 800 x 100mm expansion plugs

TEMPLATING

1 & 2 Both top and bottom panels are made of oak laminated poplar, the lower one 19mm, and 25mm for the top. The remaining dimensions are identical, as is the curved shape. After drawing it on the upper board and roughly cutting it with the jigsaw, it was shaped using a router and bearing-guided cutter running against a flexible curve screwed directly to the upper face of the panel. To achieve a more resistant long-lasting support surface, it was veneered with the same material used for the fronts. Shaping the bottom panel was done in a similar way but with the guide bearing running along the first panel to create an identical shape. Flexible templates are very easy to use but the uniformity of the curvature must be checked by eye before routing the shape.





3 Glue was applied on the strips that had been previously curved with a heat gun.

4 The clamps were pressed on wooden blocks screwed to the rear edge to hold the laminated edging to the top. This was done after a trial dry assembly.

5 The finished upper panel. The strips were carefully chosen to give the best result.

6 From the profile of the lower panel we get the ribs for constructing the laminated front.

THE SHAPED FRONTS

7 & 8 Each shape is formed with twin ply ribs and a 100mm-thick polystyrene block that is shaped with a hot-wire knife.

9 The curved panels were vacuum laminated.

10 The fronts were arranged along the cabinet for checking the shape using the reference given by the lower panel.

11 The ribs of the former were also used for the shaping of the curved edges. After planing a reference edge, the curved panels were divided into two to make the fronts. In addition to pushing the piece forward, it also had to be tilted by holding it close to the fence on the saw table.

12 The edge was machined flush on the router table. The curvature increases the stability of the front making it easier to keep upright.

THE DRAWERS

13 The drawer joints give remarkable solidity even without the glue, if the width of the groove is identical to the tenons.

14 The movement of the drawers is enabled by two runners of different lengths based on the size of the sides.

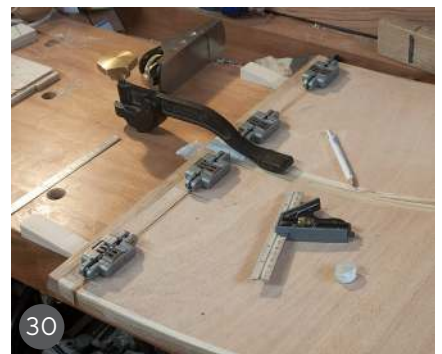
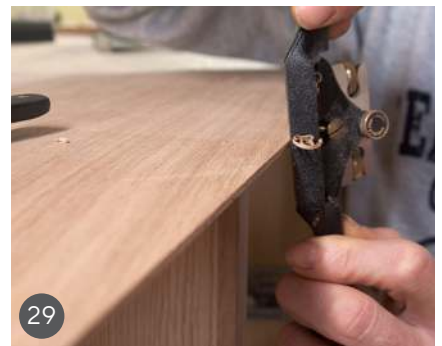
FITTING THE DRAWER FRONTS

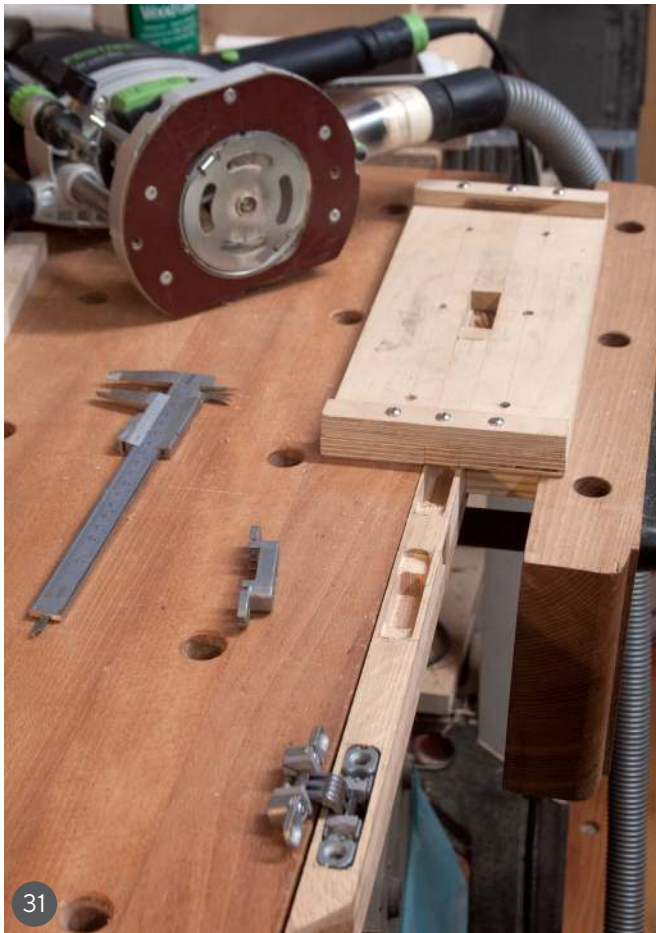
15 The internal profile of the drawer front was traced on the bottom.

16 The drawer was reassembled after the curved cut of the bottom with the jigsaw.

17 The groove was machined with the parallel guide fitted.

18 Next, the dovetail housing was machined on the fronts. On the more curved ones, the base of the machine does not rest flat, this can lead to an unwanted angle of profile. The housing must be stopped before the upper edge so it is not visible when the drawer is open.





19 The junction inserts between the fronts and the sides of each drawer were then prepared. Six 6mm plywood sandwiches were needed to get the 12 required inserts.

20 In this image you can see the truncated ends with different angles, where the fronts meet the sides of the drawers.

21 Using a WoodRat router control allows the inclination of the sliding surface on which the workpiece is clamped. Two stops establish the positioning of the tool working from both sides of the dovetail.

22 A test fit was made, the opposite end which has yet to be machined, will provide the insert for the upper front, when the panel will be divided into two.

23 The connection system of the fronts with the sides was now practically completed.

24 The pointed shapes of the upper edges of doors and drawers were roughed out with a drawknife.

25 An L-shaped support was clamped to the front to keep it perpendicular to the plane and offer a stop that prevents the cutter from chipping or damaging the edge at the end of the pass.



THE UPPER LEVEL

26 The 45° bearing-guided bevel cutter runs on the template that reproduces the outline of the plan profile. Given the poor support of the machine, an extended sub-base with a sturdy handle was essential.

27 The composition chosen for veneering the top.

28 The veneer and adhesive in place in the vacuum bag.

29 The drawknife is the best tool to equalise the edge bead shape.

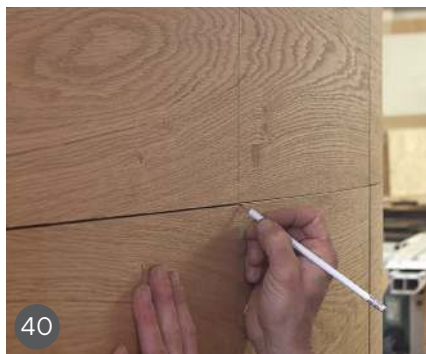
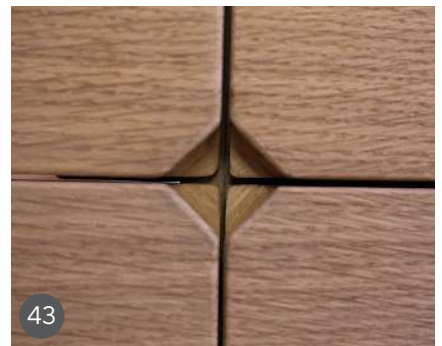
THE DOORS

30 Here you can see the two doors and the side upright with the positions of the recesses for the concealed hinges being marked out.

31 Machining the trenches on the upright was simpler than that performed on the doors where the curvature made it more awkward.

FINISHING THE FORM

32 The length of the front was adjusted with a plane. The mechanism for attaching the drawer to the guide is connected to the front through a shaped spacer, which can also be seen here.





33 Sanding the surface of the doors including the curvature needed careful checking to ensure a smooth shape.

34 The upper section of the fronts was levelled with the scraper to avoid damaging the upper panel lipping.

HAND GRIP SHAPING

35 The bevels on the fronts were trimmed by hand.

FACADE VENEER

36 When a vacuum press is used to veneer the elements of the facade, it is necessary to close the grooves with slips of wood. The inserts don't need to match perfectly, but they must be left longer to slide them out easily and treated with wax to avoid sticking.

37 The vacuum-packed sheets were pressed, four elements at a time. This process was easy because it does not require shapes or counterforms of any kind.

38 The drawknife was used to remove the surplus veneer level with the edge.

39 The dovetail insert fitted in place. This leads to the formation of a step that will hide the end of the drawer sides.

ASSEMBLY AND DISASSEMBLY

40 With the alignment of the fronts confirmed, the trimming necessary to create uniform joints between the elements could be marked out.

41 The hinge pockets were machined ready for mounting the doors.

42 A small paper template was used to mark out the finger pulls prior to hand shaping using a gouge, riffler and abrasives.

43 Close-up detail of the meeting of the finger pulls, which needed to be perfectly aligned.

THE SECRET COMPARTMENT

44 A broad chisel was used to create a bevelled slope as a means of opening the compartment panel.

45 Access to the secret compartment is well hidden but still functional.

THE PAINTING

46 A clear base coat was applied using a roller. The roller's short cotton bristles allow uniformity of finish.

47 The exterior surfaces were spray lacquered, bringing out the beauty of the wood.

48 The cabinet was fixed to the bathroom walls with four L-shaped brackets screwed to the vertical partitions and held with screws and expansion plugs. The cabinet has been drilled for the passage of the sink drain pipe.



WOOD, WIT AND WISDOM

ARTIST AND DESIGNER **SEBASTIAN ERRAZURIZ**'S PLAYFUL FURNITURE INVITES VIEWERS TO TAKE A FRESH LOOK AT PIECES THEY MIGHT OTHERWISE TAKE FOR GRANTED

Take a bit of conceptual art, mix with a mastery of furniture-making and sprinkle over a generous helping of humour and you might get Sebastian Errazuriz. But then again, you probably wouldn't. After all, it takes a pretty unusual mind to come up with a coffin that is also a boat, a shelf that is also a branch and an exploding credenza.

Chilean-born Sebastian is only the second living South American artist to have his work auctioned at Sotheby's Important Twentieth Century Design event. He has exhibited in New York's Times Square, in the New York Museum of Art and Design, the National Museum of Design in New York and the Kiasma Museum of Contemporary Art in Helsinki. He was named Chilean Designer of the Year in 2010 and *Wallpaper* magazine has described him as 'a bold and fearless innovator', producing 'original and provocative works'.

Sebastian works across a broad swathe of different media, from T-shirts and pencils through video technology to

augmented reality. His portfolio spans contemporary art, tech, design and craft – but furniture forms a central part of his work. His design collection features a series of items that look at first glance like traditional furniture forms – but which in fact surprise and subvert, doing something more, or different, or both. They invite viewers to look with fresh eyes at something they might not normally notice, and hide their differences in plain sight.

The mahogany Piano Shelf is one example. A series of piano-key-like slats can be flipped up to lie flat against a wall, or flipped down to become shelves. They provide exactly the amount of space needed for an item, and also frame it in wood. The design was hand-crafted over several months, and each of the hundreds of pieces of wood involved was regulated individually with a tiny hidden screw to make sure the shelves were perfectly level. This piece, originally designed in 1997, has been described as a signature example of Sebastian's 'paradigm-shifting creativity'.



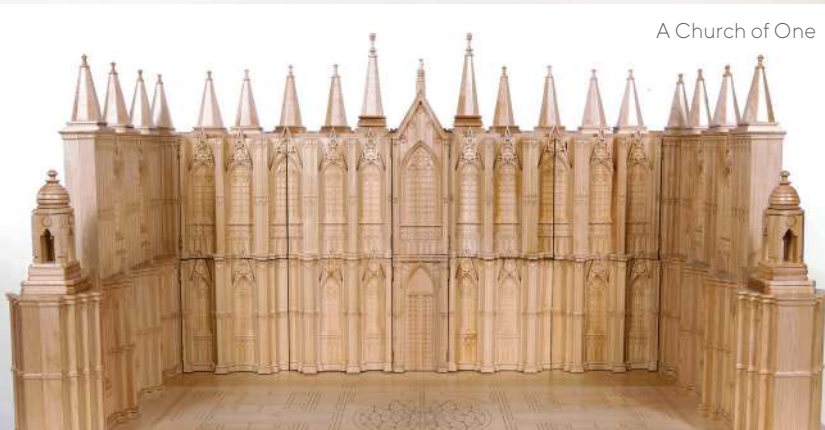
Explosion



Grand Complication



A Church of One

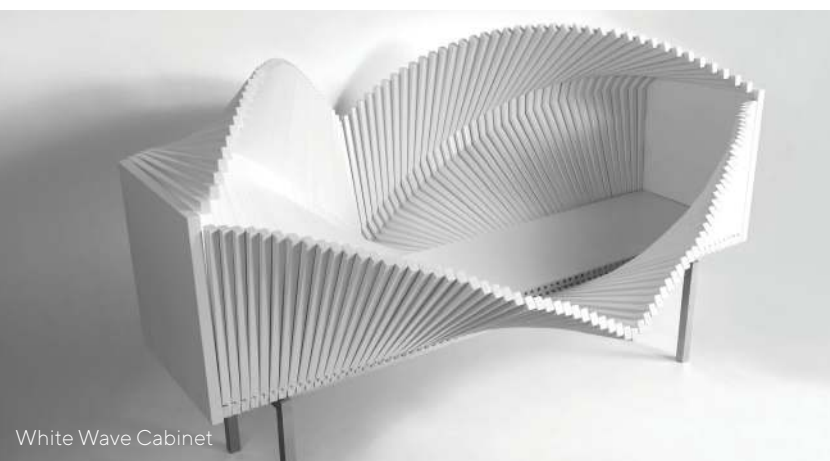
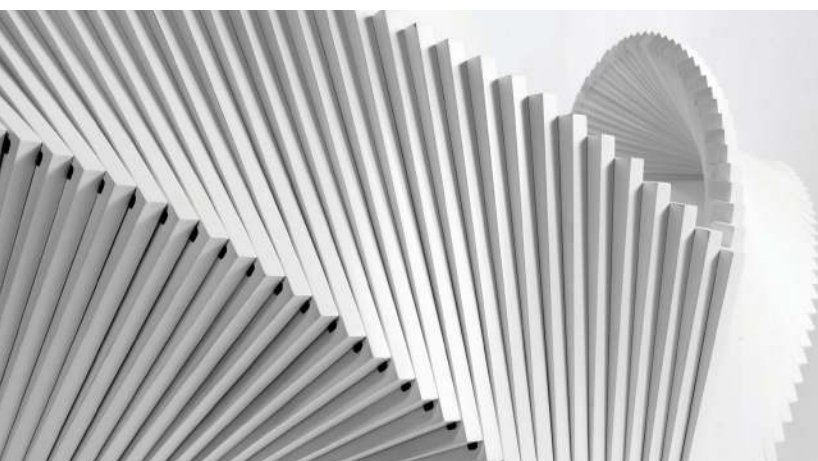


Fan Cabinet

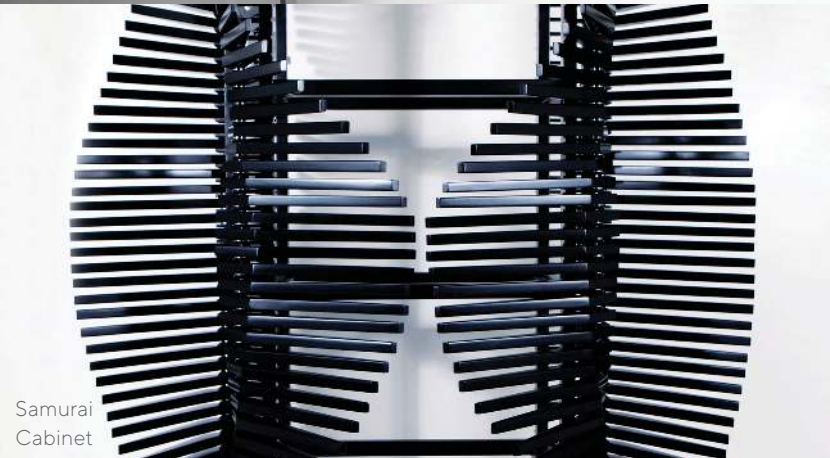
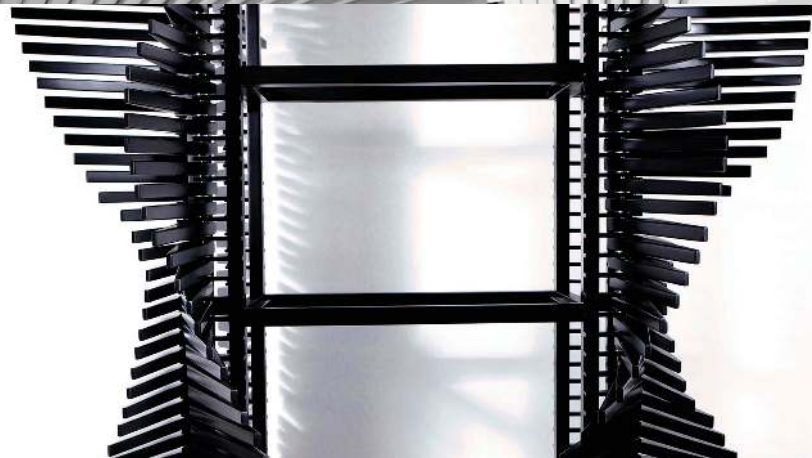


Magistral Chest





White Wave Cabinet



Samurai Cabinet

CABINETS OF MYSTERY

Again and again Sebastian returns to the cabinet, playing on this classic shape to create something different, challenging and often humorous. He explains: 'I'm inviting people to look at one of the simplest forms of furniture design and to forget that we're talking about furniture, instead to see it as a way of breaking a box. I love the idea of creating beautiful furniture; nevertheless I am much more interested in using the medium as an excuse to trigger people's curiosity and create a connection with them.'

Explosion is at first sight a simple, mid-century modern-style cabinet made up of a series of slats of wood. Crafted from maple, glass and stainless steel, Explosion has transparent side walls showing the inside of the box. But when the sideboard is opened, it turns out that each slat of wood is on a rail, made using sliding dovetails, and they slide farther and farther apart until the piece looks as if it has exploded. Explosion was one of the centrepieces at Sebastian's first solo museum exhibition at the Carnegie Museum of Art in New York. Exhibition curator Rachel Delphia described it as 'a masterwork of contemporary furniture design and craftsmanship' and 'a beautiful, surprising and confounding work that represents the playful conceit of the master cabinetmaker showing off'.

The Samurai Cabinet was designed in 2014 in lacquered maple, stainless steel and glass. It is made from nearly 400 individually movable keels which construct a flexible skin, allowing the cabinet's contents to be accessed from any angle. The small, spear-shaped pieces allow its shape to shift and change depending on the positions in which they are arranged. The keels are cleverly counterbalanced on a pivoting point, so

that each spear instantly flips open by simply sliding a finger down its side. Sculpturally the cabinet reminds of spiked armour, protecting its valuable contents, and like much of his collections, it was handmade in Sebastian's Brooklyn workshop.

Made of lacquered Baltic birch, steel and glass, the Wave Cabinet opens like a fan or an accordion, with each individual slat pulling along the following one. It can be held open or closed in a number of different configurations and looks afresh at the way we open and close cabinets.

Another take on the cabinet is the Magistral Chest from 2014, made of hardwood maple, bamboo, plywood and metal hardware. It is encased in an outer shell of more than 10,000 corn dog skewers that make it look like a sea urchin or porcupine, a slightly menacing sculpture that doesn't show any signs that it can be opened. But when it does slide open it shows a hidden interior designed to contain personal valuables. The skewers took a team of four people more than five weeks to fit, following 16 weeks of woodwork to make the piece. Including sketching, development and blueprints, the whole project took almost eight months.

FROM CHILE TO NEW YORK

Sebastian was born in Santiago, Chile, and studied for a BA in Industrial Design there before moving to New York – where he now lives and works – and obtaining a Master of Fine Art degree from New York University. He is not from the same Chilean family as the popular Errazuriz wine brand, but did get the winery to produce a personalised limited edition bottle for him for his 10th anniversary exhibition in 2012.

Sebastian set up his first studio in Brooklyn, now a 5,000 sq



Boat Coffin



Bilbao Coffee Table



Bilbao Coffee Table Natural Wood



Bilbao Tree Shelf

ft space divided into a lab, wood workshop, design area and project space. In 2017 he founded a second studio, Cross Lab, in the South Bronx, where he mixes art, technology, design and communications to produce innovative solutions for contemporary issues, investigating the impact of emerging technologies to help organisations, institutions and brands confront current and future challenges.

As well as an artist and designer, Sebastian describes himself as an activist, and much of his public art aims to get people to look at themselves in a fresh way, much in the same way his furniture does for a smaller audience. One of his most striking pieces is the Boat Coffin. Made from wood, metal, textiles and a real outboard motor, it is designed to give the 'user' a voyage to the next life, as in Egyptian and Viking funeral traditions. In March 2019 he launched blu Marble, a monumental, 20-foot-high LED structure showing a live stream of the Earth from space. 'Blu Marble is a reminder of our miraculously fragile existence. It places our very existence in perspective at a global level – as a tiny speck in space – beckoning us to live fully with an awareness and mindfulness of our limited time on this vulnerable and beautiful planet,' explains Sebastian.

WHERE ART MEETS FUNCTION

Sebastian's furniture projects combine utility with conceptual artistry, posing some serious design challenges – so once he has an idea, he always starts with a drawing. He tells *F&C*: 'The process then goes through more sketching, 3D modelling, models, blueprint and scale one prototype to find the perfect proportions, materials and mechanical system. Each cabinet is

an original concept and takes about a year of development to become as simple, clean and perfect as I first envisioned it.'

In his Bilbao designs – shelves and coffee tables designed to look like tree branches – Sebastian combines natural branches with hand-carved replicas. 'The pieces of the Bilbao series are each unique,' he explains. 'I start with a scale one hand drawing and then combine real found branches to hand-carved branches with my team in Brooklyn. The result is a mix of handmade and natural branches combined to create a sort of hybrid sculptural furniture.'

Many of his designs involve cantilevers, but he won't share the secret of how he overcomes stress issues to make them strong. 'Chefs never reveal their secret ingredient,' he says.

Sebastian can find inspiration anywhere and everywhere – 'I guess it's a cliché,' he says. 'I am very attentive to new technologies and the way they will impact us. I am currently working on a new platform addressing this.'

Looking forward, Sebastian plans to continue working in wood and metal. 'I love working with strong and noble materials like wood and steel,' he says. 'I believe there is a certain satisfaction in designing in the same materials in which other people have worked over centuries. It subscribes your designs into a tradition and a dialogue that is much bigger and important than our own personal contributions. I nevertheless believe that each project has to be realised in the material which can represent in the most honest way the original nature of the idea. But I am also very interested in working with new technologies to see how they can be challenged.'

meetsebastian.com

WORKS AND WORDS

Sebastian Errazuriz introduces some of his key furniture pieces

ANTIQUITY (2014)

This piece is an homage to the historical Venus d'Arles – a statue which was originally a gift to the city of Arles from Julius Caesar but was lost until the 17th century, when it was found in Versailles. Antiquity is made of mahogany wood and brass elements surrounding a plaster replica of the Venus d'Arles from around 1880. The shelves surround and partially obscure the statue, and function as bookshelves as well as an art work.

Sebastian says: 'I wanted to play with the notion of the seen and unseen. At the same time, my goal was to turn an invaluable statue into a functional design, breaking the boundaries of classification and turning one of the world's most famous sculptures into a mundane bookshelf.'



THE KALEIDOSCOPE CABINET (2013)

The Kaleidoscope Cabinet, also known as 'the space between the void', is a walnut hardwood cabinet lined with bevelled mirrors, bronze and electric components to create a kaleidoscope effect that multiplies whatever is placed inside it. It includes an interior light and a peephole so that, even when the doors are closed and the cabinet locked, the viewer can still peer inside and see the contents multiplied infinitely in the kaleidoscope.

"The space between the void" is another attempt to deconstruct the paradigm that a cabinet should simply be a box with two doors,' Sebastian says. 'This particular cabinet was created in memory of an old aunt I had when growing up, who always told us we could "look but never touch" the beautiful objects she had in her house. The fact that these objects were out of bounds only made them more magical for my brothers and me, who were mesmerised on every visit.'





BIRD LAMPS

Sebastian created the Bird Lamps and Bird Chandelier to explore the sculptural and functional qualities of art and design using real taxidermy.

He says: 'The series places a focus on a body of work that has always captivated audiences. Like a precarious juggling act, these aviary lamp sculptures manage to juggle between the absurd and the humorous, the morbid and the disgusting, the prohibited and the naïf.'



THE NARCISSUS DESK (2014)

A repurposed antique French desk from around 1880 is adapted with mirror, bronze and wood additions to evoke the story of Narcissus, the beautiful boy of Greek legend who fell in love with his own reflection in a pool of water, was unable to leave it and died there.

Sebastian says: 'I was struck by the idea that someone could see their reflection and yet not be aware they were looking at themselves. I believe today we are becoming like Narcissus – so obsessed with our own perfectly edited online self that we forget to be aware of the real "me" outside the screen.'

'I love the way the user now enters right into the cut we created in the desk. His body is reflected like a queen of hearts on a playing card. Surrounded by yourself – the viewer is suddenly, very aware of himself.'



10 TIPS TO ESTABLISH YOURSELF AS AN EXPERT IN YOUR FIELD

FOR YOUR FURNITURE BUSINESS TO STAND APART FROM THE COMPETITION AND THRIVE, IT'S A CLEVER IDEA TO GAIN A REPUTATION AS AN EXPERT IN YOUR FIELD. OUR TOP-10 LIST WILL HELP TO GET YOU STARTED

1 WHO ARE YOU UP AGAINST?

This is key to working out what your USP (Unique Selling Point) is to the clients you want to reach. Think about what will grab the attention of the people you are targeting against the competition.

2 WHAT INFORMATION WILL HELP POTENTIAL CLIENTS?

The process of becoming a 'go-to' expert starts by giving helpful information to your target audience. This should be content that appeals to their wants and needs. It's also good to develop an

anticipatory antenna: tune in to the issues they might face further down the road and head them off at the pass, for example you could include a page on your website with tips about long-term care of different types of wood, oil finishes, etc.

3 THE WORLD IS AT YOUR FINGERTIPS...

In the digital age, there's a wealth of ways to get on the radars of your client hit-list. Communicating with your audience is nothing new: Benjamin Franklin, one of America's founding fathers, was wise

to the power of finding a platform to get his message out there. From humble beginnings as the son of a soap-maker to the best-known thought leader of 18th-century America, the wily Franklin gained close access to communication platforms. As an apprentice at a printing press, he sneaked letters into his brother's newspaper under a pseudonym before becoming a newspaper editor, prolific publisher, printing press owner and eventually the postmaster presiding over America's first communications network. Your own ambitions may be on



'Remember that nobody starts out as an expert – it's a process of learning and yes, making mistakes.'

