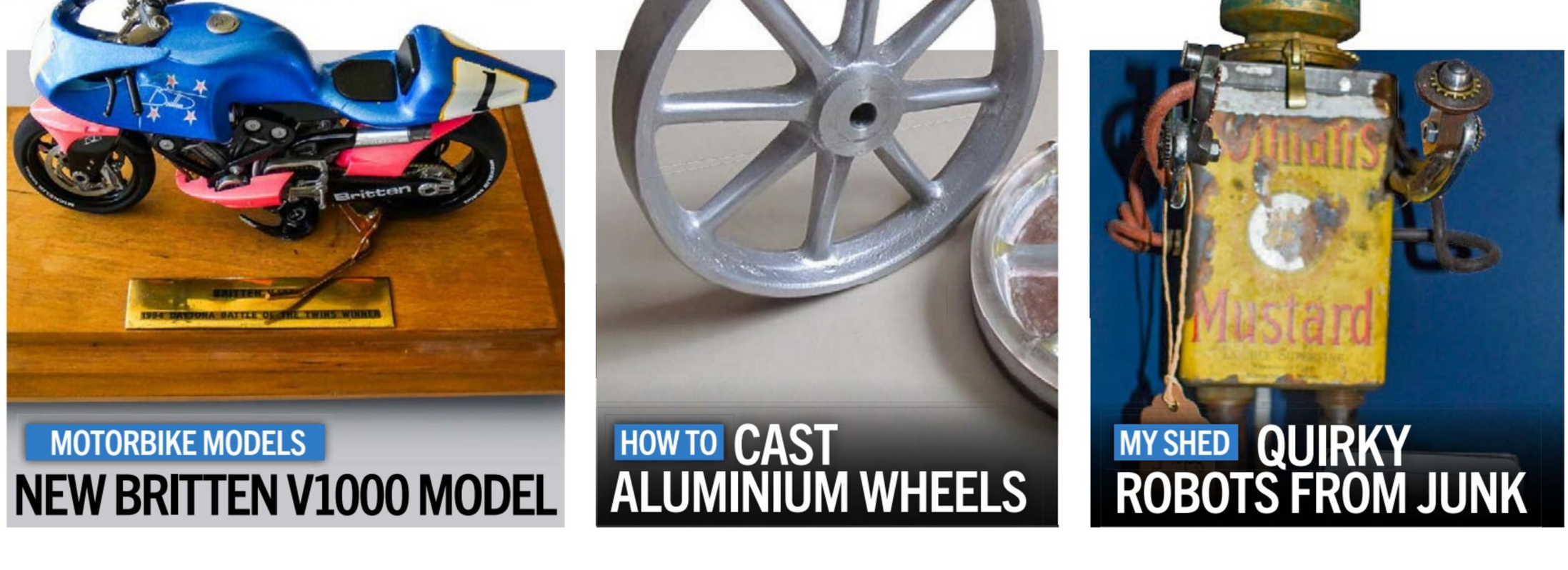
THE shed

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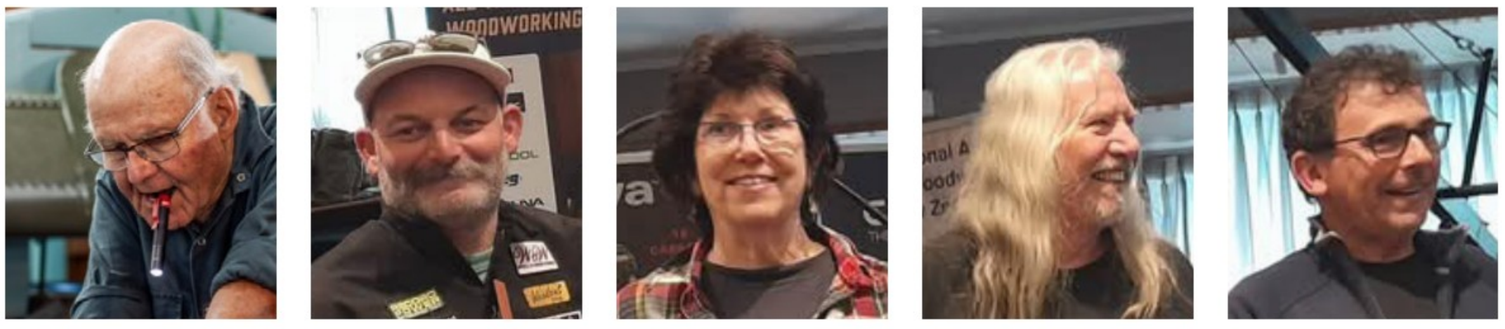
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INSPIRATION

We have several editorial mantras here at *The Shed*, one of which is inspiration.

We look for subjects and sheddies that not only inform and entertain readers but can also inspire you to take up a new interest or get stuck back into a skill that you may have put to one side for a while. For me, this particular edition is a perfect example of this mantra, and we hope you find the temptations plentiful.

If our cover story does not inspire you to start or carry on creating in your shed, then nothing will. The article about the short-take-off Storch plane built by Murray Belfield is special. Murray commenced construction when in his mid 70s, and then spent the next nine years completing the project, with almost all of it undertaken in his home workshop. Impressive. And it was not his first plane build. Murray is an inspiration to us all to 'never let the old guy in'. The point: keep doing what you enjoy and still have the ability to undertake.

We visited the National Association of Woodworkers' annual expo, and boy, were we impressed. A huge crowd was treated to some world-renowned demonstrators, and the audiovisual support for the event was pretty first-rate as well. The expo attendees were so well catered for with the demonstrations. There were about four cameras focused on the demonstrator, which then switched to the action and displayed it on two large TV screens. Very professional and informative. If this sounds like a bit of you, check out the article and then find the club nearest to you.

But wait, there's more. This issue, we commence a short series on everything you need to know about ham radio. Interest piqued? There are clubs aplenty where you can join and learn more.

Or maybe valve radios float your boat? We have the first part on a *Shed* team member having a crack at restoring one. Have a read, and if that excites you, again, there are plenty of fans of vintage radios who you can connect with and get stuck into restoring or collecting.

We also introduce you to Jim Dryburgh, who stumbled into a new interest and income by making small junk robots.

Our ever-enterprising Off the Grider Murray Grimwood shares his interest in model boat building. Is this a bit of you? Plenty of scope in making models. Plus, our AJS resto is still going, and you may be inspired to cast aluminium – we show you how to undertake this as well in this issue.

So, our point is, read *The Shed* – often – get interested, get busy, have a crack, and enjoy yourself. As a very dear mate of mine used to regularly say to me, "You're a long time looking at the lid."

He is now constantly looking at that lid.

Greg Vincent
editor@theshed.nz

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Flat wings – a challenge for the pilot

MURRAY BELFIELD IS A PHENOMENON

Murray has built a couple of planes and flown plenty of others, but none gave him the performance and thrills he really wanted. Until he built his scale replica Storch. Building this rarest of planes consumed nine years of this 86-year-old's life – and he couldn't be happier

By Chris Hegan | Photographs: Chris Hegan and supplied



Murray's co-pilot (and dinner)



Murray's first build

For most of us, stalking a deer across the back country, shooting it cleanly, and lugging it home to furnish the table would be accomplishment enough for any evening's bragging rights.

