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MAY–JUNE 2018
ISSUE 78

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Some things just make you feel good don't they?

A deep, deep blue summer's day sky without a cloud to be seen along with a hot, blazing sun beating down. The smell of fish and chips or freshly ground coffee beans. I'll bet you have your favourite sights and smells too, but great sounds are just as an important feel-good sensation for me as my other senses.

It is heart-warming to see the current rebirth of vinyl and a real thrill to see the young enjoying the warm sounds that LPs bring to their audio experience. I am still disheartened that the majority of the younger generation just don't get what good-quality sound can add to their musical listening pleasure. They blithely listen to their favourite artists and songs on rubbish speakers or tiny earphones. Kids you are missing out! Argh, they won't hear me rave on.

To listen to music on a good hi-fi adds more to the experience than can be imagined. You feel the air move, almost feel the breath of the vocalist, and can enjoy the sounds of fingers dragged over strings, again and again. But hey, we *Sheddies* know this, don't we? We were brought up with great music; great change; and, as the dollars would allow it, we bought hi-fi after hi-fi to move that listening experience up a notch with each purchase.

This issue of *The Shed* just happens to have turned into a bit of a homage to quality sound. Not because of any great plan — it just happened that way. I have a valve radio in my shed and it brings a smile to my dial every time I turn it on to listen to RNZ or, even better, a full five-day test. Heaven!

The warm sound that the valve radio throws out makes me feels at peace with the world and brings on a contented smile — memories of Merv Smith, probably.

If ever I visit another shed or a bach with a valve radio, I can't wait to turn it on to get that same feeling and enjoy its own distinctive AM hum.

This issue of *The Shed* has a few audio stories for you to enjoy and I hope they make you feel good too. We have a couple of clever sheddies restoring, preserving, and upgrading some glorious old radios, we have a Kiwi in London who had a crack at replicating some $150K speakers and was very happy with the outcome (especially the price), and we have the very talented Paul Downie building harpsichords that will create amazing music for many to enjoy for decades to come.

We hope you like the sound of all that and hopefully it will encourage you to repair — or plug in — that old valve radio in the back of your shed.

What was that spider's name on Merv's show?

Greg Vincent
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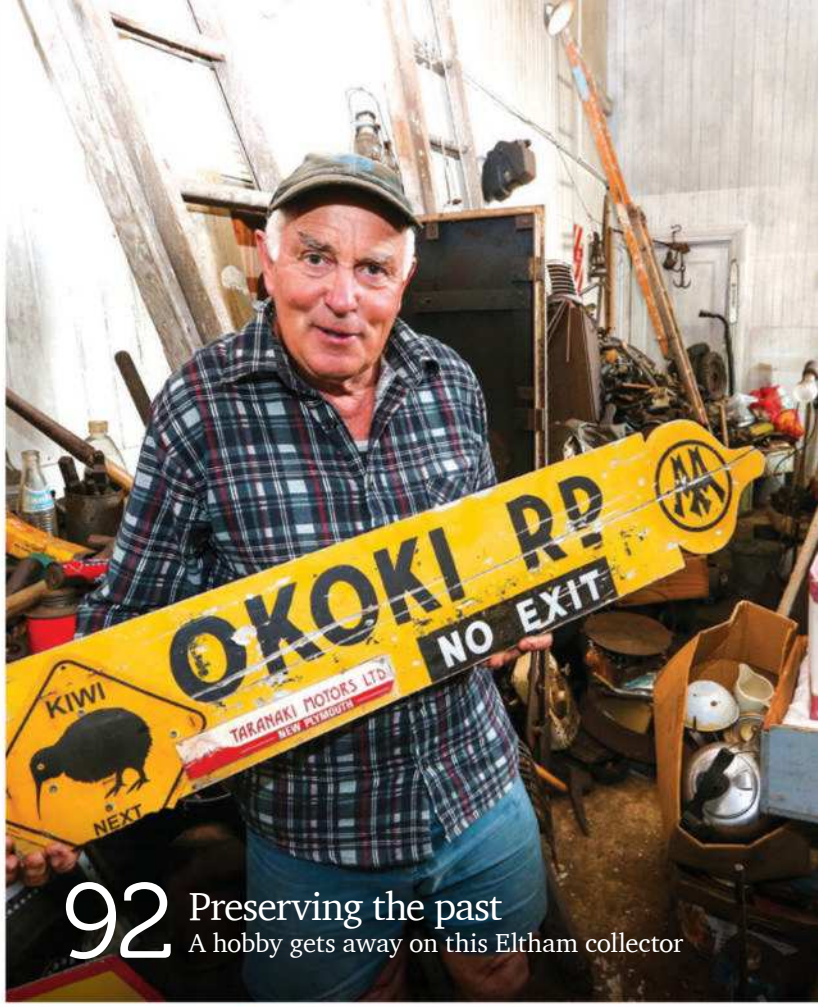

In 2017 Great Barrier Island became the first island to be given the status of International Dark Sky Sanctuary, one of only three such sanctuaries in the world.

Great Barrier Island is totally off grid, so generators and solar power systems are the norm. When people are off grid and making do with creative solutions to solve their problems, their homes need a shed. On Great Barrier they have some of the finest sheds to be found anywhere in New Zealand.

But here is an extra special one: a Tryphena shed with the milky way overhead, shot this past summer.

If you have a great shot of your shed, share it with us. Send it to editor@theshedmag.co.nz.

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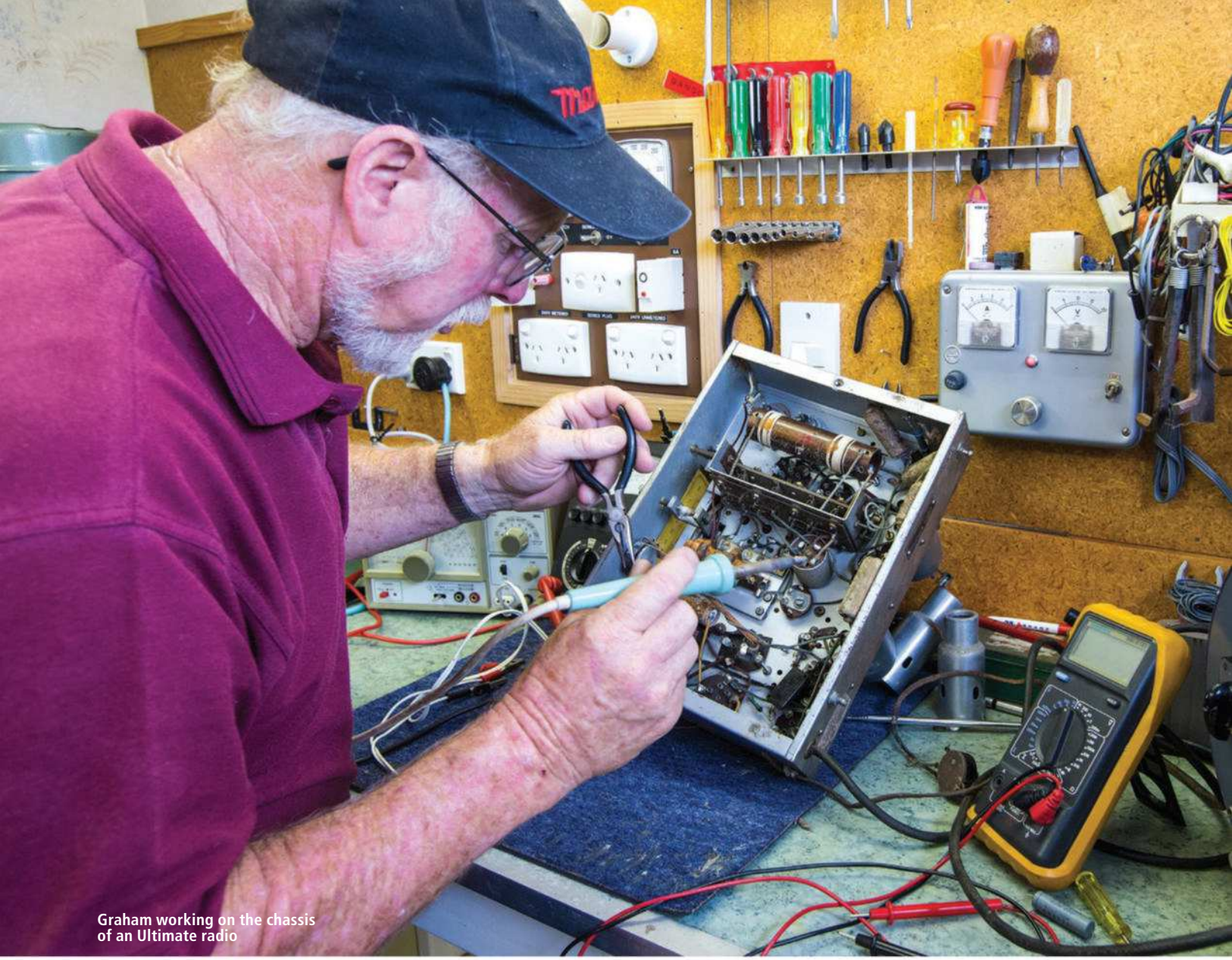
LISTENING TO THE PAST

A COLLECTOR AND RESTORER IS DRIVEN BY A DESIRE TO PRESERVE VINTAGE RADIOS

By Helen Frances

Photography by Tracey Grant



Graham working on the chassis of an Ultimate radio

The back doorstep at Graham and Val Hawtree's place in Whanganui is the drop off spot for any and every kind of vintage radio. That's because Graham is a veteran collector and restorer of radios, and well known for being unable to say "no".

"Quite often I come home at night and find radios sitting on the back patio," he says. "Sometimes we know who has left them but quite often we never find out. Or people ring up and say, 'We're cleaning out the house and have a couple of old radios.' We always follow them up because you never know when there might be a really nice set or a rare one. We can always use damaged radios for parts, too."

Graham has 750 fully restored vintage radios in mint working order and intends to expand his current storage and 'museum' space when he winds up his building business later this year.

Huge collection

But the 750 are nothing compared to the 2000 they have acquired over time from many different sources, including large radio collections from estates. Graham is a licensed auctioneer and travels all over the country to auction estate lots. His knowledge of radios is a distinct advantage.

He often comes home with much more than he started the day with. But they have had no trouble passing on 1300 radios to the community of dedicated radio collectors.

Graham's interest in radios goes back a long way. In 1965, while a teenager, he became involved with the Whanganui Amateur Radio Society, and 20 years ago extended his interest to vintage broadcast radios. The museum idea grew from that.

His double garage and a large room out the back are chock-a-block with radios

Replacing faulty capacitors

and catalogued parts. Spare speakers hang from the rafters, and boxes of valves — which he can access easily through the internet — line the shelves. A filing cabinet holds knobs, wires, and replacement transformers.

Expensive hobby

The latest radio to arrive at Graham's is a 1936 Majestic model 85, which sits waiting to be restored. The veneer has bubbled but he won't take it off unless he has to. He bought it for $100 but if it costs another $200 to restore he says that won't be such a good buy.

"I can slit the veneer and squeeze some glue under it and clamp it back down. If it's successful that'll be near enough because I don't want to over-restore the cabinet. If it's not successful I can strip the veneer off and re-veneer it."

Another Majestic console is in restoration mode. The cabinet is finished

Avometer

Graham often gets asked how difficult it is to get replacement valves. Most valves are still around, held mostly by collectors and radio restorers. Russia and China and a couple of other countries are still producing valves as there is currently a big swing back to valve amplifiers for audio listening

> *"They have had no trouble passing on 1300 radios to the community of dedicated radio collectors"*

An Ariel clock radio, possibly the only operational one in New Zealand

The Museum

Graham and Val's museum collection is built around American, Australian, and New Zealand-made radios that many people will remember. There are several rare radios he thinks are the only operational radios of their kind left in New Zealand — a Majestic Church radio, and an Ariel clock radio that appears in the book *The Golden Age of Radio in the Home* by radio guru John Stokes.

The oldest is an Atwater Kent 1923 Breadboard set that has no cabinet or cover. The components are assembled on a wooden plinth called a breadboard. There are also many console radios from the late 1920s to the late 1940s, some with horn speakers.

The Columbus was common in New Zealand, and there are several Atwater Kent radios. Arthur Atwater Kent Sr. (1873–1949) was an American inventor and manufacturer based in Philadelphia. Graham has a couple of AM (amplitude modulation) transmitters with a limited range of 300 feet (91.5m) or so, and he can feed them tapes of early radio shows.

"When the museum is up and running you will be able to walk in and hear different shows. You might hear Churchill's speech from one of the radios, Bob Hope, or an episode of Life with Dexter from others."

He says the tone of some vintage radios is more mellow than digitally produced sound, with a bit more bass response. Other early radios and some horn speakers are very noisy and scratchy.

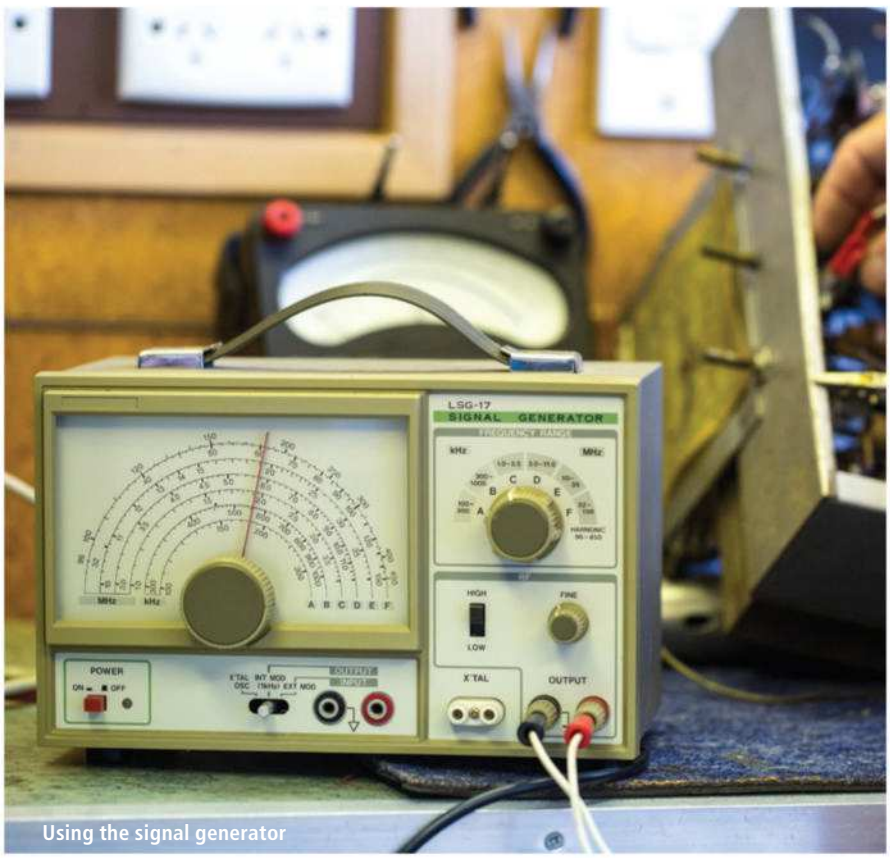
There are a only a few AM stations on the band these days and FM will slowly be replaced by digital.

"Soon there won't be any signals for them so a swag of those radios will be obsolete. Even early rare transistor radios are becoming collectibles. Someone left an early National Panasonic on the back doorstep the other day."

Art deco bakelite radios, of which he has several, are also collector's items and quite popular as the material is of no interest to borer. New Zealand designed and produced Bell Colt radios were manufactured in a range of colours and the red ones are particularly sought after.

There are plenty of spare parts around the workshop

"Criteria to consider are: is it slightly rare or a common everyday radio? If it is common, you may think twice about restoring it"



Using the signal generator

and only the speaker cloth needs to be changed. A former owner gave it an orange cloth which is out of character, so he will find something that looks like the original.

A clock radio depicting rural scenes, which he suspects isn't factory made, has cracks in the casing, but Graham says this is all part of the patina of age and will not be repaired. When the radio is on, the dial scale showing all the stations is visible through the tapestry dial cloth.

Restoring a vintage radio

Graham restores the radios as close to the original as possible. He can get them back into running order but prefers to focus on the cabinets, which can be a long and arduous task. Friends of his museum — half a dozen chaps — do most of the electronic work.

"Finding people today who have still got the knowledge of how to service the old valve radios is getting very difficult," he says. "A lot have died. Some knowledge has been passed down, some has been lost."

He says a lot of information is on the internet, including circuit diagrams for all but a few radios. The 'lads' of the New Zealand Vintage Radio Society, of which he is a member, are also extremely

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Val and Graham are both licensed Ham radio operators. Their hobby is evident from the amateur radio aerial spiking skywards from their backyard.

Val belongs to NZ WARO — New Zealand Women Amateur Radio Operators, formed in 1962. Frequency: 3.695MHZ + or – at 8pm NZ time Monday nights.

"We talk regularly. Early members paved the way. Back then it was considered quite unwomanly," Val says. Her call sign is ZL2FO. "I've met some amazing people over the years and made some really good friends."

The group holds a contest every year in memory of the founder-secretary, Thelma Souper, and Val won the female section in 2017 for making the most contacts over two consecutive evenings. Thelma was the second woman in New Zealand to gain her licence in 1931. For more info, visit www.nzart.org.nz/waro

Graham has talked with King Hussein of Jordan, Burl Ives, and a military surveillance pilot flying over the Middle East. Then there's Hank, a California highway patrol officer who they talked to for years. He turned up unexpectedly on their doorstep one day, all 6 foot 6 inches of him. The introduction went something like, "Hi, I'm Hank from the United States and I've come to arrest you."

helpful. And he has a lot of parts, including about 12,500 spare valves.

The electronics

The walls of Graham's tiny radio repair shed, called 'The Shack', are lined with labeled component drawers that hold valves, resistors, transistors, transformers, capacitors, tuning condensers, diodes, wire connectors, nuts, bolts, and screws — all the bits and pieces needed to service the radios. Testing gear sits on the service bench.

"When we start to restore a radio the first thing we do is remove the chassis and speaker and knobs and things, and place them on the bench away from the cabinet. The steel chassis sits in the base of the radio and holds all the components and the front-mounted dial."

He takes out all the valves and inspects the lead to make sure it's safe, then plugs it in and lets the transformer sit with the power on. It heats up quickly and, if there is a short in the windings, will start to smoke.

"Then you have to make a decision because the transformer usually has a short in it and needs to be rewound. Fortunately I have a very good colleague who specializes in rewinding transformers. It is an expense to have it done so you have to look at what the radio is worth, what it's going to cost to restore, and if it's going to be worth while."

Criteria to consider are: is it slightly rare or a common everyday radio? If it is common, you may think twice about restoring it.

Minimum tools required

He says very little test equipment is needed to service the old valve radios. A really good multimeter that measures ▸

> *"If you want to take a bit of sandpaper to it, you put it six feet away from you where you can't really reach it and then you wave the sandpaper at it"*

Right: Collection of Bell Colt and Clipper radios from the 1950s

Above: Collection of vintage valve radios
Below: Vintage radio spare dials

Beginnings of radio

Crystal radio receiver sets were developed in the early 20th century and were used to receive Morse code. World War I gave a boost to developing telecommunications.

Then as electronics evolved and voice signals were sent by radio broadcast, radios took off between the 1920s and 1940s and evolved into today's radio broadcasting industry.

In America, radio manufacturers set up nationwide. Many fell by the wayside as the years progressed so the sets they manufactured are rare and sought after by serious collectors.

"RCA had a real stranglehold on patents and nothing much moved with the development of valves and other parts unless RCA had a finger in the pie," Graham says. "It was difficult for a lot of manufacturers to break away from that, and they were forced to use RCA tubes in their radios."

The first radios were battery-operated. "It was probably the school kids' job early in the morning to take the battery to the local garage to have it charged so that dad could listen to the radio at night, and God help them if they forgot to pick the battery up on their way home from school," says Graham.

In New Zealand during the Great Depression of the 1930s the government put an import embargo on built-up radios.

"The New Zealand radio distributors of the day were able to import the basic guts of the radio but they couldn't import the cabinets so they were made here. There were some beautiful cabinets produced. The skills of those cabinet makers were superb — everything was done by hand, they didn't have fancy machinery, maybe a few power tools, certainly not spindle molders, and any shaping of moldings would have been done with hand planes."

Radios were manufactured in Hastings, Wellington, Auckland, and even in Whanganui where, Graham discovered by chance, Gordon radio manufacturers made the chassis of only 38 sets. He knows of only two examples — he has one and the other is in Palmerston North.

Graham says "An uncle saw it sitting on a shelf and his first words were, "Where the devil did you get that from? Because when I did my apprenticeship as a radio serviceman I built those sets. I will have worked on that set because we only made 38 of them!"

Vintage record players, also part of Graham's collection, developed quickly. He has a couple of early Edisons (built prior to 1920) that play cartridges, which look a bit like a toilet roll.

"The problem with them is that they are all made out of wax and they get very crumbly. Sometimes they can fall apart in your hand."

Zenith radio from the 1930s

volts, ohms, and capacitance may be enough, although a good valve tester can be handy as well.

"The good thing about old radios is that once you turn them upside down there is lots of room to get in and do anything."

And with speakers, if it's specialized and the cone is torn, then he reckons it's probably worth having the cone redone by a firm in Auckland.

"It's quite an expense so the radio has to be special. A lot of guys throw them out but we can get them re-coned. I've had several done."

When we visit, Graham is doing a routine check of a valve set and finds the plug is illegally wired. He removes the valves and applies a low voltage through the Variac. After an hour the transformer, which is the nerve centre of the set, shows no signs of distress. He changes the faulty capacitors and checks the old carbon resistors, which go out of tolerance.

He says the process is the same for every chassis, with variations depending on the voltage.

The cabinets

Borer is the timber cabinet's number one enemy. During the flying season Graham uses anti-borer Robocans, which spray automatically.

He inspects all radios thoroughly

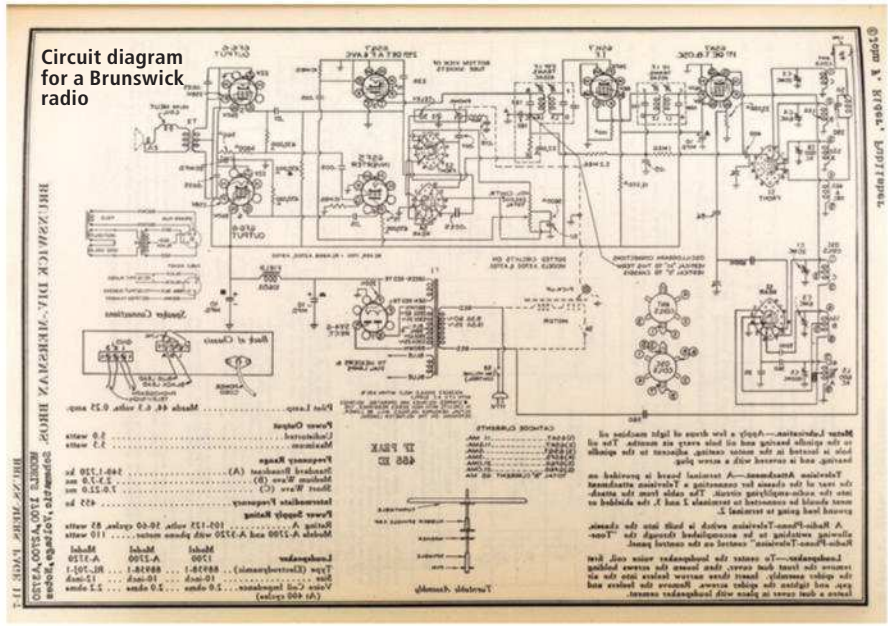
The Gordon radio

Graham has one of only two known Gordon radios left in existance. The Radio Service Company that made Gordon radios was originally founded in 1925 in Whanganui. That company was purchased in 1934 by Brian Hugh McLean who ran the shop out of the Foster's Hotel building at the bottom end of Whanganui's main street, Victoria Avenue.

The trade name Gordon derived from a family connection with the Scottish clan of the same name. Well-known Whanganui radio buff, Don Sutherland married McLean's daughter, Mary, further cementing the clan connections. Sutherland and Gordon clans go back a long way together.

In 25 years of manufacture, just 38 Gordon radios were made and apprentices worked on some to gain experience in wiring and servicing; the cabinets were by an Auckland firm, Goodes. Only one battery set was made — the Gordon 3-5 model and the circuit was published by the Lamphouse in the 1937 Lamphouse Annual without acknowledgement. However, the published circuit had an error, which prevented it working. Graham's Gordon set was made approximately 1936-1938.

Graham switches on a very early American Brunswick console radio



Circuit diagram for a Brunswick radio

and treats those infested with borer as the beetle can destroy and devalue a collection.

He removes the inside of the radio and treats the cabinet with a solution of commercially available borer solution mixed with turpentine. It soaks into the timber and acts as a permanent borer deterrent. ▸

Radiola 20 — a battery-operated radio

Finding replacement valves presents no real problems these days

Kerosene was also quite penetrating but it leaves a residue that can take some time cleaning off.

Stripping a cabinet right back is a long arduous task, he says.

"They didn't use varnish in the old days– they used shellac. That needs to be scraped off right back to the bare veneer and then any repairs done — maybe the moldings need a little bit of fixing, maybe there's been evidence of borer and if you want to save the set you may want to change the veneer. Once it's down to the bare bones state that's the hardest part done. You can use a commercial stripper or, if it's only shellac, I use a scraper and it comes straight off."

"There is a fine line between original and restoration"

Don't over-restore

Graham tries to envisage what each radio was like in its original state. He may re-veneer the outside, re-stain it, then polish the cabinet. Cabinets made in the early 1930s and 40s had superb inlay, which can be replicated and repaired.

"You need to be a bit careful because if you over-restore the cabinet it doesn't look right and it's no longer original," he warns. "There is a fine line between original and restoration."

He uses either a flat or satin polyurethane finish, because sets done with a gloss finish never look authentic. And don't be tempted to paint them.

"We'll get a really nice set and someone has painted it pink to match the curtains or something. You can salvage them with paint stripper. Sets that look fit for the dump, a few months later can look a million dollars — right back to the natural veneer finish, up and running. There's virtually nothing that can't be restored

Graham and Val's collection has 750 fully restored vintage radios in mint working order

A few handy tools

back to its original looks and concept."

Moldings can be a bit of a pain as they are unique to every radio.

"You are tempted to run extra when you're making moldings, build up a bit of stock, but the chances are you'll never use that particular molding again."

If the speaker fretwork needs replacing he cuts it out of thin plywood; then it's veneered, and carefully trimmed out so that the veneer stays on the fretwork but the holes are opened up in the grill for the speaker. The veneer is a super thin 1mm.

"If you want to take a bit of sandpaper to it, you put it six feet away from you where you can't really reach it and you wave the sand paper at it, because if you're not careful you can sand through it."

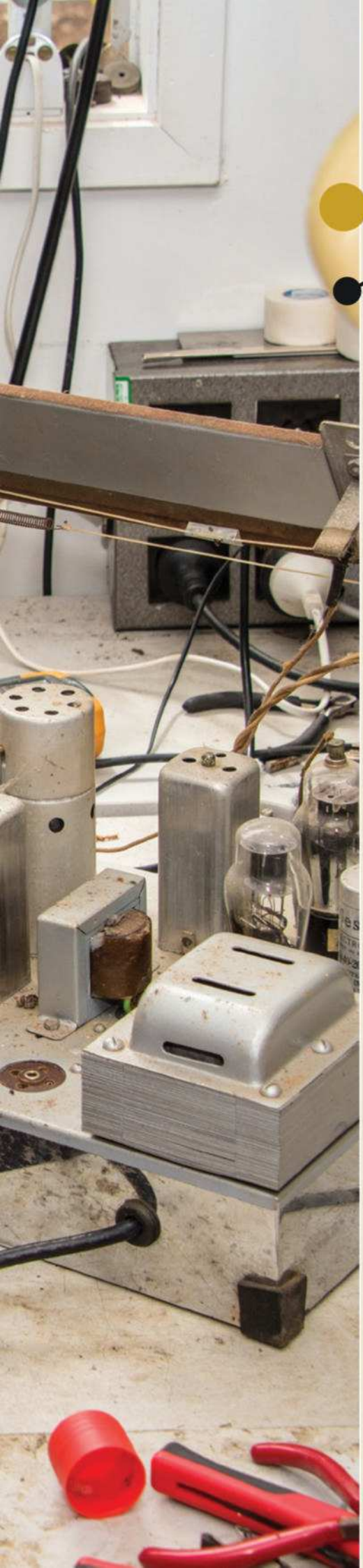
Graham says collecting vintage radios means different things to different people but for himself and Val it's all about preservation and helping other collectors with missing items.

They are very grateful to all the people who have helped in forming the collection and for their ongoing interest and support.

Should you start collecting radios he strongly recommends joining the New Zealand Vintage Radio Society where you will find "help and friendship and lots of knowledge". Visit www.nzvrs.pl.net.

Graham and Val can be contacted by email: grahamandval1@xtra.co.nz.