As you gain in confidence, you'll naturally include other platforms.

5 GET BLOGGING!

This is a super-easy way to connect with your audience, increase traffic to your website and create the foundations for establishing yourself as a furniture expert. Regular blogging about your work will help you clamber up the rankings in search engine result pages: essential for increasing your visibility. And don't get paralysed by overthinking what you're going to write about. If you think the subject is interesting and relevant to your audience, chances are they will too. To further increase your exposure, offer to write guest blogs on relevant industry websites. This feeds into forming strategic alliances: cross-promoting with other businesses. Take blogging one step further by...

6 WRITING AN E-BOOK

Authors are perceived as instant subject matter experts, so it's a sure-fire way to put yourself on the map as an expert in your field. The self-publishing platform Amazon Kindle makes it fairly easy and make sure you drum up some publicity by approaching magazine and website editors. You can also consider breaking up the e-book content for a series of blog posts: a clever way to stretch original content further.

7 THE LIKEABILITY FACTOR

OK, it sounds obvious, but everything will flow more easily if your audience likes you. The foundation for this is being authentic and building trust. In a digital world awash with wannabe experts and thought-leaders, your potential clients can sniff out insincerity in a nano-second. Be truthful and

transparent in your goals and remember that nothing can replace that human-to-human interaction (even if it is virtual). Respond to comments on blogs and social media – the communication with your audience should be a two-way street and establishing an emotional connection is key.

8 SPEAK UP

The words 'public speaking' might strike fear into even the most confident person but it is a very useful skill to have in your self-promotion kit bag. To get started, write a strong presentation pitch to send to local trade organisations and small-business networking events: anywhere you can locate your target audience. Not only will it increase your exposure, but it's a great lead-generator, too. Mindtools.com offers a comprehensive guide to dealing with those pre-talk jitters.

9 STAY CURRENT AND KNOW YOUR STUFF

Make it your business to know what's going on in the furniture industry both with trends and other makers and design experts. Read books and magazines, listen to podcasts, subscribe to newsletters; anything that can help you stay on top of your expert game.

10 OWN YOUR EXPERTISE

Come up with a catchy tagline for yourself that explains what you do. It's important to let people know what you have to offer, and this messaging should create a strong thread through your website, social media profiles, business cards and marketing materials. And remember that nobody starts out as an expert – it's a process of learning and yes, making mistakes. But keep on keeping on and watch that momentum build.

a slightly smaller scale, but the principle is the same. If you have a great idea for an article, why not submit it to *F&C*?

4 GET CLUED UP ABOUT SOCIAL MEDIA

Overwhelmed by the available choices? Start by focusing your efforts on one platform to begin with, whether that's Instagram, Twitter or Facebook. Whatever you choose, you have an incredible opportunity to reach an audience. Share links to your blog posts, news, quick tips, opinions and questions.



A MODERN APPROACH TO TRADITIONAL SHOJI

BRIAN HOLCOMBE DEMONSTRATES JAPANESE CARPENTRY TECHNIQUES



In this article I will detail the process of making the sliding doors and windows used in traditional Japanese carpentry work, known as shoji. These lightweight frames are made to carry paper-covered latticework. In use, sunlight permeates through the kozo paper backings creating a soft glow, and elegantly brightening a room. Shoji utilise lightweight materials and careful construction to make a strong screen that glides easily on wooden tracks.

Making shoji starts at material preparation and material prep is often the longest part of the shoji-making process. Shoji are made of thin section stiles and rails. The stiles in many cases are quite long and are best made of perfectly rift sawn and straight-grained material. I often bring in very heavy slabs of material to begin a shoji project. In this case the project started with 12/4 cherry and 12/4 mahogany, 510mm wide and 2.4m long.

MAKING SHOJI

1 These slabs are first sawn into rough, oversized blanks for each part required. The tightest grain of the slab is to be featured on the front and back faces of the screen.

2 After the blanks are rough sized, they're left to sit and acclimatise for a few weeks or longer if the time is available. Once the acclimation period is over the parts are brought down to exact size.

3 Next the parts are cut to exact length and the process of cutting the joinery begins. Traditional shoji feature double mortise and tenons with a mitred shoulder known as a jaguchi. The jaguchi is met by a chamfer on the inside of the stile.

4 Double mortise and tenon are used to offer a large glue surface allowing otherwise weak glues, such as rice glue, to keep the joint tight. I cut the tenons using a combined method of hand tools and router table to create these joints.

5 The mortises are cut using an automatic swing chisel mortising machine made by Maka.

6 With the mortise and tenon joinery complete, the next step is to trim the inner frame, or tsukeko to fit. Traditional shoji



sometimes feature a small inner frame referred to as the tsukeko, and I will be using the tsukeko in these screens. The tsukeko is a thin strip of material seamed into the stiles. There are many ways to join the tsukeko into the stiles and rails, such as applying them plainly using glue, creating a groove to receive them or moulding them into the profile. I take a combined approach, my tsukeko are set into a groove in the stiles and they're moulded into the profile of the rails. I perform the mitring operation with a carefully set stop on the sliding tablesaw to make the mitre cuts required for the inside of the frame. Once the tsukeko inserts are applied the frame can be laid out for kumiko. Kumiko are joined into the tsukeko with mortise and tenon joinery. After which the kumiko are joined amongst themselves with half-lap joints.

7 I establish the layout of the kumiko grid then move onto the hollow chisel mortiser to process the joinery.

8 The mortise layout becomes a master, which is then transferred to a test kumiko lattice. From there the layout work is next transferred to the kumiko that will be used in the work. Stops are set and the half-lap joints are processed on the tablesaw using a fence and spacer. The spacer is used to tune the fit between mating parts.

9 The ideal fit is one that just squeaks together without distorting the parts.

10 Along the way I processed and carefully hand planed panels for the lower portion of the doors.



11 The screens are now ready for hand planing. Hand planing brings the material to life and keeps nice, crisp chamfers and details.

12 The panels are carefully locked into place with a small tsukeko. This part is slipped into the assembled frame and seated with a block and hammer.

13 I chose to apply a shellac finish in this case – that’s a departure from tradition, but with cherry as the underlying material, I felt it was called for. The parts are individually finished and then the frames assembled.

14 Once the frames are together my final steps in processing the woodwork are to cut the stiles to meet the rails at their grooves. These grooves are then fitted into their respective tracks.

15 The paper applied to shoji, known as kozo paper, comes in many patterns. Plain kozo is a simple off-white and offers a light texture, if more interest is desired than one can choose from many patterns including those with bark flecks or silk woven into the paper. For this project, the client chose a subtle off-white kozo. Nori glue (rice glue) is applied to the kumiko and the paper is rolled out onto the screen. The glue soaks through the paper and the two become strongly connected once the glue cures. With the screens now complete I move onto constructing tracks for the floor and ceiling.

16 The project is now complete and ready to be enjoyed as a room divider.

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BLIND DOVETAILS

FRANCESCO CREMONINI DEMONSTRATES
HIS TECHNIQUE FOR MAKING A STRONG,
UNSEEN INTERLOCKING JOINT

PHOTOGRAPHS BY FRANCESCO CREMONINI

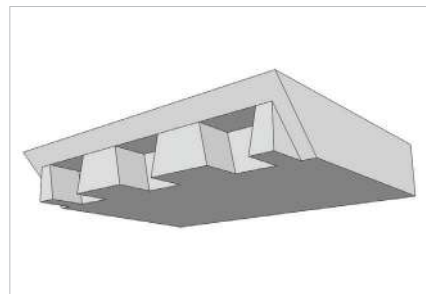
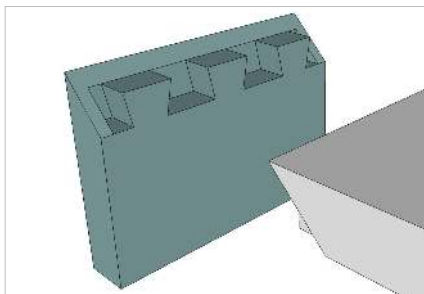
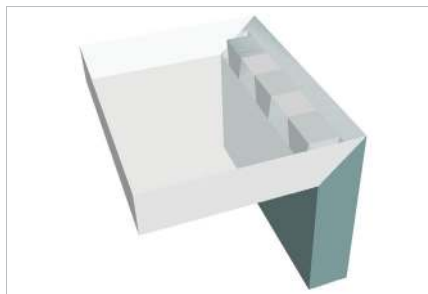
Anyone who sees this particular joint for the first time can only wonder why it was invented, why be driven to making dovetails then hide them inside a 45° joint? In this article, I'll discuss how useful this 'secret' joint can be.

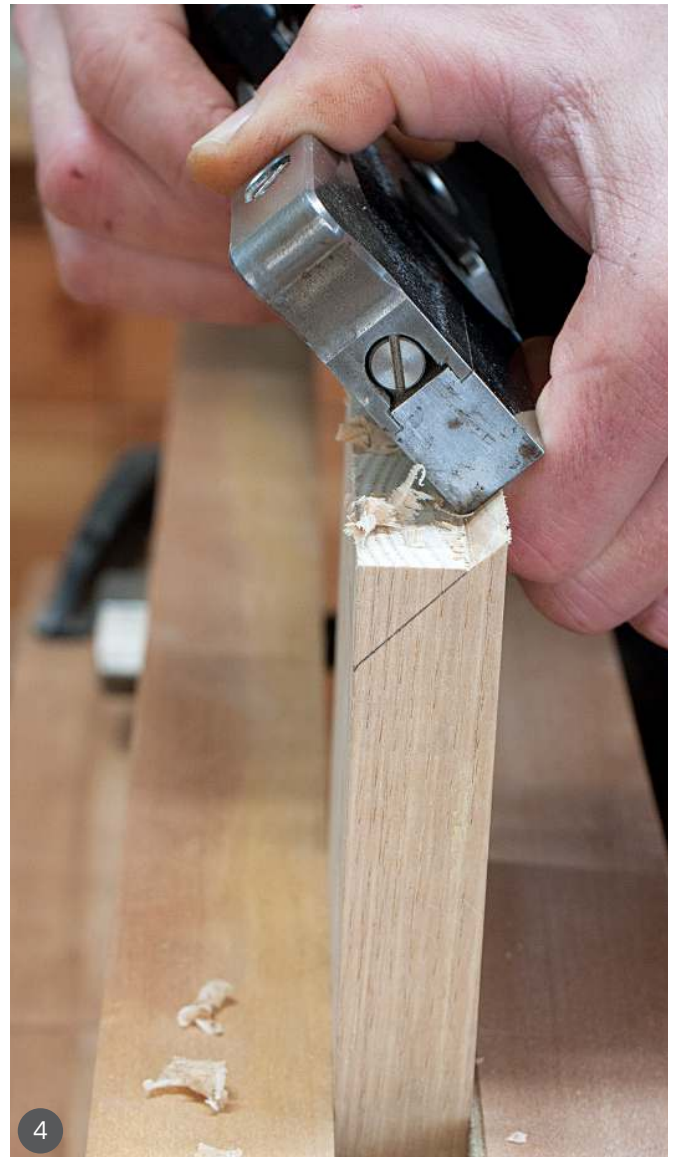
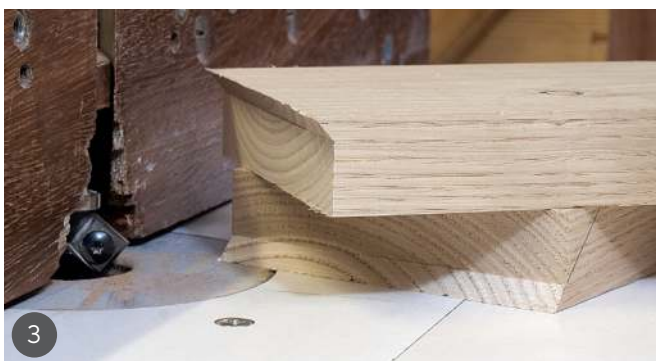
A 45° joint, made by cutting the fibres transversely, is never synonymous with robustness. However broad and clean the surface to be glued may be, poor adhesion of the elements is inevitable due to the consistency of the end grain and the rapidity with which it absorbs the glue. To keep the appearance clean and obviate the inconvenience, internal reinforcements planted at 90° with respect to the inclined cut are usually used; biscuits, wooden biscuits or Domino fittings are the most used systems. In addition to strengthening the junction from the mechanical point of view, they give the glue the best surfaces

to grip. There are also cutters that create male-female profiles with the same purpose, although with these it is impossible to completely hide the machining.

Today this is how it is done, but when dedicated electric tools did not exist, someone must have found a more elegant and practical way to make dovetails hidden inside the joint.

Leaving aside the elegance of the solution, the main reason for the execution is its robustness. The geometry of the joint makes it solid in itself, so much so that it can be opened in one plane until the glue needs to be applied. This feature suggests its use when significant loads are expected or any situation where you want the maximum cohesion in the other direction of the junction, as could happen for a drawer where effort only occurs in one direction.





MARKING OUT

1 The initial marking out circumscribes the 45° cut. The dovetail joint will be hidden by the outside of the wood, bounded by the horizontal line on the head of the piece.

2 The step can be made by hand or by other means, the important thing is that it has a perfectly square section.

3 The 45° points, that is the strip of wood that will cover the dovetails. It is an awkward cut to make by hand because, being visible, it must be precise. A cutter with 45° cutting edges makes this process easier.

4 The rebate plane is the best tool to make or finish the inclined cut if you're working by hand.

CREATING THE JOINT

The joint starts from two square elements of identical thickness and width. The first thing to do is to trace the 45° cut on the

ends, then a line parallel to the three outer sides at a distance equal to about one-quarter of the thickness. This U-shaped line divides the larger portion, where the tails will be cut, from the narrower one which will instead be equalled at 45°.

The first thing to do is to machine down to the traced line, eliminating the wood from the widest portion for the entire width of the piece. The step to be formed on the router table has a square section, therefore it is about 6mm wide and deep. It is important that the step measurements are identical for both pieces.

At this point the tails or the 45° part of the joint can be cut in different ways. I first made the oblique cut using the router table. You can do it by hand, but the work requires expertise because the cut is visible on the outside so it must be clean and accurate. Rather than using a saw, it is better to use a rebate plane.

To trace the dovetails, you can use a surface gauge, a pencil, a knife, a template with the chosen angle or a false square, and a compass. Once the line at the base of the tails and pegs has been marked, at a distance from the front edge equal to the thickness of the piece, the joint is drawn on the head of the



table with the pegs. The lengths and spacing of the tails are of little importance, since they will remain hidden. It is therefore advisable to decrease the number by lengthening both elements to cut fewer joints. This is done without lengthening the half pegs at the beginning and at the end, which for reasons of tightness is better to leave shorter (perhaps we should have called them more properly thirds, fourths or fifths!).

MARKING THE DOVETAILS

5 The outer shoulders are traced using a sliding square and a pencil, then a compass is used to divide the space between them.

6 It is important that the line is cut and not drawn with a pencil for accurate reference later when using a chisel.

7 Using an adjustable bevel or a special template, the pegs are traced in pencil. The corners of the tails are usually defined by the ratio between the base and the height of the triangle and are normally between 1:6 for soft woods and 1:9 for hard woods.

CUTTING THE TAILS AND PINS

The cut of this joint entails the piece protruding from the vice more than usual to allow the angled trajectory of the saw. It can be cut by simultaneously tracing the horizontal and vertical lines, or initially set one of the two trajectories and use the cut made to guide the blade in the other. The cut must stop before reaching the inclined surface and the base of the pegs.

Once all the pins have been cut, the scrap is removed between them with a chisel, working so as to cut the wood along the fibres. The first splinters jump with a couple of strokes across the grain and along the grain, then when you go down under the cut left by the saw – incomplete because it is at 45° – you must also work laterally. When you reach the bottom, be careful not to cut into undercuts and, if you are not sure you can work supported parallel to the face, it is preferable to use a small router plane.

8 To obtain the tails and pins, a saw with rip teeth is used for the long grain cuts. Care must be taken to stop the saw as soon as the outer edge is reached or the cuts will show on the outside.



REMOVING THE WASTE

9 The best way to do a quick, clean job is to place the piece vertically in a vice: by pointing a chisel on the incised line at the base of the joint, the piece is set in position when the blade rests flat on the jaw.

10 and 11 Raising the chisel slightly, you begin to cut the root and simultaneously cleave the wood from above.

12 It is also necessary to work along the sides of the joint because the cut made by the saw is at 45°.

13 and 14 With the last two cuts, the lines are pared by pushing the chisel in fully.

It is important to eliminate the waste from the edges before using the joint to trace the other half that has the tails. To obtain a perfect cut, use the chisel marks as a guide in preparation for the saw kerfs.

15, 16 and 17 Perfect cut, no problem. To make a cut by hand with a saw just like a machine cut, there is a small trick: it involves making a groove with two chisel cuts on the line to be sawn. Just go down a couple of millimetres and what you will see from the outside will be a perfectly linear cut.

18 And now the tails. The newly cut joint acts as a template to draw the tails on the second table.



The second part of the operation is the same, the only complication being clearing the seating for the half pins where it is necessary to work carefully with the chisel to avoid forcing or prying on the outer section and risk breaking it. It would be better to cut it at 45° before clearing out, but on the other hand the inner side is a convenient reference for the chisel, so the choice is yours.

19, 20 and 21 Unlike the cut for the pins, the cut to make the tails must be kept on the waste side of the lines or the joint will be loose.

22 The two outer triangular pieces of the mitre joint are cut away.

ADJUSTMENTS AND JOINT CLOSURE

23 and 24 The joint fits, at least on the outside. You may need to check the assembly carefully and adjust it until it is a good fit. Depending on the timber species, there may be shiny high spots from partial trial assembly that give a clue where to pare with a chisel. Whatever happens hidden inside the joint, the 45° mitre cuts must pull together well for a job well done.

25 The finished joint.



PHOTOGRAPH: JIM ESCALANTE

ONE WOMAN'S WORK

ANNIE EVELYN DELIGHTS IN TURNING CONVENTION ON ITS HEAD

A chair that is also a ballgown. Another that crowns you with flowers. A third that emits a rude noise when you sit down. What do they have in common? They are all the creations of Annie Evelyn, who has made a career out of taking a very conventional furniture form and transforming it into something that will make you look at the whole business of sitting down in a new light.

One of the most striking things about Annie's work in the context of current furniture trends is its conscious femininity. Cathedral Train Chair imagines the chair as a garment and the Windsor Flower Chair 'sprinkles fresh flowers around the sitter'. Both are part of her Static Adornment collection, which aims to create furniture that adorns the user. 'The objects dictate the person's position and decorate the spaces around and between the body,' she explains.

The latest in the series is The Hideous Beautiful New Reality. Annie says: 'Making furniture to adorn the body had accidentally caused me to make design decisions based on how a person will look in the photo. This forced me to examine the effect the daily barrage of internet imagery has had on my work. The Hideous Beautiful New Reality looks to poke fun

at these issues by exaggerating them. The front is "pretty" and "selfie-worthy", with faux gold and copper scales and blue velvet upholstery, while the back is intentionally ugly and poorly constructed. The chair only looks "good" from certain angles. It is currently in the show OBJECTS:REDUX at the Houston Center for Contemporary Craft, where it is being displayed with a selfie stick so people can post their photos online.'

GIRL POWER

Annie says her own femininity has emerged more clearly as she has grown in confidence and clarity in her work. She says: 'For years women in this field had to focus on fitting in and "being one of the guys", so being tough was an important part of my identity as a young maker. As I have got older and the world has changed around me, I have been able to soften the angles a bit.'

Annie also feels free to express herself openly because she does not rely on furniture making for her main income. 'I make sure I don't rely on selling work to eat,' she says. 'Earlier in my career I worked as a freelance upholsterer and taught. In the past six years I have supported myself through a combination of artist residencies, adjunct teaching and sales.'



PHOTOGRAPH MERCEDES JELINEK

She notes: 'Some of my work is unsellable. Oshibana is made from paper flowers that crush when sat upon. Cathedral Train Chair is too large for most spaces. Not worrying about selling them allows me to make the pieces that truly express the concept I am working on without worrying about daily wear reality. But because I love actually using furniture, I also want to make pieces that are for daily use. I let the pieces evolve naturally and don't predetermine whether it is ready-to-wear or runway when I start the project.'

Not worrying about sales has allowed Annie to stray further from what she calls 'the norm'. 'Even though there are tons of female furniture makers out there, we have very poor representation in the galleries,' she says. 'So, what we see as normal is primarily from the male perspective. I was thrilled to be included in the show Making a Seat at the Table: Women Transform Woodworking last year, which showcased 43 female-identifying makers from all generations. So hopefully we will begin to see changes on this front.'

Annie is also working with the organisation craftingthefuture.org, a group of artists who are working together to try to provide equitable opportunities in the arts. 'We are trying to change our community by raising money to support people we feel need to be represented in the field of craft, art and design,' she says.

SURPRISED BY JOY

Annie's overall goal is to surprise people and make them smile or laugh. She says: 'My work has always been playful, but not until I lost my beloved stepfather, my father and got divorced within a span of two years did I realise that creating furniture helped me cope with the pains of life by making people laugh and smile. I made a memorial fountain for my stepfather that had a secret pump connected to a remote control, so I could splash people in the face with water as they mourned. Ever since I have wanted to draw in as many people as I can and create joyful experiences.'

The design that makes her laugh most is the Impolite Chair: 'It has a hidden custom whoopee cushion in it, and farting never stops being funny,' she says. Her favourite part of the process is not making the furniture or seeing the finished object, but watching how people interact with her pieces and enjoy them.

She creates some identical components, such as seat surfaces, using a variety of methods, including chop saw, bandsaw, casting and CNC. 'Some are made by making shaped rods on the tablesaw and then slicing them on the chop saw. Some are pressed from sheet metal on the hydraulic press,' she adds. Some of the seats look hard, as if they are made of wood or metal, but change shape when sat on. How does she do it? 'These pieces are upholstered. I combine the principles of marquetry with the upholstery technique of button tufting and basically create an entire surface of shaped "buttons" made of small hard pieces attached to the cushioning underneath,' Annie explains. 'I use a lot of different materials, so usually the most challenging part is joining the two in ways that make sense and feel seamless.'

EARLY DAYS

Annie grew up surrounded by furniture made by her grandparents' company, Old Colony Furniture. 'It was period

reproduction furniture, but it was very interactive and had lots of moving parts: tambour doors, slide-out tables, adjustable backrests on headboards,' she says. 'They were fun, and because of that they ended up having a major role in my imaginary play world as a child. They were also the most valued objects in our home. Later as I developed into a maker it made sense that I would express myself through furniture.'

She trained in art furniture, which meant studying both art and the technical aspects of furniture making. 'My professors were studio furniture makers like Alphonse Mattia, John Dunnigan and Rosanne Somerson, who all studied under Tage Frid. We started with hand tools and worked our way up to machines,' Annie recalls.

Annie is constantly learning and loves trying out new things. 'My favourite material is a new material or using an old material in a new way,' she says. 'Material exploration is my playtime. I particularly love learning a new process from another medium and applying it to furniture. For example, in the Ginkgo chair, I had learned to form leather on a last during a shoe-making workshop. I took some of those ideas back to the woodshop and CNC-ed a mould that I put leather over in the vacuum bag veneer press. It allowed me to form the leather with three-dimensional designs.'

'Even though TIG welding is my favourite craft activity, I find that wood is most often the best material for what I am trying to achieve. The warmth and inviting qualities of wood draw people in and make them feel comfortable, so I'm mostly in the woodshop.'

Inspiration also varies. 'When I am working on a project I surround myself with visual imagery that relates to what I am making. Right now my studio walls are covered with pictures of 1980s prom dresses and other over-the-top fashion pictures. These inspirations change from project to project.'

'But my most constant source of inspiration is my friends and the art they make. To me art is about connection and communication. So I love getting to experience the art of friends. It is also why I collaborate as much as possible. My partner, Shae Bishop, is a brilliant ceramic artist who works making clothing and sculpture from small handmade porcelain tiles and I am inspired by him every day. We worked together on one of my favourite projects, the Bucher Benches.'

TODAY AND TOMORROW

Annie, who is based in North Carolina, USA, is still working on the Static Adornment collection. 'There are still so many areas I want to explore with this concept,' she says. 'This work will overlap with my next project, which I am calling Tangible Objects in the Untouchable World. The next works will look at how crafted objects have changed in a time when most people interact with objects digitally.'

She adds: 'Each body of work informs the next. With one question answered, another emerges and I want to follow the path wherever it leads me. I want to continue learning from what my work teaches me about myself, along the way gathering more technical skills, expanding my community of makers and helping to create a more diverse landscape in the field of craft.'

annieevelyn.com

*'Each body of work informs the next. With one question answered,
another emerges and I want to follow the path wherever it leads me.'*



PHOTOGRAPHS: MERCEDES JELINEK, L GNADINGER, SCOTT CARTWRIGHT, SCOTTY CIAN O'DONAGHUE

HOLTEY 985 PLANE

'IF YOU NEED TO KNOW THE PRICE
YOU CAN'T AFFORD IT' –

ANTHONY BAILEY REVIEWS
THE LATEST PLANE FROM
KARL HOLTEY

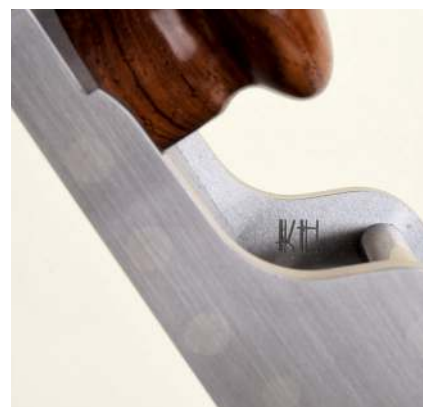


SOMETHING SPECIAL

Let's start with the cost of this fabulous piece of precision engineering – £6,200 inc VAT. To describe this hand plane as the Rolls-Royce of plane building would be to do Karl Holtey a disservice, apart from a few unique examples, Rolls-Royce motor cars are two-a-penny figuratively speaking, whereas a Holtey plane is strictly a limited edition 'machine' wrought using Karl's exquisite engineering skills. Karl gets bored in the way that only an engineer can – once he has made a batch, it's on to the next design incorporating his latest thinking in how to create the perfect tool. He was supposed to have retired, but he has been itching to carry on and the 985 model is the latest off his very exclusive production line.