But when that involves landing an aeroplane you built in your shed onto a handkerchief-sized patch of hilltop scrub, finding and shooting the quarry, manoeuvring the carcase into the spare seat, and getting off the ground again, and doing all that at the age of 86, bragging just vanishes in the slipstream. Murray Belfield is, anyway, far too practical and busy a guy to waste his evenings boasting to his mates, but he is, nevertheless, a phenomenon. His plane, the second he has built by hand, is another. Highly specialised for short take-offs and landings (STOLs), it is a three-quarters-scale replica of a World War II flying legend, the Fieseler Storch.

The replica, designed by famed aircraft engineer Ladislao Pazmany, is so challenging to build that, to Murray's knowledge, only one other Pazmany model has been completed to the flying stage, by an enthusiast in Alaska. As if that wasn't a hard enough ask, Murray has incorporated many improvements of his own based on his many years of bush flying experience (and his dislike of fibreglass).



Murray's shed

The plane bug bit early

As a boy growing up on a Northland farm, Murray loved to build model aeroplanes and always wanted to construct a real one.

As a young man finishing his electrician's apprenticeship, he became enthused about the idea of building a Druine Turbulent, a tiny single-seater with a Volkswagen engine popular in the '50s and '60s as a homebuild. He even got permission from the Civil Aviation Authority, but his father was not having it. Instead, he built a 17-foot boat from free plans in *Popular Mechanics* magazine, a hard-chine cabin boat designed for an outboard motor, which he couldn't afford.

"I used an old Armstrong Siddeley six engine and a jet transfer case. It was a great sea boat," he says. "We'd haul in half a ton and stick them in sacks until the exhaust pipe was well below the water line."

After a stint in the merchant marine sailing the Tasman, which he loved and confesses to some regret at leaving, he wound up at the Kinleith mill, where he worked for 30 years. Although his title remained head electrician, he effectively ended up as the chief technical officer thanks to his intensely practical nature and willingness to take on any task.

He takes me to the two-storey Tokoroa shed where he built the plane, a handsome Dutch barn design following a photo he took in the US. Given the large section available, I wonder why the two storeys?

"Didn't matter how big my section was, the council said 650 square feet was all I was allowed. So, OK, two storeys."

Five metres of plans

Murray first shows me the plane's plans – about 40 rolls of paper, scorched but still intact from a workshop fire.

Then he rolls one out, and my jaw drops. More than 1m high, it stretches for 5m along his benchtop and consists entirely of technical drawings and tables of numbers. No instructions, no photographs, just photocopies of blueprints.

"I worked out that there's about 800 square feet of them," he says,



Dutch barn shed



A few plans

> "To Murray's knowledge, only one other Pazmany model has been completed to the flying stage"



800 square feet of them



The picture of health

"which is about the size of our house before we did the additions."

Building a Pazmany Storch is clearly a project beyond the capabilities of most mortals and starting on it when you're already in your 70s is a considerable vote of confidence in your health and durability, a subject on which Murray has plenty to say, including daily doses of linseed oil, large quantities of leaf vegetables and salads, and eating every part of what he catches, including the brains and, in the case of fish, the eyeballs. It must work – his upright posture, clear bright eyes, and energy to spare are testimony to that, plus the fact that so far he has passed every biennial pilot's health check with ease. There was a scare about ischaemic heart disease a few years ago, and he holds nothing back about the thousands of dollars in tests it cost him to prove the specialist wrong.

"I had to have an angiogram to clear it up," he says. "Results came back, and I quote, absolutely no plaque in any arteries and a perfectly normal heart. Next time I need to have an ECG, I said they should give it to me free, but they wouldn't come at that."

Flipping the Jodel

The shed is a shocking sight, thanks to a fire from an exploded lithium-ion battery.

"My son asked if he could charge it up in the shed. I should have put it on the lawn, but within an hour it burst into flames," Murray says. Downstairs, where he built the fuselage, everything is blackened by smoke, but upstairs, where the rest was assembled, is pristine,



"It can all be repaired"

although currently taken over by the repair work on the Jodel D11, the first plane Murray built.

"It took me 10 years to build the Jodel. A friend smashed it up, and I'm still fixing it. He had his pilot's licence, and I gave him a couple of goes in the Maule, my other plane. He could handle the tail-dragger on the ground; that's the main thing. But the Jodel is heavy in the front, and I'd just fixed the brakes. End result, he flipped it over on its back, and I broke my neck."

Miraculously, given the nature of the paddocks and hillsides where Murray regularly lands, it is the only significant flying injury he has sustained, although not the Jodel's first crash.

"I was in the Jodel, coming into the farm up north," Murray recalls. "A bull was in a place I normally land. Just the top of a hill, not a strip. The bull was right next to a power pole carrying 11,000V, just where I had to go around it, midway.

"Well, Jersey bulls are unpredictable, so I went and landed on another ridge; done it before. But this time, the wind was gusting. The old man said not to land on the farm, and he was quite right. The grass was up, so I didn't see where a bull had dug out a hole, the way they do. I dropped a wheel in it. That was the first time the Jodel got wrecked; it wasn't a flying mistake but due to the terrain.

"It didn't flip that time. The wheel stuck, and it spun, knocking the wings and tail off. But being a wooden aircraft, it can all be repaired."



Maule not quite right for Murray

His next plane was a Maule M5-235, also technically a STOL design, and easier to get a carcase in and out of, but it weighs 1550 pounds, so even with its six-cylinder 230-horsepower engine, it still comes up short of the ideal performance that Murray was after.

Hence the Storch. The scaled-down Pazmany Storch retains all of its prized features, its performance identical to the original.

Murray knows of a number of abandoned attempts to build Pazmany Storchs and suggests that often the loss of impetus comes from a classic misstep – namely, building the fuselage first. In fact, he acquired his airframe from just such an abandoned project.