Checking the valves on a restoration



Retro radio Magic

BLUETOOTH AND 3D PRINTING ARE HARNESSED TO HELP BREATHE LIFE BACK INTO RADIOGRAMS AND HI-FIS

By Jude Woodside

Photographs: Jude Woodside

The family gathering around the wireless to listen to the Friday-evening programme may be a thing of the distant past, but the beauty of those old valve-driven radios lives on in the dedicated work of Retro Radios.

Based in Dannevirke, Alister Ramsay works from an assortment of sheds, a garage, and a container, lovingly restoring old valve radios and radiograms. In a workshop redolent of the glory days of the 1940s to the 1960s, with nostalgic posters for *Life* magazine and a smattering of old cameras — another hobby is collecting those — Alister works to a background of smooth jazz issuing from one of a variety of beautifully restored valve radios producing warm-toned music to set the mood.

It's not hard to imagine that you are back in a 1950s hi-fi shop when you are surrounded by dozens of fully restored radios looking as they must have done when they were new. Alister has a small AM radio transmitter to give his radios something to tune to, although they can be used to play from any source via Bluetooth. He sources the radios by word of mouth and from second-hand dealers, as well as at auctions up and down the country, and has quite a few that he is restoring on commission.

Restoring and modifying

The process starts with stripping the electrical components from the case. The old wax capacitors are replaced with modern electrolytic and ceramic capacitors. The capacitors are usually the first thing to break down as they are made from wax and paper and will have deteriorated long ago. The set is then connected to power and turned on to determine if any of the valves need replacing.

Alister is helped by a friend, now retired after a lifetime of repairing radio and TVs, who possesses a hoard of old valves still unused and the knowledge of their operation. He also has a very handy valve tester to trace faults.

To bring them up to date he adds an auxiliary connection to the radio amplifier stage that can inject a signal via Bluetooth sourced from any other device, iPad, phone or computer tuned to FM, Spotify, or any other source. This way you can take

Nearly every inch of space in the showroom is filled with a restored treasure. It's a bit like being in a 1950s hi-fi store

It's not hard to imagine that you are back in a 1950s hi-fi shop when you are surrounded by dozens of fully restored radios looking as they must have done when they were new

A valve tester comes in handy

advantage of the valve amplifier and the substantial old speakers that these early radios possessed.

The beauty of valve amplifiers as any hi-fi aficionado can tell you is the warmth and richness of the sound. The older speakers were very substantially made too and, mostly, still operational.

"One trick I have learnt is that micropore tape is very good for repairing any small holes or tears in the paper cones. It's a paper tape and it sticks so well because it's paper to paper. It's available in every first-aid kit and is the tape that nurses use most often," says Alister. As luck would have it, his wife happens to be a nurse.

Once the chassis is repaired and working, it is tested and given an Electrical Safety Certificate. Alister can also supply a Bluetooth dongle that runs off the radio power supply.

AM was the go

Old radios were primarily used for the AM network and shortwave for long distance.

FM was virtually unheard of, although Alister has a German set from the 1950s with FM capability.

Garage sale

Alister started restoring old radios when he picked up a Columbus (one of the very popular New Zealand–made brands from the '40s) at a garage sale for $5.

"I fixed up a couple of capacitors and got it going. The sound quality wasn't that good — old valve radios sound scratchy and horrible because the AM radio transmitters aren't as powerful as they were when AM was popular. Nowadays they are pumping out a few hundred watts whereas before it was up to 60,000W," he explains.

"You also get all sorts of interference from all the other devices you have in the home. When these radios were made the only thing plugged into the power was the radio — there were no other sources of interference, like

A beautifully restored HMV radiogram commission

An 80 rectifier valve that was removed and found to be in perfect working order

A Philips Carnegie Hall

microwave ovens, TV, and Wi-Fi that all cause AC interference.

"So I thought maybe I could feed a signal into it. I did some research and found [that] I could connect an auxiliary device into the circuit, and then I found I could hook-up a Bluetooth device. Then friends starting asking me to do one for them and it started to grow."

He developed his business and his marketing material with mentoring and help from the local Tararua Business Network in Dannevirke to turn what was a burgeoning hobby into a thriving part-time business selling sets all over the country.

Radiogram upgrades

Radiograms were popular from the 1940s to the early 1970s, incorporating both a radio and a turntable for playing vinyl records. Some later models even incorporated a TV. Alister strips down the turntable to make them go again and in some instances he will replace the turntable with a more modern one. Vinyl records are making a comeback and valve amplifiers are also undergoing a renaissance.

When he first receives them they are not usually in great condition, with up to 80 years of accumulated grime and smoke stains marring them.

"It's amazing what a difference it makes to just clean off the dirt and [then] you can start to see the original colour of the cabinets underneath," says Alister. He often has to strip the old finish from the cabinets for which he uses the locally produced ▸

Refurbished USB radios

A Custom-built unit using an existing elegant cabinet

Blaupunkt 6W68H

Marine Transceiver C1

Courier RU

Lewis Eddig Radiogram

Courtney 75

Rolls Radios - These radios are basically all the same but just branded as Courier / Ultimate / Golden Knight

Philips Model 666

Companion 77 AWAC

Below: Gulbransen Console 7H67W

Restored, they wouldn't look out of place in a modern kitchen alongside that retro-look toaster

Pye P2 340

A steampunk ray gun

> *"I did some research and found [that] I could connect an auxiliary device into the circuit, and then I found I could hook-up a Bluetooth device"*

The 21st-century-update Bluetooth auxiliary dongle

▸ Coopers Strip Club. The stripper does no damage to the underlying veneer. If the cabinet is undamaged apart from the built-up dirt then the restoration is fairly straightforward — cleaning, stripping, and polishing the cabinet.

Any damage to the veneers is fixed and the piece given a fine sanding down to 400 grit before being oiled and polished with a locally made wax polish. The fabrics that were typically used to cover the speaker are carefully replaced and brass and bronze accents polished or replaced then the cases are buffed to a glow.

The transformation is astonishing. From a drab piece of furniture emerges a glowing work of art, complete with lights. Some of the old sets had glowing screens, others had a 'magic-eye tuner' that glowed in fluorescent green when a station was tuned in accurately. The use of veneers was often inspired, creating accents and highlights in the contrasting woods.

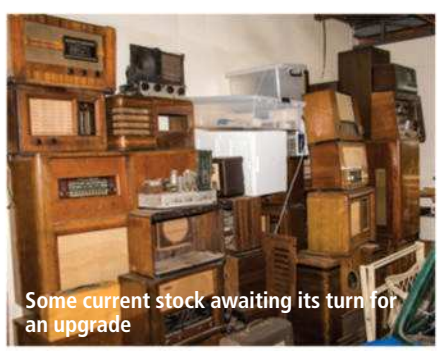
3D printing

With so many sets available, Alister is often given old radios. He used to buy as many as possible but has got fussier now that he has plenty of spare parts, although now that his son has recently acquired a 3D printer and CAD skills he his able to reproduce hard-to-find knobs and details.

Alister has a ready supply of one very popular set from the '50s — a kitchen-shelf radio that went by various names but most commonly 'Courier'. This set has a steel cabinet that was finished in white. Alister buys them whenever he can find them and strips them before having them refinished by an automotive spray painter. Restored, they wouldn't look out of place in a modern kitchen alongside that retro-look toaster.

Rare pieces

His collection contains many rare examples of early hi-fis — including a very rare bi-amplified radiogram built in 1959 by Rogers Developments, a British audio company.



Some current stock awaiting its turn for an upgrade

Started in 1947 by Jim Rogers, Rogers Developments was famous for the development of the LS3/5A studio monitors commissioned by the BBC in the early 1970s that became a legend among audiophiles. The Rogers set has Wharfedale stereo speakers.

He also has a beautifully restored Philips Carnegie Hall also from 1959. In its day it was very much a state-of-the-art set, with the then all-new stereo speakers.

It's not all work though. The availability of so many exotic valves gave Alister the inspiration for his steampunk ray gun, a work-in-progress that he hopes eventually to make flash and glow in a realistic manner.

Alister regularly tours with his Retro Radios van to antique fairs and events around the country. The van contains an inverter so that he can run the radios he sells. He also accepts commissions to restore sets.

For more info about Retro Radios and more pictures of his stock, see the website retroradios.nz.

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YOUR FUTURE KNOWS
NO BOUNDS

Seriously fun

By Bob Hulme

Photographs: Bob Hulme

IT'S EASY TO CATCH THE CLASSIC BIKE RACING BUG

Sidecars head out of pit lane for their practice session

My first impression was — wow! So many classic and rare motorcycles with their riders ready to tackle the Pukekohe Park race track. The organizer of the 39th Annual Classic Motorcycle Festival — the New Zealand Classic Motorcycle Racing Register (NZCMRR) — had done its utmost to make sure this would be a top event with a line-up of celebrity riders. The whole event was dedicated to the memory of Geoff Perry.

Geoff was an amazing New Zealand racer who competed successfully in the early 1970s before losing his life when the Pan Am flight he was on crashed shortly after take-off from Tahiti in 1973. Geoff was just 23 years old. I grew up in the Auckland suburb of Greenlane not far from his father Len Perry's motorbike shop and often saw Geoff blatting around the local streets but I did not know him well personally. I saw him race on the Levin circuit once and his talent was clearly remarkable. Had he not been on that plane, I am certain he would have become a multiple world champion and a household name around the world.

The weather, again

Despite the efforts by the NZCMRR to organize a cracker event, the weather did its best to put a spanner in the works. Saturday saw just enough time to run a few practice sessions before the rain pelted down, forcing the track to be closed. You would think it would be safe to plan a race meeting over the weekend of February 3–4, with our weather usually being the most settled at that time of year.

The upside to this was that I was able

A bit more than a tune up!

Don't you love summer

> *Most of the thrill of watching is seeing the bravery of the riders and swingers*

The two Brittens were popular with fans

Melissa Tate shows that all riders weren't grey-haired men

to talk with several riders who had interesting stories to tell about their bikes while they waited in the pits for the rain to clear. The organizers took the opportunity to broadcast interviews and included a chat with Geoff Perry's sister, Dale.

Helpful mods

In my wanderings around the pits, I was fascinated by the variety of devices for starting up these classic bikes. (It brings out the engineer in me.) We're talking classic racing motorcycles here, which were usually started by the rider pushing the bike until it was going quickly enough to drop the clutch and start while swinging their leg over. As time has gone by, some of these bikes have got more cantankerous and difficult to start. At the same time many of the riders who own them have got a bit less youthful.

The solution is to use an external starter that spins up the rear wheel. Genius! It's probably possible to buy such a thing, but the ones I saw all looked home-made and none was the same as another. Most

Immaculate BSA Metisse

were electric-motor driven. I saw one with a small petrol motor and even one using an angle grinder to power it. I guess that would be taken off and used as an angle grinder again after the weekend's racing.

Brave buggers

Sidecar racing has always been a favourite of mine. Not actually doing it you understand, just watching. Most of the thrill of watching is seeing the bravery of the riders and swingers doing something that I definitely would not risk doing myself.

Most forms of motor sport today are made safe by regulations that have been tightened progressively every year to the point at which risk of injury is far less than for anyone travelling on public roads. Sidecar racing and motorcycle racing can only be made safer by helmet and clothing improvements, which have progressed greatly, but it still hurts if you fall off.

For the swinger on a sidecar, it boils down to how good your grip is to counter the G-force trying to fling you off. I appreciate the skill it takes to do that job well and the teamwork it takes to get the best from the sidecar outfit. There were plenty of sidecars racing at the classic festival weekend.

Sidecar outfits are often home-made specials too, so there is a lot of ingenuity to be seen. Of the more than a dozen entries very few had the same power unit and they all looked different in construction. One even had a Coventry Climax engine. These were the motors that powered the Cooper F1 race cars in the days when Bruce McLaren was racing for that team.

The stories

It seemed fitting that I came across a Norton racing bike that was the one Len Perry rode at the Isle of Man in 1951. Back then, a team of New Zealand's best riders were sent over to Europe to take part in the Isle of Man Tourist Trophy (TT), among other top events. Len captained the team of Rod Coleman, Ken Mudford, and himself. They were given two new Norton Featherbed race bikes to run at the Isle of Man by the Norton factory. The results were good, with second place in the team's category, and Len came ninth in the senior TT, and collected the trophy for Best Colonial.

The owner of this Norton, Artie Laven from Great Barrier Island, told me that this was the actual bike that Len rode at the Isle of Man in 1951. He detailed the

A trio of Triumphs

> *Over time he has cobbled the rest of the bike together with found parts*

history to me. After being raced by Len in Europe, both Nortons were shipped to the New Zealand Norton agent, Whites. Whites sold both bikes before Len Perry returned from Europe and there was quite an argument when he eventually made it back home. Len thought that the bikes were his, so was very unhappy that they'd been sold. It's not clear how things were resolved, but the bikes didn't return to Len.

Engine swaps

Jim Swarbrick, also known as 'The Flying Milkman', bought the 500cc Norton Featherbed that Len had raced as well as another 350cc machine. Swarbrick then sold the bikes to fellow Christchurch racer Selwyn Burt, who, together with Mick Holland, short stroked the engine. Norton itself did this to its race bikes in 1953. Selwyn sold to Ron Taggart in 1959, who, after a year, swapped the motor over with a Triumph engine. The history is a little hazy for a few years after that, and it was rumoured that it was used as a road bike and at one time had a Vincent V-twin engine.

After Artie acquired the bike, he set about tracking down the original engine. He managed to buy it in 2009 and after many hours of work got it all back together and in the bike just two weeks before this classic race meeting. Artie entered in the regularity laps runs, which comprise four laps of the track with the objective being to maintain consistent lap times. The winner is not necessarily the fastest but the rider whose lap times have the least variation. A perfect event for having some fun without pushing the bike to its limits.

Rare as BSA

Barry Deane has a lovely 1940 BSA B29. They only made 125 of these so you can imagine how rare they are. This one was not all that intact when Barry bought it.

Artie Laven and his Norton racing bike

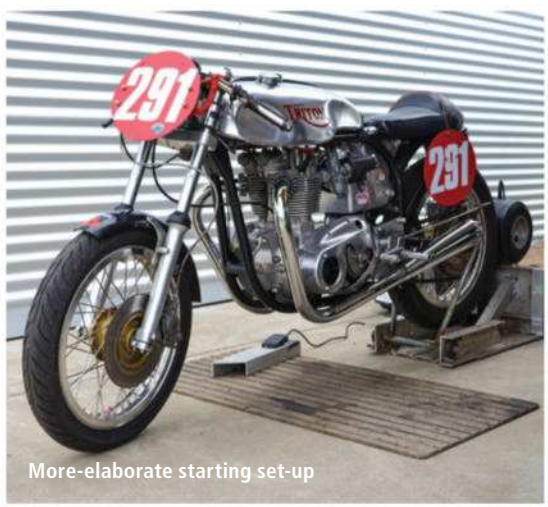
In fact, all he got for his money was the frame, gearbox, and front forks. Over time he has cobbled the rest of the bike together with found parts but has had to make some replica parts when he couldn't track down originals.

The B29 model is the basis of the post-war B31 model. Barry has been racing this bike for around five years. Like Artie, Barry was running the BSA in the regularity laps, but he also had a 1930 Rudge Ulster 500cc bike that he was running in the pre-war races. This was a trend I noticed — more than 40 of the riders had more than one bike that they were competing on, so this classic bike racing bug must be serious.

All mates

The camaraderie among these guys is strong. I overheard a conversation on the Saturday between Ginger Malloy and a rider who had a problem with the gearbox on his Bultaco. Now, Ginger is a bit of an expert on Bultacos as well as being a renowned rider. He offered to fix it that night as long as the rider could get it out of the bike and pop it around to his home workshop in Huntly. The rider was stunned, as it seemed he hardly knew Ginger, but out came the spanners and I am sure that he was all sorted for Sunday's racing.

Here's hoping for some decent weather for next year. I reckon I will be there to take in the sights, sounds, and the smells for sure.



More-elaborate starting set-up


Douglas flat-twin. Note the exposed cams

The first kids to get cars — Jiselle has heart disease and needed back support to slow the rate of fatigue, Lilli (rear) needed side support in a smaller car, with the throttle shifted closer to her tiny frame
Below: The final touch — Gobabygo stickers, the child's name on the numberplate, and rally-style stickering for major sponsors

Free wheeling

By Jacqui Madelin

Photographs: Jacqui Madelin and Ross Wearing

SHEDDIES' SKILLS HELP DISABLED CHILDREN JOIN IN MOBILE PLAY

Lots of folk fiddle about with cars in sheds, but a few New Zealanders are handling cars with a difference. Gobabygo is a volunteer-run charity that buys ride-in toy electric cars and adapts them for disabled children. Some of those volunteers put the cars together, make the adaptations, and fit them, all in their shed.

It started with a group of mates in Auckland who had heard about Gobabygo overseas and figured that its DIY ethos would work well here. Kidz First paediatrician Adrian Trenholme suggested three children who could benefit from the increased mobility, and retired furniture-maker Geoff Bentham was roped in to work out the first adaptations and how to fit them.

Those initial children ranged in size, age, and disability but the benefits of increased mobility were immediately obvious. Parents often cry when they see their disabled child at last able to join in with mobile play alongside siblings on bicycles or scooters.

Unique adaptations

After discussing and measuring, Geoff went home and made, then fitted those first adaptations. The crew soon realized that evaluating individual needs separately was not realistic, so a therapist produced an application form. The team also began working out what could be built ahead of time and started stockpiling parts.

Geoff discovered that plastic drawer handles make good additions to steering wheels. He developed a plug-in wiring

Above: (Left to right) Friends Alistair McLean, David Johncock, Allan Horner, and Graeme Lobb put the cars together in Allan's shed

Below: Geoff discussing the adaptations Hunter will need with his Nelson therapist, Mindy Silva

Drawer handles make great steering-wheel extensions

adaptation to add a buddy button to the cars so the throttle can easily move from the foot to the steering wheel and head. The initial harness support made from plumbing pipe was replaced with a plywood backrest that he designed. And he did it all in his suburban garage.

Gobaby grows

The charity has grown a lot and demand for the cars is increasing. Support from companies such as BMW and Proactive Fire Protection — and the hard work of Rotary branches nationwide raising funds — has made it possible to give away the cars.

But Gobaby needs more skilled volunteers to help in making the adaptations and to service the cars.

The range of disabilities Gobabygo has worked around is wide and varied — but these children all have one thing in common. Their Gobabygo car has introduced them to mobile play for the first time, and it's all down to a few men in sheds.

Allan applying steering handles: BMW and Gobabygo logos await use

How can you help?

Gobabygo needs people with a wide range of skills to help in the whole process of adapting cars. Visit facebook.com/gobabygonz or gobabygo.org.nz for more information.

The Shed online

What's happening online at theshedmag.co.nz?

Every week we upload new content on *The Shed* website to join the 100s of articles and videos already on the site for readers to discover and enjoy.

This month's new uploads include:

- a short video of a Lister Start-O-Matic electric generator on Great Barrier Island. A great old stationary work horse

- extra unpublished photos from *The Shed* Issue No. 77 of the Oamaru Steam and Train Society

- a step-by-step guide to building a set of car ramps for automotive maintenance at home
- All last issue's competitions' prize winners. Two *Shed* subscribers won a palezzetti Oslo Outdoor fireplace worth $1499.

These are just some of the new uploads to our website this month. Visit theshedmag.co.nz to enjoy even more.

Letter of the MONTH

The Shed helps out with the studies

When my daughter needed a bigger desk to study for NCEA I bought a used office table from Eco Store. It had a nice veneer top with solid timber edging — a light-coloured timber — probably tawa. I sanded it down and gave it a new coat of polyurethane. The legs were very heavy Customwood in black and there was a solid divider in the centre of the table. This left limited legroom for a growing 16 year old.

The November/December 2017 issue of *The Shed* featured a desk project. That was the inspiration to make new legs for my daughter's desk. Dressed pine from Mitre 10 was a reasonable price and similar in colour to the tawa top.

I took up the challenge laid down in *The Shed* article and made 16 mortise and tenon joints with basic tools — hand mitre saw, tenon saw, electric drill in a simple press, and chisels.

For the glue-up I used a portable workbench and some cheap pipe clamps. The new legs were finished with a router to round over the edges and an orbital sander, before applying three coats of polyurethane.

The end result is satisfying, and my daughter is happy with her upgraded desk. Thanks to *The Shed* for the inspiration. Keep up the good work.

Allan Holden (via The Shed website).

Letter of the month

The prize this issue is a stylish Teng Tools laptop computer bag. Perfect for protecting your tablet or laptop in your busy shed. The winner of this month's prize is Allan Holden.

Letters should be emailed to editor@theshedmag.co.nz, or posted to Editor The Shed *magazine, PO Box 46020, Herne Bay, Auckland 1147.*

Praise the rain

A really great article in the latest *The Shed* magazine 'Rain, rain come again' [Issue No.77] by Jude Woodside. A superbly written article and beautifully illustrated too, with lots of excellent colour photographs. Very informative, I must say.

Please convey my compliments to Jude Woodside because he has certainly done an excellent job here.

Stan Abbott, Adjunct Senior Lecturer

School of Health Sciences,
Massey University.

Your entire workshop – now you can take it with you!

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Wiha tool set electrician's competence

- **Increases your efficiency**
  A comprehensive tool assortment, always having the right tool at hand when needed.
- **Meets your requirements**
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  The right tool protects you from damaging materials and avoids subsequent work.
- **Protects your health**
  Ergonomic handle design makes work easier and prevents occupational illnesses.
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MORE THAN YOU BARGAINED FOR

By Jude Woodside
Photographs: Jude Woodside

Bruck O Muench, proprietor of the Colonial Trading Company

AN ECLECTIC HARDWARE STORE WILL HAVE YOU HANKERING FOR SOMETHING YOU NEVER KNEW YOU NEEDED

There are some places that just seem to be made for you. A store for example filled with all the things that appeal to your many different interests at once.

The Colonial Trading Company is situated in a small 19th-century shop in Featherston at the foot of the Rimutaka hill. It is such a place! From the moment you enter it feels like you have been there before. Maybe it's the wood panelling, the warmth of the honey-coloured macrocarpa around the counter, the tool wall with carefully chosen tools of general interest, camping equipment, American clothing, wood-panelled and wire-caged gun room, or the fascinating culinary section with Lodge cast-iron skillets, Italian coffee makers, and Danish cookware.

Everything in the store is carefully chosen, good-quality, and not always to be expected in a hardware store. In fact, the real hardware — nuts and bolts and hand tools — is kept in a back portion of the store.

Like a beer with that?

The proprietor Bruck O Muench is the big, ebullient guy wearing braces who stands behind the counter more like a bartender than a hardware store owner. In fact he confesses he'd like to get a license to round out the experience.

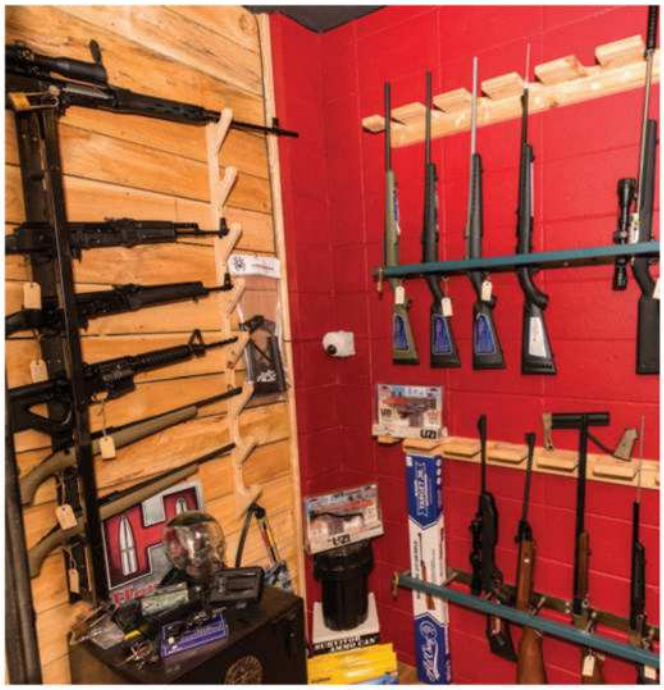
This man-cave store is located in Featherston

Bruck is inclined to enjoy a yarn. He is well versed on the provenance of all the goods in his store. A gun specialist, he worked for a time as an arms dealer but he also has an engineering background. He loves to cook, too, so the range of cookware in the culinary section at the front of the store reflects his tastes in that department.

The store is divided into four main areas with the hardware section tucked away at the back where Bruck sharpens and makes up chainsaw blades, and cuts keys — all the usual things a hardware store in the country should do. Here there is also a range of gardening tools, hand tools, and fastenings.

Popular, quality brands

Adjacent to the hardware section is the gun room where he keeps a range of guns (Ruger brand). He prides himself on being a specialist, and focusing on the one quality brand for which he can get better deals.



Good selection of hunting rifles in store

The store has the atmosphere of an old American general store

> *"You won't get it in Bunnings but this is a store for real blokes, and real men like real coffee and hot sauces"*

Just in front of the gunroom is an extensive range of Carhartt clothing. Carhartt, favoured by construction workers, tradies, and ranch hands in America, makes very sturdy, cotton-drill workwear; both stylish and long-lived.

His range of Stubai forestry gear and Estwing hammers shows a devotion to quality products. The attraction of the store is just that specialization. You are likely to find what you want and you might also find something you didn't know you needed until you saw it here. What about a cast-iron cornshucker for example? You won't get that in Mitre 10.

The attraction of a store with a range focused on quality means you aren't wasting your time or money on inferior products, and it permits a wider range of tools within a small space.

But aside from the Austrian forestry tools and the Danish cookware, Bruck is an unashamed fan of America. The fan light over the counter is from Kentucky, and he drives a left-hand drive Ford F-150 pickup with the obligatory Texas-style gun rack. He has just taken delivery of a restored Allis- Chalmers B tractor.

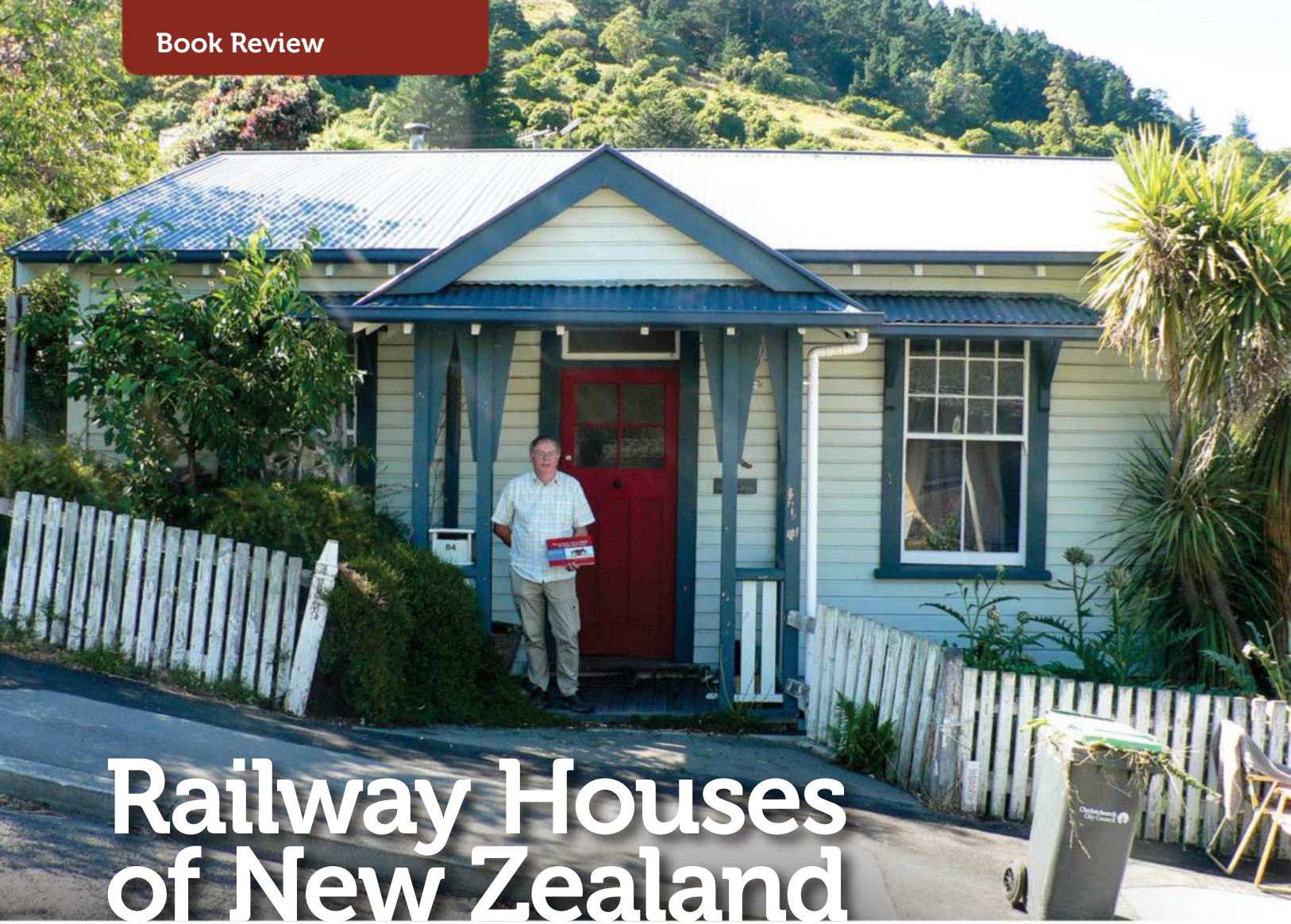
Stunning fit-out

The counter is clad in macrocarpa panelling that Bruck milled and machined himself, as he did the entire fit-out of the store. Each plank of timber that gives the store its rustic ambience was placed there by his own hands, and he is justifiably proud of it.

