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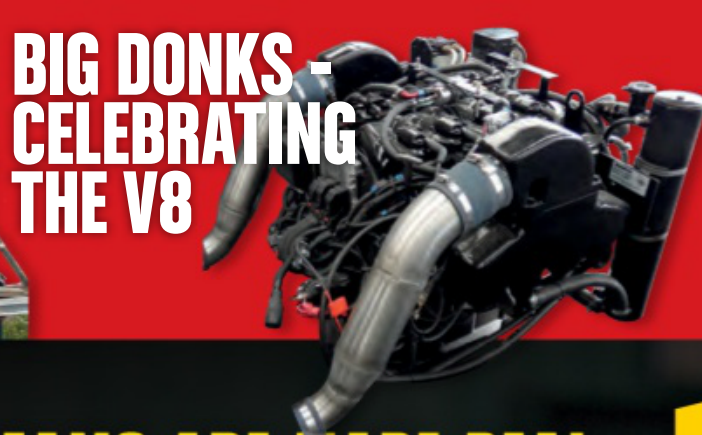
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JULY-AUGUST 2020

ISSUE 91

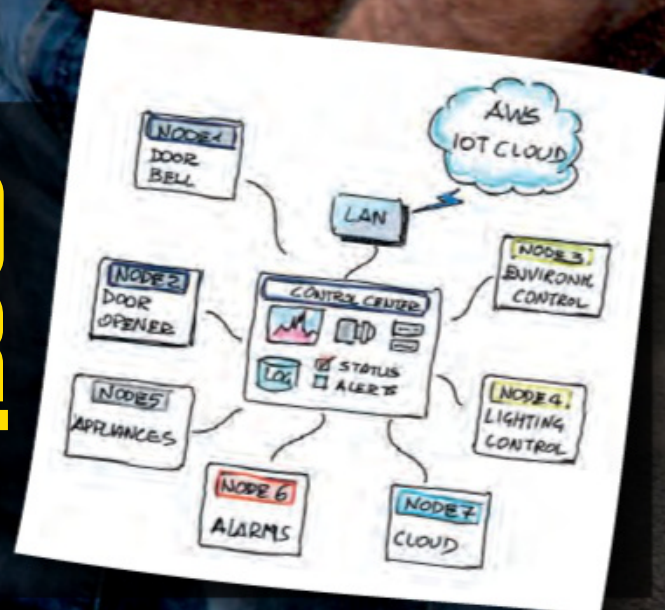
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PROJECT

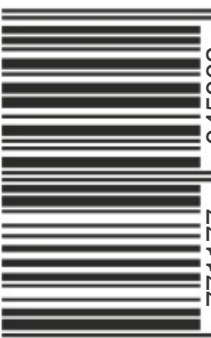
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AT LAST, SOME GOOD NEWS!

There won't be many of us who missed the recent announcement about consent no longer being required for new minor dwellings up to 30m² in size — consent exemptions for low risk work / new building.

The chatter everywhere was about sleep-outs, outdoor fires, carports, and the like, and of course my thinking went straight to — a 30m² shed!

I am sure many of you will recall a time when you could build your own house, shed, garage, etc. and it was no big deal. However times change — probably for the better. Structures need to be safe and sound, of course, so rules are there for a reason — basically to keep us safe and sound and not cause issues for anyone else.

This new building consent also caught my ear because we have a couple of builds in this issue of the magazine. I wonder if Bob's eco-shed build (page 70) will now get a couple of siblings to make it up to the newly permitted 30m².

I have been around the construction of a few 10m² sleep-out buildings. They were great for a small office or bedroom in the garden but, to my shame, were never designed to be sheds. I suppose some of them may have been turned into one by now, though.

Ours had power, of course, but that was about it — no kitchen or bathroom. It would have been great to have those but it wasn't permitted. With this new exemption to the Building Act to allow larger dwellings it is unclear to me whether you will be allowed to have a water and waste supply fitted, but heck you'd think that would need to be part of the scheme; you at least need a sink to clean your fish.

I believe the finer details of this exemption are still to be finalized and we are still some months away from when it will actually kick in. One thing is for sure, though: the construction will still have to conform to code, so some very good advice and sign-off by a licensed building practitioner will be required for any of this construction.

There may be an opportunity here for many a tradesperson sheddie who has quit working full time to be some sort of consultant for non-professional builders. A nice new career tangent too, if yours has suddenly been taken away from you by this darned bug.

For more info, see building.govt.nz.

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Lockdown didn't stop Bill Stevenson from finishing his project build



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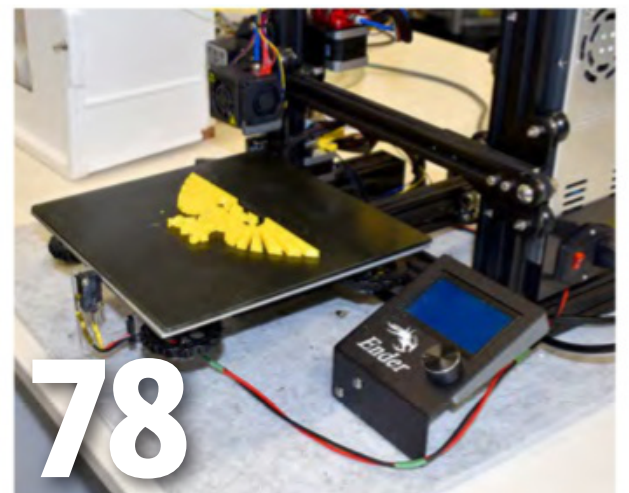
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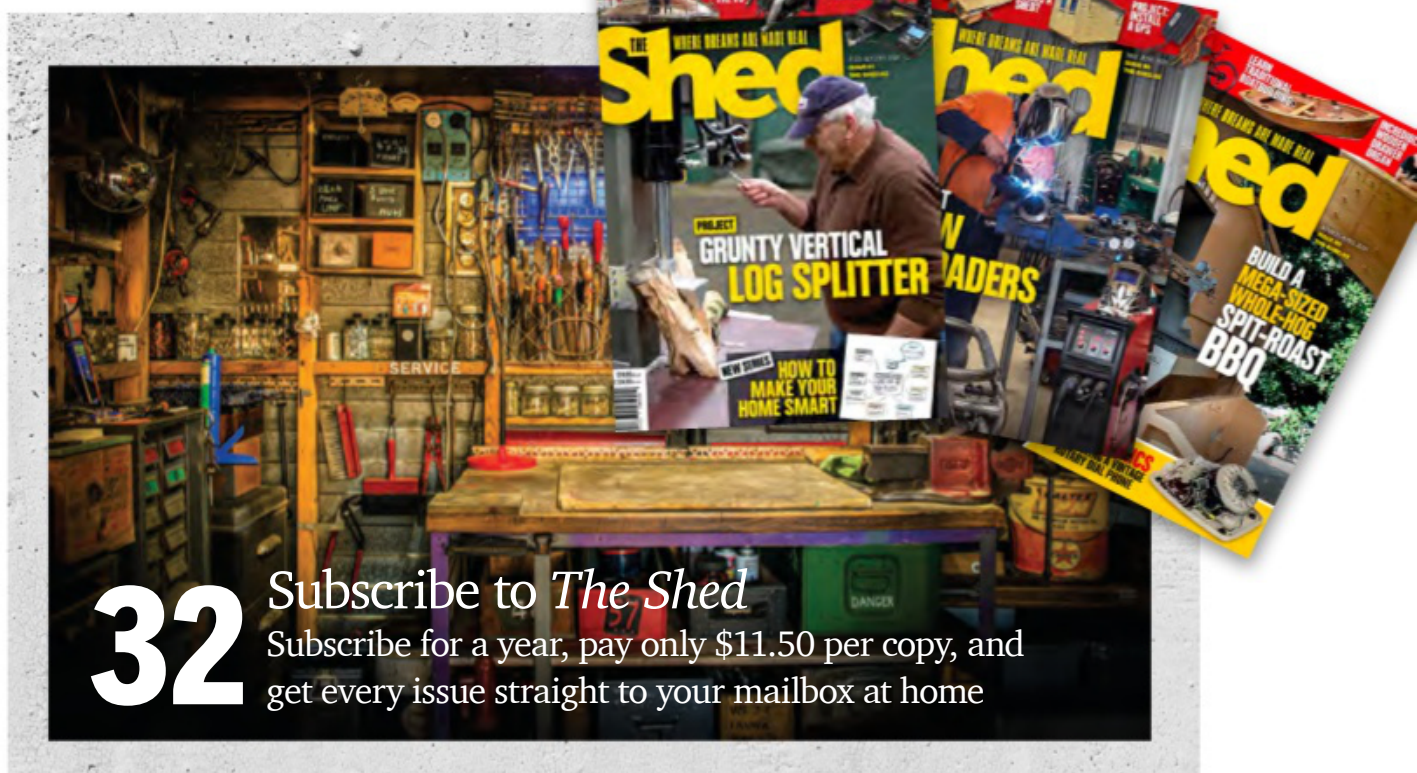


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STAY IN YOUR SHED AND CARRY ON

AS NEW ZEALAND WAS UNDER THE 'STAY AT HOME' ORDER FOR FIVE WEEKS, SHEDDIES WERE BUSY AND VERY ACTIVE. WE MADE THE CALL-OUT TO SHOW AND SHARE ONLINE, AND HERE ARE SOME OF THE RESPONSES



A Northland beef farmer and sheddie, Nick, found some time to tidy his shed.

"I use my workshop for all farm maintenance activities, ranging from water reticulation projects to mechanical repairs to tools, small machinery, tractor, and excavator. Unfortunately, I do not have much time for my passion for working with native timbers."

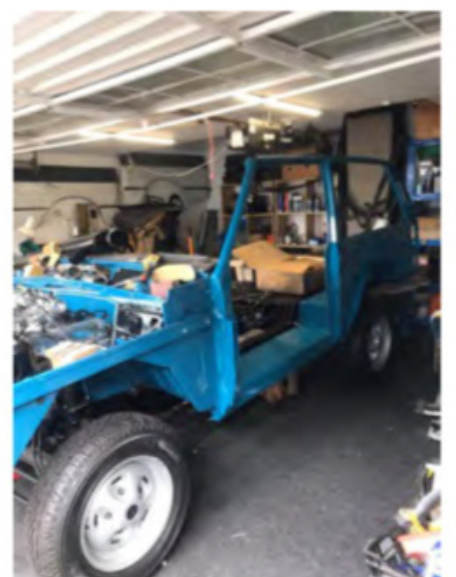


A bonus in the lockdown was some precious time spent with family and then teaching them how to be great sheddies.

This is Anthony Kleinjan and his four grandsons sanding the toolboxes they made. The boys are: Cooper (7), Maximus (4), Spencer (3), and Beau (2). They all are in Ohoka north of Christchurch and were isolating together.



Hemi Bloomer Puawai Uri describes his shed as "a big mess".



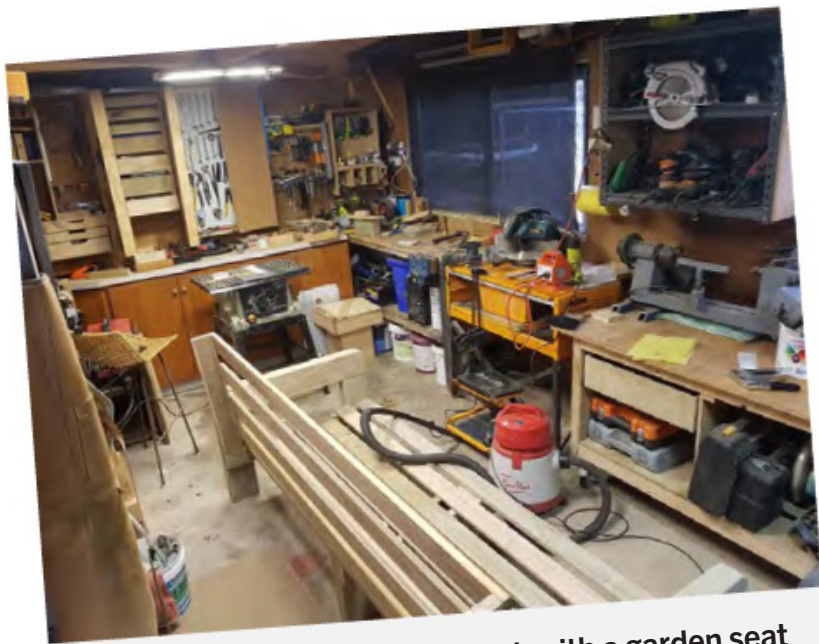
Darryn Bell's lockdown shed space.



Ian from Wellington shared his at-home project: building pet enclosures out of old furniture. For only a few dollars you can make these unique spaces for pets. This one is for a cute-as blue-tongued lizard named Massey.



Kevin Serginson's shed is, "My escape from the madness going on at the moment".



Neville Thomas reveals his shed, with a garden seat he is making for the pergola.



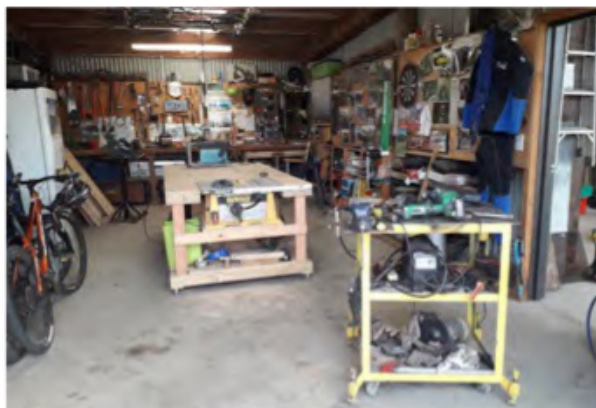
Irving King thought he might as well just kick back and relax.



During the lockdown, Ron from New Plymouth found time to work on his mill vice.



These were made just in time prior to lockdown.



Westport sheddie Chris had heaps going on in his shed during the lockdown.



Paul Mills — "This is mine!"



Peter Linton says, "Here's my shed."



Clever sheddies were as busy as.

WHAT'S HAPPENING ONLINE AT THE-SHED.NZ?

Every week we upload new content on *The Shed* website to add to the hundreds of articles and videos already on the site for readers to discover, learn from, and enjoy.

The past two months' uploads include:

Learn how to make a knife from the award-winning Leif Haseltine



Video of Ray Woodhouse, artist and sculptor from Raetihi

Step-by-step guide to making a dining chair



Adapting tools — making a pipe bender that curves flats





MISSING DETAILS

The belt sander article in Issue No. 90 (May/June 2020) leaves out a couple of small details.

1. The spindle speed — what motor revs, what size pulleys?
2. Direction of rotation — does the roller pull the material through or does it need to be pushed against the roller?

Ken Buckley

Great questions, Ken — I should have thought to include that info.

1. The motor is a 1/3hp, which runs at 1425rpm. The pulley at the sander drum is 155mm, and the pulley at the motor is 115mm. The calculation is $(1425 \times 115) / 155 = 1057\text{rpm}$.
2. The material is pushed against the roller — I got it wrong once and was pleased I wasn't standing on the other side as the piece of wood flew out of there at a great rate of knots.

Nigel Young

DARN THAT VIRUS

I was rather excited to see Bryan's article on fresh hop beers in this latest issue of *The Shed*. As a lover of fine ales and a sometimes brewer, I was rather disappointed when the coronavirus (understandably) put the kibosh on the Fresh Hop festival in Auckland. It is a highlight of the events calendar for me and a nice way to see out the summer.

Even though the publication came out too late for this year's hops, I shall endeavour to get my hands on some of that Nelson Sauvignon through Brewers Coop next harvest so that I can attempt my own brew. Here's hoping the corona doesn't get us first!

Yours sincerely,

Ernie Coldwell



LETTER OF THE MONTH PRIZE

Every issue, our Letter of the Month winner will receive a gift bag of great Selley's products. This month's prize pack is a selection of Selley's products to clean your well-used barbeque. Remember, "If its Selley's it works".

Letters should be emailed to editor@theshedmag.co.nz, or posted to Editor, The Shed, PO Box 46,020, Herne Bay, Auckland 1147.

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A LABOUR OF LOVE

A SHEDDIE FINDS THAT TEAMWORK DOES INDEED MAKE THE DREAM WORK

By Nigel Young Photographs: Nigel Young

Bill Stevenson has a granddaughter with a family, living on a farm down south.

The farm has a lot of trees and the family has a log burner, so keeping warm in those cold southern winters isn't a problem. However, cutting the firewood is an arduous task, even with a chainsaw. Many of the logs arrive at the house several metres long and with a diameter of more than 500mm. Chopping those to size with an axe is even more laborious. The family needed a log splitter.

Building a log splitter was nothing new to Bill — he'd built them before. With a background working at Comalco — where, incidentally, he worked with Des Thomson, another writer for *The Shed* — Bill has skills and experience, particularly in the

engineering arts. However, the challenge was that the log splitter needed to be built on a trailer for ease of dragging it around the farm.

“Building a log splitter was nothing new to Bill — he'd built them before”

Too high

Now, Bill has a garage but, as with most sheddies, his car lives outside — in this case because he was housing the log splitter in the garage. Unfortunately, the garage door was not high enough to allow for the post carrying the 500mm hydraulic ram. So Bill folded it over and put a hinge in it

— the post, that is, not the door.

Like many sheddie projects, this one started on Trade Me. The post is made from 150mm x 50mm x 5mm RHS that Bill bought for \$50. The hinged plate is made from 10mm steel plate with 1-inch shafting, and 1-inch heavy wall pipe is used for the pin.

Bill has used high-tension bolts on both the ram post and the splitting wedge, with 45 x 16mm for the post and 35 x 12mm for the wedge. The top of the post is 1400mm from the table, and can cater for a 500mm diameter log. The splitting wedge stops short of the table by 15mm in order to avoid unnecessary damage caused by a careless moment — 37 tonnes of wedge slamming into the table is not ideal. The cutting table is 800mm x 1200mm, cut from ¼-inch mild steel plate. ►



Bill Stevenson in his workshop, looking at the log splitter

Built like the proverbial

Bill has plans to build a side-loading ramp / lifting arrangement capable of handling extra-large rings at a later stage and is deciding whether he'll use a cable or hydraulics to lift and manoeuvre them. He made the trailer and chassis from welded 75 x 35 x 3 RHS.

Much attention was paid to both the weight of the log splitter and the forces involved in its operation, particularly in respect of the suspension. Bill decided on 1000kg springs to accommodate its final weight of 700–800kg — which includes 80 litres of oil. He ruled out using 1500kg springs due to the potential for too much bounce during towing.

Among the Trade Me treasures Bill amassed was a pair of Holden Commodore mags for the trailer. This

“In order to avoid unnecessary damage caused by a careless moment — 37 tonnes of wedge slamming into the table is not ideal”

log splitter's got class! Bill bought the RHS for the trailer chassis new, along with the other major components. These include the 16hp electric-start Titan petrol motor, the 5.5-inch 500mm stroke ram, the hand-control valve, the oil pump and filter, and the coupling and housing for the pump, motor, and hydraulic hoses.

A hard day's work

The pump can move oil at the rate of 100 litres a minute, building up a pressure of 37 tonnes with a cycle time of around 9 seconds. It's not surprising, then, that the fabrication specs for the log splitter are significant. A day spent splitting logs is a formidable amount of work, and the hydraulic system must be able to cater for that just as much as the trailer/chassis does.

The mudguards are 750 x 250mm x 1.5mm stainless steel bent over a 25 x 25 x 2 RHS frame. Bill happened to have the stainless steel already, and it looks good against the mags. The breather cap on the oil reservoir and the tail lights are Trade Me buys, with Bill himself doing all the necessary wiring. A new battery to power the electric start will be housed between the oil reservoir and pump.

Good mates

Bill moved to Christchurch 11 years ago, and 3 years ago discovered the Halswell MenzShed. He met fellow sheddie Graham Weal there, and is full of praise for him.

“I got Graham, who is a top-notch TIG welder, to weld the tank. He did a first-class job.”

The reservoir holds 80 litres of oil and is made of 2mm mild steel plate. The choice of such a large tank was due to Bill’s concern over cooling as the cycle time means the oil will

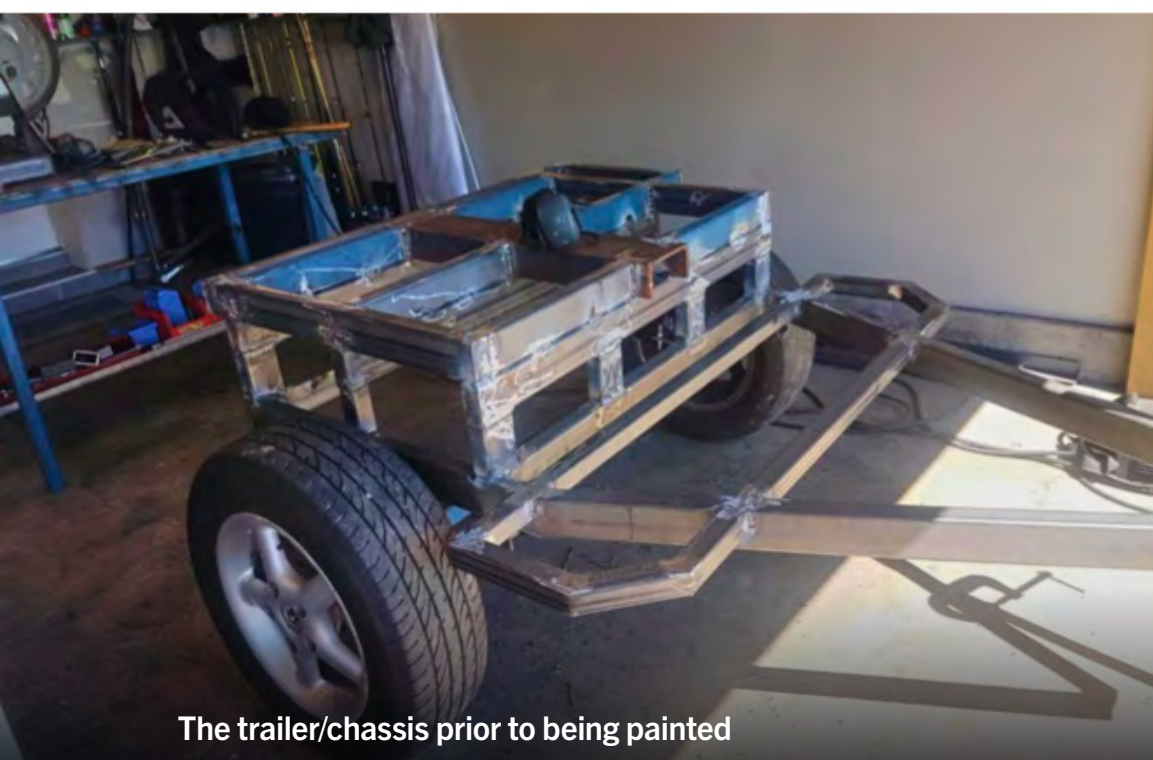
“He ruled out using 1500kg springs due to the potential for too much bounce during towing”

heat up, which will be detrimental to the splitter if the temperature is not monitored — he is fitting a thermometer to the front of the tank. Bill wants an operating pressure of

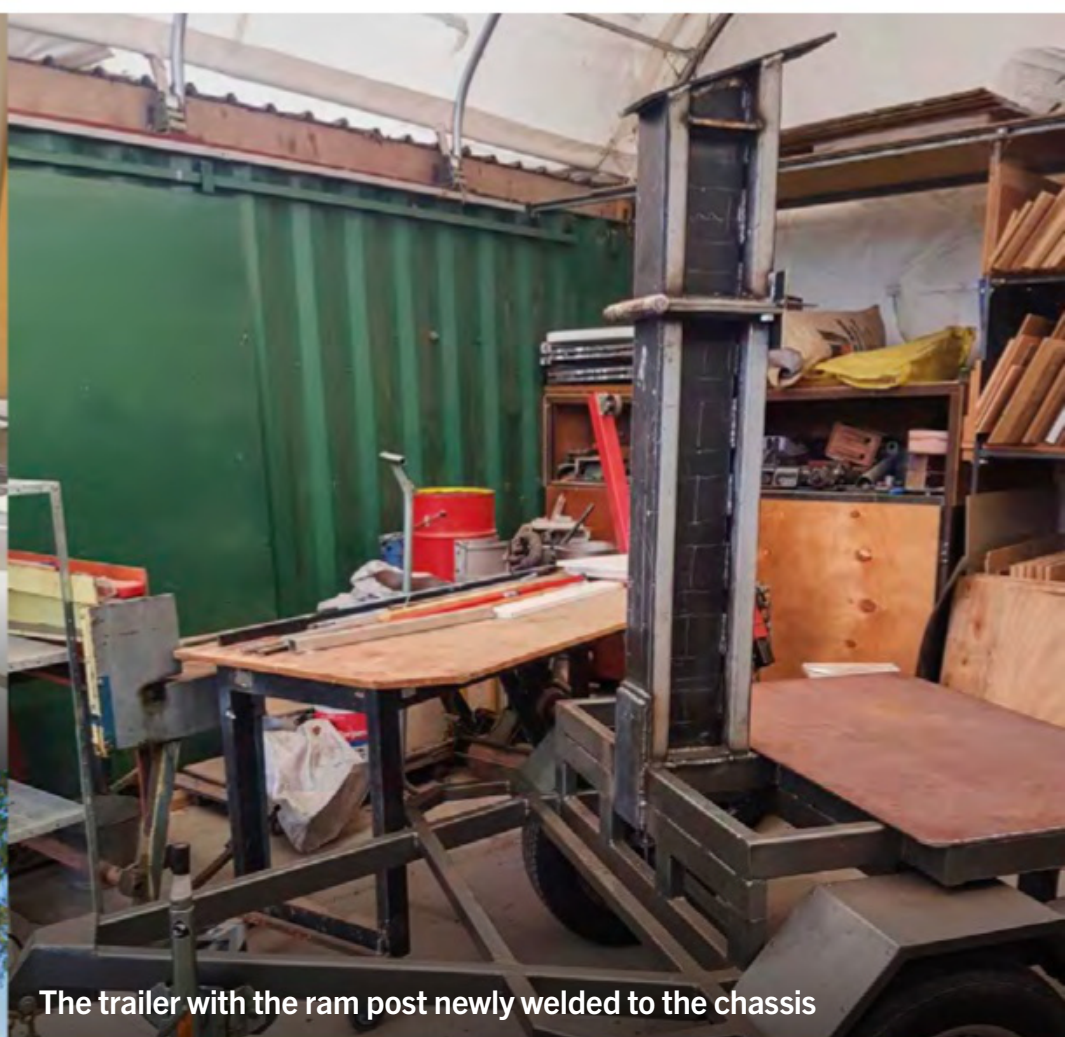
2500psi, with a ceiling of 3000psi, and will use an oil pressure gauge during testing in order to achieve this.

At this stage he’s not certain which oil to use, and is planning on seeking professional advice when the time comes. That will not be cheap!

Craig Burrowes — another sheddie — helped Bill design the ram post and splitting wedge, doing the necessary MIG welding in the process. A menzshed lathe was used to turn out bushes for the hydraulic ram mountings. ►



The trailer/chassis prior to being painted



The trailer with the ram post newly welded to the chassis



Bill showing the position where the hand-control valve goes between the oil line to the ram



Bill showing the position of the ram



Bill showing the position of the thermometer on the side of the oil reservoir

Vertical operation is the go

At the beginning of the project Bill looked at existing splitters, usually with 6hp motors and 50-litre oil reservoirs. Some operated horizontally but he didn't like the ergonomics of that approach, particularly when the planned side-loader is taken into account. He also found that the vertical approach gave the operator more control with regard to handling and manoeuvring the timber on the table.

"A day spent splitting logs is a formidable amount of work"

Not a toy

The rigours of towing — both down to the farm and ultimately over it — have been factored into the design strength of the splitter. Bill is also aware that this is no toy, and used incorrectly can cause harm to the operator and damage to the splitter, so he intends to put together a training package for those unfamiliar with a splitter. His only design concern at this stage is the splitting wedge — but that's subject to testing.

The wedge is 200mm long and 115mm wide across the top, with a depth of 115mm to the cutting edge. When compared with the cheaper and lighter splitters on the market, this one is serious value for money. And let's not forget the mags! ►



Bill uses a block and crowbar to line up the bolts that hold the splitting wedge in place



The log splitter just prior to the lockdown



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Snail's pace

The project had begun around six months ago before my first visit, but due to other priorities — building a tilt trailer for a golf cart, making a covered canopy for a ute, and spending a month in Aussie — Bill had been concentrating on the splitter for only about a month, with work progressing at both the menzshed and in his garage.

Like a lot of projects the log splitter got bigger and dearer as it progressed. The budget was around \$1500 but the final figure will be closer to \$3000. This includes the cost of the warrant of fitness, registration, and all the items necessary for compliance such as the tail lights, coupling, safety chain, and a jockey wheel — plus the oil.

A tight finish

This article was written during the lockdown, the photos being taken the day before. As we headed into June, I caught up with Bill again and he had all but completed the project, with one final piece to be addressed.

It was a simple matter: the shaft on the oil pump was metric, and the shaft on the motor was imperial — 25mm > 25.4mm. This meant the coupling had to be machined to accommodate

“The reservoir holds 80 litres of oil and is made of 2mm mild steel plate”

the 0.4mm. Then, as it turned out, it also had to be shortened by 12mm. The red ‘spider’ that provides a flexible link between the two components couldn’t be fitted as the coupling was too far forward by 10mm. Given that the spider is 2mm thick, 12mm needed to be removed. Of course this was only discovered after the coupling had been fitted. With much vigour and comments such as, “Well, Bill, I hope you’re not going to want to get that off in a hurry!”, it was removed. With the combination of a crowbar, a steel bar as a fulcrum, and Bill, it came off surprisingly easily — somehow I think resistance would have been futile.

The finishing touch was Hammerite Gunmetal Grey paint brushed all over except for the splitting wedge, which was painted silver with Cold Gal. An hour counter was added to the motor, more for oil changes than engine life. ►

The gap between the reservoir and the pump is for the battery that will fire up the electric motor



Commodore mags make this log splitter a class act



Test run

Finally, it was the moment of truth: time to test the beast out. With what — Bill hadn't brought any logs with him.

Fortunately the Halswell MenzShed is situated in the beautiful grounds of St John of God hospital, and it wasn't long before two logs were found. Bill fired up the 16hp engine, situated the log, and pulled the lever. The words 'knife', 'butter', and 'hot' came to mind very quickly as we watched the product of Bill's endeavours perform flawlessly.

"He also found that the vertical approach gave the operator more control with regard to handling and manoeuvring the timber on the table"

A satisfying project

Bill told me he really enjoyed the project. A retired mechanical fitter, and former rower and rugby player — I can't imagine him on the wing — he said the build was a mix of both his skills and the expertise of other sheddies.

"It's been a very satisfying project, particularly in terms of the design and spec'ing of the materials."

This log splitter's got many years of productive life in front of it — I wonder if Bill can adapt it to cut the kindling as well. ►



Des turning out the coupling from 25mm > 25.4mm — the metric > imperial connection between the pump and the motor



Des and Bill fitting the coupling before it had to be removed



Preparing to drill the side of the coupling for a holding screw



Bolting the flip top of the post into place



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Looking back

Bill didn't do any drawings for the log splitter; he just made it up as he went along. He spent around 200 hours on the project. When I asked him if he'd change anything or what lessons he might have learned along the way, he was quite happy with his approach and wouldn't have changed anything.

Bill registered the machine as a trailer as then there was no need for the level of scrutiny a home-made car, for example, would have required.

It was a privilege to be a part of this project, albeit as an observer. Seeing the camaraderie and joint efforts involved in bringing it to fruition is a good sign for the new normal now being talked about post lockdown.

NOTE: *This logsplitter is designed for private, not commercial use. Commercial log splitters are required to be designed and manufactured to meet the appropriate health and safety and industry standards. If you use a log splitter for commercial gain and have an injury, you will not be covered by ACC.*

For more information on using a commercial log splitter or upgrading a log splitter for commercial use, see <https://worksafe.govt.nz> and search PCBU. PCBU is a broad term used throughout HSWA to describe all types of modern working arrangements, which Worksafe commonly refers to as businesses. 📄



Fixing the top of the ram to the post just prior to its successful first try

“Like a lot of projects the log splitter got bigger and dearer as it progressed”

When oil gets too hot

Pressure and heat are the two fundamental elements of an oil-driven hydraulic system.

In the case of the log splitter the risks are heat and dust, particularly if it is to be used in a rural environment. Oil has two primary functions: lubrication and cooling. Cars also have water cooling through a radiator and fan, and that works in tandem with the oil. The Titan motor Bill is using is air-cooled, but unlike a motorcycle, for example, it

is stationary so there is no air moving through it to assist the process. Oil then is the primary cooling agent for the log splitter, hence Bill's decision to go to a larger reservoir.

When oil overheats, a process begins that results in the oil becoming thinner before ultimately breaking down. A degradation process means that the oil loses its viscosity — essentially, its ability to flow. Think water and paint as two extremes. Once that degradation process begins,

the oil's ability to protect the surfaces between the moving components is compromised, the result being increased friction, and in turn increased heat. This becomes a cycle that can only end in seizure if not resolved.

Although the oil pump moves the oil around, a predetermined pressure is needed to achieve that. In the case of Bill's log splitter, it is 2500psi. Without the pump, gravity would take over and all the oil would remain in the sump.