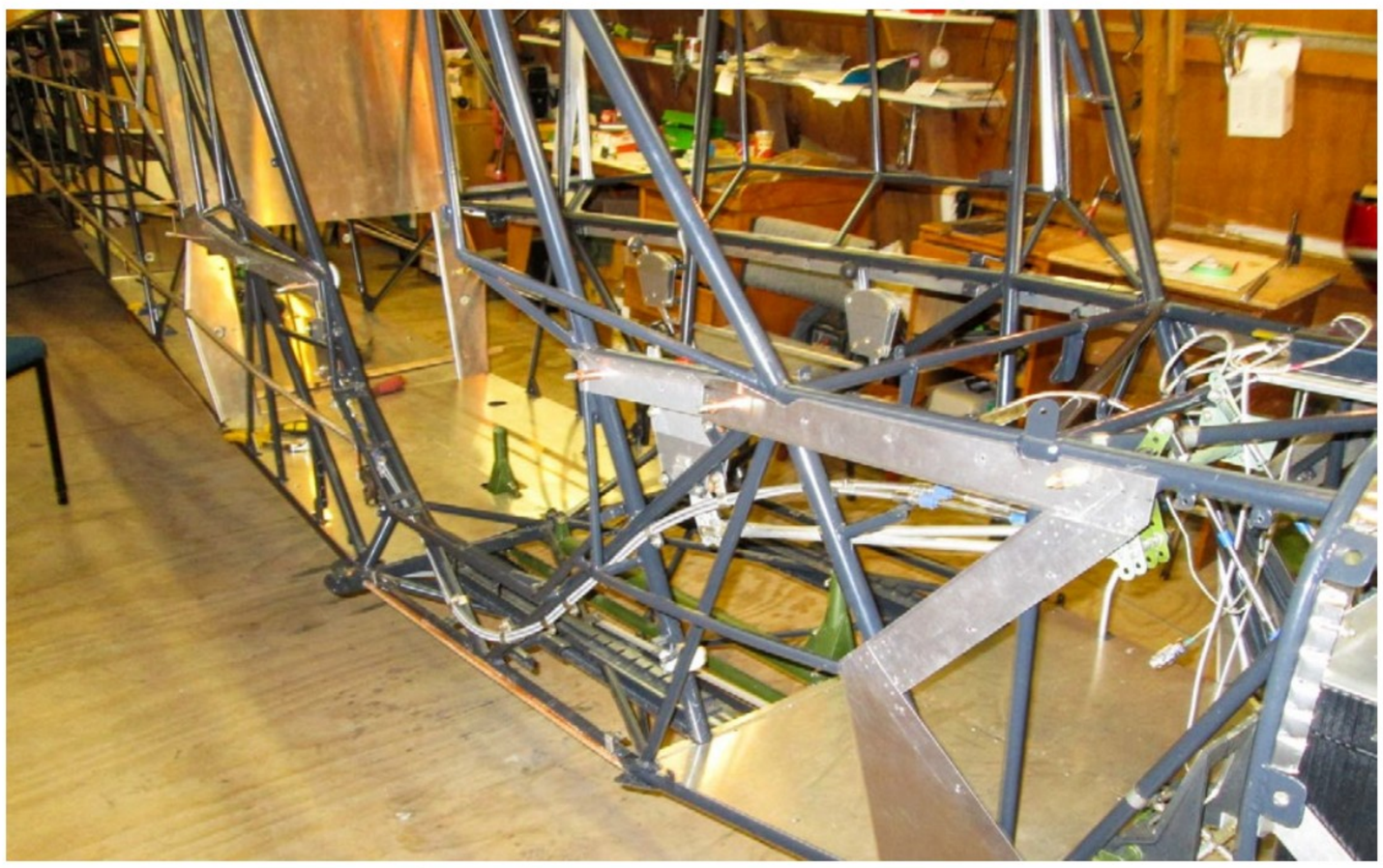
"I had a lot of the plane built by the time I bought the bare bones of the fuselage," he says. "The guy selling it asked me, 'Why did you do all that before you built the frame?' I said, 'I left the easiest bit for last.' It really is. There's no figuring out curves or bending; they're just about all straight bits. ▶



Proud maker, owner, and pilot



No kitsets here



The ‘easy’ part – mostly straight tubing



In amongst the wires – no problem for a sparky

No kits around for the Storch

In fact, the experts on homebuilt planes say that if you’ve got the fuselage, you’ve got two-and-a-half per cent of the job done.

Murray says, “I started with the air services – rudder, flaps, ailerons, tail stabiliser, and so forth.”

He thinks the other reason so few people complete homebuilding a complex beast like the Storch is the big advances in kits in recent years: “When I started, there were kits around, but in the last 10 years, the kits like the Bearhawk have become so advanced, all CNC drilled; you don’t need to work anything out. It goes together like Lego. You assemble it with the rivets in place, and the fuselage will align itself. Wings the same.

“They don’t have to do any cutting or folding. The steelwork comes finish-painted. Tailplane, rudder. You have to provide your own instruments and engine. But they mean the guy can say, ‘I built this aircraft’, and it’s still a lot cheaper than buying a new plane. I think they’re a great development for recreational flying, but building this was another task altogether.

“You’ve got to be so dedicated and have the skills to do it. Mind you, it’s

not all down to you. Typical thing that happens with homebuilts: someone who has one skill and also loves flying, he'll want a hand to do some work on his plane, or maybe some help building his hangar. In my case, it was a guy called Jason, who was a certified aircraft welder. I wired his hangar, being an electrician, and he did the welding for me."

Nine years and happy

Even so, building the Storch has consumed nine years of Murray's life. And the result? He couldn't be happier.

The most commonly-used light plane for back-country use is the Piper Cub, but the Storch is in a different class.

"You feel so safe in it when you want to land in a tricky place," Murray says. The plane flies beautifully – search 'Tokoroa Storch' on YouTube to see Murray put it through its paces, finishing with an elegant demonstration of the steerable tail wheel in action.

Scaled but no midget

Knowing it to be a scaled-down version and, I suppose, the assumptions suggested by short take-offs and landings, I am expecting a smallish plane, but when he opens the hangar, I get quite a surprise. The Storch is no midget, indeed it is almost majestic with deep wings spanning 11m, a large, airy cabin and tall, thick hydraulic sprung legs. In its Luftwaffe livery, it is a mighty sight.

The plane fairly bristles with extra features Bachem and his collaborator Reinhold Mewes devised to squeeze every possible morsel of lift out of it.

Slats along the leading edges of the wings duplicate the control devices on airliners, although on those, they retract on hydraulics in cruise mode.

The slats force airflow through a gap, creating extra lift as the air expands above the wing. Murray cranks the flaps down to show me how the ailerons move down with them, creating a second gap between the wing and the control surfaces to create even more lift. These pose extra challenges for the pilot.

"She's quite different to fly from the others," he explains. "There's no dihedral [the upward angle between the two wings that stabilise most planes]. The flat wings make her unstable; you have to keep it flat. Most planes, you can let the stick go; you can't do that on the Storch. She's fairly heavy to manoeuvre, so heavy in fact that the ailerons have a modification to assist the pilot.

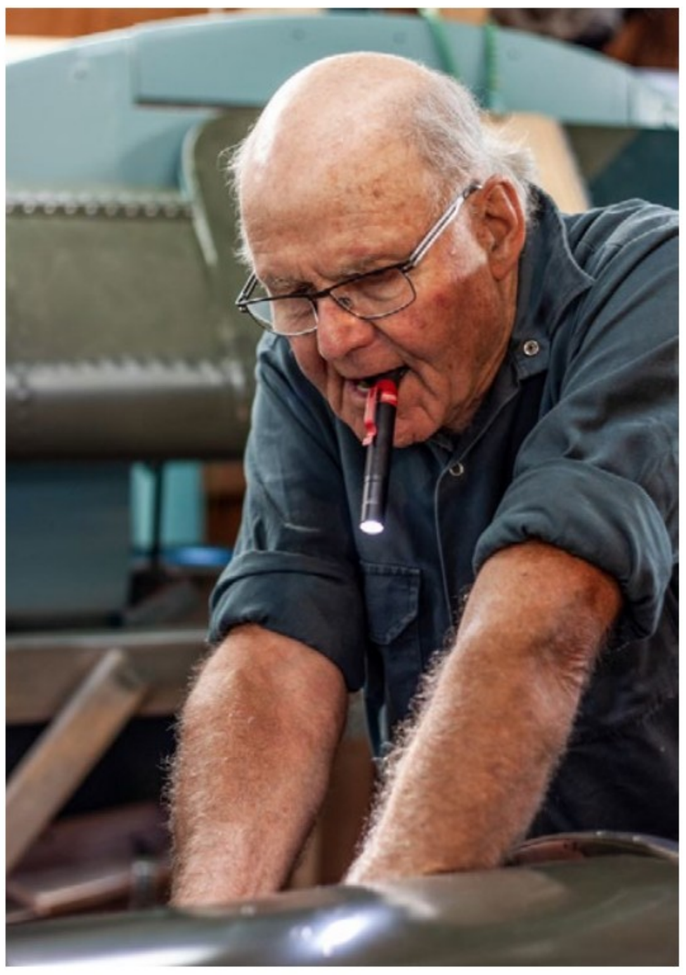
"A small independent section of each one moves on gears in the opposite direction to the rest.