It is intended to reflect the atmosphere of an old American general store. Above the counter is a range of Havana coffee that he can grind on the spot. He also carries a range of hot sauces for the barbecue. You might not expect that in a hardware store, and you won't get it in Bunnings, but this is a store for real blokes, and real men like real coffee and hot sauces.

The store clearly caters to farmers, lifestylers, hunters, and would-be chefs and should be a destination for readers of *The Shed* passing through the Wairarapa. The steady flow of locals and tourists denotes its popularity with its target market, but surprisingly Bruck says many of his customers are women mostly attracted by the cuisine section but others in search of the definitive gift for a man. Most of his customers stay for a chat and no one leaves without some words of wisdom from the man behind the counter.

Wood panelling gives the store a wonderful country feel



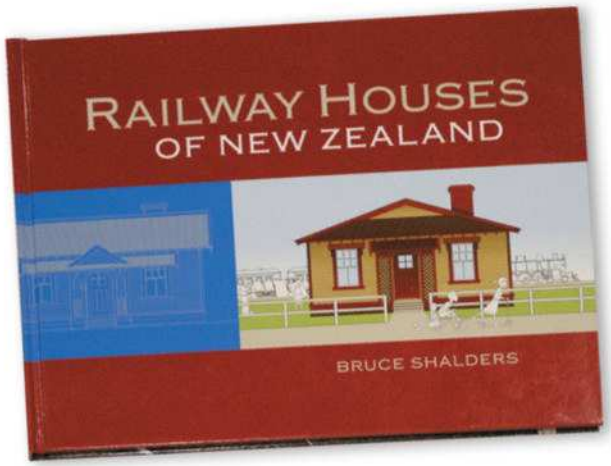
Railway Houses of New Zealand

The very attractive cover of this well produced book immediately attracted my attention, and the contents ticked a number of boxes for me. Railways — check; old houses — check; utopian schemes — check. What was a surprise was that the book described a housing problem which had been long recognized that was solved, despite teething problems, in an effective and efficient manner.

The Labour Party, which leads the recently elected coalition government, has pledged to build 100,000 houses in New Zealand over the next 10 years. It will be interesting to see if they encounter the same problems with workers and material as the Railways Department did a century ago, and whether the same solution of standard design and prefabrication at a central location will be adopted.

Staff recruitment

As railways around the world were built it became difficult to recruit staff to work in remote locations because of a lack of suitable housing. With the completion of the main trunk line in the North Island in 1908, this problem became acute in New Zealand. The response of the New Zealand Railways Department, who ran the railways, was to have houses built to their own designs. By the end of the 1910s the loss of trained railwaymen because of lack of houses forced a dramatic solution. So many houses were thought to be needed that the materials and builders required would not be available in the country.



Consideration was given to importing prefabricated houses from overseas, but it was decided that the Railways Department would build the houses themselves using timber from the Department's own forests. Accordingly the Architectural Branch was set up under the direction of George (later Sir George) Troup. The branch built a sawmill and house factory at Frankton Junction near Hamilton and between 1923 and 1928 produced about 1500 pre-cut house kitsets in native timbers (mostly rimu and matai) to a standard design with a

Above: Pre-World War I Railways house in Hornby
Left: Author Bruce Shalders outside house A66 in Lyttelton.
A66 was built to the Architectural Branch design with roof A and porch A

By Bruce Shalders, published by NZ Railway & Locomotive Society, hardback, 142 pages

Review by Ritchie Wilson

$49.99

limited number of cosmetic differences. That equates to a house every day and a half. The kitsets were shipped from the factory by rail and erected in two to three weeks by semi-skilled labour.

Stunning images

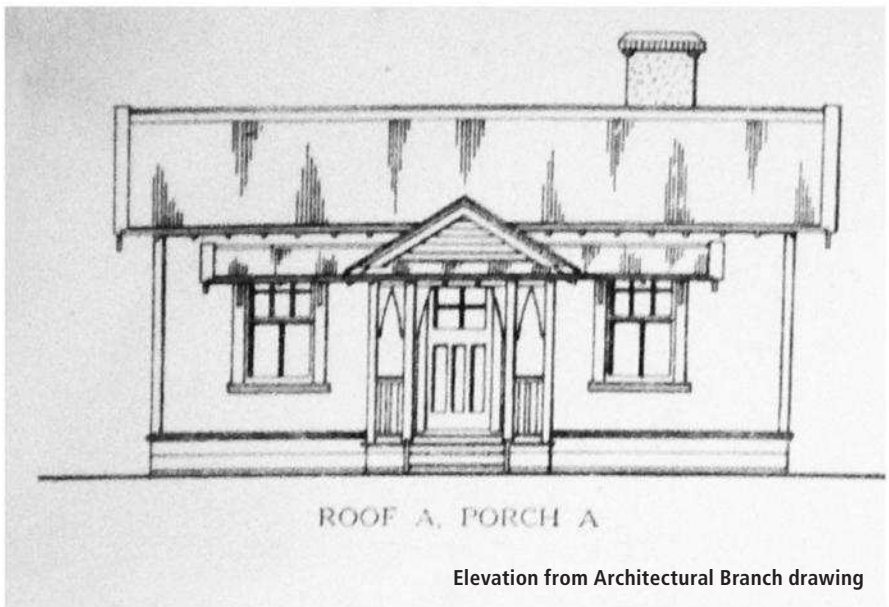
Eventually the Department owned around 4000 houses which were numbered, more or less logically, for administrative convenience. A few pages of Bill McKay and Andrea Stevens' comprehensive 2014 book on state houses, *Beyond The State*, gave an introduction to the Railway housing problem and its solution, but *Railway Houses of New Zealand* gives a much fuller treatment of this, as well as including a trove of engaging photographs both historic and new. Photographers love trains and so Bruce Shalders has found numerous evocative images to illustrate the information he conveys so skillfully in the text. Also in the book are five pages of house plans, four pages of settlement plans and 11 pages of house numbers and their general locations. The author has tracked down many of the surviving houses and about 50 photos of them are reproduced in this delightful volume.

The same house showing the pizza oven made by the son of the family as a school project with help from his dad

Free rent

Of the many aspects of the Railway's houses described, the two I found particularly interesting were the Garden City theme of the planned railways settlements, and the houses where railwaymen and their families were possibly living rent-free. George Troup had returned from a study tour overseas with two main insights: prefabrication and settlements with room for gardens, sports, and community centres following the Garden City model, mostly limited in practice to room for vegetable gardens.

I laughed out loud at the author's description of the unresolved discrepancy in 1982 between the total number of houses and the number of houses producing a rental income or listed as untenanted — a matter of more than 60 houses. Presumably families were living in Department houses and were not being charged rent. Now, that is the railways that I remember.



Elevation from Architectural Branch drawing


ROAD RUNNER
SUPERBIRD
Plymouth
BFGoodrich
Radial T/A

BRINGING A BEAST TO LIFE

By Ray Cleaver
Photographs: Rob Tucker

RESTORING A PLYMOUTH SUPERBIRD MUSCLE CAR HAS REQUIRED DETERMINATION — AND TIME

Nuts and bolts galore

The renovated motor for the pop-up headlights

"The restoration took about 1100 hours' work and a search for parts from all over the world"

The nose cone and pop-up headlights

Muscle cars have been around in America for about 70 years. These two-door tanks with massive V8 engines first became popular vehicles to outrun the police when loaded with bootleg moonshine liquor during the Prohibition era. Later they were powered up even further for Nascar racing.

The restoration of a rare 1970 Plymouth Superbird in New Plymouth has involved a complete strip down and rebuild of a truly iconic machine.

Motor engineer Michael Wolfe has rebuilt the car for owner Bryce Barnett — a massive job that he started early last year and which took about 1100 hours' work and a search for parts from all over the world.

Bryce has a large collection of classic cars, which includes a big shed full of restored American vehicles. Michael

Michael's workshop with parts laid out

works full-time restoring and looking after the collection, which was featured in *The Shed*'s February/March edition last year.

Bare bones

This Superbird came to New Zealand incomplete from a panel shop in America in the early '90s. After a spell in Levin it was passed on to Peter Fagan in New Plymouth who semi-restored the beast.

Current owner Bryce then picked it up, and Michael stripped the car down to the bare bones and rebuilt it from the ground up.

"The panels were pretty good but some of the chassis rails were rotten," Michael says. "It had been involved in one major prang during its life."

Michael acquired a jig to mount the

The wiring loom that Michael cleaned up and re-fitted


Consulting the parts book


Michael and Murray Fabish fitting a cross member on the hoist


The new floor shift


The original Road Runner (beep beep) horn


Unpacking the door trim panels

stripped-down car on — one that could flip the car over — and he cut out the chassis rails one at a time.

He imported new replacement chassis rails and outer sills from a company in California, then carefully welded them into the braced-up bodyshell.

He says that they have to fit perfectly, as the foundations of the car decide how everything else will fit and how 'true' the car will be.

Michael had to hand-make some cross members and mounts, and there was a lot of welding needed to rebuild the monocoque chassis. Once completed, ▸

History of the Superbird

Developed specifically for Nascar racing, the Superbird was a highly modified, short-lived version of the Plymouth Road Runner and a follow-up design to sister company Dodge's Charger Daytona.

The 1970 Superbird is a specialized stock car, factory-built for racing. Only 1920 Superbirds were made, a limited number to qualify for the stock car racing circuit. These muscle cars were raced at speeds of more than 200 miles per hour (322kph) at Nascar events.

The Charger 500 version that began the 1969 season was the first American car to be designed aerodynamically using a wind tunnel and computer analysis, and later was modified into the Daytona version with nose and tail.

The Superbird's smoothed-out body and nose cone were further refined from those of the Daytona, and the street version's retractable fibreglass headlights added 19 inches (48cm) to the Road Runner's original length. The rear wing was mounted on tall vertical struts that put it into less disturbed air, increasing the efficiency of the downdraught placed on the car's rear axle.

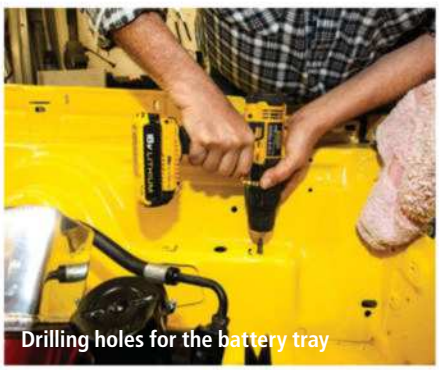
These cars were banned in some American states, as they reached such high speeds and were deadly in wet conditions. Many muscle car crashes were recorded.

"The power-to-brain ratio was all wrong for some drivers," says Michael.

Still doing body prep prior to sending off to the paint shop

The rebuilt fan

"The car had been off the road for over 40 years"



Drilling holes for the battery tray

In the paint shop with Brent May

In the paint shop

Stock cars and Nascar

Stock car racing in the US has its origins in bootlegging during the Prohibition era from 1920 to 1933, when drivers ran bootleg whiskey made primarily in the Appalachian region of the US.

Bootleggers typically drove small fast vehicles to evade the police when they were distributing the illegal alcohol. Many of the cars were modified for speed and superior handling, and most featured increased capacity for storing cargo. Many of the drivers became very skilled at driving at high speeds down steep winding mountain roads.

Jerry Elijah Rushing was an American best known for his years as a moonshine runner. Rushing's family made a living from making illegal moonshine whiskey. He drove a modified 1958 Chrysler 300D easily able to reach speeds of 140 miles per hour (225kph) and outrun police cars. He became very skilled at high-speed driving at night, often without headlights. He nicknamed the car 'Traveller', after Robert E Lee's favourite horse.

The car ran out of fuel during a police chase, was abandoned, and impounded by police. It was sold to a private collector and has since been restored.

Rushing eventually used his skills to pursue a career in early stock car racing and was reportedly the inspiration for some of the characters in the B-movie *Moonrunners* and *The Dukes of Hazzard* TV series.

The 'General Lee' (sometimes referred to as simply 'the General') is the name given to the 1969 Dodge Charger driven in the series by the Duke boys, Bo and Luke.

Although the estimated number of General Lees used during filming varies according to different sources, former cast member Ben Jones and builders on set estimate that 325 General Lees were used up — on average, more than one per show. Approximately 17 still exist in various states of repair.

When filming a jump for the series, anything from 500 to 1000 pounds (230–450kg) of sand bags or concrete ballast was placed in the trunk to prevent the car from nosing over.

Michael stripped the car down to the bare bones and rebuilt it from the ground up

▸ he sealed off the underside with a good underseal product called 'Pro Form', a paintable, rubberized underseal from Germany. The car was rust-proofed with Dinitrol, a high-performance German cavity wax.

"It's a spray-on improvement on the old Fishoilene everyone used to use," Michael explains.

Seek and ye shall find

"Numerous parts had been lost over the years, and the car had been off the road for over 40 years," Michael says. "It was a case of seek and ye shall find. Thankfully, I've been in the motor trade for 35 years and have built up a lot of contacts."

Rust was a major problem with this restoration: "I spent hours and hours on the internet sourcing parts. The Superbird has some totally unique parts — some I found and some I made myself. I had to make about 10 to 15 per cent of the missing car parts and track down the rest."

Michael believes that there is only one other genuine example of these cars in New Zealand.

He did, however, find a set of new,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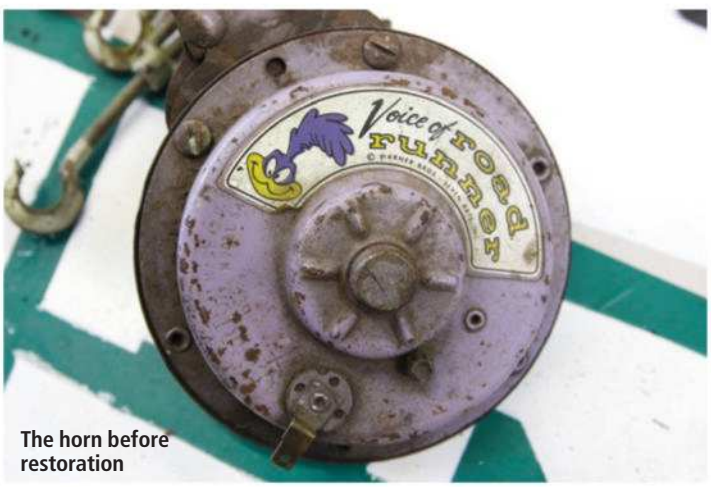
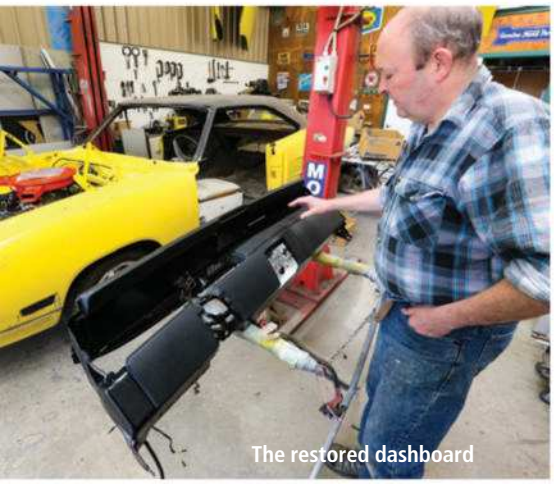
Tuning the big engine

The car had its original Road Runner (beep beep) horn, which still worked



The horn before restoration

Unpacking the new rev counter



The restored dashboard

The new instrument facia

original wheels and other parts in Bulls, of all places, and imported a windscreen and bucket seats from America, but he had no option than to rebuild the existing back seat.

The car originally had a front bench seat and column change, which Michael has now changed to a floor-change shift.

He was chuffed to find that the car had its original Road Runner (beep beep) horn, which still worked.

As an example of the grunt this engine puts out, Michael points to the rear leaf springs and the fact that the springs on the left side are thicker than the right side.

"The engine is so powerful that when it's accelerated it twists the car and the left springs are strengthened to handle this stress," he says.

"The suspension is leaf springs on the back, and torsion bars and shocks on the front. It's the same basic suspension as the used in the big Aussie Valiants.

"This has been a big restoration job. I've yet to restore a car in under 500 hours, even a Mini, but this took me over twice that time, and that doesn't include engine work, painting, finishing, and upholstery."

One example of the work involved was carefully sandblasting the viscous coupling and fan, which took five hours.

Restoring and cleaning the original wiring loom was a major undertaking too.

"In America they buy new parts for restoration, but you have to ask yourself how much of the car is original when you've finished," says Michael. ▸

Stock cars and Nascar

A 'stock car', in the original sense of the term, is an automobile that has not been modified from its original factory configuration. Later the term 'stock car' came to mean any production-based automobile used in racing. This term is used to differentiate such a car from a 'race car': a special, custom-built car designed only for racing purposes.

Nascar, founded in 1948, is US motor sport's pre-eminent stock car racing organization.

Nascar's requirement demanded that vehicles to be raced must be available to the general public and sold through dealerships in specific minimum numbers. For 1970, Nascar raised the production requirement from 500 examples to one for every two manufacturer's dealers in the US.

In the case of Plymouth, that meant having to build 1920 Superbirds. Due to increasing emissions regulations, combined with insurance hikes for high-performance cars and Nascar's effective ban on the aero cars, 1970 was its only production year.

In the 1920s and '30s, Daytona Beach became known as the place to set world-land-speed records.

The Daytona 500 is a 500-mile-long (805km) Nascar Cup Series motor race held annually at Daytona International Speedway in Daytona Beach, Florida.

The inaugural Daytona 500 was held in 1959, coinciding with the opening of the speedway. Daytona International Speedway is 2.5 miles (4km) long and a 500-mile race requires 200 laps to complete.

The completed Roadrunner ready for the Annual Americana Show in New Plymouth February 2018

"This is a special car and the value of the car more than justifies the total expense of a big, thorough restoration"

The power train

The car is powered by a 7.2-litre Chrysler 440 Magnum engine with a four-barrel double-pumper Holley carb and was rebuilt by Engine Rebuilders in New Plymouth.

"A car like this is not cheap to run," says Michael. "It's got the speed and will go past anything except a petrol station. You're probably looking at about seven miles per gallon [2.5km/l]."

It has a high-lift camshaft, polished heads, and extractors. It has a three-speed auto shifter, which, like all the other ancillaries, has been completely overhauled.

"The car has the proven Chrysler power train from the late '60s and early '70s," says Michael. It's the same three-speed auto and Plymouth engine combination you see in the police cars in *The Blues Brothers* movie.

Michael finished the car just in time for the big annual Americana show in New Plymouth in February of this year, stunningly painted in Chrysler Lemon Twist Yellow.

The first Americana event was in February 2007 and was limited to 550 vehicles. By February this year, the 11th gathering had attracted 850 cars, which convoyed around Taranaki to all the towns and took part in various activities.

Taranaki was decked out in stars and stripes for the occasion.

"This is a special car and the value of the car more than justifies the total expense of a big, thorough restoration," Michael says.

The first muscle car

Opinions on the origin of the muscle car vary, but the 1949 Oldsmobile Rocket 88, created in response to public interest in speed and power, is often cited as the first muscle car. It featured America's first high-compression overhead-valve V8 in the smaller, lighter Oldsmobile 76 / Chevy body for six-cylinder engines.

Jack Nerad wrote in *Driving Today*: "The Rocket V8 set the standard for every American V8 engine that would follow it for at least three decades.

"With a displacement of 303 cubic inches and topped by a two-barrel carburettor, the first Rocket V8 churned out 135 hp (101 kW; 137 PS) at 3,600 rpm and 263 pound force-feet (357 Nm) of torque at a lazy 1800 rpm [and] no mid-range car in the world, except the Hudson Hornet, came close to the Rocket Olds' performance potential".

Nerad added that the Rocket 88 was "the hit of Nascar's 1950 season, winning eight of the 10 races. Given its lightning-like success, one could clearly make the case that the Olds 88 … was the first 'muscle car'."

In response to rising costs and weight, a secondary trend towards more basic, budget muscle cars emerged in 1967 and 1968. These included the Plymouth Road Runner, the "original budget Supercar", the Plymouth GTX, which at a base price of US$3355 offered as much performance per dollar as anything on the market.

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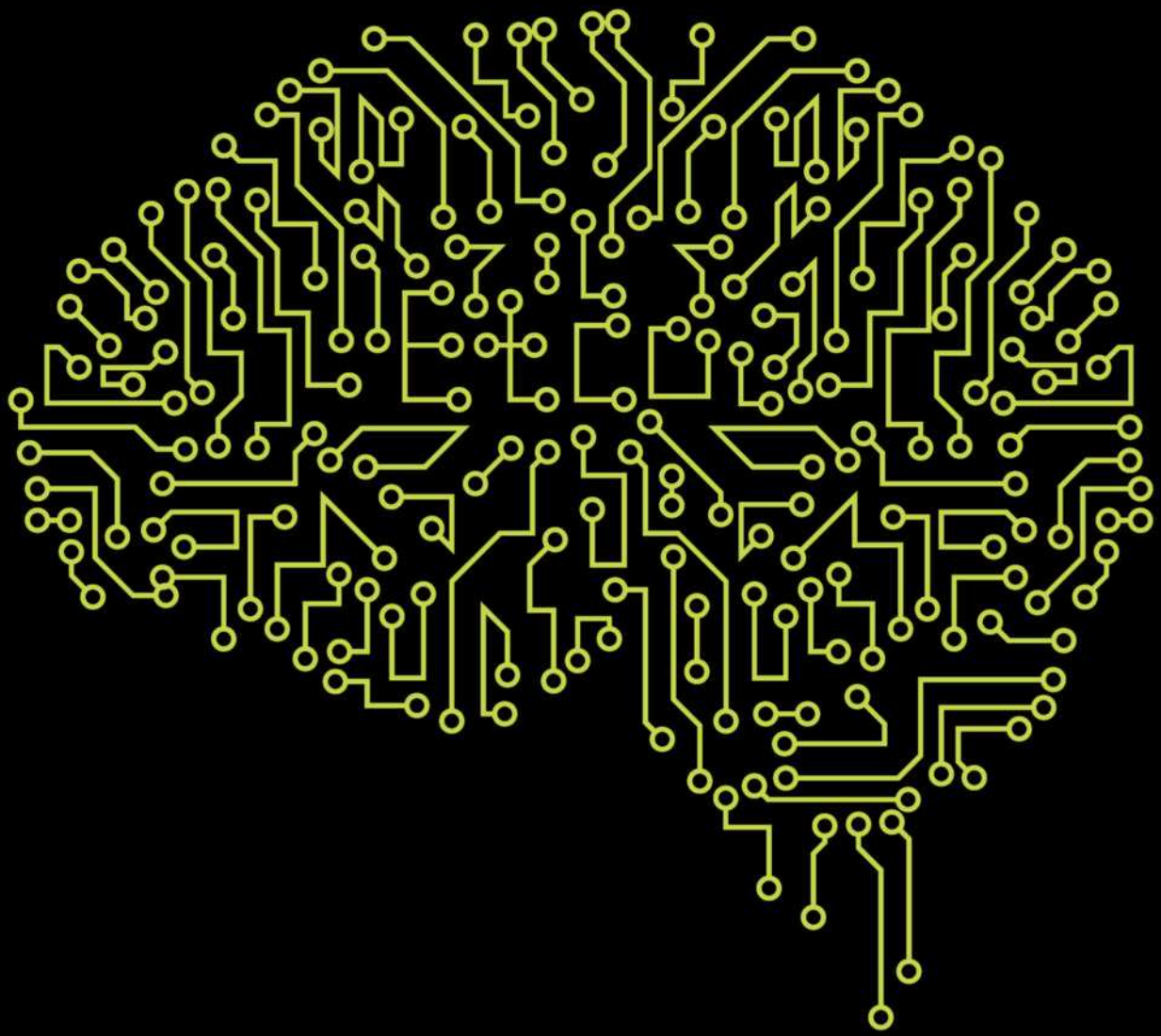

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STANDING TO ATTENTION

Cutting the parts of the frame

Cleaning the ends and bevelling the edges

IN PART 1 OF A 2-PART SERIES, WE START ON THE FIRST STAGE OF MAKING A LATHE STAND WITH DRAWERS

By Jude Woodside
Photographs: Jude Woodside

I moved recently and in the haste to pack I loaded my lathe complete with its stand. The stand, which is really just a couple of sheet-metal cabinets, didn't really survive the move all that well, and it was bent out of shape.

That didn't really bother me since I have wanted to make a decent stand for the lathe since I got it, and include some drawers for tooling and other bits and pieces. Now that the lathe is in its permanent home I have my chance. This is just a small lathe but it weighs 250kg nonetheless.

I wanted to make something sturdy and solid that would serve to support the lathe without sagging and eliminate any vibrations.

My go-to tube

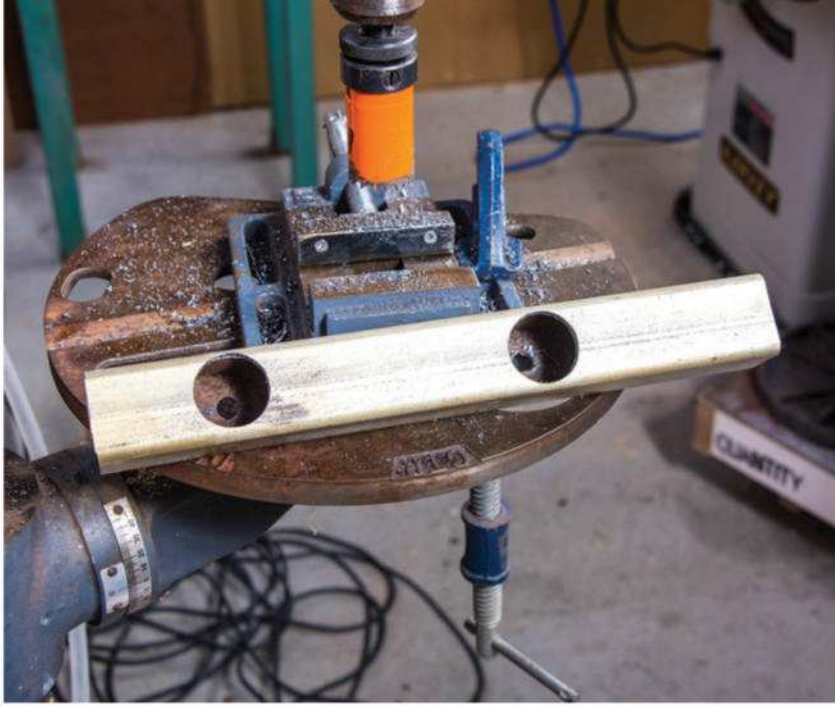
I still have a stack of 40mm square tube that you might have noticed I have made good use of in the past, and this is my go-to material for this job. I also want to incorporate steel drawers in the stand that will necessitate making the stand very accurately. In the past I may have been guilty of being a touch loose in my dimensions, knowing that nothing really demanded precision, but this job has two areas that are unforgiving—the mounting holes for the lathe, and the whole cabinet being square especially where the drawers will fit.

I love the plastic nature of steel, which means you can fill holes where something isn't quite fitting, but it does have a

Checking for square

Tacking up the frame

Carefully positioning the second lathe support



Left: tacking the first of the lathe supports
Right: a lathe support cross member. The large hole is for access for a 17mm socket

> *"In hindsight I would have used a long pilot drill first and only drilled the 10mm holes on one end"*

tendency to distort, and that can be disturbing.

I need to be quite careful with welding so I don't apply too much heat and distort the frame. You might think I am joking to suggest that 40mm square tube x 3mm thick will distort, but it does happen.

Stand design

I started with the design of the stand. I knew the position of the mounting holes and the weight of the machine. I intend to retain the tray under the lathe so I needed to make something that would match the dimensions of the cabinets. In fact, I found I could make them a bit deeper than the cabinets at 400mm.

I wanted to incorporate four feet and machine pads that can be levelled to hopefully eliminate the tedious levelling I had to do with shims when I first installed the lathe. The cabinets didn't have any adjustable components other than shims.

Solid as

I am concerned too that the thing doesn't rack. It is unlikely given the number of welds, but I will brace the back and the ends.

I'm not too concerned about the weight, in fact, the heavier the better. I am toying with the possibility of pouring some concrete in the base too. At this stage that is just a thought.

With my basic design sorted I began by cutting the major components to size, being very careful to make sure they were accurately sized. In fact, I ended up recutting a few that didn't quite make the grade.

I started by assembling the top frame. As I have in the past I made this with mitred joints, taking care to ensure that the ends were square and the length was precise. It's easy to slip the mitres by a millimetre or so; that might not matter in some cases but in this instance I needed to be sure that the top frame matched the dimensions I had planned, especially the inside dimensions.