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PART 1

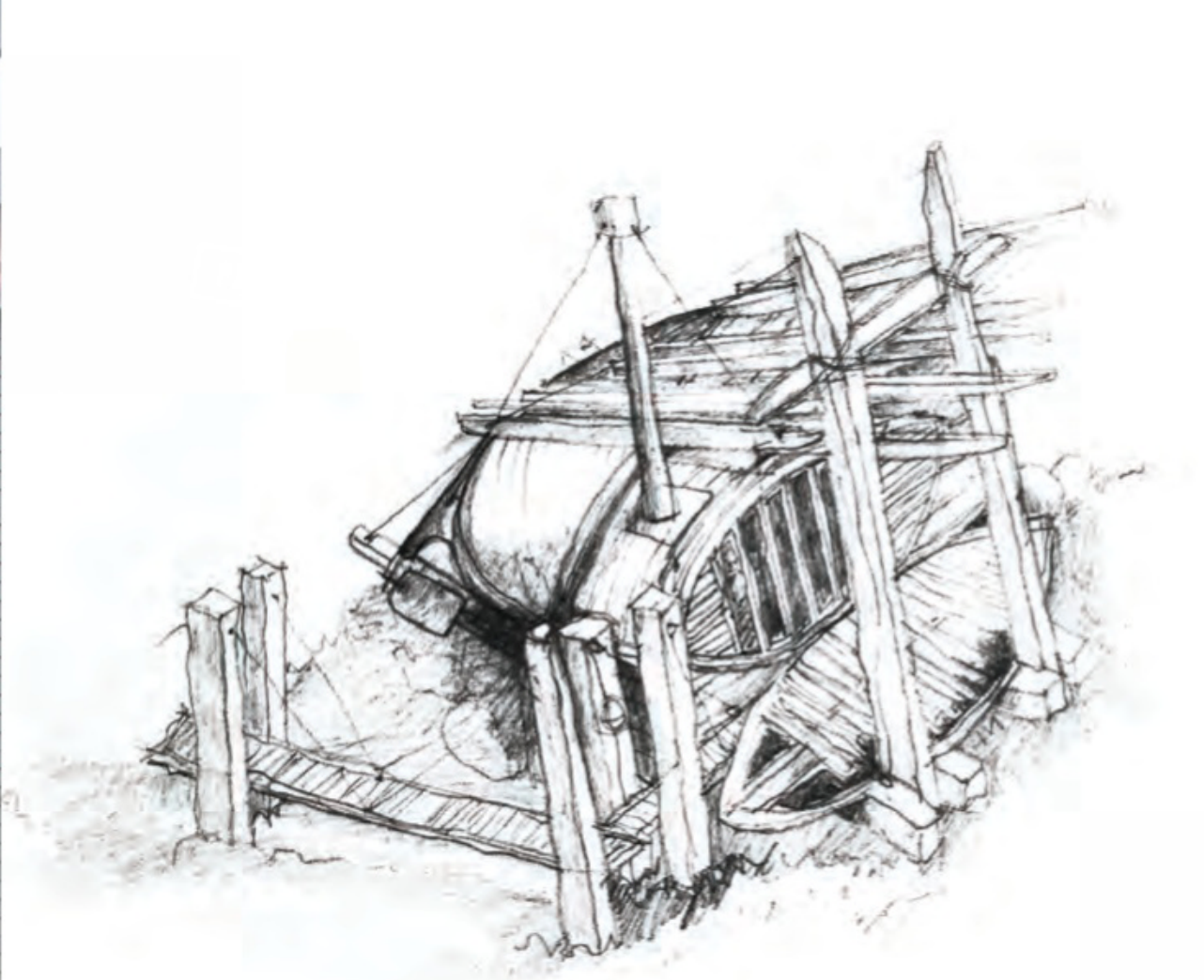
THE IONA PROJECT INVOLVED TURNING THE HULL OF AN OLD WORKBOAT ON ITS SIDE ON THE BANKS OF THE WHANGANUI RIVER AND CONVERTING IT INTO A TINY HOUSE. MANY SKILLED TRADESMEN HELPED BRING ARCHITECT ELINOR MCDOUALL'S VISION TO FRUITION. THIS ARTICLE FEATURES THE ARCHITECT'S DESIGN AND SOME OF THE BUILDING CHALLENGES AND THEIR SOLUTIONS.

By Helen Frances

Photographs: Tracey Grant



THE SECOND ARTICLE, TO BE PUBLISHED IN THE ISSUE 92 OF *THE SHED*, WILL FEATURE THE INTERIOR OF THE TINY HOUSE, THE EXTERIOR JOINERY AND THE COPPER WORK, WHICH WERE CARRIED OUT USING SOME TRADITIONAL METHODS AND MACHINERY



Initial design sketch

Architect Elinor McDouall's vision to transform a 1920s Otago Harbour Board workboat into a tiny house caught the imagination and tested the skills of all the tradesmen who brought it to fruition.

Not your typical wedding cake structure, Elinor's design turned the Iona on its side and the hull, podlike, now forms the backbone of a unique little bed and breakfast on the Whanganui River, opposite the city's historic central business district.

Following the curve

Boats are mainly curved, unlike your standard house or commercial building. Elinor wanted to retain the boat shape as much as possible while making something entirely different. The builders and other contractors loved the project even as they wrestled with some of the challenges. How to get your head and materials around curved windows, roof, and walls and make a seagoing vessel weathertight on land?

The project started in earnest in October 2018 and was completed a few months before Covid-19 sent the country into lockdown. Three years earlier Elinor had bought the boat online, sight unseen, from a tug-boat enthusiast in Northland.

"I was fascinated by the idea of

making something out of the boat. So I sat down and worked out how I could do that. I asked him how the draught was because that's really crucial if you're trying to make it the right way up and do something under the deck. But it was just over a metre so it wasn't going to be possible."

Elinor then decided to turn the Iona on its side and explore the design possibilities, making it into a functional, sculptural type work that would both honour the original boat and become something entirely different.

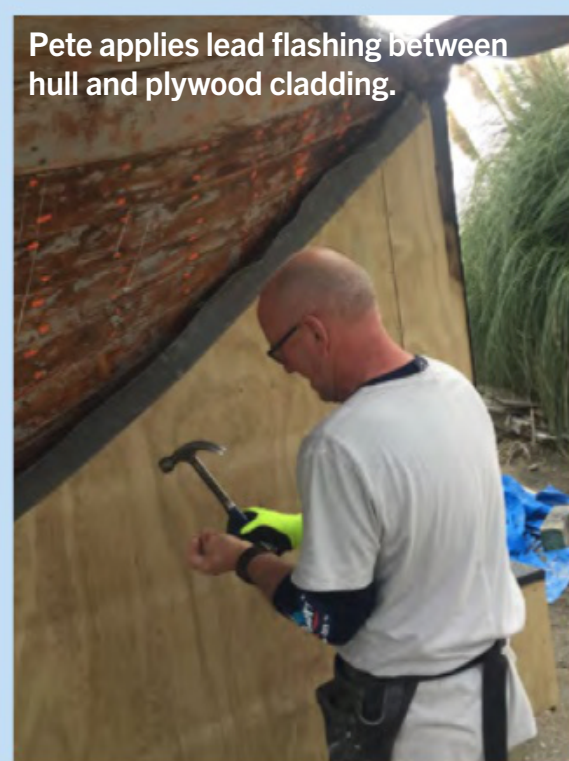
"It's got particularly pregnant kind of curves in the middle and that's what I was interested in. It also came when I was watching George Clarke's *Amazing Spaces* with my children, and it was a bit of a challenge from them.

"At a deeper level this kind of architecture connects back to the child in me who loved making huts. Instagram is bristling with cabins and tiny houses, so it's not just me who has a kind of yearning for something like this; people love miniatures and respond to them emotionally."

The Iona house seems to evoke expressions of delight both from the tradies who worked on it and the general public. The unusual accommodation and site also give tourists to Whanganui a novel place from which to explore the region. ►



Robert attaches plastic sheeting to the outside of the hull to aid drying out in the early stages.



Pete applies lead flashing between hull and plywood cladding.

Kauri bonus

Despite advice not to buy from her father, a seasoned furniture maker, Elinor bought the boat in 2015 and the 1000m² site on the riverbank.

“Then he became really excited and very kindly offered to freight the boat down. I think it’s probably because of him that I love all this timber. He had a workshop when I was a kid and made

spinning wheels, colonial furniture, potting wheels, stilts, mirrors. And he made really beautiful furniture out of reclaimed timber.”

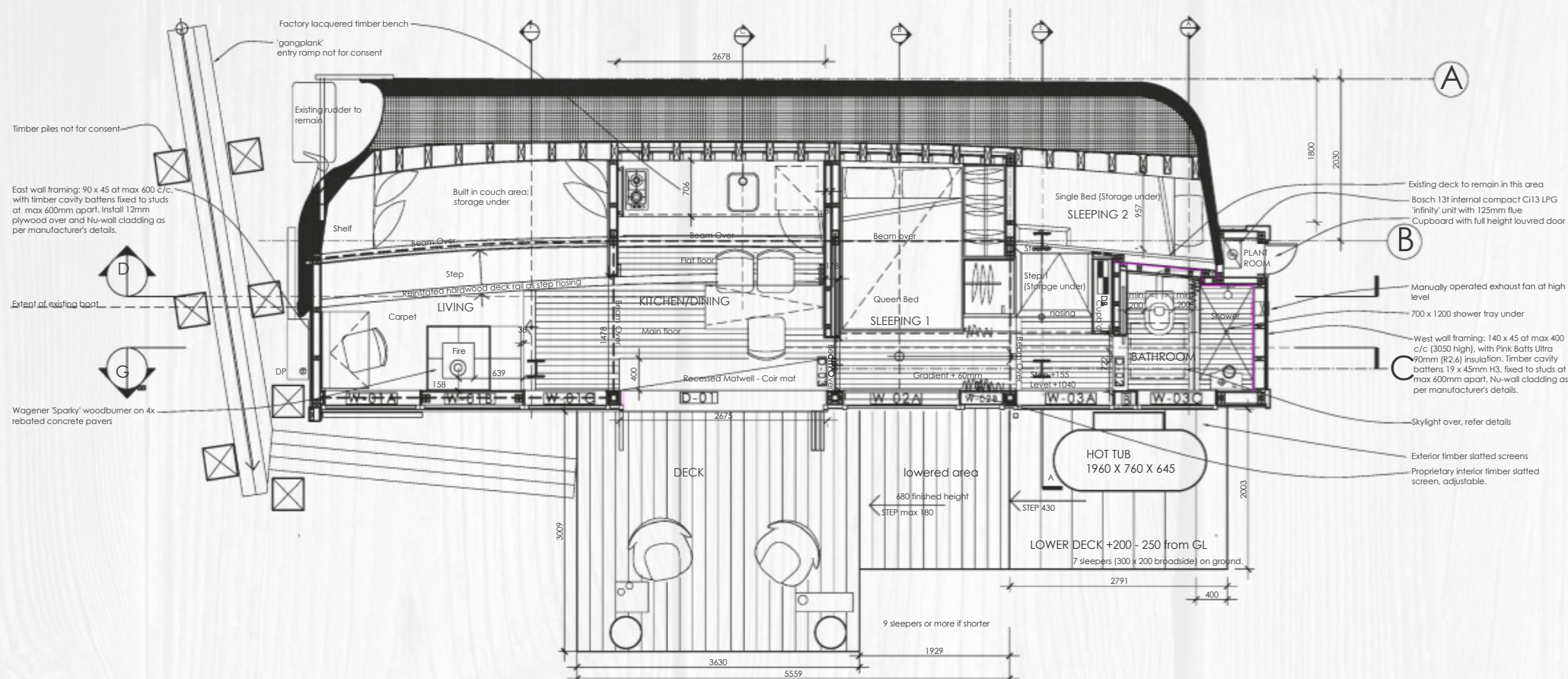
Unbeknown to Elinor, who thought she was just buying the hull, the previous owner had begun restoration, making two cabins with recycled 40mm thick native kauri. Much of this timber was reused in the fabrication of

the tiny house. In fact, reuse of a range of different timbers is another feature of the build.

The Iona was stored, drying out for two years, then Paddy O’Donnell’s company, Masterbuilt, removed the superstructure before local crane experts Emmetts craned and trucked it to site, tilting it 90 degrees while in the crane sling.

“Elinor’s design turned the Iona on its side and the hull, podlike, now forms the backbone of a unique little bed and breakfast”

The bow, stem and brass anchor leader. The plywood deck railing was the only part of the Iona not in good condition and had to be removed.



Anti-fouling was also removed, bagged, and properly disposed of. The kauri hull was found to be in excellent condition, without any rot.

“We were employed at the beginning to alter the hull, which we did on the hard stand out at the river mouth — took off the cabin and braced it so it could be turned on its side,” builder Peter Chapman said. “Elinor employed us to close it in and make it waterproof, but being a boat it took a lot longer and we ended up being there through the whole job.”

Peter and James O'Donnell inherited the project when they bought the company from Paddy and renamed it Masterbuilt Building Ltd.

Enthusiasm

Elinor had spent three months doing research and “tinkering around”, drawing highly detailed plans to present to council for consent. Her architectural training had taught her not to design curved buildings, but when she showed her plans to Paddy he came on board immediately.

Elinor said, “It’s been a neat project all along because of all the guys who are involved. When I showed them the drawings they said, ‘Yeah!’ People ‘got it’ right from the beginning. They were able to make the right decisions because they understood what I was trying to do.”

Elinor learned a lot of technical



Trying to make the drawings agree with the reality. The holes in the deck behind are where the original cabins were removed and salvaged for re-use in windows and cabinetry.

Robert Cochrane attaches rafters while Linzi Stevenson applies roof membrane



Keith Turner prepares the rainscreen battens



“He had a workshop when I was a kid and made spinning wheels, colonial furniture, potting wheels, stilts, mirrors”



Detail showing rafters fixed to a curved laminated beam running along the line of the boat's perimeter

stuff on the job, looking into the different ways to do copper roofing, waterproofing, and insulation because she wanted to leave some of the hull exposed on the inside. She investigated various methods of insulating on the inside and the outside, taking into account the U value and thermal conductivity.

“I found some really thin materials that NASA uses that have very high values. You don't have to insulate all areas as long as the overall equation complies. What I was trying to do was to keep some areas completely free of any insulation but I had to overcompensate in other areas. It was really difficult to get it to work.”

She said the boat's 40mm planking, plus the resin covering, is within the range of Lockwood Homes, which are around 75mm thick and are not insulated. If it felt cool in winter she would cover the exposed hull area with thin pads covered in leather.

Perfect position

Once the external rafters were removed and wheels fitted, the tiny house could technically be towed or transported by road. Elinor designed the width to 4.1m, which is under the maximum 4.5 width, requiring only a single pilot vehicle. Above that there is greater cost and compliance. The flat floor is about 35m² — 48m² including the area from the hull.

Elinor says the ‘rolling stone’ movable house is more of an American thing.

“I think if you have a site, you want to be part of that site,” she said, and the tiny house looks set to stay on the riverbank.

No stranger to the practical side of building, Elinor emptied water and diesel sludge from the hull, filled all the cracks with sealant, and did a lot of the painting. She put the rimu match lining, sourced from a heritage building in Whanganui, through the thicknesser and, with builder Clinton Raymond, put up the Marmoleum ceiling — something she was advised not to do but that has worked beyond expectations. The colour, reflectivity, and leathery look suits the boat/caravan-style interior.

“I'm stoked with the way it looks. You use contact adhesive and have about five seconds before it goes off so you've got to get it in the right place. And all the while you're trying not to fall off the scaffold from the fumes!”

Stuart Mackintosh of BPL Group designed the structural steel, which was fabricated by Mike Hughes of Emmetts Civil Construction. Keith Turner, a retired builder and boatie who worked for many months on the Iona, explained that there is a large commercial-type engineering component hidden below the floor.

“The whole structure sits on two big

Right: The Iona at Port Chalmers during her days with Otago Harbour Board



Iona moored at Whangateau in 2007

Iona history

The previous owner sent Elinor some historical information after she had bought the boat, which was at the time afloat at Whangateau.

Iona was built by Miller and Tunnage and launched as “Mona” in 1924.

The boat fished out of Akaroa and later Moeraki. Otago Harbour Board (OHB) bought her in 1941 and she was used as a lines boat and for servicing the lights on the harbour.

The Iona was sold privately in 1978 and went fishing again. After an accident on the Taieri River entrance, she was put into Miller and Tunnage for extensive work involving stem, frames and planking. She was then stored for some years.

The owner had planned to rebuild Iona into the original workboat configuration with two masts and aft wheelhouse but ran out of energy for the project. He also sent Elinor some pictures of Iona and a sister ship when first with the OHB.

long steel I-beams. They are supported by two other steel I-beams that are attached to four piles that were driven into the ground. They were driven in until they hit something solid and wouldn't go any further. That's similar to what they did reclaiming the riverbank by the [Whanganui] city bridge.”

He said the heavy engineering put into a domestic environment has made the structure very secure.

“By driving a steel beam into the ground, you go to where it's solid, but you get what they call fricative effort. As it's forced through the ground, the ground grabs it. Every metre of that beam will support so much lateral loading, which is very easily calculated. They just add a bit more to it for security and then pour a concrete pad round the top. It's a very simple but very effective way that has been used for decades.” ►



The three steel frames which give rigidity to the building and stop the boat from turning over.

Twisted hull

The recently-installed hull threw them a curveball after the Christmas break. They found it had twisted so much that the stern had moved 14cm away from its support point, meaning a new steel post had to be fabricated to hold it in place.

“Mike was able to achieve an excellent brace by connecting the new post via a gusset to the old rudder stock, a concealed steel shaft that originally ran vertically down to the rudder. It did continue to move a little bit so all the dividing walls had to become brace walls to strengthen it, to make it more rigid,” Elinor said.

Keith wasn’t fazed by the boat’s settling behavior.

“Turning a boat on its side, you’ve got to do extra structural work to make it retain its shape because it just wants to collapse. We put a prop under and pushed it back into shape. The engineers had some concern about the keel still settling, but we’ve built for the worst-case scenario.”

“When I showed them the drawings they said, ‘Yeah!’ People ‘got it’ right from the beginning”

As for the gaps between the planks in the hull, Keith explained that back in the day they would have been filled with string (caulking) so any water that got in expanded and kept it watertight — “the old stuff still works. Because the boat has dried and all the packing has dried, a lot of it had fallen out.”

The hull was sanded and sealed with several coats of sealant then, after it had settled, covered with a more flexible fibreglass matting and a clear resin so that the timber of the hull is visible.

To add detail to the nautical theme, Elinor was given a rope off a local ship for the balustrading and a propeller from a riverboat.

The old rudder stock is visible on the left, now connected structurally to the new building via Mike’s wide steel gusset.



The propped and braced hull. Mike’s post and gusset are visible at far left, and the new curved ceiling is in place.





Clint Raymond grappling with how to fit the last curved window

Many challenges

From a builder's point of view the rustic look with no straight lines and a few gaps here and there was not too hard to achieve but it drew some

comments from people disconcerted by the unconventional nature of this new build.

When the deck was built, the materials — cracked and bent 8x6m

native Australian hardwood — dictated that crooked was the new norm. The timber is fixed with brackets underneath so there are no fixings on it.

"You can't walk on it on stilettos," Peter laughs.

"Some days it was tear your hair out, but many really good guys worked on it and found it interesting and exciting.

"We were also making sure it's up to code, so we could get a compliance certificate but at the same time making it look like it's old and fitting into the landscape — which it does pretty well."

During an early construction site visit Keith showed how the foredeck comes to a point and the deck is rounded for water to run off. That part of the boat, with its angle and curve, was to contain the shower and toilet.

"There will be an angled wall on the back of the toilet but it's not just going to be angled. Because of the deck behind it has to be curved as well. So you've got to match up the top and the bottom. Do you go straight or do you just match that curve so it becomes something that looks correct to the eye? Until you have a proper look at it, you're not sure."

Keith has spent his whole working life in the building trade.

"Done all sorts of stuff, fit-outs on boats to high rises and domestic work. It's nice to be able to draw on that knowledge and use it here. It's a really interesting project because so many elements keep popping up and you've got to be looking ahead so far as well." ►



Garth McGregor and crew start to apply fibreglass mat and resin to the upper hull.



The new exterior façade batted out ready for a plywood skin which will form the base façade under the rainscreen.

“The floorboards are recycled timber; decking trusses came from the Majestic Theatre in Whanganui and the posts from Wellington wharf”

Creative problem solving

Waterproofing, working through the cavities and rain screens, then putting the decorative finish on the rain screens required some curved thinking.

“We weren’t flashing the windows into a weatherboard house but into the curved hull of a boat. We were keeping it compliant — making a house but trying to make it not look like one,” Peter said.

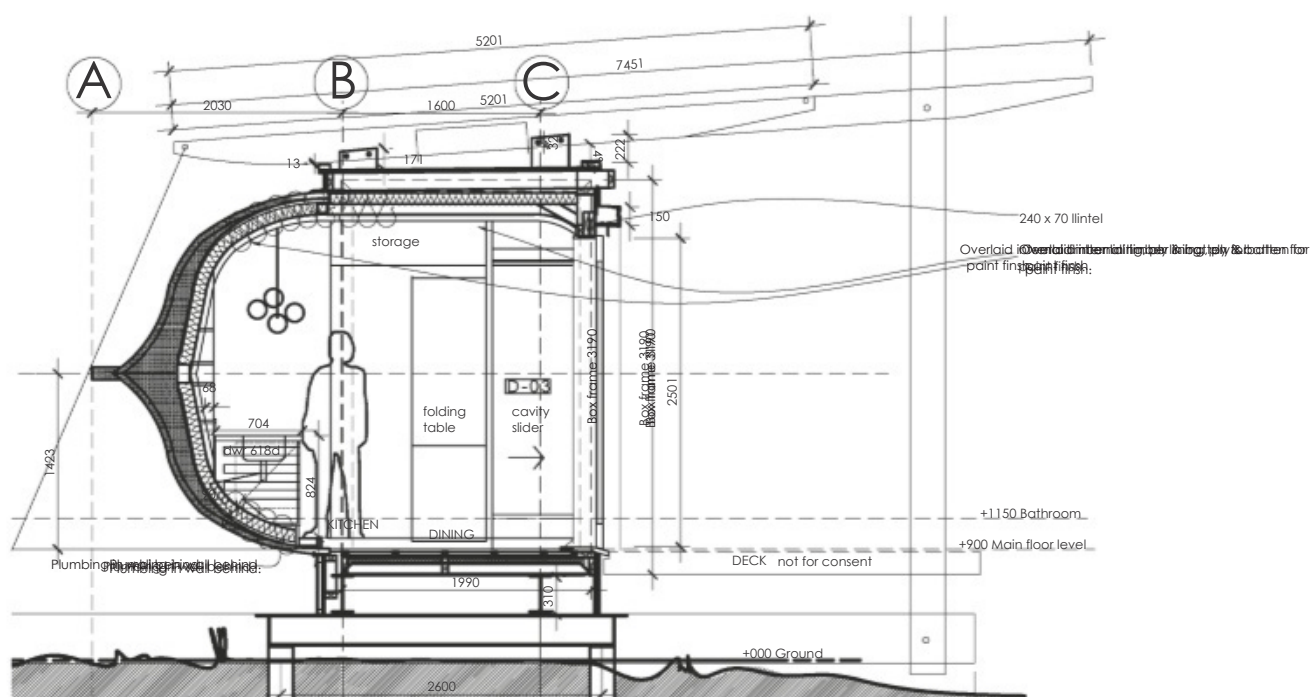
The window jamb was given a groove then a flat flashing, which is sealed to stop any moisture getting through. A cavity construction was built with plywood then another cavity batten system put over that. The horizontal battens form a decorative rain screen only and the actual waterproofing is two rows back with the plywood.

Behind the copper panels, between the windows, are the galvanized flashings, already mentioned, then the 18mm cavity battens and the 12mm plywood. The copper was fixed over that and is purely decorative, sealed to the plywood.

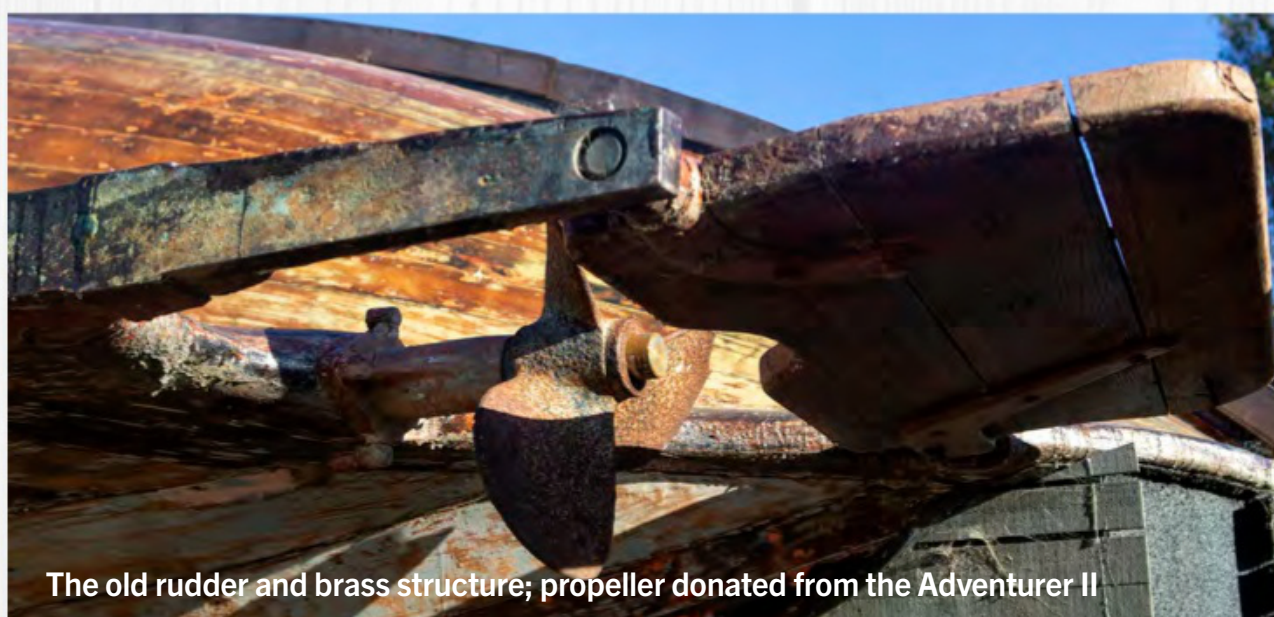
Fitting out the kitchen also called for outside-the-square problem solving.

“Nothing is straight in a boat — nothing’s square, nothing’s level — so fitting a kitchen joinery unit and bench top into the side of the hull and trying to scribe it into the hull with all the ribs still showing was a challenge,” Peter said. “The council was more than helpful — to be able to ring them up and ask them to come over and work through solutions because it’s not the usual 3604 build.” ▶

Elinor and Keith trying to work out the curvature and height for the marmoleum-clad curved ceiling.



Section at the kitchen bench.



The old rudder and brass structure; propeller donated from the Adventurer II



Lead was used both below the cladding and again at the intersection between hull and rainscreen cladding. The old antifouling is still visible on the hull.

Lead the best

Peter said the hardest part was trying to flash the boat to the building. Because the roof was copper they didn't want to use Colorsteel so they used lead.

"We ended up using the old-fashioned lead — rolls of 150mm-wide lead, moulding it as an up-stand and apron flashing on the hull in 2m-long strips; getting it formed, moving it aside, putting a seal in the gap, then sealing the lead to that. Then above that on the wall, forming the cavity construction — making sure the lead was sealed to the hull, tacking it down; 50mm centres all the way along so it looks like it's stitched to the hull."

They used the lead to seal around other protrusions because it was

malleable. "We didn't want to use torch-on membrane — that wouldn't have looked good," Peter explained, "but the lead has weathered well. It looks like it has been there for a long time and won't peel off."

"Some days it was tear your hair out, but many really good guys worked on it and found it interesting and exciting"
"Nothing is straight in a boat — nothing's square, nothing's level"



Ready for rainscreen cladding and roof membrane.

Lead was also used under the hull to stop any water running underneath and to form a drip edge on the keel.

"It works well, although lead isn't cheap. Other options would have worked but not been aesthetically pleasing," Peter said.

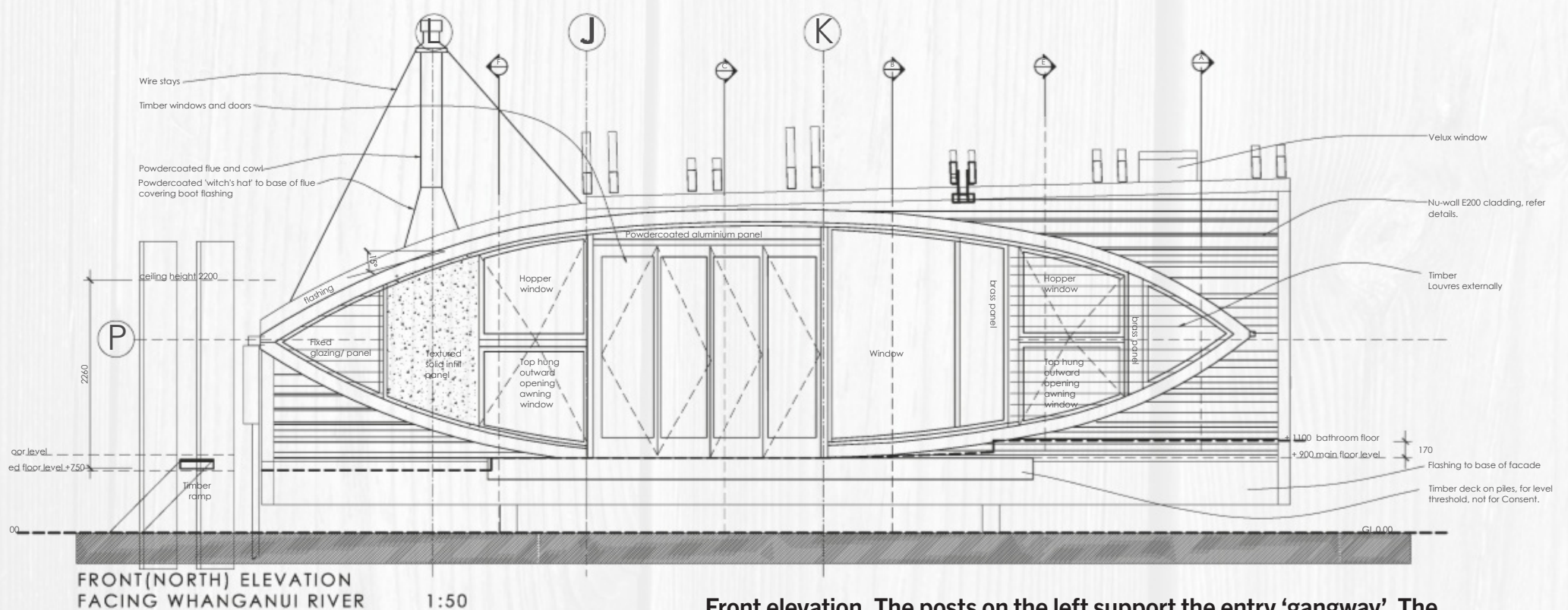
"I enjoyed working on it and everybody that worked on the boat could see the vision. They all wanted to be there."

The windows made by joiner Mark Thompson of The Door Shoppe echo the shape of the boat. Their making is a story in itself as is the copper roofing and other copper work, made by Kerry Buchanan of Wanganui Plumbing.

In the next issue we feature the interior of the Iona along with the joinery and copper work, all of which contribute to making this tiny house a work of art. 🏠



Shot showing the finished project from the river bank. The posts are ex Wellington Wharf and were supplied by Jurgens Demolition locally.



Front elevation. The posts on the left support the entry 'gangway'. The copper flue is for the Wagener Sparky miniature woodburner.



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Plasma cutting is one of the fastest means of cutting steel to shape

PLASMA CUTTING

**A GUIDE TO BUYING AND USING A PLASMA CUTTER.
PART SIX IN A SERIES ON HOW TO WELD**

By Greg Holster Photographs: Jude Woodside

Plasma' is a state of matter whereby gas or a mixture of gases is heated to an extremely high temperature and ionized to become electrically conductive. In plasma cutting, compressed air is the main source of supply with nitrogen the gas used for commercial or heavy industrial uses.

The electrically conductive arc is forced through a small, constricting orifice / plasma tip to create a high-velocity jet of ionized gas. The parent metal or workpiece is then melted away by the heat of this clean, controlled arc.

To put it into perspective, lightning is probably one of the most recognized

forms of plasma. The lightning is looking for an earth in the same way that the plasma machine looks for the earthed workpiece.

The intense heat of the plasma arc is around 22,000°C. Compare this with oxyacetylene at around 3150°C or oxy/LPG at 2850°C, and you will have an idea of the energy created. To



reach this, plasma machines use DC power sources with very high open-circuit voltages.

That can be lethal. As a result, most good machines have a safety system called ‘parts in place’ to prevent accidental shock. If you disassemble the nozzle, the machine will automatically cut the power to the head. But it’s wise to turn the power off before changing electrodes anyway.

What it will cut

Plasma is ideal for cutting both ferrous and non-ferrous metals. Aluminium and stainless steels are the most common, as well as thin steels and zinc-coated alloys. Some types and brands of plasma cutters struggle with brass and copper. So, if you have a need to cut these materials, try the machine first! Heat-affected zones are very narrow in plasma-cut materials, especially in thin metals where heat from oxy/acetylene gas at the cutting edge can cause twisting or distortion.

Plasma is very fast compared with other hand-held cutting methods. This makes it popular in the sheet-metal and panel-repair industry, where this ionized arc is hot enough to burn through paint, rust, and various other metal coatings with ease.