"When the aileron goes down, for



Slats for extra lift







Nearing journey's end



Instrument panel



Jig for wing insert



Wing insert in place

> “Take-off is about 100 yards, fully loaded”

instance, that little tab comes up, and the air pressure on that takes the weight off the stick and helps push the aileron down.”

Murray points out the fairings wrapping the struts on the landing gear, another of his modifications.

“The plans specify straight tubing, but believe it or not, these fairings give you a nine times reduction in drag over a round tube,” he says.

So, how effective are all those STOL modifications?

“Take-off is about 100 yards, fully loaded. Landing, you can get her down in a bit more than half that,” he says. In the Mussolini rescue (see sidebar), in spite of being overloaded, the Storch took off in 70m.

Extraordinary skill

The plans specified fibreglass moulded seats, but Murray looked through old pictures and saw how the Germans built theirs out of steel tube with aluminium bottoms and backs, and designed his own steel-tube frame with canvas upholstery that perfectly suits the period of the original Storch.

The seats slide on hardened-steel notched and clamped rails, easily adjustable but rock solid against any impact – again, Murray’s own design.

“They won’t slide back like some light planes,” he says, “where the seat locks are so spidery that pilots have ended up on their backs with the planes going up and crashing.”

It is not only on the seats that Murray made changes to the materials used. He doesn’t like fibreglass: “It’s a messy business, with all those chemicals, and it doesn’t last as well as aluminium.” The fairings, which reduce drag where wings



Cabin and engine mount nearing completion



Fuselage completed

join the fuselage, were also specified as fibreglass, but with considerable skill, Murray produced them in aluminium. Likewise, for the engine cowling, where fibreglass is almost universally used, Murray fashioned aluminium sheets, both jobs calling for extraordinary skill in bending and forming. How does he do it?

"You start out with a cardboard cutout, and when you've got that right, you get to shrinking and bending the sheets into shape. I managed to get a perfect fit, which was no mean feat," he says.

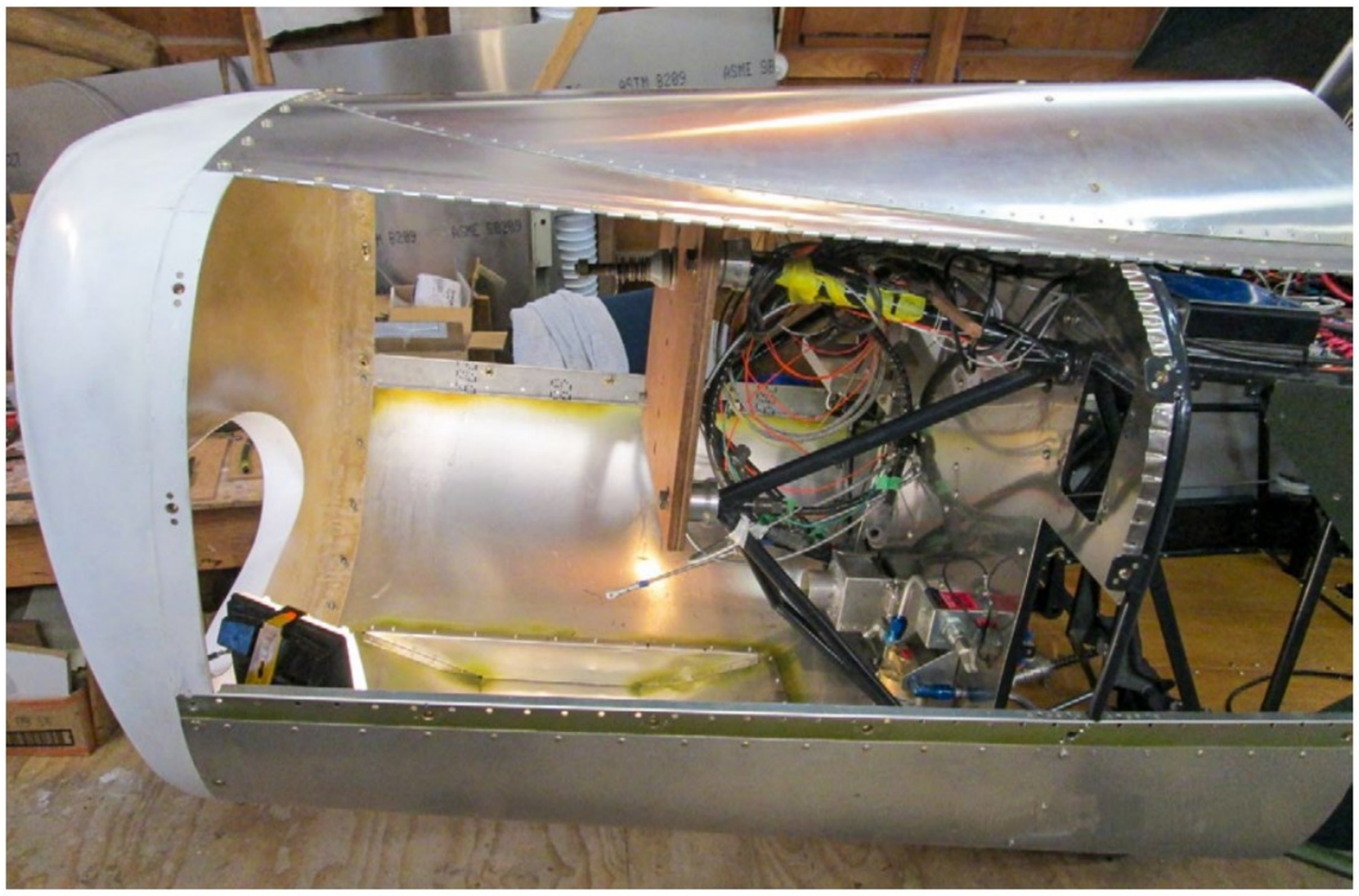
In the end, the only fibreglass on the plane is the nose cone and wingtips.

Great views for the pilot

Another significant modification involving a great deal of extra work was in the way the many sheets of Perspex encase the cabin to provide the 360-degree view for the pilot.

"The plans said to rivet the sheets to the tube framing. But in New Zealand, you don't drill holes in steel tubes, because of the sea air," Murray explains. "So I made metal saddles to enclose the tubes and riveted the Perspex to those."