The rolled nature of the corners on this tube make it difficult to accurately determine when the pieces are aligned to each other so one piece isn't lower than the one it mates to, for example. I tacked each piece and turned the whole assembly and tacked the other side too.

Access to bolts

There are two cross members to be added to the top framework that the lathe will mount to. The mounting bolts are high-tensile M10 and are currently attached through a 1mm tray to the top of the cabinet.

I want to mount them to the 3mm-thick square section tube with the original tray, and possibly another 1mm thick cover. To do that I will need to get a socket up through the tube.

I measured and marked the holes and drilled them right through on the drill press. In hindsight I should have used a long pilot drill first and only drilled the 10mm holes on one end. That would have made it far easier to centre the hole saw I used to cut the socket clearance hole in the other side. However, I turned the parts over and proceeded to cut the larger hole to accommodate a 17mm socket in the underside with a bi-metal holesaw.

Adjustable feet

I planned to put on some heavy-duty adjustable machine feet that I sourced from Machinery House. These feet screw into plates that are welded onto the legs. I cut four pieces of 50mmx4mm flat bar that I found in the scrap bin. The screws are M10 so I drilled an 8.5mm hole and tapped it. ▸

Tacking the second support

Cutting the feet

> *"It may come as a surprise to you, but not all of my welds are things of beauty"*

I have found that it is best to drill a pilot hole and then drill to the final hole size — it also saves wear and tear on your bigger twist drills. I then tapped the holes for an M10 screw at 1.5mm pitch. I stood the legs on the plates and tacked and welded each in place.

To mount the legs to the frame I made good use of some newly acquired right-angle Magswitches. They are aluminium sheathed but the magnet works well when clicked into place. The real benefit is that filings and grindings won't stick, unlike the permanent magnet, right-angle clamps. Their extra heft made keeping the legs plumb a bit easier. I still managed to tack at least one up that was off by a couple of degrees. I managed to correct it with some judicious clamping when I welded on the bottom rail.

Amateur welder's friend

It may come as a surprise to you, but not all of my welds are things of beauty, and it won't have escaped your attention if you are a regular reader that I make good use of flappy discs — they are the amateur welder's best friend. The biggest bugbear I have found with flappy discs is they don't get into fillet welds well.

However, I have found a disc that is especially made for fillet welds. It's by Pferd, a German company that manufactures high-quality files and abrasives. These discs are supplied in 6mm or 8mm radius edges that make quick work of fillet welds, leaving a clean, concave look.

I used them to clean up the leg welds and in fact most of the fillet welds on this project.

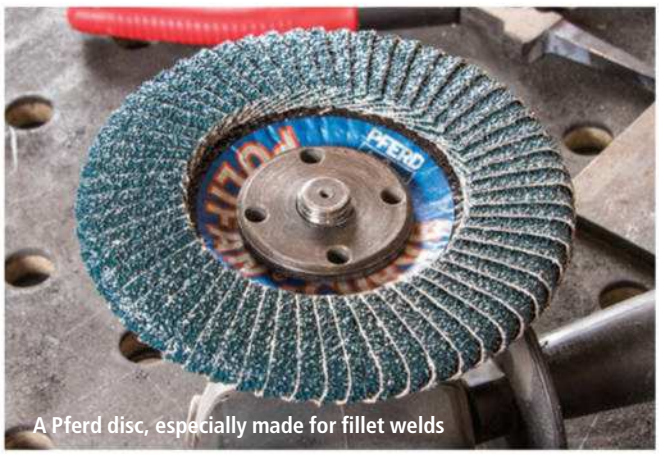
With the legs in place I added the bottom rails, which had been cut to 1100mm exactly, and the side rails, cut to exactly 320mm. I found it was useful to cut a couple of pieces of timber to 610mm length to help with placement. I also discovered that one of the carefully placed legs was not as plumb as I hoped, and I needed to employ a clamp to take up the additional 2mm.

Burning scalp

I have found after enduring too many spatters on my exposed head that it's a good idea to wear a cap under a welding mask but also it's also an even better idea to clean the ends of the galvanized pieces. So I now routinely grind off the galvanized coating when I look to bevel the ends of the pieces. That makes a huge difference to the smoothness of the welding process and makes for a much tidier weld. It also dramatically reduces spatter.

I have also noticed in the past that I have been rather lazy welding vertical joints, often welding downward. That's not a good idea — it's far better to weld vertical upwards so you are not simply creating a

Welding the feet to the leg

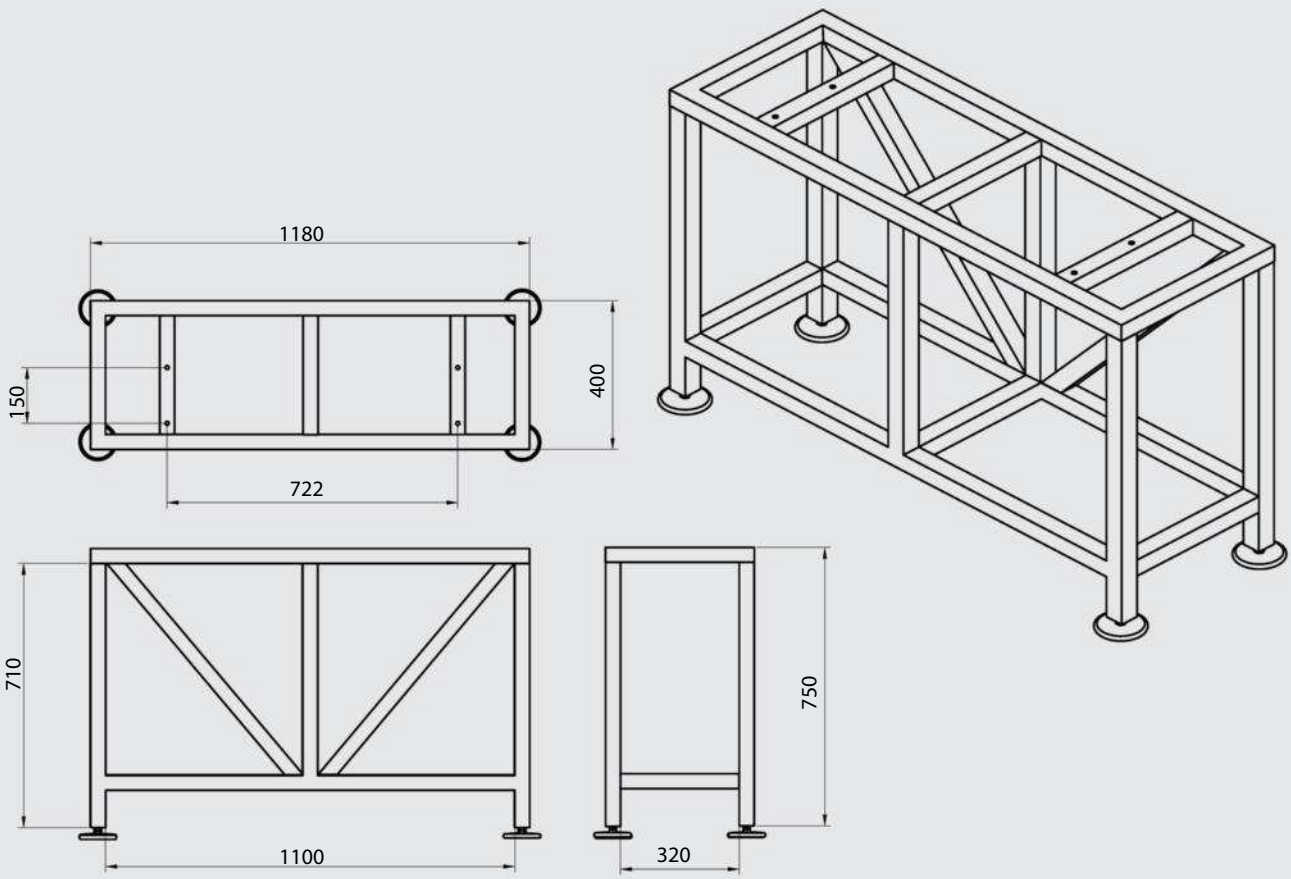


A Pferd disc, especially made for fillet welds

Drilling a foot

The profile of the Pferd fillet flap disc

Dimensions



Above and below: The rangefinder is invaluable for precision measurements

"These little digital laser rangefinders are reasonably inexpensive considering how much use you will get from them"

blob of molten metal that will succumb to gravity and grow as you move the torch down to create an unsightly lump at the bottom. Welding up allows the weldment to cool as you go, and you will have a better weld.

Laser rangefinder

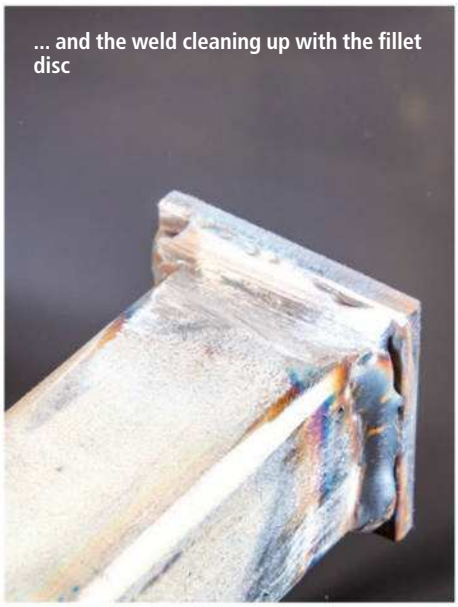
With the bottom rails in place I needed to add the uprights that make up the centre section. This is intended to both split the cabinet into two parts for the drawers and to help distribute the weight of the lathe. I needed something to accurately measure the space between the upright and the ends to ensure that it was equal.

It occurred to me that if my laser rangefinder would work at this short range it would be very accurate. I already know how exact it is having used it for renovating in the past and finding it far more accurate than any tape measure, especially for awkward measurements.

It worked. In fact, better than I thought, and it also allowed me to get the piece square.

These little digital laser rangefinders


The welded foot ...


... and the weld cleaning up with the fillet disc


Welding a cross member to the legs. Note the timber support

are reasonably inexpensive considering how much use you will get from them, and the saving in time that an accurate measure will provide. They aren't perfect and you have to be careful that the piece you are measuring from is aligned square to the one you are measuring to. Even then it's possible get the odd curious measurement. but in the main I have found it extremely useful. It was especially handy for centring the middle uprights. ▸


Welding the leg


Marking the angles for a brace

Cleaning up the welds

The adjustable machine feet

Setting the lathe in place

The new stand in place

"I wanted to make something sturdy and solid"

A bit of bracing

With the two uprights centred and welded in place, I then added the spacers between them. I noticed in doing so that the upper framework had a slight dip in the centre, so the upright in the top helped to keep the top frame parallel.

To keep the back stiff and also to help with weight I have included two braces, also from 40x40mm stock.

I determined their angles by the simple expedient of placing the oversize pieces in place and drawing the angle of cut with a sharpie. I was able to tack one in place while holding it, and the other I managed to clamp. They weren't a precise fit and I did have to do a little weld build-up to fill the gap in some cases. The carcase was becoming a bit heavy and I was keen to see if there was any racking in the thing.

So I added the feet and tested it on the floor.

I was keen to see if the base was sturdy enough so I have test mounted the lathe to it. I was also curious to know if I needed to add the angle bracket braces I was considering adding to the ends. At this stage it doesn't appear that I need to, but I want to wait until I have added the drawers, which is the project for the next issue. There is no vibration and the stand is quite sturdy. I haven't yet adjusted the ways for level — that will have to wait until the project is completed next issue.

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AUDIO UTOPIA

A KIWI IN LONDON USES HIS SHEDDIE SKILLS TO CREATE AN AUDIO MAN CAVE AND BUILD THE ULTIMATE SPEAKER CLONE

By Dean Johnston
Photographs: Lucy Johnston

I've always been interested in music and hi-fi and always thought that the best scenario for serious listening would be a dedicated sound-proof music room where you could listen at all hours of the night at any volume without disturbing anyone. A 'man cave' for want of a better term.

I was lucky enough to buy a house with a large detached garage that the previous owner had built for his automotive engineering pursuits. At 13x5m this is unusually large for where I live in London and would never get planning permission nowadays of course.

The garage is a single-storey prefab of concrete construction with concrete corrugated roof panels, which was common in the '70s. For many years the garage was just a storage facility and rubbish dump until I finally got around to transforming it into a music room and art studio for my wife (always good to have a guise for spending large amounts of time on a DIY project — I'm doing this all for you, my darling).

Big speakers

This project got me thinking about a large-scale DIY speaker build that was somewhere between a club system and high-end audio to fill the studio with pumping sounds.

> *There is something rewarding about building a clone speaker, as it fufils a desire for a recognized high-end product at a fraction of the cost*

I have always been a fan of the radical design of the Focal Utopia range but not had the budget to match. Happily, I came across an advert for a set of Focal AudioM drive units (15-inch WX woofer, 6.5-inch WM mid, TD5 tweeter) and struck on the idea of building a Utopia clone, with these drivers giving some lineage to the original.

I did consider doing my own design but there is something rewarding about building a clone speaker, as it fufils a desire for a recognized high-end product at a fraction of the cost and most of the design work is already done for you if you follow the same dimensions, baffle, port, etc.

The speakers are a clone of the third-generation Utopias, which have many innovations, such as separate boxes for each drive unit to avoid any distortion across channels, with each box angled towards the listener to ensure correct timing, which they call "Focus Time".

Less hassle

I have done one smaller DIY speaker project before and found the traditional crossover design frustrating, as it is fixed once soldered and difficult to alter but has so much bearing on the sound. I had recently attended a hi-fi enthusiast show at which a DIY speaker with digital active crossover was on display. This got me thinking that a self-build speaker would be a lot less hassle and more fun without the passive crossover.

The digital active crossover made by MiniDSP does all the sound-channel processing in software much like a surround-sound system. It is highly flexible and made the complex speaker build possible for a novice with no electronics experience. One downside is that you need an amplifier for each output channel, which means six amplifiers, which produces an active speaker set-up. ▸

The cone-head hat helps to direct maximum listening pleasure to the wearer

A dusty job planing down the joining blocks

Second-hand drive units off eBay

Compression straps on bass cabinet

Prototype to understand angles

The prototype

I decided to build a prototype to help me understand the angles and taper of the cabinets while testing that the drive units did actually sound decent before launching into a full-scale build. I used the original Utopia speaker dimensions and photos as a guide to the design, combined with a lot of guesswork. The rear taper and angles were a real challenge, as I couldn't find that information anywhere on the web.

I built a simple frame to support the baffles and give me an idea of the various angles to achieve the "Focus Time" idea of all drive units directed to the listener's ear. I used the laser on my skill saw to line up the angles against a point on the wall at ear height.

Internal bracing on mid-range cabinet

Glue and screw into battens

Initial testing

With the prototypes roughly screwed together I set up all the components and connected speaker cable to each drive unit using crocodile clips to some cheap amps I bought on eBay. I really didn't know what I was doing and it took me a long time to get any kind of coherent sound. By slowly adjusting the crossover frequencies and outputs to each component and the volumes on each amp, I managed to get a full bandwidth sound and proved that the drive units were all in good working order. This was a welcome result at the right time, as even building the prototypes had been a lot of heavy, dusty work and I was starting to question what I was doing.

I decided to build a prototype to help me understand the angles and taper of the cabinets while testing that the drive units did actually sound decent

Cabinet build

Before I started on the build proper I visited a well-known London hi-fi store to have a look at the Utopias. This was very helpful to get a feel for the overall size and the various curves of the cabinet. They are very impressive in scale and design.

I bought a belt sander, which is very good for shaping wood quickly, and found this was the best way to make the curved baffles and flared openings for the drivers, which was easier than expected. For the curved sidewall I used 6mm MDF bent around a baton and glued and screwed into place, as I don't trust glue alone to hold the pressure on the curved panel over time. For most of the construction I used the glue-and-screw method into batons to join panels together. I looked at jointing methods but the angled side walls makes it tricky to get a flush finish to both sides of the join. I then used flexible wood filler to complete any gaps in the cabinet to avoid leakage. ▸

Crimped lugs for connecting drivers


A lot of sanding to align all the sides

Pay off

The build process on the first speaker was slow with a lot of thought required on how to achieve the curves on the baffles and how to join the boxes together. Each box took around 12 hours or more of work to complete over about four months of late evenings.

I made all the baffles for both speakers in one go, doing all the cut-outs while the router was set up for that cut, and machined from a single piece of wood where possible so that the curved baffles were consistent. I then cut to length. This sped up the construction of the second speaker massively, which was done in about two weeks.

Building such large elaborate boxes for the tweeters did seem over the top but once the whole speaker was put together it made sense and the long hours were forgiven.


2K paint done with HVLP sprayer

Tricky angle

The joining blocks between each box were tricky to construct as they needed to be angled on both sides like a V somewhere near 20° and solid all the way around. When shaving down these blocks I ended up with a lot of waste material but it was the only way to get solid angled blocks. The angle of the boxes to the listener, or the "Focus Time", is fixed but can be adjusted using spacers if needed. The bolts and wing nuts give a way to break down the cabinets without too much trouble if needed for transport but took some thinking through, as the cabinets would be closed before painting so I had to put all the bolts in place first and hold them in place with nuts.

Finally I had the cabinets completed and sanded ready for painting. There was a lot of work to get a consistent shape and depth to the overlapped edges between the top panels and side panels. I did some simple testing with the woofer in place to ensure bass response was effective with no vibration from the cabinet.

The prototypes had been a lot of heavy, dusty work and I was starting to question what I was doing

First test run after completion

Painting

To simplify the painting job I opted for one colour all over on the boxes and a matt black finish to the plinths and tweeter units for contrast. I used a 2K auto paint, primer, base coat, and clear coat finish, all applied using a high-volume low-pressure (HVLP) spray system I had used previously for the house.

The 2K paint is nasty stuff and although I used proper breathing apparatus it was still a very toxic job and I'm lucky my shed is far away from other houses. Next time I would use a water-based primer and base coat and a 2K clear coat but I took what the local paint shop gave me.

I had a few runs in the clear coat but managed to sand these out with fine grit paper and I'm very pleased with the end result. I could have spent more time perfecting the finish by wet sanding and respraying the clear coat to get a mirror finish but I just couldn't justify the time. I had considered taking them to be professionally painted but I'm pleased I could do the whole thing myself and avoided having to transport the heavy units. ▸

Focal Utopia clone after four months' effort

Above: Digital active crossover allows for infinite customization of sound
Left: My audio man cave is now complete

Putting it all together

After joining all the boxes together and running internal speaker cable through holes from top to bottom, I used crimped terminal connectors to connect the drivers, which I found much easier than soldering.

I then crimped the internal speaker cable directly onto the external cable so that the cable is fixed to the speaker but easy enough to change as the rear panel of the bass unit is removable.

I used hex bolts on all the drive units, which gives a great finish. The large hex bolts on the baffle of the tweeter unit are for looks only to mimic the original. I added some absorption foam inside the units on the sides and rear to soak up reflections, and some internal bracing to support the woofer from underneath, as they are very heavy units.

I had considered taking them to be professionally painted but I'm pleased I could do the whole thing myself

First listening

I set up the digital crossover frequencies to the drive-unit spec sheet and the initial sound was good enough for an impromptu Friday night disco as word got out around the neighbourhood. The sound output is pretty massive and easily fills the garage with bass levels to rival those of a nightclub. The bass extension is pretty phenomenal and will easily rattle the windows and vibrate the ceiling but is easy to tame with the volume control on the amps.

Man cave conversion

Once I completed the speakers and cleaned up the huge amount of MDF dust I moved on to the garage and the man cave conversion itself. I lined all the internal walls with 18mm hardwood ply over 15mm sound-proof wallboard attached to a 3x2 timber frame with 70mm glass-fibre insulation infill.

On the ceiling I used 50mm foam insulation panels with a bonded 6mm ply finish, which was easy to fix to the purlins and lightweight.

On the external walls I used treated 2x2 timber in a vertical pattern attached to battens to get a modern, cabin-style look. This layered approach gives good sound damping and reasonable heat retention.

The sound proofing together with the fact that the garage is at least 15m away from any neighbouring houses means that virtually no bass can be heard, which is ideal for late-night listening and parties.

I'm proud of the speakers and very pleased with the end result. Visitors are quite literally blown away by the scale and sound of the speakers. The finish on the cabinets is nothing like that of the actual Utopias and puts into perspective the workmanship and man hours that go into building a high-end speaker like that. But still, it gives me a little taste of the Focal Utopia experience — a poor man's Utopia. I'm good with that.

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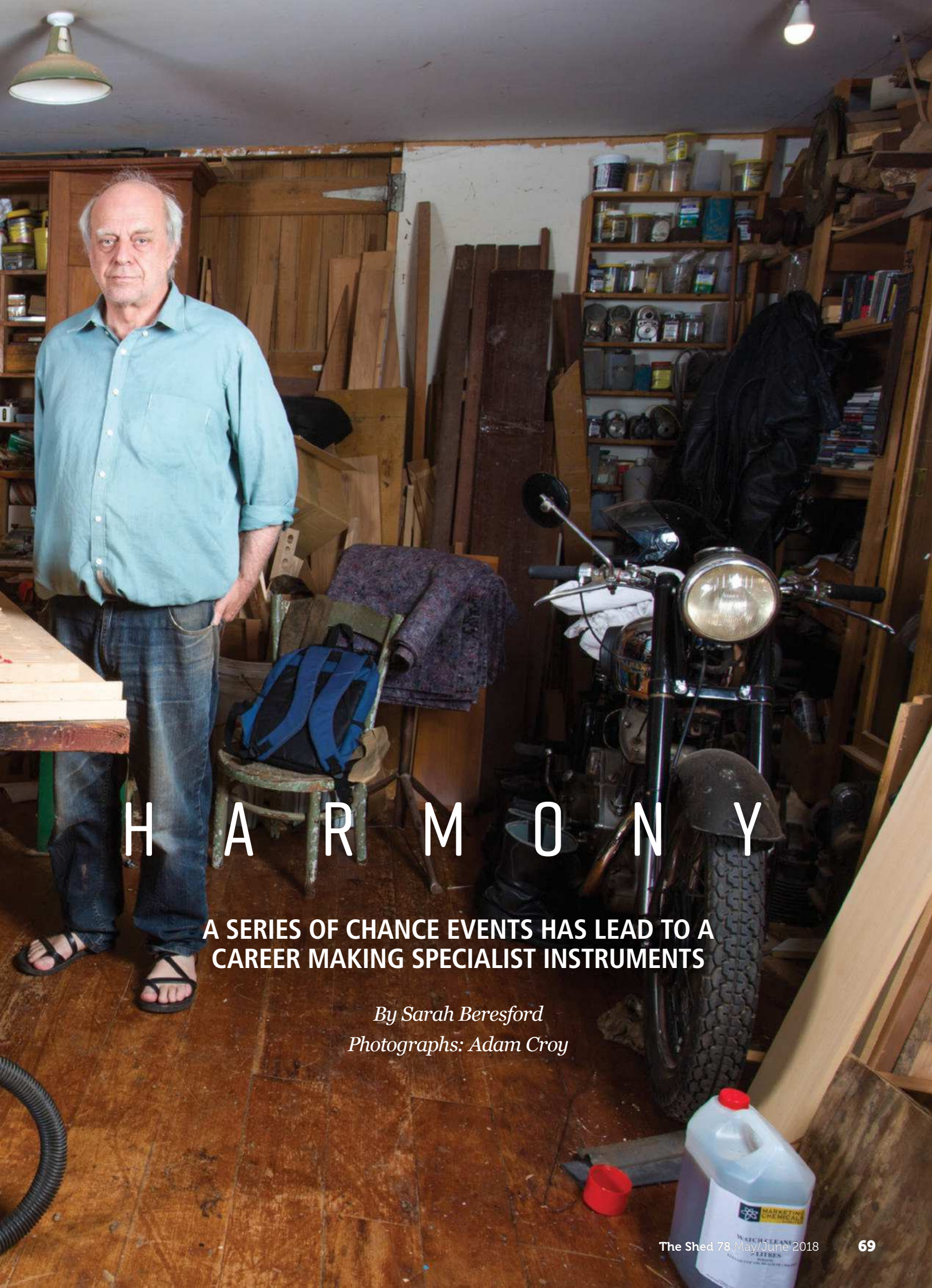
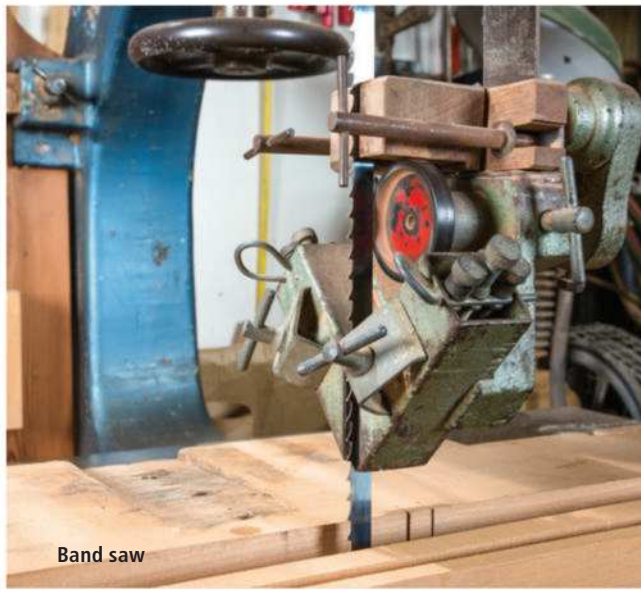


H A R M O N Y

A SERIES OF CHANCE EVENTS HAS LEAD TO A CAREER MAKING SPECIALIST INSTRUMENTS

By Sarah Beresford
Photographs: Adam Croy

Paul's well-used drill press



Band saw

Paul has a large selection of hand planes for all the hand work he does

There is such a thing as serendipity. When Paul Downie was 11 years old a chance meeting at his grandmother's house was to eventually set him on a course that would define his career.

"I was learning the piano at the time and her friend had a harpsichord that he invited me over to see. I thought it was marvellous," he recalls. "He told me I should build one, and although it sounded like a ridiculous idea, it never went away."

When he was 22, Paul embarked on the project, researching how to build a harpsichord, scouring junk shops for old tools, sawing bits of wood, and gluing them up until he had constructed the instrument.

"I enjoyed the whole process so much that when I was 23 I decided to build another one. I discovered that overseas museums had very detailed technical drawings of old instruments which you could buy — when they are restored everything about the instrument and the mechanisms is recorded.

"I went on to build two more harpsichords. The first one did work but it wasn't up to the same standard so I ended up pulling it apart and my sister burnt it as firewood," he says laughing. "The others have survived and are owned by very good musicians."

Pre-industrial techniques

Then in another serendipitous moment he was contacted by a German woman who was holidaying in New Zealand. Her husband built instruments using pre-industrial techniques and she asked if she could visit.

"She said I should go and stay with them in Germany and we became fine friends. We went to museums to see instruments, visited harpsichord builders, I made contacts with suppliers of materials, and helped her husband in his workshop. I made some very interesting connections in the six months I was there."

He even met Martin Skowroneck, a German harpsichord builder who is credited with being one of the modern pioneers of building harpsichords using historical principles.

"In the early 19th century they stopped building harpsichords using a wooden frame and construction was heavily influenced by the piano and used iron frames. After World War II there was a movement that recognized the antique instruments had a much lighter

Above: Paul at work refurbishing the keyboard on a harpsichord he made

Below: Paul's Myford lathe — king of the workshop

action and different sound so they started researching the old methods and building instruments using traditional materials and techniques."

Customers are worldwide

Paul came back to New Zealand armed with drawings of an early harpsichord he had seen in Hamburg Museum. "Once I'd built it I took it to Germany for a big instrument exhibition. It cost a lot of money to air freight it but luckily a woman bought it, which was just as well as I had nearly run out of money by that stage," he says laughing. "She still owns it and uses it for teaching at the University of Hamburg and is familiar with the original."

Paul's passion has since morphed into a demanding career — he has built 30 harpsichords and three fortepianos over the years with overseas commissions from music lovers in London, Tenerife, and the Canary Islands, among other places. He also restores and refurbishes instruments, and tunes them.

He has just completed a commission by Auckland University's Music Department for a fortepiano.

"It's been one of my pet projects recently and I'm very pleased with it. It has a wooden frame — I'm not interested in iron-frame instruments. I use pre-Industrial Revolution techniques. It's a very bright, responsive instrument with a light key action that allows you to play incredibly fast. A lot of pieces by composers like Mozart and Haydn are hard to play on modern instruments because they have a much slower action. They were written for the instruments of their time." ▸

The lathes are also used for Paul's motorbike restoration projects


A lot of machinery is squeezed into Paul's small workshop

"Paul goes to great lengths to use authentic materials rather than the modern equivalent"

Workshop

Paul lives above his workshop in an inner-city suburb of Auckland. The workshop has a lot of specialist tools that Paul has made himself over the years and also a huge array of things such as clamps, drawers full of chisels, and lots of different planes.

"When I first started making the harpsichords I had never seen the original tools that were used so I designed and made my own for particular jobs. It was problem solving and not based on anything else. Now I've seen what was originally used and some are quite cumbersome — I still use a lot of the tools I made years ago to this day."