“As a result, most good machines have a safety system called ‘parts in place’ to prevent accidental shock”

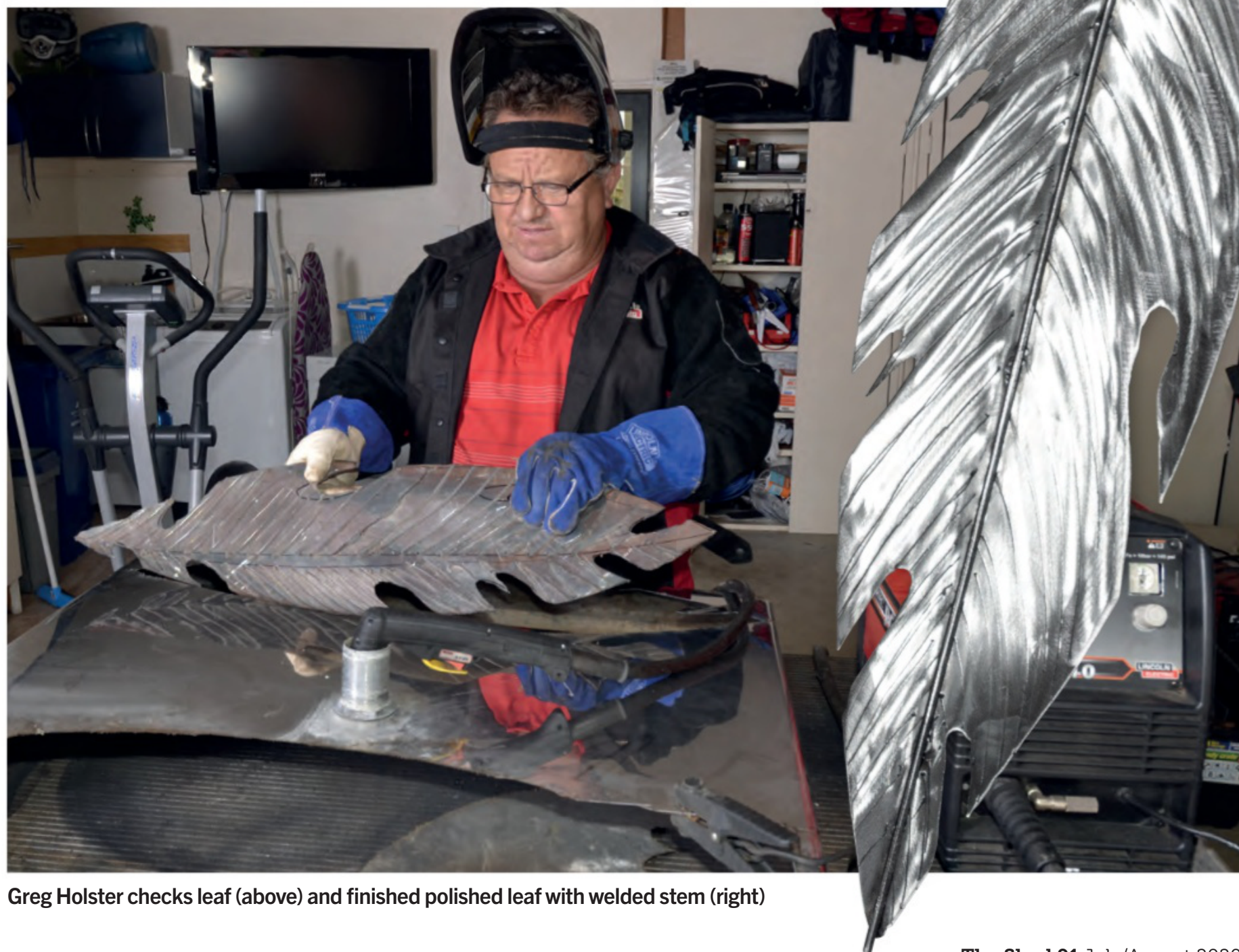
Cutting thicknesses for single-phase machines usually range from 0.5mm up to 12mm, although on some machines a cut at the 12mm mark looks more like a shark bite. My advice if you want to cut up to 12mm is to test the machine. Cutting 10–12 mm all day long with a single-phase machine is a big ask. You are entering into a 50A

upwards-sized machine, and these come only as three-phase units.

The big three-phase specialized plasma units are capable of cutting aluminium and stainless more than 50mm thick at almost a metre a minute.

Starting to arc

A high-frequency pilot-arc or a retractable-contact start is required to initiate the arc. This arc is transferred through a handpiece or torch. The head of the torch contains a tungsten or hafnium-tipped arc electrode and a tip with a constricting orifice. The orifice size changes to suit the amperage. The higher the amperage, the larger the diameter of the orifice. ►



Greg Holster checks leaf (above) and finished polished leaf with welded stem (right)



Gouges representing leaf veins, cut freehand



“Many machines have been blamed for leaving too much dross when the real culprit has been travel speed that is too slow”

Shield cup, cutting tip and electrode

Compressed air at between 50 and 65psi is the main source of gas supply. Straight nitrogen, oxygen, and argon/helium mixtures can be used for production-type mechanized cutting of stainless steel and aluminium and other specialized metals. However, compressed air is the most common and cheapest form of pressure for the average single-phase plasma machine. Clean air supply is a must when using a compressor. Add a good filter — it will pay for itself in a very short time. If oil or water in the form of dirty air passes through the plasma arc, the electrode and tip will burn out very quickly. The cut quality will also be affected.

Of all the metal-cutting processes, whether mechanical, gas, or electric powered, plasma cutting has the ability to give the operator the most freedom to cut difficult shapes. Plasma is also fast, with minimal heat input or distortion. It has the ability to be used in creative work as well as in commercial or industrial applications.

What to look for

The important questions to ask when buying a plasma cutter are:

- What kind of material do you plan to cut?
- How thick is the material likely to be?
- What are your budget limitations?
- How often will the machine be used?
- What standards does it conform to?

This is a really important one.

I would certainly recommend, when you are buying a plasma cutter, that you try it out first.

Cutting speed

Finding the correct cutting speed will help eliminate dross. ‘Dross’ is the slag left underneath the cutting edge. Many machines have been blamed for leaving too much dross when the real culprit has been travel speed that is too slow. The leaf I cut out had a bit too much dross but that was because I was concentrating more on following the line. A good flap disc cleans up the edge in no time.

Safety

Like any cutting or welding process, plasma has its share of hazards:

- Fumes: be aware that these metals are being melted at very high temperatures with some very nasty by-products.
- Arc: use a minimum of No. 5 shade for very low amp cutting, Nos 6–9 shade for medium amperage machines, and Nos 10–14 shade for high amps. The instruction book should outline these points.

Welding lens shade numbers refer to the lens’s ability to filter light. All auto-darkening welding helmets that meet the appropriate standard provide 100-per-cent protection against harmful infrared and UV rays. They may range from a No. 8 shade for low amp applications up to a No. 13 shade for high amp applications. Top-line helmets include additional ranges (No. 3 to No. 8) for grinding or cutting.

- Arc burn: wear gloves and a long-sleeved shirt; this is not a healthy way to get a tan.
- Sparks: where is the dross going? Keep the cutting zone clear of flammables, rags, etc.
- Wear safety gear, including heavy-duty trousers, leather apron, or heavy cotton overalls.
- Use common sense.

A good instruction book will point out all of these hazards in more detail. If it doesn’t, don’t buy the machine. ►



These two pins in the heads are microswitches for the parts-in-place sensor, which helps prevent accidental electrocution when changing electrodes

Two types

You will find two types of plasma cutter available in the cheaper price range. The cheapest models do not have high-frequency or pilot-arc start. Most of them have a retract contact start or lift arc. This means the handpiece must be pushed down on the metal to initiate contact to start. This does not always work that well, so definitely try starting and cutting numerous times before deciding on this type of machine.

The second type will have a high-frequency or pilot-arc start. This high-frequency start is normally the preferred option. Push the button and you are cutting. It is generally much less hassle and very simple to use, especially for the novice.

Trial

While trying out the plasma cutter, be aware of the cut quality, how well you can see the cutting nozzle, and the cut being made. You need to be able to see where you are going. Try

a few different types of materials — aluminium, stainless, maybe a piece of copper or brass. Try the unit on the different thicknesses that the manufacturer specifies. Some models have drag tips that allow you to have the nozzle in contact with the metal being cut. This is ideal for beginners or when cutting using templates. Like most things, you get what you pay for.

The torch

The plasma torch is the secret to the plasma process. There are a lot of plasma cutters shoved into a corner because the torch is inferior. The power source is probably fine. Some cheap imported machines have very short-life parts and can be expensive. Who's bought a printer and found out the cartridges are a horrendous price?

So ask the right questions before purchasing.

- What is the cost of the consumables?
- What safety features does the machine have? Because of the very high voltage available at the

handpiece, a parts-in-place sensor is a must. With this feature, the machine will not start unless the nozzle and torch are in place — to avoid electric shock.

- Air compressor? Yes, you need one of these to supply clean air. The compressor should deliver a volume of 8cfm or more, but I have seen smaller compressors used. A lot depends on the brand and model, and how many times the motor can start before overheating. Plasmas do like a lot of air.
- You will notice that after you cease cutting, post-flow air will continue for another 10–20 seconds. This post-flow cools the consumables.
- Cutting tips? Most brands of plasma will have the facility to use two different types of tip: a stand-off tip for higher amperages, and a contact or drag tip for, say, 25A or under. I like using the drag tips when using a straight edge or a template. The stand-off is good when following a line or for gouging.



A school of fish cut using a template



The front panel on the Lincoln Electric Invertec PC210 showing the amperage control and a switch to turn the internal compressor on or off

Set-up checklist

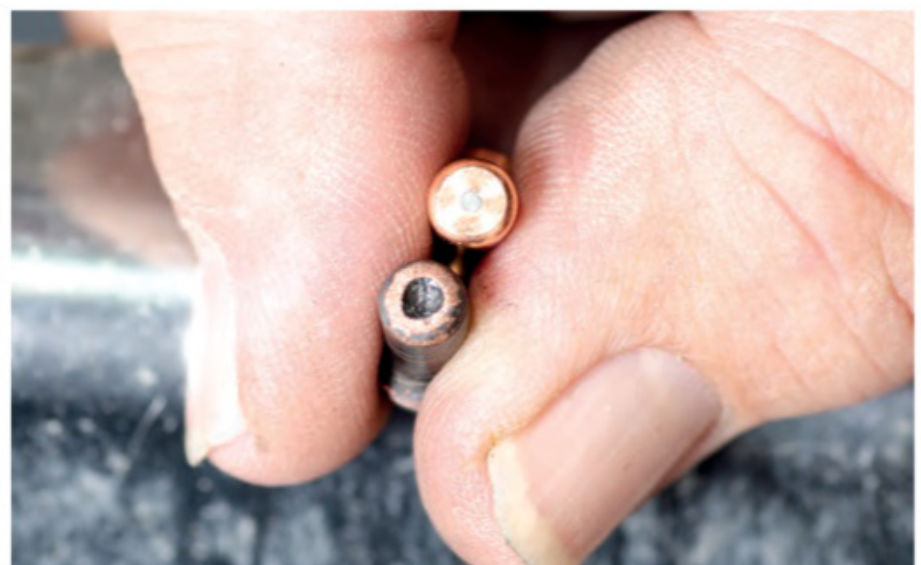
Before starting, check the following items.

- You will need a clean, compressed-air supply, free of water or oil. Tips and electrodes that wear quickly or black burn marks on the plate may mean that the air is contaminated.
- Correct air pressure. All good machines come with a readable gauge on the unit and usually have the correct settings from the factory. Check the instructions.
- Be sure that a nozzle, tip, and electrode are correctly in place.
- Does it have a good earth?
- Read the instruction book.
- Don't make the mistake of buying a plasma machine because of its low cost. A cheap machine that doesn't cut well or costs too much to run is certainly no bargain. The machine we used to cut our shapes was the Lincoln Electric Invertec PC210 single-phase plasma machine with a built-in air compressor and the ability also to use external air. Notice the nozzle shape, which makes it easy to see the cutting line. There is a huge range of plasmas available. If you are unsure about an unknown brand, ask who the repair agent is and talk to them. 📄

“Don't make the mistake of buying a plasma machine because of its low cost”



Plasma cutting is one of the fastest means of cutting steel to shape



Showing how the electrodes wear: the top one is a new electrode with a hafnium insert; the bottom one has been flogged out

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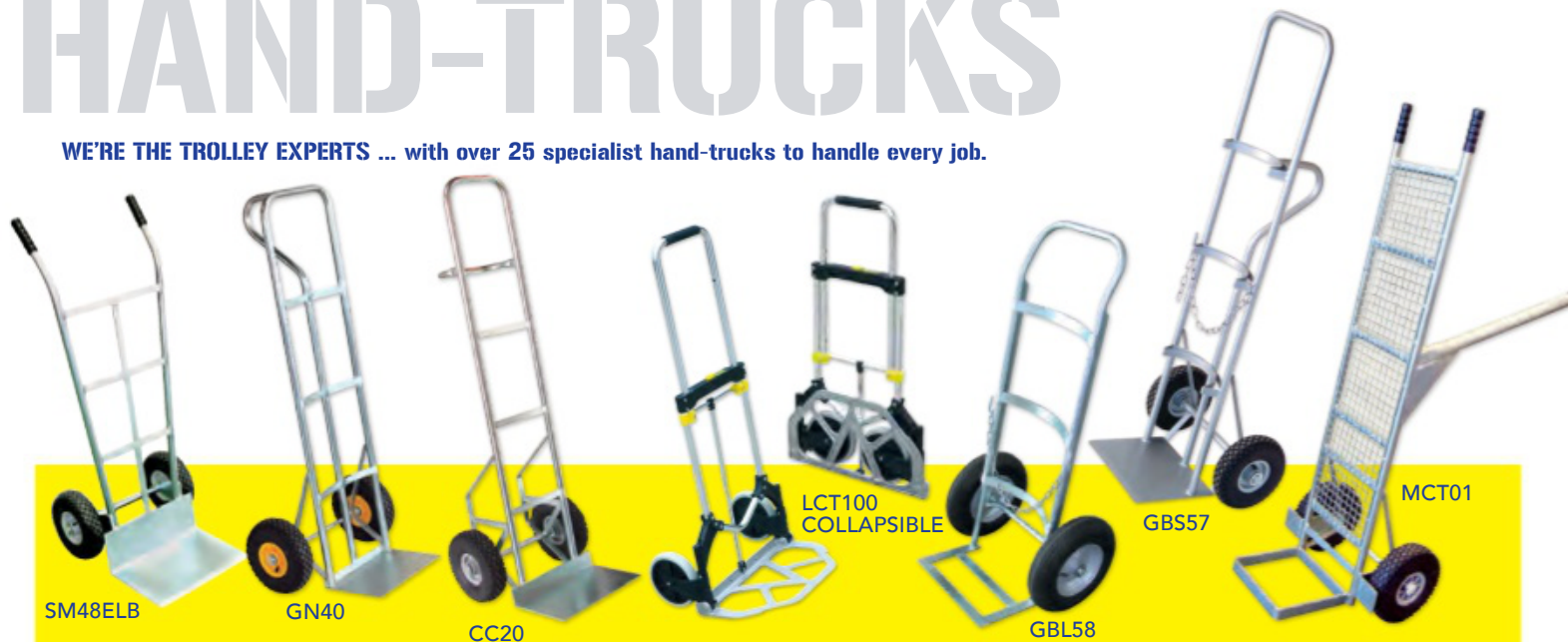
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THE ROMANCE OF TOOLS

THE HISTORY OF TOOLS GIVES US A GLIMPSE INTO THE PAST

By Ritchie Wilson

Photographs: Ritchie Wilson



Pre-war US tool catalogues and four home made tools

Many sheds have things on their shelves that are visually interesting but not strictly useful — perhaps a torque wrench the sheddie made during their apprenticeship, a tool or toolbox that was their father's or grandfather's, or an antique mechanical curiosity of some kind.

Most woodworkers lucky enough to own a very valuable Stanley No. 1 bench plane or a Sargent No. 1507 Ladybug rebate plane would have it on display rather than be using it. These two planes command such high prices that modern reproductions of them are available.

Valuable antique tools

Some sheds, of course, have more than just a few 'display only' tools and their owners may have spent significant sums accumulating their collections. Serious tool collectors will have an encyclopedic knowledge of their particular enthusiasm and will have formed definite opinions about the history of tool use in New Zealand — for instance, the relative rarity of old tools being found in their original box. Antique tools in their own box (IOB) may be worth twice as much as the tool alone.

A retired plumber who is a prolific collector told me that New Zealand tradesmen had historically been paid

less than their counterparts in some other countries and that their tools — almost all of which were imported — had been much more expensive. This meant that New Zealand workers couldn't afford to buy a lot of gear; every purchase had to be carefully considered. When they did buy a tool it was because they had a real and continuing need for it. And the tool would be worked hard. The boxes containing tools used very regularly would have a hard life and would soon fall apart. The boxes that have survived are often extensively repaired with packaging tape, or have been replaced with a new, more durable box made by the owner. ►



Examples of home made tools. The Stanley Tools (UK) DIY book “designs for making your own furniture” (1966) looks futuristic even today

Good as new

Ironically, the tools that regularly turn up in boxes in good nick are tools that are not very useful. Record fibreboard planes such as the Record No. 735 or Record No. 730 are usually found in very good condition, in relatively undamaged boxes, indicating that their owners didn’t use them very much — if at all.

Even more ironic is that the only New Zealand plane produced commercially in any numbers is the Starkie, a fibreboard plane, although I have only seen one in a box. According to the pamphlet inside that Starkie’s flimsy grey cardboard box, the plane was made by DH Henry and Co, 12–14 Nelson Street, Auckland — just a block or two away from the offices of *The Shed*, amongst the high-rises of downtown Auckland.



These three cardboard boxes are for woodworking routers; all show characteristic damage caused by the projecting depth-gauge rod

Repairs reduce value

One result of the relatively high cost of tools is that many tradesmen would repair a broken tool rather than replace it. Woodworking planes or spokeshaves made of cast iron can be easily damaged when they fall even short distances onto a hard surface, and I have seen several which have been repaired by brazing.

Today, a repaired tool is virtually worthless. Tool collectors have to be very careful that the tools they buy haven't been repaired or modified.

Another result of costly tools was that skilled tradespeople would make a copy of an imported tool, usually at their place of work. Versions of items from Stanley's extensive pre-WWII catalogue cast in brass or gunmetal rather than cast iron turn up on

Another result of costly tools was that skilled tradespeople would make a copy of an imported tool



The box on the right, for a heavy Record 073 rebate plane, has a very high percentage of Sellotape and is in critical condition. The box at the rear, for a Carter router, is of robust Australian cardboard construction and has survived in quite good condition

Internet auctions. It is rumoured that these may have been produced in New Zealand Railways' long-gone giant railway workshops, where many skilled craftsmen used to work and where the tools made would have proved useful.

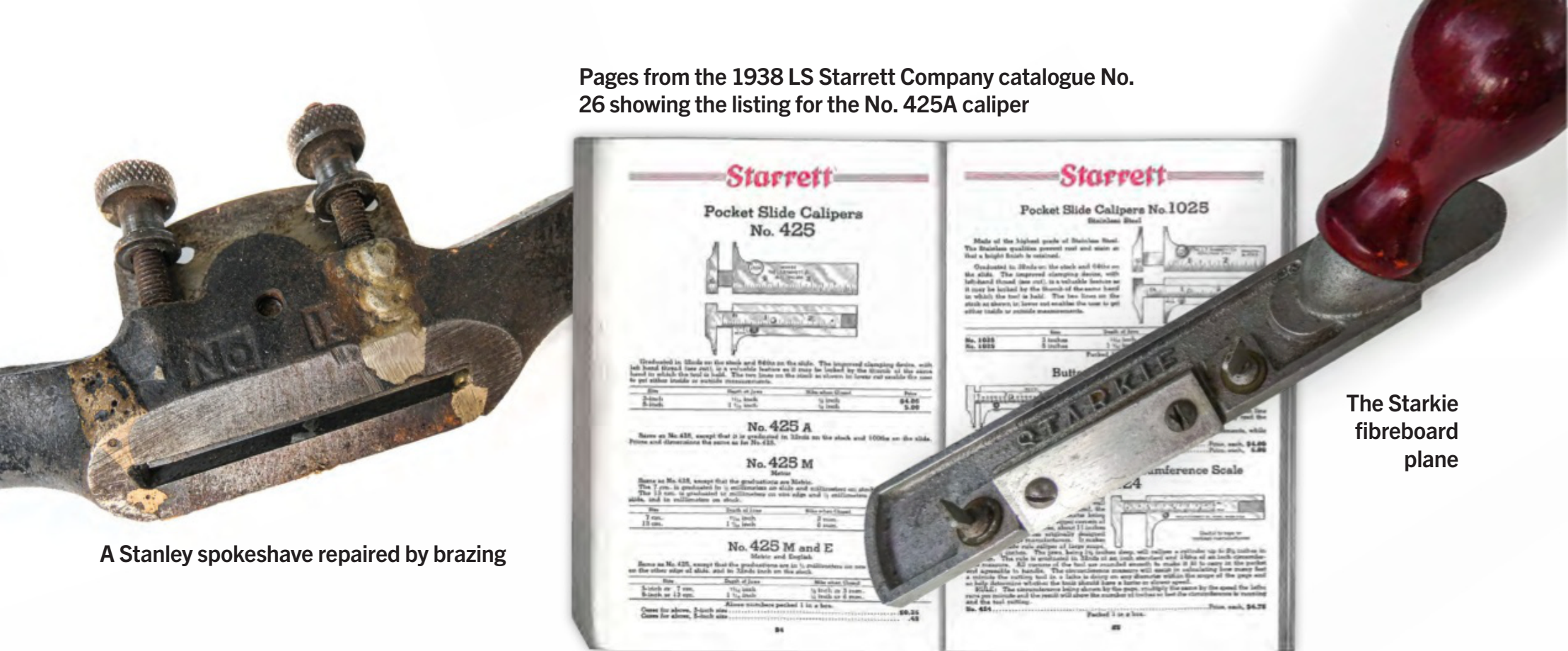
Decades ago I saw an older carpenter, hired to install shelves in the government department where I

was working, using a 'granny's tooth' router he had made. He told me he had cut out the base from about a 12mm steel plate with a hacksaw and drill and had used wooden door handles as the two grips. The cutters were Stanley ones he had purchased from the company's spares department. It worked just fine, too. ►



Two fibreboard planes — top: a Record 730; below: a New Zealand-made Starkie. Note the projecting disposable cutters. The two small blue packets with yellow labels contain replacement cutters

Pages from the 1938 LS Starrett Company catalogue No. 26 showing the listing for the No. 425A caliper



A Stanley spokeshave repaired by brazing

The Starkie fibreboard plane



Two torque wrenches, an apprentice piece and an Australian Sidchrome example



Above: The ruined Starrett calipers and a pair of pliers with nicely modified jaws

Left: At the front is a Stanley 50 rebate plane with adjustable fence; at the rear is a home-made copy of the similar Stanley 45. The cutter securing piece is from a 45, but the rest has been made by the local constructor. Only close examination led to the conclusion that the fence wasn't genuine Stanley



Routers and boxes — top: an Australian Carter, made in Parramatta in New South Wales; middle: a possibly New Zealand-made example, which has handles that closely resemble drawer knobs; bottom: a British Marples

My tools

I own several tradesman-made tools. I have a couple of simply-made routers and a copy of a Stanley 45 multiplane, all made from steel plate cut and welded. The multiplane has a genuine Stanley blade holder. Perhaps the original owner had broken the cast-iron body of his 45 and fabricated a new body to replace it, incorporating the unbroken part. Regrettably, the 40 or so cutters supplied with Stanley 45s didn't come with my hybrid.

I also have a 'bending beam' torque wrench that was made by motor-engineering apprentices at Christchurch Polytech — now called Ara Institute — as part of their training. The torque wrench is well made, but the marking of the

calibrations seems rather rushed. I have seen another that was unfinished; perhaps time was short at the end of these courses.

I have recently bought locally a Starrett 435A Vernier caliper, with quite beautifully engraved 1/100 inch markings. It has had one of the jaws cut

off, with a complex-shaped replacement silver soldered in place. The other jaw has a milled steel addition skilfully riveted to it. There must have been an urgent need to measure the differences in size of similar, irregularly shaped objects to warrant the mutilation of one of Starrett's particularly nice devices. ►



The open-ended spanners both show the same modification for some unknown job

At first glance this smoothing plane looks like a very cleverly repaired example. The cutter holder is wooden and also serves as a back handle. The cam holding the lever cap — which holds the cutter in position — is innovative, applying pressure as the lever is pushed forward rather than in the opposite direction as is usual



Bending spanners

I bought an old Sidchrome spanner because it was a type (Whitworth) that fitted the fastenings on my pre-war British car. The price was drastically reduced because the shaft of the tool had been bent at right angles near one end to enable the spanner's jaws to access a hard-to-reach nut. Some months later I saw the same-sized spanner — this time a Stahlwille — bent in exactly the same way. Evidently, in times past, many motor mechanics in New Zealand had a bent 5/16 Whitworth spanner in their toolbox to work on some popular British car. The Ford 10? Austin Seven?

Evidently, in times past, many motor mechanics in New Zealand had a bent 5/16 Whitworth spanner in their toolbox to work on some popular British car

The pattern-maker's plane with replaceable wooden soles; the cutter and its securing clamp are missing



The name is a clue to the plane's origin; there is also an inconspicuous X4 cast on the base



Plane and replaceable wooden soles



A home-made wooden butt gauge, for marking out the rebates required for installing door hinges, etc. The brass sliding pieces with a steel point soldered to the end move in dovetailed housings in the wood. The settings are kept secure by tightening the screws. Today, electric routers and templates are very widely used to cut hinge rebates quickly, so newer butt gauges often show little use

Pattern-makers make the patterns used in metal foundries. The pattern is often made of wood, the shape pressed into casting-sand and then removed, leaving a void in the sand. Molten metal is poured into the void and, when the metal cools and solidifies, reproduces the pattern in metal — more or less. Pattern-makers are extremely skilled woodworkers and have many specialized techniques and tools, including planes with rounded soles and cutters to match. A full set of pattern-maker's curved sole planes would be expensive, so varieties with a set of replaceable soles are available. The example shown here was started by a pattern-maker who cast the body in aluminium and had begun to fashion the various wooden soles with different radii with cutters to match. The unsophisticated cutter retainer — a wooden wedge — made depth of cut adjustment time-consuming and resulted in the maker losing enthusiasm. Only a couple of soles were finished. ►

The scarlet butt gauge was made by Sydney-based Silex Tools



The plane at the bottom was made from one similar to the Scottish plough plane at the top. The body of the plough plane has been put through a thicknesser to make a very thin grooving plane. The openings for the arms of the fence and the depth-stop mechanism have been blocked with filler. It would, perhaps, have been easier to make a grooving plane from scratch and so preserved a useful plough

Home or factory made?



I purchased an unusual-looking smoothing plane from a tool dealer thinking it had been drastically modified by a previous owner. It was similar in size to a Stanley No. 4 or a Record 04. The plane had had the back handle (called the tote) and the blade holder (the frog) replaced with a single wooden handle. It occurred to me that this may have been the prototype for a new type of plane. However, a wooden frog with a blade that is moved while being adjusted clamped to it would probably suffer rapid wear and would have a limited life, so I thought it was probably another example of a damaged tool being repaired by an owner who couldn't afford to replace it. The plane, I theorized, might have been dropped, the cast-iron frog snapped, and a wooden replacement crafted, the incorporation of the tote with the frog an inspired innovation.

The first clue that I was mistaken was the machining of the blade-holding surface of the wooden frog. It was very precisely routed, with a much better finish than would be expected from a one-off. Close inspection revealed the symbol X4 cast in the tool's body. A search for X4 online immediately turned up images of my plane and its unexpected history.

The Marples X4 plane was designed by David Pye and produced in Britain between 1955 and 1965 by the old-established Sheffield firm of William Marples and Sons, Ltd.

It was highly regarded as an innovative design and was granted Registered Design No. 873,964 in 1955. Notably, its cutter end is always supported by the body at the plane's mouth, so reducing chatter, and the mouth is adjustable so it can be made very small, allowing very fine shavings to be produced. X4s are apparently sought-after tools today and command high prices on Internet auction sites. My example has been thrashed and looks a sorry sight. A previous owner was so concerned that other workers would appropriate his X4 that he has drilled his identification mark on it in no fewer than four places.

It's English, Jim, but not as we know it



Britain and the USA have been described as “two countries separated by a single language”. This is especially noticeable in the case of tools. Spanner or wrench? Stanley knife or box cutter? And what, exactly, is a tire iron?

Wood planes are usually named for the job they do. A smoothing plane smooths the surface of a piece of wood; a jointer plane straightens the edges of boards so that they can be closely joined together. So a rebate plane cuts a rebate — a step-shaped thinner portion — in the edge of a plank. The distinctive feature of a rebate plane is that its body has openings to allow a full-width cutter to be fitted, so it can plane right into the corner of a rebate.

The original name for a rebate in Britain was a rabbet, from the French word for planing. This is what the first English settlers in America would have called it. In Britain the name changed (as names do) to rebate, but it remained rabbet in the New World — just as the Australian accent is thought to be a remnant of the way English people spoke when they first arrived in Botany Bay; the accent changed in Britain but it didn't down under. So rabbet and rebate are synonyms and a rabbet plane is the same as a rebate plane.

A fillister, or filletster, plane also cuts rebates. An adjustable fence guides the plane so that the rebate is of a certain width. When a rebate plane is being used, the rebate width is controlled either by a straight batten clamped along the board or just by eye. A nicker — spur in North America — cuts the wood's grain in the corner of the rebate.

A housing, or dado, plane cuts a rectangular trench in the surface of a board. It is a rebate plane with a nicker on both sides and usually has a fence.

A shoulder plane is a rebate plane used for trimming the end grain at the shoulders of a tenon. It has a finer mouth and a lower set cutter (iron/blade). This type of plane is called a cabinet maker's rabbet plane in North America.

A bull-nose plane is a rebate plane with the cutter nearer the front so that blind rebates can be planed more easily.

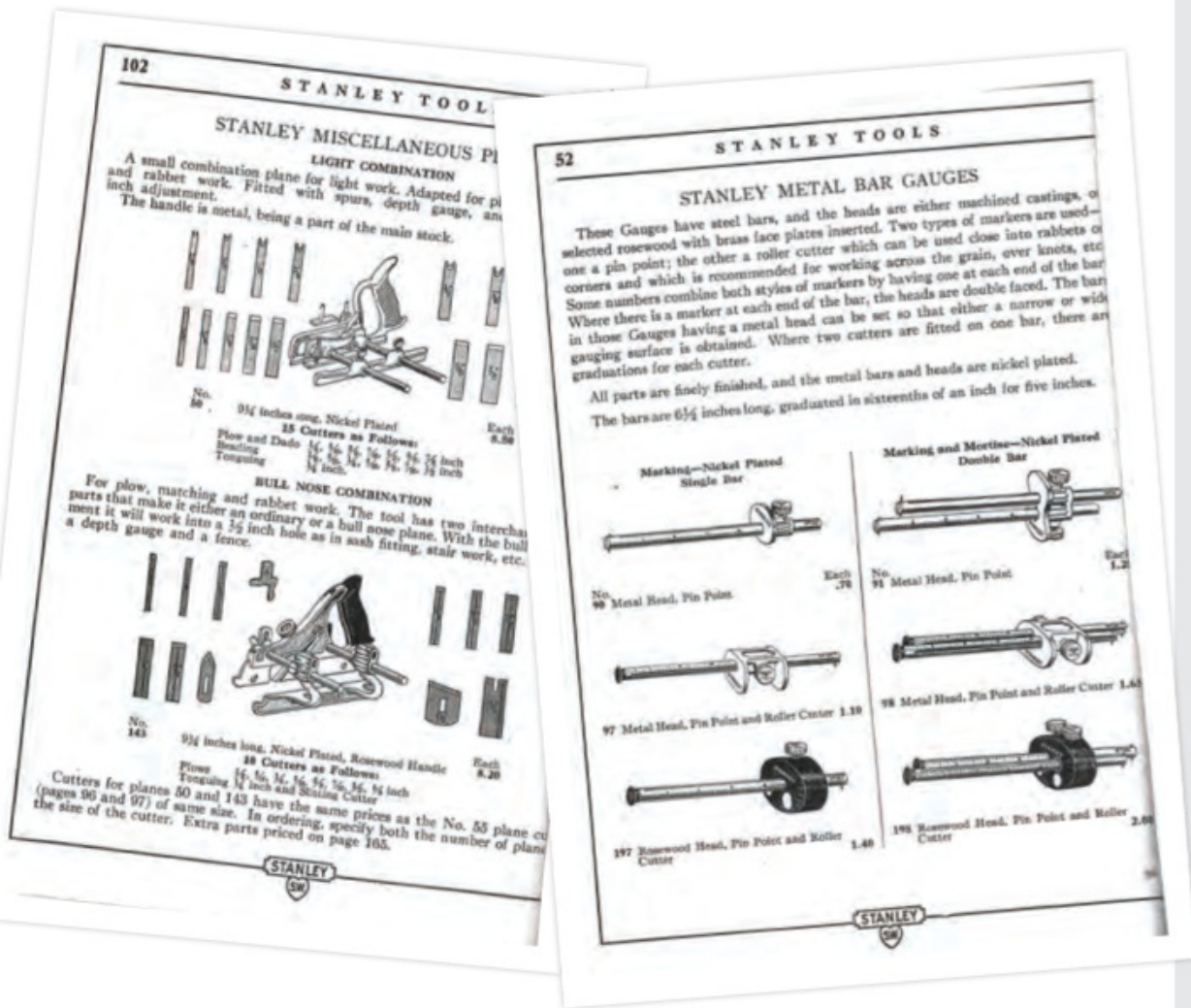
A chisel plane has the cutter at the very front of the plane.

One of the planes Stanley still produces is the No. 78 Duplex rabbet and filletster plane. The fence is removed to make it a rabbet plane and the cutter is moved to the forward seat to convert it to a bull-nose rabbet plane.