As well as building different seats,



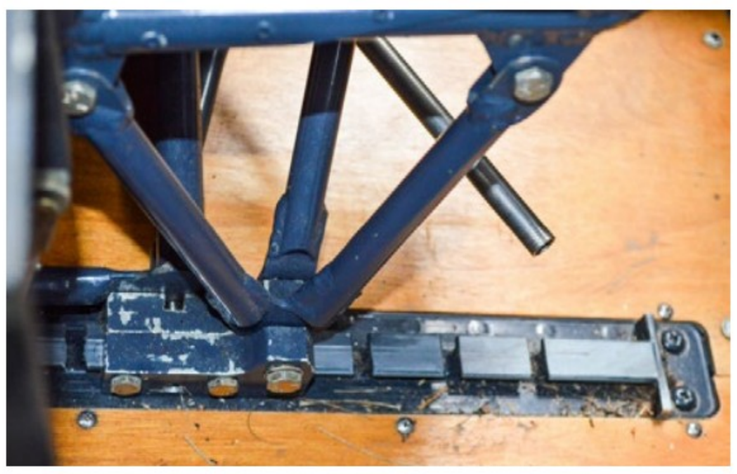
Perfectly crafted aluminium



Ventilation – another Belfield wrinkle



Perfectly angled saddles



Solid seat lock



Protective skirting

he has moved the controls around to suit his flying preferences, added a mechanical fuel pump to the gravity feed from the tanks, and run aluminium skirting around the inside of the cabin to prevent dirt and grass building up between the tubing and fabric of the fuselage. He has also added a hatch for storage behind the cabin.

"I've got a sleeping bag and a tent back there in case I have to put down in a paddock for the night," he says.

He also made the tail wheel steerable – "That's important for the tight spots. I can turn the thing pretty much in its own length with the steerable wheel."

One of his modifications reflects both his love of aluminium and his tight grasp on a dollar: "The flat surface of the wings are fabric, and the plans simply said to wrap the whole wing. That was just a waste, so I made a jig to replicate the gaps and built fabric-covered frames to drop into them. Worked perfectly and I've got fabric left over." ▶

Fieseler Fi 156 Storch

The original Fieseler Fi 156 Storch was designed in the 1930s as a liaison, reconnaissance, and aero-medical utility and went into production after winning a competitive tender for a STOL plane by the German Air Ministry in the '30s.

The idea for the leading-edge wing slat was borrowed from the presiding genius of German aircraft design, Hugo Junkers, who pioneered numerous innovations, including all-metal aircraft and a giant flying wing that accommodated some of its passengers in cabins inside the wing.

With the Storch's slats, foldable wings, and other features, it was well ahead of its time – largely the brainchild of another true original, designer Erich Bachem. He went on to pioneer aluminium-skinned caravans, including the first pop-top and, believe it or not, guitars with interchangeable bottoms.

'Storch' is German for 'stork', with the plane named for its unusual long-legged landing gear. Very robust, oil and spring-loaded, the legs were so strong that the plane could be landed vertically from a stall a metre or two above the ground. Its STOL features were so outstanding that in a decent headwind it could land or take off in a few metres and, thanks to its 50kph stall speed, it could literally hover in a strong enough wind. On reconnaissance, the huge glass canopy, with a glass ledge cantilevered over the lower half of the doors, enabled occupants to see in every direction, including straight down.

Unsurprisingly, it became popular with the top brass for hopping around the field of war; Generals Kesselring



Three-hundred-and-sixty-degree view



Churchill's Storch (photo: flitetest.com)



Slepcev Storch (photo: buildandfly.shop)

and Rommel both had theirs, along with several other senior Wehrmacht figures, and after the Allies captured some, they were nabbed by Field Marshal Montgomery; Air Vice-Marshall Broadhurst; and, reportedly, Churchill himself.

Most famously, a Storch was used by a crack SS unit to rescue Mussolini from the mountain-top hotel where he had been imprisoned after his overthrow. From the mountain, it took off in 70m, despite being overloaded. In an even more historic moment, Germany's famous woman test pilot and devout Nazi Hannah Reitsch flew a summoned general to Berlin in a Storch and landed near the Brandenburg Gate in the last hours of Hitler's life. They made their way to the bunker, and Reitsch was given permission to leave by the Führer.



Scaled replica with original Storch in the background

A Storch was also reported to be the only plane in World War II to be brought down by pistol fire, in an encounter with a US military Piper Cub that turned out to be the last dogfight on the Western Front.

These days, you may see a Storch in the skies in a number of countries, but unless you are in Alaska, it won't be a Pazmany. Australian-Czech designer Nestor Slepcev designed a lighter, simplified Storch that is sold in various versions, including an ultralight kitset.

More unusual features

The door, when open, swung free, which was not ideal in windy conditions, so Murray added a little latch to fix the door in the open position.

I notice that the fuel lines leading from the tanks in the wings are flexible external tubing, which leads to the revelation of another unusual feature of the design: the fuel line is there to enable the wings to be folded back for storage. In this configuration, it would fit comfortably into a 5x4m garage.

It is a rare feature, although not unique. With wings folded, it can also be towed behind a vehicle. If ever Murray found himself flying into a storm predicted to last for days, he could put down in a field, fold back the wings, and tow the plane home. It would not be the first time the plane has been towed. When he had finished all the parts, and it was time to put it together in the hangar, Murray hooked it onto the back of his car and towed it.

"I asked the cops if I was allowed to do it. They just laughed," he says. Then he trailered the wings one at a time.

At a guess, $100K

Nine years of work is investment enough, but what did it cost in dollars?

"I wouldn't have a bloody clue," laughs Murray.

"The engine, a wide-deck Lycoming, only cost me five grand. It's one that had been passed around in Aussie. It came out of a crashed helicopter; it had been bought and sold and bought and sold and hadn't flown for 30 years. I flew it once, and my young engineer friend insisted we take it apart to check it out. Inside, it was as good as new.

"Because you don't hurt the engine when you crash a helicopter, because they have a clutch that disengages it. But at a guess, I might say $100K all in, for materials."

At 86, Murray knows he won't be flying forever, but he is hopeful for the Storch's future. Two sons fly. Of course, with Murray not being a qualified instructor, they had to go through certified training, but he had given them both more than a nudge.



Once all parts were finished, the plane was assembled in the hangar



Flexible external fuel line



The engine, a wide-deck Lycoming, came out of a crashed helicopter

"They both soloed after their first lesson," he says, "so I guess I taught them something." Although one of the sons does not like fixed wings and flies a homebuilt Safari helicopter, Murray also has a young grandson who is desperate to get behind the controls, so we can expect to see a Luftwaffe-liveried Pazmany Storch in our skies for some time to come. Provided, of course, that Murray doesn't drop a wheel into another invisible hole. But Murray Belfield is not a man to make the same mistake twice.

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About us

Over the past 15 years, we've refined our off-grid solar systems through hands-on experience, trial, and improvement. In just the past three years, our team has successfully completed more than 300 off-grid installations - the most in New Zealand.
Our latest Solar Pac range represents the culmination of that expertise. Each system has been designed to meet every requirement of off-grid living:

- Outdoor-rated and weather-resistant enclosures
- Temperature-controlled operation for optimal battery and inverter longevity
- Wi-Fi monitoring for real-time system oversight
- Generator-compatible for full energy independence
- Compliant with all New Zealand Electrical Codes

To date, we've installed over 100 Solar Pac kits across the country. These systems are modular and easily scalable, allowing homeowners, farms, and businesses to expand as their energy needs grow - all while maintaining reliability and compliance.