Kings of the workshop are his Myford and Colchester lathes. "They're very useful pieces of equipment and great for all sorts of specialist stuff. I also use them for restoring motorbikes and making parts for old bikes," he says laughing.

"A lot of my machinery is quite basic.

The bandsaw is the mainstay of the workshop. It can saw wood into any dimension and it's also very economical on wood. I use the buzzer for flattening off wood and I've got a thicknesser, saw bench, and drill press. And of course the two engineering lathes."

Hand finishing

However, most of the wood components, finishing and fine fitting are done by hand.

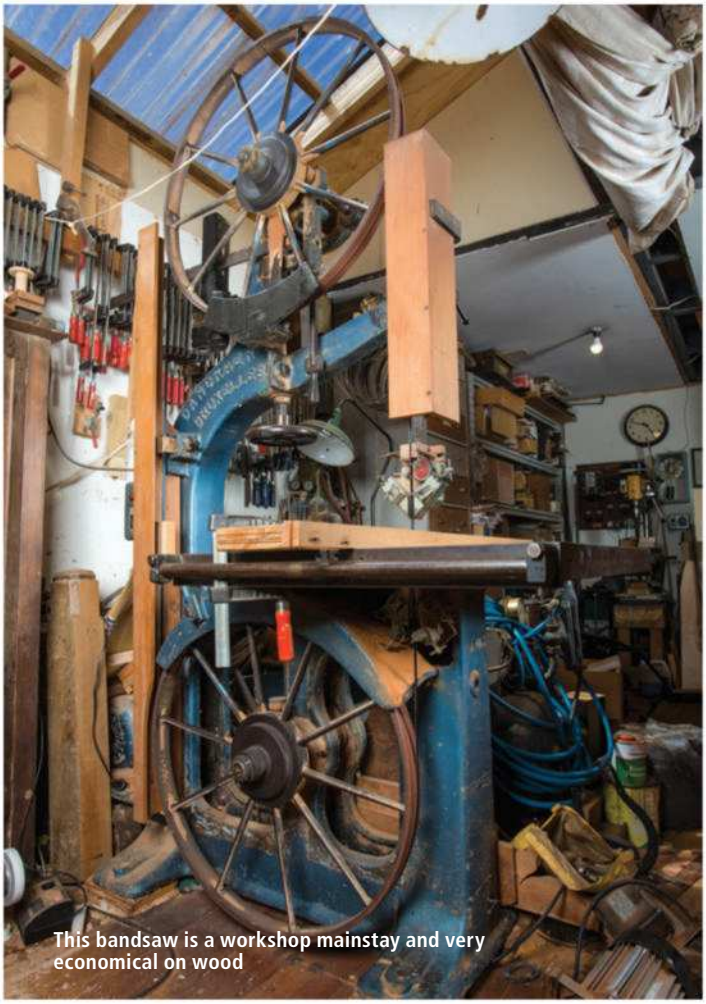
"Just to make the jacks that pluck the strings on the harpsichord involves a lot of very fine work, but I've got practised at it now. You need 180 of them and it takes me about six minutes to turn out each one."

As well as the very fine woodwork required to make each instrument, a lot of the materials used are very specialized,

A selection of Paul's chisels

The plans Paul used to build

The skill in these harpsicord builds is so apparent



This bandsaw is a workshop mainstay and very economical on wood

Special harpsichord

When The Shed visited Paul's workshop he was refurbishing a harpsichord. He had made the instrument in 1988 and it took him nine months to build.
"The case is kauri, the white keys are bone, and the brown keys are thuja, which is highly decorative and smells so good when you cut it. It's a copy of a famous German instrument in Hamburg."

and Paul goes to great lengths to use authentic materials rather than the modern equivalent where possible.

"The jack on a harpsichord holds a plectrum that plucks the string. This was traditionally made from raven's quill. I've salvaged gannet feathers from Muriwai to make mine. The spring on the jack was made from hog's bristle. I got a huge bundle from a paint brush manufacturer years ago, and 30 years later I'm still working my way through the supply. I can get three to four springs from each bristle. You could use monofilament but it is very sluggish compared to hair, which is slick and returns very quickly."

The networks for sourcing materials that Paul has built up over the years are especially valuable.

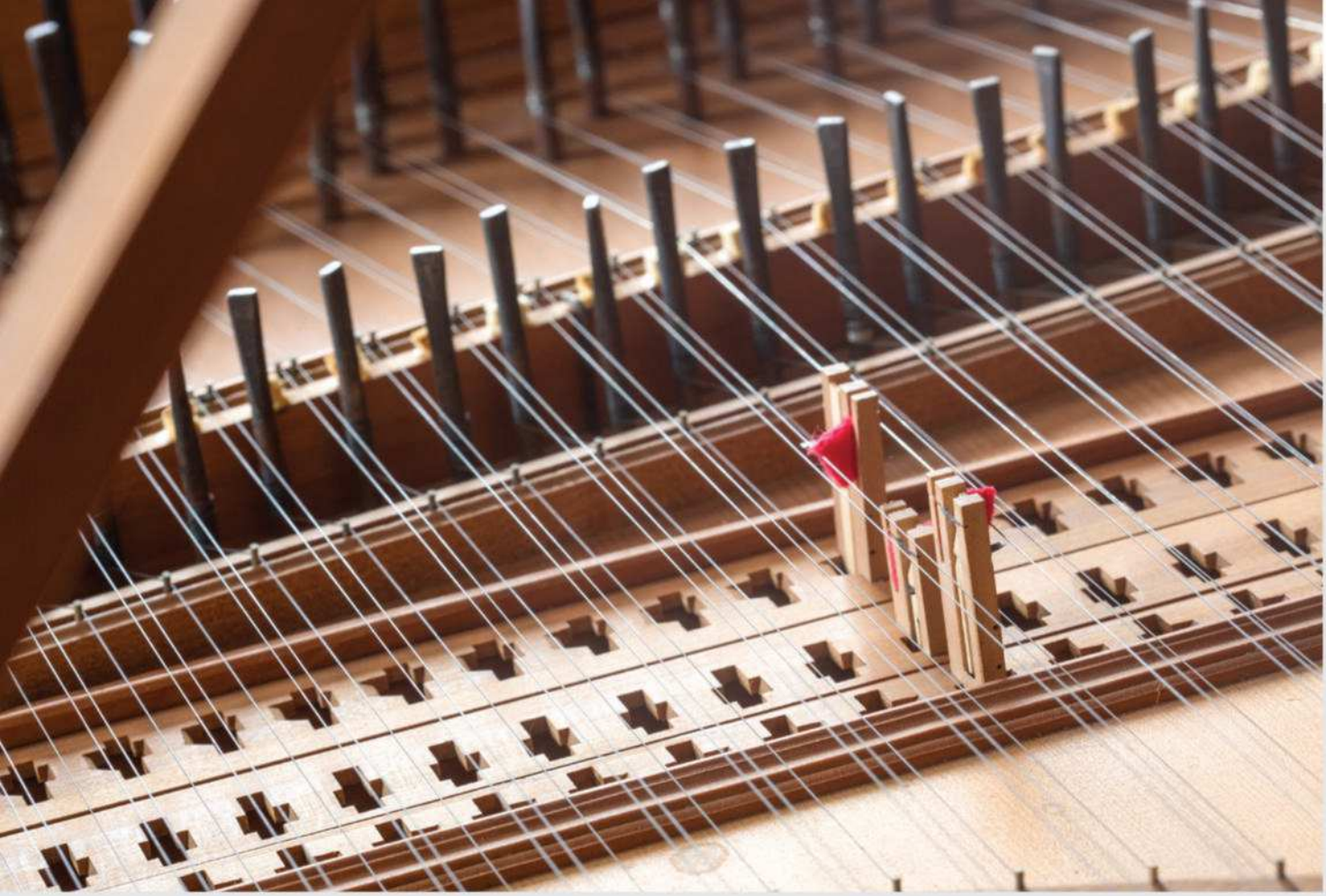
> *"I use the pear wood to make the jacks. It's very tough so you can punch through an extremely small hole without it bursting"*

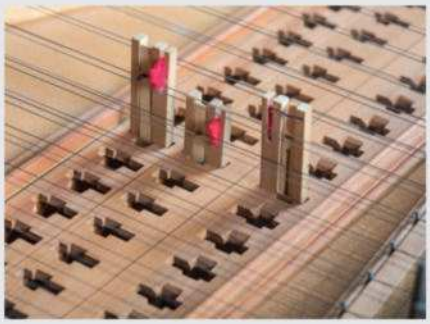
Original formula

"I get the wire strings from England. They are manufactured by a specialist who analysed the strings used in the original instruments and makes them to the same formula. It makes quite a difference to the sound — a lot of the instruments were built using technology from the late 1400s, which was actually very sophisticated."

Paul is always on the lookout for different kinds of wood that have particular qualities needed for different parts of the instruments. He imports the wood for the sound boards from a specialist manufacturer in southern Germany but a lot of what he uses has been accumulated from being at the right place at the right time.

"I got some holly from a tree that had been cut down in Mt Eden. They were huge logs and I'm only using very small amounts at a time. I use it to make the tongue on the jacks. I also got some pear wood from an old orchard in St Heliers that had been planted by Bishop Selwyn. It fell over and I got the wood. It's been





air drying for 30 years so it's very stable. I use the pear wood to make the jacks. It's very tough so you can punch through an extremely small hole without it bursting."

Animal glues

He uses linseed oil and shellac to polish the wood and mostly gelatin-based animal glues. "There are some parts where you want a permanent bond so you could use epoxy but for the most part you want glues that are reversible so you can take the instruments apart to do repairs. Animal glues are nice to work with because there's no solvents."

Paul says one thing he does have a lot of use for in the workshop is drop sheets. "You have to be very careful when you're working to protect the instruments, especially when you're doing metal and woodwork in the same space. You need to be extremely disciplined to keep surfaces clean and not do something like pick up a piece of wood with oily hands. It sounds silly but it's incredibly easy to do."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kitchen dilemma sorted

A "GRR" MOMENT TURNS INTO A SHEDDIE'S OPPORTUNITY

By Hugh McCarroll

Photographs: Hugh McCarroll

Right: the original layout. Microwave and oven, pull-out pantry, freezer, space where fridge used to be, and cupboards above

We had a designer kitchen installed in 2007. I was impressed by the whole operation — a designer visited, discussed our requirements, and measured up. Then we got the plans and after some further discussion and amendment these were signed off and a substantial deposit paid. The installation was quick and efficient — a young chap who knew what he was doing, a screwdriver, and a pile of flat-pack modules. I thought at the time that a handyperson could just about do the installation themselves.

The void space above was to accommodate a structural cantilever beam

The fridge packed up, so...

Our kitchen is a galley layout, and the design included matching refrigerator and freezer units side by side, along with the oven and microwave in a wall of storage cupboards. The layout worked well but the refrigerator started playing up after a few years, and eventually we were obliged to replace it. Problem number one was that the particular model refrigerator is no longer manufactured, and in fact, there is nothing on the market that size. We had

Finished! The new fridge in place and working well

Damp spot being dried out

"The refrigerator had been leaking and the particle board floor underneath was damp"

The two cabinets removed

to replace both refrigerator and freezer. Grr! The freezer is still working well, and fortunately there is space in the laundry for it.

We looked around and found a very nice refrigerator/freezer unit with French doors, so opening them in the confined space of the kitchen is easier than with full-width doors or drawers. The new fridge is 1000mmx2100mmx700mm.

What to do?

When the kitchen was installed there was a void space over the 2100mm high modules to the ceiling above. There is a structural beam which restricts the height in one place, but mostly it is wasted space. It was faced with MDF panels that matched the rest of the joinery, edging and all.

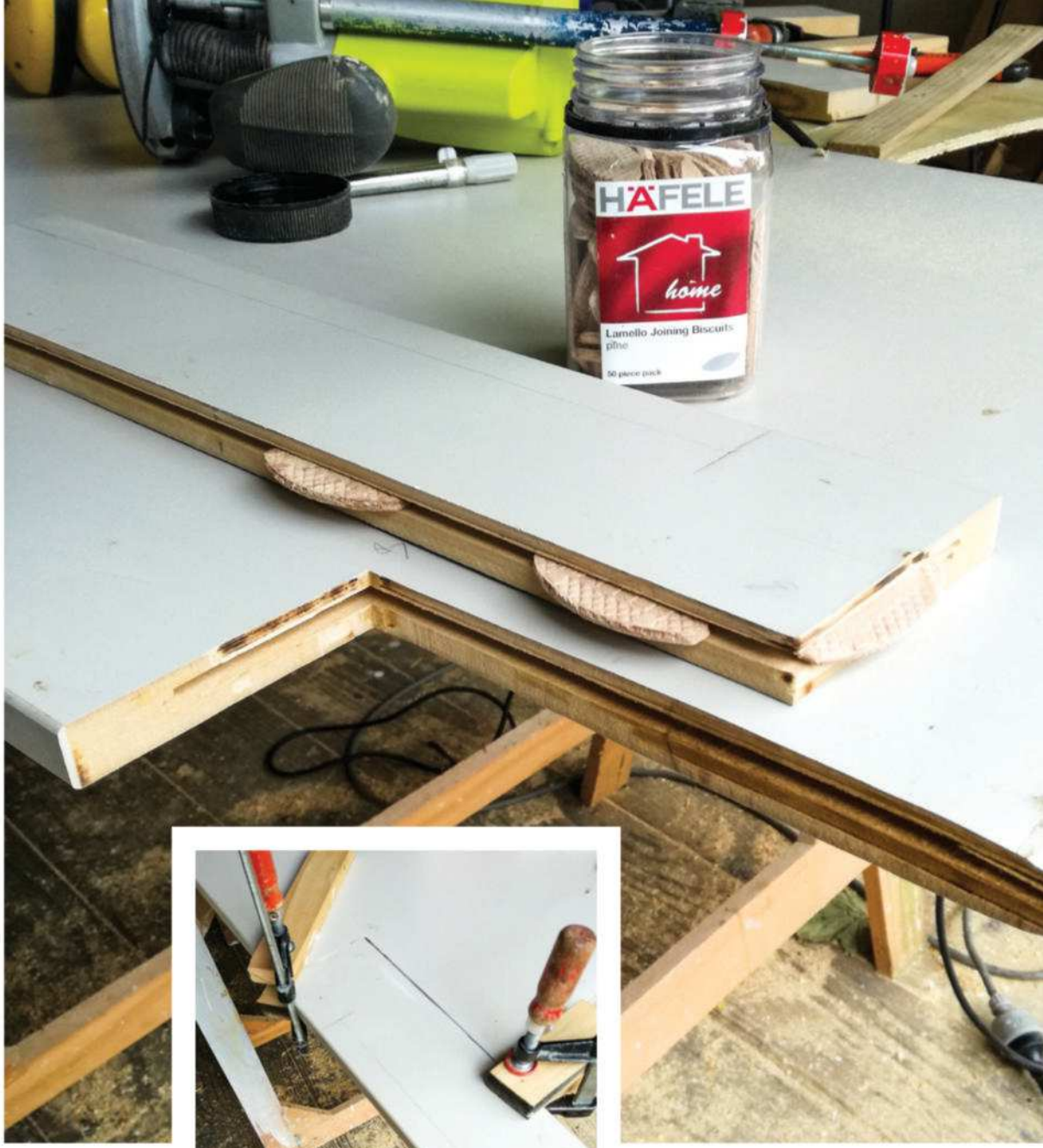
The refrigerator and freezer are side by side in two 600mm wide spaces separated by a full-height, laminated MDF panel. Above the refrigerator and freezer are two cupboard units 600mmx450mmx300mm in which we kept cookbooks (my wife, Rosaleen, likes cookbooks).

How to fit a 1000mmx1850mm refrigerator/freezer unit into a space 1200mmx1600mm? It will stick out more than the old fridge but that is not a problem. Width is also not a problem, but the cabinets above would need to be made shorter.

Then came the "Aha!" moment that makes DIY so rewarding. Why not slide the cupboards up into the void space? They are still accessible, and they free up enough space for the new refrigerator. Marvellous! And better still — a 200mmx1900mm space beside the new fridge enclosure is now available for use. It would make a good bookcase.

Easy as ...

So that was the project. Removing the two small cupboards was as simple as locating and unscrewing four screws on each side of each cabinet that secured them

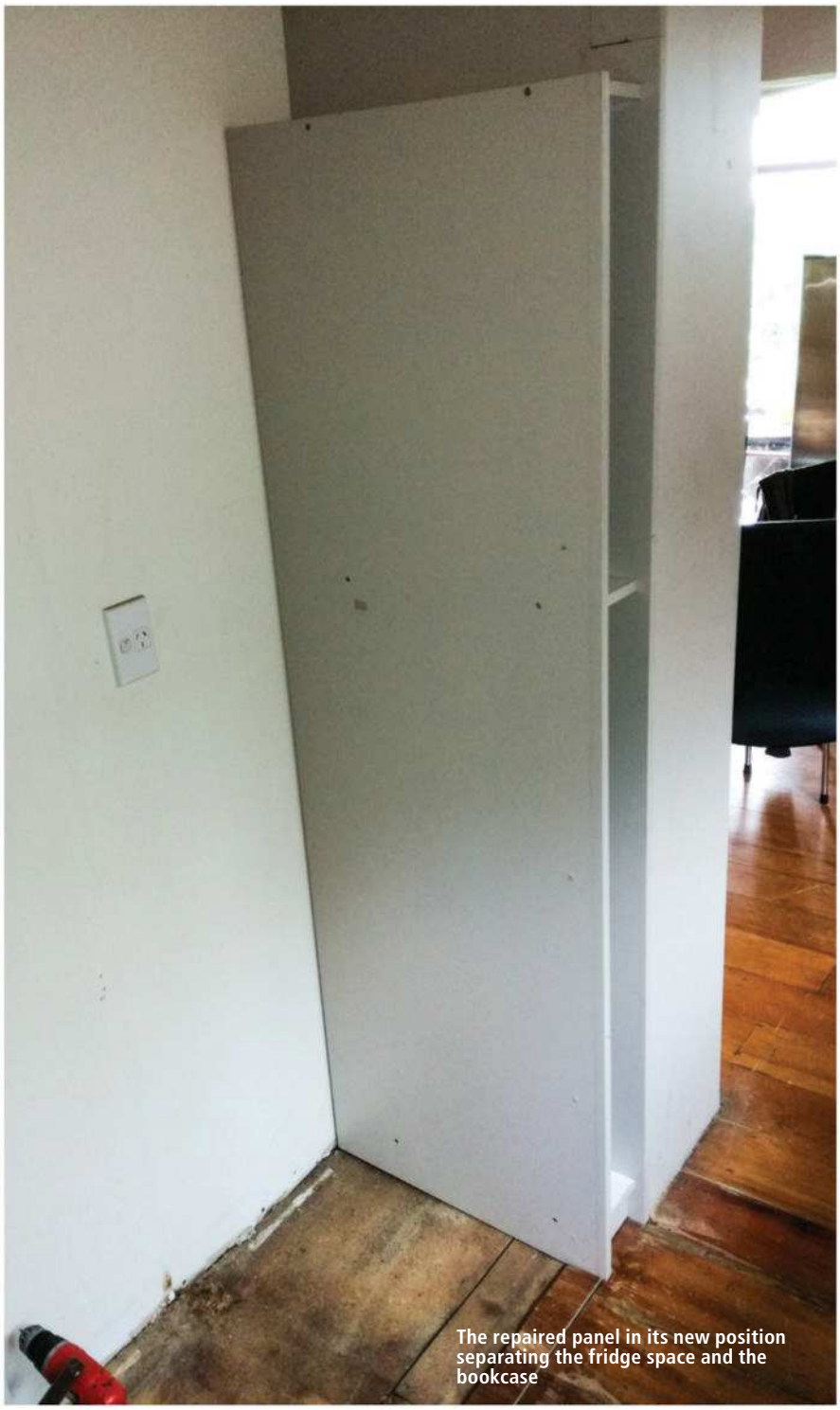


Above and right: repairing the water damaged panel using material that previously covered the void space. The edges were routed and the patch secured with biscuits and glue

Below left: drilling holes for shelf support pins in the new bookcase space.
Below right: sometimes you overdrill the dowel holes and have to retrieve the dowel before you glue them.

to the adjacent MDF panels, and sliding them out. That left the central MDF panel, which separated the refrigerator and freezer. Getting this out required removal of the floor panels on which the refrigerator and freezer sat.

The kitchen floor is a 12mm thick laminated composite material called Hydrawood glued to the particle board floor underneath. However, under the refrigerator and freezer the Hydrawood was replaced by 12mm thick plywood panels. These revealed problem number two. The refrigerator had been leaking and the particle board floor underneath was damp. It was marine-grade ply, and there was a lot of silicone sealant round the edges, but the water had still found a way. More grr! ▸



The repaired panel in its new position separating the fridge space and the bookcase

Making the cabinets deeper. The 40mm wide strips are dowelled, glued, and screwed in position. The slot to locate the rear panel has been moved 40mm back, and the original slot filled

I contemplated having to replace a section of the flooring, but closer inspection showed the damp patch was small and quite localized. So I set the dehumidifier going in the space and left it running for a week. The floor dried out pretty quickly but I left the dehumidifier going for another couple of weeks, just to be sure.

More storage space

With the cookbooks allowed for in the new narrow bookcase beside the new refrigerator, I proposed to use the high cupboards to store our slow cooker and electric fry pan, for which we had no space in the kitchen before. Problem number three — the cupboards are not deep enough. They are made shallow to provide air circulation space above the refrigerator and freezer, and that made them about 20mm too narrow to fit the fry pan and the slow cooker.

The cabinets consist of top, bottom, two sides, and a back; all 18mm white laminated MDF panels joined by dowels and screws. The back panel is held in place in a slot routed into the other panels.

I made the two cabinets deeper by adding a 40mm wide strip of MDF to the back. I had a half sheet of 21mm thick white melamine in the garage, so I cut four lengths 40mmx1220mm long using my hand-held circular saw, and then cut them to 18mm thick using my bench saw. Then I routed a slot along each 40mm wide strip to replicate the slot in the original panels.

Above: reinstalling the first of the cabinets
Below and right: both cabinets back in their new locations

"I could have made new cabinets, but I didn't think that was justified. I'm the only one who will notice"

Keeping the look consistent

These strips were then cut to length to match the top, bottom, and sides of the cabinets, and dowelled, screwed, and glued in place. The cabinets end up with a slot and a join visible near the rear of each cabinet, so I filled the slots with Polyfilla and sanded them smooth. The slots are at the back of what are now high cupboards, so they are not really visible. I could have made new cabinets, but I didn't think that was justified. I'm the only one who will notice.

The gap between the two cupboards was filled using off-cuts from the MDF panels that previously covered the void space above the modules. These were the matching colour and had the same edging, so the appearance of the kitchen is unchanged.

The water leakage had damaged the bottom of the full-height MDF panel separating the refrigerator and freezer, but I was able to cut the damaged end out, and reuse the panel as the edge

Cabinet doors back on ...

... and adjusted all square and true

Folding the stainless steel base on my workbench. I used a folder to do the two ends, clamped the base to the workbench, and the peened the front edge down over a length of angle iron and used the same technique to fold up the rear edge

Finished base in place — I sealed the back corners and the slot along the front with Sikaflex 291

"I did worry about the floor, and vowed never to trust silicone again"

of the new refrigerator enclosure, separating it from the bookcase.

Future proofing

The only additional timber I needed for this job was the melamine strips to make the two top cabinets deeper.

I did worry about the floor, and vowed never to trust silicone again. I elected to make a stainless-steel tray for the floor for the refrigerator to sit on. When I (or someone else) has to remove it in 10 or 20 years, the floor should still be in sound condition.

To make the tray, I purchased a 1200mmx700mm off-cut of 0.55mm stainless sheet, and cut and folded it to fit neatly in the opening, held in place by four screws. The front edge of the tray where it meets the kitchen floor is folded down and sits in a milled slot that is filled with Sikaflex 291 marine sealant, which I am assured is the best available. It sits on a new plywood base.

Now the refrigerator is in place and the new layout is working really well — in fact, even better than the old one.

This is a particular solution to a specific problem, but the modular nature of kitchen cabinetry means that with a bit of inspiration, a perceived problem can be just a sheddie's opportunity in disguise.

GETTING THE JOB DONE

MORE TOOLS, TECHNIQUES AND TIPS FOR SUCCESSFUL DE-SOLDERING

By Mark Beckett

Photographs: Mark Beckett

We touched on some simple desoldering methods last issue. Just like other workshop tools, there is more than one way to achieve the desired outcome; some with less damage and frustration than others.

Desoldering involves removing the solder from the joint to either release the component, or repair the solder joint. The aim is to do this with minimal damage to either part, but since you can generally replace the component, protecting the PCB (Printed Circuit Board) is paramount.

SMT (Surface Mount Technology) is a whole other subject, and because of the design and density of the components, different tools are required.

Desolder or rework stations consist of a box controlling a heated tip and a vacuum pump. There are many manufacturers but I'm only going to discuss some of the ones I've had experience with.

While the control box may have shrunk, there is a limit to reducing the handset. The handset consists of a tube to collect the solder and filters to absorb the flux residue. The tips are hollow and reach right through into the collection tube.

I prefer the pistol-type handset rather than the fat tube-style that Pace commonly use. I find it allows you to reach into tighter spots and is more ergonomic.

While personal preference plays a part, the type of PCBs that you will be fixing has an influence. They aren't getting bigger, and tall components can get in the way.

There are several different types and styles available, along with prices. Our Asian friends have their own version, and sometimes it's hard to know whether to stick with a reputable brand (and pay for the name) or buy the cheaper version along with some spares.

Whichever path you choose, buy consumables at the time. Murphy will ensure you need them on the day when it is '… just a two-minute job.'

Self-contained

Many years ago I had a Denon desoldering gun. They are a brilliant device.

"I prefer the pistol-type handset rather than the fat tube-style that Pace commonly use"

They are easy to use, have good suction, fit into your toolbag, and the motor (that provides the suction) is in the handle so there is some vibration transferred to the joint you are trying to desolder.

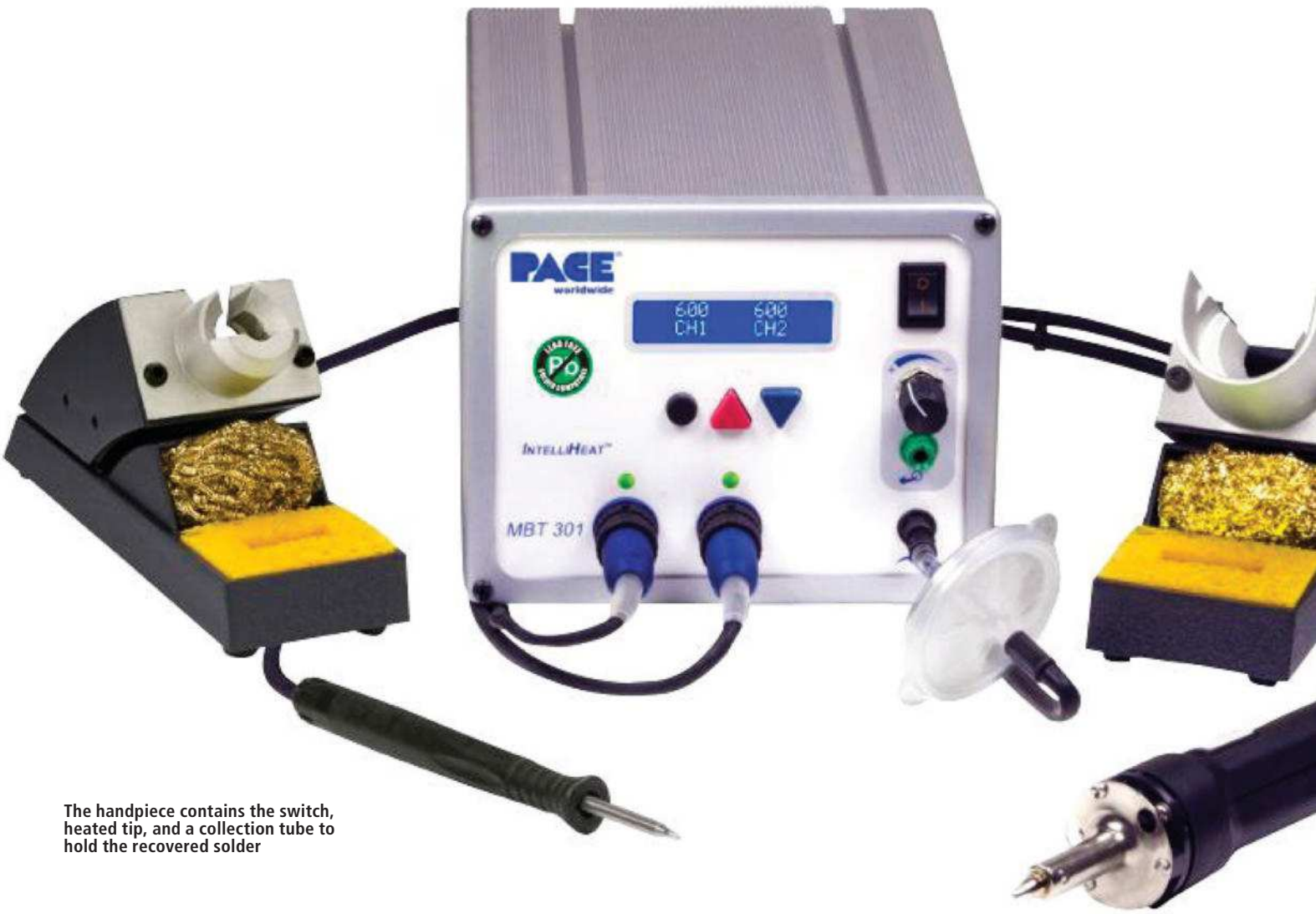
We had issues with the tips (which weren't cheap) and it may have been linked to our techniques, rather than the tips themselves.