BUILD QUALITY

So what is a model 985 and what do you get for the money? This is a stainless-steel bodied smoother with a very thick high grade PM steel blade. The body is compact and to do this successfully Karl has removed any idea of a fine depth adjuster. To the cognoscenti of planes this seems perhaps counterintuitive but the whole point about tools and skills working at this level, is using your critical hand-eye coordination not only in the act of planing but also in setting the blade precisely to depth. On his website he tells us how the project turned out to be a swan – graceful above but very busy below the waterline. The parts photograph opposite shows just how complex the construction really is. The many machine screws, which are custom made, have heads created for



installation only to be machined off flush with the body. Indeed it is only under the lights in the *F&C* photographic studio that it was just possible to discern the presence of the heads on the body sides. Although Karl's designs are unique and very modern in engineering terms, he constantly makes reference to past plane makers and designs – typically Norris, Spiers and Mathieson. The handles are rare Honduran rosewood made from old stock or alternatively brass sides with box wood handles. Supplies of these planes are limited, once they're gone, they're gone!

TRIAL BY COMPETENCE

Handling this model is a pleasant if heavily built experience, the tote is very comfortable and the thick milled sides of the plane

allow a positive grip. Karl sent me a Veritas plane hammer for making minute side-to-side blade adjustment. Depth setting he suggested could be tried by placing the plane on a perfectly flat piece of softwood and dropping the blade down and locking it with the knurled nut which acts against the blade, which in turn sits against a round raised stainless steel 'button'. Although this is a starting point, I found I needed to sight along the sole to obtain a whisker of blade projection. The blade came with a honed edge but I was advised to give it my own edge before use. For general work I now use well worn diamond plates because they give a quick, flat edge but at this level stropping after using a 1,000 mesh plate is simply too crude, so knowing the blade would only create the finest of wire edges after honing,



I swapped to a ceramic plate to finish the job. Ceramic has a sort of creamy cutting action with water, it gives a sort of stropped edge, polishing it nicely. First of all I tried the 985 on a piece of standard PAR softwood. I readjusted the blade to create finer shavings as the first ones were a little thick for my liking. There is no chipbreaker, something Karl feels is superfluous, there is the finest of throat openings by the time the blade sits in place. Up the shavings came but they tended to concertina, I found that by only holding the tote and gripping the front body side, the shavings flowed much more freely without my meaty paw getting in the way when holding the front knob.

Then I moved on to a piece of 150-year-old recovered but case-hardened ecclesiastical oak. This was more of an ask, it

needed two-handed control and firmer pressure on the forward stroke. This is where my sharpening technique may have let me down I suspect, nevertheless I obtained some quite reasonable fine shavings.

IN CONCLUSION

At this level, if you are lucky enough to buy one of these planes, you will no doubt spend many hours perfecting your sharpening and planing technique to match up to the quality of this bench tool. Maybe that all important project will have to wait...

To find out more about Karl's methods and materials used in the construction of the 985 smoother visit: holteyplanes.com

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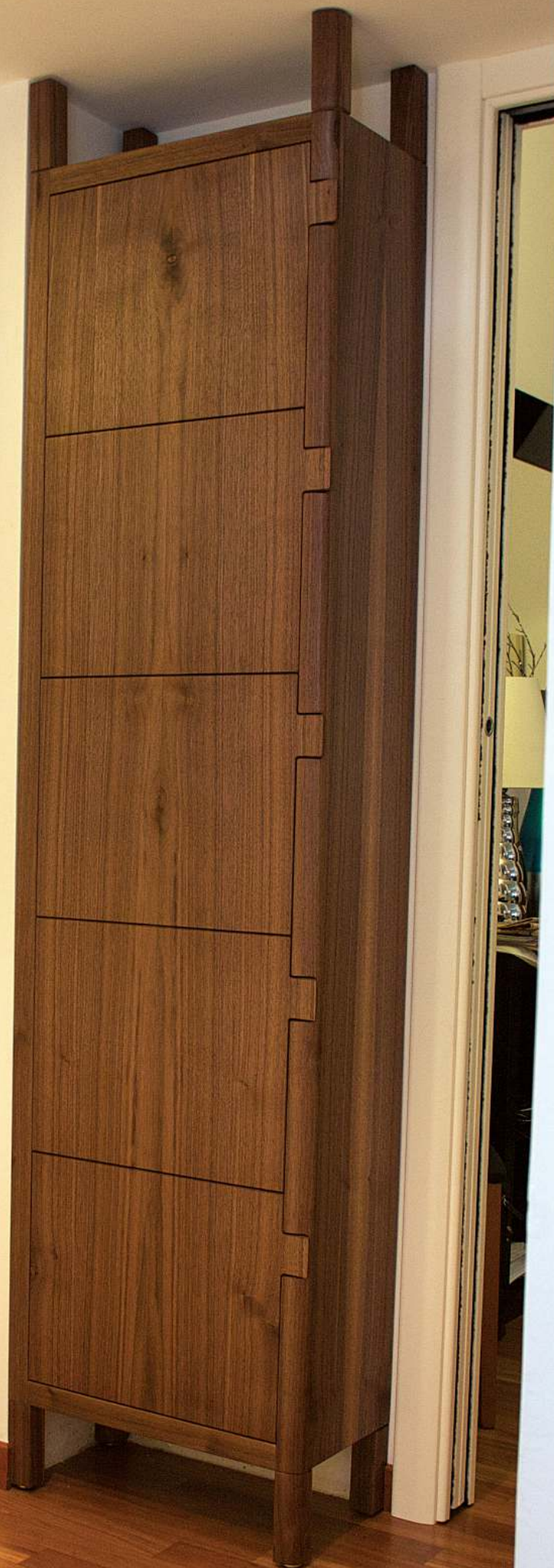
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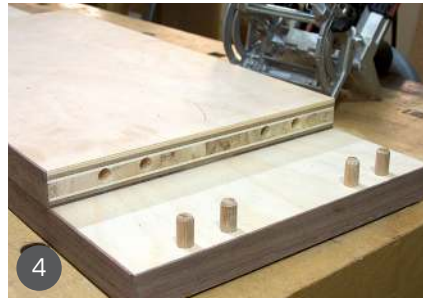
FRANCESCO CREMONINI

USES A VAST REPERTOIRE
OF TECHNIQUES FOR
A DIFFERENT WAY OF
UNDERSTANDING AND
CREATING CUSTOM-
MADE FURNITURE



Some of the smooth, sophisticated
shaping detailing





1 2mm-thick American walnut veneer with distinctive grain 2 Trimming the thin solid sections of walnut for the legs and carcass edges 3 Bonding the walnut veneer to the pre-sized blockboard cores 4 A Mafell Duo-Doweller used to join the carcass sections together 5 The basic carcass dry assembled for checking and marking out 6 Thick walnut veneer over spruce cores for the leg material 7 Trying out the fit of a projecting handgrip on a curved door edge section

One can look at the construction of a custom-made piece of furniture in two substantially different ways. You can focus only on the functionality of the object to fulfil practical solutions and everything else becomes marginal, including aesthetics. In the end compromise is taken for granted as long as the furniture serves its purpose. Alternatively, a different view allows us to see shapes, then the solutions that allow us to not compromise functionality. In this article I'll describe the construction of tower furniture designed to be installed in the recess of a hallway.

YOU WILL NEED

- **Wood used:** 20mm poplar blockboard, 30mm solid spruce, 2mm American walnut veneer and solid, 4mm birch or poplar plywood, 6mm and 12mm birch plywood
- **Hardware:** 5 x 70mm brass poles, 10 x 40 x 10mm brass perforated plates, 5 x 7mm brass cylindrical shelf supports and relative nut screws, 5 x M6x35 bolts and relative nut screws, 4 x M6x70 bolts, 4 x adjustable feet and relative nut screws, 20 x screws for wood 35 x 3,5mm, self-adhesive felt pads

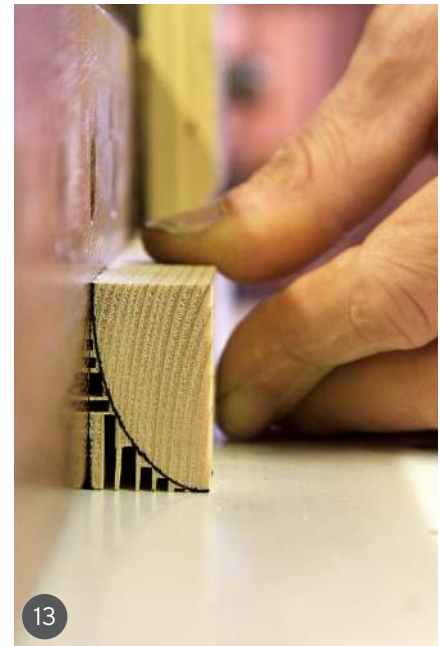
DESIGN

To reduce the verticality of the shoe rack, exaggerated by the reduced depth of 295mm, I decided to separate the body from the floor and from the false ceiling in a homogeneous way with four lower legs and with four identical elements on top. This decision does not lose any usable space but gains a more airy visual presence. The rack has only one of its two sides exposed to the passage, which led me to consider the exposed angle as an important visual element so I decided on a shaped edge.

Once the profile had been decided, I felt the door handles would become the most distinctive element of the rack. The ability to veneer the shape and make its appearance homogeneous to the rest of the piece was an intriguing concept.

CARCASS

The perimeter panelling of the two enclosures is made with a sandwich of three materials: a 20mm-thick MDF with a poplar blockboard heart, 4mm birch laminated poplar plywood for the inner face and the 2mm American walnut veneer for the

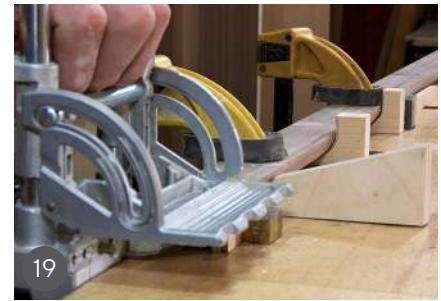


- 8 Removing the sections of the carcass corner which will have walnut inserts 9 Using a small router to level the carcass corner cutouts 10 Machining an undercut angle on the walnut insert material 11 An alternative method for undercutting the ends – a Japanese pullsaw 12 The inserts glued in flush ready for shaping 13 Machining in two passes, vertical and horizontal, to create the right curvature 14 Using a spokeshave to improve the smoothness of the curve

external cover. The choice of veneer is important to ensure it is proportionate to the size of the piece of furniture; in this case I chose sheets 140mm wide, mainly striped and characterised partly by the presence of sapwood which is much lighter than the heartwood in the American walnut, 12 sheets 3 metres long were needed.

VENEERING

A key aspect was the need for the walnut veneer to run through from top to bottom. Not a problem on the carcass sides but on the doors it meant each door with its solid lippings was made first, then all the doors placed in a line and all veneered together and then cut apart afterwards.



15 Gluing the walnut to the inside faces of the carcass edging **16** Trimming the walnut prior to veneering the front face **17** The thick veneer has already been steamed to soften it for bending **18** The two veneered corner pieces being held tightly by the vacuum bag press **19** The now sanded corner section being dowelled ready to fit on the carcass **20** Machining the slot for attaching a panel using a groover in the router table **21** Levelling the panel border using a Japanese plane

CURVED CORNER

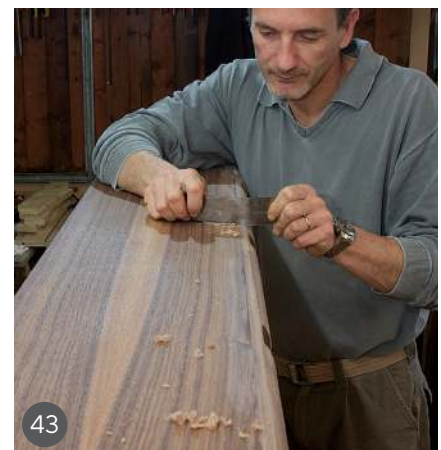
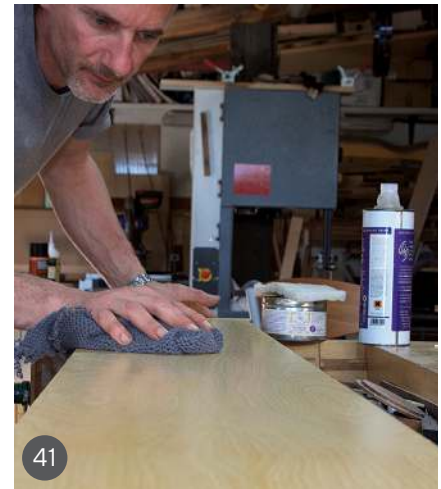
An asymmetrical design creates issues, specifically the curved corner post that needed to have a 2mm veneer applied, which needed to be softened first so it would fit without cracking. In addition, blocks of solid walnut had to be glued in place where the pull recesses would be shaped later on.

DOOR PULLS

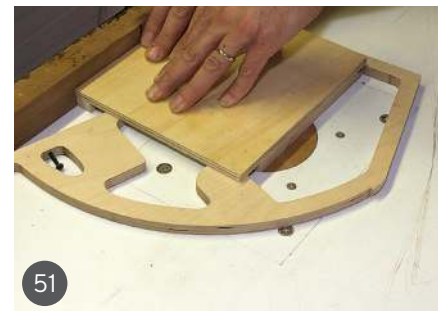
Another tricky problem was fitting integral pulls that match the veneer but cannot be glued in situ until they have been shaped separately. This entailed leaving sockets in the door filled with blanks wrapped in plastic that could be withdrawn after gluing so the shaped pulls could then be glued in and the shapes blended in.



22 Detail of the solid liping on the blockboard panel 23 The vertical panel fully assembled and clamped during glue-up 24 The walnut blocks for hand grips being planed flush with the doors 25 Plug-in blocks wrapped in clingfilm so they can be removed later 26 The veneer with adhesive applied ready for positioning the doors in line 27 The doors now being separated maintaining the grain flow from top to bottom 28 The plastic wrapped blocks are now withdrawn using a screw and pliers 29 Experimenting with the ideal door rotation to avoid clashing with the carcass 30 Standard slide bolts for the doors but with the spring removed 31 The door locking location jig has a metal tube inside for guiding the drill 32 Marking exactly where the brass catch plate will be fitted



33 The hinge recess mortising jig for use with a router and guide bush 34 One of the door pulls sawn and ready to fit in a door panel socket 35 Marking a door pull position before shaping it 'out of situ' 36 The door pull profile being shaped on the router table 37 Marking where to make the recess for the door pull to rest against 38 Using a shaped piece of MDF to mark the cross-grain cut lines 39 A router jig was made up for creating the pull recess cutouts 40 Finishing the cutout with a chisel so it follows the shape of the door pull 41 Applying a finish to the back panel before assembling into the carcass 42 At last the carcass is glued up and left to cure 43 The carcass is cleaned up using a card scraper followed by fine abrasives



DOOR FITTING

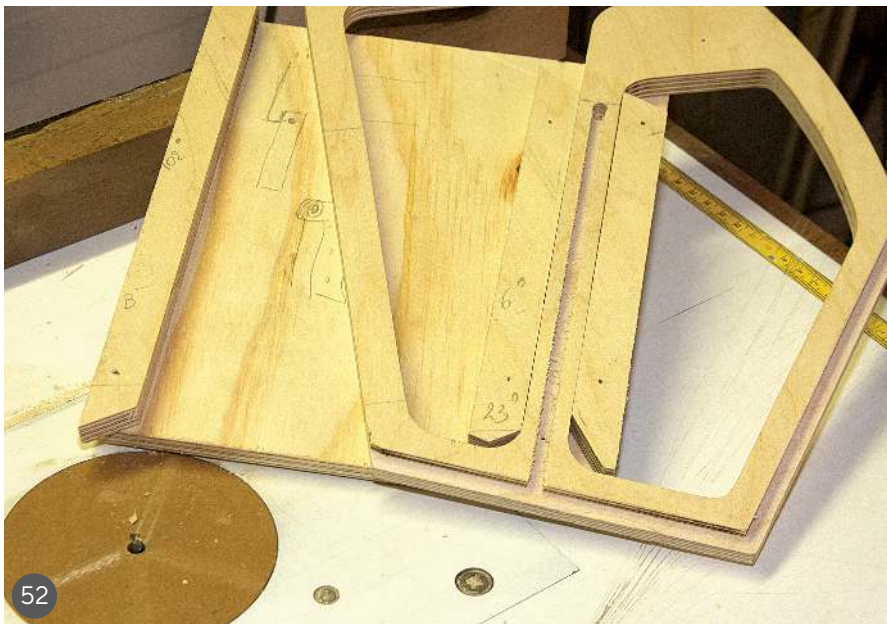
The doors needed a rotation point that would not clash with the carcass frame and the pulls would need to fit neatly. Care in making the recesses in the corner post was essential so the result looked exactly right.

SHOE RACKS

In a way making the racks was almost the easiest part of the job once the design was worked out. Using the router and templates a number of rack ends could be made quite easily and glued and pinned to the division boards that make up each rack. However, care was needed in laying out and fitting the racks so they would swing down and fit back into the carcass afterwards once located back into their resting positions.

FINISHING

A hard wax oil was applied in repeated coats, denibbing in between coats to give a soft satin sheen that suits walnut. Once the piece was installed in its final location it was easy to touch in any slight marks and the client quickly had it filled up with shoes, all discreetly hidden by a very unusual but beautiful piece of furniture!



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44 A brush applied base coat hard wax oil is used on the carcass exterior

45 Using a jig to drill the leg fixing positions before screwing the legs on

46 Very fine finishing abrasives used between coats for levelling and denibbing

47 The whole carcass now has a soft satin finish that brings out the grain

48 Pull recesses, catch plates and pegs needed for the shoe racks

49 Using a router trammel to make the template for the shoe rack ends

50 Profiling one of the rack ends using the template on the router table

51 Another jig creates a narrow slot in each rack end which are 'handed'

52 The function of the jig is obvious when it is turned over

53 Air nailing a rack together with the division panels slotted in place

54 One of the swing-down racks installed and being adjusted

55 The racks locked back in their rest position
BELOW Details of the finished shoe rack



UNDER THE HAMMER

THE MODERN DESIGN AND ART AUCTION AT BONHAMS' LOS ANGELES SALEROOM SAW MANY FINE EXAMPLES OF 20TH-CENTURY CRAFTSMANSHIP GO UNDER THE HAMMER. HERE WE TAKE A CLOSER LOOK AT THE TOP-SELLING FURNITURE LOTS



LOT 10
US\$7,575 (£5,863)

Chest of drawers made circa 1910 at the Craftsman Workshops of Gustav Stickley in Eastwood, New York. The piece was made in the style of Harvey Ellis (1852–1904), the American architect, painter and furniture designer who was a prominent figure in the American Arts and Crafts movement. Towards the end of his life, Ellis collaborated with Stickley at the United Crafts organisation and on *The Craftsman* magazine. This chest of drawers is made in stained curly maple, inlaid with copper and fruitwoods, with bronze pulls.



LOT 50
US\$6,325 (£4,895)

Occasional table made in 1929 by Eugene Printz. French cabinetmaker Printz (1889–1948) was a proponent of the Art Deco style whose pieces mixed precious woods with innovative design aesthetics. This table, Model No 93, was made in mahogany. Only 15 examples of this model were produced.

LOT 19
US\$10,075 (£7,798)

Greene & Greene dining table in Oregon pine, made circa 1904 for the Edgar Camp House in Sierra Madre, California. One of the most famous names in American Arts and Crafts, the architectural firm Greene & Greene was established by brothers Charles Sumner Greene (1868–1957) and Henry Mather Greene (1870–1954). They were often commissioned to design the furnishings for the buildings they designed. This table is one of the Greenes' earliest pieces of furniture and is possibly the first piece of Greene & Greene furniture to have their signature 'square edge' screw heads.



LOT 15
US\$16,325 (£12,635)

Rare blanket chest made circa 1902 at the Craftsman Workshops of Gustav Stickley in Eastwood, New York. Stickley (1858–1942) was the leader of the American Arts and Crafts movement and his furniture designs honoured his ideals of simplicity, honest construction and truth to materials. This chest is made from oak with copper strapwork decorated with a hammered texture. Details like this on the metalwork were intended to highlight the handmade nature of the work.



LOT 363
US\$31,325 (£24,245)

Roll-top desk made in 1976 by Arthur Espenet Carpenter. A self-taught furniture maker, Carpenter (1920–2006) is considered a master craftsman and his work is now in the collection of the Smithsonian Institution in Washington, DC, and the Museum of Modern Art in New York. He is known for his use of scalloped edges, as on this desk. It is made from black walnut and has a tambour top and a fitted interior.



FISHING FOR FURNITURE

PLASTIC WHALE HAS COME UP WITH A PRACTICAL SOLUTION TO AMSTERDAM'S POLLUTED CANALS – FISH OUT THE WASTE AND TURN IT INTO OFFICE FURNITURE

Unlike most entrepreneurs, Marius Smit's aim for his company is for it to go out of business. That's because Marius is a man with a special story, a unique profession and a challenging mission. He is the founder of Plastic Whale, the first professional plastic fishing company in the world. It is a social enterprise with a mission: make the world's waters plastic-free, starting with the Amsterdam canals. Marius believes that if Plastic Whale can make itself redundant in Amsterdam, the organisation can then find business all over the world.

Marius founded Plastic Whale in 2011, without any means, but with an exciting challenge: 'I want to build a boat from plastic waste. But I've never sailed a boat, let alone built one. So help me!' The response to his call for help was enormous. Since then, Plastic Whale has developed into a fast-growing social enterprise with investors, dozens of sponsors, partners and thousands of customers. Its newest venture is Plastic Whale Circular Furniture, high-end office furniture made from Amsterdam canal plastic in collaboration with Dutch furniture manufacturer Vepa.

PLASTIC WHALE'S FISHING FLEET

The idea for Plastic Whale came when Marius spent a year travelling the world. 'I visited the most beautiful places you can imagine. But everywhere we went we saw plastic waste. During my travels I decided that I wanted to do something against this problem called "plastic soup". I wanted to create a movement of civilians, companies and government institutions who work together towards a concrete, positive outcome for the plastic soup. So I created a challenge to build a boat from plastic waste and I invited everyone to help me,' he explains.

Plastic Whale now has a fleet of 11 boats, all built from reconstituted plastic waste. Anyone can book a canal tour on a Plastic Whale boat and help combat the plastic pollution problem in Amsterdam's canals. The company has now expanded to Rotterdam and Marius hopes to clean up the water in other cities too: 'Our ambition is to create economic value from plastic waste in various parts of the world, especially in developing countries where the problem of plastic waste is worst. By creating value from the waste we give an economic impulse to the local community and attack the problem of plastic waste at the same time.'





The boardroom table is made from recycled PET and birch wood and the lamps are inspired by the shape of barnacles



CIRCULAR FURNITURE

In 2018 Plastic Whale and Vepa launched the Circular collection of high-end office furniture. The collection consists of a boardroom table, a chair, lamps and acoustic wall panels, all made from plastic fished from the Amsterdam canals. Part of the sales proceeds are invested in initiatives around the world that tackle plastic pollution. 'With office furniture we can make an even greater impact, as many companies want to make a positive contribution to a cleaner environment,' says Marius.

Vepa – a leader in the field of sustainable innovation – is responsible for the technical development and production of the furniture range. 'For the manufacturing of the furniture, we use PET bottles that have been fished out of Amsterdam's canals. We are also using steel waste from our own factory for the cast-iron base of the chair,' says Janwillem de Kam, Vepa's Managing Director.



The chair is made from recycled PET, steel and cutting dust
 RIGHT The table's origin is proudly stamped on the end





Plastic Whale's fleet tours Amsterdam's canals fishing for plastic waste



PHOTOGRAPHS COURTESY OF PLASTIC WHALE

Amsterdam-based design agency LAMA Concept is responsible for the design side of the collection, for which circularity is key and the whale has served as a source of inspiration. Yvonne Laurysen, co-owner of LAMA Concept explains: 'Plastic soup is a huge threat for this incredible mammal, and so we have translated characteristic elements of the whale into the designs. Think, for example, of the look and feel of its skin, the adipose tissue and the impressive skeleton.'

The boardroom table, for example, is inspired by a surfacing whale, with its distinctive blowhole and gracious lines. The table top consists of layers of recycled PET felt, recycled PET foam and FSC birch wood. The robust FSC oak legs recall a whale's bone structure, while the table surface is finished using PET felt that has been heated and pressed to give it a luxurious look and feel.

The chair's shape subtly echoes the form of the whale's tail. The cast-iron frame is made from recycled steel waste, the back from pressed felt from recycled PET plastic bottles and the cushioning from recycled cutting dust.

The ingenious lamps, which get their shape from the barnacles found living on a whale's skin, are made from pressed recycled PET felt and take LED filament bulbs to minimise energy usage. The acoustic panels, whose fluent lines are reminiscent of the pleats on a whale's throat, are made entirely from pressed recycled PET felt.

TURNING WASTE INTO IMPACT

Part of the proceeds from Circular Furniture will – through the Plastic Whale Foundation – be invested in local projects that

tackle the plastic problem in places where it's needed the most. The first collaboration is with SweepSmart, an organisation that offers professional waste solutions in India, where the plastic problem is enormous. 'Thanks to Plastic Whale Circular Furniture, it will be possible for SweepSmart to develop waste-processing centres in India, and subsequently reuse the collected plastic for the next furniture line,' says Marius.

Given the scale of plastic pollution around the world, it's unlikely that Marius and Plastic Whale will be out of work any time soon but in the meantime Amsterdam's are looking cleaner and its boardrooms much smarter.

plasticwhale.com

OVERCOMING COMPARISON AND SELF-DOUBT

IT'S EASY TO LOOK AT OTHER PEOPLE'S FINISHED PROJECTS AND IMAGINE YOUR OWN FALL SHORT. PERHAPS, HOWEVER, IT WOULD BE BETTER TO EVALUATE YOUR PROGRESS BY SEEING YOUR OWN ADVANCES AND PURSUING YOUR OWN GOALS

Being a furniture maker often means working alone, however, most creative individuals need a mix of alone-time and connection with others. Many of us turn to social media to keep in touch with like-minded people and other creatives. The experience is usually enriching, and in the online world I have found inspiration, support and genuine friendships.

On a few occasions, however, it has triggered feelings of inadequacy and self-doubt. I fell into the comparison trap, began to doubt my worth and my creativity started to dwindle.

One of the reasons comparison has such a negative effect on creativity, and morale, is that you usually liken your beginnings to other people's end journey. You see the tip of the iceberg, the brilliant success and amazing talent and you lose heart.

You need to keep in mind that what you see on social media is not the whole story, but a series of curated moments. You don't see the struggles, the months and years spent honing skills, exploring new ideas, coping with rejections and failed projects. Yet you compare that single highlight to your own efforts and find yourself lacking. The ideas you were so excited about suddenly seem trivial, the project you are working on irrelevant, so you stop creating – what's the point anyway?

CREATIVITY AND SOCIAL MEDIA

Judging the value of your work from how well it's received on social media is a double-edged sword. It can make you feel good about your work (if you get enough recognition), but remember that positive feedback is not the only measure, especially in

these times of algorithms and popularity trends.

Every time I make the mistake of focusing on the end result, and placing too much importance on the feedback I receive, I hit a creative slump. It's only when I shift focus to the process of creating and exploring for the fun of it that ideas flow again.