Go Off-Grid

Choosing to go off-grid is about more than just independence - it's about taking control of your energy future. With power prices in New Zealand continuing to rise and outages becoming more frequent in rural and coastal areas, generating and storing your own electricity gives you stability, savings, and peace of mind.
Off-grid living allows you to produce 100% of your own clean energy, free from the costs and limitations of the national grid. You decide how much power you use, how it's managed, and when it's stored or backed up by a generator. For remote properties, farms, and lifestyle blocks, this means no connection fees, no surprise rate increases, and no dependence on distant infrastructure.
Our Solar Pac systems make that independence simple - combining solar generation, lithium battery storage, and intelligent monitoring into one seamless package. Designed to handle New Zealand's varied climates and conditions, they provide consistent power all year round. Going off-grid isn't just a lifestyle choice anymore - it's a smart investment in resilience, sustainability, and long-term financial freedom.

THE ANNUAL WOODTURNERS' EXPO IS A WINNER

By John Woods | Photographs: *The Shed*

World-renowned woodturners demonstrating at this year's event, plus a tool supermarket, and an outstanding multi-camera video set-up, make our correspondent's day

The freshly cut – and thus wet – chunky slab of lime wood I took to the National Wood Expo in my suitcase for a calabash-making workshop made me slightly unpopular with my classmates.

The wet wood spat drops of sticky sap over the South Auckland Woodturners Guild workshop and sprinkled a few fellow turners … spinning at 3500rpm on the lathe. Nobody complained though – they laughed at the spectacle, while our teacher, Hawaiian master turner and wood artist Emiliano Achaval, pronounced lime his new favourite wood for turning due to its dense buttery texture and white basswood nature that peeled off in ribbons.

High expectations

As a woodturner, carver, and woodcraft maker who now proudly wears the 2026 Expo PHD T-shirt – "I'm working on my PHD (projects half done) in woodworking" – I went to the annual woodworkers' National Wood Expo with high expectations.

I was entirely satisfied because it did not disappoint. I came away with some new tools for my latest pursuit of Windsor chairmaking, plus knowledge, theory, and skills in more new disciplines; untold ideas for decorating art pieces with pyrography and chisel texturing, or completion of PHD undertakings; some expensive souvenir pieces purchased for gifts at an auction of work; and a nearly finished Hawaiian calabash, which I learned to make in a hands-on workshop with the aforementioned Hawaiian master craftsman. Now I plan to make more traditional Hawaiian calabashes in my home workshop in Gisborne.

My goal as a whakairo practitioner is to carve Aotearoa Māori motifs, or mokotukupu, on them.

World-leading wood artist

For hobbyists and semi-professional woodcrafters alike, the appeal of the expo, run by the National Association of Woodworkers NZ (NAW) – and this year, held in the salubrious premises of the Papatoetoe Cossie Club in South Auckland – is that it serves as a one-stop gallery and exhibition of top-class art pieces; a place to meet and greet the best 100-plus woodturners from around the country; a makeshift supermarket of equipment, tools, and supplies from the leading merchants and retailers supplying our industry; and a place to discover and learn new techniques and practices from world-class demonstrators.

Another of the drawcard demonstrators at this year's expo was world-leading American female wood artist Andi Wolfe, a botanist with art pieces in Smithsonian museums and a teacher at numerous institutions around the globe.

Her art and woodwork focus on botanical motifs, flowering or maple and oak leaves, and her weekend demonstrations dealt with 3D carving, pyrography, and other decorating techniques. She exhorted Kiwi woodturners to design and make outside their comfort zones, stressing that the difference between a good piece and a museum piece is in the refining and finessing of the finished art.

Both Wolfe and Achaval were retained for a few extra days after the expo to run hands-on workshops providing Kiwi woodworkers with a deep dive into their specialist areas in the art of woodturning, with interactive workshops catering for all skill levels.

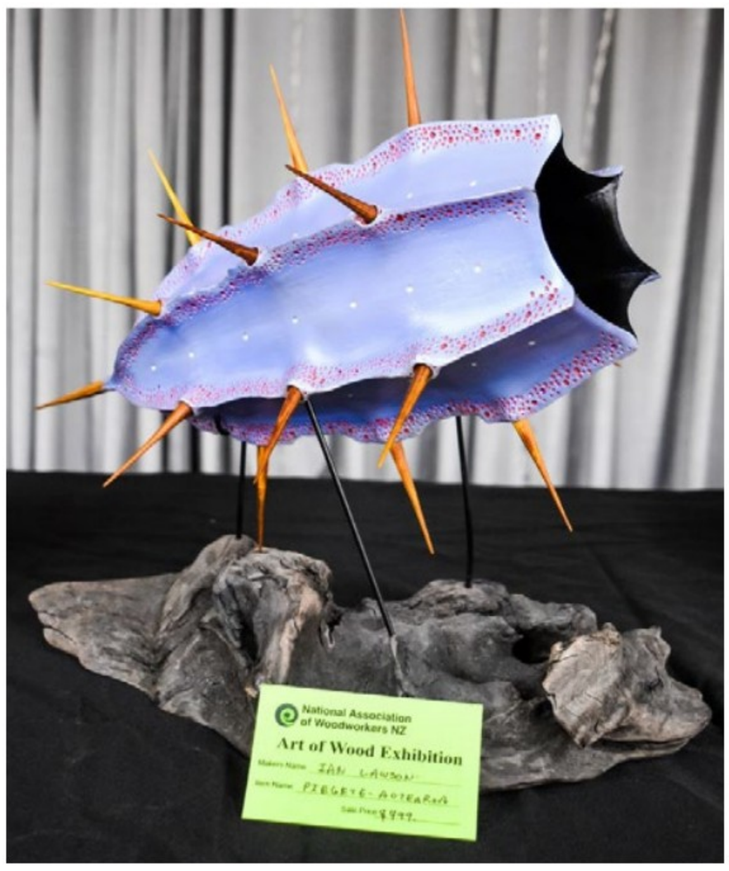
New Zealand wood artists

During the expo, three prominent world-class New Zealand wood artists showcased their own mastery, sharing their techniques and insights in a venue set up to deliver multi-camera video

ART OF WOOD COMPETITION















and audiovisual quality, probably of the highest standard ever seen in a New Zealand makers' gathering.

Aucklander Renee Bauxalle, a tool designer/inventor and award-winning artist in his own right, demonstrated his patented ring-tipped hollowing tool for making delicate floral and fungi forms that confound the very definition of abstract art.

World-renowned Taupō artist Robbie Graham, a former supreme award winner of the annual Art of Wood competition, proved why he is one of our best in his demonstration, showing woodturning as a high art form rather than the making of purely functional objects. Of his real-time making of a piece that looks like a cluster of three interconnected bowls, he explains: "*Toru 9* is a multi-axis turned piece of New Zealand beech wood, turned, carved, and lightly sandblasted on the outer surface, then oiled with New Zealand Haarlem oil. This series is challenging to create, due to the high degree of accuracy required, but I just love the challenge. I aspire to promote woodturning as an art form, rather than just produce functional items.