British Name	USA Name
Rebate plane	Rabbet plane
Fillister plane	Filletster plane
Housing plane	Dado plane
Iron	Cutter
Nicker	Spur



Four marking gauges — the two in the middle are factory made; the left and right ones are craftsman made. The left one is made from aluminium; the right one is made of steel. The steel one has a fence made from steel components brazed together. The steel rod has a groove nicely milled in it. The mortise gauge — the one with two rods — is another Silex Tools product



Pages from the 1925 Stanley Tools catalogue No. 34



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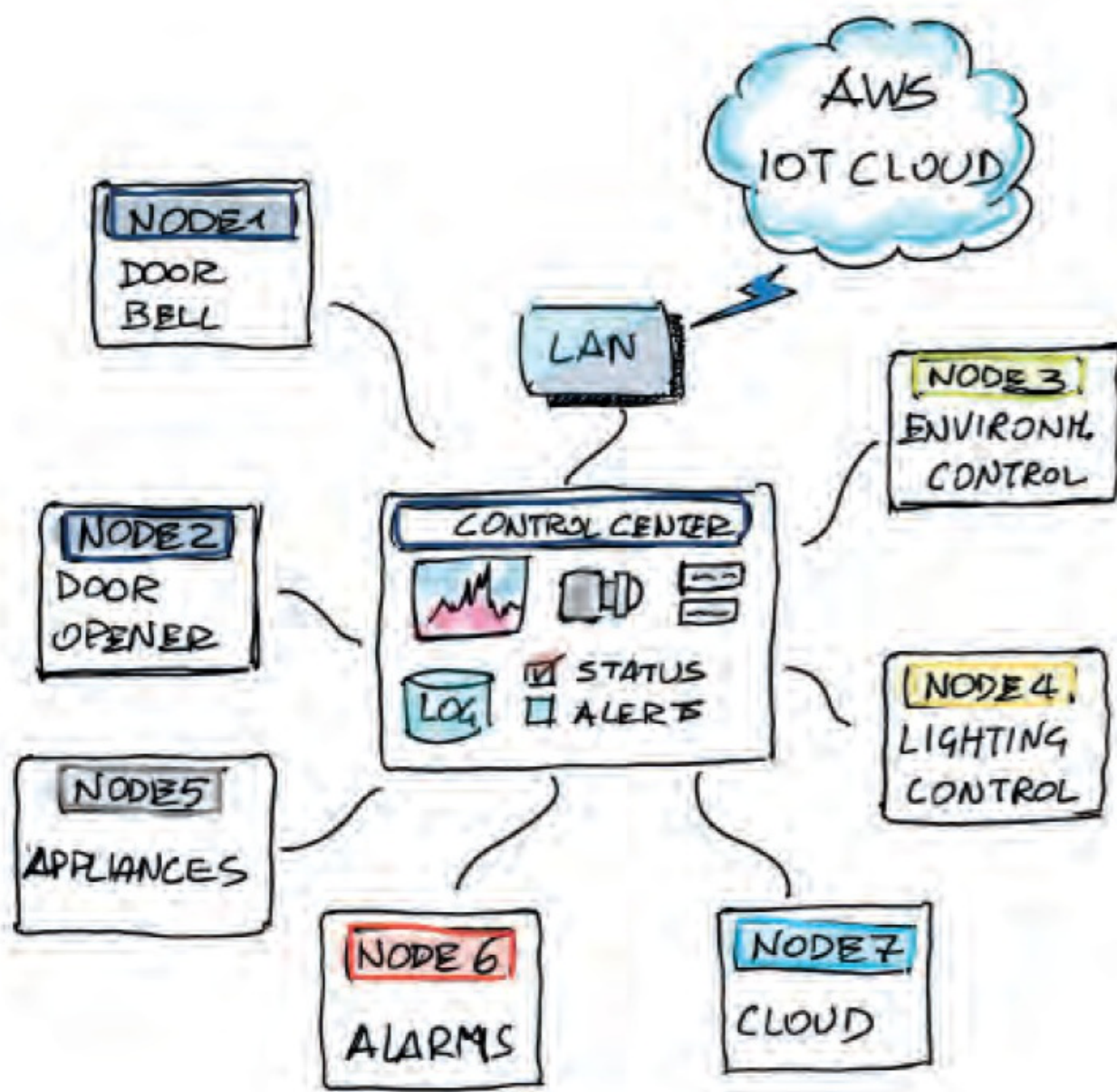
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Scheme of the Smart Home Global Project: every home area is controlled — and that includes feedback — through a node. The home nodes are connected through the local Wi-Fi to the control centre, based on a Raspberry Pi 4B, and are able to complete the following tasks:

- Integrate the information and alarms coming from the other nodes
- Create a history log
- Show the nodes' updated information on a panel on the screen
- Enable manual controls
- Send the most relevant information to the AWS IoT cloud for remote consultation and statistics (optional)

MAKE YOUR HOME A SMART HOME

YOU'VE GOT YOUR SMARTPHONE — NOW IT'S TIME FOR A SMART HOME.
DRAW ON ALL YOUR SHEDDIE SKILLS TO CREATE A HOME OF THE FUTURE

By Enrico Miglino — Photographs: Enrico Miglino

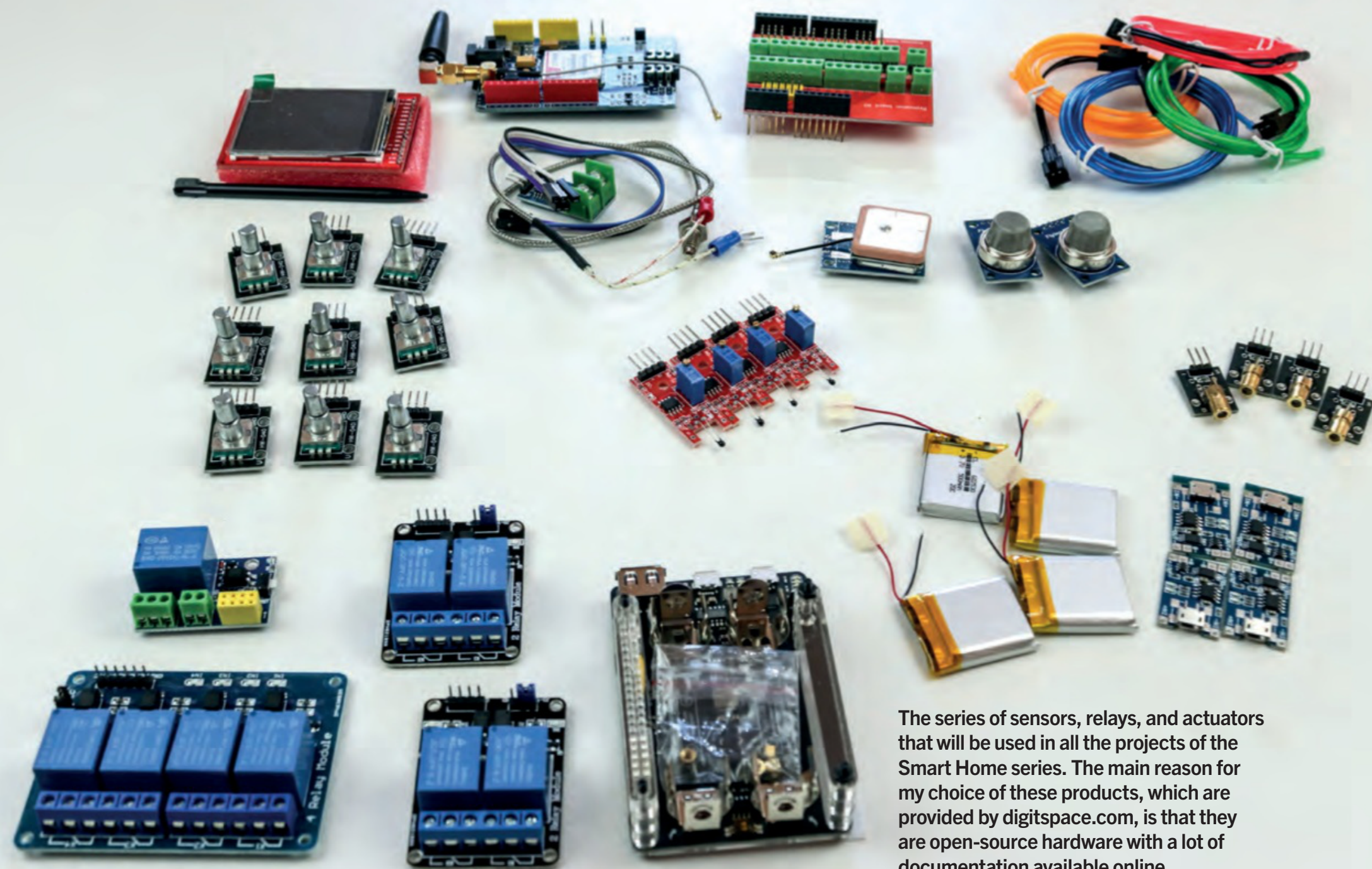
In this issue of *The Shed*, I am introducing a series aimed at making our living spaces better and more comfortable.

The projects in the “Smart Home and Internet of Things (IoT) applications”

series will include some of the great home automation upgrades that are now available. These projects will involve not just electronics and software but also electromechanics, mechanics, 3D printing, and other

sheddie skills such as woodworking.

I get a lot of enjoyment from undertaking these home automation projects and I'm sure you will also enjoy seeing them installed in your home.



The series of sensors, relays, and actuators that will be used in all the projects of the Smart Home series. The main reason for my choice of these products, which are provided by digispaces.com, is that they are open-source hardware with a lot of documentation available online.

“A series aimed at making our living spaces better and more comfortable”

A small budget

I have designed the projects to be as easy as possible, adaptable to very different living spaces. Every project can be undertaken as an independent home automation application, but each module also has the possibility of integration into an IoT home network that would allow all the modules to operate through a single control centre.

The projects will be focused on achieving the best possible results on a small budget. For me, the most challenging aspect in choosing the components has been to keep the total cost of the projects under \$1000.

Obviously, as sheddies, we should not only choose exactly how we want to make these objects but we should also depend on our own ability to assemble them. ►

The plan

What we will build

- A secure door lock controlled by a web browser
- A doorbell that can call the homeowner's smartphone if the homeowner is not present
- A two-way-secured password system to open the home's door with a pin and one-time-password (OTP)
- An electronic key to open the door with a credit card-sized BBC micro: bit
- An advanced heating control takes into account the temperature of every room
- A secure gas kitchen valve that makes it almost impossible to leave the gas on or the flame burning when not cooking
- An efficient dog water dispenser
- A lighting control
- A garden watering system linked to the weather report

What we will use

Each project is based on platforms that are easy to develop and manage:

- Arduino Uno, Mega, and Nano
- ESP8266 — different models
- A Raspberry Pi 413 (a Pi 3 Bt also works well)

All the circuits connecting the microcontrollers to the sensors use a few discrete components — mostly resistors, capacitors, and connectors — and can be built easily with prototyping PCB boards.



The software

Every project includes a part dedicated to the software. The choice of the microcontrollers makes it possible to use the popular Arduino IDE to program all of them, while the programs for the Raspberry Pi are developed with Python — powerful and easy to program. For all those readers with little or no experience in software programming, every software project will be available on a GitHub repository, tested and ready to use.

“Every project can be undertaken as an independent home automation application”

Sensors and handmade components

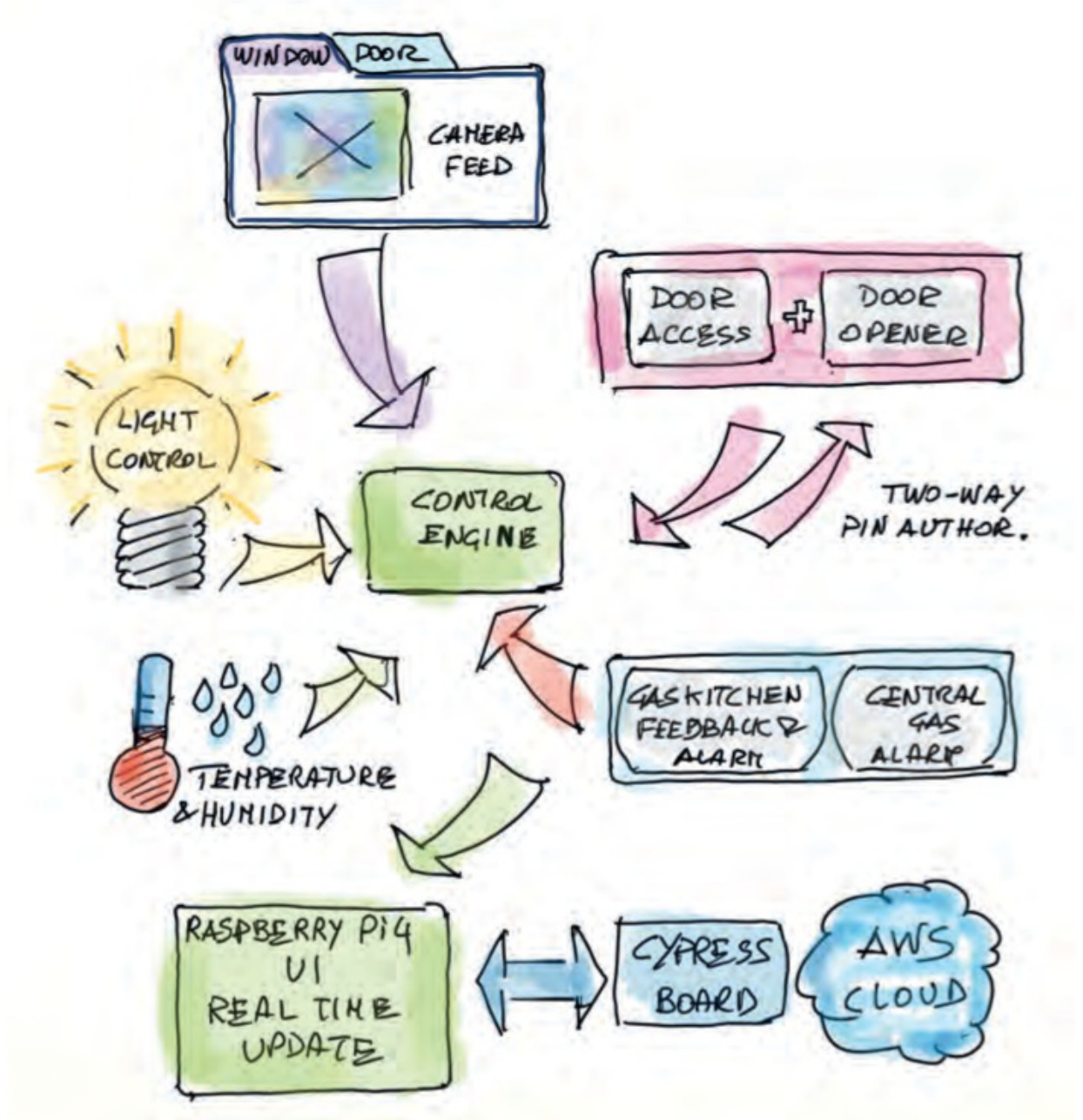
As I have been involved with 3D printing technology for many years, most of the handmade components (supports, cases, etc.) have been designed for 3D printing. The 3D-printable STL files will be available on the GitHub repository, but any alternative to 3D printing can be adopted as well.

The sensors I plan to use in the projects are open-source cheap devices that in most cases can be wired directly to the pins of the microcontroller boards without extra components.

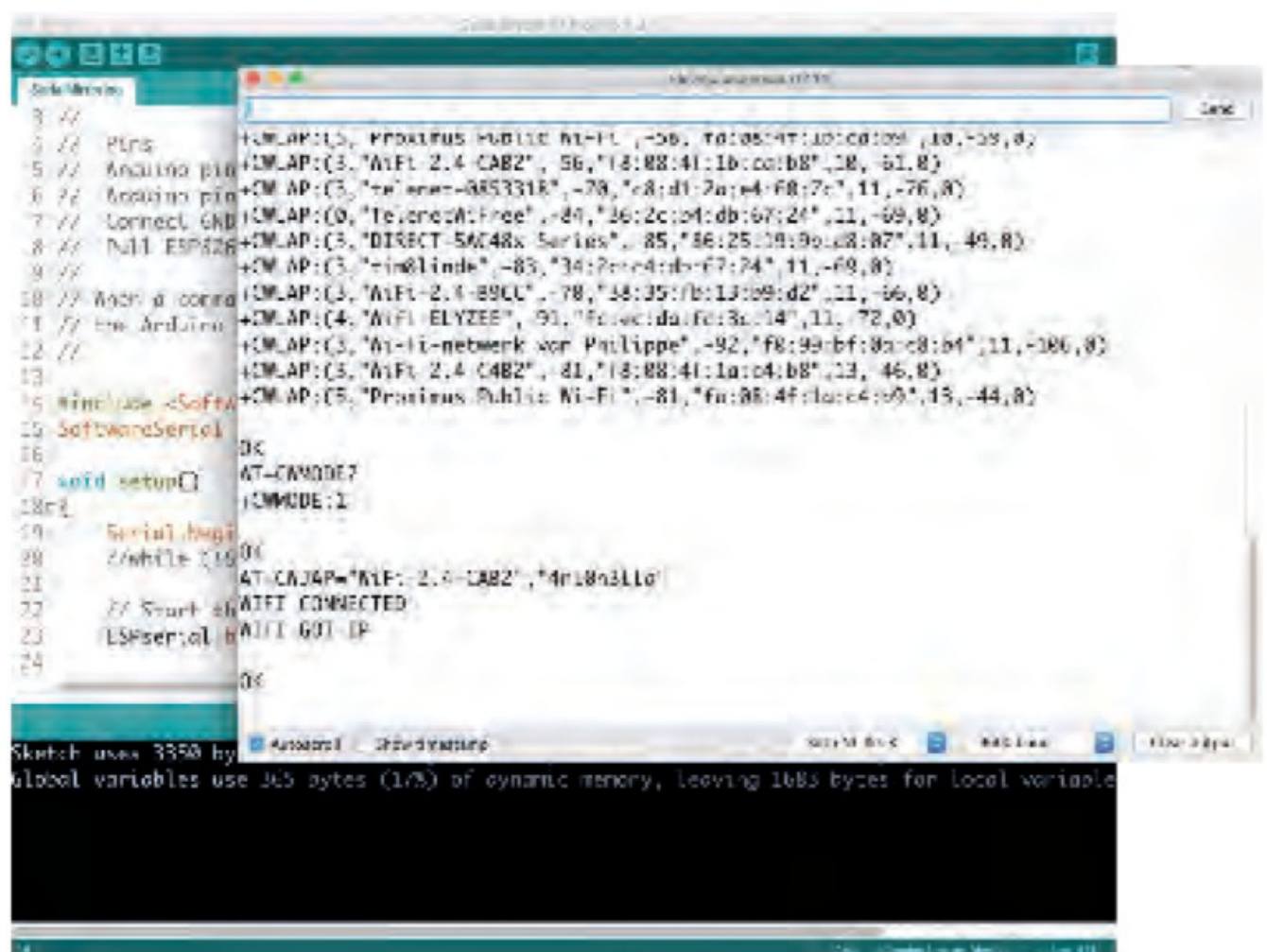
The home automation plan

To make things easy, I have divided the ideal living environments into ‘node modules’ — every module will cover one aspect of home automation. I have taken particular care of two important aspects in the design: the security and the feedback.

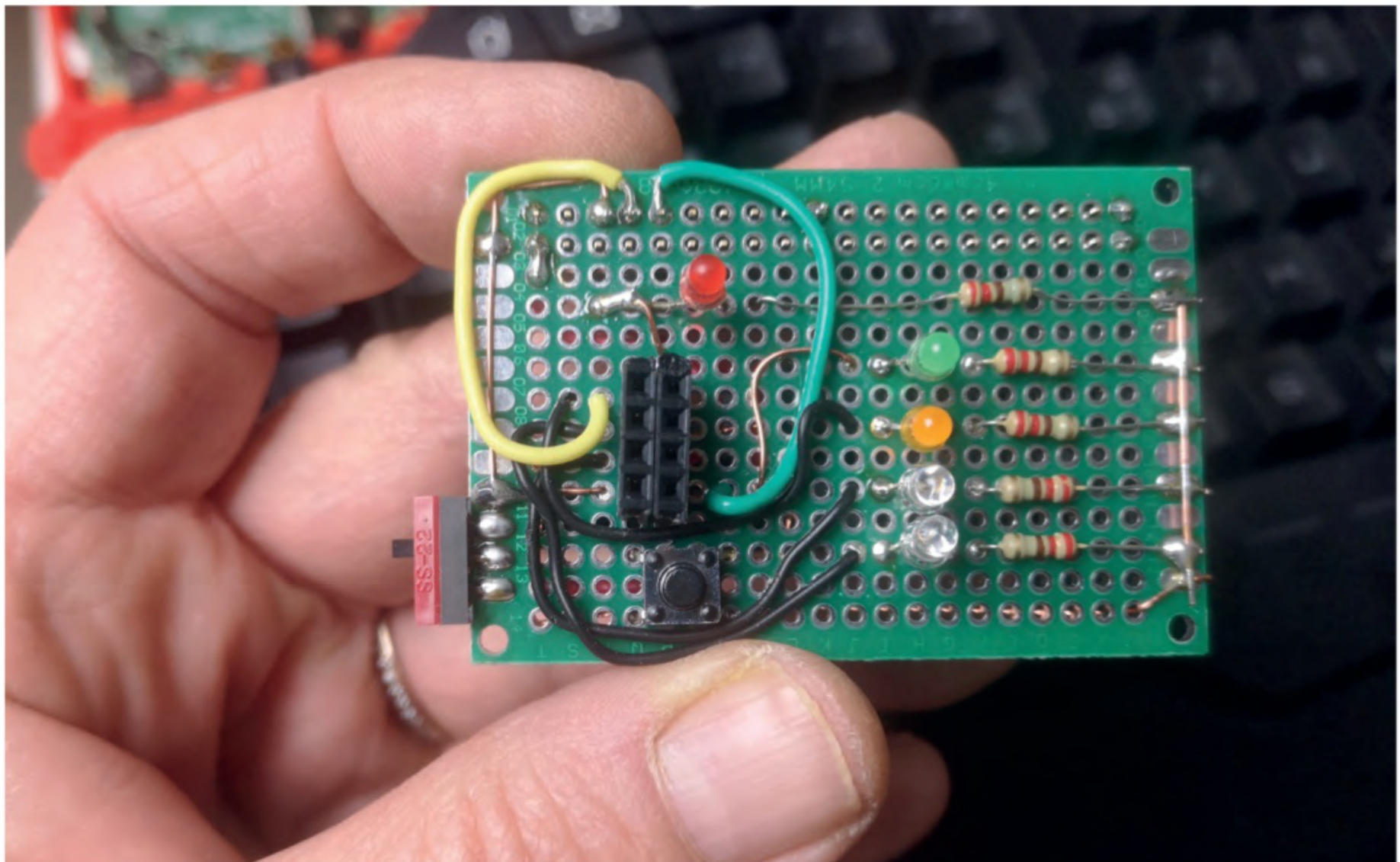
Commercial home automation solutions are frequently limited to generating alarms, locally or remotely, that eventually send messages to your smartphone: fire and smoke detection, overheating control, gas detection, and so on. On the contrary, every model



Scheme of how the control engine of the nodes interacts with the sensors. The projects are not limited to data acquisition for monitoring; after an alarm has been sent to the control centre — based on a Raspberry Pi 4B — the involved node also provides direct feedback to stop the state of alert.



The microcontrollers used in the projects — mainly from the Arduino family and the ESP8266 series — are easy to program using the popular multiplatform Arduino IDE (interface development environment). The image shows a test on an ESP8266 at work.



The small circuit used to program the ESP8266-01 microcontroller. As I mentioned in the article, if it is necessary to make a small circuit, a few discrete components — resistors, capacitors, LEDs, etc. — are sufficient, without the need for special electronic skills.

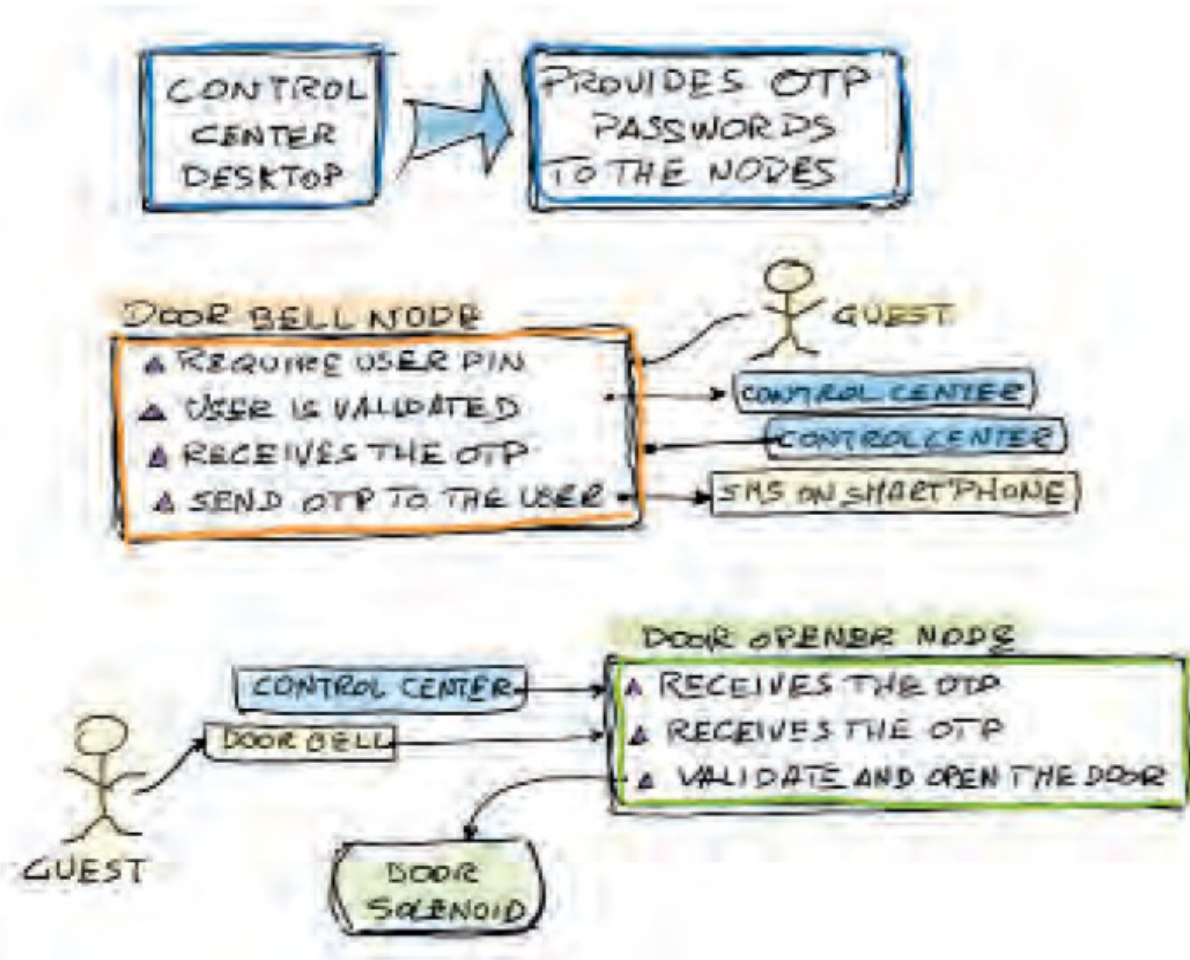
of the Smart Home Global Project includes, together with alarms and notifications, immediate feedback so that the source of the risk can be dealt with as soon as possible.

Coordinating all the projects — they come from a single global design —

simplifies the Wi-Fi connection of each node. I have tried to ensure that anyone who wants to modify one or more of the projects to their personal living environment will be able to integrate the project into a local IoT network and eventually store some of

the information in the cloud.

As the cloud reference I adopted the AWS (Amazon Web Server) IoT cloud service; it is sufficiently secure, available worldwide, and offers reliable options to implement a personal cloud Smart Home Network at no cost. In the articles discussing the cloud connection, I will guide readers on how to use the Amazon Web Services IoT cloud services efficiently at no cost or, at least, at a ridiculous price. This is because this personal Smart Home project — limited to the use of the essential data — generates so little traffic that the free plans offered by Amazon are more than sufficient to do the job. ►



The scheme shows how the secure, two-way password works to open the door, thanks to the 3G mobile module for Arduino provided by digitspace.com. The guest enters his identification pin on the doorbell numeric pad. If the Raspberry Pi recognizes the code, it will send back the opener pin to the guest's smartphone. For security reasons, this pin can be used only once.



The home automation projects do not only involve software and electronics but also require handwork and some mechanical hacking and changes. The image shows a robust electromechanical door lock opener connected to the actuator relay, controlled from a web browser through an ESP8266 microcontroller.

An in-depth look at the project

As mentioned, I have split an ideal home automation design into different ‘nodes’.

Every node refers to a specific aspect of the home that should be controlled or that can generate an alarm when a risky or potentially dangerous situation is detected. Nodes are functional areas of the home and can include more than a single device. The important characteristic of a node is that it can be considered a ‘controllable unit’: a group of IoT devices (boards and sensors) that can be identified on the network as a single IoT object.

The reason is that these devices — corresponding to different projects

“anyone ... will be able to integrate the project into a local IoT network”

able to act independently — are connected to each other inside the same node, and the notifications or alarms generated are the result of the interaction of all the node components.

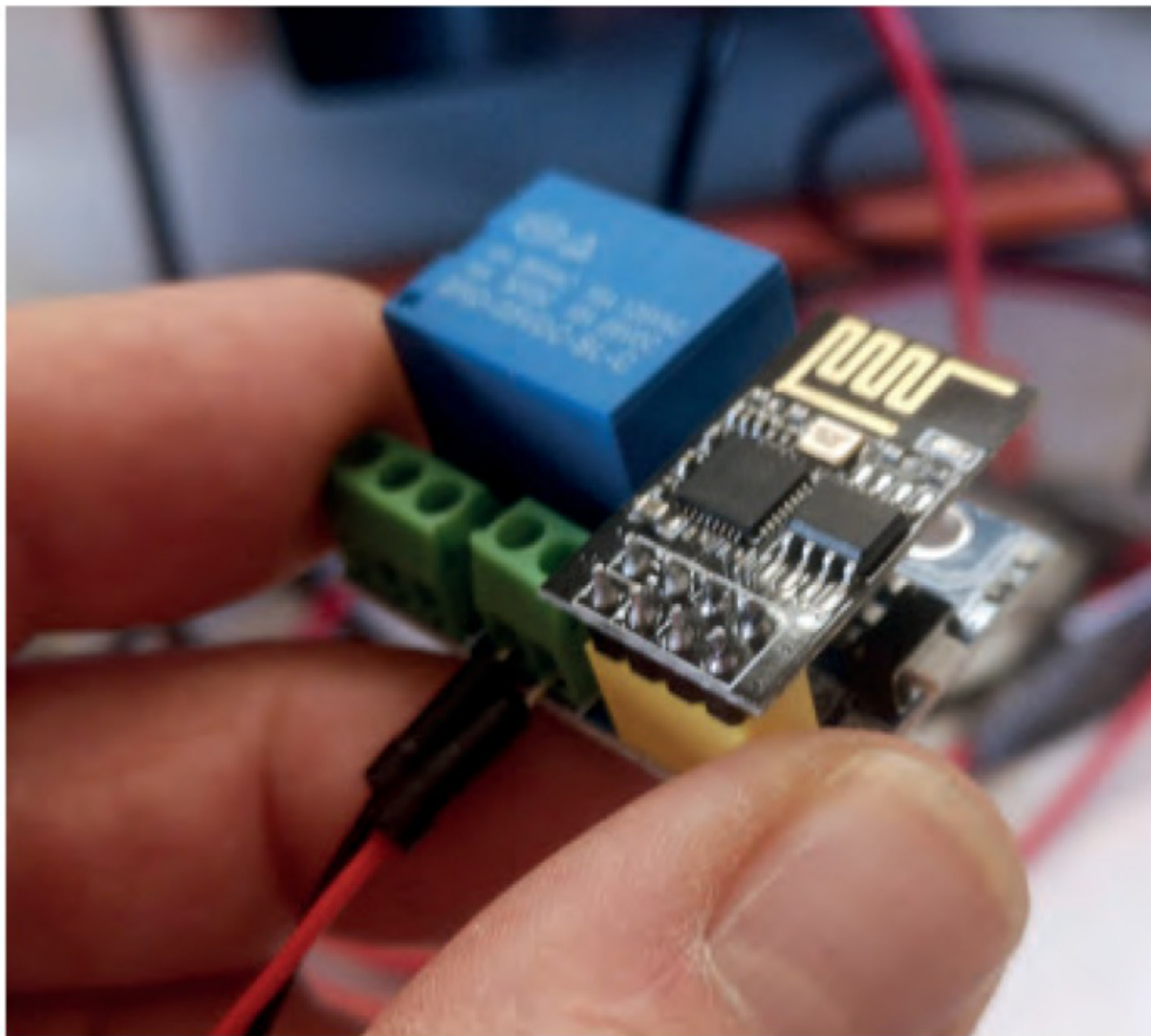
Below are some insights into how the nodes are designed, analyzing one of the first nodes I will present in the upcoming issues.

Node one — doorbell

This node includes everything related

to the main door entrance. It will include three different projects.

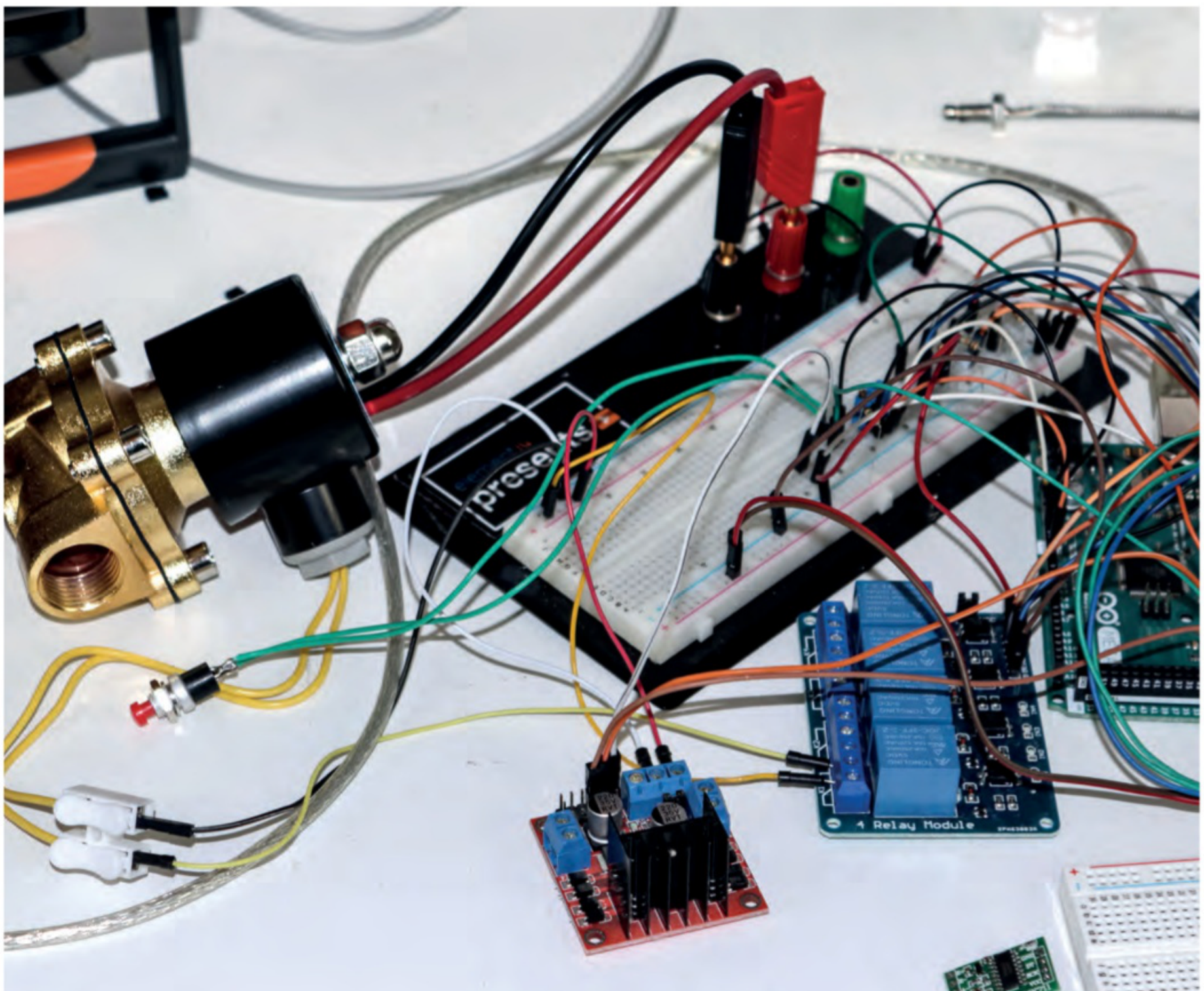
1. When someone comes to the door and no one is home, the doorbell informs the guest of this and the guest can request a phone call to the owner. This project will be carried out with an Arduino and a 3G mobile phone module.
2. Known guests — persons registered as authorized to access the home — can enter their four-number pin on the numeric keypad. In a few seconds they will receive another pin that can be used just once to unlock the door. This is a secure two-way password.
3. Direct access with a BBC micro:bit used as an electronic key. ►



Where to find the materials



- The Arduino boards are available on the official Arduino site: store.arduino.cc
- Sensors, Arduino shields, relay, and electronic parts: digispaces.com
- Raspberry Pi device: export.farnell.com/buy-raspberry-pi
- Some mechanical parts and tools: amazon.com (where mentioned) or at your local hardware store
- All the 3D designs are developed on Autodesk Fusion 360 free edition
- All the 3D-printed components are done with the Elegoo Saturn 3D printer, a large LCD model using UV resin



Node two — door opener

The door opener is exclusively operated by the control centre, upon an authorized request of the doorbell or directly from the control centre's 'open door' button.