The only comparison should be with yourself, and it's essential to move from an arbitrary outer judgment to your inner one. When you stop using the external measures you've been conditioned to believe are the only acceptable ones and instead start to think with your own head and decide which path you want to take you feel inspired and energised. Then you can compare and evaluate your own progress.

RECOGNISING PROGRESS

To counterbalance moments of demotivation and self-doubt, I came up with a way to track my progress and give my self-esteem a boost. At the end of each month I write down all that I have achieved, learned and created in the previous four weeks. This helps me measure my own progress and shift the focus to what I have done, rather than what I haven't yet achieved.

I find it essential to pause and recognise my achievements, big and small, and enjoy my advancement. From time to time I also go through my work, and review projects to see how I have evolved. This is another simple yet effective way to evaluate progress and growth.

WORDS: CRISTINA COLLI



‘The only comparison should be with yourself, and it’s essential to move from an arbitrary outer judgment to your inner one’.



PHOTOGRAPHS BY THOMAS EDDOLL

ARTS AND CRAFTS CHEST OF DRAWERS

THOMAS EDDOLLS DESIGNS AND MAKES A CHEST
IN A STYLE THAT WILL NEVER GO OUT OF FASHION

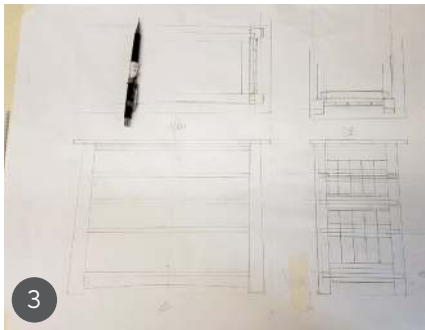
I was sitting in Gloucester Royal Hospital welcoming my newborn son into the world when I noticed an emailed enquiry. 'Could you make these two chests of drawers?' Attached were pictures of the items to be made, one small Gordon Russell-style chest and a larger American Mission Arts and Crafts-style piece.

CHOOSING TIMBER

That was the beginning of a new making adventure. Once quotes and figures were agreed between both parties the first thing to do was source materials. The client's brief stipulated the use of quartersawn oak throughout and so after a quick

phone call to Geoff Tyler of Tyler Hardwoods near Hungerford he assured me that he could supply the quantity and quality I was looking for. At the timber yard, I selected the quartered oak boards I needed from a milled and seasoned tree; these were sawn to a nominal 27mm thick, most of my finished thicknesses were 25mm, the 2mm difference was a bit risky but the wastage would be kept to a bare minimum.

The beautiful medullary rays were prominent and even throughout the quartered boards, and selecting for the whole project from the same tree ensured a consistency of colour and texture.



- 1 Tyler Hardwood's covered yard full of good quality timbers including the oak used for this chest
- 2 Hand planing the board edges to size and square makes the ray figure evident
- 3 2D paper working drawings are all that is needed for construction to proceed
- 4 The solid looking end frame sub-assemblies between which the rails will be fitted
- 5 The rails part dry assembled with the tenons visible
- 6 Sizing the drawer fronts using veneers to achieve accurate spacings

END FRAMES

After producing the working drawings by hand, it was time for timber selection and conversion. The first stage of the build would be to construct the end frames, big heavy tapered legs mortised to accept inch rails. I tapered them by dropping onto the surfacer before a final dressing by hand with a No. 7 plane. The next task was to mill out the horizontal drawer dividers which would be tenoned into the legs. Dry-fitted, this gave me the skeletal outline from which I could progress forward.

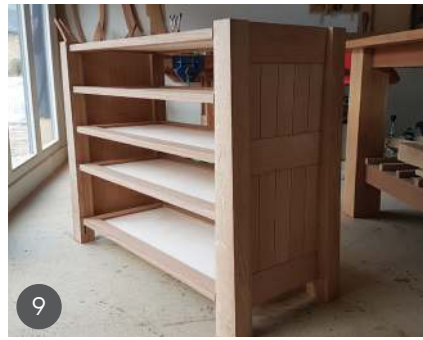
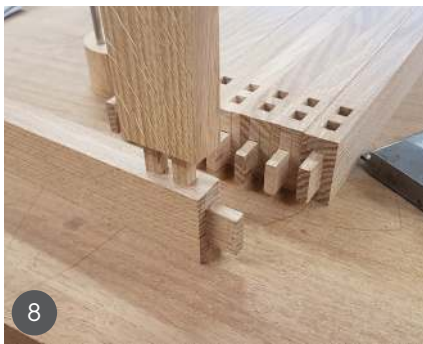
PANELLING

Having established this stage it was time to look at fully constructing the end sections, these were to be tongue-and-groove solid panelling, another firm part of the brief. Once the selected boards were sawn, planed and thickened they were figure-match arranged into bare panels before routing solid tongue-and-groove mating sections. The boards would have to be a dead fit in the height direction with a calculated 1mm gap between sections to allow for movement in the width. A chamfer was run along the joint lines to achieve the required look. After considering how best to assemble the chest ends,

I opted to 'spot adhesive' the middle of each panel board tenon. After sanding the faces to 240 grit and planing the chamfers with a block plane to hold the crisp lines, I carefully clamped this assembly to the rails spaced out with veneer shims for consistency. Leaving the assembly long enough for the adhesive to fully cure I could then adhere and sash clamp the rails and panel boards to the legs.

DRAWER RUNNING SYSTEM

With the two ends constructed, the next stage was to set about making the running system, which was to incorporate dust boards. I had my cross rails to which I could make up a frame and panel system incorporating a 4mm birch ply dust board grooved into the frame internals. As the long horizontal divider rails were end tenoned to the legs I opted for a twin mortise and tenon for the runners and kickers to maintain the structural integrity of the assembly. It's worth noting that there were some minor discrepancies on the ends of these frameworks that would affect the actual mechanics of the working drawer system. With tenons on the end of each long rail, working these out by hand wouldn't be easy so they were flushed off with a bottom insert router cutter to a square-edged reference board.



ESSENTIAL ACCURACY

Once the frames were joined by adhesives, guides were carefully sized to the chest ends' internal cavity by dead cutting to length in between the legs and hand planing down to the leg internals before being jointed onto the dust board frames. This was a troublesome point as any discrepancy in the glue-up positioning meant that there were multiple chances of the main chest glue-up not being an accurate fit. After some thought, a dry assembly was needed, and the leg positions were carefully knifed onto the dust board ends giving me a decisive reference point to assemble to.

PLINTH RAILS

Carefully assembling each numbered guide to the relevant running frame to my scribe marks, I worked through the series of glue-ups while also considering the curved plinth rails, in between glue-ups. Again these were tenoned into the legs with an arced radius marked onto the underside, bandsawn out and compass planed by hand to the correct dimension, which was the work of minutes compared to the bother of jig making and machining for just two components. The low front rail was jointed flush with the face of the bottom framework with a mating double

chamfered breaker, mirrored in shape from the end panelling. Rather than being set in an inset position, the back lower rail was set flush with the back legs, so as to accept the solid tongue-and-groove back boards that were left floating in the length.

THE MAJOR GLUE-UP

With these objectives accomplished, the time had arrived for a pretty major glue-up so a bit of preparation was needed, the relevant sash clamps were set to length and a working ordered system was figured out in order to keep the adhesive 'open time' to its strictest minimum.

The adhesive was mixed using a two-part urea formaldehyde compound with a slow-working catalyst hardener. I borrowed a capable extra pair of hands and we began to apply the adhesive to the mating components. We tackled the mortises first – using a thicker mixture would stand a lesser chance of 'skinning off' quickly – then moved on to the tenon cheeks and shoulders. We mated the frameworks and rails vertically to an end section before knocking the other end on. All of the careful making was worked out, and with the joints part-way home we were able to lift the carcass onto the floor and start to pull everything together with the sash clamps. Using scrap blocks to protect the



- 7 The end panels in place and spot glued to allow for movement
- 8 The drawer rails and runners showing the twin mortise and tenon jointwork
- 9 The carcass dry assembled with birch ply dustboards in place
- 10 Now for the major carcass glue-up – plenty of sash clamps in position
- 11 Ready to mark the drawer sides for length now the front tails have been cut
- 12 The drawer front resting in position to check fit and appearance
- 13 Knifing the pin lines off the tails, first with a scalpel then a marking knife
- 14 The pins and recesses neatly cut out and a sample of the handle hardware
- 15 The dovetailed drawers all lining up neatly and in their correct order

work the clamping had to be done ‘in series’ gradually working the carcass together and adjusting cramp pressures where necessary, creaking and snapping noises emanating from well-fitting joints suddenly creeping home. Finally, when everything was up and the joints checked over, the carcass was checked for wind, then square, measuring across the diagonals. There was a slight discrepancy from corner to corner but slightly angling the clamps in the direction of the longest measurement remedied this and all that was left to do was clean the adhesive off with an old chisel and a wet rag.

THE DRAWERS

It was now time to make the drawers. Searching back through the boards I had earmarked for various things, I selected the drawer fronts from the timber that had the most attractive medullary figuring, making sure there was a good selection left for the all-important carcass top. Once the boards had been selected the first thing to do was grain match each front to the correct opening for the most attractive visual effect on the frontage. They were then carefully sized to their respective opening, planed and thickened down to 25mm thick and sawn just over size before being hand sized using a hand plane for a perfect fit.

DRAWER DOVETAILS

Once I was happy with everything it was time to begin the drawer dovetail making exercise. I had purchased some thinner 18mm-thick quartered boards for this and so looking at these, the final timber selection process took place for the sides and backs but keeping enough material for the tongue-and-groove backboards.

The sides were left over length allowing me options if there were any mistakes when cutting the front set of tails, any discrepancy in the fit being carefully worked with a shoulder plane. Everything was numbered up in its correct order.

Next the front tails were marked out by hand and cut with a 1.8 angled jig on the bandsaw and the pin openings were pared down to my cutting gauge lines by hand. When all of the sides were at this stage I could begin transferring the tails’ shapes onto the pin boards, after finish sanding the inside faces, lightly scribing in with a sharp scalpel. I like to use Swan Morton 10a blades for this, aligning everything to my already preset gauge marks. I firmed up the lines with a thicker Japanese marking knife using a dovetail square as a guide, ensuring the bevelled side of the knife was working into the waste area. I set the cutting gauge to just under the thickness of the drawer sides allowing me to plane them down to the pin ends after assembly.



16 The back panel boards all carefully separated just as the ends were for consistency

17 A drawer showing the slips at either side and the centre dividing bar

18 Corner detail showing the figured grain, neat drawer fit and hardware

19 End detail with board gapping and fine dovetails

The scribe marks were squared down with a pencil to the gauge lines and the pins were cut by hand, using a fine Japanese dovetail saw just up to the gauge lines. Using a router with a fence, the bulk of the waste was removed leaving me with quite a bit of hand work to do before the joints were ready to mate. There were no jointing mistakes on this occasion, so I cut the sides to the required final length and worked on the backboard pins. This was a quicker process, no fancy 'needle pins' necessary here, cutting the tails on the bandsaw again and the pin slots coping sawn and chiselled out. Once transferred, the pins were cut straight from the saw. The waste on the pin boards was quickly sawn out and clamping a thick block flush with the end grain of the pins I used a small bearing following hinge sinker to route accurately down to the gauge line following the pins. The drawers were then glued up, I used Titebond 3 for a longer open time. After leaving everything to cure properly the sides were planed down flush with the pins.

DRAWER SLIPS

The slips were manufactured, grooved and jointed to the sides to allow for the oak veneered birch ply bases, in this case two bases captivated within a central muntin.

Now the final fit could begin, so carefully making sure all the running surfaces were sanded and then paste waxed for lubrication, the drawers could be 'run in', fettling where necessary until a smooth gliding action was attained.

HARDWARE AND FINISHING

Arts and Crafts-style handles from Armac Martin were added temporarily before applying a finish. The back boards were loose tongue-and-grooved into the opening again with 1mm expansion gaps and chamfers. And finally the top, which was made with the best looking figured boards that were left. These boards were converted and assembled before the final piece of the puzzle was set into place.

The hardware was removed and Osmo satin polyx oil was ragged on and off and the hardware was re-fixed in place.

Happily, the client was delighted on delivery day and with a wistful look I bade my farewells to the chest in its new home.

For more information about making drawer slips, see Ryan Cheney's guide opposite.



DRAWER SLIPS

RYAN CHENEY MAKES THE CASE FOR AN
ALTERNATIVE METHOD OF DRAWER CONSTRUCTION

Of all the ways to install a bottom in a drawer box, drawer slips often escape mention, but there are several advantages to their use that suggest they shouldn't be overlooked. For one, they increase the bearing surface the drawer slides on, which both smooths the drawer's action and slows long term wear. The drawer slips are added after the drawer box is constructed, freeing up the maker to lay out dovetails wholly without

concern for the placement of the drawer groove. Furthermore, the maker can use thinner stock for the drawer sides, saving material, weight and interior space as well as lightening up the look of the drawer. The one disadvantage to drawer slips is that they are a bit of extra work, but I hope to show that they're not as labour intensive as they first appear and can actually be quite enjoyable to install.



PHOTOGRAPHS BY RYAN CHENEY

1 The grooved drawer slips are cut off on the bandsaw repeatedly until enough are created **2** The slips are ganged together against a bench stop, the backs are then flattened with a hand plane **3** Before cutting the slips to fit, a chamfer tool is used to shape the edges **4** The mitres are cut with a backsaw ready for fine trimming **5** The internal mitres are trimmed on a 45° shooting board **6** Note how the layout of the dovetail joint is unaffected by the groove in the slip

PREPARATION

It all starts with a board milled to roughly triple the thickness of the drawer bottom and at least as long as the longest side of the drawer box. I like to use the same wood species as the drawer box itself, but any material that wears well is appropriate. If you're doing the work mostly by hand, it's also helpful if the grain runs out consistently along the board's edge, to ease the use of plough and moulding planes and yield a result that is tear-out free.

WORKING THE GROOVE

Rather than centre the groove on the board's edge, I like to leave a little bit more material on what will be the underside of the groove for extra strength and support. In this example the drawer bottom is 6mm thick, so the resultant groove will have just over 6mm of material below and a little less than 5mm above.

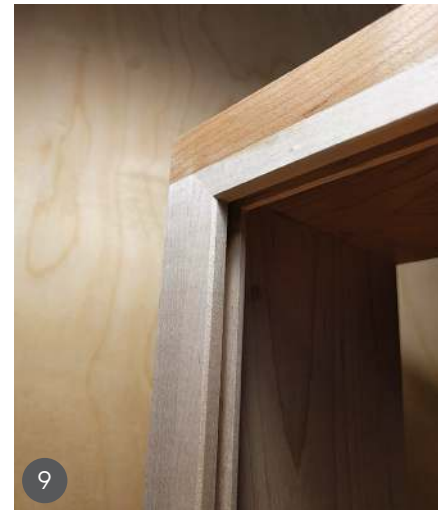
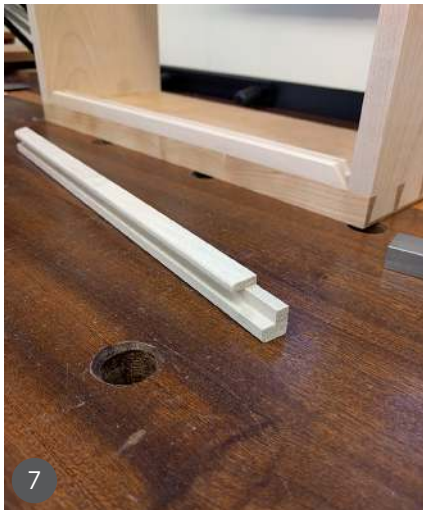
Once the groove has been ploughed, either with a plough plane or on a router table, it's time to break the edge on what

will be the lower inside edge of the drawer slip, and round over or chamfer what will be the upper inside edge, so that the end user isn't met with something sharp while fishing around inside the completed drawer.

FITTING THE SLIPS

The prepared profile can now be ripped free from the board via bandsaw, tablesaw or hand saw. The process so far should be repeated using the remainder of the board until sufficient stock has been gathered. It's helpful at this point to gang the slips together and dress them with a long hand plane, removing saw marks and ensuring that the slips come to an even thickness.

I find it helpful to install the front drawer slip first, because it helps hold the side slips in place for marking later in the installation. I measure the inside width of the drawer and cut an inside mitre at both ends of the slip, being sure to leave the slip a touch overlong. A 45° angle shooting board is the perfect



7 The cutaway to accommodate the rear of the drawer where the drawer bottom will be inserted **8** Plenty of clamps are needed to hold the slips precisely in place during glue-up **9** The result is a very neat, pleasing appearance ready for the drawer bottom **10** A very tidy result showing the layout of the dovetails relative to the drawer bottom **11** An equally tidy appearance in the internal corner of the drawer

set-up for trimming the slip to fit. Once this is done, glue it to the inside of the drawer front so that the bottom of the drawer slip is flush with the bottom of the drawer front.

The sides are mitred at the front and left overlong. The overall length will be determined by the drawer itself. Tucking the mitres into the front of the drawer allows for marking them directly off the drawer back. Make a knife line on top of the drawer slip where it meets the inside of the drawer back, and a pencil line where the slip meets outside the drawer back. Crosscut the slip at least 5mm past the pencil line; the slip will extend past the back of the drawer after glue-up and get cut flush later. Then notch out the top of the slip at the knife line so that the portion above the groove tucks inside the drawer. Be sure to leave the groove itself fully intact, or you may have trouble sliding the drawer bottom in later!

Now glue the side slips in place flush with the bottom of the drawer. It won't hurt to exhaust your supply of small clamps to

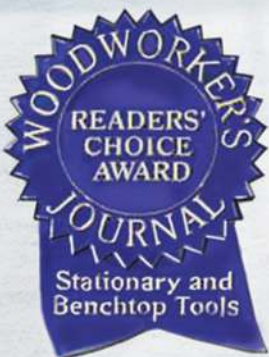
hold them in place while the glue sets. Once the clamps are off, take a light pass off the bottom edge of the drawer with a hand plane to smooth and even it out. Then cut the protruding slips flush with the back of the drawer with a flush cut saw. I like to file a subtle chamfer at the back, bottom edge so the drawer travels the runners like a snow sled.

FUTURE PROOFED

Once the drawer bottom is slipped into place, the result is clean and highly functional. The thin drawer sides are stiffened considerably and won't knife into the drawer dividers over the years like they would if left alone. The drawer slips wrap around the inside of the drawer like a picture frame and, when viewed from the inside of the drawer, add a touch of class and sophistication that can't be denied. Not least of all for this furniture maker, they're good fun to make as well.

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A young woman with brown hair tied back, wearing a black shirt and a light-colored apron, is working in a workshop. She is focused on her task, using a tool to work on a small object on a workbench. The background is a blurred workshop with various tools and equipment.

SPOTLIGHT ON THE NEXT GENERATION

WE CHART THE FLEDGLING
CAREER OF MAKER
SAPPHIRE HALES, WHO HAS
BEEN SPONSORED BY THE
GUILD OF MASTER CRAFTSMEN



Sapphire Hales is a young woman who is passionate about craft and good design. Just over three years ago, she decided to pursue her dream and was successful in gaining a place to study woodworking at the Building Crafts College in Stratford, London. In her final year, Sapphire was selected for support by The Guild of Master Craftsmen and obtained a Diploma in Fine Woodworking. During Craft Week 2019, Sapphire took part in the Celebrating the Best of British Craft Exhibition held at the OXO Gallery, sponsored by The Guild of Master Craftsmen.

DESIGN INFLUENCES

A striking feature reflected in Sapphire's work is her deep interest in design, both modern and with echoes of the traditions of the East, particularly Japanese design. She is developing a whole range of original designs from tables to Japanese cups and bowls.

Currently Sapphire is a maker in residence at the Building Crafts College. This role includes teaching woodworking to

GCSE students from a local school. As maker in residence, Sapphire can also work on her own projects and commissions. This work includes making some small side tables and woodturning objects for a new collection.

A BRIGHT FUTURE

The Alvernia chair Sapphire designed and made in her final Diploma year was exhibited by the Building Crafts College at the New Designers show in Islington. This led to her participating in an exhibition at the Mint Gallery and the Decorex exhibition. Glade, a small table, was shown at the Young Furniture Makers Awards and was then chosen as one of the pieces to be shown at the January Furniture Show in Birmingham.

Certainly the future looks bright for Sapphire and we shall be following her career with interest.

WORDS: HELEN ESMONDE



RESTORED DISPLAY CABINET

SPLITS, CRACKS AND BREAKS –
LOUISE BIGGS FOUND THIS
CABINET HAD THEM ALL

This display cabinet is a family piece that has been handed down through the generations and is now in the care of my customers. Unfortunately, due to the ceiling height of modern-day rooms, they are unable to use the fretwork pediment. They had noticed some damage to the cabinet and the stored pediment and that various sections were a bit loose, so approached me to have the piece restored.

ASSESSMENT

- The bottom carcass was loose at every intersection of timber and the legs were loose.
- The fretwork on the door had some loose sections and splits within the door frame.
- On the top section the tiered shelves on each side were loose.
- There were some splits and cracks in and between the sections that made up the top back panel.
- The mirrored carved decorations applied to the back panel were loose and one piece had been broken and only half remained.

- On the pediment, the moulding which fitted around the back panel was broken and a piece missing.

While completing the assessment I could find no tell-tale signs as to the type of joints used on the bottom carcass. It appeared at first glance that the whole cabinet was screwed and nailed together. This article will concentrate on repairing the carving and fretwork. Throughout the process old mahogany and animal or hide glue were used.



Damage to the fretwork door panel



Tiered shelving loose on the back board



CARVED DECORATION

1 As the piece could not be laid on its front due to the tiered shelving, it was supported upright against the bench and the back panels carefully removed, levered off using a Japanese cat's paw, working around the edges so as not to split the panels. Removing the back panels revealed the remaining screws which held the tiered shelves.



2 Having removed the tiered shelves the applied carved decorations were lifted off the back panel to be re-fixed after the other restoration work was completed. One pair of carvings had one carving with half missing and the second with a small piece missing. A template was made of the more complete piece and the shape cut out of card.

3 Joint surfaces needed to be cut where the breaks had occurred. As the carved sections were thin and fragile they were supported in the vice, with my finger underneath for additional support and the joint carefully cut by paring the timber in thin slices, as too much pressure might further break the carving.

4 The broken carving was lined up over the template, which was marked at the point of the joints. The area was then marked out on a piece of mahogany prepared to the required thickness. The timber was cut out, slightly oversize, on a bandsaw with a narrow blade and the edges adjusted to form a tight joint with the existing carving.

5 The existing carving was glued to a waste piece of board using wallpaper paste and newspaper to form a paper joint. The replacement piece was glued to the board in the same way, while rub jointing the two pieces together. This effectively held the carved decoration ready for it to be sent to the woodcarver while the other restoration work was carried out. The small missing section on the second carving was replaced in the same way.

FRETWORK DOOR

6 The glass needed to be removed from the door in order that the fretwork could be restored. Using the cat's paw and an old cabinet scraper to lever against, the beading was carefully prised off the door frame as both glass and beads would be re-fitted.

7 The fretwork and the veneer overlaying the door frame were cut from the same piece. Due to shrinkage some of the fretwork was broken and there were splits in the wide edges that were lifting away from the door frame.

8 Having cleaned out the dust and debris from behind the edge veneers, traditional animal or hide glue was applied between the two surfaces and the frame and veneer clamped together until dry.

9 Supported on a piece of waste board wrapped in newspaper, the breaks in the fretwork were glued if they were a tight break. For those where pieces were missing or the breaks too wide, small pieces of old mahogany were cut and fitted into the relevant areas and held with a combination of low tack tape and fine pins. Be careful of your fingers when cutting small sections like these; I only use a small hand saw and hold the piece with pliers or similar if required.

10 Any remaining splits in the edge veneers were cleaned out using a fine flush cut saw, with no kerf on the blade. This kept the split as small as possible and removed less of the original material. The resulting grooves were then filled with small shivers of old mahogany.

11 Once dry the shivers were pared down flush with a chisel, being careful not to remove the surrounding finish. In this instance no abrasives were used. The fretwork repairs were carved to shape using a selection of small carving gouges that corresponded to the curves.

GENERAL REPAIRS

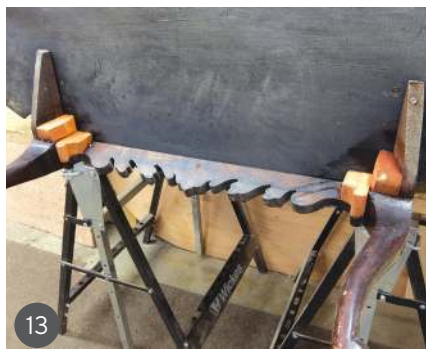
12 The bottom carcass was dismantled and, where necessary, the worn screw holes plugged with timber before the carcass was reassembled and the screw holes drilled with a pilot drill and the screws fitted and tightened. The back panels were then reinstated and pinned, making sure the carcass was square. This further stabilised the carcass before the top was reinstated.

13 The front legs were fitted to the carcass by the front frieze and a bracket, which were nailed and screwed together and to the bottom. New support blocks were shaped and glued into place.

14 Having dismantled the carcass the whole bottom section was turned upside down and, using two straight edges spanned between the legs as winding sticks, the legs were checked for being level. When sighted through the two bottom edges they should be parallel, as shown in the photo. At first one front leg was slightly high so the end was eased off with a rasp until the winding sticks were parallel.

15 With the carvings returned, the sections were separated from the boards by passing a thin knife behind, which separates the paper joint. Any remaining paper was then removed using some hot water to soften the wallpaper paste and carefully scrape the paper off.

16 With all the repairs completed the areas were stained and polished to match, the applied carvings were polished before being glued back in their respective positions and a board was made for the pediment to ensure that it was protected while in storage.