The other issue we experienced was the control board had a tendency to burn out a resistor.

Sadly mine killed the resistor and I no longer have any good boards to compare the value to.

Pricing a replacement board from the company some years ago brought more than tears to my eyes, and I haven't found a schematic.

There are some alternative-looking devices, at more realistic prices, and if they perform as well as the Denon did, then they would be high on my list of choices. ▸



The handpiece contains the switch, heated tip, and a collection tube to hold the recovered solder

Pace

I have nothing against Pace as a company, but I do have trouble with the desoldering stations we have at work. We have both the earlier versions and the newer models.

While the control side has changed, the basic principle and 'hot' end hasn't really changed much.

The large part contains the power supply, temperature control, and vacuum (or blow) pump, and this model has a controllable soldering iron.

The tube (3) holds a bent piece of aluminium (4) to collect the solder and a filter (5) at the end to trap solder particles and most of the flux.

A secondary filter (17) was fitted at the end of the vacuum tube to ensure no particles went through the pump.

Earlier collection tubes were glass, with a rubber end that fitted around the end of the tip.

> *"Whatever the reason, I've never had much luck de-soldering at work using these"*

The collected solder was visible, and the rubber end made a good seal to ensure all the vacuum went via the tip.

For some reason the glass tube got replaced by a cardboard tube on our units.

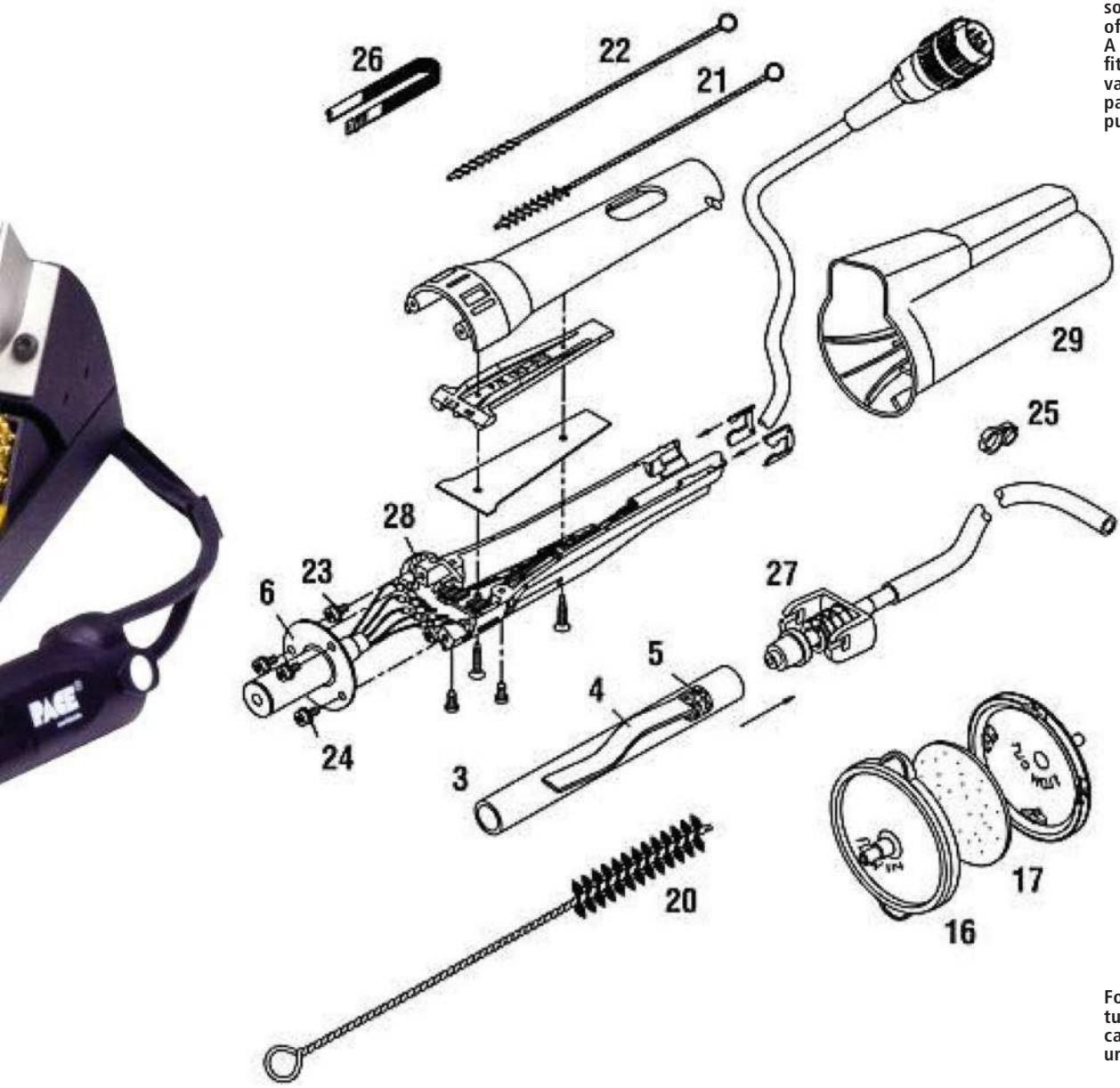
They are cheaper, and you only broke the tube by rough handling or way too much solder causing localized overheating.

However there are Health and Safety issues in the workplace and it could be these considerations that has resulted in our work using these instead.

They are more difficult to clean out since you can't stick something in the other end to push out the bent aluminium 'catcher'. Perhaps they aren't designed to be cleaned out (more consumables to buy).

What this picture is not showing is the end is rounded and pushed back on itself. This forms a surface that seals against the tip. The glass tube seemed to seal better around the end of the tip, which is why I find the suction is not great on ours. As I said, the Pace units aren't mine, so it's very likely that there are some tweaks to make, or the end seal needs to be changed.

Both earlier and later models use a similar handpiece, and you hold it like a very large pencil. Whatever the reason, I've never had much luck desoldering at work using these. The results have been frustrating, plus it seems to take a lot longer due to the double and triple desoldering.



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For some reason the glass tube got replaced by a cardboard tube on our units

Duratool

I was lucky enough to go to England in August 2015 and meet some of the other members of the element14 community (www.element14.com/community), along with a tour of the Leeds Distribution Centre.

While I was there, the Duratool came on sale and consequently was added to my baggage. Along with the station we decided a spare handpiece, tips, and filters would be useful.

The main box contains a power supply and control logic, along with the vacuum pump. Unlike the Pace, the output of the pump is not provided on the front panel, so you only have suction.

The collection tube is similar to the Denon and Pace, and it fits between the tip and the suction line, but there are two minor issues:

1. The instructions are sparse and there is no reference to the loose, rubber-like washer. This fits around the end of the tip and provides the sealing surface for the tube assembly. Without it, the suction leaks around the end of the tube.

2. The spring tries to push the disc and filter out the suction end whenever you open it.

I think that a bent piece of aluminium to collect the solder on and a larger disc that holds the filter and increases the exposed filtering area would help.

These are easily fixed and should not stop you adding this to the list of choices.

Techniques

All desoldering stations will block if not used correctly and, while you can clean them out with the included rod, the better technique is to keep the trigger on for a second or two after lifting the tip from the joint.

This will remove the flux and residue at the very end where it meets the collection tube. It is also worth cleaning the tip using the tip cleaner before turning it off, as Mr Murphy is likely to visit when you turn it on and find it is

I bought one of these Durotool desoldering stations as soon as it came on the market

blocked just as you want to use it for that quick fix.

For plate-through holes, you should apply movement to the component as you're sucking. It will release the solder trapped between the component lead and the hole.

As discussed, we want to avoid damaging the PCB, so it may be worth sacrificing the $1 component by cutting off the legs and then removing each leg separately.

This works well for ICs, and is a must for header pins or other sockets.

There is a good tutorial at www.sparkfun.com/tutorials/97, but I'd use side cutters to nip each leg, rather than risk cutting the board.

For headers or sockets you need to be careful not to damage the plate through part of the hole.

Generally the hole is snug, so it's important to separate the pins. See www.sparkfun.com/tutorials/339.

Step 1: Cut the pins.

Step 2: Heat and remove each pin.

The photo shows right-angle cutters, but straight cutters can be used to cut the plastic separator and then remove it to expose the pins.

Stubborn joints

I've struck solder joints that will not desolder. Despite the correct technique, the solder seems to stick to both the part and the board.

Lead-free solder is particularly sticky when it comes to desoldering, so remove as much as you can and then re-solder the joint adding new solder (and flux). You should then be able to fully desolder it.

Sometimes a little sideways pressure can break the small bridge of solder that is resisting the component from exiting the board.

Many boards have the power and ground as internal layers, or the ground end of the component is on a very large earth plane. Sometimes fitting the board into a holder and applying heat to one side, and a solder pump to the other side; or a soldering iron to one side, and desolder station to the other side, will get the job done.

> *"All desoldering stations will block if not used correctly"*

Whatever you do, avoid excess heat to small pads, or you'll lift them from the substrate, and then have problems putting the replacement component back in.

Hopefully this article has provided some useful tricks and tips to tackle the next through hole soldering job.

A very old 1905/08 Ruston stationary motor. These ran on oil or kerosene and were used in the early days to power saw mills and farm equipment

PRESERVING THE PAST - BY THE TONNE

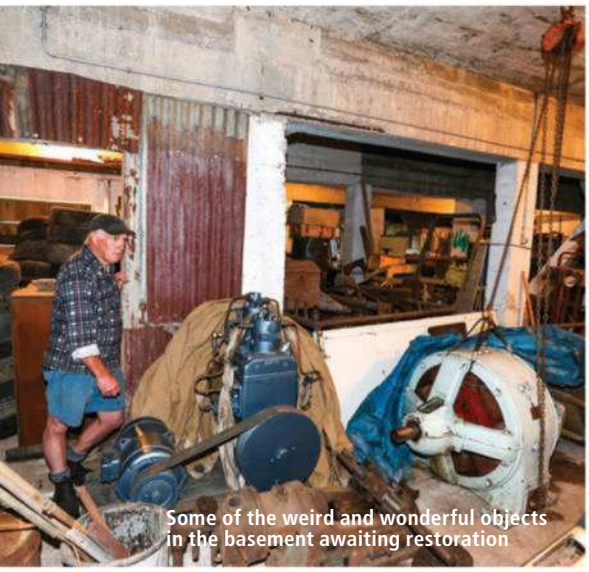
A PASSIONATE COLLECTOR HAS ACCUMULATED SO MUCH STUFF HE NOW HAS HIS OWN MUSEUM

By Ray Cleaver

Photographs by Rob Tucker

A whitetail deer head mounted on the side of an old stove

A well-known advertising display from the 60s



Some of the weird and wonderful objects in the basement awaiting restoration

"It was built in 1910 in the Doric style and it's believed to be the first building outside of Europe to be constructed with a suspended floor — it's on concrete stilts"

Fuel bowser handles, the big one, from Ohakea air base, is for refuelling aircraft

What do you do when your passion for collecting means you are accumulating objects that can be measured by the tonne?

One answer is to buy a big building and open it up to the public — Mike's Museum in Eltham displays the extraordinary results of Mike Coil's collection mania.

Two upper stories and a huge basement of an historic building in the small Taranaki town are bulging with the strangest things. A big collection of antique chainsaws, World War II objects, including an anti-aircraft searchlight and US submarine generator engine, steam boilers of all sizes; you name it, Mike's collected it.

There's also a great collection of historic tools and objects from New Zealand's past.

Starting young

Mike began collecting when he was a young fella. From a family of 12, he was raised on Taranaki farms and recalls, when aged eight, his father coming home from a stint at sea with a handful of coins.

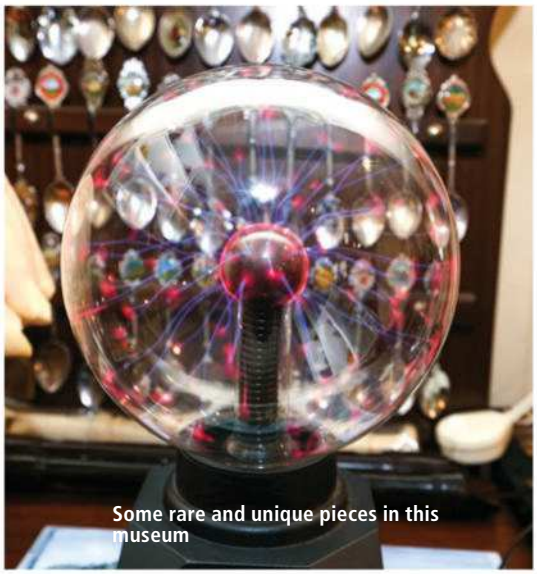
"Yep, the old man got me started on this path. He gave all us 12 kids each some foreign coins and said when he came back the one who'd collected the most will get more.

"I didn't stop. I started collecting coins, then stamps, then left high school aged 14 to work on a farm. I was paid 12 pounds a week and given two sows."

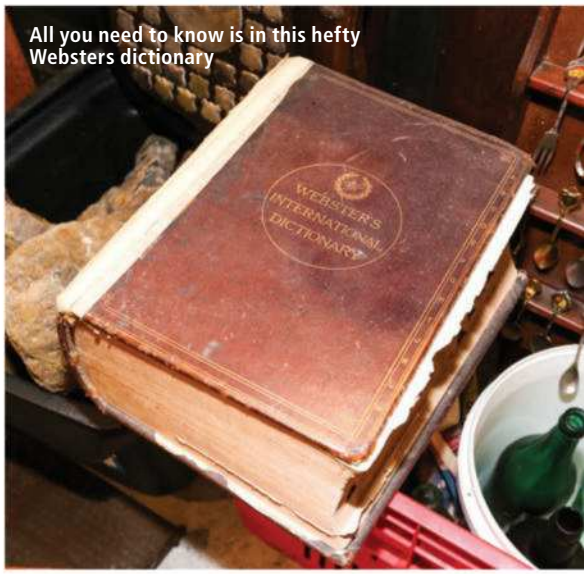
When Mike was 17 he expanded into bottle collecting and then got into WWII military vehicles, including a Dodge 4 x 4 and a Chevy Puddle Jumper.

He purchased a milk bar in New Plymouth, which his father ran, then he crossed the ditch to Australia where he ran a number of abattoirs, and owned and operated an interstate truck and trailer.

Even the building itself is collectable



Some rare and unique pieces in this museum



All you need to know is in this hefty Websters dictionary

When he returned to Taranaki he was loaded up with a big WWII anti-aircraft carbon arc searchlight, 12 crates of antique bottles, and a 1700s flintlock pistol.

That's when the collecting and restoring of old things really took off.

Mike's Museum

Mike needed space. He purchased a big building in Eltham, and 14 years ago began filling it, setting up what's become Mike's Museum.

The two-storied building, with a massive basement, had a history. It was built in 1910 in the Doric style and it's believed to be the first building outside of Europe to be constructed with a suspended floor. It's on stilts — huge legs made of solid concrete.

Every bit of free space in the building is now full of things either on show or waiting to be restored. Mike spent some time in the on- and off-shore Taranaki oil and gas industry, operating boilers. As a result, his collection has many steam boilers, from tiny working models to big boilers designed to run steam equipment in workshops.

His workbench in one of the big rooms is in danger of disappearing under the mass of 'collectibles'. He only just has room to get to his grinder to clean things up.

"I've had many sheds over the years. The trouble is I fill them up fairly quickly."

In 1993 he joined the Taranaki Vintage Machinery Club. "That's when things got really serious," he said.

Buying the best stuff

Mike goes to auctions, field days, swap meets and does scrap metal deals.

He picked up the WWII submarine engine at a farm auction.

"I love auctions but I have to back off a bit now. I'm running out of room! I call it preserving history, but you could say I'm a mad collector," he says with a grin.

Now aged 67 he's as passionate about his collecting as he ever was.

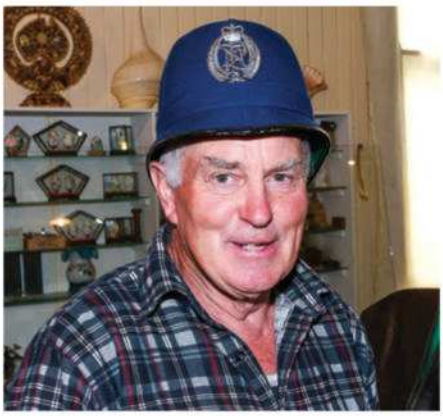
"I'll never get round to restoring all this stuff but I just can't stand seeing so much history end up in rubbish tips."

While most of the building has massive piles of old objects from yesteryear, all awaiting restoration, the displays in the downstairs museum are restored and fascinating.

He waved three petrol bowser pump handles at us. One was from a garage

Not a lot of room left in storage

A WW II carbon arc searchlight



"I also spotted a pith helmet and police baton which Mike explains was issued to special constables during the 1931 Depression riots"

A massive spanner made for bending beams that was found hooked under a rural Taranaki bridge. These were used as bridge spanners, for tightening the massive nuts and bolts holding these structures together

bowser, one from a farm, and one for refuelling aircraft that he got from the Ohakea Air Base.

Mike collects strange things. Outside the museum he has a funny-looking device on wheels that was used way back to wheel stoves into houses so the delivery man wouldn't need an assistant.

Also outside is a 1919 Fordson F farm tractor with metal cleats on the wheels.

On display inside is an old stainless steel operating table, complete with instrument trolley and birthing stirrups.

I also spotted a pith helmet and police baton, which Mike explains was issued to special constables during the 1931 Depression riots.

One of Mike's stranger finds — an ancient pig castrating device

Chainsaws of old

Mike's collection of about 250 chainsaws from long ago is impressive, and he has 30 of these on show in the museum.

"I knew a bulldozer driver at the New Plymouth dump. I told him I'd give him a dozen beer for each old chainsaw he found. "He ended up getting me 70 saws, some of them quite rare. I don't think he died of thirst."

One big two-man saw is powered by a Mercury twin-cylinder outboard boat motor. It was adapted by Diston to run a big saw. The motor could be detached from the saw and used back on the boat.

An unusual saw is the Blue Streak, made in Australia in the '50s with the chain oil tank in the pipe handle. Because the carburettor would only work in the upright position, when the saw was on its side the carb and tank would swivel to

Part of Mike's collection of old chainsaws

A section of the displays in the museum

A piece of original macadam from Eltham streets — the first road in New Zealand to have tar-sealed roads back in the early 1900s

Mike at his workbench — not much room to work

remain horizontal; very innovative. This saw motor also detached to run a post hole auger or a blasting auger. Mike said some of these saws had clutches, which made them ideal for powering early go-karts when their sawing days were over.

He showed us a 1940s bar with roller tips and, instead of the chain running inside a slot, the chain had the slot and it ran over the bar.

Some of these saws are huge. The big two-man saws were heavy to lift, let alone use for sawing. Mike has some bars and chains well over two metres long, from the days when men were men.

But wait, there's more

Old motorbikes, pushbikes, stationary engines, a giant wasp nest, a collection of fossils, bottles, tools, old swords, and china are scattered around. Not to mention several early police helmets.

There's even a piece of original roading macadam from an Eltham street, which was the first street in the country to be sealed by this new-fangled method.

His old car parts include parts from an early horseless carriage, and a Rex engine from a pre-1905 water-cooled motorbike. There's an early loom, an old forerunner of the Flymo mower, and one of the odder objects — an old electric stove he picked up in outback

Mike Coils and his museum

"I'm a bit lucky. My partner, Mary, is very supportive, she's a bit of a collector herself"

New South Wales with a white tailed deer head and antlers attached to the side.

There's a collection of wheelbarrow wheels, an ancient pig castrator, old ceramics, and a row of very old stationary motors.

He took us underneath the big building into a massive basement that was once a .22 shooting range, and then a boxing club and gym for Eltham youth.

Climbing under the building, another world opened up. A jet unit from an early Hamilton jet boat sits by old street lights that once lit up the streets of Melbourne, along with two 24-volt aircraft generators.

Mike said that working on a farm, he once used similar old generators as welders.

He has a big, heavy-duty air compressor off an oil rig, which compresses up to 5000psi, sitting near a 1900 Ruston stationary motor awaiting restoration.

A big power generator, which was once the standby generator for the New Plymouth power station, is surrounded by tractors, farm tools, vintage car parts, a small church organ, a big mangle, horse-drawn equipment, and old street lights. There must be a kitchen sink there somewhere.

"I'm a bit lucky. My partner, Mary, is very supportive. She's a bit of a collector herself, mainly collecting period furniture. She's added to the museum collection during the 24 years we've been together."

At present, Mike is into restoring old tractors. He's currently working on a rare 1950 Renault and a 1948 Fordson E27N half track.

Mike's Museum is open during local events, during the Taranaki Garden Festivals, and by arrangement.

To contact Mike, ring 027 724 3731.

DESIGNING *for the* REAL WORLD

BEWARE OF DOWNLOADING 3D PRINTING PROJECTS FROM THE INTERNET — IT MAY BE BETTER TO START FROM SCRATCH

By Enrico Miglano

Photographs by Enrico Miglino and Cristina Manfredini

Some weeks ago I recorded a very enjoyable chat with Lino Zangirolami. Lino is a 71-year-old Italian friend of mine, and one of the most versatile creators of things I have ever met. He has the ability to make any kind of mechanism and automated machine. Recently, we have been working together on some electronic projects.

We talked about many topics, such as his career, 3D printing, CAD design, CAM, and more.

As I continue this series of articles about 3D printing, I will include suggestions and comments from my conversation with Lino along the way.

Designing for 3D printing

3D-printing technology is a great opportunity for all: makers, students, children, hobbyists. But what should we print? After finishing the assembly of the DIY 3D printer in the previous three articles, we should test it, and then start using it.

As discussed before in this series, all the mentioned examples are available on the Shed Mag Git Hub *repository https://github.com/alicemirror/ShedMagazine*. You can find literally hundreds of thousands of STL (stereolithography) ready-to-use model files on the internet, downloadable for free. Any kind of box for the most popular electronic boards

The prototype parts of the project we will use as a an example in the next three issues of The Shed Magazine on 3D printing, dedicated to the CAD custom design of the 3D printing parts. As you can see, the 3D printed components are not very complex, but need to be designed correctly to support the bearings, the stepper motor and the micro switches

(Raspberry Pi, BeagleBone, Arduino, Micro:bit, and more), as well as puppets, buildings and monuments, mechanical components, gears, and great playable games, etc., are available.

I have used these resources many times and, based on my experience, I should warn the reader that not all the material available on the internet is good. After downloading and trying to print some models, I realized how many of them are purely theoretical projects. As a matter of fact, 3D printing many of these proposed projects is often difficult: design errors, wrong parts and proportions, and objects that are impossible to print are only some of issues I found. A tip from Lino:

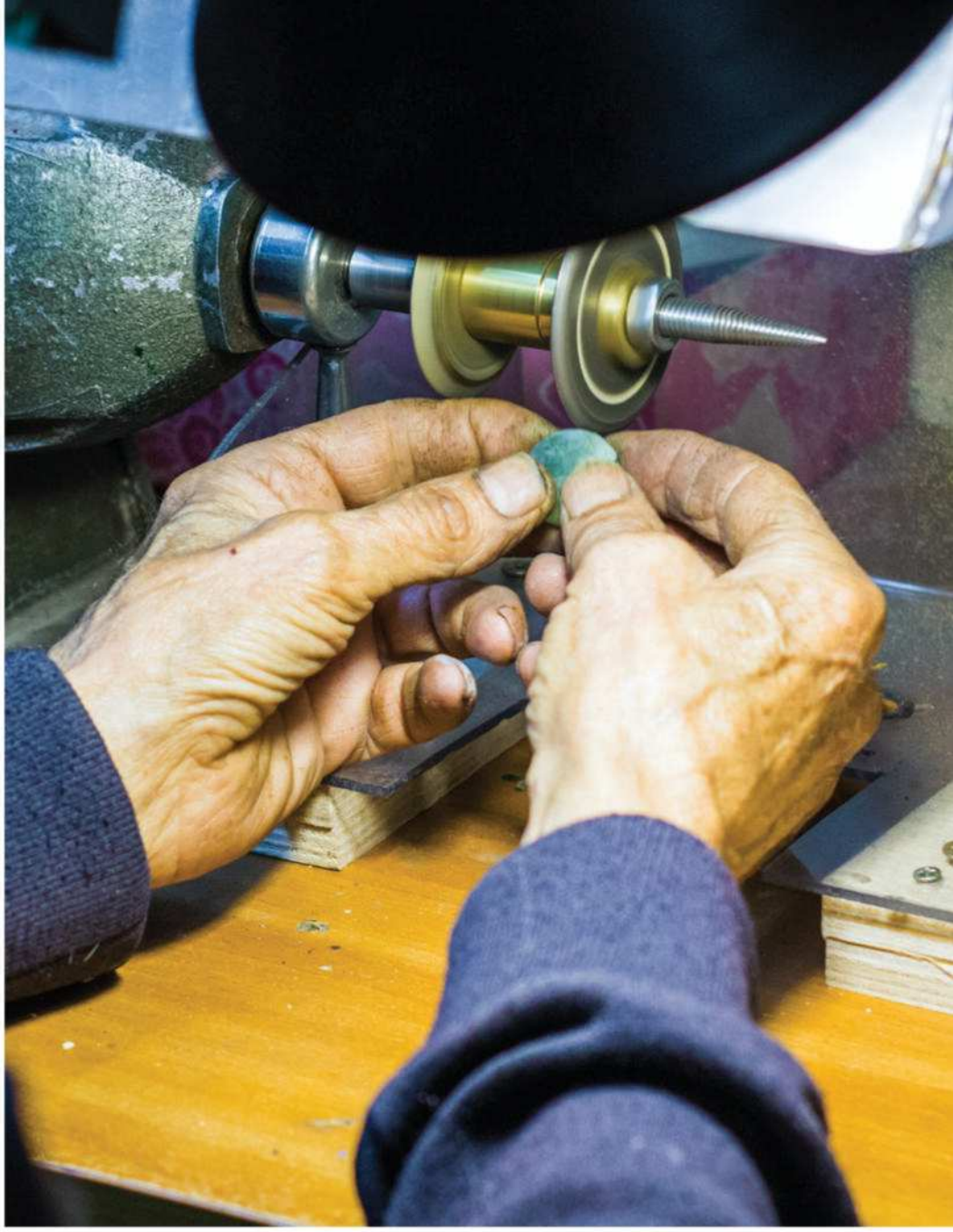
"Suggestion: when downloading an STL file from the internet for your personal use, before trying to 3D print it, wasting time and filament, choose the ones that include some clear images of the finished and assembled work. Never trust the 3D-model simulations only!"

After finding a ready-to-use STL file, it is very rare that the design perfectly fits my needs completely, and some changes are needed. But STL files — the rendered format of a 3D-model — can't be changed at all. The files should be imported as is into the 3D-printing software.

Trying the available models online may be a good starting point and a great source of ideas and inspiration. But be

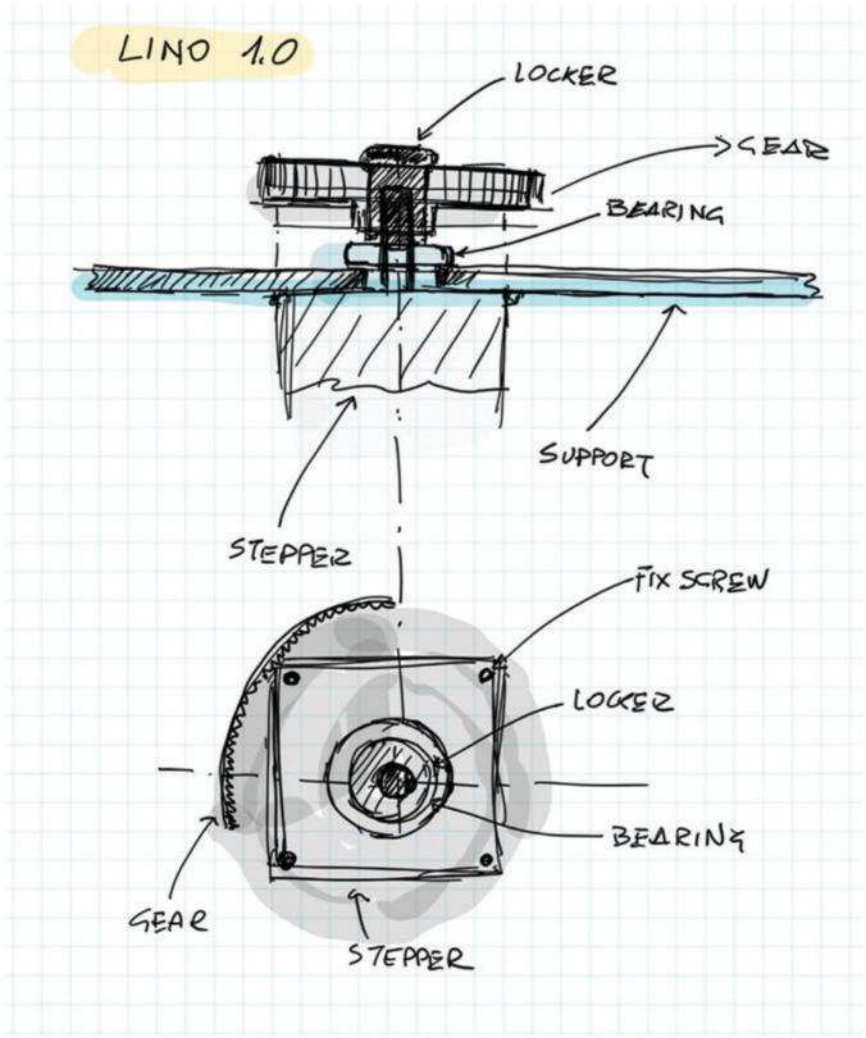
Above: In our job we use a special kind of semi-automated CNC (Computer Numerical Control), the cabbing machines. These machines can replicate a 3D model, just like a pantograph can do with 3D designs. The master model designed with CAD software was built almost exclusively by hand: it's a very difficult and time-consuming job. The introduction of 3D printers helped make this job faster and more efficient: the CAD 3D model is exported and 3D printed, applying a scale factor to avoid the small surface imperfections. Then the zoomed master — usually done with PLA (polylactic acid) — can be used to create real scale copies with the same cabbing machine.