Node three — environmental control

For now the definition of 'home environment' is limited to temperature and humidity, but it can be extended. The environmental control node has direct feedback on the fans for air circulation and the heating system. The temperature and humidity are taken by several sensors in different home locations and the values are mediated. The temperature feedback is regulated according to the season, the presence of persons, and the rooms where the persons are.

Node four — lighting control

The lighting control is not only a way to control the lights remotely; it is also designed to turn off the lights in a room when there is no person present. It also has other features.

Node five — appliances

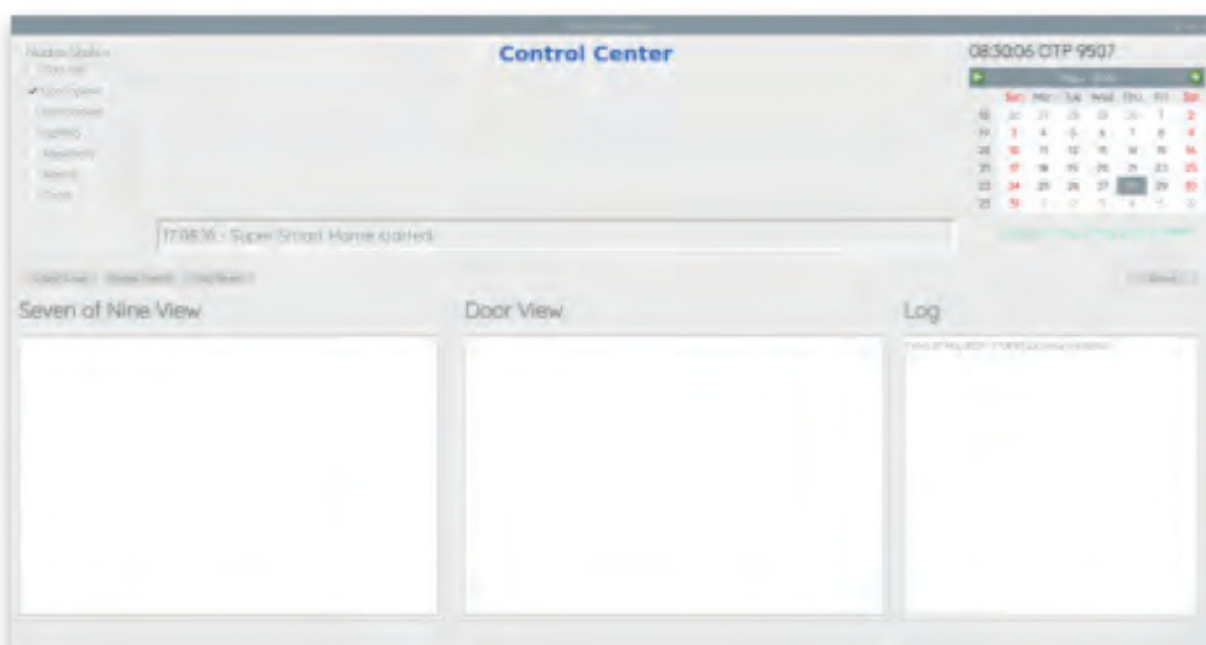
Depending on the availability of some components within a decent time frame (I am still awaiting delivery of some of the kitchen appliances) these will be controlled automatically and will be able to be activated from a remote. If I receive the water pump and some other parts in time, the appliances node should also be able to control plant humidity and the watering system.

Node six — alarms

The alarms node takes care of situations that may pose a risk to home security, such as detecting a gas leak. The alarms node should also provide direct feedback so that this risky state of affairs can be remedied, and keep the alarm setting on high until it has been reset by the control centre.

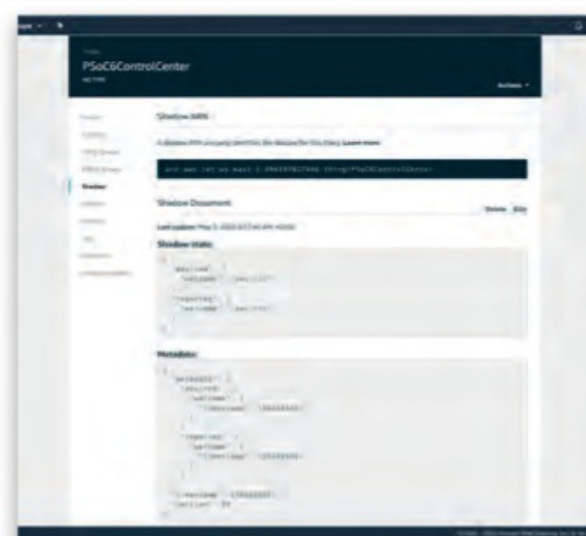
Node seven — the cloud

This is the implicit node coincident with the control centre machine, with the role of publishing on the AWS cloud



One of the topics discussed in the control centre project is how to create neat and useful graphical interfaces with a minimum of effort. Using the free Qt design tool and a few Python lines of code we will design the control centre user interface to monitor all the nodes and eventually update the AWS IoT cloud periodically.

"I will guide readers on how to use the AWS IoT cloud services efficiently at no cost"



A screenshot of the AWS IoT cloud console, in which we see the feed coming from remote. The data received by the console is then addressed to an automated Web interface whence we can see the health status of our home.

the strategic information collected locally from the other nodes.

What we will learn

I hope that this series of articles will provide the opportunity to learn new skills and techniques with some new approaches to some of the most popular platforms. The term 'home automation' covers a wide range of possible applications, and the projects will offer the possibility of exploring interesting aspects of microcontrollers, sensors, and embedded devices. As each project develops, we will learn or review our knowledge of different techniques and technologies:

- Programming the ESP8266 inexpensive family of microcontrollers to connect physical devices to the network — in particular, how to control actuators and read sensors from the web browser
- Some advanced programming

techniques on programming Arduino and how to communicate between different microcontroller boards. We will also see how it is possible to interface the Arduino boards to a GSM/3G capable device without a great effort

- How to interface actuators and relays to automate the behaviour of some home appliances with simple hackings with microcontrollers
- How to make IoT communication secure when exchanging critical information
- How to design and create custom implementation of electromechanics to the real world

In the next issue

The first project we will tackle is the door-lock opener based on an inexpensive ESP8266 and an electromechanical door lock.

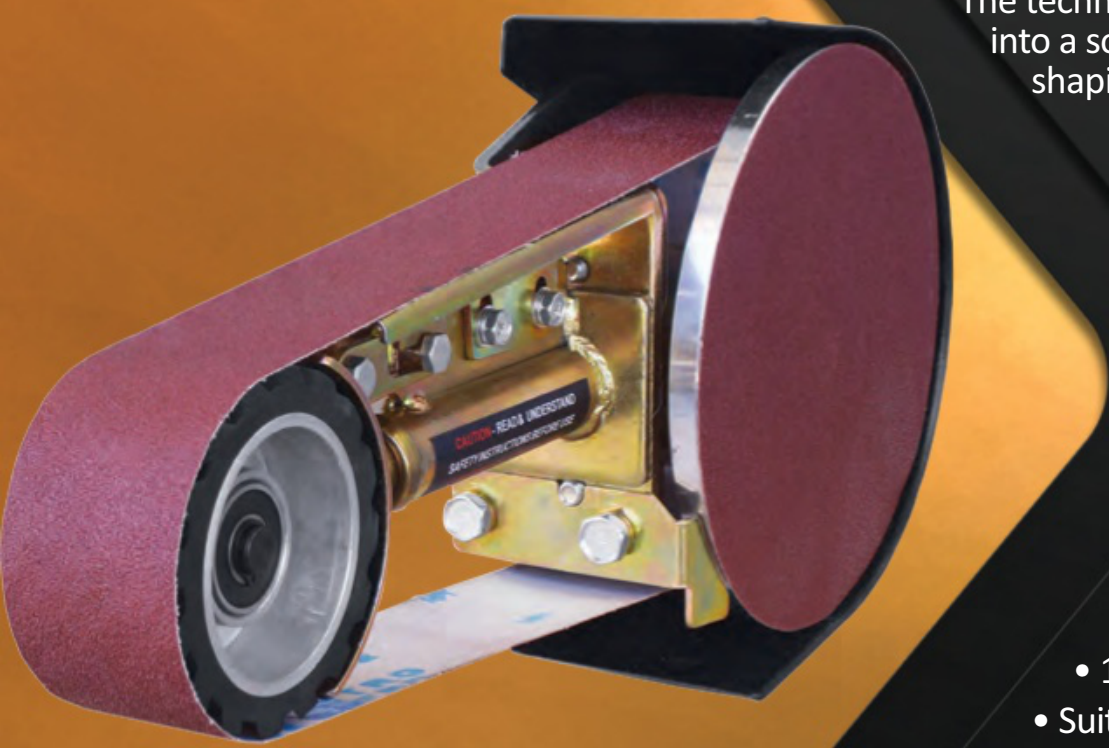
Stand by! 📺

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Chris Cooper aboard
Devonport on Hamilton Lake

ALL STEAMED UP

FOR THESE TWO ENTHUSIASTS, A CHILDHOOD
FASCINATION EVOLVED INTO AN ADULT PASSION

By Geoff Lewis

Photographs: Geoff Lewis

Chris Cooper can trace his fascination with steam to his grandfather, who was a boiler inspector on the railways at Taumarunui.

Born and raised in Hamilton, Chris remembers school holidays spent around the marshalling yards and workshops of that historic central North Island town. One day he bribed the driver of a shunting loco with a bunch of grapes and so gained his first ride in the cab of a steam loco.

Chris went on to become interested in model steam locomotives. He joined Hamilton Model Engineers Inc. in the days when it had its facilities at Seddon Park and built his first model steam engine.

The steam adventure begins

Also a member of the club was John Hannah, chief engineer at the Waitoa Dairy Factory. John ran a steam launch named Greenbank and, as Chris explains, it started there.

“[John] would ask people to come and ‘fire’ (stoke) for him. He had the launch moored at the Paeroa Maritime Museum. We had some serious adventures going out through the Waihou River into the Firth of Thames and up to Clevedon on the way to Auckland steam meets. Often, we’d go overnight and camp out on the islands.

“One time I had the fire going beautifully and decided to toast a cheese sandwich on a steel shovel. But the fire was a bit too hot and the sandwich went ‘Whoof!’ We’d often trawl a line behind to catch fish and poach them in the embers.”

Curate’s egg

John’s boat was an older-style double diagonally planked kauri vessel weighing about seven tonnes. It was powered by a Simpson-Strickland four-cylinder steam engine with a water-tube boiler.

This gave Chris the idea to find and build his own steam-powered boat. ►

Chris Cooper
with his restored
Devonport
navy pinnacle at
Hamilton Lake





Chris spent a decade of lunchtimes at work building this engine from scratch

An engineer and tool and die maker by trade, he was at work one Saturday morning in 1990 when a workmate mentioned there was a 1911 pinnacle that had been a steam-powered launch for sale at Beach Haven in Auckland.

"I went to have a look and was a bit crestfallen. It had a 21ft kauri hull but it had been left under a hedge for many years and one side was rotted out."

Chris brought the forlorn remains home. The hull was empty. The pinnacle had once been based at Devonport Naval Base and used as a customs and excise boat and the admiral's private launch. As the years progressed the old craft had lost its glory; it was gradually downgraded, its steam gear stripped, and finally it was abandoned.

Restoration begins

One of Chris's early tasks was to find a supply of kauri so he could begin rebuilding the hull. That is where the generosity of other people came into play.

"That is where the generosity of other people came into play"

"I went down to Johnson's Demolition in Hamilton. Old man Johnson had a barn full of salvaged kauri weather boards and beams. There was an old church staircase made of mahogany, which I wanted to use for the decking.

I was looking at this timber and thinking, \$100 for that bit and \$100 for that bit — it was all going to add up. But he just said, 'So you're looking for a piece for your boat — \$100 the lot'. So I loaded up and drove home with the front of the car pointed skywards."

There followed many years of cutting and machining planks with a bandsaw and thicknesser. Six months work on the 'idiot' board (a two-handed sander) and the hull was rebuilt and coated in seven layers of two-pot lacquer.



The engine was another story. The original machinery had disappeared, so Chris drew upon his engineering skills and chewed up most of his lunchtimes at work for most of a decade building another one from scratch.

"I built the crankshaft and the valve gear. I made the patterns and castings. Having seen John's engine I went for a triple-expansion compound design, which is a more efficient way of using the heat. It also allows the steam to be condensed back into water so I can get 90 per cent of the water back." ►

Steam engine regs

Steam boilers can be prone to explosions if not manufactured to rigorous standards. While boiler inspection was pretty commonplace 60 years ago, it isn't today. What little call there is for it is handled by Maritime New Zealand.

"I had to come up with a design and have it calculated and registered with the department. They take it seriously."

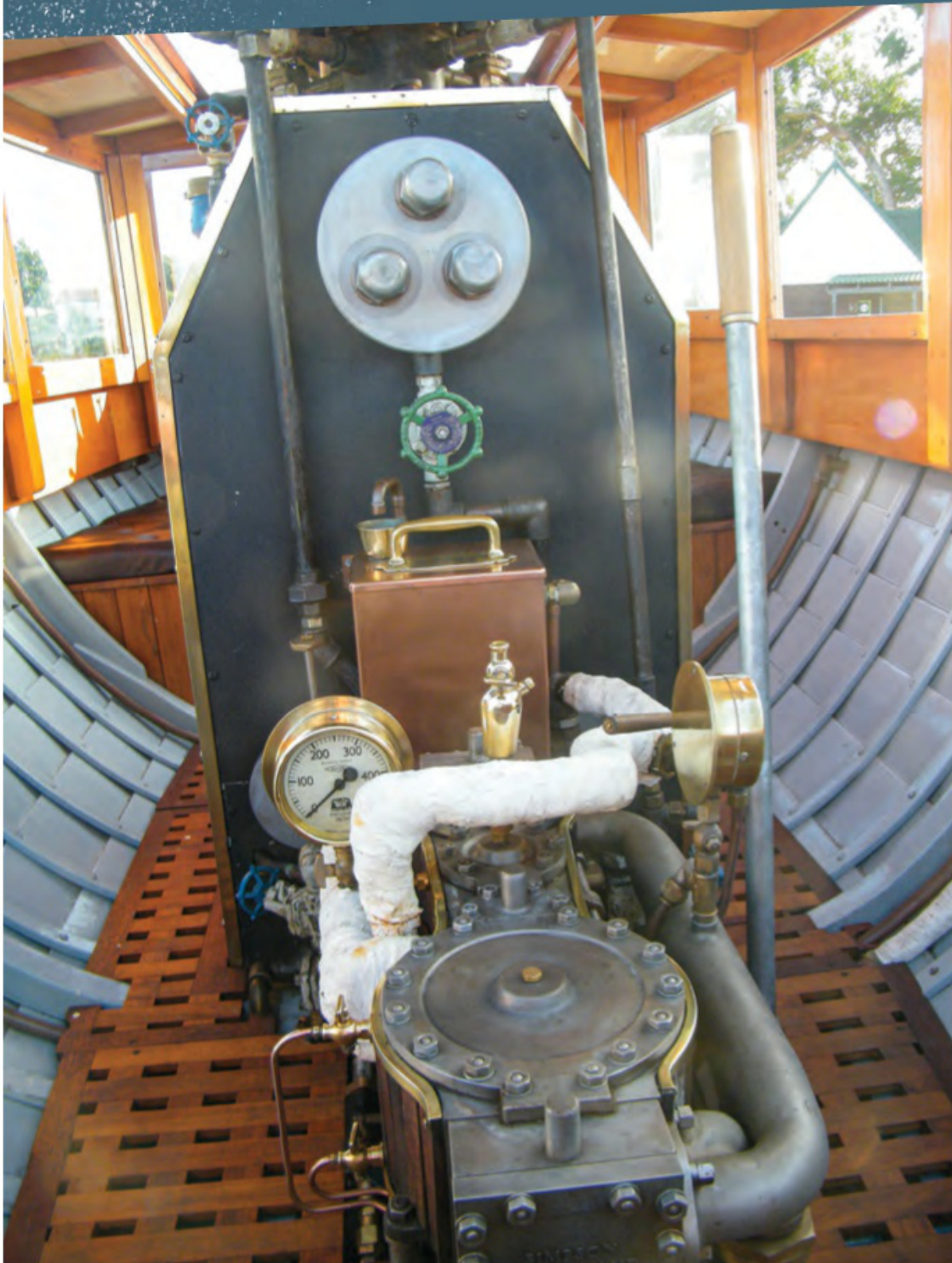
Chris's engine uses a three-drum Yarrow boiler running at a pressure of 250psi.

"The boiler had to be vessel-welded by a registered welder and all the heat numbers and materials used had to be



The 1911 pinnacle launch was found under a hedge with half its hull missing

"Steam boilers can be prone to explosions if not manufactured to rigorous standards"



described. Luckily the marine inspector in Hamilton, Kevin Arnott, was very helpful."

Chris's pinnacle had its first outing on Lake Kainui near Ngaruawahia around 2010 and drew the sort of crowd it usually does. So far he has fired it with coal but plans to convert it to fuel-oil so he can get better range and it doesn't need constant hand stoking.

Fresh water only

Chris sticks to fresh water, such as lakes and rivers, as salt water is damaging to the prized and polished brass work. He and a fellow steam-pinnacle builder, John Olsen, are planning a big trip down to Rotoiti in the Nelson Lakes National Park.

"I'm changing it from a working boat to a bit of a show pony," he mentions. "I like taking it out to Karapiro so I can disappear way up the lake, and I enjoy going to the Wooden Boat Festival at Rotoiti, near Rotorua.

Wherever Chris goes, the steamboat is a crowd-puller. He enjoys hearing the tales from people whose fathers and grandfathers were involved with steam.

Earlier on in life Chris built a miniature steam shunting engine and as he approaches retirement age his next project could be a replica of a KA locomotive of 1950s vintage, which would be about 1.8m long when complete.



John Olsen with 'Dancer' in his Cambridge shed

boatbuilding but also pattern-making, fitting and turning, and boiler making. Although his professional background was in electronics, that didn't stop John.

"I had built small steam engines before I got into boats. My first was a model Stuart 10V, about $\frac{1}{12}$ scale. The originals were used in factories to drive machinery."

The next was a 'Double 10' twin-cylinder marine engine that could be used to power a model boat of up to about 2m in length.

John, wife Diana, and their sons lived in Wellington for 17 years and the family did a stint in Germany, where John worked for telecommunications giant Ericsson. While there, they cruised the canals.

Building Dancer

Back in Wellington, John decided to build a steam-powered launch.

"I started on the engine. The idea was I'd spend three years on the engine, three years on the hull, and three years on the boiler but the whole lot took 17 years."

In the early '00s, John started talking to other people about building

The steam bug

Chris's fellow steam enthusiast, John Olsen, lives in Cambridge and also gained his introduction to steam through his father.

John's dad, Bill, was the fireman on a Fell engine on the Rimutaka Incline when the family lived in Masterton. Bill was also a keen model engineer and John still has his father's collection of *Model Engineer* magazines dating back to 1944.

"I'd sit on his knee and look at the pictures."

When John decided to build his 30ft launch Dancer, his father recommended he use a diesel engine rather than steam.

"He'd say, 'Real engineers would have more sense than to touch something like that,'" John explains.

Building a boat, and a steamboat at that, involves a veritable library of skills and trades — not only

"Building a boat, and a steamboat at that, involves a veritable library of skills and trades"





Construction of Dancer's hull in John's Auckland basement with a glass over cedar finish



Building a steam boat requires a library of skills and trades

the engine. He went for a two-cylinder high-pressure simple-expansion engine, rather than the triple-expansion type Chris used. The simple expansion has a 90-degree crank that gives easy starting and is good at manoeuvring.

The engineering castings could be obtained and John went on to make many of his own patterns from custom wood and epoxy — anything that could

stand up to being knocked around in the foundry.

The Dancer build started in Wellington, and that's where most of the engine work was done. Then, halfway through the project, the family moved to Auckland, where John began the job of building the hull in the confined space of their suburban home's basement.



The cabin is removable

Building the boiler



Dancer's engine a 'Simple expansion' type



Modern design touches

The hull was designed by Peter Sewell — son of Ralph Sewell, who built the legendary brigantine Breeze, which is still a popular sight in Auckland waters.

“I got a table of offsets and patterns from which I could create formers on the hog, put the keel on top and the deadwood for the bow.”

The hull is planked in cedar with the keel and deadwood knees in Australian jarrah and the transom in attractive African rosewood. The hull was glassed inside and out. This keeps the timber dry, makes the hull lighter, improves strength, and reduces the chance of rot.

“This keeps the timber dry, makes the hull lighter, improves strength, and reduces the chance of rot”

John explained that although the overall style of Dancer comes from the 1890–1914 period — old-style steam launches began to disappear around the beginning of WWI, when many were converted to petrol or diesel engines — it is really a modern sort of hull with the ribs and bulkheads going in afterwards.

The deck is a plywood sandwich with foam at its core covered in recycled kauri.

After six years work, the hull was in one piece by 2013 and work began on the water-tube boiler. Similar to the Yarrow boiler design but more compact, and built of certified boiler-grade steel line pipe, the boiler has 130 tubes and was welded together by a professional welder. All the tubes were expanded into place with special tools. The boiler and the engine between them weigh about 600kgs and the hull has 150kgs of lead ballast built into its keel.

Dancer's engine can produce about 10bhp and run up to about 600rpm, giving the 30-foot launch a speed of 7–8 knots through a coarse-pitch screw. John fires the twin-cylinder with diesel but, with the environment in mind, he's on the lookout for a good source of used cooking oil.

Dancer gets a shed

The entire shooting-box was transported from Auckland to Cambridge in three shipping containers four years ago. A special trailer was built to carry the vessel and towed by a 4WD Nissan Patrol on LPG — combined cost around \$25,000, plus \$41,000 for a new shed.

Dancer had its introduction to the water at Lake Hakanoa in Huntly and its first official run on Lake Karapiro as part of the Cambridge Armistice Day event in 2018. It has since run on the Mahurangi River near Warkworth and in the Bay of Islands.

The boat is fitted with a removable cabin and can sleep up to four people, with two stowed under the foredeck and space for another two under the aft. John went a little bit further than Chris — he's put his background in electronics to use by installing a set of solar cells on the cabin roof. The electrical current thus generated allows him to run a little galley stove and a refrigerator — the sort of mod cons not normally found on old-style steam launches but ones that make the craft more usable on outings. 📺



A modern touch, solar cells to run the galley and refrigerator



Dented cans are often discounted



Oats add mouthfeel to your beer

RECESSION BREWING

BEING CREATIVE CAN ENABLE YOU TO CONTINUE TO ENJOY AN ALE IN THESE BELT-TIGHTENING TIMES

By Bryan Livingston Photographs: Robyn Livingston

What we have experienced this year has been unprecedented in our lifetime. We will continue to feel the aftershocks of this virus for quite a while longer as our economy rebuilds and recovers.

However, one thing we didn't foresee is that the virus is starting to impact on our brewing. We all have to be careful with our finances, and we need to save money where we can. So, how can we save money with our brewing?

Shop local

Malts and hops grown in New Zealand are usually cheaper than those imported. This is simply because they don't need to travel from other countries.

I would normally recommend using products from the country where that style of beer originates. If making a German Pilsner, then use German-grown malt and hops. However, to save dollars

"I would normally recommend using products from the country where that style of beer originates"

try putting a New Zealand slant on an overseas style. For example, try making your German Pilsner using New Zealand-

grown Pilsner malt with a New Zealand-grown noble hop such as Wakatu (New Zealand Hallertau), thereby saving money and also buying local.

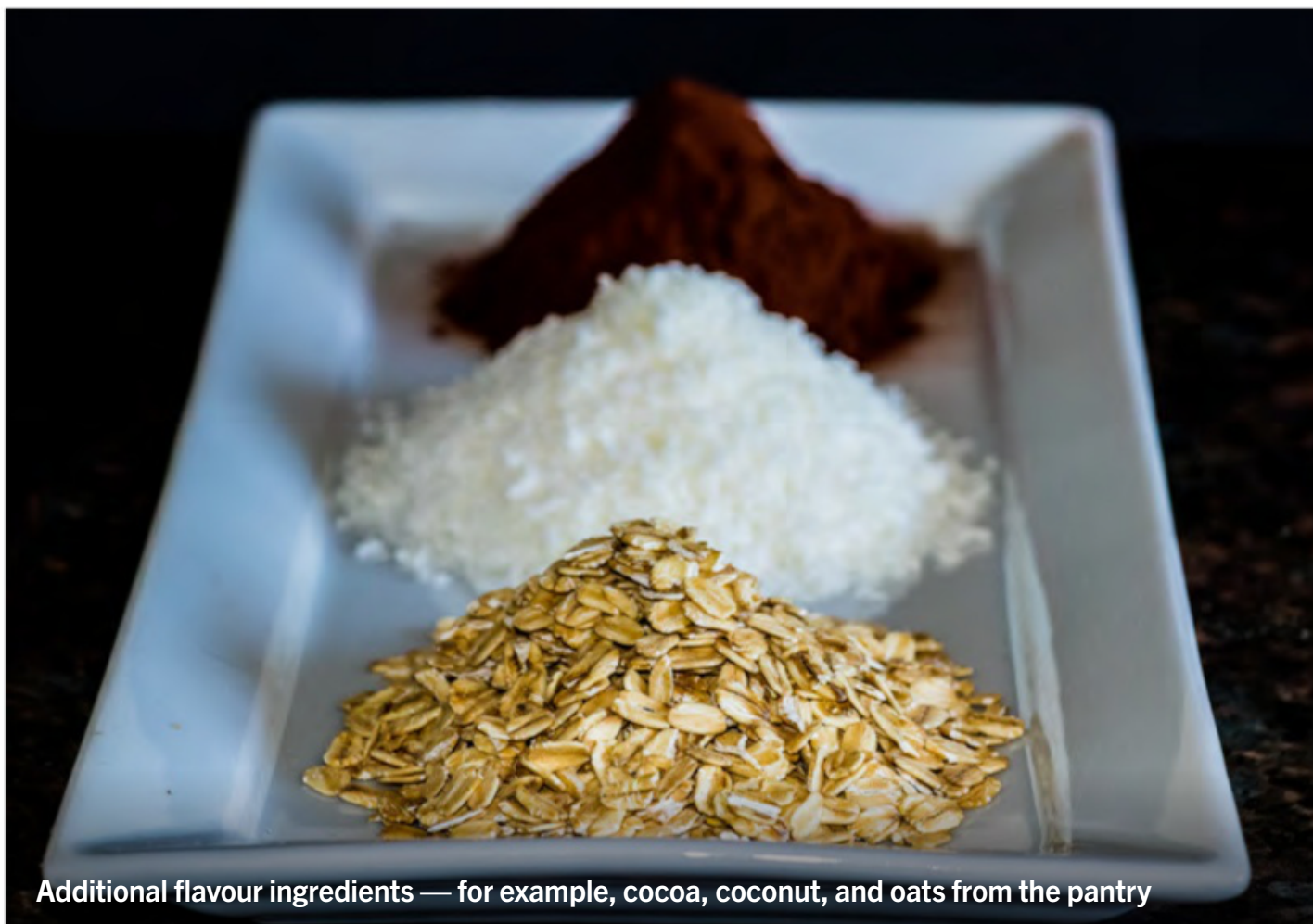
Take advantage of specials

Everyone likes a special — brewers are no different. Taking advantage of discounted, dented, or dated stock at your local home-brew store could lead to a well-priced brew. Dented cans don't look good on a shelf at the retailer so are often discounted for a quick sale. The quality of the brew shouldn't be any different from that of an undented can.

Same if you are brewing all-grain. Take advantage of specials and



Measuring the starting gravity of the brew with a hydrometer



Additional flavour ingredients — for example, cocoa, coconut, and oats from the pantry

discounts — especially on base malt, as that makes up the greatest part of your grain bill.

Raid the pantry

We all like making big-flavour beers but it doesn't all need to be malt. Adding ingredients that are already in the pantry can contribute extra flavour without extra cost. Brown ales, porters, and stouts could benefit from cocoa, oats, and coconut, which add flavour without you having to buy extra malts. Oats add mouthfeel and a creamy head while chocolate and coconut are a natural marriage of flavours.

Darker beers are more popular in winter so now is the perfect time to experiment with a few extra flavours in your pantry. Just think about which ingredients work well together in food recipes. Can these also work in a beer? Think about a Bounty Bar — chocolate-covered coconut. That same flavour combination works in a chocolate stout!

Make lower strength beers

Big hoppy IPAs and APAs are the most popular beers brewed by home brewers. They are also some of the most expensive, as they have hefty grain bills to get to six to eight per cent ABV and are loaded with costly

American hops. Now, I'm not saying don't make IPAs and APAs — far from it; I love them! But what if we made every other brew a lower strength sessionable beer? Lower strength beers need less malt and fewer hops so they are cheaper to make. Also, because of

“Also, because of the lower alcohol, you can enjoy a few more without feeling too wobbly”

the lower alcohol, you can enjoy a few more without feeling too wobbly.

Create a cost-effective sessionable ale

The challenge in making a sessionable ale is to make a beer with a similar mouthfeel and hop aroma to a seven per cent IPA but in a beer of only 4.5 per cent.

Using 300g flaked oats for added mouthfeel will compensate for the reduced malt in the beer, and adding 500g of Munich and 250g each of biscuit and Caramunich III will compensate for the reduced flavour of using less base malt.

For the base malt in a 23-litre all-

grain recipe, use 3.5kg of New Zealand pale malt. Or, if you are extract brewing, use a 1.7kg can of unhopped liquid malt plus an additional 600g jar of unhopped liquid malt — both available straight off the shelf in your local home-brew shop — along with the steeping grains described.

The secret is to keep the beer in balance. With less malt and alcohol you need fewer hops. Even with fewer, the hops are still noticeable in these beers. Ten grams of New Zealand Southern Cross or Green Bullet boiled for 60 minutes gives you bitterness; 30g of Taiheke boiled for the last 10 minutes gives flavour; and then add 50g dry hop of your favourite aroma like Riwaka, Nelson Sauvin, Citra, or Mosaic.

Keep the yeast clean and cost-effective. You can't go past a Safale US-05 American ale yeast.

We will survive recession brewing

Tightening the belt on your brewing might be necessary but it doesn't mean we have to give up our favourite hobby. Remember, brewing is cheaper than buying the same style of beer in the local bottle store. So fine-tune your brewing recipes and find ways to make cost-effective brews. 🍺



Bob in his element

CAN HE BUILD IT? YES HE CAN — PART TWO

AS HE SURVEYS HIS COMPLETED SHED, BOB WONDERS WHETHER A KITSET WAS REALLY THE WAY TO GO

By Bob Hulme Photographs: Bob Hulme

Welcome back. Now that the foundations are done and the base frame, floor, and walls are up, it's time to put up the roof trusses, which will tie this shed/workshop together.

At the moment the walls are a bit wobbly and only braced by being screwed together in the corners. The roof trusses attach to the top edge of the wall sections and make the whole structure more rigid — not totally rigid, though; the addition of the plywood lining I decided to add took it a leap closer to brick outhouse standard.

All trussed up

The roof trusses were pre-made as part of the kit so only needed to be screwed to the top of the wall sections. The trusses at the ends had shiplap-style boards pre-stapled to them vertically. Full-length timber stringers were then run at the peak edges of the roof — one just each side of the crest — and at the outer edges.

I did feel it would have been better to have an additional stringer halfway between the top and outer edge of each side of the roof so that the iron wouldn't tend to buckle so easily when someone was up there trying to paint it, but to my regret I didn't make that change at the time. If I were to build another of these, I would definitely add those two stringers. As it is, the roofing iron is only able to be screwed down at its outer edges.

“If I were to build another of these, I would definitely add those two stringers”

Closing the gap

Next was the lintel above the doorway. Positioning this was interesting because when it was fitted up under the roof truss it left a large gap above the doors — well, to my

mind it was a large gap. So, I decided to lower the lintel so the gap between its lower edge and the top of the doors was minimal.

I wanted to make it difficult for rainwater to find its way in on windy days — wind and rain are not uncommon in my coastal location. The lintel is quite heavy, so to do this single-handedly I had to nail some temporary blocks onto the door jams at a measured height to rest the lintel on. I held the lintel in place on the blocks with clamps so I could check that the doors fitted properly before screwing the lintel finally in place — in accordance with the old ‘measure twice, cut once’ proverb.