THE AGE OF ELEGANCE

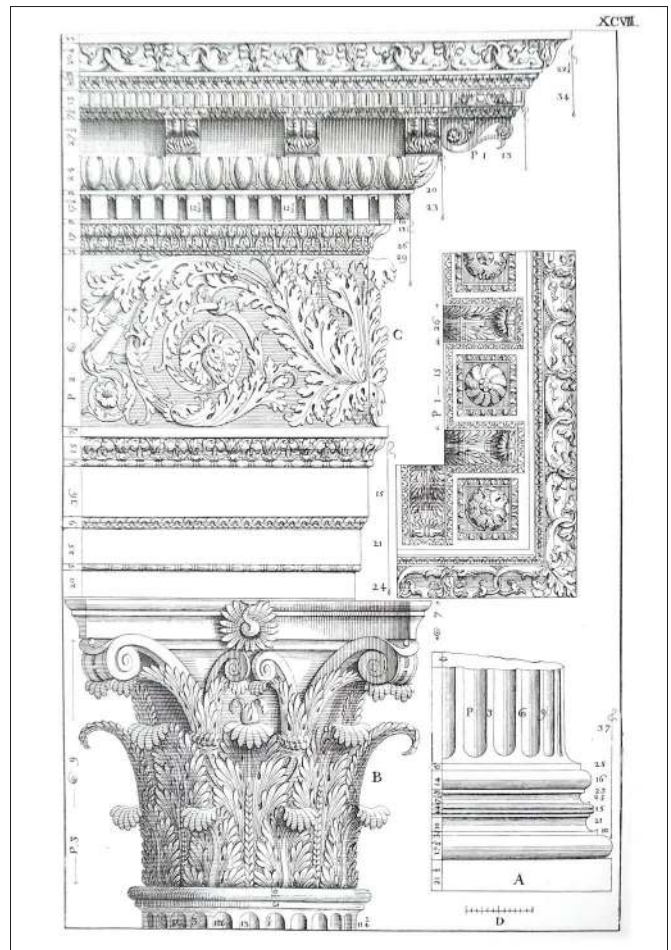
STEVE BISCO LOOKS AT GEORGIAN STYLE

The Georgian era (1714–1830) is so called because it covers the reigns of four successive King Georges. It is known as the Age of Enlightenment for the rapid advances made in science, exploration and learning, but in the arts and architecture it is also recognised as the Age of Elegance.

Despite Britain being almost constantly at war during this period, and the internal strife of the Jacobite rebellions of 1715 and 1745, it was an era that produced the music of Handel, the architecture of Robert Adam, the furniture of Thomas Chippendale, the landscapes of Capability Brown, the pottery of Josiah Wedgwood and the romance of Jane Austen's novels, among many other examples. The Georgian neo-classical country house, set in its green acres of parkland, is one of the glories of our heritage.

As you would expect in a period of 116 years, there were several different 'Georgian' styles, many of them overlapping or running concurrently. In 1714 when the first George came over from Hanover with his German court, expecting to be murdered in his bed by the British subjects he had inherited under the Act of Succession, the Baroque style with its rich and heavy decoration was in gradual decline. The intellectual and historically accurate Roman classical 'Palladian' style, championed by architect Colen Campbell and the Earl of Burlington, was in the ascendant with its 'orders' of columns, pilasters, pediments and friezes.

By the 1740s, the 'French taste' – later to be called Rococo – was coming into fashion with its abundance of light, frivolous swirling scrolls and wild lack of symmetry. As a counter-



ABOVE LEFT: Corinthian columns, with their elaborate capitals, are a mainstay of classical architecture
 ABOVE RIGHT: Palladio's *The Four Books of Architecture* inspired the Palladian style in Georgian Britain
 OPPOSITE: The Palladian-style Marble Hill House encapsulates the elegance of the neo-classical Georgian country house

reaction, by the end of the 18th century and into the early 19th, the masculine formality of the Greek Revival style had come to dominate with its more stripped-down classical detail, often used in the new 'reformed' churches.

Running alongside these 'classically-derived' styles was a bit of Chinoiserie (Chinese style), the 18th-century version of Gothick (with a 'K'), a bit of 'Hindoo' (as in Brighton Pavilion) and the simpler but very elegant 'Regency' style of domestic architecture with its verandas, bow windows, shallow roofs and wide eaves. *The Gentleman and Cabinet-maker's Director* – Thomas Chippendale's 'mail order catalogue' of furniture designs first published in 1753 – contained designs in the Classical, Rococo, Gothick and Chinese styles all prevalent at the time.

But it is the 'Palladian' neo-classical style that dominated the Georgian era, named after Italian Renaissance architect Andrea Palladio (1508–80). His architectural source book, *The Four Books of Architecture* (still available today from Dover Publications), contained drawings and measurements of ancient Roman classical architecture. It had been influential in the early 1600s, but when it was published in English in 1738 it profoundly influenced architecture and decoration in the British Isles throughout the Georgian era and beyond.

Running like a thread through all the classical styles, including Baroque and Rococo, was the acanthus swirl. How this unremarkable Mediterranean 'weed' came to be represented in ancient Greece and Rome as a swirling vine clasping capitals and corbels and curling along friezes and entablatures is a mystery as the actual plant bears little resemblance to the stylised form. But it was and still is the dominant feature of classical decoration, especially in woodcarving. On capitals and corbels it is portrayed as a leaf or leaves in something like the form of a real acanthus leaf, but in pierced panels, picture frames, friezes and on chimneypieces it is a series of long spiralling curls that look like they are being sucked into a vortex. A good acanthus swirl is full of 'movement', continuously curling up, down, sideways, in and out with never a straight line or an awkward angle to spoil the flow.

Georgian woodcarvings in every style were nearly always painted in white or pastel colours, and were frequently fully gilded or decorated with gilded highlights known as 'parcel', or partial, gilding. This gave Georgian rooms the lightness and elegance that is so familiar to stately home visitors. Interior designers still emulate it today, and estate agents say that Georgian properties are the most sought-after dream home.



CARVED GEORGIAN- STYLE CORBEL

STEVE BISCO CARVES AND GILDS A
DECORATIVE BRACKET IN THE 18TH-
CENTURY STYLE

The elegant Georgian room was set out with the perfect proportions of a Greek or Roman temple, and the 'supporting cast' of that scheme of decoration was the gilded corbel. They were of such importance that in *The Gentleman & Cabinet-Maker's Director* (1754), Thomas Chippendale devotes a whole page to drawing a volute (spiral scroll) – like the one in this project – using compasses centred on no less than 18 separate foci set out in a highly complex geometrical arrangement. I have to admit I am less disciplined – I draw my volutes by eye and tidy them up using French curves!

PAINTING AND GILDING

These days it is unusual to paint a carving, but in Georgian times it was normal for 'architectural' carving to be painted. To keep to the Georgian spirit, I painted this corbel with a 'heritage' matt oil paint. Combined with the gilding of the volute, the acanthus and the waterleaf detail, this gives the corbel an authentic 18th-century look.

I have also based the gilding on traditional methods, though with some concession to the conveniences of modern materials. Gold leaf was normally applied over several coats of gesso – a mixture of fine chalk powder, rabbit-skin glue and water, which had to be warmed in a pan and mixed thoroughly. We are able to take a shortcut by using ready-mixed acrylic gesso, which can be used cold straight from the tub.

YOU WILL NEED

Timber

Lime: 'body' section block: 550 x 150 x 90mm cut diagonally and glued together; entablature section block: 235 x 171 x 76mm

Adhesive

Evostick Resin W PVA Wood Adhesive

Power tools

Bandsaw, Axminster multi-tool (V-tool and flat chisel for initial shaping)

Planes

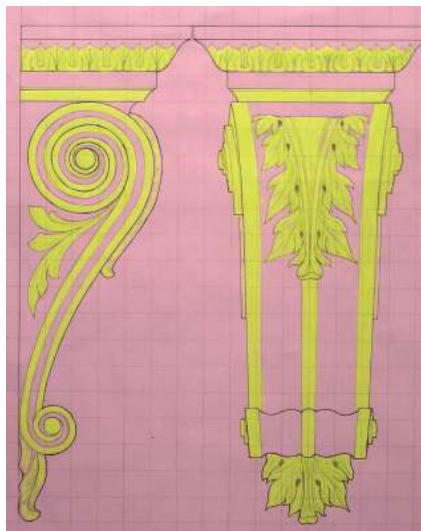
38mm rebate plane, 25mm convex moulding plane, 25mm concave moulding plane, 13mm concave moulding plane – concave/convex refers to the moulding, not the plane

Chisels and gouges

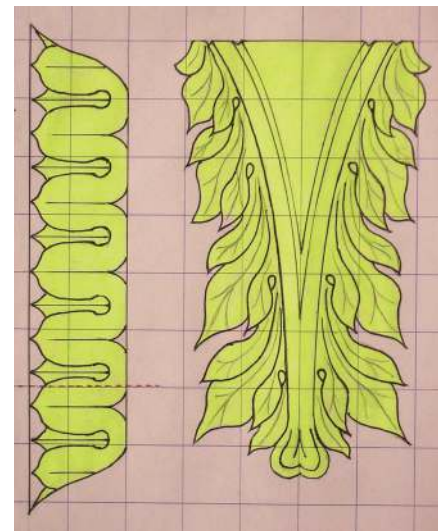
V-tool, 5mm fine-ground flat chisel, 25mm flat chisel No.3 10mm, No.5 6mm, No.5 4mm, No.8 5mm, No.8 8mm, No.6 25mm gouges

Finishing

Danish Oil (as primer), 'heritage' paint (Farrow & Ball Dead Flat Oil House White), acrylic gesso, water-based gilding size, 233/4 carat double gold leaf (about 40 leaves)



Main pattern



Detail pattern



PHOTOGRAPHS AND DRAWINGS BY STEVE BISCO

The gesso is applied thinly over the areas to be gilded, building up about six to nine coats, to give an exceptionally smooth finish for the gilding.

Genuine gold leaf, applied over gesso, gives a luxurious finish worthy of a Palladian mansion. This project takes around 40 leaves of genuine leaf (233/4 carat). If you use the larger artificial gold leaf you will only need about 25 leaves, which will be cheaper, but you will need to seal it against tarnishing. Genuine 233/4 carat gold is immune to corrosion so it needs no varnish or shellac. It appears quite bright to modern eyes used to seeing Georgian decoration through 200 years of patina, but I resisted the temptation to 'antique' it. I thought it fitting that it should look as new as it would have looked to an 18th-century 'person of quality' fitting out their residence in 'the latest fashion'.

GETTING STARTED

1 A block of lime 550 x 150 x 90mm will provide two overlapped body sections which can be cut out on the bandsaw and glued to form a 180mm-thick main body. Trace the pattern onto both sides of the block and plane crossways – I am using traditional moulding planes and a 38mm rebate plane – to the profile set by the tracing lines. Leave a raised section of 6mm on the face where the acanthus leaf section will be carved later – notice the flip-up at the end which will be the 'tendrill'. Leave about 13mm of spare wood at the head of the corbel body to protect it from damage until you are ready to make the join later. Screw a board to the back so you can clamp it to the bench while working.



2 Redraw the guidelines carefully on the face after planing, and cut off the waste wood at the sides with the bandsaw, taking care not to remove wood that will be used for the scrolls and the raised leaf on the sides. Re-trace all the patterns – use the detail pattern, not the main drawing, for the front acanthus panel, as it is the right length for the curved surface. Cut round the edge of the front acanthus panel to the main surface of the face. Again, the guidelines need to be drawn back on.

FORMING THE VOLUTE

3 Cut away surplus wood at the back of the scrolls and cut round the leaf pattern with a V-tool. The volute must now be formed. Gradually work down the level in a spiral from the centre boss to the side of the main body. Clamp the edge of the backing board in a vice when working on the sides.

4 With an 8mm No.8 gouge, cut a groove (or flute) along the middle of the volute all the way along its length. The groove should be one-third of the width of the volute – the width changes along its length. Take care to get the edges and bottom of the groove crisp and smooth.

LEAVES

5 Part the leaves on the side acanthus pattern with a V-tool. Use the 8mm No.8 gouge and the back of a 10mm No.3 gouge to shape the leaves. Make sure you create smooth curves that seem to flow out of the volute.

6 Start the bottom acanthus leaf section by cutting round the pattern with a coping saw.

7 Shape the rounded 'tendrill' at the end, then separate the leaves with a V-tool. Use the 8mm No.8 gouge to cut curving grooves in the leaves, lowering the level towards the edges as you go. Take the piece off the backing board and shave away the edges from the back so that the edge of each leaf is about 6mm thick.

CURVES

8 Shape the lower face and the 'bobbin' into a double convex and concave curved cross-section. A heavy 25mm No.6 gouge is the best tool for the concave curve. The convex curve is tricky as the slope of the face makes it difficult to use the back of a gouge. Scraping with a skew chisel is quite effective, but



you will probably need a bit of work with abrasives to get a smooth finish.

9 Start the front acanthus panel by using a 3mm No.9 gouge to cut the 'eyes' in the loops of the leaves, then use a V-tool to separate each group of leaves. Cut the lines in the large 'V' section in the centre using the V-tool, and 'bost' round the edge of the pattern to separate it from the volute.

10 Shape the 'tendrils' at the bottom end of the pattern, then shape each group of leaves using mainly the V-tool and the 8mm No.8 gouge. Create smooth curves sweeping down and outwards from the 'eyes' – the appearance of this section will depend very much on the flow of the curves.

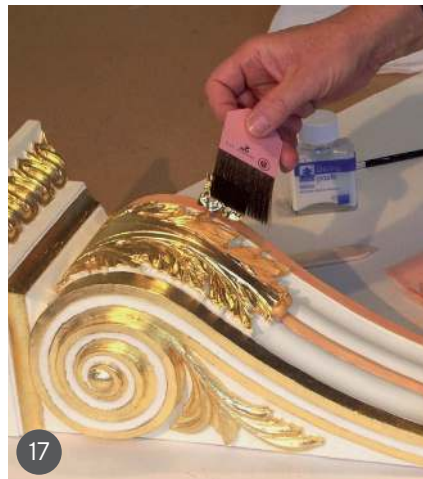
MOULDINGS

11 A block of lime 235 x 171 x 76mm will be used for the top section. Start by forming the mouldings around the sides. I am using traditional moulding planes, but if you don't have any you can use a router or gouges.

12 Trace the waterleaf pattern onto the wide cyma-recta moulding – use the detail pattern, not the main drawing, to get the correct depth on the curve. Make shallow 'bosting' cuts around the edge of the pattern, followed by shallow surface cuts to extend the moulding in between the leaf points.

13 Cut the 'eye' in the join of each leaf. Separate the join between the leaves with a V-tool, if the grain allows, or a sharp flat chisel, then chamfer from the centreline to the edges to give a pointed 'spear' with an inverted V cross-section.

14 With an 8mm No.8 or No.5 gouge, carefully make a shallow groove up each half of the leaf, following it round the curve at the bottom to give a smooth flowing continuous pattern. Make a shallow V cut up the centre with a V-tool. Grain direction is a problem on the front face because you are cutting across the grain, so go carefully. Aim for smoothness, delicacy, symmetry and flow.



GLUING AND SEALING

15 The two sections of the corbel must now be glued and compressed to give a strong bond. Cut off the spare wood at the head of the body section to give an accurate square cut where it will join the entablature section. You could leave it like this, but if you are ready for the 'full Georgian' effect, give it a coat of sealer and then two coats of a suitable 'heritage' paint. Paint very thinly over the carving so you don't fill the detail with paint.

GILDING

16 Start the gilding process by applying acrylic gesso over the areas to be gilded. This will build up a smooth surface for the gold leaf. You will need about six coats on the smooth surfaces of the volute, and nine coats on the carved surfaces of the acanthus and waterleaf detail. This is a slow process taking about 10 hours in total – by the time you finish one coat it is dry enough to start at the beginning again – but is worth it if you want to achieve 18th-century standards.

17 Apply a thin coat of size to the part of the area to be gilded, one section at a time. The gold will stick exactly where you apply the size, so accuracy is important. The size will take about 15 minutes to become dry and tacky to the touch. Carefully fold back the cover paper on a sheet of gold leaf – it is very delicate – and gently score across the leaf with a knife at the edge of your fold. Cut it into sections slightly larger than the patch you are going to gild. On carved detail, use smaller pieces as large pieces will span the hollows and just fall apart. With a 'gilder's tip' or a suitable soft brush rubbed on your skin or in your hair to give it some 'static', pick up a piece of leaf – slowly and carefully – and place it onto the size. Press it down gently with a soft brush, and brush away loose leaf. Go over bare patches again with small pieces of leaf.

18 With the gilding finished, the piece comes to life. If you use genuine gold leaf of 22-24 carats, it will not need sealing and will retain its brightness for very many years.

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Pipe Organ desk made
on commission for film
director Darren Aranofsky
RIGHT: The Pinwheel Box
was one of the first puzzle
boxes Kagen made

A SOUND CHOICE

KAGEN SOUND COMBINES CELEBRATED CRAFTSMANSHIP WITH
DEVILISHLY DIFFICULT PUZZLES IN HIS SPECIALIST WORK CREATING
BOXES INSPIRED BY THE JAPANESE ART OF HIMITSU-BAKU

You know that a man takes his work seriously when he changes his surname to reflect his commitment to his craft. Kagen Sound (formerly known as Schaefer) is the man in question: along with his wife Megan, he adopted the new name after they married in 2013.

The name had a dual significance for the pair. Sound can describe both a character trait, so a person can be said to be 'sound of character', and an object can be 'structurally sound' – a description that artist Kagen identifies with in his work creating complex wooden puzzle boxes based on the Japanese art of Himitsu-Bako.

DISCOVERING HIMITSU-BAKO

The tradition began over 150 years ago in the Hakone region in southern Japan, with craftspeople taking advantage of the plentiful wood supply to be found in the forests covering the Hakone mountains. These puzzle boxes, made from the timber of trees such as magnolia and katsura, typically contain many secret spaces that have to be unlocked by the owner and feature elaborate marquetry techniques.

As an eight-year-old boy, Kagen was enchanted by the mysterious boxes on first sight. 'My family was visiting San Francisco and we went to Chinatown, where they were being sold in the market,' he recalls. 'As an object, it resonated strongly with me although I had no clue how they were made.'

After choosing and buying his favourite box, Kagen returned home to Denver, Colorado, and the secrets it contained were revealed with a helping hand from nature. 'Colorado's dry climate meant that the wood shrank naturally, until one of the box's panels popped off on its own, showing me the inner mechanics of the puzzle,' he says. 'Although the truth is, even without seeing that, I was already utterly intrigued.'

The memory lingered into Kagen's high school years, when he fashioned a rudimentary version of the box that had so captivated him in woodworking class. Soon after, he attained a Bachelor of Arts in Mathematics with honours and it looked as if a bright future working with figures beckoned. But Kagen wasn't entirely convinced. 'Studying theoretical maths was all about using my brain,' he explains. 'However, I've always had this need to make stuff with my hands, so I decided to take some time to pursue woodwork because I couldn't shake off that interest in the puzzle boxes and getting to use mathematical geometry in that way.'

PUZZLE BOX MASTER

Fast-forward over 20 years later and Kagen, who still calls Denver home, produces exquisite and perplexing puzzles that have seen him acknowledged as a master craftsman by the Karakuri Creation Group, a guild of secret box makers in Japan. His complex work has garnered a clutch of awards at the prestigious annual International NobYosigahara Puzzle Design Competition over the years, too, and today, Kagen is a highly sought-after artist within the industry.

The secret of his success seems to be the perfect marriage between his mathematician's brain and his passion for woodwork. 'I flit back and forth between my thinking,' he explains. 'It's about getting the tension right between the logistics and the aesthetics.'

The Pinwheel is one of the first puzzles Kagen made where he exercised this fine balance. As its name suggests, the prototype box, made from oak, transforms into a pinwheel through pushing the sides – which fan out – in a certain sequence. It's a common device in much of his work: patterns, via intricate mechanics, are transformed into other patterns and the process provides clues about how to unlock the puzzles within the box.



Maple and walnut are the timbers principally used by Kagen in his work. 'It was an early choice I made, and I've fallen in love with them both,' he explains. 'With maple, you get all of these different types of grain pattern because the wood comes from the sapwood of the tree which is closest to the outside of the trunk. This means the wood has the potential to take on a lot of different shapes in the grain such as quilt, curl and bird's-eye. Walnut I love simply because of its colour and because it's a very forgiving wood to work with.'

The most time-consuming part of creating a new puzzle is working out the prototype, then each copy (in general, Kagen produces limited runs of around 250) takes between 10–15 hours to make.

PUZZLE DESK

Specific commissions are rare, although one of Kagen's most exceptional pieces – a pipe organ desk which can be viewed on his website – was a unique project requested by the American director Darren Aranofsky in 2005. Known for his often perplexing movies, including *Mother!* and *Black Swan*, it makes perfect sense.

Kagen chose a rare timber, Bastogne walnut, to make the table for Aranofsky, who is a keen fan of Japanese puzzles. The species of tree is the result of a cross pollination between English and Californian Claro walnut, combining the beautiful colour of the Claro with the grain of the English tree. Striking aesthetics aside, the main features are the small drawers across the top – they are actually small bellows that make musical notes when pushed in or pulled out.

The project was, like much of Kagen's work, a labour of love. 'I spent five years working on it, pretty much full time,' he reveals. 'Although to be honest, you stop counting the hours after a while. There were over 20 puzzles hidden in the desk and I know Darren solved them all – although I'm sure it took him a while!'



Snake Box made from holly, ebony and curly maple

THE TREE WHISPERER

While Kagen laughs off the suggestion that he more than deserves the nickname 'The Tree Whisperer', his years of experience mean he can 'read' a tree's life at a glance and see how it has been affected by man through its lifetime. 'I recently bought some timber and I could tell that it was a city tree and the warp showed me that it had had a branch that had been trimmed a few decades ago,' he says. 'I can't pinpoint the exact age, but I can work out if it is an old or new-growth tree.'

Older timber is Kagen's perfect material to work with because it tends to have a wider range of grain patterns, from wide and straight to wild and wavy, plus amazing colour variations. However, his firm commitment to using wood from sustainable sources (and donating a percentage of his revenues to the Forest Stewardship Council), means he has a wholly different approach than when he started out.

'My general rule of thumb is using wood that is being replenished at the same rate and these older timbers can be questionable,' he explains. 'Global demand for rosewoods and ebones seems to have reached a saturation point, so I tend to ask more questions if I'm considering purchasing this type of wood. If I cannot verify that it is ethically harvested I do not purchase it.'

But rather cleverly, Kagen has found a way to imitate ebony using a process of oxidation. He soaks a timber in a solution made from vinegar and steel wool which turns it into the desired jet-black colour. It's just one of the many ways in which the artist's processes are constantly evolving. Though they are considerably harder to use than the Western versions, he recently switched over to using traditional Japanese woodworking tools. 'I've learnt from people who have already mastered them,' Kagen says. 'But I made lots of mistakes along the way because they demand a higher degree of accuracy compared to other tools.' His favourite tools include Japanese hand-planes. Known as a kanna, once mastered, they offer the chance to use the actual wood shavings in the artwork, too.

And metal has become more of a feature in Kagen's work in recent years; demonstrated in the maze boxes currently for sale on his website which are constructed from wood including maple, Pau Amarello and cherry, plus stainless steel. 'I had a very idealistic approach when I first started out, which meant I used to like to challenge myself to see how far I could push wood as a material, but I have gradually relaxed about that and have a less fixed mindset,' Kagen says. 'The fact is that a wooden dowel might not always be able to deal with the pressure I need to put on it, so I'll opt for metal because it's stronger.'

As for the future, Kagen doesn't have any plans at present to (excuse the pun) branch out into other areas, believing that there is a growing interest and appreciation for work such as his. 'My theory is that there is a desire in the younger generation for physical, real objects, instead of virtual versions,' he reasons. 'And mechanical puzzles represent that: they are very pleasing to hold and works of art in themselves.'

For more of Kagen's work, see kagensound.com

WORDS: RACHEL ROBERTS



Lotus Table featuring a top made from
10 concentric rings of inlaid wood



Pipe Organ desk made on commission for film director Darren Aranofsky



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TOXIC TIMBERS

A USEFUL CHART FROM THE HSE

We make furniture because we enjoy the process because wood itself is an infinitely practical and economic material. I hope readers take proper precautions for personal safety when working with timber, but it is easy to forget the risks involved. The worst is inhalation of fine dust, the smallest most invisible of which can penetrate skin or lung tissue and cause long-term damage, but

some timbers can also cause an allergic reaction such as 'contact dermatitis' and repeated exposure tends to increase sensitivity. So, without wishing to alarm readers, we thought it might be appropriate to reproduce this chart with the kind permission of the Health and Safety Executive.

TIMBER NAME(S) [# – used for plywood, \$ – softwood]	USE	REPORTED ADVERSE HEALTH EFFECTS
Abura/bahia (<i>Hallea ledermannii</i>)	Furniture, shop-fitting, cladding	Vomiting
Afrormosia (<i>Pericopsis elata</i>)	Joinery, furniture, framing, veneers, cladding, boats	Skin irritation, splinters go septic, nervous system effects
Afzelia/doussié (<i>Afzelia spp.</i>)	Stairs, doors, floors, cladding	Dermatitis, sneezing
Agba/tola (<i>Gossweilerodendron balsamiferum</i>)	Cladding, general uses	Skin irritation
Alder (<i>Alnus glutinosa</i>)	Construction, toys, brush handles	Dermatitis, rhinitis, bronchial effects
Andiroba/crabwood (<i>Carapa guianensis</i>)	Interior joinery	Sneezing, eye irritation
Ash (<i>Fraxinus excelsior</i>)	Joinery, sports goods	Decrease in lung function
Avodiré (<i>Turraeanthus africanus</i>)	Decorative veneers	Dermatitis, nose bleeds
Ayan/movingui (<i>Distemonanthus benthamianus</i>)	Doors, windows, furniture	Dermatitis
Basralocus/angelique (<i>Dicorynia guianensis</i>)	Marine uses, barrels	General unspecific effects
Beech (<i>Fagus sylvatica</i>) #	Furniture, veneers, tool handles, musical goods	Dermatitis, decrease in lung function, eye irritation (possibly from bark lichens)
Birch (<i>Betula pendula</i>) #	Furniture, paper and pulp, veneers, flooring	Dermatitis on sawing lumber
Bubinga (<i>Guibourtia demeusei</i>)	Veneers, turnery, knife and brush handles	Dermatitis, skin lesions possible
Cedar of Lebanon (<i>Cedrus libani</i>) \$	Joinery, garden furniture, gates	Respiratory disorders, rhinitis
Cedar (Central/South American) (<i>Cedrela fissilis</i>) #	Cabinets, joinery, panelling, boats, cigar boxes	Allergic contact dermatitis
Cedar (western red) (<i>Thuja plicata</i>) \$	Indoor and outdoor constructions, shingles, planking, boats, panelling, cladding	Asthma, rhinitis, dermatitis, mucous membrane irritation, nervous system effect
Chestnut (sweet) (<i>Castanea sativa</i>)	Furniture, kitchen utensils, fences, gates, veneers	Dermatitis (possibly from bark lichens)
Douglas fir (<i>Pseudotsuga menziesii</i>) # \$	Flooring, joinery, turnery, boats, vats, veneers	Dermatitis, splinters go septic, rhinitis, bronchial effects
Ebony (<i>Diospyros spp.</i>)	Tool handles, musical and sports goods	Mucous membrane irritation, dermatitis, possibly a skin sensitiser
Freijo/cordia (<i>Cordia goeldiana</i>)	Interior furniture	Possibly a skin sensitiser
Gaboon/okoumé (<i>Aucoumea klaineana</i>) #	Blockboard, veneers, packing cases, cigar boxes	Asthma, cough, eye irritation, dermal effects (hands, eyelids)
Gedu nohor/edinam (<i>Entandrophragma angolense</i>)	Furniture, boats, coffins	Dermatitis (rare)
Greenheart (<i>Chlorocardium rodiei</i>)	Marine uses, axe handles, factory flooring, sports goods	Splinters go septic, cardiac and intestinal disorders, severe throat irritation
Guarea (<i>Guarea cedrata</i>)	Boats, furniture and cabinetmaking	Skin and mucous membrane irritation
Gum (southern blue) (<i>Eucalyptus globulus</i>)	Packing cases, construction, pulp	Dermatitis



The full document WIS30 and much, much more safety information is available on the HSE website:
hse.gov.uk/woodworking. There are PDFs available for download on a variety of topics.