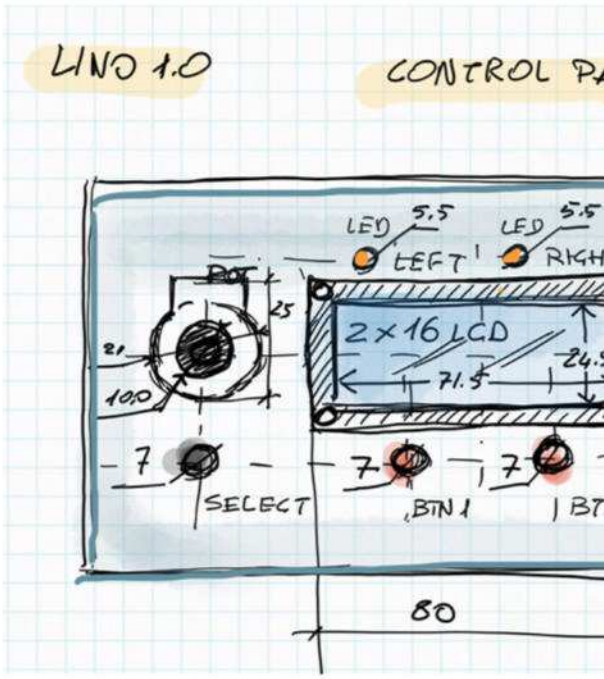
"During the years between '94 and '96, I funded a small jewel-cutting company. In that period I represented a vanguard as I bought one of the first semi-automatic machines for stone jewel cutting from Germany. I self-learnt the needed knowledge and acquired the experience to manage those machines. Thanks to a sort of natural feeling with computers, after the first C64 I always continued to evolve and update my knowledge, from the first BASIC programming up to the most recent Windows 3D-modelling application and CAM controllers"



Above: Jewelry stones are about 140 times harder than metals. Over 60 years ago companies that specialized in building tools for extra hard metal machining, started building synthetic diamond tools for hard jewelry stones machining.
Nowadays we can choose using both sinteryzed or electrodeposited machining tools.

In many respects, we can consider 3D printers, and CNC routers and lathe machines applying complementary technologies. In both cases, moving from one technology to the other is not so difficult; by a procedural point of view, the principle is always the same: design a 3D CAD model then export the file in STL format for 3D printing or create the tool path for material machining. In the case of the CNC machining, the extruder is replaced by the tool. The great difference that should be considered in the design phase is that 3D printers add material by layers on a flat bed while the CNC routers subtract material from an original piece.
In my opinion, it is easier to move from the 3D printer experience to a CNC router, a more complex machine requiring control of more variables to reach good results.





The hand-made sketch design of the prototype with the right measures, before starting the 3D design of the printed parts, compared with the finished details

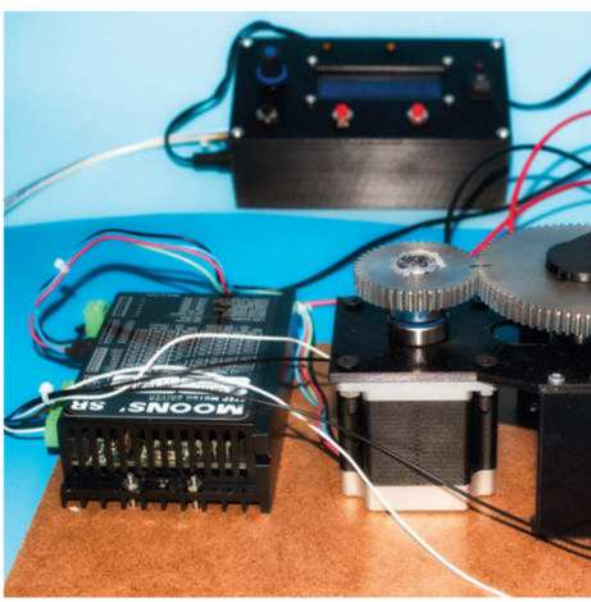
prepared to design your own model to achieve the results you want. Excluding those rare cases when you find exactly what you need (or you decide to adopt some compromise), the much better solution, in my opinion, is to design the model yourself.

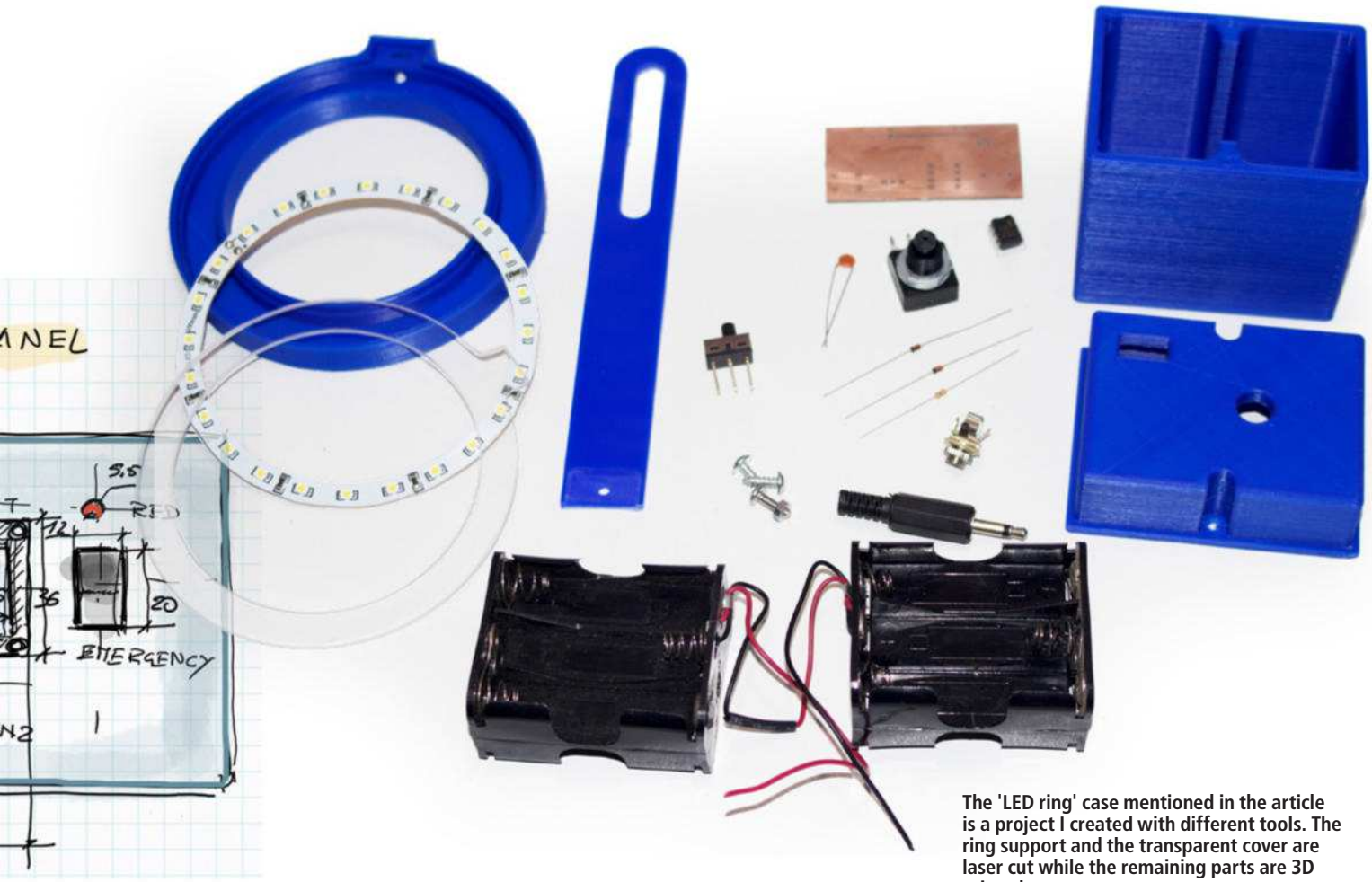
The LED ring

A couple of months ago, I developed a very simple project based on 3D-printed components to make an LED ring for my camera to shoot macro photography and close-up portraits.

I designed all the parts, then printed

After downloading and trying to print some models, I realized how many of them are purely theoretical projects



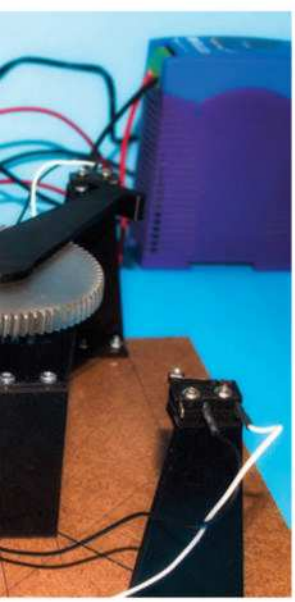


The 'LED ring' case mentioned in the article is a project I created with different tools. The ring support and the transparent cover are laser cut while the remaining parts are 3D printed

them at home, and the tests were satisfactory. To fix the LED ring around the camera lens I made a 3mm-thick perspex bar (www.kitronik.co.uk/materials.html) to be screwed to the camera flash socket. The solution worked well, but it was not aesthetically pleasing. I searched on the Thingiverse site for some kind of alternative solution, or some inspiring project, and downloaded the Iris Box created by Brien Allison (www.thingiverse.com/thing:2479617) aiming to make an iris to keep the LED ring firmly in place on the camera lens.

Why choose this project? Because it is one of the rare cases where the author, as well as the STL files, has also released the original CAD design.

Consider keeping the 3D printer powered off for a while and start playing with some CAD application. For about three decades, I have been experimenting with a lot of different



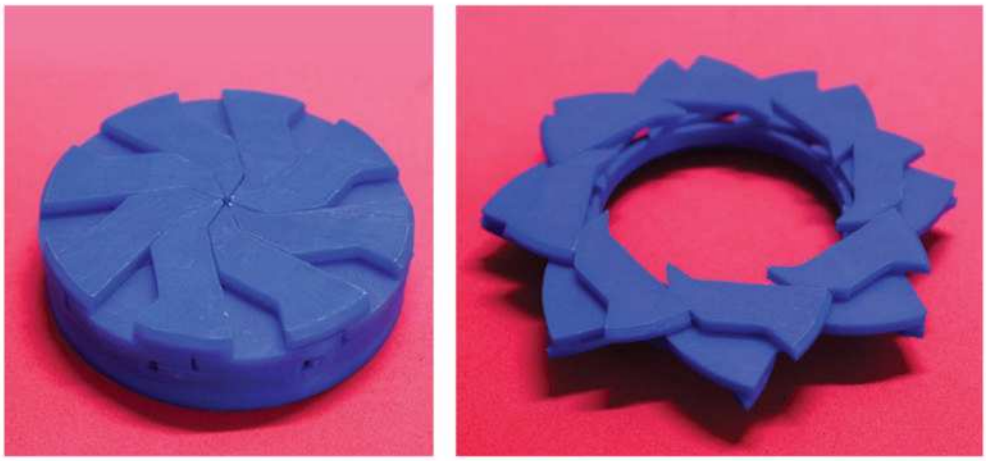
Right: this is a primitive version of the iris locking system that need some other modifications to work fine

The simple electronic parts of the Light Ring, ready to be assembled together with the battery holder

Below: the electronic circuit is engraved with a 300x300mm mill machine

Below: the LED ring support uses the camera flash socket; it is not aesthetically pleasing, and causes issues if an external flash should be used

One of the first things we should consider when planning to design 3D parts ourselves is following some methodology.



The first version of the modified iris box by Brien Allison (www.myminifactory.com/users/Brien%20Allison) that will lock the LED ring directly to the lens body

programs and 3D environments, following the evolution of 3D-modelling software. To date, the scenario is very interesting, not only for professionals, but also for makers and hobbyists.

During the past five years, the number of free CAD applications supported by the open-source community has grown considerably. A number of commercial CAD producers have also made available free versions of their commercially licensed software. This change has been influenced by at least two main factors: the growing popularity of low-cost 3D printers, and the large diffusion of the maker's culture through a number of powerful and active online personalities. Makers' communities have strongly influenced this trend.

In the next three articles, we will explore and test the best and worst options available to create 3D models from scratch for 3D printing.

Planning the 3D design

One of the first things we should consider when planning to design 3D parts ourselves is following some methodology. That's not complex, but if we have a clear path to follow in our minds from the very beginning, the job will be faster and easier. The design approach is separate from the 3D application we will use in printing. When planning the design, we should be aware of the 3D printer set-up aspects discussed in previous Shed articles, as well as something else, specific to the design phase.

The first suggestion is to have a clear picture of the final object before starting the design. In the preparation phase, measure exactly all the non-3D printed components that will be part of the project — inserted parts, screw diameters and length, hole diameters, bearing sizes, etc.

It's a good idea to make a paper draft of your design idea and write down the quotes, as shown in the design draft, and 3D-rendered sample images pictured here. As you can see in the draft, I have measured and drawn the design on paper, then used it to create the 3D model.

Before proceeding with the CAD software, there are still a couple of things to consider — the 3D printer settings and filament features that will be used.

These parameters affect the aspect of the 3D model and vice versa. It is easier to explain with some examples:

• Shell layer thickness: 0.6mm.

This means that designing a surface of the 3.5mm-thick model will be printed 3.6mm thick, which is different from what we expect.

• X–Y axis horizontal movement resolution: 0.1mm.

This means that the solid dimensions should be designed accordingly. A solid block measuring, for example, 7.55mmx4.03mm will not be printed as expected. The slicer software will probably create a real object sized 7.6mmx4mm.

One last design point we should consider is the size of the parts that will fit together or connect to other components (pins, screws, bearings, etc.).

The 3D model is a theoretical representation of a real object, created by fusing a plastic filament. For example, if designing an 8mm-diameter bearing seat, you should consider a diameter of 8.2mm instead.

When designing extremely precise models consider the kind of material and process applied to the real world — if you take the time to do this it is possible to save an incredible amount of time in paper sanding and finishing the 3D printed parts.

For the software download of this series of articles, head to https://github.com/alicemirror/ShedMagazine.

BACK TO THE FUTURE

HOMAGE TO THE VIKINGS' LONGBOATS TAKES ON A DISTINCTLY FUTURISTIC FEEL

By Coen Smit
Photographs: Coen Smit

Having been bitten by the steampunk toy bug recently I couldn't resist trying once again to bring the theme to bear on another model. I have always admired the elegant lines of the clinker-built Viking longboats, their savage, war-like image on storm-tossed seas, and the whole mythology of the Viking era. I decided to see if I could combine that vision with steampunk to produce a modern take on the old boats.

As with my other steampunk toys and models, I chose a central element around which to base this one. The ultra-smooth mirror-like hard-drive disks I have used as hub caps in a previous steampunk toy are especially well suited to replicate (with a modern twist) the Viking shields that adorned the gunwales of their longboats.

> *I decided to see if I could combine that vision with steampunk to produce a modern take on the old boats*

Copper hull

Originally I intended to construct a traditional model using steam-bent planks for the ship's hull, however I settled on using copper sheet instead. Copper sheet has the advantage of being easier to bend and shape to the desired hull form. It also gives the model more of the steampunk look. It was still a labour-intensive part of the project,

The hull under construction

especially as I used the small discarded screws from the disassembled hard drives as the 'rivets' for the overlapping hull planks.

What I have ended up with is a longboat hull that pays some homage to the original Viking builders but is more a modern interpretation of what they might have created if they had access to more advanced materials and technology. Like the Vikings' longboats, my model was still constructed using the clinker method of overlapping planks, however, of copper rather than timber.

Smooth lines

I started by cutting a wooden keel from a wide board of Tasmanian oak and attached to it three frames to define the basic shape of the hull. I then cut strips from some thin sheet copper and bent them over along their long sides to give them a bit more solidity. Each strip was then laid on the frame and massaged into the correct position using a combination of tiny screws rescued from the aforementioned hard drives; persuasion with fingers; and, when necessary, a small hammer.

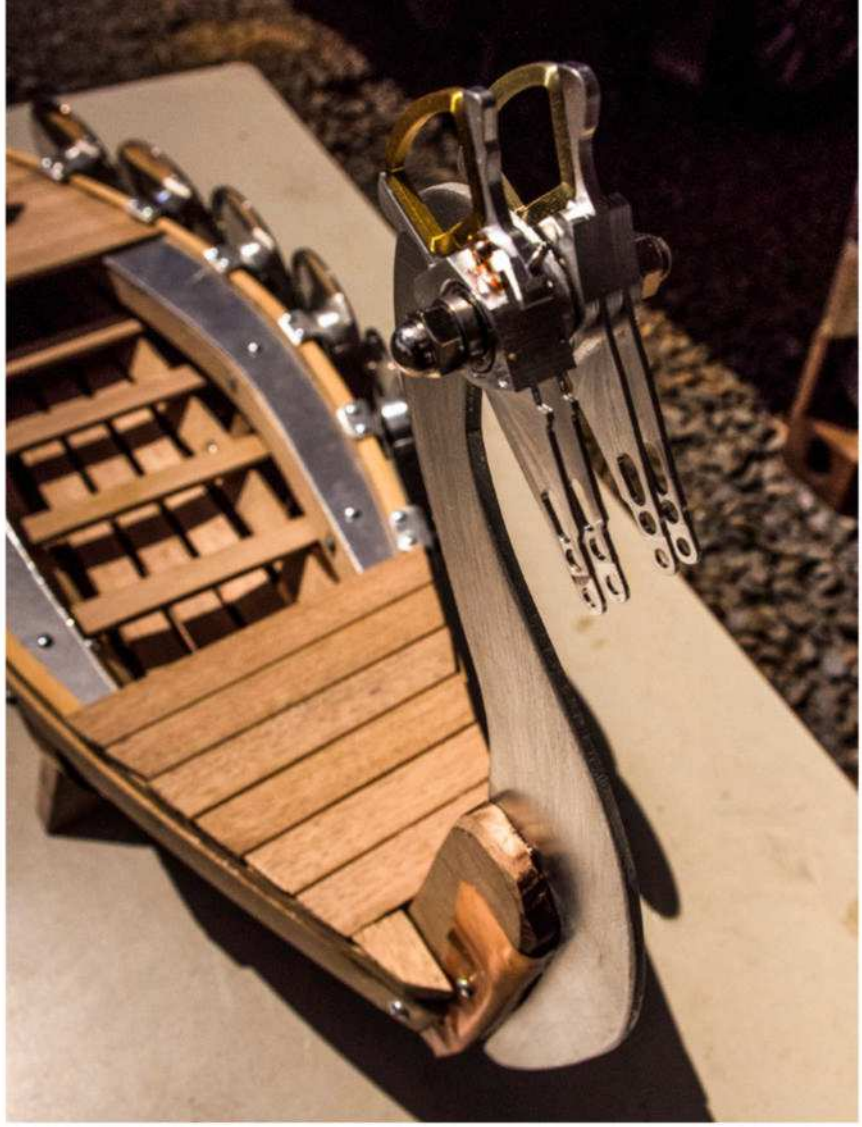
This was a very finicky and time-consuming process, especially as I wanted as much as possible to recreate the smooth, rounded lines of the original longboats. If I were to do it again I would opt for more frames to help better define the desired shape of the hull.

> *I cut and shaped a piece of heavy-gauge aluminium in such a way that it would also act as a battering post*

Close-up of the motor and deck

Below left: Close-up of the prop
Below: The motor, driveshaft, and prop
Right: Close-up of the figurehead

Below: The hull under construction, showing the keel and frames



Steampunk approach

Once the hull was completed and the timber gunwales were attached, I turned my attention to the more obvious steampunk elements of the model. First of all I had to convince myself that steampunk Vikings would avail themselves of new technology if they could, while still retaining their original war-like habits. Adorning the longboat with shields was never in doubt, however I decided that they wouldn't bother rowing their boats if they had another means of propulsion.

As a craft designed to be run aground on foreign shores and beaches, the perfect propulsion unit would be like the ones seen plying the rivers and lakes of Asia — a small engine counterbalanced by a long shaft and propeller, the depth and direction controlled by the helmsman. The helmsman needs somewhere to stand and has to be able to swing the motor to control the direction of the vessel. I built in a small aft deck and ensured that the placing of the warriors' shields would not interfere with the free movement of the motor.

The power train

I constructed the actual 'motor' by bolting together three bearing centres from the hard drives to give a somewhat futuristic impression of a three-rotor rotary engine. Attached to the rear of the engine is a section of 5mm shaft that was fitted through a small swivel from an old sewing machine, then inserted in the stern post. This gives the motor and propeller its full range of movement. At the end of the shaft I constructed an aluminium propeller and a small cone-shaped counterweight to balance the whole unit at the swivel point.

The next part of the construction involved finding a suitable prow and figurehead, both such an integral part of the genuine longboats.

Again, in keeping with the steampunk nature of the model, I opted for a modern interpretation. To extend the prow to a suitable height, I cut and shaped a piece of heavy-gauge aluminium in such a way that it would also act as a battering post to protect the wooden keel and at the same time support the figurehead made from two computer hard-drive pickups. I glued it to the riser on the timber keel and also used it secure the front stay rope for the mast.

Crew's positions

To finish the model I lined the inside with thin wooden strips secured to the frames and affixed three cross benches for the crew.

I believe that the finished model blends the Viking longboat heritage and mythology nicely with my interpretation of steampunk to create a unique piece of imaginative maritime architecture.

Gauge and Eclipse honing guide

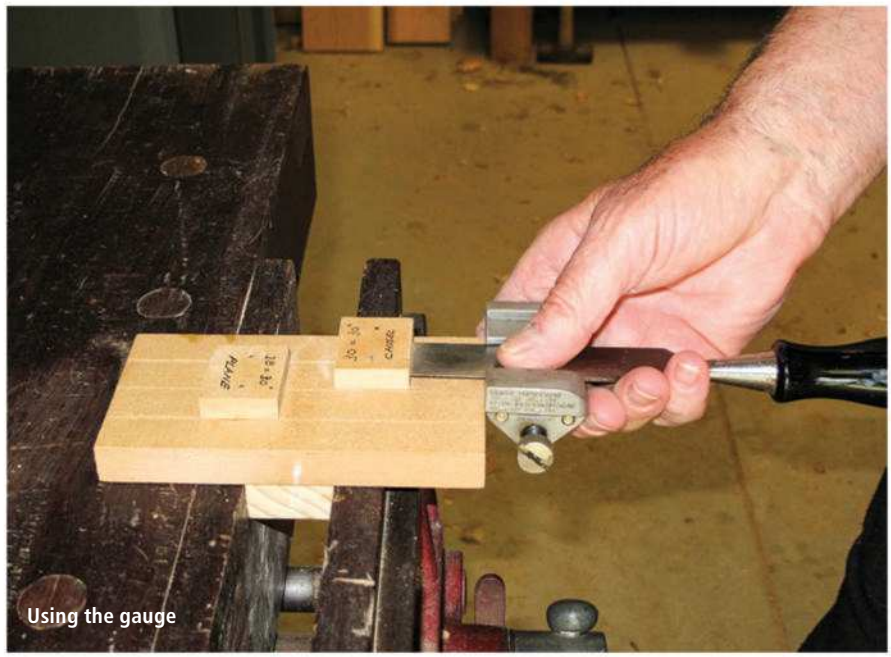
honing in

BUILD A SIMPLE HONING-GUIDE GAUGE FROM MDF

By Bob Browning
Photographs: Bob Browning

One of the most important items in my honing kit is a honing guide. I cannot maintain a constant honing angle without it, and I think the same applies to most of us.

The honing angle on my honing guide is set by extending the blade a specified distance from the front of the guide. When I first bought the guide I set the extension using a steel rule, but I found this awkward and had difficulty achieving accuracy. To improve this I have made a gauge from MDF that makes setting up a blade in the honing guide simple, fast, accurate, and exactly repeatable. It ensures that the blade is set at exactly the same angle each time it is honed, which minimizes both the amount of metal removed and the honing time. It has settings for both chisel and plane blades.


Using the gauge


Honing with a honing guide

The gauge is simple, but it has been accurately made

Building the gauge

The dimensions of the gauge are 150x80x20mm. The top stop blocks are 40x26x11mm and the bottom block is 75x38x16mm. There are three longitudinal lines marked into the top with a marking gauge, spaced 20mm apart.

On the chisel side of the gauge, the distance from the gauge end to the stop is 30mm, and this projection will, on my honing guide (an Eclipse 36), give a honing angle of 30°, which is the correct honing angle for a general-purpose bench chisel. There is room for an additional stop to be attached to give a finer honing angle for specialist paring chisels.

Similarly, on the plane side, the stop is set 38mm from the end of the gauge, which on my honing guide gives a honing angle of 30° for a plane blade.

How to use

To use it, the gauge is held in a vice, the blade is loosely mounted in the honing guide, the guide is pressed against the end of the gauge, the blade is pushed forward until it comes up against the stop, and the holding screw on the honing guide is then tightened. While doing this the blade needs to be held parallel to the lines marked on the top of the gauge, which ensures that the blade is set at right angles to the honing guide.

The gauge is simple, but it has been accurately made. The lines on the top are at exactly 90° to the ends of the gauge, and the stops are set at exactly 90° to the lines — that is, parallel to the ends.

There is now a honing guide on the market that includes a more sophisticated gauge that works on the same principle. It is not cheap. For those who use a basic honing guide such as the Eclipse, this simple gauge is cheap and effective.

WOODEN WIHA

These German-made wooden-handle screwdrivers are made from sealed beech wood and are designed especially for woodworking. With a hex bolster and specially designed handle profile, these screwdrivers are for the discerning craftsperson. The handle end has a high-quality leather cap making for a robust, long-lasting screwdriver. Made by Wiha, one of the most respected screwdriver manufacturers worldwide, this quality German-made product will last a lifetime.

Visit www.wiha.co.nz for more information.

HANDY TOOLS

BOC has added two handy new tools to its Trademaster range. The Trademaster Folding Utility Knife has a steel head with an aluminium alloy handle and belt clip. The knife folds for easy storage and safety and it includes three spare blades stored in the handle. The Trademaster Stubby Ratchet Driver set is another tool you wouldn't be without. The pocket-sized compact tool has storage in the handle and features three settings (forward, reverse, fixed), six CRV bits (slotted: 5mm, 6mm; Phillips: PH2, PH3; Torx: T10, T20). The handle itself is ergonomically designed for comfort positive grip.

Visit www.boc.co.nz or phone 0800 111 333.

ONE HELL OF A LAMP

Power outlets aren't always handy when you need a decent light. HELLA's Uni Max LED work lamp is rechargeable via a USB power bank, which will also charge your phone or other device, so it's perfect for DIY enthusiasts, tradesmen, and for camping. Featuring the latest LED technology, it produces an extremely high light output in a uniform and even illumination. The adjustable 180°-rotating stand is made from die-cast aluminium, meaning that it's lightweight and sturdy enough to take almost anywhere.

For more information go to www.hella.co.nz.

CURRENT TOOLS NOT CUTTING IT?

Japanese blades have long been held up as the embodiment of good design and craftsmanship, and they aren't just for your kitchen. The Kakuri Universal Saw Set contains four saw blades — 270mm, 250mm, 210mm, and 100mm — and one red oak handle, which is interchangeable with every blade in the Kakuri Fine Cut Saw Series. These are great for carpentry and cabinetry tasks such as cross-cutting, diagonal cuts, and fine finishing cuts. The set also comes with a heavy duty canvas bag to protect your knives.

Check out japanesetools.com.au to purchase, with free shipping for orders over NZ$150.