To fill the gap now above the lintel I looked around the racks at the local DIY store. There was nothing the right size but I found a tapered piece of moulding that could be tapped tightly into place then nailed, making it nice and weatherproof without the need for any sealer. ►



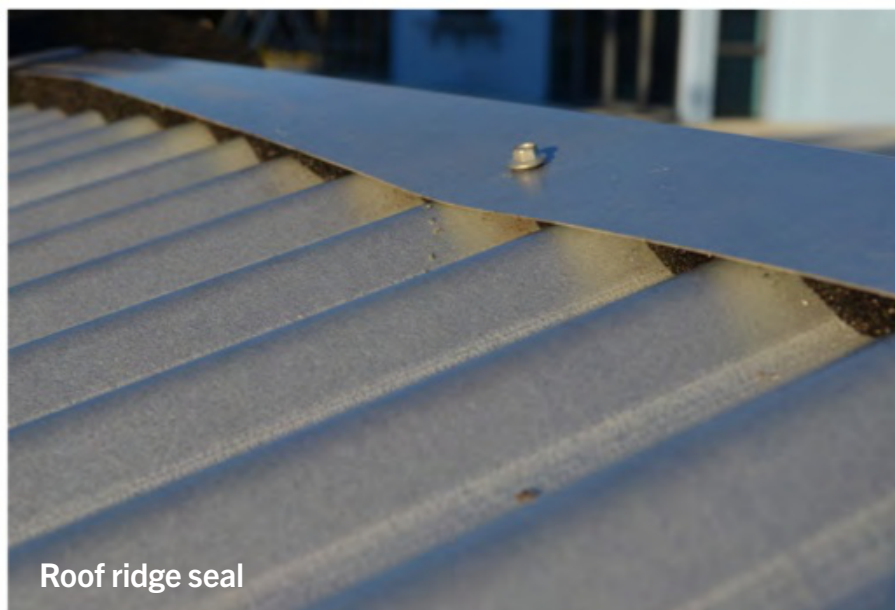
Roof going on



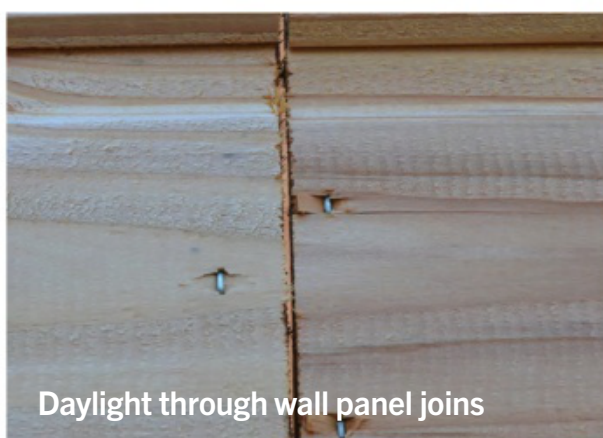
Checking door fit



Screwing down the roof



Roof ridge seal



Daylight through wall panel joins



Wall panel join sealed



Supplied corner batten



My corner batten

Ironed out

Attaching the roofing iron was reasonably straightforward. The job was made a little more awkward because I opted to go for building paper under the iron as I wanted to line the inside fully.

It was necessary to pre-drill the screw holes through the corrugated iron, as just pushing on the self-drilling screws would make the iron buckle. A socket bit in my new cordless drill — a bargain I picked up at Fieldays at Mystery Creek — made short work of securing all the sheets down. I did have to wait for a day with only light winds to do this. The ridge cap appeared to me to be quite narrow and didn't have the lead edging that I have seen on most other ridge caps for stopping rainwater getting in. I wasn't happy about this and tried to source better (wider) ridge capping only

“My solution was to buy some special corrugated-shape foam pieces that are sold for precisely this purpose”

to find that it's almost impossible to buy from retail outlets.

My solution was to buy some special corrugated-shape foam pieces that are sold for precisely this purpose. They are supplied soaked in bitumen and are for placement on top of the corrugated iron and under the ridge cap. This fills the gap and also helps prevent corrosion. Unfortunately, it is quite an expensive material but

sometimes you have to bite the bullet for the sake of doing a good job.

More fussing

Before putting on the battens I got out my trusty tin of oil-based primer/undercoat and coated the joints in the wall panels. Rubbing the paint well in where there are staples is important to stop them rusting. I used silicone sealer in places where I thought gaps could let water in and then painted over those areas again. Silicone sealers are best painted with an oil-based paint just after the sealer has formed skin but before it cures. That way the paint etches into the sealer. Future coats of paint will adhere well because the undercoat is sound. Yes, I know I'm fussy — some would say anal — but I hate doing things twice. If I do it as right as I can the first time, I will have no regrets.

Battens

The battens were nailed on, and again I elected to pre-drill them to avoid splitting. They came pre-cut as part of the kit and were easy to fit. Corners should have been easy too, but my fussiness came into play and I wasn't confident that the width of the material supplied sufficiently covered the join. So off to the local DIY shop I went and bought wider timber.

I had seen other sheds with a horizontal stringer fixed to the top edge

“Yes, I know I’m fussy — some would say anal — but I hate doing things twice”

of the wall and under the outer edge of the roofing iron. This not only adds more strength to the walls but helps to stop rainwater getting back up under the outer edge of the roofing iron. These pieces go over the battens so that

any water that does find its way past can run down the outside of the wall.

With the exterior finished it was time for a complete coat of that lovely oil-based primer/undercoat over everything. There were no shortcuts with that job, unfortunately. The surface was not flat enough to do with a roller and the paint needed to be worked into all the rough bits, knots, and staple holes. A wider brush helped here — using a 75 or 100mm wide brush was the way to go. ►



Power to the people

Having power for lights and mains-powered tools was, for me, one of the essentials for a shed intended to be used as a workshop. After discussing the details with a local electrician, I opted for a 32A supply. It's a bit like buying a computer: get one with way more capacity than you think you want because inevitably the time will come when you need more.

To determine the current loading you may need, make a list of what power tools, etc. you might want to use — for instance: drill press, saw bench, router, welder, linisher, disc grinder, planer, thicknesser, bench grinder, battery chargers, plasma cutter, soldering iron, etc. I thought

“After discussing the details with a local electrician, I opted for a 32A supply”

22A would probably be enough for me, but the additional cost to go up to 32A capacity was minimal.

Don't skimp on the number of power points, either. Make sure you are covered for all those battery chargers as well as things that are always plugged in such as a drill press and maybe a radio. There are plenty of lighting options around — LEDs use very little power and give a strong white light. Having good lighting extends the time you can spend in your shed, and it's surprising how much difference having the lights on during dull days makes.

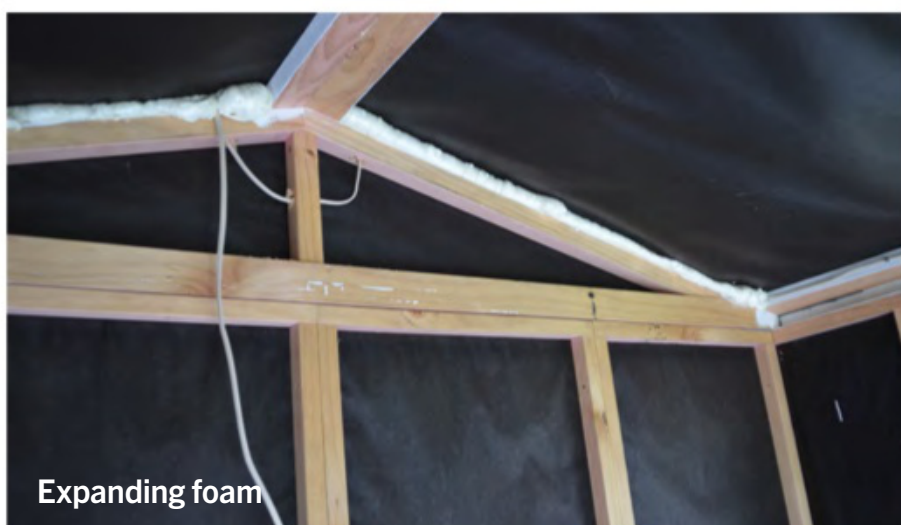
In the trenches

Power cables have to be buried a minimum of 600mm under the ground. In my case the trench only needed to be about 8m long, so I saved myself some cost by putting my own spade to good use. Even though the soil is very sandy, it was more of a task than I had imagined. But the thought of how much I was saving spurred me on! Fortunately, I didn't cut through the phone cable I encountered during the dig.

A distribution board was necessary in the shed to house earth-leakage circuit breakers and other fuses and to separate lighting and power outlet circuits. All wiring work must be, and was, done by a registered electrician.



Fusebox



Expanding foam



Deep cable trench



Plywood lining going on



Top of door



Bottom of door



Front doors

Lining

Once the electric bits were done, the interior lining could be fixed on. I used treated plywood 12mm thick on the walls and 6mm thick on the ceiling. The ceiling doesn't need to be as thick as the walls because I reckoned that I wouldn't be mounting anything heavy up there and I wanted it to be light enough for me to hold the pieces up there while screwing them on. It was my challenge to see if I could do this all single-handedly.

As it is just a shed, I didn't worry about plastering. Just applied a good coat of my favourite oil-based undercoat followed by two coats of water-based off-white paint — see, I'm not really all that OCD after all.

Colour is a personal preference, of course, but I went for a light colour without it being a stark white because I like a nice bright work area with plenty of reflected light. This isn't ideal

for any type of arc welding, as the reflected light makes you feel as if you are working inside a thunderstorm. The arc flashes bounce around and shine in from behind the welding helmet, and can damage eyes. Obviously not ideal. Making some screens from plywood coated with blackboard paint then putting them around the area where welding is being done can overcome this problem.

“The arc flashes bounce around and shine in from behind the welding helmet, and can damage eyes”

Safe and secure

Like me you've probably worked hard to build up a shed-load of tools and equipment to be able to do the things

you want to do. To make it hard for someone else to waltz away with them I made grilles for the windows from steel reinforcing rod and flat bar. I also put a hasp and staple with a padlock on the double doors, but that looked a bit vulnerable so I fitted another locking handle, too.

The doors could move back and forth a bit even when the locks were on, so I fitted pad bolts top and bottom to one door. They say locks are only to keep honest people out and the measures I have taken will not be the ultimate answer, but maybe they will deter a thief because it will be too much trouble to break in.

The kit did not include hooks to hold back the doors when open but these are essential, so I bought some and put them on. Sure, a couple of pieces of 100x50 propped against the doors might have done the trick, but there are tidier ways of doing things. ►

Fit-out

The layout was already planned so that I could determine where the doors and windows would be, so the final stages were spent putting together the workbench and storage cabinets. I already had a workbench made from pallet racking components, which knocks down easily, and a couple of melamine pantry-style cupboards.

My favourite storage item is an old metal library cabinet that was used for storing microfiche films. The shallow drawers are ideal for organizing all those nuts, bolts, screws, washers, etc. As I use the shed I will most likely change a few things around and add a shelf or two, but for now it's looking good. There has been the odd storm or two since I finished the building and it has stayed dry inside.

The rain dripping off the edges of the roof had already made a groove in the ground so it was easy to place rows of pebbles to halt the erosion. The pebbles also dress up the lower edge around the shed. A concrete mowing strip might be needed in the future, but I like the look of the pebbles.

“Looking back is always the easy part. Would I have done it differently?”

Hindsight

Looking back is always the easy part. Would I have done it differently? Probably not — apart from putting those extra stringers under the roofing iron. I've learnt a lot from this build and, if I were to do it again, I would probably draw up a shed myself and buy a load of timber rather than buy a kit. However, as I know I'm not a builder's bottom, with the lack of experience I had at the start of this project the kit was the right way to go.

Now, I'm looking forward to spending time creating and fixing things in my own-built wee workshop. Maybe I should nickname it 'the Tardis', as it's amazing how much stuff I've squeezed in there already. 📁



Completed shed



Pebble edging



Bob is amazed at how much the shed can fit



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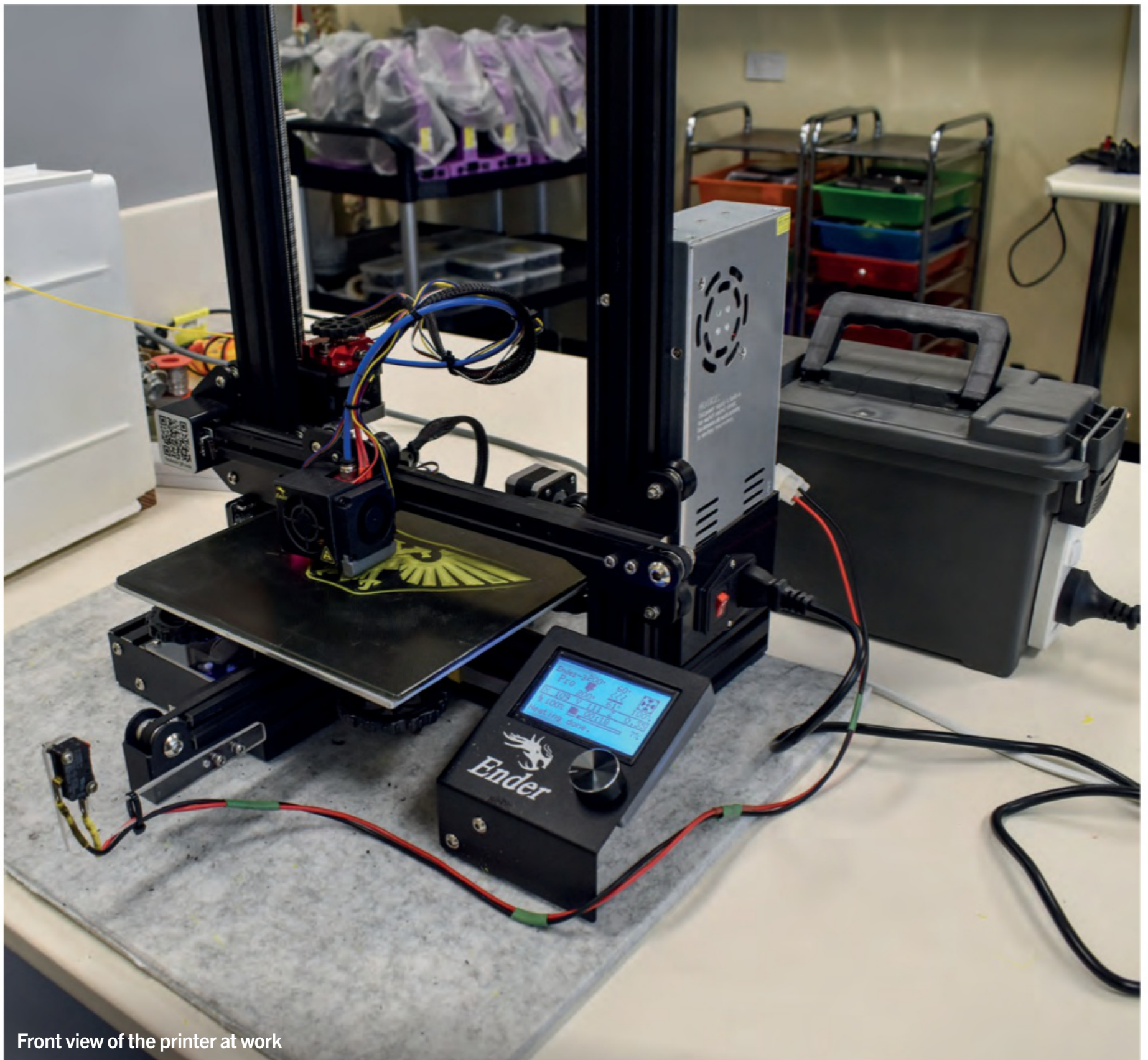
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Front view of the printer at work

SOMETIMES YOU JUST HAVE TO SWITCH OFF

ENHANCING THE VERSATILITY OF A 3D PRINTER

By Coen Smit Photographs: Coen Smit

Recently, as the price of 3D printers started to fall, I took the plunge and bought a Creality Ender 3 printer.

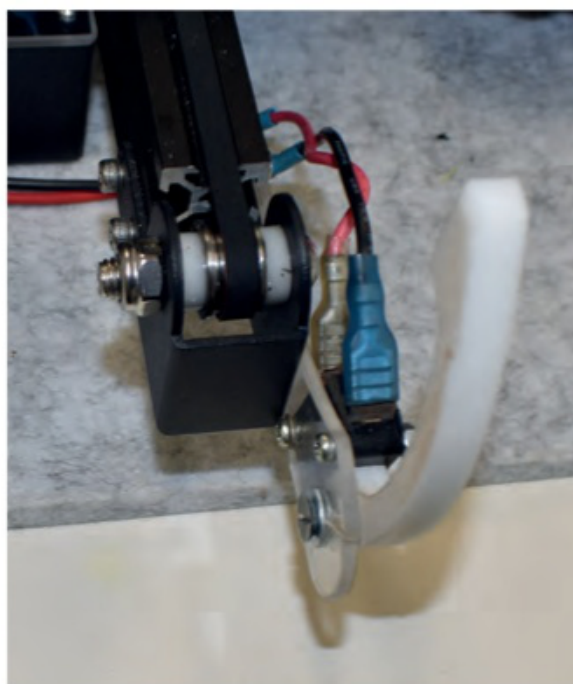
As those of you who have also taken the plunge will know, once you have the bug, the add-ons, upgrades, etc. soon follow. One upgrade I thought would be good to have is a method by which the printer will shut itself off. This enables you to make long prints that finish at some ungodly hour without the worry of the printer idling away until you can get back to turn it off.

The mandatory internet search came up with an Arduino-controlled motion sensor that would detect when the printer stopped moving the extruder head and the heated bed, indicating that the printer job was finished.

A return to programming

I must confess that my last in-depth association with programming was during the 1970s. Since then I have simply been a user of information technology rather than a developer of it. Consequently, the process involved in making the switch-off add-on by this method looked a bit problematic. I would need to rewire the printer's 240V circuit to accommodate the 12/240 relay, create space and boxes to house the Arduino and the relay, and mount them on the printer — all in all, quite a job and one that would also clutter up the printer.

However, the Ender 3 printer has one feature that I could exploit



The microswitch with lever fitted

“This enables you to make long prints that finish at some ungodly hour without the worry of the printer idling away until you can get back to turn it off”

instead. Once the job is finished the bed moves forward as far it can on the Z-axis, a position it doesn't reach when printing. A microswitch fixed to the printer so that it is activated once the bed moves to that position could be used to disrupt the 24V circuit, thereby effectively switching the printer off. It's not as flash or sophisticated as the motion sensor but it is basically a stand-alone unit that can also be used as a circuit breaker

for a number of other applications if you want. Not only that, but in its final configuration it could be a portable 12V power supply as well as a 240V outlet, all contained in a box 300mm long, 160mm high, and 130mm wide.

Safety first

You could simply use a 240V microswitch positioned at the front of the bed so that the printer disconnects itself from mains power at the end of the print job. However, as you can see from the photographs, the switch is located in a fairly vulnerable position, close to where you prepare and set up the printer, insert the SD card, and the like. In my view it's not ideal to have 240V power held in place by the microswitch's spade bits. To reduce the pressure required to activate the microswitch I added a lever to it. This also reduced the requirement to place the switch exactly at the right bed height, making it operate more reliably.

To make sure that the 12/240V relay is safe and unable to short out on the power supply, I first printed a smaller box and lid for it to be isolated within the larger box. Having roughed out the location of each component I cut a hole for the 240V switch; another for the fan to help control the temperature of the power supply; and drilled holes for the main power cord, microswitch, and fan wires. ►

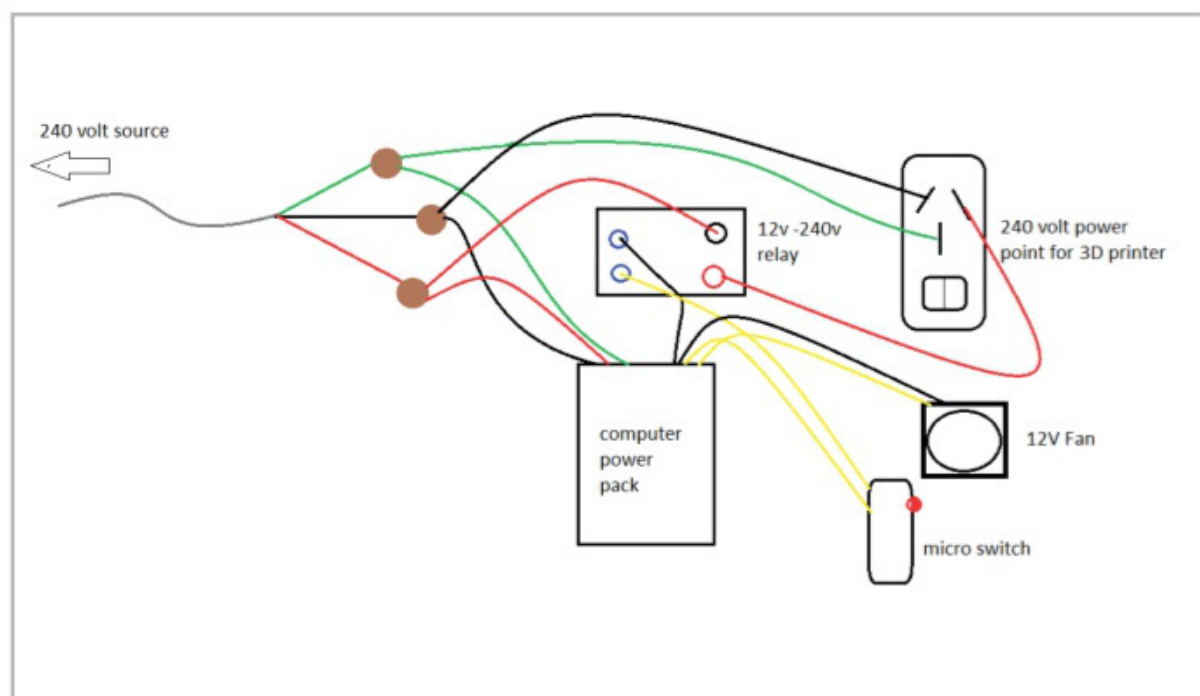
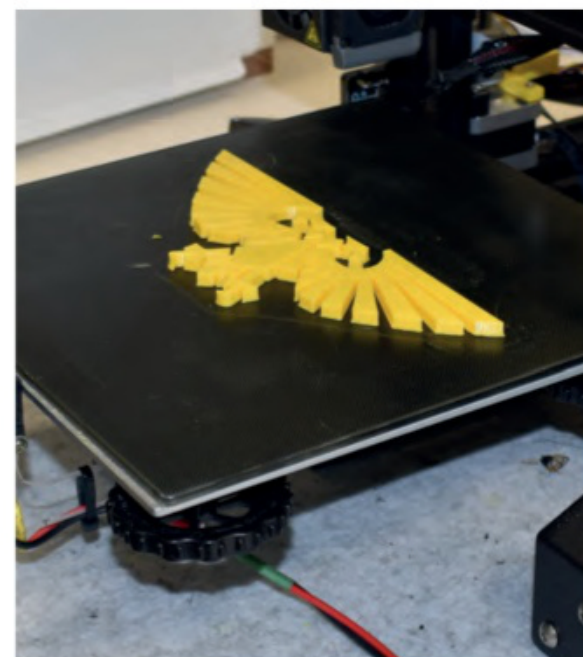


Diagram 1 — Circuit diagram and components for switch-off add-on



A completed print with the microswitch engaged

Keeping it cool

As you can see from Diagram 1 there are two sets of yellow and black wires coming from the computer power supply. (See Diagram 2 for how to set up the power supply to deliver 12V.)

These are two of the numerous 12V wires available. The power supply has its own inbuilt fan. I added the external fan because the unit is in a cramped box and I wanted to make sure it wouldn't overheat, as it will keep running even once the 3D printer job has finished. This does mean that the computer power supply and its extra cooling fan keep running after the printer job is finished.

No doubt some of you are wondering what the point of that was. Well, as we know, all things electrical and mechanical have a finite life. However, computer power supplies are meant to be able to run continuously, and they're also cheap to obtain — in my case, free! The only reason I added a fan

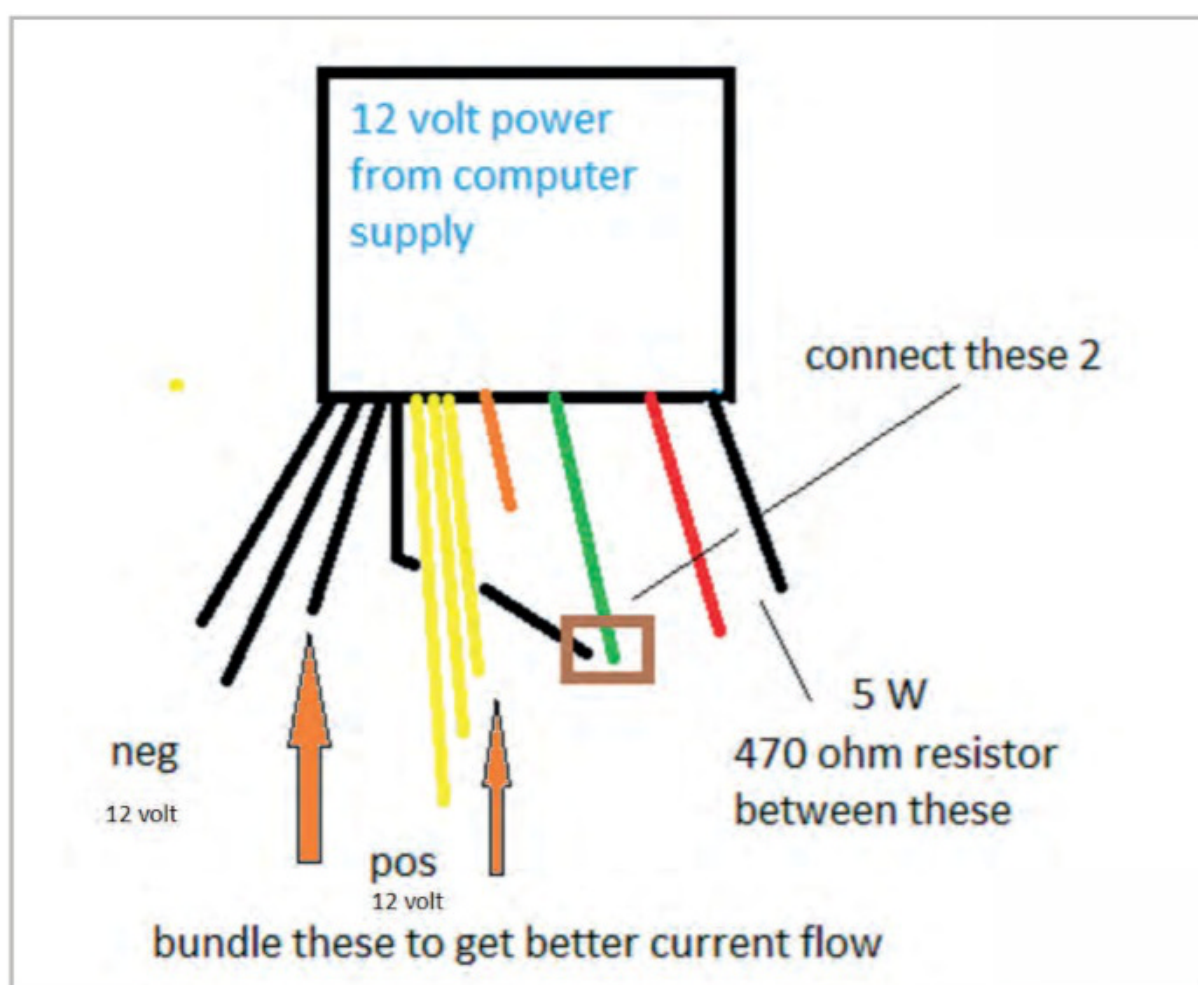
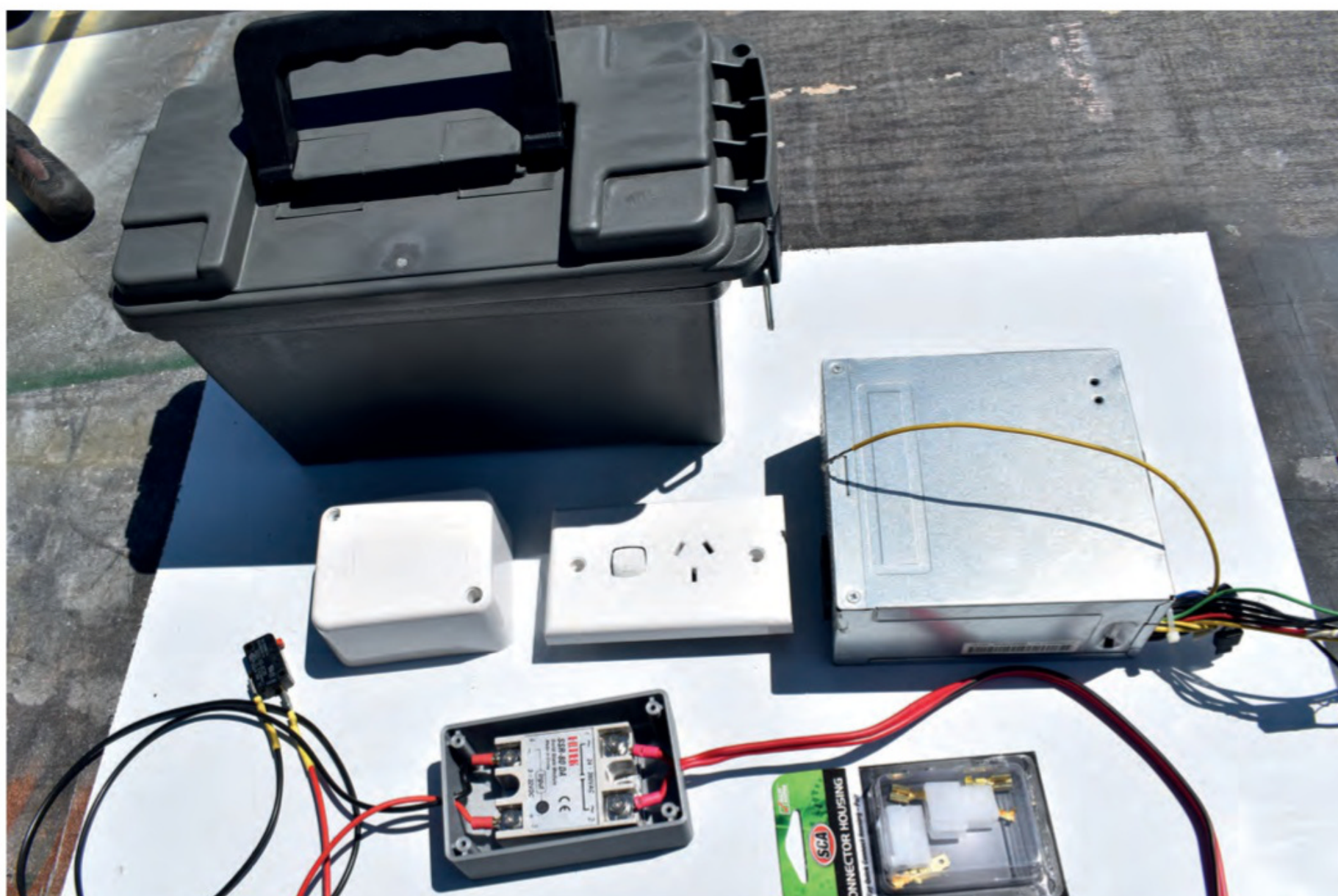


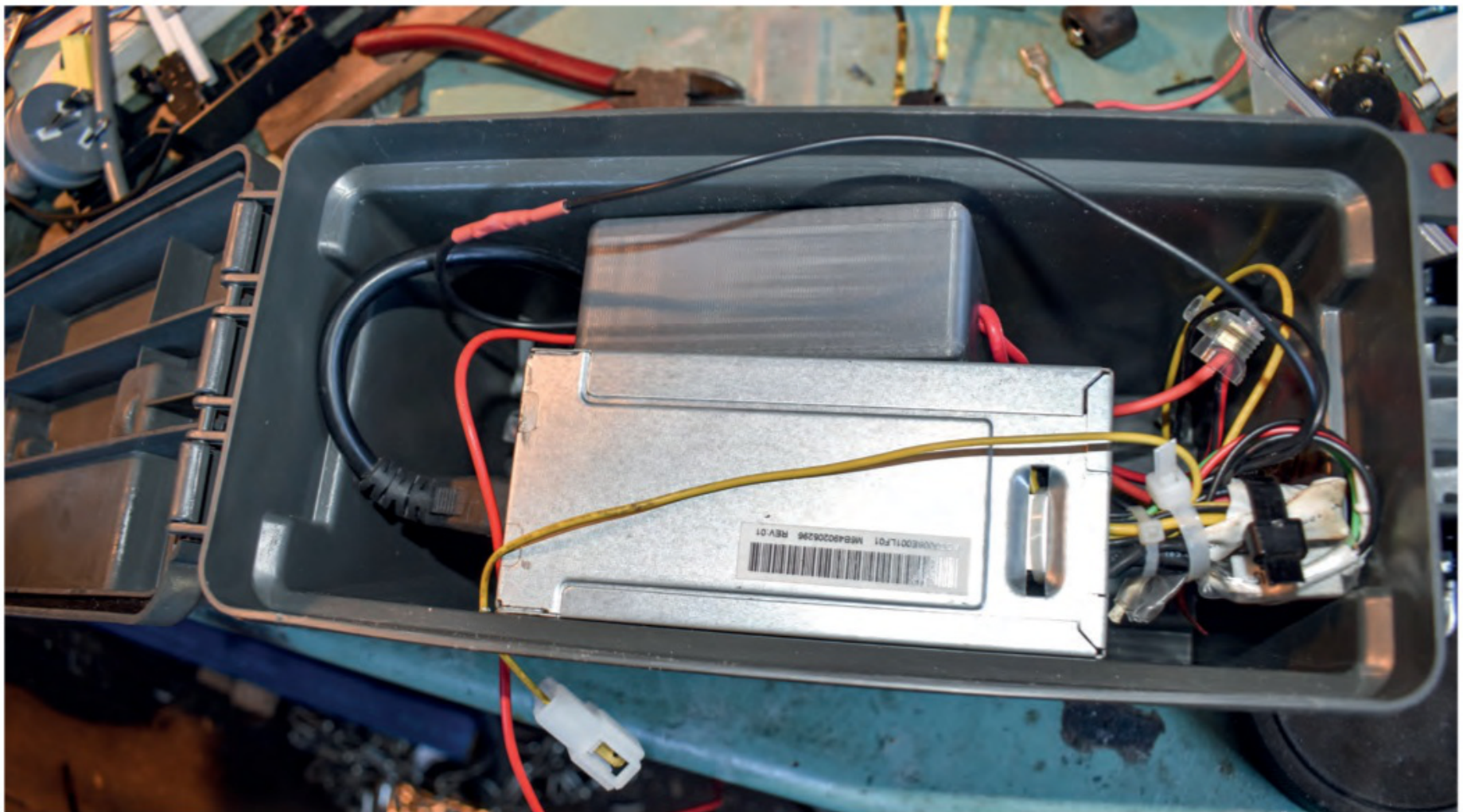
Diagram 2 — 12V power from computer power supply

to the switch-off box was because of the confined space. In a larger box the computer power supply's own fan would be adequate. My main concern was to eliminate the

printer's unnecessary idling time when the small heater head cooling fans and the mainboard and its fan run for no purpose, long after the job is completed.