"Multi-axis and offset turning techniques really appeal to me, so I can create forms in wood that give an illusion of 'the nearly impossible'. Living at Waitahanui on the edge of scenic Lake Taupō, I am inspired by the patterns and shapes I see in the natural world. For instance, the very first in my *Toru* series was embellished with a pyrography leaf pattern and with plaited native tussock grass.

"My style has taken years of experimenting, drawing different designs, paying attention to the shape of classic curves, and constantly thinking, what if? So my *Toru* series ('toru' meaning 'three' in the Māori language) is a result of my fascination with the possibilities of multi-axis turning, keeping an eye on form, balance, and a pleasing design. As with most worthwhile things, practice makes progress."

Kiwi off to the US event

Turning from a wheelchair, paraplegic turner Troy Grimwood, also from Taupō, proved that point in his demonstration of a lidded vessel using a technique and style he has perfected, making more than 30 pieces of the same design over four years. Tony will demonstrate in the US later this year at the world's biggest gathering of woodturners, convened by the American Association of Woodturners.

Grimwood is a journeyman carpenter and building company supervisor who took up woodturning as a hobby



A vast array of wood blanks was on sale


Terry Scott of Timberly with his retail display



This linisher was just one of the many tools available to purchase



The hall had on display every tool that a woodworker could wish for











Scan the QR code for more









Andi created a piece from start to finish for her demonstration



The Robbie Graham demonstration. Robbie is a former supreme award winner of the annual Art of Wood competition

16 years ago after being confined to a wheelchair by a rock-climbing accident

The expo's trade hall was also a makeshift supermarket where attendees could explore a vast array of tools and equipment, pick through blanks of untold wood species, discover the latest innovations, and get their hands on top-quality materials.

Socially, the expo was also a chance to mingle and connect with fellow woodturners, share experiences, and grow relationships within the woodturning community.

Contact:
naw.org.nz



Demonstrators (left to right): Troy Grimwood, Andi Wolfe, Robbie Graham, Renee Bauxalle, Emiliano Achaval

CLASSIC CARS RALLY FOR CANCER

Daffodil Rally 2026 set to roll out nationwide

The Daffodil Rally returns in 2026 as a nationwide collaboration between the Vintage Car Club of New Zealand (VCC), Ford New Zealand, and the Cancer Society NZ, bringing together classic vehicles, local communities, and a shared commitment to making a difference.

The rally continues to grow in both scale and impact, with 36 VCC branches and 34 Ford dealerships set to take part across the country, supported by Cancer Society teams nationwide.

This year also introduces Women Behind the Wheel, a campaign recognising the women helping lead and drive the rally across all partner organisations.

At the heart of the initiative is Kaaren Smylie, whose passion and commitment have helped grow the rally into one of New Zealand's most recognised charitable motoring events. Her ability to connect communities through classic cars and shared purpose has become a defining part of the campaign.

Bringing people together

Joining her is Nicola Coom from the Cancer Society, whose leadership continues to ensure funds raised through the rally directly support New Zealanders affected by cancer through essential services, advocacy, and support programmes.

Supporting the campaign nationally is Annaliese Atina, managing director of Ford New Zealand, whose leadership has seen Ford dealerships around the country unite behind the rally and its wider community impact.



Kaaren Smylie says the campaign continues to show the power of community and shared purpose.

"The Daffodil Rally has always been about bringing people together," she says. "Whether it's a small rural branch or a major dealership, everyone involved is contributing toward something much bigger than themselves.

"The Women Behind the Wheel initiative recognises the incredible women helping lead this campaign forward, and I'm proud to stand alongside such passionate and dedicated people who genuinely want to make a difference."

Ford New Zealand managing director Annaliese Atina says the rally represents far more than motoring: "At Ford, we believe our responsibility extends beyond the vehicles we build. It is about the people and communities we serve. Supporting the VCC Daffodil Rally brings together our motoring heritage with a cause that impacts so many New Zealanders.

"Seeing these vehicles on the road for such an important purpose is inspiring, and we are proud to support the Cancer Society in providing essential services. We encourage everyone to get involved and be part of something that truly makes a difference."

One in three

The Cancer Society says the partnership and national support behind the rally continues to make a genuine impact: "This collaboration enables us to continue providing vital support for the one in three New Zealanders affected by cancer. With the Women Behind the Wheel leading the way, there is tremendous momentum behind the 2026 campaign."

Funds raised through the rally directly support the Cancer Society's work helping individuals and families navigating cancer across New Zealand.

Further event details will be announced closer to the rally.

THE SHED ONLINE

What's happening online at theshed.nz?

Every week, we upload new content onto The Shed *website to add to the hundreds of articles and videos already on the site for readers to discover, learn from, and enjoy. Some uploads of the past few months include:*



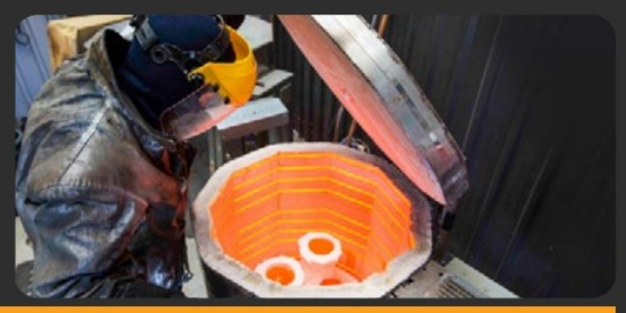
Racing motorcycles – the art of engineering

Chris Gordon uses skill and artistry to make racing motorcycles in his shed
https://theshed.nz/racing-motorcycles-the-art-of-engineering/



Video – making a workshop bench

Making a macrocarpa bench by Jude Woodside, 'The Useful Idiot'
https://theshed.nz/making-a-workshop-bench-video/



Heart of glass

A Whanganui glass artist shares her passion
https://theshed.nz/heart-of-glass/



Hot stuff in Taranaki

Three businesses work together on building hot rods
https://theshed.nz/hot-stuff-in-taranaki/

OUR BIGGEST FAN EVER?

LETTER OF THE MONTH

Dear Mr Vincent,
I have been a dedicated follower of *The Shed* magazine since Issue No. 1, all those years ago.

I remember taking it to my partner's godchild's birthday party at a well-known children's party venue. Due to my disability, I can not play like a lot of people with children, so what is a girl to do? I had been going out of my skull trying to get my very first copy of *The Shed* magazine, but everywhere we went, it was sold out, until that day, then there was only one.

One lonely cellophane-wrapped copy sitting on the shelf, and it was mine.

I was so careful to unwrap it, so careful not to stretch the spine, not to let sticky fingers touch it (I'm talking about the dad's)! However, I did not stop them from reading over my elbow, shoulders, and my head! All asking me where and when I managed to get my copy.

I have collected them religiously ever since, even when I moved to the UK. However, on the flight over (2017), I got meningitis, and I was delayed in arranging my subscription. This caused me a major issue; I missed out on buying Issue No. 75.

I have tried everything I can think of, I have run out of ideas, so I am writing to you out of total frustration. Are any of your discerning readers willing to sell me this issue that I am sadly missing? If you can arrange this, I am willing to pay $100 plus postage for a clean, non-damaged copy.