FROM HOOD TO TOE

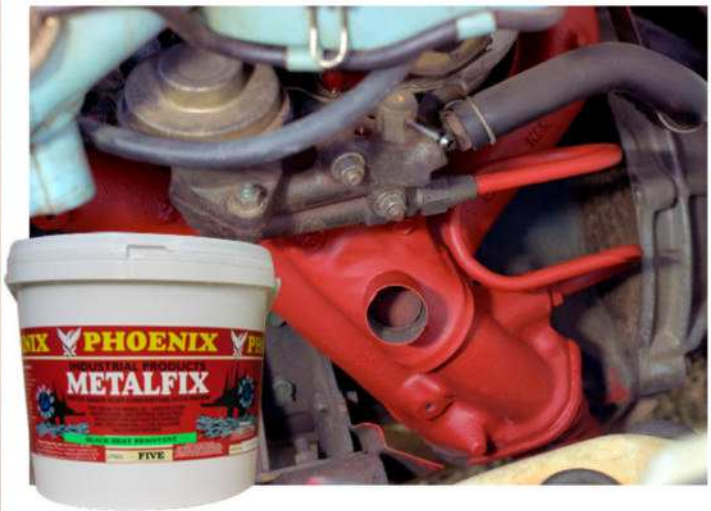
You're probably familiar with Red Band footwear — now you can get that comfort and quality in the form of a hoodie. The Red Band Hoodie is made from premium 360gsm anti-pill pre-shrunk fabric and features a pouch pocket and full-length metal zip, and its generous fit makes it extra comfy. Black, with subtle red trim, it's a great option for keeping cosy during a hard day's work, or even for a night out.

Priced at $64.95 and available in sizes XS-3XL. Available from leading rural retailers, contact Skellerup Customer Services on 0800 475 355 or visit www.redband.co.nz

DREAMING OF THAT UNIQUE KNIFE?

John McDonald from Alba Knives can help make that dream a reality. Passing on the skills gained in his 20 years of knife-making, John now offers the opportunity, in a one-day practical course, to create your unique knife. Choose your design or bring your design with you. Grind your blade from either D2 high-carbon steel or multi-layered Damascus steel, and choose from black maire, kowhai, rimu, purple heartwood, deer antler, or diamond wood for your handle. You will also learn how to produce a premium leather pouch to suit your knife. Dreams can come true ...

Courses are run most days. For more information visit albaknives.nz or contact John on 021 236 7639.



GOODBYE TO RUST

KemTek's Metalfix is a water-based rust-converting etch primer, for application over rusted steel. The product converts the rust layer into a metal phosphate and simultaneously cures into a tough abrasion-resistant skin, which is impervious to further rusting. This product is suitable for protecting rusted exhaust systems and rusted holes in water tanks. It's also safe for hazardous areas such as fuel depots with its fire retardant properties, operates from sub-zero to over 900 degrees centigrade, and able to be washed up with water alone.

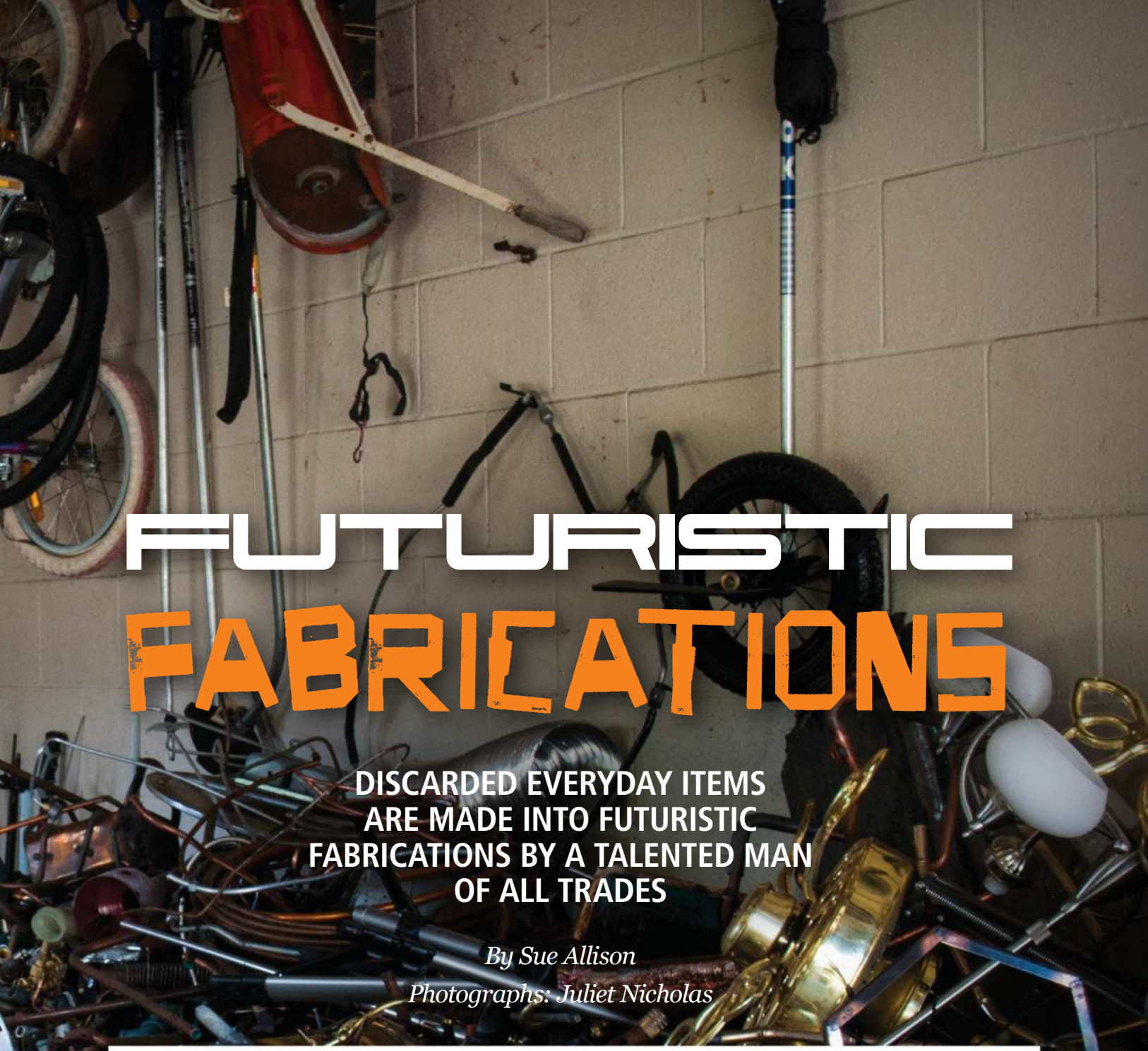
Call 03 6882160 or visit kemtek.co.nz for more info.

BRIGHT IDEA

Chevpac have a new range of LED Hi-Bay lighting. The LED lighting consists of ultra bright LEDs perfect for high-stud workshops. Being LEDs they draw considerably less power than either incandescent or fluorescent bulbs and will last considerably longer — up to 50,000 hours, and will save the user up to 80 per cent of their current lighting costs. The lights require no warm up time, are maintenance free, and come with a three-year guarantee.

Available from Chevpac, 30 Saleyards Road, Otahuhu. Call 0508 243 872 or visit www.chevpac.co.nz.

Sean's super-sonic Rocket Bike began life as a derelict Honda motorbike picked up on Trade Me for $1. He reinvented it with the help of an old Tellus vacuum cleaner, a pair of toasters, and a gas heater



FUTURISTIC FABRICATIONS

DISCARDED EVERYDAY ITEMS ARE MADE INTO FUTURISTIC FABRICATIONS BY A TALENTED MAN OF ALL TRADES

By Sue Allison

Photographs: Juliet Nicholas

A sci-fi artist working from a backyard shed in Central Otago is turning stuff no one wants into things that are sought after across the globe.

Sean Boyd uses anything that takes his fancy, from light fittings and plumbing parts to typewriters and old vacuum cleaners, to make futuristic fabrications which include ray guns, life-sized robots, jetpacks, and other cosmic curiosities.

"The satisfaction is in finding parts, imagining outcomes and working out how they can fit together," says Sean, who gets most of his raw materials from the local recycling centre, Central Otago WasteBusters. "I fill the back of car for about $35. I think I've got more waste here than the waste station," he says, looking round at the piles of paraphernalia in his humble garage in Clyde.

Are these real?

Sean's creations, many of which look as if they've been unearthed in a Raiders of the Lost Ark archaeological dig, are designed to look and feel real, from his ray guns to an apparently steam-powered walking stick complete with moving pistons. "I like to create pieces that make the onlooker question if they're real, before investigating further to discover they are created from everyday items," he says. "I know I've done my job when I see people looking from 30 metres away thinking 'What the hell is that?!'"

While no junk is without possibilities, Sean has favourite materials for his sci-fi sculptures. He loves the shape of the classic Tellus vacuum cleaner and says the plain casings of defunct Zip and Rinnai water heaters often cover quirky internal workings and sought-after raw materials like copper tubing. Cogs and gauges are hard to come by since the steampunk movement gained popularity, but Sean recently scored a windfall of nine

Left and above: old light fittings, vacuum cleaner parts and plumbing pieces are among Sean's boxes of potentially useful componentry

brass gauges from a Roxburgh hydro-electric dam refit. "They were going to throw them out but the electrician said 'I know someone who'll want them'."

Parts harmony

He likes to keep the integrity of the original components while camouflaging them by their placement. "It sometimes feels like cheating because someone has already done the design work, but the art is in getting bits that look right with each other," says Sean, whose eyesight is live-wired to his imagination. A double-headed ceramic insulator is an

owl's head; a box of cupboard hinges a scorpion; a set of light fittings that were "smirking at me" became a family of happy aliens; an old diesel burner's fate was sealed because of its uncanny resemblance to Kenny on the South Park TV series.

He holds up the expansion chamber from a two-stroke motorcycle. "Isn't that beautiful? I'm going to make it into a hummingbird," he says. It won't be an ordinary bird, but some whimsical galactic creature that likely lights up.

Lamps are among his best sellers. "Some people are happy with things they can just look at while others want things that do something," says Sean, who does the wiring himself, then gets it checked and ticketed by an electrician.

Useless inventions

Others seek the spectacularly impractical. Sean, who has exhibited at the World Of Wearable Art (WOW) in Wellington, is currently devising a series of patently pointless pieces for an exhibition of Useless Inventions at Wanaka Puzzling World. So far, he has hatched up a hamster-driven Singer sewing machine, cooking pot with ▸

A man of many trades

Doing some welding work on his Rocket Bike

"I think I've got more waste here than the waste station"

The Veselating Protonator, a lamp assembled from a copper water heater, brass miner's lamp, glass solar tube and brass light fittings

Sean started out bending steel in a factory after leaving school aged 15. "You would get a million rods and put a 90-degree bend in them, turn them over and put a 90-degree bend in the other side. I did that for a while, then I did plastic injection molding. Then I did welding, and then I was an oyster farmer."

Born in England, he came to New Zealand as a baby, but has moved backwards and forwards between the hemispheres, along the way working as security for the Chelsea Football Club, and as a takeaway cook. "I never knew where I fitted so I just kind of did a bit of everything."

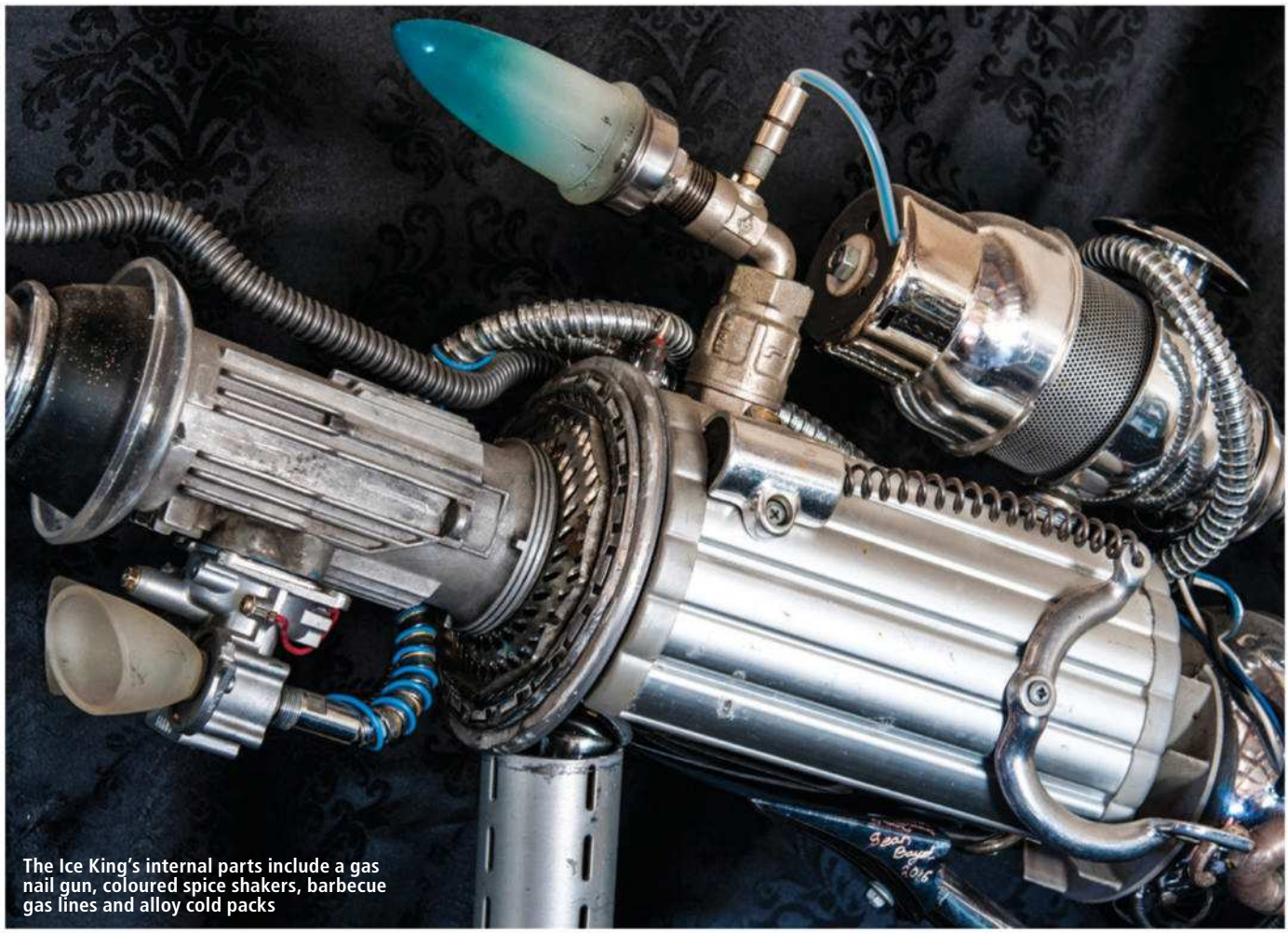
Sean had a lightbulb moment when someone explained to him how an engine worked. "I really took it on board and went back to school and got my mechanic's apprenticeship."

He went on to sell cars, clean cars, work as a service advisor, and manage a workshop before joining the police force. He spent 10 years in the force, including five years as a constable in Alexandra, followed by a stint as a probation officer, which reinforced his belief that a creative outlet is essential for everyone and can steer people away from offending.

"I can't draw to save myself so never thought I was artistic or creative," says Sean. Then one day in 2012, the self-confessed hoarder was fiddling in his shed and came out with a ray gun made from an oil lamp, old electric drill, drawer handle, and corkscrew. Impressed with his handiwork, he put it up for auction on Trade Me. "It had over 10,000 views and sold for $300, and business skyrocketed from there."

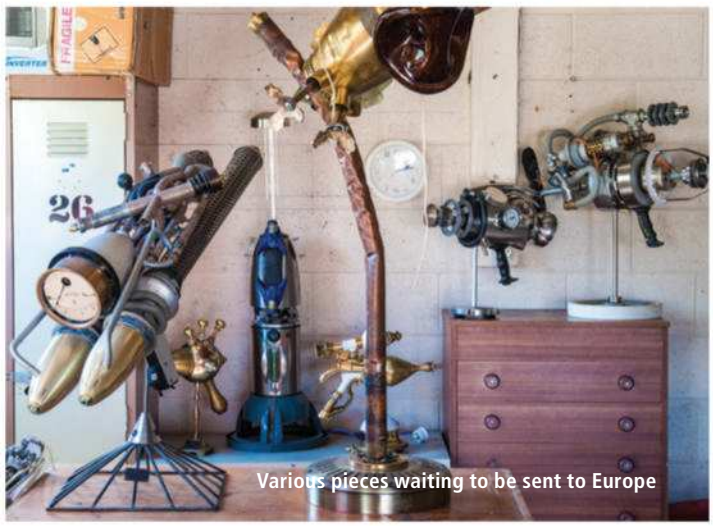
Sean, who has lived in Clyde for the past 10 years where he shares the care of his 12-year-old son and 9-year-old daughter, took a break from science fiction a few years ago to work on a more practical invention — a high-tech, carbon-fibre snow sled that he saw as an alternative to snowboarding and skiing.

His Snolo Sleds business won third prize in the ANZ Flying Start competition and looked set to take off internationally "but didn't fly in the end," as other grown-ups were slow to catch on. Sean is now pretty much a full-time junk artist with a bit of window-cleaning thrown in "to get me out and talking to people".



The Ice King's internal parts include a gas nail gun, coloured spice shakers, barbecue gas lines and alloy cold packs

Removing typewriter parts



Various pieces waiting to be sent to Europe

Making a cabbage tree from recycled alloy wire

"As long as I'm having fun it will be a good result"

Space oddities

Cosmic characters to make their way out of Sean's shed include the Cyborg Stellanating Receivanator, Galacton Warper, Plasma Distillinator, and Maximus Regalius. "I come up with crazy names and used to write a story for each one," he says. At first his yarns revolved around wiping out races of aliens but with the rise of Isis and global strife, he changed tack. "I now market myself as a failed intergalactic gunsmith who made these amazing contraptions to help people, but they ended up hindering people so they have been decommissioned and are just ornaments."

His Fishillator 500, for example: this submariner ray gun was designed for the elite forces of Atlantis. They requested a design that was light, easily manoeuvrable, powerful, and durable. I managed to make it all of these things except I forgot to make it waterproof. Needless to say, they did not purchase any so this is the only underwater leaky ray gun in existence.

"I just haven't grown up," says the Peter Pan of Never-say-Never Land. "I see things through a nine-year-old's eyes."

The Stubby Snubster incorporates a 1980s' eyeball ceiling light, drawer handles and a brass vase

Sean with JET, a 1.5m robot destined for Germany

internal handle, and an utterly useless cutlery set with rope handles.

Apart from a bit of showmanship for the photo shoot, Sean says he does very little welding. "I lay all the pieces out like a big jigsaw then usually bolt or screw them together." Aside from spanners and screwdrivers, his most-used tools are a second-hand drill press salvaged from a deceased estate, a Ryobi bench grinder, and a hacksaw.

Dremel tools also come in handy for inscribing alien hieroglyphics on metal surfaces. His shed is packed with potential-laden junk sorted into such categories as brass and copper, stainless steel and aluminium, plumbing parts, and light fittings. He tries to keep it tidy but not overly organized as he figures fossicking keeps his mental inventory up to date.

Going with the flow

As far as construction goes, Sean doesn't follow plans and has neither rules nor boundaries. "I don't sketch anything. I pick things up and look at them and think 'That's how you normally look at it, so what is it like that?' Then I start grabbing other things that fit with it and start assembling. I tend to be quite manic when I'm in the mood," he says. "As long as I'm having fun it will be a good result."

Sean sells his works through an online mailing list, with most pieces selling within an hour or two of being offered. His international market has grown as steadily as the stream of

A mock jet engine cum lamp has been assembled using a Tellus vacuum cleaner housing, sink taps, light fittings and barbecue gas lines

tourists pedalling through town on the Otago Central Rail Trail, and business rocketed when he took his wares to the Queenstown market. His biggest market is Europe, but he also has a solid fan-base in America. Of the 125 major pieces he has made in the past five years, each worth $1000–$2000, only 10 have remained in New Zealand.

Recycled Roger

One is ROGER (Recycled Object Gathering Electronic Robot), a 1.5m-high, classic 1980s Japanese automaton who stands in reception at The Mind Lab science discovery centre in Auckland. A German visitor was so impressed that he ordered one for himself, but requested a "menacing earth invader not a comical butler". And so JET was born (pictured below).

Sean fitted arched taps to form malevolent eyebrows on its water pump head and incorporated various vacuum cleaner parts into the rest of the body. That client has bought 32 pieces and flown Sean over to Germany to help set them up in his mansion where he has a collection of more than 200 motorcycles and a Swiss military helicopter suspended from the ceiling. While over there, he lent Sean a motorbike and went touring with him for a couple of weeks. "All from making stuff out of junk," Sean muses.

He takes on a few commissions, but insists there is no obligation to buy as they will be the products of his own imagination and interpretation. When the owner of a tattoo studio in Germany with a warped sense of humour wanted a device to scare nervous customers, Sean obliged with a jackhammer-sized contraption complete with syringes full of coloured dyes leading to a drill tip.

No two creations are the same. "You can have all the money in the world but the only difference between your Lamborghini and your neighbour's is the colour of the trim," he says. "With these, you've got the only one in the entire galaxy."

To view more of Sean's creations, check out www.spaceboyd.com.

Angled tap eyebrows give robot JET a menacing demeanour

A drill press and small grinder are among Sean's most-used machines

Through children's eyes

Sean is a great believer in the power of the imagination and the importance of nurturing the inherent creativity of children.

School groups regularly visit his shed. "It's like Aladdin's cave to them. I roll up the garage door and their eyes light up," he says. "I tell them art is whatever they want it to be. It's not about what other people think of it. It can be anything. It can be a toothpick sitting on a green background in the Guggenheim."

Imagination is something that is lost, not learned. "Kids have got it. If you hold up an iron and say, 'What does this look like?' then turn it over and say, 'Now what does it look like?' Adults go, 'It's an iron, it's an iron, it's an iron'. Kids go 'It's a boat, it's a submarine, it's a sail'."

Sean left school as soon as he could and thought he was stupid. "The first memory of school was the teacher asking me what the time was. I didn't have a clue. She said, 'What number is the big hand on?' and I looked at them and thought, 'They're both big but one is short and fat and the other is tall and thin'. Under pressure I thought, 'You say people are big if they are fat so I'll go with the fat one.' Everyone laughed at me and I thought, 'How come everyone else knows this but I don't?' Looking back, I saw them as being the same volume but didn't recognize that then."

Jumbo Jet, a lamp made from items more likely found at a white elephant stall, has a small teapot for her head and butterfly coat hooks as ears

Bookcase

Best of The Shed

$19.90

Featuring 18 of the best projects from the last 10 years, *The Best of* The Shed includes all of our most popular projects. With step-by-step instructions, the 176-page book will take you through a variety of projects, including a pizza oven, a trailer, a rocking horse, and a knife.

How to Weld

Learn how to weld with this best-selling book on the subject. Suitable for beginners through experienced welders, this 207-page book will help you to transform ordinary steel into a blank canvas for invention.

$65

The Complete Kiwi Pizza Oven

This 288-page book is the ultimate guide to Kiwi outdoor living. Including a step-by-step guide on how to build your own pre-cast oven, as well as profiles of 17 Kiwis' ovens, with their (often hilarious) experiences, recipes, and tips.

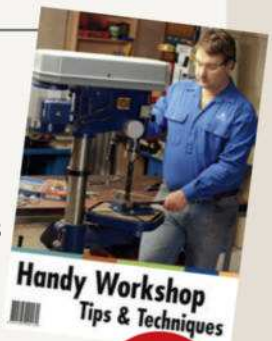
$50

Men and their Sheds

$55

Something for everyone in this coffee table book, beautifully presented in a salute to that unique place where things are fixed and friendships formed, where invention begins and the amazing history of things is kept alive. Some contributors stress the benefit of sheds as a therapeutic tool, but their real gift is that they're incubators of dreams, fostering creativity, skill, achievement and pride. This book's 224 pages make it the perfect present for every Sheddie.

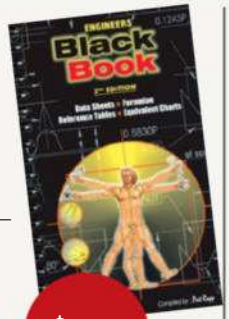
Handy Workshop Tips and Techniques



The ultimate workshop companion, this 320-page book is a comprehensive guide for anything crafted of wood and metal. With something to teach everyone, this book has ideas to encourage and inspire, and clear directions that'll lead you through a project every step of the way.

$49

Engineers Black Book



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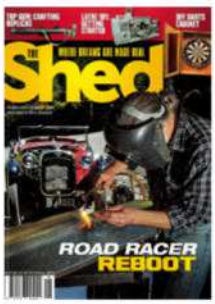

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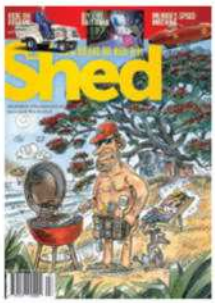

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Change is coming

By Jim Hopkins

The ladies at the bank are fearful they'll be outsourced, to a call centre in Mumbai maybe, or turned into holograms, bitcoin babes, virtual tellers in some mirror maze of money.

Much apprehension abounds in today's workplaces, fanned by the gale-force winds of change blowing old certainties and job security out the window.

But this isn't the first such shock-and-awe cyclone to visit alarum on us. Two things recently reminded me of this; first, the fascinating valve radio story on page 6 of this issue, and second, just days later, a visit to the Bush Town Steam Up Day on the outskirts of Waimate.

On radio first — it came with the car and later in the car and both, in their wondrous ways, made the world a more accessible and exciting place. Radio was the precursor of everything electronic we now take for granted. It was a revelation and a revolution. There was a time when it was so new and awesome that families would dress up and sit in a semicircle in front of it, not only listening to but staring reverently at the wooden box delivering this unimagined magic. We passed through radio's aural portal on our way to becoming modern.

I still own a big upright valve radio, tall as a bar fridge, an ornate reminder of those crackly YA days, but with one knob missing now, alas. Oh dear, a missing knob — every bloke's nightmare.

Not so the Bush Town Steam Up Day. That was every sheddie's dream. With several traction engines working, plus stationary engines, a rescued Ransome steam lorry, and an old-school sawmill savagely slicing sappy slabs, it was a splendid spectacle.

When it's finished, Bush Town will be a fully fledged, recreated pioneer timber town, as Waimate was when the loggers came to mill the great southern totara forest, cutting wood for houses and railway sleepers. In 1887 a runaway blaze destroyed the forest and the industry.

And Steam Up went beyond timber too. It showcased what was yesterday's cutting edge and state of the art, the dizzy limit of known technology. It's easy to forget, as you're seduced again by the polished brass, the painted wheels, the jets of steam, and the holy, coaly smell of an old traction engine that today's nostalgia was yesterday's game changer, as confronting as the driverless car.

They may be old tunes now, but the slow, methodical chug of a single-cylinder engine and the hisses, whirs, rattles, rumbles, clanks, and chuffs of a Foden or Burrell were once the sounds of revolution. It's amazing how coal and water have transformed the world. Light one, heat the other, and you've got steam, an energy source as vital as oil or electricity. There wouldn't have been an Industrial Revolution without it. It transformed the workplace as electronics are today.

And on a grander scale. Change was bigger then, machines more massive. Steam needs furnaces and boilers to do its thing; not so a lithium-propelled smartphone. Progress is shrinking. Tomorrow keeps getting downsized, miniaturized, its working parts unseen or uninteresting. Will there be a 2118 Charge Up Day featuring displays of olde worlde Samsungs and iPhones? I doubt it!

But Steam Up 2018 reminds you just how much love, sweat, and beers it takes to keep these old chuffers going. There isn't space here to cover Guy Wigley's Burrell, or the 1000 tons of smokeless Welsh coal that he's imported to keep it running, or the old Ransome steam lorry that he and his brother Hugh now preserve, or Stewart Townshend's US plan-perfect Model T Depot Hack that started out as nothing more than a fuel cap.

Suffice to say, for now, to all of them and every other overall'd saviour of the machines that made us, "Thanks, guys, love your work!" And if you love traction engines, check out Timaru's Traction Engine Museum, off SH1 at 233 Brosnan Road, open 1–4pm every Saturday.

Finally, a message from the past for today's apprehensive employees: "Fear not. Change is coming. It always has. It always will. And we'll get by. We always do." Listen carefully and you'll hear the valve radios and traction engines quietly agree.

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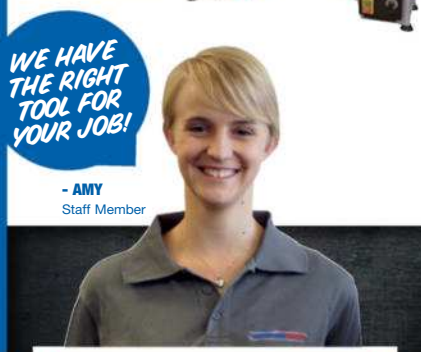

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Metalex, on guard to keep your timber safe.

If you are cutting, scarfing, drilling or notching treated timber you are weakening the treatment envelope and the strength and lifespan of your timber. Apply Metalex to protect and preserve your timber this summer.