3D printer switch — the basic components



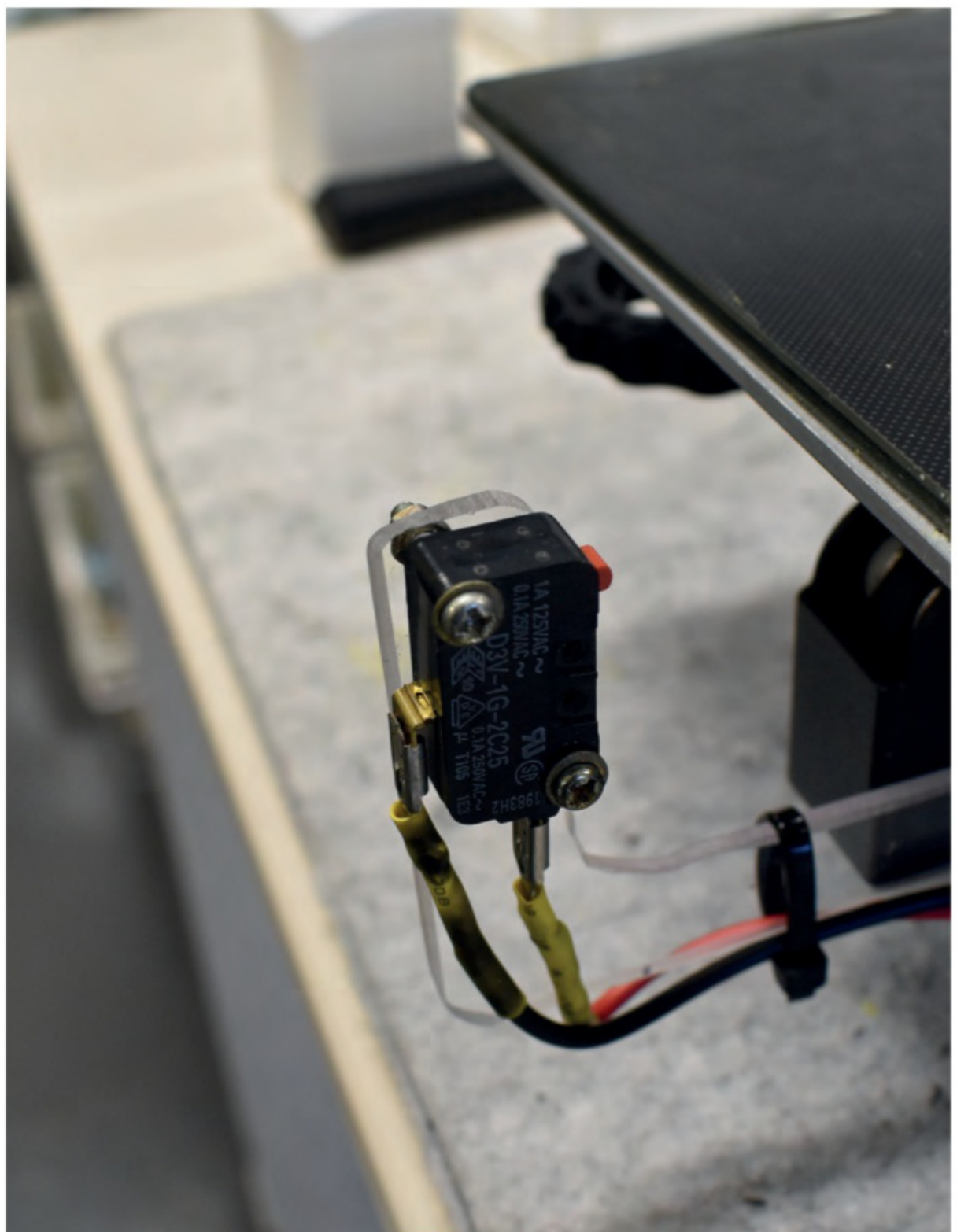
All components assembled in the box

The correct switch

A word of caution here: if you intend to build this switch-off box, make sure that the microswitch you use is one that breaks the 12V circuit when it is pressed. The more common one makes the circuit when it is pressed and is of no use in this application.

The finished switch-off box is a stand-alone unit. The printer just plugs into the box's power point and the microswitch is the only add-on to the printer itself, with a short plug-in lead to the box. As there is no modification to the printer, apart from the microswitch, it can be used with or without its switch-off-box add-on.

If you are considering diving into the world of 3D printing, the Creality Ender 3 isn't a bad start. I bought the very basic model and have since incorporated a number of upgrades to make it easier to use. I started with a glass bed plate, which eliminated a whole lot of hassles in getting the builds to stick to the original flexible mat with which the printer was supplied. Before printing I lightly brush the plate with a 1:80-part mixture of PVA glue and water. This gives the surface just enough stickiness to hold the build as it progresses. ►



Location of the microswitch

New motherboard and another upgrade

Unfortunately, the original motherboard went on the blink about six months after I bought the printer, so I invested in a new upgraded motherboard, which came with a self-levelling probe that has completely eliminated the tedious adjustment of the bed springs before each print. (I had previously also fitted heavier bed springs.)

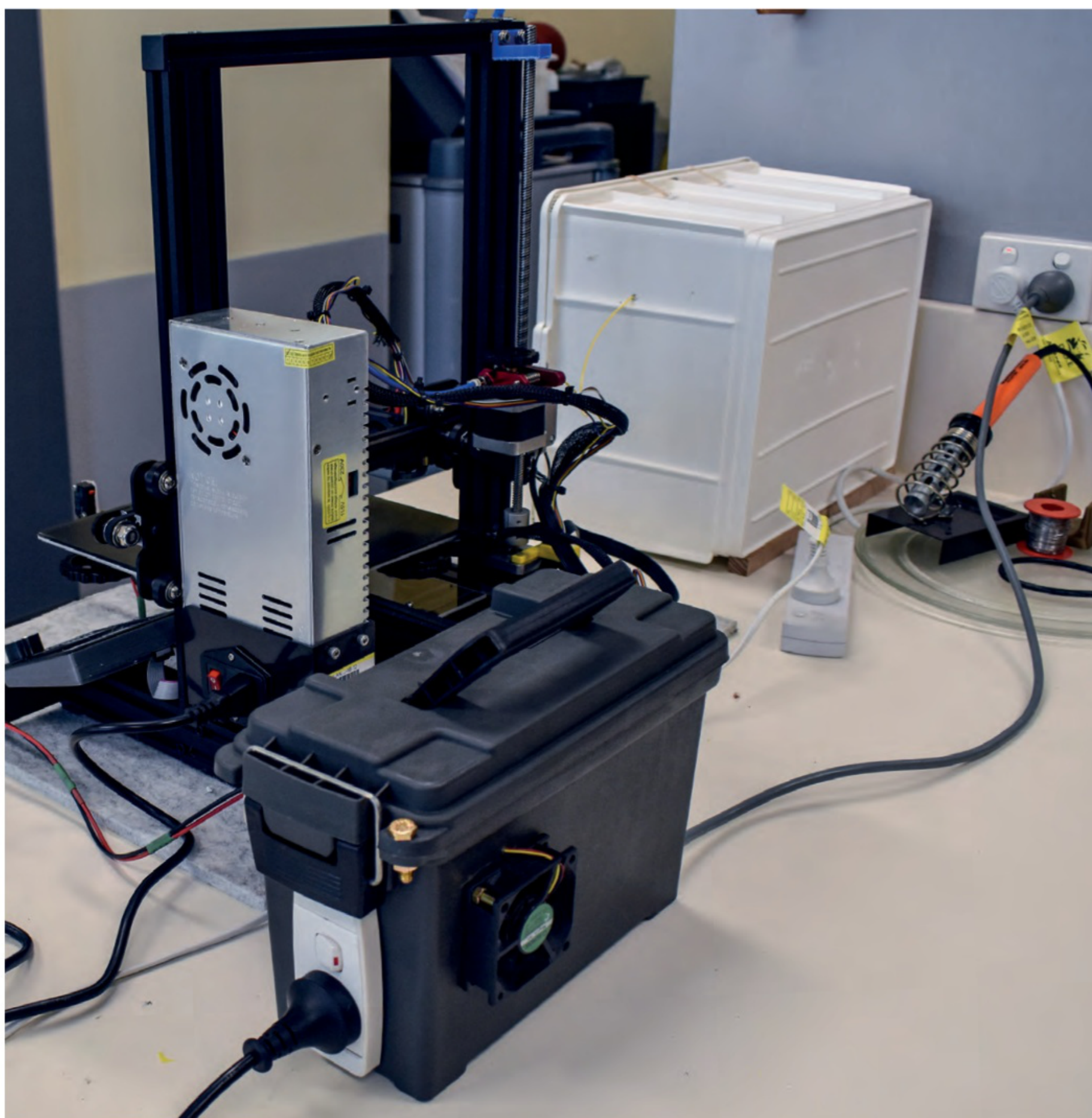
In my last upgrade I replaced the plastic top on the stepper motor that

“All things ... have a finite life. However, computer power supplies are meant to be able to run continuously, and they're also cheap”

feeds the heating element with an aluminium version. This has greatly improved the accuracy of the amount of filament supplied to the heating

head, thereby improving the quality of the finished prints, as it has eliminated over and under extrusion. I also printed a small attachment that fits below the cooling fan and directs airflow around the extruder tip to cool the PLA as it is laid down.

All these small improvements have made the printer more reliable and less finicky to prepare and use. Now once I have loaded the model onto the SD card I can leave the printer to get on with it, only coming back to it at a time that suits me. 📁



The switch-off box sitting behind the printer

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OF SHIPS AND SEALING WAX

NOT CONTENT WITH THE CHALLENGE OF SURVIVING FOUR WEEKS IN LOCKDOWN WITH SEVEN PEOPLE, MURRAY TESTS HIS RESOURCEFULNESS WITH ANOTHER PROJECT

By Murray Grimwood Photography: Murray Grimwood

An off-grid lifestyle tends to be somewhat insulated from outside change, so we approached the Covid-19 lockdown with little trepidation; we even hosted five extra people — we're usually two.

A to-do list was pinned on the wall, and life changed gear just a little. We built a glasshouse — number four, or thereabouts — out of some old ranchsliders and did

some running repairs. We pulled out the Thermettes to save on firewood and gas, and had a fastest-to-boil competition while we used them — Jennie won with 7min 17s. Turns out combustion is better if you start dry and add the water later.

Heading into the southern winter, we added our

old 200W of solar to our visitors' bus-top-mounted 1100W so they could continue homeschooling, and mounted and connected our brand-new 300W to the house so Jennie could work from home.



KZ Lockdown coming together and starting to show her elegant 1948 lines. Deck beams of western red cedar, set in routed slots in the hull



The hull as inherited, in my 'office'. She is hand-hollowed from a stack of cedar planks

Now for some fun

It may be lockdown but you still gotta have fun — and a challenge. Sitting on the shelf was the bread-and-butter-built hull for a model yacht, formally known as the '1948 10-Rater Moth'. It had been left by an emigrating friend, along with the 1951 book from which he'd lifted the lines. The challenge would be to complete it during lockdown, using only on-site materials.

After a lot of sifting through trays marked 'yachting', 'misc.', and so on, I spread my collection of the most likely bits on the bench and set to work. Maybe I should have collected some patience over the years; certainly it was the thing in shortest supply!

The jib-stay mount called for a short piece of T-section brass, drilled for adjustment like Meccano. I fabricated two out of copper and then discarded them, before cannibalizing a couple of old brass cupboard locks. They weren't

quite mirror images, but in the spirit of lockdown they'd do.

Other brass fittings were also called for: chainplates, a mainsheet horse, jib track — ideally, everything at deck level. I chopped the chainplates — deck-mounts for side rigging — out of busbar material from an old switchboard.

I can't remember now where the four brass standoffs came from, but one became the horizontal jib track and the other three became keel bolts. The forestay deck fitting is from an old window opener and the backstay one is the end bracket from a roller blind. The horse nearly had me stumped, then, on my fifth pass of the resource library, I spotted a ballcock — 'resource library' is a great name for a stack of stuff under

"The challenge would be to complete it during lockdown, using only on-site materials"

the trees. The brass arm was perfect, and a couple of old circular lock faces became the anchoring flanges.

Circular locks are a rare thing; my late dad once made a production run of central-locking inserts for retrofitting to houses, all designed to fit a 28mm hole. I'm sure he wouldn't mind a couple being repurposed! ►



Keel plug carefully sawn from the hull



Lockdown guest Nikki and me, pressing the plug into the clay half-mould



Plywood deck sealed and about to receive reinforcing blocks

“The brass arm was perfect, and a couple of old circular lock faces became the anchoring flanges”

Choosing the rig

I turned to the hull, sealing the wood inside and out with a quick coat of Everdure and following that a coat of high-build two-pack. The deck beams were cut from western red cedar and set in slots routed in the hull.

I decided against the old-timer’s railway-track mast-base adjustment in favour of waterproof practicality: a piece of PVC pipe epoxied in place and extending above deck height. Good enough for muggins and sloppy enough to allow for rigging-induced mast-rake adjustment.

Fore and aft, cedar strips braced the

PVC pipe and provided a landing for the cabin / radio-control (RC) box. I jigsawed the deck from 2mm marine ply, glued blocks to its underside where deck fittings were to be bolted, and glued it down using a lot of cobbled-together weights — bricks, bottle jacks, a last ...

Those yesteryear fellows raced these boats with three complete rigs for varying wind strengths. I went for the number-two rig dimensions as a compromise; one mast is quite enough! That called for something 73 inches (1.85m) long. The old-timers built them hollow and in timber but I didn’t have the patience for that. A friend suggested using a fishing rod, and that worked for the bottom half; the top is an old ski pole.

The innovation goes on. The masthead fitting is filed from aluminium T-section, the hounds raided from dinghy hardware. The boom is an old pup-tent pole, and the jib boom started life as a hang-glider batten. The ‘gooseneck’ — the pivot

at the forward end of the boom — is a mountain-bike seat clamp; the ‘outhaul’ — the slide at the back of the boom — is curtain track with a hand-filed traveller. The rudder tube is also hang-glider batten, with the shaft formed from a 6mm stainless-steel drinking straw, and the rudder itself is stainless sheet wrapped around the shaft.

It pays to have a plan B

The keel, of course, had to be cast in lead, using the wooden original as a male plug. I’d done two-piece moulding before for full-size catamaran centreboards, using plaster



A mountain-bike seat clamp serves as a gooseneck



Rudder is of stainless sheet wrapped around a stainless drinking straw



Using a lot of cobbled-together weights ... bricks, bottle jacks, a last



Ski-pole mast and a twisted saddle carrying the cedar spreader

of Paris, but the only thing available this time was some old, premixed Polyfilla. It needed to be soaked so much to become malleable that it took forever to dry, and then it shrank too much in the drying. I broke it up and went for plan B; it so happened that one of our lockdown guests is a dab hand with clay.

The process is to sink the plug halfway into the clay, let that go hard, wax the remaining piece of plug and the clay face, then pour more clay over as the second half of the mould. Both parts have to be robust enough to be split, have the plug removed, have pouring and venting holes carved out, be clamped together again with the keel bolts sandwiched, then have lead poured into the cavity. At time of writing, the second clay pour has just been done.



Masthead fitting with trial rigging attached. Having used one end of a fishing rod for the lower mast, it seemed appropriate to use the other as a flagstaff

As of the end of the four-week lockdown — and the deadline for this article — *KZ Lockdown* isn't finished.

*A friend suggested
“using a fishing rod,
and that worked for
the bottom half; the
top is an old ski pole”*

The RC is in transit, the keel is yet to be poured, and there's a bit more painting and rigging to go. I might cheat and ask a friend to sew the sails — although the cutting and material are mine, thus qualifying as 'on-site' and 'during'.

I could have sweated over a replica of the old-timer's automatic sailing-control mechanism — called 'Braine



Dad's idea for retrofitting central locking to a house using one bored hole. I raided two to mount the traveller (below). I'm sure he wouldn't mind

gear' after its inventor — but RC is a lot more practical.

KZ Lockdown isn't a perfect vintage replica, nor will she foot it with a modern 10-Rater — any more than a 1948 racing yacht can foot it with a modern one. However, she will pass the 'class' test with flying colours and what she lacks in finesse she makes up for in backstory and patina.

It's been a ton of fun thus far, and promises a lot more to come. For someone who rates sailing in the top two, it's been a good way of keeping frustration at bay. 📄



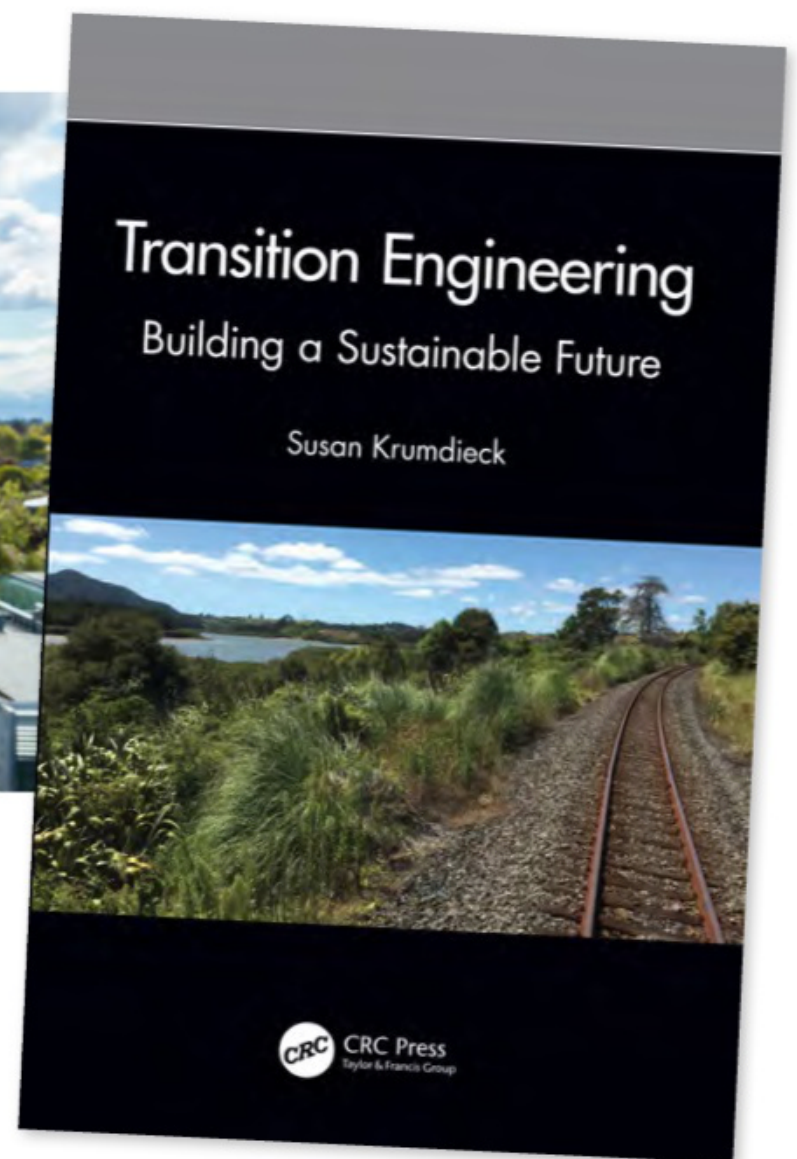
Two brass locks furnished the adjustable jib-stay mount; the jib boom started life as a hang-glider batten



Outhaul filed from a curtain track; traveller was a ballcock arm



Transition Engineering author, Dr Susan Krumdieck



TRANSITION ENGINEERING

BUILDING A SUSTAINABLE FUTURE

BY DR SUSAN KRUMDIECK

Review by Murray Grimwood

Dr Susan Krumdieck is a professor of engineering at the University of Canterbury. She has spent a working lifetime contemplating energy, resources, and social constructs from an engineering point of view. *Transition Engineering* is aimed at her students, but is digestible by anyone with an engineering bent. It is the cleanest expression of the problems facing humanity, from a practical perspective, that I have ever read.

The concept is simple. She starts with how we will be in 2100 — no fossil energy, lower population, little or no mining, massive recycling — and asks how we get from here to there. More specifically, how we engineer our way from here to there. She addresses mega-problems and ‘wicked problems’ without shying away, an approach that has seen her become a founding member and trustee of the Global Association for Transition Engineering (GATE) in order to address them.

Chapters logic-sequence their way from The Mega-Problems of Unsustainability to the inevitable Conclusion, with a lesser look at the

“Transition Engineering is aimed at her students, but is digestible by anyone with an engineering bent”

economic implications — including taking a longer term, differently calculated view of return on investment.

I was particularly taken by the chapter discussing systems and what she describes as the “InTIME approach”. If I was left with an impression it was the realization that we have empirically built our infrastructure over the past 200 years but we now have to make the same kind of effort — curtailed by specific things such as oil reduction —

in a much shorter time. ‘All hands to the pumps’ comes to mind.

This is a word-dense book, made palatable by its logical format and Robert Stannard’s outstanding illustrations. If coming cold to the subject, I suggest downloading James Howard Kunstler’s *The Long Emergency* and Ronald Wright’s *A Short History of Progress*; they make a good, easily readable curtain-raiser. *Transition Engineering* is the big game, and well worth the ticket. 📖

Book info

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- Published by CRC Press
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- 230 pages — 67 black-and-white illustrations
- Available in hardback and paperback at <https://bit.ly/3dung3A>



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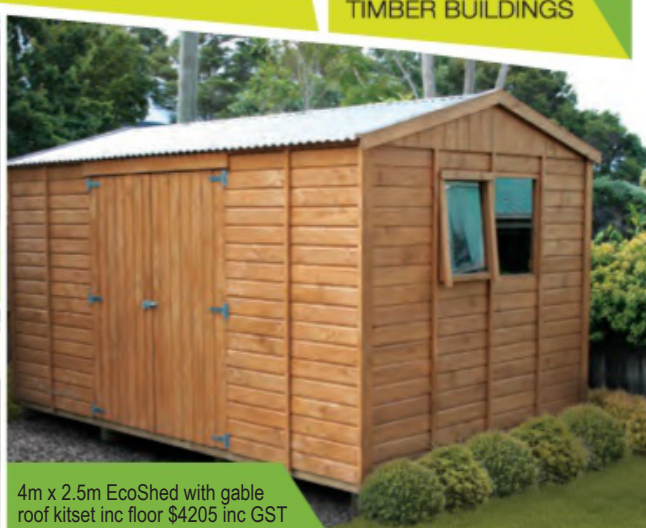
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ENGINES ENABLE EXPLORATION

WHETHER YOU ARE RE-ENACTING A WWII DOGFIGHT ABOVE CANTERBURY'S CHECKERBOARD LANDSCAPE OR SPEEDING ALONG ITS BRAIDED RIVERS, HORSEPOWER IS KEY TO YOUR RIDE

By Ritchie Wilson

Photographs: Ritchie Wilson

'Donk' is Australian and New Zealand slang for an engine, although it does have other meanings, 'drunk' or 'wet' being two.

The word is probably an abbreviation for 'donkey engine'. These were the ancillary engines on sailing ships that replaced large gangs of sailors in

weighing anchor or hoisting a large sail using a capstan, thus allowing a much smaller crew to operate the vessel.



Big donks on the plains

The accepted theory is that deep within the Earth there are thermal currents that push bits of Earth's outermost layer, the crust, around. In our part of the planet, the sea floor is pushed upwards by these movements, resulting in earthquakes, volcanoes, and mountains such as the South Island's Southern Alps. These run pretty much north to south, forming the spine of the island.

The higher the alps are pushed up, the more they are weathered by ice, wind, and rain and the more material is washed away forming, on the eastern side of the mountains, the Canterbury Plains. These plains are pretty dry

because the high ground to the west combined with the prevailing westerly winds produce a rain shadow zone.

The extensive flat landscape and the generally fine weather make the area perfect for aviation, especially the training of pilots. The New Zealand Air Force maintained a flying school at Wigram, on the edge of Christchurch, for more than 40 years.

The plains are divided up by large, shallow rivers that continually split into separate streams and then recombine as they flow, more or less directly east, from the mountains to the sea. These shallow braided rivers are only navigable by a special type of boat: a jetboat. ►



Warbird over the southern lakes

Spitfire engines

The original Supermarine Spitfire was powered by the 27-litre, water and glycol-cooled, Rolls-Royce Merlin 60o V-12 48 valve engine designed by Cyril Lovesey (1899–1976), among others.

In the early 1930s Rolls-Royce decided that it needed to make a larger, more powerful aircraft engine, leading to the design of the Merlin in 1933. Production started in 1936 and ended in the 1950s. It wasn't the most powerful aircraft engine of WWII, but it is widely regarded as the best. It was the engine that powered the North American P52 Mustangs as well as the Hawker Hurricane and Supermarine Spitfire fighters that defeated the German Luftwaffe in 1940s Battle of Britain.

More than 150,000 Merlins were manufactured by Rolls-Royce and Ford

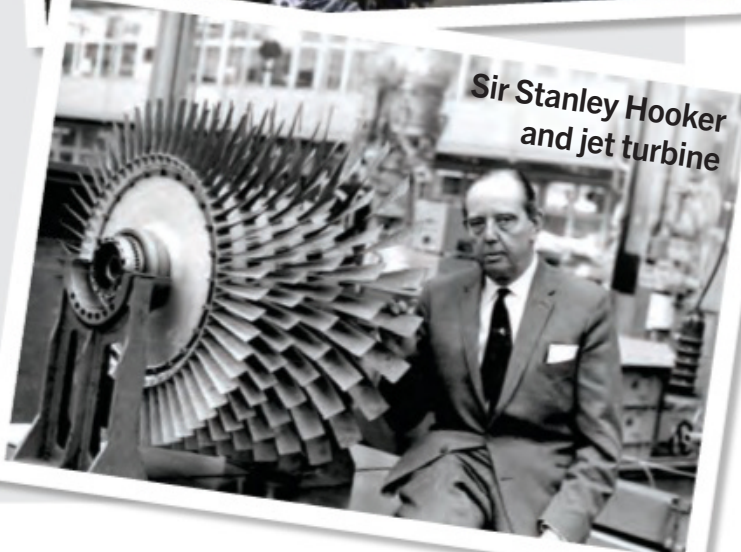
in Britain, and by Packard in the US. Lovesey was in charge of the development work, which increased the output of the engine from 1000hp to 2000hp over the course of the war, while famous engineer Stanley Hooker (1907–1984) was the designer of the two-stage supercharging, with twin intercoolers, which, along with improvements in its fuel's octane rating, was responsible for the dramatic power increase.

Hooker was knighted in 1974 in recognition of his work on jet engines. He died the day before his biography, *Not Much of an Engineer*, was published.

More Merlins were actually used in the Avro Lancaster heavy bomber and in the de Havilland Mosquito fighter-bomber than were used in Spitfires.



Rolls Royce Merlin V12 engine



Sir Stanley Hooker and jet turbine

Bill Hamilton on the Ganges River 1977



Shallow water navigation

The jetboat was designed and developed in Canterbury by local engineering company CWF Hamilton & Co. Until then, there was no watercraft that could navigate the shallow, fast-flowing waters of many South Island rivers.

Running a propeller in shallow water is impractical as it is very exposed to damage from continually hitting rocks and tree roots on the riverbed.

“The efficiency of a propeller in air is too low to enable an airboat to make progress through fast-flowing water”

Airboats in Florida are driven by an airscrew, turning in the air rather than the water, but the efficiency of a propeller in air is too low to enable an airboat to make progress through fast-flowing water.

Jetboats don't have an exposed propeller to be damaged by contact with rocks, and so on; instead they have an impeller, turning in a metal duct, which directs a stream of water backwards. Every action having an equal and opposite reaction, the water jetting backwards drives the boat forwards.

From the age of 21 Bill (later Sir William) Hamilton owned and ran a 9000ha South Island high-country station, Irishman Creek. He was also a skilled, self-taught engineer.

In 1925, at Auckland's Muriwai Beach, Bill took the Australasian speed

record, the first person in Australia or New Zealand to officially exceed 100mph. While visiting England in 1929, Bill's wife bought him a second-hand 4.5-litre Bentley tourer. He tuned the car himself, took it to the iconic Brooklands racetrack, and unprecedentedly won all three races held that day, beating, among other celebrated drivers, the then world land speed record holder, Sir Malcolm Campbell, and the equally famous Sir Tim Birkin.

Eureka moment

Bill built earth-moving machinery to his own designs at Irishman Creek and hired staff to make replicas. He was keen to explore the shallow, turbulent streams in the foothills of the Southern Alps near his property and so turned his mind to designing a suitable craft.

First he tried a propeller running in a channel located in the bottom of a small boat. The idea was that the propeller would draw the water towards it, but it didn't; the boat hardly moved.

Bill was then shown a magazine article about fire-fighting boats built by American fire-pump manufacturer Keenan Hanley, where the pump not only squirted water onto a burning ship but also propelled and steadied the fireboat by expelling water from a steerable nozzle under the hull. Unfortunately, the nozzle was as vulnerable to damage as a standard propeller. So Bill and his engineer son, Jon, tried a shrouded propeller which squirted water, drawn from under the hull, out of the transom of the boat — an idea that Bill patented: NZ Patent 112694.





A GM marinized V8 being installed into a hull at Hamilton Marine

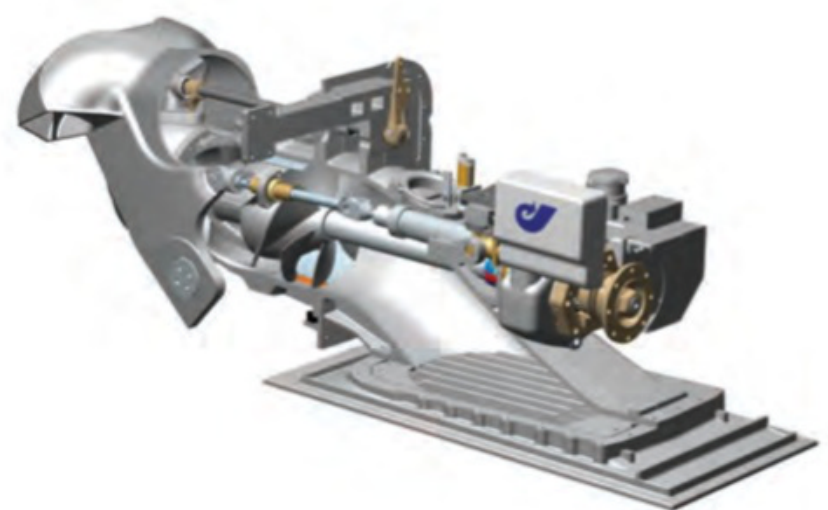
The Hamilton jet is born

The breakthrough, which resulted in a much more effective propulsion system, was to have the jet of water squirting at the water surface rather than into the water below the surface, giving a completely unobstructed hull bottom. This idea was so successful that it allowed Bill to redirect his Christchurch-based engineering company away from its heavy-engineering work, such as the first Queenstown gondola, and into manufacturing jet units of steadily-increasing size and efficiency.

Today, HamiltonJet manufactures a range of jet units, some large enough

to power small ships. The company is still producing complete jetboats in its Hamilton Marine division.

The 4.7m jetboats marketed by Hamilton Marine are powered by Oldsmobile LS2 5.2-litre V8 engines, which are supplied, ready to install, by GM. These are basically the same engines as give the latest Chevrolet Corvette its sparkling performance. The marinized version of the LS2 has different exhaust manifolds and a water-cooled heat exchanger. It drives the jet unit directly, the impeller turning at engine speed. The boats have a hull with an aluminium bottom and glass-reinforced plastic sides and deck. ►



A jet unit sucks water through the base of the hull, accelerates it with an impeller and forces it out a nozzle at the stern, creating a high-velocity jetstream to push the boat forward and steer. Reverse is achieved by forcing the flow backwards around a “deflector”.



Above: The jet unit was first cast and fabricated at the Irishman Creek station then, after 1945, in a large engineering shop in Christchurch



Silvester Motor Company manager, Wayne Watson, and some crate engines

Improving the thrust

The first commercially-produced Hamilton jet units were designed by George Davison as his first job after leaving the University of Canterbury's engineering school.

The units were called Rainbow and, like a pump, moved the water around the drive axis. This is a relatively inefficient process because the water has to change direction several times. The next production unit Davison designed, the Chinook, was axial flow — the water moves along the axis of the drive allowing the movement of a larger volume of water at lower pressure through a larger aperture which, it turns out, produces more thrust. Subsequent models moved the water even more directly from under the hull through the transom.

The recent movie *From the Ocean to the Sky*, which documents Sir Edmund Hillary's 1977 expedition up the Ganges River — more properly the Ganga River — features three Hamilton Jet 52 boats: Kiwi, Ganga, and Air India.

Jon Hamilton and his son Mike were the lead drivers and the boats performed well on the 2000km journey until thwarted by a 4m waterfall at Nandaprayag. Sir Ed several times stated that this expedition was his favourite adventure.

The early-model jet units are sought after; at the 2019 Canterbury Vintage Car Club swap meet at least two stallholders had signs indicating their willingness to buy Rainbow or Chinook jet units.



GM V8 — a big donk

From boats to planes

A company selling kits of classic first and second World War fighter aircraft, Campbell Aero Classics, is located on the plains at Loburn in North Canterbury.

What, you might ask, do jetboats and reproduction 'war birds' have in common. Well, apart from finding conditions on the Canterbury Plains ideal for their mode of transport, they are both usually powered by large-capacity, high-powered, eight-cylinder petrol engines manufactured in the USA, most often by General Motors.

"These engines ... are used in hot rods, trikes, and race cars as well as in boats and aircraft"

A thing of beauty

Several companies in New Zealand import these engines, which are used in hot rods, trikes, and race cars as well as in boats and aircraft. One of those companies, which has been in business for 50 years, is Silvester Motor Company in Moorhouse Avenue in

Christchurch. The company imports new and used engines as well as parts and accessories. The new engines are called crate engines because they arrive, factory fresh, in wooden crates. They are things of beauty.

As I am sure readers will be aware, crate engines come in three main varieties: short block, long block, and turnkey. Short blocks lack heads, manifolds, and most accessories. Long blocks have heads and some accessories, such as starter motors. Turnkey engines are complete with all electrical and fuel-injection gear, virtually ready to run. ►



Ivan Campbell's replica bi-plane in his hangar



If you think that the North American P-51 Mustang has a superior claim to be the ‘fighter that won the war’, Ivan can sell you a kit to make a 75 per cent replica dual-seater. He is the New Zealand agent for the kit’s manufacturer

V8-powered Supermarine Spitfire

Most students of military history would agree that without the Supermarine Spitfire fighter aircraft the Allies would have faced an even more difficult struggle to defeat Germany and its allies in World War II. Very few of the original 20,351 Spitfires built between 1938 and 1948 exist today, and only multimillionaires could afford any that were for sale.