TIMBER NAME(S) [# – used for plywood, \$ – softwood]	USE	REPORTED ADVERSE HEALTH EFFECTS
Hemlock (western) (<i>Tsuga heterophylla</i>) \$	Construction, joinery	Bronchial effects, rhinitis
Idigbo (<i>Terminalia ivorensis</i>) #	Interior and exterior joinery, furniture	Possible irritant
Iroko (<i>Milicia excelsa</i>)	Construction, bench tops, marine, joinery	Asthma, dermatitis, nettle rash
Larch (<i>Larix decidua</i>) \$	Construction, fencing stakes, stairs, flooring	Nettle rash, dermatitis
Limba/afara (<i>Terminalia superba</i>) #	Frames, drawer sides, coffins, veneers, furniture	Splinters go septic, nettle rash, nose and gum bleeding, decrease in lung function
Mahogany (<i>Khaya ivorensis</i>)	Furniture, cabinet work, boats	Dermatitis, respiratory disorders, mucous membrane irritation
Makoré (<i>Tieghemella heckelii</i>) #	Planks, floors, panelling, doors, furniture, boats	Dermatitis, mucous membrane and respiratory tract irritation, central nervous system and blood effects
Mansonia (<i>Mansonia altissima</i>)	Cabinetmaking, turnery, sports goods	Splinters go septic, skin sensitisation, irritation, respiratory disorders, nose bleeds, headache, cardiac disorders
Maple (<i>Acer campestre</i>)	Flooring, furniture, sports goods	Decrease in lung function
Meranti/lauan (various) (<i>Shorea spp.</i>) #	Boats, flooring, furniture, joinery	Skin irritation
Oak (<i>Quercus robur</i>)	Furniture, joinery, flooring, panelling, barrels	Asthma, sneezing, eye irritation
Obeche (<i>Triplochiton scleroxylon</i>) #	Model-making, musical goods, picture frames and rails	Skin and respiratory tract irritation, nettle rash, dermatitis (handling articles), feverish, sneezing, wheezing
Opepe (<i>Nauclea diderrichii</i>)	Construction, marine uses, flooring	Dermatitis, mucous membrane irritation, central nervous system effects (e.g. giddiness, visual effects), nose bleeds and blood spitting
Padauk (<i>Pterocarpus dalbergioides</i>)	Turnery, carving, boats, flooring	Species-dependent: itching, eye irritation, vomiting, swelling (e.g. eyelids)
Peroba (<i>Paratecoma peroba</i>)	Construction, joinery, turnery	Skin and mucous membrane irritation, systemic effects (e.g. headache, nausea, stomach cramp, weakness), blisters
Pine (<i>Pinus spp.</i>) #\$	Construction, stairs, doors, furniture, pallets	Skin irritation (may cause photosensitisation) decrease in lung function
Poplar (<i>Populus spp.</i>) #	Shelves, toys, matches, pallets, wood wool	Sneezing, eye irritation, may cause blisters
Ramin (<i>Gonystylus macrophyllum</i>)	Furniture, mouldings, toys, joinery	Dermatitis (possibly from bark)
Rosewood (many species)	Furniture, cabinets, musical goods, jewellery	Dermatitis, respiratory disorders. Effects may arise from handling wood
Sapele (<i>Entandrophragma cylindricum</i>) #	Furniture, mouldings, flooring, veneers	Skin irritation
Spruce (several species) #\$	Construction, telegraph poles, packings, pallets	Respiratory disorders, possible photosensitisation
Teak (<i>Tectona grandis</i>)	Marine fittings, joinery, scrubbing towers	Dermatitis (potent, even after seasoning), nettle rash, respiratory disorders
Utile (<i>Entandrophragma utile</i>)	Furniture, cabinetmaking, veneers, mouldings	Skin irritation
Walnut (not African) (<i>Juglans regia</i>)	Furniture, fancy goods, gun stocks, veneers	Sneezing, rhinitis, dermatitis from nut shells and roots
Wengé (<i>Millettia laurentii</i>)	Panelling, furniture, kitchens, veneers	Splinters go septic, dermatitis, central nervous system (e.g. giddiness, drowsiness, visual disturbance), abdominal cramps
Whitewood (American) (<i>Liriodendron tulipifera</i>) #	Construction, flooring, joinery	Dermatitis
Yew (<i>Taxus baccata</i>) \$	Carving, turnery, cabinetmaking, sports goods	Dermatitis, systemic effects (e.g. headache, blood pressure drop), cardiac effects

SAFETY NOTE Whatever woodworking activity you are engaged in you need to make sure you are wearing appropriate PPE (Personal Protection Equipment) and use extraction as well.

STATIONERY BOX

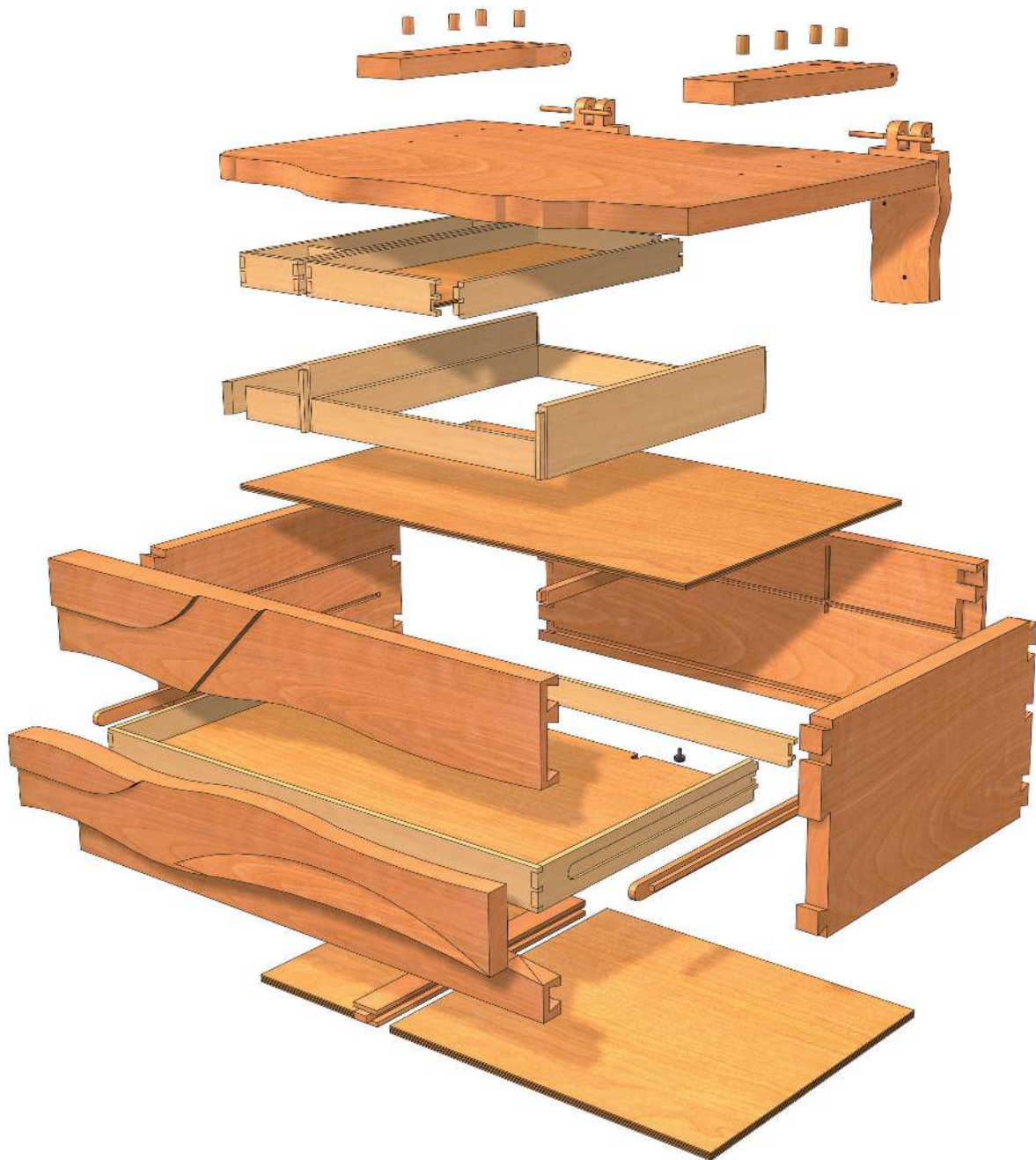
PERFECTION DOES NOT NECESSARILY MEAN STRAIGHT AND SQUARE,
AS **PETER LLOYD** SHOWS US WITH THIS BURR ELM BOX

When I first thought about making a box with a drawer, I didn't much like the idea. Drawers, I knew, were not easy. Was I up to it? However, the customer said drawer, so drawer it had to be. And I'd said yes. I seldom say no, which can make for an interesting life; it certainly stretches the old grey matter.

I decided that I didn't want to impose the drawer onto the box – I wanted it to be a part of the box and a part of the wood as well. I wanted it to sit happily with the figure of the wood and not slash across it. So it had to be curved and it had to be cut from the same material.



PHOTOGRAPH BY ANTHONY BAILEY/GMC PUBLICATIONS



THE WOOD

I chose burr elm for this stationary box. It is available in wide boards, and the piece I chose provided the perfect front: 50mm or so of burry edge giving way to swirling figure that I could use for the drawer.

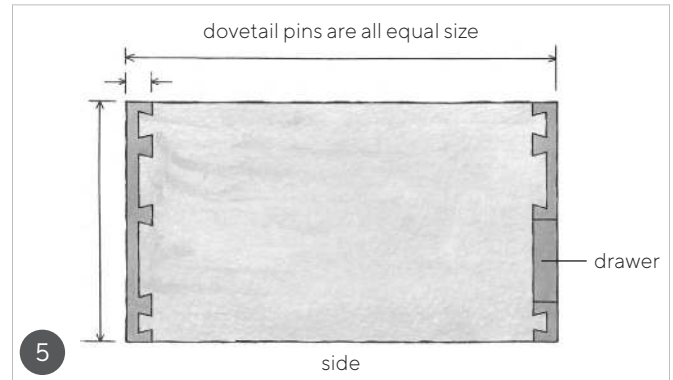
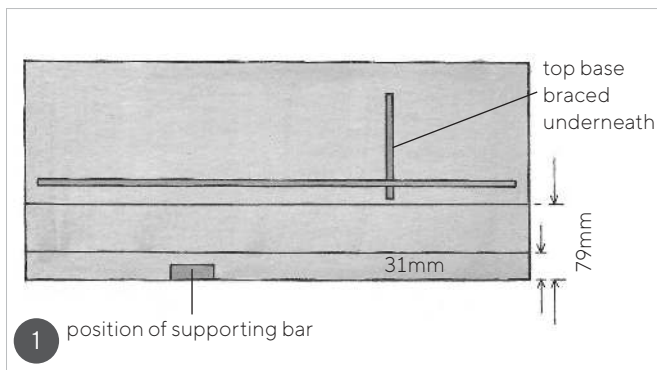
THE PROCESS

Choose a board bearing in mind the lid for this box is wide, however it is very important that the wood is completely dry and stable. Of course, stable is a relative term: any wood with burr in it may behave unpredictably and could well have built-up internal stresses which may not become apparent until after the wood has been cut. It's a good idea to let the wood acclimatise

for a few weeks once the drawer has been cut so that any stresses in the front have a chance to settle down. Far better to find out at this stage, as I did with my box, that the drawer is going to bow and twist out of shape.

Map out the four sides of the box, very carefully choosing the front piece from which the drawer will be cut. With regard to wood movement, the drawer is probably the most critical part of this box so I tend to choose a piece which is not too burry and wild at the bottom but with a little burr at the top to connect the front of the box to the lid visually.

Once the box has been mapped out including the hinges, number the sides and cut each piece precisely to length and width. Note that the front is 10mm wider than the back and sides.



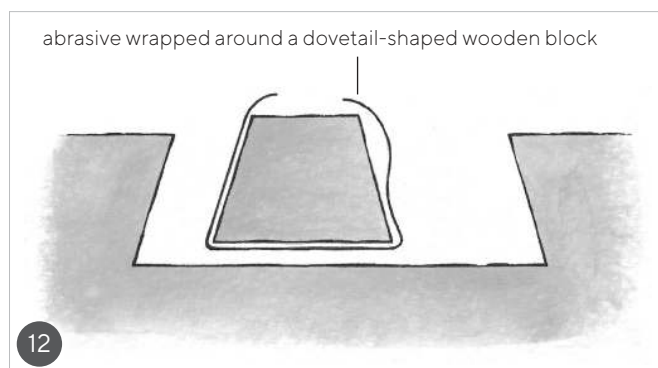
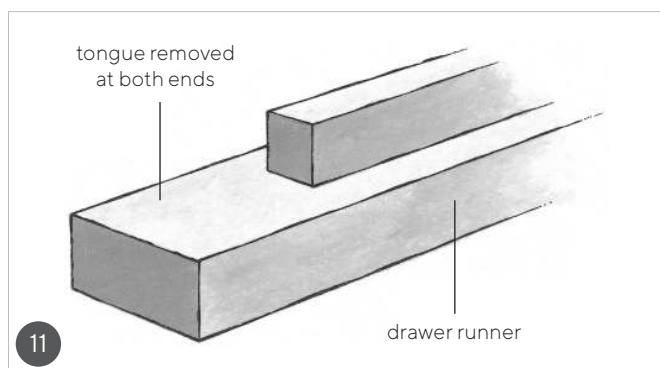
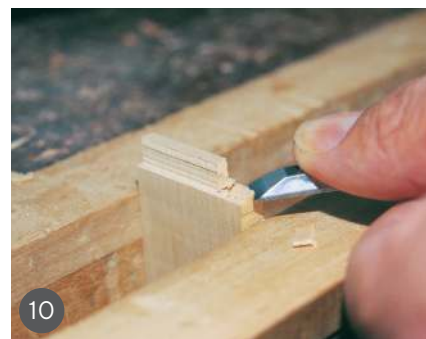
1 The drawer is marked on to the front of the box 2 Sanding the drawer edge 3 Checking that the drawer has a close fit 4 Use masking tape to rejoin the drawer front to the box front 5 The box side, showing the spacing of the dovetails 6 Use a try plane to make the base flat 7 The inside of the box, showing the support bar 8 The groove for the drawer runners is stopped 9 Cutting one of the dividers in two 10 Removing the end of the tenon with a chisel 11 The drawer runners are chiselled flat at the ends 12 This small wooden block is used to sand the end grain against which the drawer stops 13 Using the block illustrated in step 12 14 Taking the sharp edge off the grooves 15 Hammering the edge of the leather will thin it out slightly

THE DRAWER FRONT

Now mark the drawer on to the front using long, sweeping curves either to take up the figure in the wood or to contrast with it. The drawer should be the same height at either end. I have found that an electric jigsaw gives a good clean cut but a bandsaw or bow saw would do just as well. Whatever type of saw you use, make sure the blade cuts along the curve in one long, fluid movement. If the saw drifts off the line, ease it back on course gradually. At all costs, avoid sudden kinks in the cut. As I mentioned earlier, if at all possible, leave the box for a couple of weeks at this stage. Once your wood has had a chance to acclimatise, clean off the saw marks from the four edges, removing as little as possible. I find the best way of doing this is to fold and hold down some sandpaper with your thumb. If the

wood has moved, more drastic measures might be necessary, you may need a spokeshave or rasp-type shaping tool. With the saw marks removed, check for high spots by holding the pieces up against the light or in front of a window. The idea is to get as near perfect a fit as possible but unless the saw cut was very clean and the wood very stable, a perfect fit is not that easy to achieve; there is always a chink of light coming through somewhere.

With the drawer front fitting as tightly as possible and the sides lined up, use masking tape on both sides to tape it in position. You can now treat the front of the box as one piece of wood. Plane it to the same width as the sides and back, assuming that the 10mm extra allowed on the front was enough for the saw cuts and finishing. If it wasn't, you will have to reduce the back and sides to match the front.



THE DOVETAILS

Leaving the front taped in position, map and cut out the dovetails. I spaced my dovetails so that they were the same on the back and front of the box, cutting one large dovetail on the back to the height of the drawer. There is no dovetail cut into the drawer front.

Assemble the box and check that it stands flat and level, using a machine table or a piece of glass, and that there are no steps between the pieces. If necessary, gently remove any high spots. It is best to use a long try plane for this as the sole of the plane can rest on both edges. The top edge can be left as it is at this stage.

THE BASE

The next step is to cut the plywood for the base of the box, using two pieces with a supporting bar. Position the support to coincide with one of the upward curves in the drawer front.

Now cut the plywood base for the top section of the box. This can be made in one piece and will be supported by a divider. Cover both sides of the plywood in leather and measure the resultant thickness, preferably with a pair of calipers. Select a cutter for the router. If you don't have one of the correct size

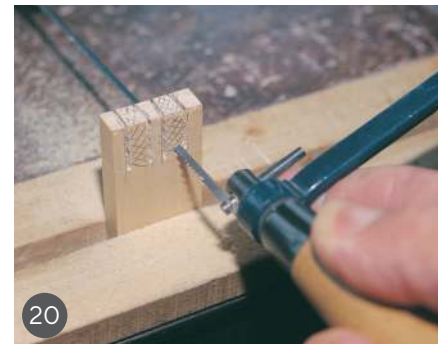
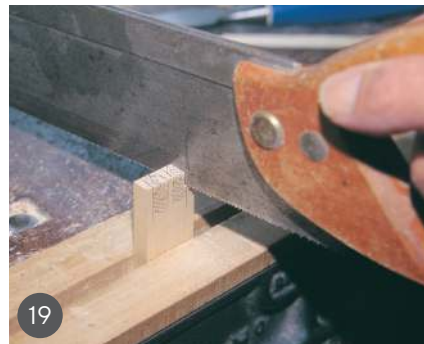
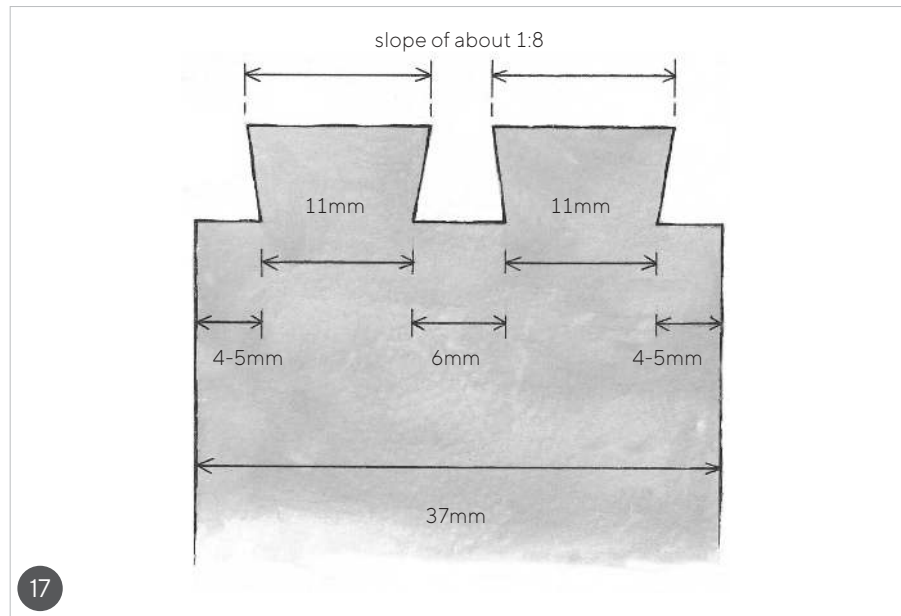
for the base, use the next size down and cut the grooves for the top and bottom bases in two passes.

Using the same cutter, rout a stopped groove on both sides of the box to take the drawer runners. This groove should be around 5mm wide but it doesn't have to be exact as the drawer runners will be rabbeted to match the groove later.

THE DIVIDERS

Next, cut the vertical grooves for the dividing pieces. These should be around 4mm wide but again, use whatever cutters are closest to this size as the dividers will be cut later, to suit the grooves. What does need to be accurate is the position of the grooves or the envelopes and paper won't fit. It doesn't really matter whether the narrow division for the pens is on the left or the right of the box, but one of the dividers needs to run through the base groove so that the top base can be braced underneath; position them so that the curve of the drawer front allows for the largest possible brace.

To find the length required for the dividing pieces, measure the distance between the shoulders of an end piece, add the depth of both grooves and subtract 1mm. For my box the



equation was $255 + 14 - 1 = 268\text{mm}$. Cut the dividing pieces to length, then cut the shoulders on them. I used a pair of slotting cutters in the inverted router for this job but a radial arm saw or a single straight router cutter could be used equally well. On the divider that is to go above and below the top base, it is best to cut the shoulders before cutting it into two: it is much easier to cut both shoulders on a wide piece of wood than cut the first on a wide piece and the second on a narrow one. Carefully pare the top of the tenon down to the shoulders with a chisel.

Now cut the drawer runners from the 8mm sycamore, using a router to cut the rabbet and remove the tongue at either end. Sand all the inside faces of the box – both sides and one edge of the dividers, both sides and both edges of the bottom support – to 400 grit. The end grain of the edge where the drawer slots in must also be sanded, but take care not to overdo this: the dovetails won't fit if too much material is removed and the drawer will not close neatly. I use abrasive wrapped around a dovetail-shaped wooden block for this.

It's a good idea to take the sharp edge off the grooves for the top and bottom base at this stage. This will help the leather-covered plywood slip into its groove. Also, if you gently hammer the edge of the leather on a flat surface, it is much less likely to ruck up on the grooves when the box is being assembled.

Before gluing up, assemble and clamp the box dry. Check that

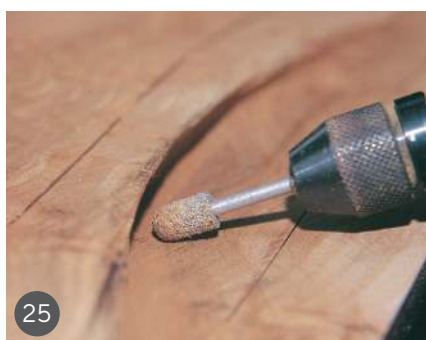
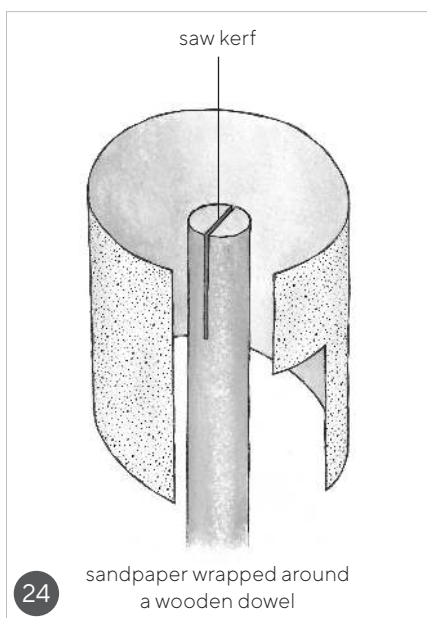
the shoulders of the dividers are tight against the front and back when the sash clamps are tight. If they need a clamp to keep them tight, they are probably too loose. It is far preferable to have these slightly long and keep the front and back apart than to cut them too short and have trouble keeping them together. There is any amount of compression strength in these pieces but the joints on the ends are really only to locate them. If they were under tension they would very quickly spring apart.

GLUING UP

Once everything has been checked on a dry run, take a deep breath, put up the 'do not disturb' signs and get out the glue pot. Assemble the back and front first, with the dividers and base in place, and then, taking care not to spread too much glue on the surfaces where it can squeeze out, assemble the sides. It will be impossible to get rid of glue from the drawer space after this step. Make sure the pressure is applied square to the joint as you tighten the sash clamps.

THE DRAWER FRAME

It is time now to start work on the drawer frame. Making the frame separate from the drawer front is not the traditional way of making a drawer, but this isn't a traditional box and for me it's the best method. I suppose if I extended that argument



16 All clamped up **17** Dovetails on the sides of the drawer frame **18** Marking around the dovetails on to the pins **19** Cutting the waste from between the pins **20** Removing the waste using a coping saw **21** Chisel to the knife line square across but either chisel only to the centre, or have a piece of waste wood clamped to the back of the drawer piece **22** The back of the drawer **23** Roughly marking the lines for the drawer handles **24** My sanding device – a length of abrasive-covered dowel **25** A small burr cutter that I use for undercutting the handles **26** Using calipers to check the positions for the screws

the drawer could be made the same width all the way around and a plywood base could be let in to stopped grooves, in much the same way as I usually make my trays. This would be marginally easier but to me, it somehow seems more 'right' to make the drawer with the base fixed on to the underside of the drawer back. Make the length of the drawer front exactly the same as the width of the opening. This should give about a 2mm clearance once the drawer is glued up. Make the side about 5mm shorter than the available space. This should make a drawer that accepts A4 paper neatly and allows a finger to remove it.

Dovetail the drawer frame using through dovetails at the back and front. I prefer to cut the tails first and then mark these on to the pins. Check that the frame is level on the underside and, if necessary, remove any steps between pieces, then rout a groove for the drawer base. Once again I used plywood that was covered with leather on both sides but covering just one side would be perfectly adequate. Put the drawer to one side now and return to the box.

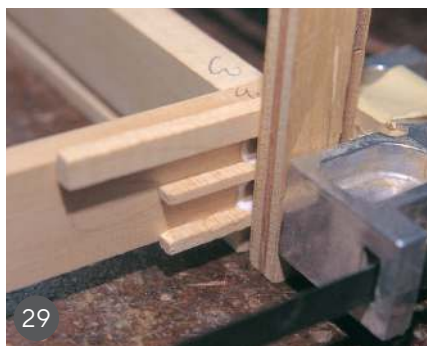
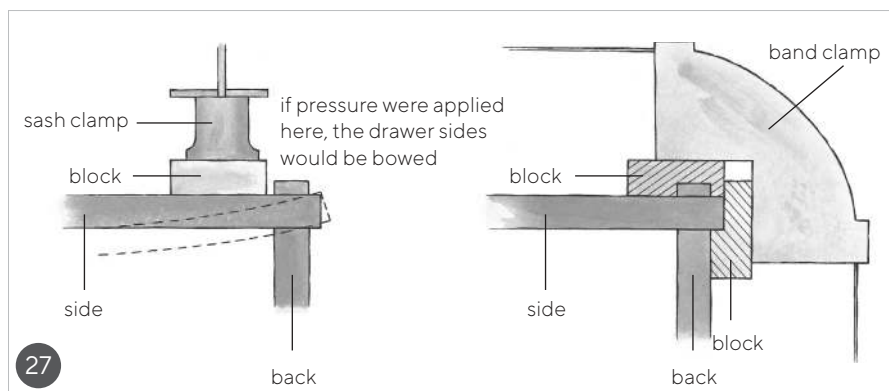
CARVING AND SHAPING

Slot the drawer front into place and wedge it into position by wrapping some masking tape around it. Following the figure in the wood and the shape of the drawer, pencil two sweeping curves

on the front of the box. These will be carved and deepened to form handles where they cross the drawer front so they should be about equidistant from the centre of the drawer front. Think also of what the lid will look like when you pencil in these curves and where the handle will be. It wouldn't look right if the whole thing was unbalanced by too much happening on one side.

An Arbortech certainly makes short work of carving the front. Keep the curves flowing smoothly and undercut the drawer handles very gently, a little at a time. It wouldn't be totally disastrous to cut the drawer front right through to the other side but I think on this box it is better not to.

Getting the drawer handles smooth and even is a job that simply needs bucket loads of patience. A burr cutter in a flexible drive will be an enormous help, but in the end it comes down to abrasive paper and elbow grease. A little device that I have found useful for this job is a piece of dowel about 75mm long, 8mm diameter and with a saw cut at one end. I insert a piece of good cloth-backed abrasive into the slot, wrap the rest around the dowel and then, holding the abrasive-covered dowel, push it into the power-drill chuck. The abrasive does wear out and tear pretty quickly but it's a device that is well worth making. The drawer front doesn't need to be finished at this stage. If the curves are good and the drawer pulls are sufficiently undercut, sand the front to about 60 grit, then put it to one side.



27 Strictly speaking, dovetails shouldn't be clamped at all – they should be tapped home and the pins slightly burred over to hold them in position while the glue dries. Would that mine were that perfect! I do clamp mine, but it is important that the clamp applies pressure square to the joint **28** A band clamp is useful for clamping up the frame **29** Detail of a joint, showing the temporary wooden strips **30** The hinges are held in line with a steel rod **31** Shaping the lid **32** Marking the position of the drawer runner on to the drawer **33** Push the drawer front on to the frame to locate it, using the panel pins (brads) **34** The slot allows the drawer base to move within it, though with a plywood base it's not really necessary

Back to the drawer now. With the front of the drawer frame laid on the back of the drawer front, the best positions for the screws can be seen. It's important to keep the screws well away from the drawer pulls as it is around these that the front is at its thinnest, so there is a risk of the screw emerging from the other side – not a pretty sight. Use a pair of calipers to check this. Once the rough positions have been established, measure, mark, drill and counterbore these holes with a 7mm bit. In order to get them evenly spaced, you will have to compromise with their positions.

You can now sand the inside faces of the drawer frame and glue the frame up. My dovetails are seldom so perfect that they don't need clamping and with the pins and tails projecting about 1mm, I was faced with the task of clamping the frame up without throwing it out of shape, just what might happen if I used sash clamps. I overcame this by cutting a piece of 5mm sycamore into strips of different widths and using a drop of PVA to glue them over the dovetails and pins. Then, using eight blocks to spread the pressure, I clamped the frame using a band clamp. If you can't get your hands on a band clamp, use two lengths of string; wind one around the top of the frame several times, and the other around the bottom. Tighten these lengths of string by twisting them with wooden levers, using one on each side, one on the front and one on the back of the box – eight in total. It is essential to have a dry run before gluing the frame for real.

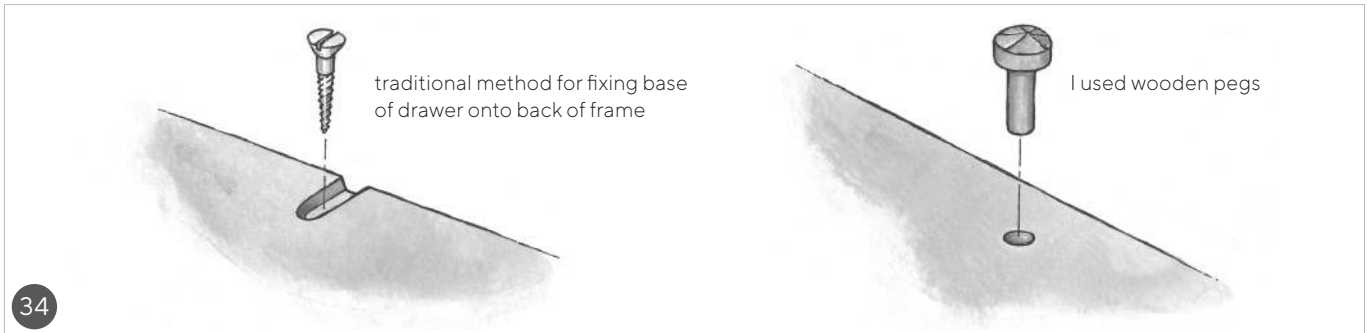
THE HINGES

With the drawer frame glued, clamped up and put to one side, the hinges can be made. First, select where the knuckles will be. This section needs to be fairly straight and even-grained so avoid burry bits, wild or sloping grain. Aim to have the knuckle just over one-third of the total length from the end. Mark a rough line to indicate its position.

Mark the position of the hinges and use this side as the face side. Set a marking gauge to exactly half the thickness of the hinge and score a line on both edges 40–50mm either side of the knuckle.

THE INTERIOR

The bearers for the trays are made from eight pieces of 35 x 28mm sycamore which sit inside the pen compartment and the central compartment. These are mitred in position. I do this job in two stages. First, I cut the sycamore to overall length, allowing plenty for waste. I then mark it out, write an identification number on the back and sand the front to 400 grit. Next I cut out the eight pieces, 2–3mm oversize, then cut a mitre on one end of each. I use my mitre block and disc sander for this but a mitre shooting board or a guillotine would do just as well. Mark the front and back, left and right side of each piece, making sure the joint where the grain will not match comes at the front, then cut each piece precisely to the lines. The pen compartment is subdivided into three.



Trace around the hinges then prise them off with a broad chisel. With reference to the figure of the wood, continue the curves on the front of the box round to the sides. The lid, too, should have a suggestion of a curved ridge but I don't like to overdo these things.

REFINING THE SHAPE

Next, use an Arbortech to generally reduce the thickness of the box sides and work up to the sweeping curves. After the Arbortech, it's back to sandpaper. This is where a good rotary sander pays for its keep but it isn't essential – elbow grease and patience will work just as well. Sand the whole of the box down to 240 grit, except for the front. Leave the front at about 120 grit at this stage: it's best to finish sanding it once the drawer has been properly fitted.

FITTING THE DRAWER

You should now turn your attention back to the drawer. Lever off the wooden blocks. I didn't apply pressure when these were glued on and I found I could just push them off with my thumb. Carefully plane down the tails and pins, then check that the frame is absolutely flat, on a machine table or a piece of glass, taking a fine shaving off at any point if necessary.

Extend the centrelines of the drawer-runner grooves with a light pencil line and, with the drawer frame held in its opening, mark this centreline on the frame sides. These marks must be the same on either side.

Rout a stopped groove on either side of the drawer frame for the drawer runners. These grooves should be fractionally larger than the runners by about 0.3mm. Now comes a moment of truth. If the runners weren't marked or cut out accurately the frame may touch the bottom or top tails. All is not lost if it does. This is the reason for not gluing the runners before the box is

assembled. If the drawer frame needs moving up or down, new runners can be made. The runners should be made oversize and then planed so that there is as little side-to-side movement as possible. Round off the ends of the runners on the sanding disc.

Hammer two panel pins into the front of the frame, making sure they don't go right through, and snip them off with a pair of pincers. Then, using a block of scrap wood to prevent the frame from going all the way back into the box, push the drawer front on to the pins to mark the position for the screws. Remove the frame and, using just two screws at first, screw the frame on to the drawer front. Take off the masking tape that has been wedging the drawer in position all this time and the drawer should fit perfectly. Remove the pins, sand the frame and the drawer front to 400 grit, then glue and screw the drawer front into position. Counterbore and plug these screws in the same way as the hinges.

You can now sand the whole box down to 400 grit, then attach and finish the hinges.

Cut the base of the drawer from 4mm plywood and cover it with leather as you did the box base. If you line it on one side only I suggest that you fix the base in place by screwing it to the back of the drawer frame. The traditional way of fixing drawer bases is by screwing them into a slot. This is to allow some movement of the base where solid wood is being used. Movement in plywood is virtually non-existent and a straightforward countersunk screw would do the job perfectly satisfactorily. I covered both sides of the drawer bottom with leather and, while I could have used round head screws to fix the bottom to the back of the frame, I wanted to keep the box all wood so I asked a friend to turn me some wooden pegs.

This box has two trays: a pen tray and a compliments slip and envelope tray. Both are lined with leather. To finish, give the box two or three coats of Danish oil and then wax.



CONNECT AND DISCONNECT

BRAZILIAN ARTIST AND FURNITURE MAKER **TATIANE FREITAS** RESTORES
BROKEN ANTIQUE FURNITURE PIECES WITH STARKLY TRANSPARENT
ACRYLIC TO EXPLORE THE LINKS AND SPACES BETWEEN OLD AND NEW,
PAST AND PRESENT

'My job today is to look at objects that contain construction history and turn them into contemporary design art,' says Tatiane Freitas, a São Paulo-based artist and designer who combines traditional pieces of furniture and furnishings with clear acrylic and other modern materials to create unique artworks.

Originally from a small city in inland Brazil, Tatiane moved to São Paulo at the age of 14 and never looked back. But she brought with her a love of carpentry and woodcraft inspired by her grandfather, who had a small workshop at the back of their house. 'I grew up with this contact and believe that is where my passion for carving and carpentry tools comes from,' she recalls.

Tatiane studied marketing and fashion and worked as a fashion designer for major Brazilian brands for 12 years. 'I always kept my craft as a hobby and today I dedicate 100% to my art

and design projects,' she says. Working solely on one-off projects, she has exhibited in New York and Cuba and has another show coming up in São Paulo.

One of her biggest challenges as she developed her art was to learn how to hand-mould the acrylic structures that marry up with the found wooden objects she restores. 'Luckily I found an 82-year-old gentleman who teaches me every day,' she says. She uses an acrylic polishing compound to achieve her high-shine, smooth finish.

Tatiane uses Japanese fittings to give strength to the pieces subtly, and has worked with a Brazilian company to develop a special transparent glue that fixes the two parts of each work together. In her next exhibition she hopes to introduce other materials, such as concrete.





'I see them as works of art, by the process of construction, by the story they contain and by being unique. But many people ask me to be functional, and that's fine. How they are defined to me doesn't matter. The important thing is that they are understood in the end.'



She says people are keen to explore her works when she exhibits them and aren't put off by their fragile, almost ethereal appearance. 'In fact, it's the opposite,' she explains. 'They get curious and want to sit, touch and look at the fittings and glue.'

While she sees her own work as art, Tatiane believes its interpretation is fluid. She explains: 'I see them as works of art, by the process of construction, by the story they contain and by being unique. But many people ask me to be functional, and that's fine. How they are defined to me doesn't matter. The important thing is that they are understood in the end.'

The pieces are also deeply personal. Tatiane says she gets her ideas and inspiration from her own history: 'I say my works are self-portraits of who I am. The relationship between past and future is what drives me. The past with its stories and forms and the invisible and imaginary future. The result is the present feeling.' That said, it's hard for her to choose a favourite from among her designs. 'All are special to me. Each has a why and a story to tell from a moment I lived which was so special I

wanted to make it into a material thing.'

Looking ahead, Tatiane believes societal changes are creating big opportunities for individual artists like her. She explains: 'I believe that society is consciously changing the form of consumption, thinking of durable objects with purpose and identity. People are looking for something to identify with and for me, as an artist and designer of unique objects, this behavioural change is a major opportunity for market penetration.'

'The challenge is to make it understand that my work need not be defined as art or design, it is simply what it is.'

When she's not working, Tatiane loves travelling with her husband. 'I like to travel and know different cultures,' she says. 'My husband and I are always looking for ticket deals and whenever we have a good opportunity and time, we schedule and go. I always come back with a different take on the work I develop and the path I am following in life, and that is priceless.'

tatianefreitas.com





THE CARBON FIBRE TUB CHAIR

INSPIRED BY THE GOLDEN AGE OF LUXURY TRAVEL, **TIM GOSLING'S** CHAIR RECEIVED A PRESTIGIOUS BESPOKE GUILD MARK

The Bespoke Guild Mark, awarded by The Furniture Makers' Company, is the ultimate accolade for designer-makers, recognising excellence in design, materials, craftsmanship and function for exquisite pieces of furniture made as single items or a limited run of up to 12.

It is awarded to only the most meticulous, luxurious and highly crafted pieces of bespoke furniture and, since its launch in 1952, has been the apex of distinctions for UK designer-makers.

In order to be awarded a Bespoke Guild Mark, each design has to be stringently vetted and scrutinised by a panel of judges. One piece that was deemed worthy of the honour is the Carbon Fibre Tub Chair designed by Tim Gosling. He tells *F&C* about it.

THE CHAIR

Can you tell us about the background of this project and your inspiration to make it?

The inspiration came from luxury travel of the 1930s, starting

with the lightweight materials used in airships, followed by the design creativity of the *SS Normandie*, the luxury ocean liner.

What materials did you use for the piece and why were they chosen over others?

Creating outside furniture exposed to sun, salt, wind and rain creates a huge technical issue. Teak was a material that, because of its oil content, was historically always the popular choice. Carbon fibre was a brand new material that suddenly gave us the opportunity to create more dynamic pieces and shapes and so the idea of the Gosling Marine Collection was born.

What features – subtle or obvious – are you particularly proud of or make the design unique?

The use of marine-grade steel inset into the tub chair on a compound curve and bent to follow the exact chamfer angle was technically amazing and a great thing to have achieved.



PHOTOGRAPHS COURTESY OF THE FURNITURE MAKERS' COMPANY/TIM GOSLING



How long did it take to create, from initial design to completion?
The design and development took over three years.

What modifications did you make along the way and why did you make them?

We went through a great deal of problem solving, tweaking and rethinking. To a certain extent we still are. I'm not sure we will ever stop looking at the design and working out how to adapt it to the new technical discoveries that are going on around carbon fibre and its production. The industry is moving at a fast rate.

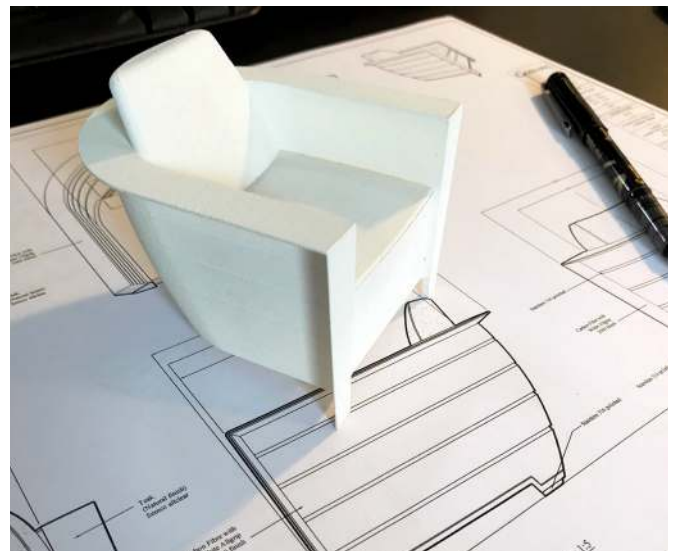
What was the most challenging aspect of the design?

Carbon by its nature is always going to be black and looking at the yachting industry the last thing you want on board is black furniture, especially outside against the turquoise sea and blue sky. So we looked at the Allcraft paints designed for the aeronautical industry and decided to keep a small black band so you can see *into* the carbon – it's subtle but it's there.

What does the Bespoke Guild Mark mean to you?

There is no question it's a remarkable honour to be judged worthy by your peer group – The Worshipful Company of Furniture Makers has so many craftsmen that I admire, so to have their blessing on our work is wonderful.

tgosling.com



ABOVE: Plans and model of the chair – development took three years

TOP LEFT: Marine-grade steel was inset into the chair

TOP RIGHT: A subtle black band reveals the carbon

For more information about the Bespoke Guild Mark, visit furnituremakers.org.uk



PHOTOGRAPHS BY KIERAN BINNIE

ROUBO-SIZED JOINERY

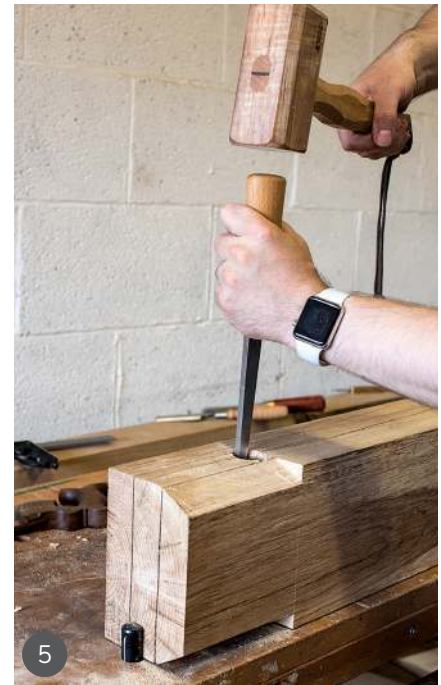
KIERAN BINNIE FITS THE JOINERY TO THE LEGS
OF AN 18TH-CENTURY-STYLE WORKBENCH

One of the most iconic features of the traditional French workbench, and one of the main reasons I longed to build this bench design for my own workshop, is the joinery connecting the legs to the bench top. In his 18th-century masterpiece *L'Art du Menuisier* (the second volume of which has been translated and republished by Lost Art Press under the title *With all the Precision Possible*), André Roubo described how the top of the legs end in a double tenon, with the outer facing tenon cut in a dovetail profile with sloped sides. The joint is instantly recognisable, looks striking when reproduced on slab-top workbenches and appealed to me as a piece of joinery to cut. When I was planning my own all-oak slab-top 'Roubo' bench build, I knew that I wanted to use this joint. In this article I will show how I cut and fitted the joinery.

LAYOUT

Ordinarily I think that starting with mortise or tenon is purely a matter of personal preference. However, for this joint, I strongly recommend starting with cutting the tenon. A tenon-first approach allows you to transfer the layout for the mortises directly off the undercarriage, and minimises the number of times you need to manoeuvre a heavy slab top.

There are two variations on the tenon layout – the way Roubo describes the joint as being cut by 18th-century French joiners, and an improvement he suggests. The joint as commonly cut involves dividing the leg into three equal widths, front to back. The middle third is removed, to create the two tenons (effectively cutting two bare-faced tenons), and then the slopes are cut to the front tenon. However, Roubo suggests that this joint can be



OPPOSITE Laying out the tenons with a marking gauge, referencing off the front and back of the leg

1 Setting the angle of the dovetail

2 Paring a v-shaped notch guides the saw

3 Cutting the tenons

4 Boring out the waste from between the tenons

5 A mortise chisel then knocks the waste out

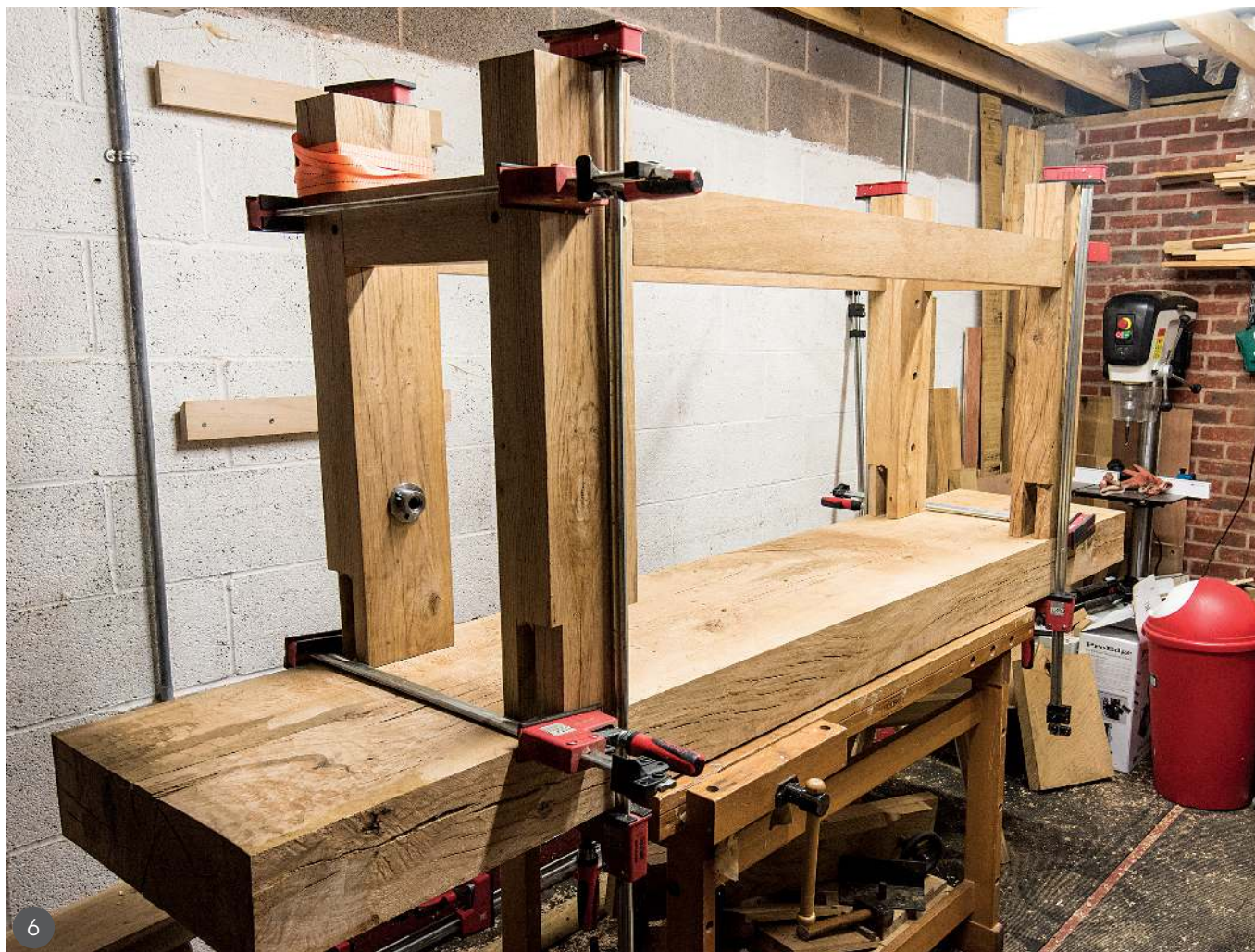
improved by cutting both cheeks of the rear tenon and creating a shoulder to support the bench top. I decided to cut my leg joinery as was commonly done by Roubo's contemporaries, and not to include his suggested improvement. This reduces the amount of work involved in cutting the joint, and I doubt that it reduces the strength by any real degree.

To start with, strike a baseline on all four sides of the leg. The distance of the baseline from the top end of the leg should correspond to the thickness of your bench top (in my case 145mm). Next, set a marking gauge to one third of the thickness of the leg, and use it to strike lines on the top end and both sides of the leg, referencing from both the front and rear faces. This gives the internal cheeks of both tenons. Next, set a sliding bevel to the angle desired for the slopes of the front tenon, and mark the angle for both slopes on the end of the tenon. I used an angle of 30°, but you can vary that depending on what you find visually pleasing. Finally, strike lines using a pencil gauge for the slopes down the face and side of the leg. Before you start cutting any joinery, make sure that the slopes are laid out on the correct side of each leg!

CUTTING THE TENONS

I like to start cutting tenons by paring a small v-shaped channel into the waste side of the nearest corner of the workpiece, as this gives the saw an easy place to start. Tilt the leg away from you so that you can sight down the layout lines on the end and side of the leg, and cut the interior cheek of each tenon as far as the opposite corner on the end grain, and down to the baseline on the side facing you. Then flip the leg around, angle it away from you and complete the cut. Once the tenon cheeks have been ripped, cut the angled sections of the outer tenon. For this, I stood the leg upright and cut vertically down the layout lines. The shoulder of the slopes can then be cut with a fine crosscut back saw, resting the leg on a pair of bench hooks. Joinery of this scale needs a large saw, and I cut all of the leg joinery for my bench with a delightfully-named Roubo Beastmaster 18in tenon saw from Bad Axe Toolworks, but a rip-filed hand saw would also work well.

Chiselling out the waste between the two tenons seems like a lot of work, and an easier way to remove the majority of the waste is to bore a hole close to the baseline. I used a 1in auger bit in my brace, followed by a 1/4in mortise chisel to remove the



remaining webbing. Once the large block of waste was removed, I then pared to the baseline with a chisel and mallet, working from both sides into the middle of the workpiece.

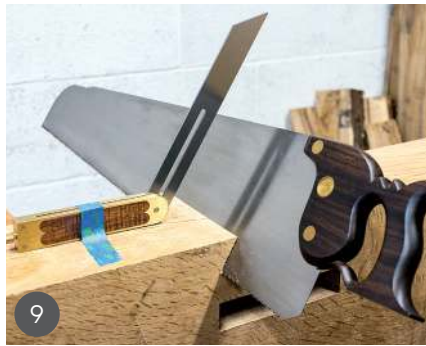
TRANSFERRING THE JOINERY

You can transfer the joinery by measuring the distance between each leg top, but this increases the risk of inaccuracy. Instead, I prefer to directly transfer critical layout from existing components whenever possible. For the Roubo bench, this involves assembling the bench entirely upside down, and laying out the position of the mortises on the top directly from the tenons. Before you start to mark the position of the joinery, make sure that each leg is square to the underside of the top on both the rear and the sides of the leg. It may be necessary to clamp each leg to the top as it is adjusted, and then do a second round of checks, in case pulling one leg into square has pushed another out of position. This can be fiddly work, but is critical to accurate layout so persevere until everything is nice and square. It is important to ensure that the layout lines on the top are flush to the surface of the legs, and the handles on many marking knives will prevent you getting close enough on work

of this size. I keep an unhandled Hock Tools marking knife in my chisel roll for exactly this sort of task, and a sharp block plane blade will also do a good job. Once the undercarriage has been disassembled, transfer the joinery to the top-side of the slab, taking measurements from both ends of each joint to take into account any rotation or twist in the position of the leg.

CUTTING THE MORTISES

The top requires two mortises for each leg, and the mortise for the dovetail requires a different strategy to that for the rectangular mortise. The rectangular mortise is a straightforward through-mortise, just on a large scale. I bored out the waste using a 1in ship's auger bit in my brace. The extra length of the ship's auger (18in long instead of the 7in length of a standard auger) makes it easier to hold the bit plumb when drilling to significant depths such as the slab top. I found that six holes would be sufficient to bore out most of the waste, and then I pared to my baseline using a 1½in-wide timber framing chisel, working from each side of the slab to the middle of the joint. For the end grain of each mortise, a 1in chisel and mallet were sufficient to cut clean mortise walls.