However, for a fraction of the price you can buy a kitset of parts to build, in your shed, your own slightly smaller version. The kits are made in America by Supermarine Aircraft, owned by Australian Mike O’Sullivan, who has spent a reported US\$5m in developing the 90 per cent scale replica of the iconic fighter.

The Australian and New Zealand agent for the type 26B Spitfire replica kits is Ivan Campbell of Campbell Aero

Classics. He has sold six of the kits, assembling three of them — all tandem two-seaters — in his hanger on his airfield at Loburn on the Canterbury Plains. He built the first 26B in 2012. He still owns the second — a dual-control, tandem two-seater powered by a Chevrolet LS 2.6-litre alloy V8 engine made by General Motors. He was the first to use a V8 in the replicas, previous ones having V6 engines.

Greater efficiency

Ivan felt that the superior torque of the V8 would give better performance without a large increase in weight and allow the use of a slower-rotating, coarser-pitched propeller. A slower-rotating prop has a slower speed through the air at its tips. If the tips are moving too fast they will be travelling faster than the speed of sound, and noise and cavitation will result. That is inefficient, making the aircraft slower and louder.

“He was the first to use a V8 in the replicas, previous ones having V6 engines”



The New Zealand-made reduction gear incorporating two rubber belts

Ivan gave the example of the North American T-6 Harvard, which was used for decades to train RNZAF pilots at the Wigram flying school. The Harvard's two-blade propeller rotated very fast, the tips exceeding the sound barrier, and produced the characteristic deafening buzz that makes it so memorable to local residents.

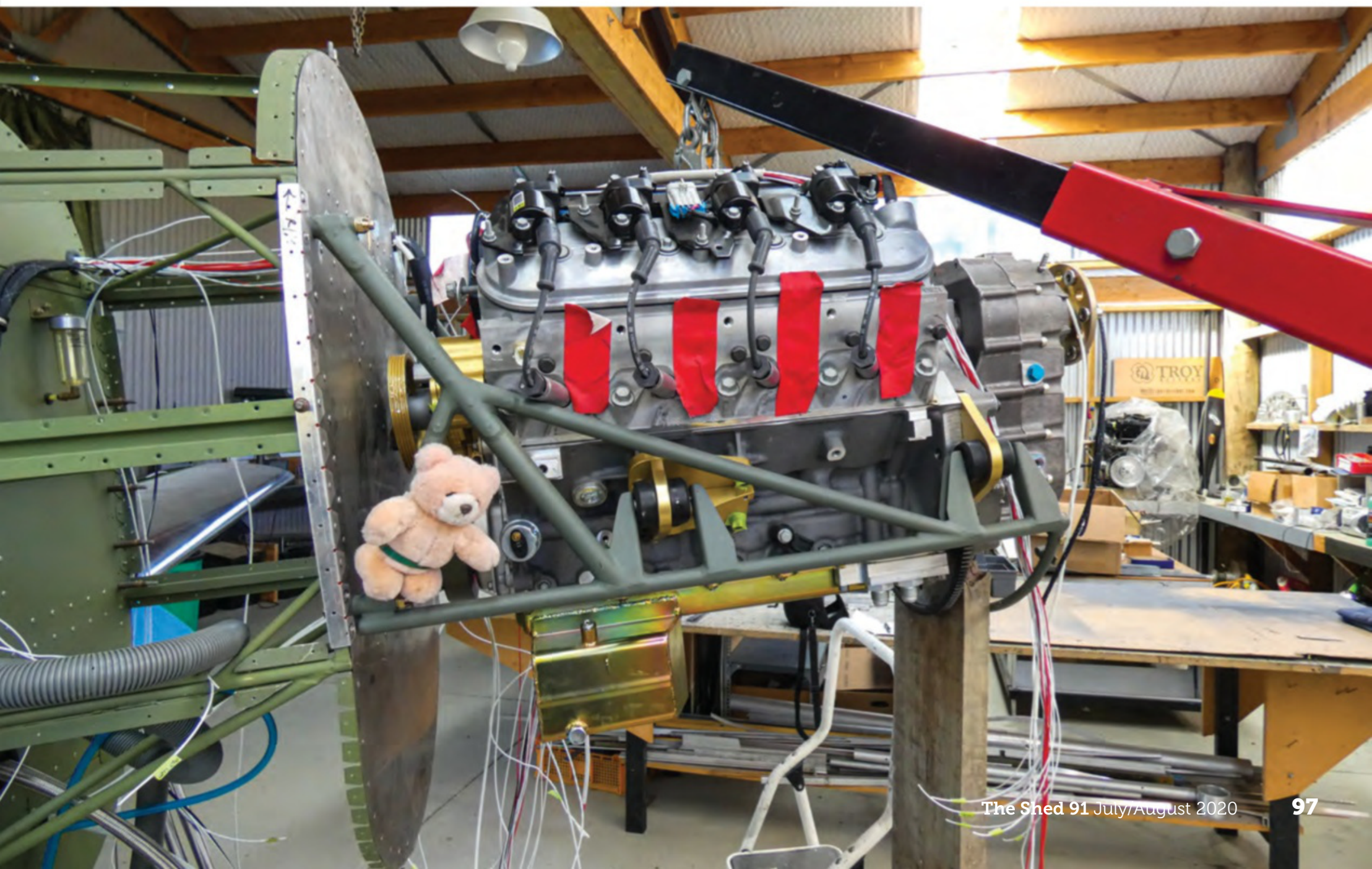
The pitch of Ivan's Spitfire's four-blade propeller is variable and is computer controlled to maintain a constant rate of rotation no matter what manoeuvres the aircraft is performing. So, the propeller tips are always subsonic and the aircraft is quieter.

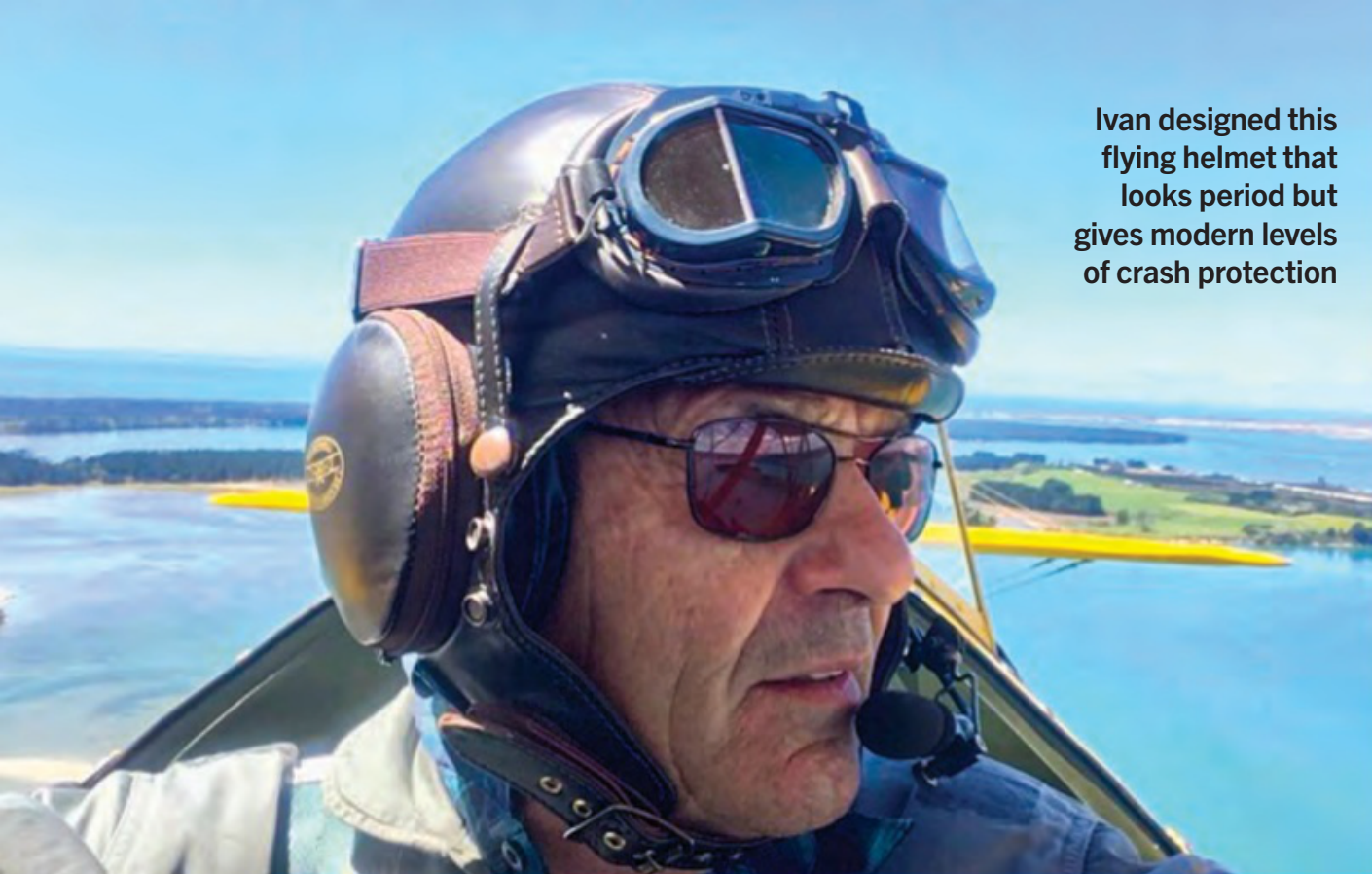
The propeller is driven by a pair of toothed rubber belts off the flywheel end of the V8, which is at the front of the aircraft. This set-up lowers both the speed and position of the engine's drive. The reduction drive is manufactured for Supermarine Aircraft by a New Zealand company. ►

"He was the first to use a V8 in the replicas, previous ones having V6 engines"



Below: GM aluminium V8 in a replica Spitfire air-frame. Ivan was an early adopter of "corona virus teddy bears"





Ivan designed this flying helmet that looks period but gives modern levels of crash protection

Sport aviation in the time of Covid-19

Except for walking, biking, and, belatedly, fishing, most recreational activities in New Zealand were banned during the mandatory Level 4 lockdown. Sport aviation was no exception.

Throughout the country, light aircraft were grounded, parked-up in hangars and airfields. Even more than most training institutions, flying schools must be concerned about the future. The news that Air New Zealand is to make 400 pilots redundant would be very discouraging to anyone thinking of making flying a career, so the number of students seeking pilot training is bound to fall.

Ivan says that the ban on flying was because of the danger of transmitting the Covid-19 virus in a rescue situation. In the aftermath of an accident, the rescue crews would inevitably have to be close to a flyer with an injury, so 'social distancing' would be impossible.

Ivan has been amazed by photos of airports jam-packed with passenger jets, wing tip to wing tip along runways, resembling the RNZAF bases at the end of WWII, when runways were lined on both sides with hundreds of unwanted fighters, veterans of the air war in the Pacific against the Japanese.



Biggles attire

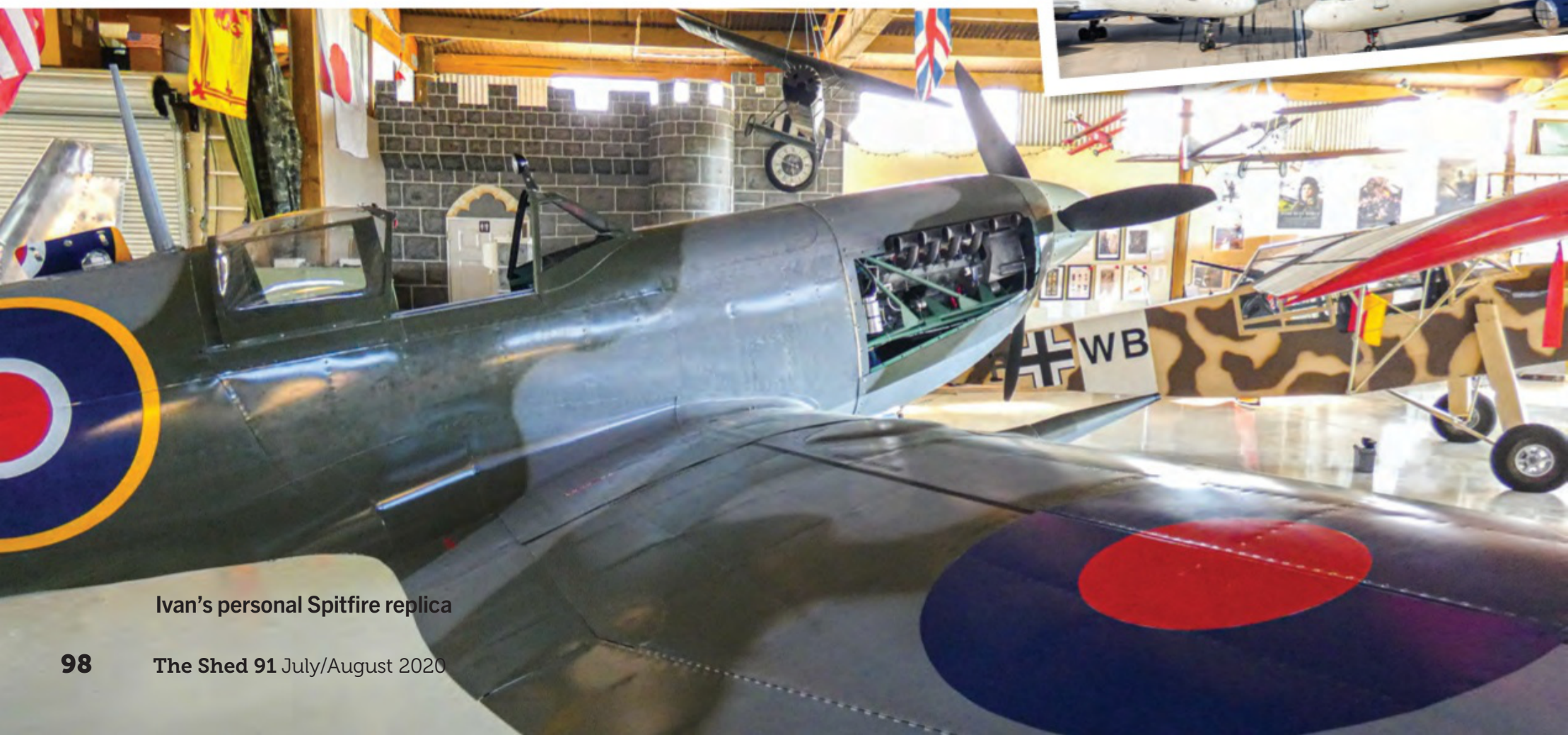
Ivan built his first aircraft, a replica De Havilland Tiger Moth powered by a Suzuki Swift twin-cam engine, when he first moved to Loburn 19 years ago. It is traditional to fly these biplanes wearing period clothing — full Biggles mode: black sheepskin flying jacket and brown leather flying helmet and goggles. Ivan, a lifelong motorcyclist, felt distinctly uncomfortable with the lack of protection a traditional flying helmet would give in a crash. A well-publicized prang of an original Spitfire and the serious injuries suffered by its famous owner made a great impression on Ivan and he was determined to make a flying helmet that looked period but gave modern levels of crash protection.

In the years since Ivan has made hundreds of his leather Classic Hard

Shell helmets. They have been used by fliers of veteran aircraft around the world. As a bonus, they feature noise reduction earphones to protect the wearer's hearing. Manufacturers of classic aircraft often supply the Classic Hard Shell helmets with the machines, and Ivan's customer list includes "some of the biggest names in aviation".

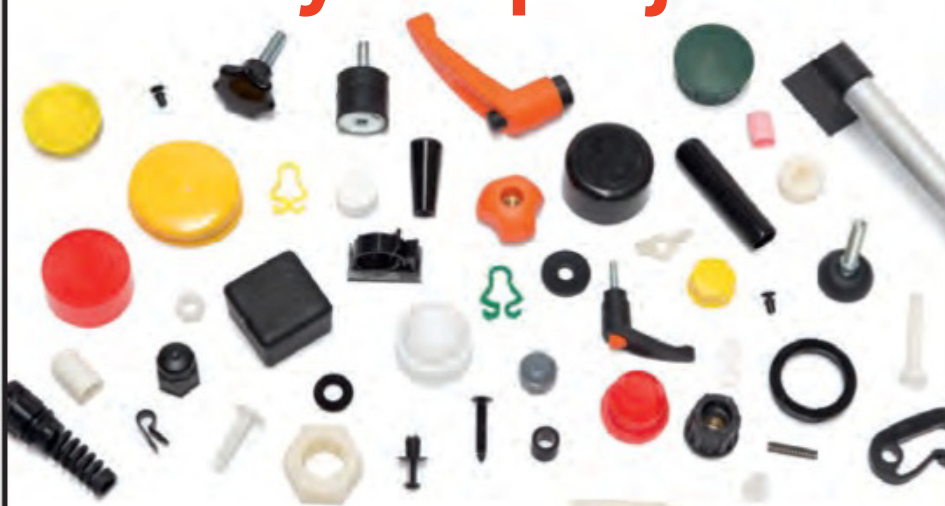
Time to fly more

Ivan has just completed a replica of the WWII German military's Storch light aircraft powered by an Australian Rotec radial engine, and is nearly finished his 20th aircraft build, a Spitfire. He thinks the Spitfire may be the last. He would like to spend more time in the air and less in the hangar. He does have the major parts of an original Tiger Moth hanging on the wall, though. 📁



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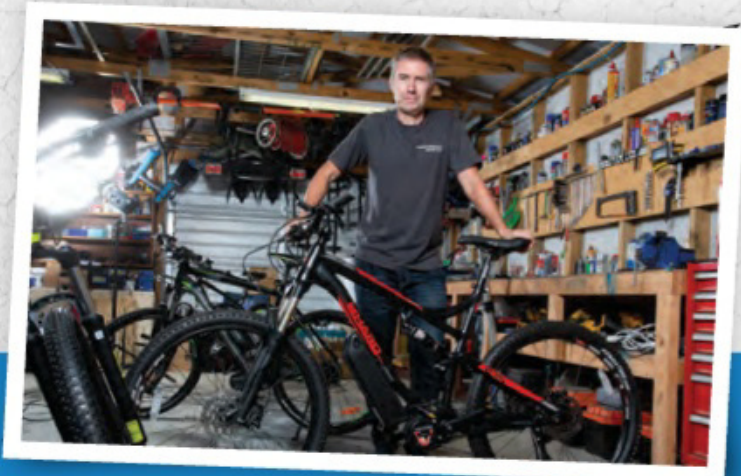
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A WEIRD AND WONDERFUL WORLD

IN A SHED CONTAINING TWO DRAWERS LABELLED 'TIME TRAVEL STUFF' ANDREW HALL CREATES ART THAT BOTH AMAZES AND AMUSES

By Jason Burgess

Photographs: Jason Burgess

A visit to Andrew Hall's shed — a single garage in suburban Henderson, West Auckland — is a portal into another dimension. In this realm, a sense of humour is essential.

First, we must pass along a fence line fringed with upside-down vintage hand saws that wave in the breeze. The palings of the fence are festooned with disfigured Barbie dolls, rusting twisted metal, and strange totemic faces. Moving on, we pass an undergrowth of salvaged steel watched over by a larger-than-life metal humanoid, whose gas cylinder belly has been converted into a brazier.

Having navigated this tangled wasteland, we drop under a shade sail, to enter a highly ordered,

tightly packed, and dimly lit Tardis of tools. Here you are greeted by an angular assembly of buckled and bent miniature figures in



Andrew Hall turns cast offs into gargoyles

various stages of completion. Their collective gene pool is composed from the detritus of the world we left behind at the gate.

Art for fun's sake

For the past two decades Andrew has been working full time at turning society's cast-offs into three-dimensional cartoon gargoyles, aliens, monsters, and effigies of mirth.

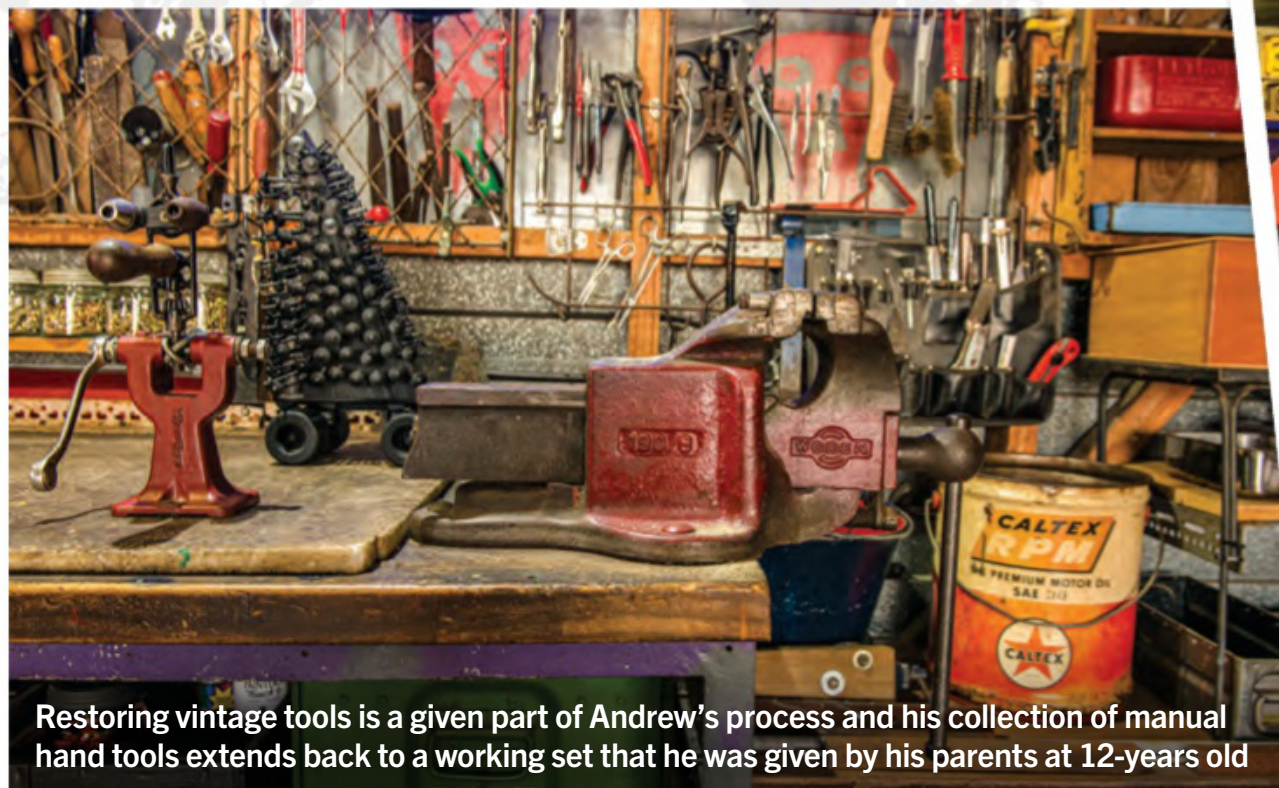
In the small but chaotically formed world of Aotearoan assemblage art, his work is highly regarded. It has featured widely in exhibitions, at flea markets, and in pop-up shows across Auckland — once staged from the roof of his modified Skoda which got pink stickered some years ago.

Andrew's art is collected by people as far away as Japan — "They like the really wacky stuff" — and France: "The French can really see art; it's in their genes; they know what art is." ►



Checking the workings on Fire Belly (a lifesize brazier), winner at the 2019 Waitakere Licensing Trust Art Awards

Right: A restored, 1950's Wolf industrial, one-speed drill. "Great tool when you need some torque"



Restoring vintage tools is a given part of Andrew's process and his collection of manual hand tools extends back to a working set that he was given by his parents at 12-years old

Andrew is a walking embodiment of his artwork. Being light sensitive he is rarely seen without his Shade 4 welding glasses. In his trademark orange T-shirts with hand-stamped grimace-face logos, dark-blue knee-length shorts, and knee-high Oliver work boots he is hard to miss. The T-shirt visage comes from a face he once cut into a brazier.

"I ended up with all these bits so I made them into a stamp. I like humorous, scary faces," he says.

Andrew's shed

The windows around Andrew's workspace are screened with a kind of deconstructed stained-glass window made from dolls' limbs, wire, and

cobalt-blue glass shards. There are work surfaces on both sides, but the grunt of the effort is reserved for the bench on the back wall, home to a massive Woden quick release vice that Andrew found in the bush on Scenic Drive in the Waitakeres.

"It's a real engineers' vice," he says, "cast steel. It's probably done a couple of lifetimes; it can't be any later than the 1950s."

"Being light sensitive he is rarely seen without his Shade 4 welding glasses"
"Two drawers marked 'time travel stuff' — whatever that is"



Tool collection

Although Andrew has a not inconsiderable tool collection, he prefers to create most of his assemblages by hand.

"I have a power hacksaw but I could get by without it," he says, explaining that he doesn't like making noise. "I've got some cool tools like a hammer action drill and grinders and things for cutting holes and experimenting. I bend steel cold and if I break it I just weld it. I like cutting and filing. I use my cordless drills a lot — really good Hitachi ones. Lately, I've been using Ryobi ones, mid range but surprisingly good; one battery fits many tools. However, it's Hitachi for really heavy jobs.

I do things that make engineers cringe but I do look after my tools. When they wear out I restore them or make them into something else. I made a brazier basket out of old tools. It won some awards and we had fun having fires in it."





Main work bench with the restored Woden vice found in the bush along the Scenic Drive, Waitakere Ranges



Two brazier baskets, one weathered, the other finished in epoxy both constructed from discarded tools

“Some people think I’m an axe murderer because I’ve dismantled a doll”

In this shed nothing is wasted. Hand-labelled vintage nail and ammo boxes, collectable tobacco tins, and weathered filing cabinets are carefully packed with the ingredients for his creations. There are boxes for G clamps and cordless grinders. Drawer sets hold trays of minute bolts, washers, and every size of screw.

We see the electrical connector collection; bike and antique spanners; pipe wrenches; and hammer and more recent spanner collections. There are units full of clips, string rope, specialized nails, horseshoes, panel pins, concrete nails, tacks, couplings, and two drawers marked ‘time travel stuff’ — whatever that is. Not to mention springs— everything from keypad springs to clutch and carburettor springs.

“You need the exact thing to do the job,” Andrew explains. ►



Treasure trove

"Lots of the stuff that people bring to me is crap but I can usually find a use for it," Andrew muses. "I sort it into categories."

If there's nothing he can create from it, it's moved on. However, there are sometimes treasures amongst the dross.

"Someone recently brought me a cool, old, silver ladle. Then I picked up some solid silver napkin rings from the tip shop. I even once found a gold sovereign in the inorganic and a gold and silver Aztec disc, a calendar — I swapped that for a huge load of scrap metal and made good dollars on it."



Children's workshops



"The kid's workshops are huge for me, lots of multitasking, prepping, and cleaning up," Andrew says. "It's something I probably shouldn't expose myself to but somehow, we get through it!"

He describes his enjoyment in watching their brains firing up and new circuits being created.

"Some get really enthusiastic about it. Some start slowly then, once they get going, they really like it. Sometimes we get 60 to 80 kids in one session. I'm not really good at controlling crowds so it's good to have teachers and parents there who can."

The reward for all the effort is seeing the children leave with something they have made all within a couple of hours.

"They make some really good stuff from a big pile of junk."



Whether upcycling brake shoes, old kitchen forks, or beer and can openers, Andrew's deceptively simple figures require a vast collection of materials and resources to inspire and build durable objects

Assemblage art

Andrew reckons his interest in assemblage art began at age four, making potato men. He started simply then found other things to join and grow them, such as plasticine, matchsticks, and acorns — anything he had access to. He employs the same MO today. He says he sees faces everywhere, in everything, whatever the material. It all starts from there. Automatic assemblage he calls it.

"It's all spontaneous — something is driving me. There is no real plan, it just comes together."

Andrew's pieces are deceptively simple. Much of what he does requires intricate work and specialized tools, especially for drilling, cutting, welding, and bending hard metal. The trick is

knowing how to join things to make them last. Wire, welds, screws, bolts, and a product called 'Knead it' are just the beginning.

His art has always raised eyebrows.

"I don't really care about people's reactions — unless they laugh too loud, because I am also sensitive to sound! Some people think I'm an axe murderer because I've dismantled a doll and made it into a giant centipede or something. One woman was so offended by what I had done to a Barbie doll it was like I had inflicted pain on her."

Andrew simply shrugs off the, "My kid could do that", reactions.

"Maybe they could, but most of the time they probably couldn't, even if they had the time." ►



Andrew visits local schools regularly



Source material is well organised in this shed





Getting the balance right on newly formed, free-standing, friends



Drawers within drawers

Upcycling approach

Andrew favours steel but works with whatever materials are at hand and says he cannot believe what people throw away. He “virtually lives from the stuff” that he finds in inorganic collections.

“I don’t like chucking things away. A lot of stuff goes into a box for the kids’ workshops I run. But sometimes it’s just too dangerous or dirty so it’s not worth the trouble and time to clean it. That stuff goes in the scrap-metal bin.”

Some things he passes on to other artists or friends just to keep things moving.

The gas cylinder guardian — aka Fire Belly — that stands guard over the yard recently won Andrew a prize at the Waitakere Licensing Trust Art Awards. His popular children’s workshops run regularly at Corbans Estate Arts Centre during school holidays and his art can be found there, too, at the gallery store. Andrew is not one for the limelight, though; he says his happy place is tooling around in his shed. 📁



Greasing the brazier door of Fire Belly



Helping students assemble their creations at CEAC



Steel is Andrew’s preference but that does not mean plastic cannot be put to good use



Sad loss

Andrew was saddened when his artistically modified Skoda was written off the road by the police, saying it created humour on the road.

“It was a perfectly good car — a mechanic checked it out for me. It had good brakes, good tyres, good steering, no rust, and a warrant but it just had weird stuff like a rubber plunger coming out of the roof rack. It was all flexible. The cops asked what it was and I said it was an atmospheric disruptor. They couldn’t process that and said it was a dangerous protrusion. They didn’t like the indicators made out of plastic egg cups or my Batman bomb in the back, either. I miss that car; it made people laugh but the cops didn’t understand — it was outside their sphere.

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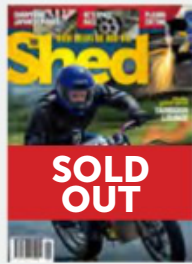
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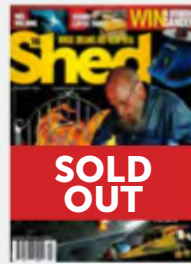
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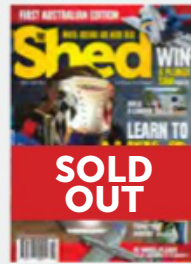
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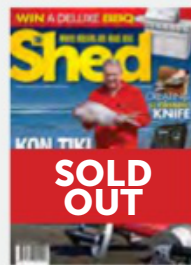
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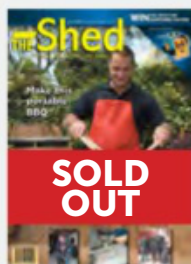
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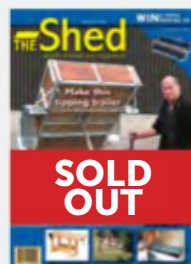
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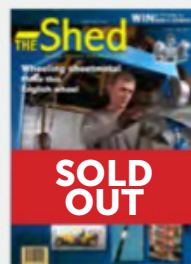
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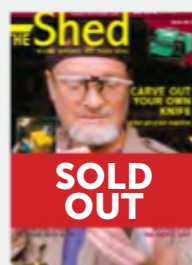
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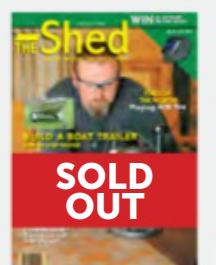
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THE GREAT CONSPIRACY

By Jude Woodside

In the period of enforced idleness that we have been through it seems the devil was busy making work for those idle hands. In particular he was working on his favourite hobby — conspiracy theories. Didn't he do well? I especially like the interaction of microwave radiation with virus — who knew?

Deception

Lately I have begun to look askance at my cat, Haybale — so called because he was supposed to be an 'outside' cat, who, upon my taking up residence, transformed into a decidedly more 'inside' version of himself, airily pretending that he had never been anything else.

I have my suspicions of the cat. He is clearly smarter than he pretends. I think he has been manipulating me. He makes me get up early to accompany him to the kitchen so he can eat. He's very fussy — he only eats kibble; he turned down veal the other day until I covered it in kibble.

He makes me get up every day by yowling and then clawing the walls. If I fail to respond, and I usually do, then he starts on the furniture or he will shred paper on the floor in frustration. He has me trained well, though, so eventually I do respond and he follows me to the kitchen and eats while I watch his back. He has me at his beck and call. There is no gratitude, no fawning, no thank you. In fact, I'm convinced that he is a member of the Illuminati, if only from the contemptuous looks he gives me, as if he knows things I don't.

You can't fool the dog

The dog on the other hand is not so much of a threat. He doesn't trust the cat, either. Dogs are good judges of character. I have the seen the cat attempting to recruit the dog by trying



"In fact, it's very likely that the cat is in on the 5G conspiracy"

to win his affection. He rubs himself on the dog, he lets him sniff his bum, but to no avail — the dog still doesn't trust him. It might be the cats he used to live with, who ambushed him on a regular basis, but I suspect he has a sixth sense that warns him that cats are not trustworthy.

In fact, if the cat is sitting in the middle of the hall, as he often is, the dog won't walk past. He sits growling to himself until I come to rescue him. He knows something! He doesn't trust the cat.

The truth at last

In fact, it's very likely that the cat is in on the 5G conspiracy. I suspect the new

tower in town was installed to allow cats to communicate with Illuminati HQ. That 5G is actually tuned to the cat's vibrational frequency — a very high C. They are reporting on us all; it's the chips in them. They can control those chips with 5G, too; that's how they send out instructions, you know. The chips in their heads are receivers. I might have to do a video on it; I think we're on to something.

Cats can carry the virus, too. Had you thought of that? Maybe that's the link between the 5G and the virus. Our cats will poison us all at the command of the Illuminati via the cell-phone tower. Then Bill Gates will inject us all with the vaccine that contains the same chip the cats have — must need a big needle — and we will all be controlled from the 5G tower. That would be it. I need some more hydroxychloroquine but I can't go out till I find my tinfoil hat, and I haven't finished my isolation suit — you can't be too careful. Where's my mask? 🧢

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