- 6 Assemble the bench upside down to transfer the joinery onto the slab
- 7 An unhandled marking knife gives a clean line flush to the surface of the tenon
- 8 After boring out the waste, pare the mortise square
- 9 Cutting the dovetail slopes with a hand saw
- 10 All the joinery is cut in the slab top
- 11 Test fitting a leg

The mortise for the dovetailed tenon is more akin to cutting a large sliding dovetail socket. Rotate the slab so that it is on its side (I stood it on a pair of saw benches, and had a team of willing volunteers to help lift it) and lay out the joinery. While it feels counterintuitive to cut joinery with a coarse filed crosscut hand saw, that is exactly the best tool I found for this job. Warm up by making some relief cuts in the waste of the joint – that will help you saw accurately and will also make removing the waste easier, then cut the two dovetail slopes. Setting a large sliding bevel to the correct angle and standing that on the side of the slab will help you cut down the line. Once both shoulders have been cut, knock out the waste with a chisel and mallet, being careful to stay above the baseline. Remove the waste from the middle of the socket first to give the waste from behind the sloped shoulder somewhere to go – levering up the waste from behind slopes can rive off the sloped shoulder. Depending on how deep your sockets are, you may be able to use a router plane to clean up the baseline. My sockets were too deep for the router plane to reach, and so I used a timber framing chisel as a large paring chisel to gently clean up the waste and flatten the bottom of the socket.

FITTING THE JOINERY

Once the joinery is cut, rotate the bench top so that it is top-side-down, and test fit each leg in turn. Ideally the leg should slide just over halfway under hand pressure, and then seat to nearly full depth with a few mallet blows. Do not leave the leg in the mortise too long, as moisture transfer from the slab top can cause the tenon to swell and lock the joint in position. Identify any over-tight areas – looking for burnished areas on the tenon or mortise is a good indicator, and also inspect the fit from the opposite side of the mortise. Gently pare away a little of the burnished areas, then test fit again. Depending on how accurately you cut the joinery, it can be a slow and painstaking process to fit the joinery, but this is time well spent – if something goes wrong when assembling the bench, it will be very difficult to disassemble and re-fit a component!

CONCLUSION

The joinery involved in building an 18th-century French-style bench is on a very different scale to that used for most furniture, but it uses the same skills and the change in scale is very enjoyable. Most importantly, this joinery will secure the top of the bench, and ensure that my Roubo bench will last for centuries.

THE IN & OUT CABINET

ISRAEL MARTIN

DESCRIBES HOW
HE MADE A SMALL
CABINET WITH A
COOPERED DOOR



The inspiration for this cabinet was one of Garrett Hack's pieces, called Duet. I wanted to make a small cabinet with drawers that could be pulled out through a curved door. I decided to use Spanish chestnut for most of the carcass because it is a really hand-tool friendly wood, and planes leave a nice polish on it.

First I made a template for the curve of the cabinet, then I started working on the carcass. Sliding dovetails are used for the main joinery of the carcass, with female on the top and bottom and males on the sides. I used two stiles to make a wider piece and easy-to-fit hinges in the front. I used the small rebate left between

the sides and the front stiles to add an edge inlay as a detail. I made the door by sawing a piece of chestnut into narrower quartersawn pieces. Adding a small angle to each of those pieces gave me the curved effect. Before gluing the door together I cut the place for the drawers leaving a small amount of wood for later

adjustment between the door hole and the drawer fronts. I then added some ebony pieces to enhance the door.

This was not a straightforward make, there were several times where I had to leave a piece unfinished and move on to the next step before I could go back and complete the previous one.



PHOTOGRAPHS BY ISRAEL MARTIN



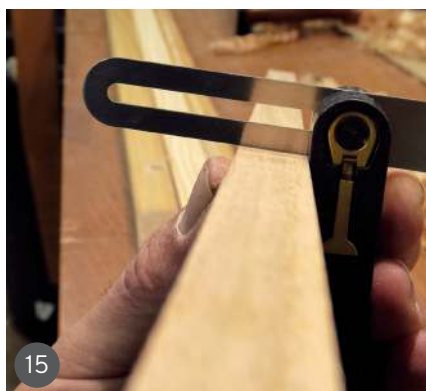
THE CURVED CARCASS

After making the plywood templates, I shaped the top and bottom parts, and made all the joinery. For the sides I made thin boards with a rebate that would later be supplemented with two stiles fitted in rebates. That working method allowed me to make through dados for the shelves, which will hold the drawer case, instead of stopped dados; I could also install the hinges more easily and it meant the whole structure had a lower weight.

Next I made the groove for the back in the top part and the place for the back on the bottom one, so I would be able to slide the back in once everything was finished. Then I made the inner case for the drawers, two shelves with the drawer divisions and runners.

I used the template to shape the case and then dry fitted the whole piece. Then I glued the drawer case, followed by gluing up the stiles to the sides (with the top and bottom dry fitted). I added the inlays to the sides and finally glued up the top and the bottom.

- 1 The plywood templates
- 2 Shaping the sides, top and bottom pieces
- 3 Making the rebate for the stiles
- 4 Shaping the stiles
- 5 The stiles in their rebates and the dados for the shelves
- 6 Making the groove on the top piece for the back
- 7 Making the place on the bottom piece for the back
- 8 Detail of the stiles, the inlays and the drawer case
- 9 The finished carcass



MULTI-STEP GLUE-UP

Gluing up the carcass had to be done in several steps. After shaping the shelves to the carcass curve I had to glue up the drawer case, then I had to adjust a little curve on those side divisions. Next I glued up the carcass sides with the drawer case) and with that done, shaped the two carcass stiles and glued them up to the sides but with the complete carcass dry fitted. Then I glued up the inlays and shaped them with a tiny curve. With that complete, I could finally glue up the top and bottom parts.

THE COOPERED DOOR

I started the coopered door by sawing one piece of chestnut to get quartersawn

pieces, much longer than the carcass. I planed them square and layed them down on the carcass front. Then on a shooting board I tried with different thin strips to get the correct angle for each piece – lots of trial and error! I then checked the edges and tested putting them together again on the carcass. I chose quartersawn wood because it will have less seasonal movement. One important thing was to check with the winding sticks to make sure I didn't have any twist, I used some Japanese clamps to hold the pieces together. The chestnut coopered door grain made any possible gaps invisible, and given its straight lines I couldn't glue it up at this point, first I had to make the square hole.

10 Gluing the drawer case

11 Gluing the drawer case to the carcass sides

12 Details of the pieces before inlays

13 Detail of the piece after gluing the inlays

14 Door pieces placed over the carcass to adjust their sides

15 Checking the sides

16 Checking how they are coming together

17 The quartersawn chestnut pieces done and tested

18 Checking for twists

19 Detail of the finished door



THE CURVED DRAWERS

There are several methods of making curved drawers and I chose the easiest one. Starting from a square piece, I made normal drawers bearing in mind that they will be curved so the spline of the half-blind dovetails was bigger than it would be at the end. I marked the shape by placing the drawers inside the door hole and then shaped the fronts. I checked to see how the drawers would look with walnut burl veneer and, pleased with the effect, I decided to add it.

Finally, I glued up the drawers. Given that the back was joined with sliding dovetails, I had small 'ears' at the end of the drawer sides to make the final adjustment of the drawers inside the carcass.

THE SQUARE DOOR HOLE

In the Garret Hack piece that inspired me, the drawers can be pulled out through the door, and I wanted to add this to my cabinet too. Before gluing the door I made a rough cut and left some wood that I would remove once the door was glued up. I had to leave the hole 2mm wider so I could add some pieces to make it look better.

20 Drawer fronts without shape

21 Testing the drawers

22 Testing the veneer for the fronts

23 The drawer sides and backs. Notice the extra space after the joinery on the sides

24 The completed drawers

25 The hole for the drawers to be pulled through the door

26 Gluing the door

27 Clamping the door

28 The hole was neaten up with extra pieces of wood



ADDING EBONY STRIPS TO THE DOOR

With the door glued up and with the square hole done, I prepared some ebony strips that should match the hole and allow the drawers to come out. They also should leave enough space so that the door could be opened with the drawers in. For that I had to make the side pieces with a different angle. I had to shape the top and bottom pieces to the door's curved shape. I also mitred them in the corners. They make a nice addition to the final piece.

MAKING SMALL SLIDING DOVETAILS BY HAND

Normally I use the dovetail plane to make the sliding dovetail males, even in small pieces like drawer backs. I leave every piece a bit longer, I make one side first and then cut the piece to length and make the other one. For the females, I start by removing a bit with the chisel to the knife line and then use the small router plane to remove most of the waist. Then I pare the dovetail sides with a wider chisel with the correct angle and

trim the bottom of the dovetail with the router plane. I fine-tune every joint after checking it. Then I check the whole piece.

MAKING THE DRAWER'S CASE

I made the case for the drawers using stopped dados to join the shelves to the case sides. I used small strips of hard maple to make the top drawer runners and I left enough space between the front part and the guides to accept the drawer fronts.



29 Testing and checking the ebony strips for the sides

30 Shaping the ebony top and bottom pieces

31 Detail of the ebony piece

32 Detail of the mitred ebony pieces in their place

33 Ebony pieces completed and glued up

34 Working to the knife line with the chisel

35 Checking the joint

36 Dry fit of the whole

37 The joinery for the case

38 Detail of the case fitted with the carcass sides

39 Adding maple strips for the drawer runners

RIGHT The final cabinet completed



CABRIOLE LEG

ALAN HOLTHAM TRIES
OFF-CENTRE TURNING
TO PRODUCE THIS
CABRIOLE-STYLE LEG

Although often described as a cabriole leg, the result of this off-centre turning is not strictly a cabriole leg, but rather the nearest approximation you can get using a conventional lathe. Proper cabriole legs are more highly shaped and involve a lot of cutting on the bandsaw and then even more handwork. Commercial cabriole legs are made on a copying lathe with variable centres and an array of fixed tooling to form the shape in one pass.

Whatever you want to call it, this type of leg is a common feature of stools and tables, adding a bit of style, even to a more contemporary design and, once you have got the hang of the principle, they are actually very quick to produce.

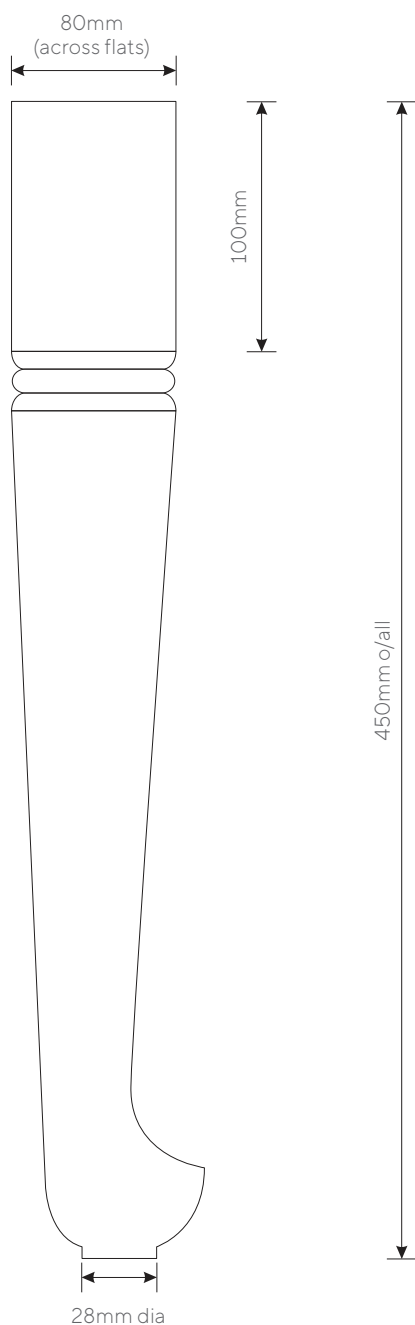
The technique is quite straightforward, with accurate marking being the key to success, but you do need to be careful with the turning during the off-centre phase, as it generates a lot of vibration and you cannot always see clearly what is happening at the cutting edge.

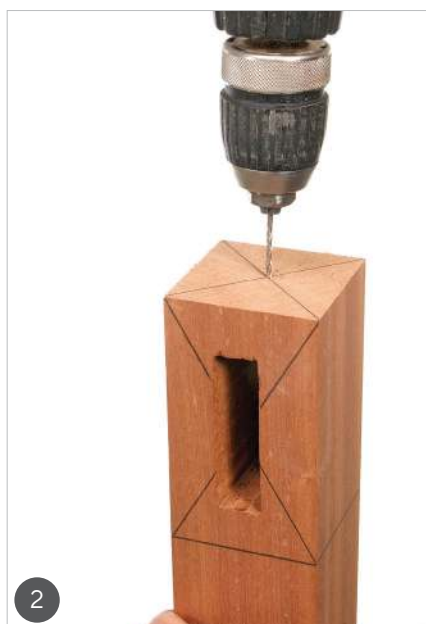
YOU WILL NEED

- Parting tool
- 9mm spindle gouge
- 19mm skew chisel
- 19mm roughing gouge

1 Start by marking out clearly where the square pummel is to be, and machine any mortises at this stage, as it will be much more difficult to hold the leg for mortising after it has been turned.

2 Mark the centres by drawing in the diagonals, drilling a tiny pilot hole to help locate the centre accurately when you





PHOTOGRAPHS BY ALAN HOLTHAM

knock it in. The drive centres must be absolutely dead on when doing any work that involves leaving squares, or you end up with flats on the detail.

3 Knock in the drive centre, making sure it stays in the centre pilot hole and that the wings are really well engaged.

4 Mount the work between centres, checking that everything is secure and the toolrest is brought up as close as possible. The speed should be about 1,500 rpm for a piece like this 63mm square blank, provided it is reasonably well balanced.

5 The first tool to use is the skew chisel; I prefer the thinner, oval-section type for this sort of work.

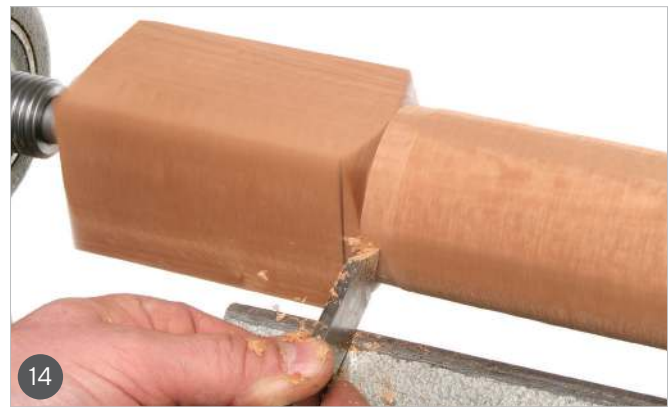
6 To separate the pommel, make an incision with a skew chisel resting on its back. Approaching the spinning work carefully, make the first cut well into the waste side of the pommel line.

7 Gradually work back towards the line with each successive cut, making them a little bit deeper each time, until you eventually reach the line.

8 Only take very light cuts, otherwise the chisel will bounce around and you'll end up with a series of ridges on the pommel ends.

9 Finish off with a single light slicing cut all the way in, to leave a clean face to the pommel ends. A shallow bevel angle ground on the skew is also a great help here if you are struggling.

10 Once the pommel has been established, you can safely rough the rest of the blank down to a cylinder, but always stop the lathe before moving the toolrest, in case you catch the pommel corners.



11 Start roughing out from the right-hand end using the gouge with the handle well down to maintain bevel contact. The cut is very intermittent to start with, but you will soon get some bevel support.

12 Start each successive cut a bit further back to the left each time, cutting down until the cylinder is perfectly round with no flats remaining.

13 If you are confident enough you should be able to work up to the pommel shoulder with the gouge rolled right over on its side to cut with the outer wing.

14 If you are not too happy doing this with the gouge, use the parting tool instead to cut a neat transition from square to round.

15 Once the corners have been removed, a big gap opens up between the rest and the wood, so move it in carefully to minimise the amount of tool overhang.

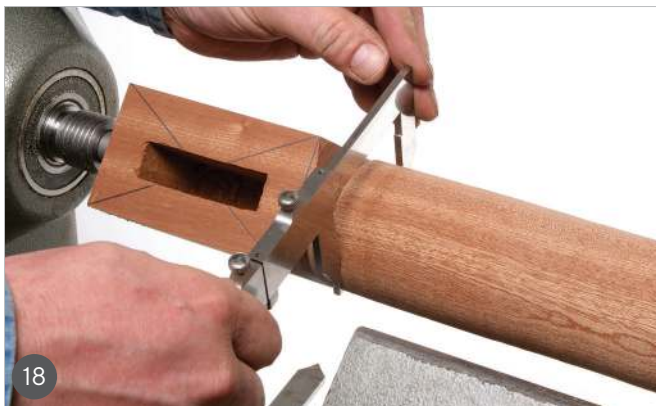
16 Complete any turned detail at the top of the leg, using the skew chisel on its back to get in tight against the shoulders.

17 Don't overdo the detail, as it will end up slightly off centre when the leg centres are moved. However, this shouldn't show

unless you come too far down the leg with it.

18 Next, determine the amount of offset for the foot. Usually, the narrow 'ankle' of the foot is half the diameter of the main cylinder, so you need to measure the diameter of the cylinder just below the square section.

19 Here, the diameter is 63mm. Divide this figure in half to give the ankle diameter, then divide it in half again to give the amount of offset necessary to achieve this. So $63\text{mm} \div 2 \div 2 = 15.75\text{mm}$. For a stool or chair leg where the foot is to point out towards the corner, mark



this offset out on the diagonal, measuring away from the centre.

Tip: Orientate it correctly relative to the mortises in the top of the leg, or the foot will point the wrong way (it should be on the diagonal that divides the two mortises). Remount the leg on this new centre, making sure it seats accurately.

20 On a long leg this is enough to provide an accurate offset, but on a shorter one offsetting just this one centre will result in the top being slightly eccentric as well. As you want the top part to remain true to the original centres, the trick is to move the top centre slightly in the opposite direction to the bottom one.

This makes such a difference to the finished appearance. Determining exactly how much you offset the top is a matter of trial and error; keep making tiny adjustments until it runs more or less true again.

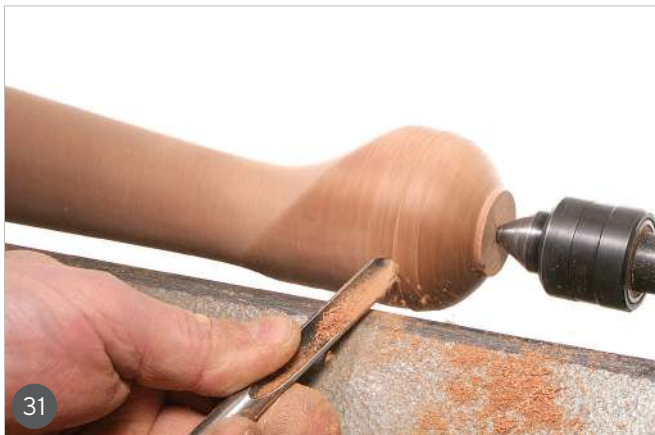
21 Before starting the lathe, spin the work by hand to check clearances – with this amount of eccentricity you do not want the work smashing into the toolrest. Check the toolrest for security as well, as the inevitable vibration will try and loosen it.

22 Set the speed down a notch or two as well to help minimise this vibration. In

this case I have reduced it to 950 rpm to allow for the imbalance.

23 Start roughing out again, approaching the wood carefully as you cannot see the extremity very clearly. Aim to reduce the blank down to the diameter based on the new centres, which shows up as a solid ghost image within the blur of the revolving work.

24 There is very little contact with the tool when you start. This will increase progressively as you cut further in, but hold the tool firmly on the rest to stop it bouncing at the start of the cut.



25 As you scoop away the foot begins to form, but stop the lathe regularly to see how the shape is developing.

26 The blank will eventually appear cylindrical again, but there may be a flat left on the back of the leg.

27 You will have to turn down further to get rid of it and achieve the correct ankle diameter.

28 I use a shallow 19mm roughing gouge for the whole operation. You can form the foot with this as well, as the size and bulk

of the gouge provide extra support where the tool overhangs the rest to scoop in the foot. A smaller gouge is likely to vibrate too much with this amount of overhang.

29 When you are happy with the shape, stay on the 'off-centre' centres and sand the leg thoroughly, using the abrasive wrapped around a block for the straight sections.

30 Take care near the foot section. Hold the abrasive underneath the revolving work, gradually blending the straight and radiused sections together.

31 Now return the blank to the two original centres and shape the underside of the foot using a spindle gouge. You can make the toe as heavy as you want, simply by making the foot more bulbous. Do any shaping work at the top of the leg as well, then finally sand these centres again, to blend the two profiles. You might need to do a bit of final hand sanding with the lathe stationary to finish the transition area.

32 The finished leg. It is not a true cabriole, but it is the nearest you will get on a standard lathe.



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BEND IT LIKE GUÉRIN

QUEBEC-BASED **KINO GUÉRIN** 'TAMES' WOOD INTO CURVES, TWISTS AND KNOTS THAT APPEAR TO BE FASHIONED FROM A SINGLE PIECE



A quest for balance – between curves and straight lines, between art and utility – inspired Kino Guérin to create his unique and intriguing curved, twisted and knotted tables, benches and shelves.

'I'm in search of equilibrium,' he explains: 'Between the work of art itself and the utility object, and between the curve and the straight line. This notion of equilibrium is particularly strong in my latest creation, Double Nebula, which, without being directly inspired by nature, nevertheless emanates from its essence.'

'My intention is to create an elegance, a beautiful lyric flow. I like challenges, I gave myself one a few years ago, one that would become my leitmotiv: from now on I would make furniture with a unique piece of wood. I know there are a lot of layers, but at the end it looks like one piece of wood. There is no secret joint, it's all bent in one shot.'

But why bend wood into curves at all?

'I love curves – I think that everybody loves curves,' says Kino. 'They are everywhere in nature. What do we like on a human body? Curves of course! I prefer to drive a sinuous road in the mountain than a straight one in the desert. A table with curves can put a smile on your face, a square and straight one? Not really. And most of all, bending wood into curves is fun!'

This love of fun, nature and experiment comes from Kino's background. He was raised in the countryside of Saguenay, Quebec, by hippie parents. 'We had a small farm with goats and vegetable gardens, life was good!' he recalls. 'My mother became a weaver and my father made our log home, he also made a few pieces of furniture. I was raised in a very creative environment, and it's clear that this background influenced my future choices.' The first things he ever made from wood were slingshots and bows

bent from tree branches when he played in the forest as a child.

Kino first studied visual art at college, in 1991, but switched to furniture-making because he was more attracted to working in three dimensions – and also because his colour blindness was a challenge in his original course. He was taught to work professionally with wood and the first thing he made at school was a box with dovetails. During the course of his studies he discovered veneer and bent lamination – 'it was love at first sight', he says.

It took a lot of experimentation to develop his method of bending wood into the shapes he wanted. Kino recalls: 'I broke a lot of plywood and veneers! Now I have a certain knowledge that allows me to create the forms that I have in mind, but I'm still experimenting with new ways of bending – if not, I would get bored.'

Kino is not yet ready to share the technique he uses to bend the wood. He doesn't use a jointer or planer, or complex jigs, and his key tool is a vacuum press with which he uses 10 different bags, some of which were made specially for him. 'Sometimes I'm gluing three pieces at a time. It takes space and organisation,' he says.

'The jigs I make to produce my pieces are not very complicated, that's the clue to understand how I can bend wood this way. I don't want to say too much about it because it's kind of my industrial secret. I worked very hard and spent a lot of money to create this technique, now I'm trying to make a living with it and things are going well. I know that's the part your readers would like to know the most, but I not ready to tell it now. One day I will explain everything about it,' he says.





For smaller pieces Kino uses white glue with a retarder in it to glue surfaces. 'I have about 15-20 minutes to manipulate the material and place it on a jig, in a bag and clamp it, and the vacuum press will be on for a minimum of three hours. Then I let it dry in place for another hour and I can unclamp and remove the piece from the bag. For bigger projects I use a powdered plastic resin glue, which allows me one hour to manipulate my material before it starts gluing. I let it in under vacuum pressing for 12 hours minimum.

'Once a piece is done gluing, I need to trim it. To cut each end I use a Japanese saw, which I love to work with. Then I finish the cut with an electric plane. To trim the edges I use my electric plane, a grinder, a belt sander, a small Japanese plane which I also love, a rasp and sanding paper.' He adds: 'I love to work with manual tools, they make no noise.'

For the core of his pieces Kino chooses mainly flexible plywood. 'I make lap joints in it to make the length I need,' he explains. 'For some projects which need more strength I interpose a thick veneer between each layer of flexible plywood. Over it I apply a veneer, mostly from North America like black walnut, cherry, cedar or sweetgum.'

Pieces are generally finished with water-based lacquer, mainly to avoid toxic lacquer fumes as his workshop is just a few steps away from his family home, but insurance is also an issue in the



choice. 'I really like to finish my pieces with oil – wood looks better with it – but in the end it's the customers who decide.' One customer asked for pieces to be finished with aluminium or brass leaf, and Kino loved the result so much he decided to finish a number of pieces in this way. To create a contrast he leaves the wood showing at the edges. 'A lot of good ideas come from customer desires,' he says.

Kino started out in workshops shared with other woodworkers, with basic tools. He then moved to his first solo workshop, and again to his current space, next door to his home. He has already built one extension to give himself more space, and is considering another one. 'I'm in my fourth workshop and I hope it's the last one – I don't want to move this stuff anymore,' he says. 'It was small when we bought it but I built an extension, so now I have more space to work with veneer and manipulate my materials when I bend wood. I also have a lot of jigs to store!'

Ninety-five percent of his successful business now comes from the US, and he is currently working on a number of dining tables. 'I already made one, Spring Table, but it was much too complicated to produce, and much too heavy,' he says. In the future he would like to create some more top-of-the-line pieces, and is hoping to show his works in Europe.

kinoguerin.com/en/





PHOTOGRAPH: SEBASTIAN ERRAZURIZ STUDIO AND ARI MALDONADO

EXPLOSION

SEBASTIAN ERRAZURIZ

The Explosion Cabinet is made from maple, glass and stainless steel. When sitting inactive, it is a neat and beautiful credenza. Transparent glass sidewalls provide a glimpse inside this intriguing but rather staid looking box. With further exploration of the central vertical seam, an entirely different object is revealed. With a gentle push, the rails slide further and further, until it seems that the cabinet has exploded beyond the bounds

of stability. As the exterior expands outward, it retains beautiful geometric proportions, complex mechanics using many sliding dovetails. Normally these would be used for shelf housing joints but here they genuinely need to slide smoothly and easily, which is no mean feat even with the best cabinetmaking techniques.

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