I would also like to tell you that not only do I love your magazine! I am mailed a copy all the way to Suffolk, UK, every issue; however, they are so good, someone with sticky fingers has also fallen for the magazine. Since it is posted in clear plastic, may I suggest black plastic so someone is not so easily tempted?

Thanks for the most awesome magazine on earth!

Nicky Peake (Lucas)



Ed. replies:
Well, flattery got Nicky everywhere, and we decided to donate our pristine office copy of Issue No. 75 to her for free. We also took heed of her advice regarding international mailings of our magazine and now dispatch them in a non-transparent envelope. Nicky was not the first of our overseas subscribers to fall foul of some sticky-fingered magazine fan; it was turning into quite a big problem in a few countries.

Solar letters feedback from *The Shed*'s article writer

I was told about the 17c export rate and spoke to them in detail, but decided against switching because it wasn't worth my while to do so.

That's because Powershop charges $1.725 a day for grid connectivity, which is less than what Transpower charges them, so they have higher charges per kilowatt for the power you use.

Ecotricity charges around $1 a day more for connectivity, but less for power. It wasn't hard to work out that while I would be paid more for what I export, it would cost me much more for being able to export it, and the difference between them as suppliers was simply not worth the hassle of switching.

I've dealt with Powershop for many years; they are generally pretty good.

Here is a quick table showing the last four months

kW	kW/day	Cost	$/kW	kW/export	Paid	Net (-ve bill)
18	0.6	$51.61	2.87	1107	$143.91	−$92.30
40	1.3	$59.91	1.50	1166	$151.58	−$91.67
44	1.3	$64.01	1.45	1175	$152.75	−$88.74
49	1.9	$54.40	1.11	841	$109.33	−$54.93

I told them up front before I bought my system, and they were very helpful when we first connected everything up. They are also very good at paying out the credits when I request them, usually within a few days.

The letter [letter of the month from John A, *The Shed* Issue No. 126], while factually true, is a good example of not looking at all the information. If John is happy with Ecotricity, great, but if he thinks he is making lots more using them as a retailer, then he is likely incorrect.

You can configure an inverter and battery system to export during peak hours and possibly make slightly more overall for what you feed back to the grid, but personally, a flat 13c per kW is much simpler. The biggest limitation is the 5kW export limit set by the network; if that limit were higher, then I'd be exporting hundreds more kilowatts per month.

Andrew Broxholme
Going Solar article writer, *The Shed* Issue No. 126

Installing solar in stages

Your article on one sheddie's solar installation will hopefully encourage others to take the plunge.

The large system described with its understandable costs might put some off however, thinking that it couldn't therefore apply to them. They would be wrong. I've had solar and a battery and hybrid inverter for a while now, and it can be done in stages with the right installer/retailer as funds are available. I started with panels and a grid-tie inverter, and later upgraded to more panels, a battery, and a hybrid inverter as we were able to.

Getting panels now is a real no-brainer, as they are so much cheaper nowadays. If you are rural, as we are and suffer the usual outages from time to time, the upgrade to a battery is welcome security for essentials like food preservation and water pumping. Australian households are way ahead of us on this.

Another point to make is that the situation nationally is in flux. Electricity retailers have been told to adjust their payment for kilowatts that households export to the grid to reflect demand at various times of the day. This should make payback for those with solar shorter in many cases, as tariffs increase during high-use export. There is also the V2X initiative, which would involve the household electric vehicle serving as a reservoir for export during these periods. The standards for this set-up are still being developed, but are seemingly a given in the near future. This initiative is international.

Lastly, I've found the installation and monitoring process and our behavioural adjustments fascinating, and I think any sheddie would have the same experience. Don't wait.

Michael Delceg



Do you have any info on a 'Radio Joy'?

Hi Greg,

I always enjoy reading *The Shed*, and for me, the last issue containing an article about vintage radio restoration written by Chris Hegan [Radio Saviour, Issue No. 126] was great, and I look forward to reading about Chris's progress.

The sidebar piece about Graham and Val Hawtree, and the main article featuring Peter Walsham, were aspirational for me, as I have a few old valve radios, some working and some not.

In particular, I have a 'Radio Joy' model which is working, but it has no cabinet. It was given to me in a pine box full of borer – 'Radio Borer'.

I would like to build a cabinet as close as possible to the original look.

Mountjoy and Sons, Royal Oak, Auckland, made them (my brother-in-law could remember the shop). The chassis number is 464 64. Probably late 1940s, seven large valves including a magic eye tuner (very faint now), and multiband reception, probably de luxe in its time. Have any readers got information about the company and/or its models, photos?

The Shed is such an interesting magazine.

Many thanks, regards,
Paul Clayton

Odd Jobs

Hang out on your own DIY swing chair!

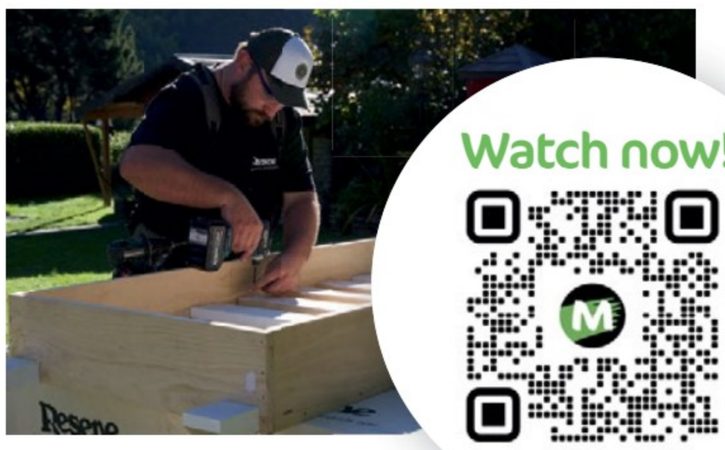


Elevate your outdoor entertainment area with your very own DIY swing chair. This is a satisfying weekend DIY project that you and your family and friends can enjoy for years to come.

Swing chair to do list

- ✔ **Prep and prime with the right Resene primer for your materials**
- ✔ **Build out the base, framing and construct the chair**
- ✔ **Paint with Resene Lustacryl in your chosen colour**
- ✔ **Suspend your chair and hang out!**





Watch now!

View how to make your own swing chair, plus cut lists and step-by-step instructions at masterstrokebyresene.com

Visit your local Resene ColorShop for all your decorating needs and the widest range of NZ made paints, wood stains and colours.

MasterStroke by Resene



Model traction engine with aluminium wheels

CASTING ALUMINIUM WHEELS

Step by step through the casting process

By Len Gale | Photographs: Len Gale and Jude Woodside

With my background as a fitter and turner with the railways, it was natural that I would be interested in making first small then large wooden locomotives as presents or to sell and extending this to creating a steam tractor, the traditional traction engine.

At one point, a friendly sheddie lent me his foundry equipment, an electric furnace, a crucible, and tongs etc., and I melted down old pistons to get a fine-grained cast.

Wheels are an important component to add character to a toy tractor, truck, or locomotive. This raises the possibility of casting wheels in aluminium. Casting aluminium is not as complicated as it may seem; common sense is the main ingredient.

In the case of a tractor or traction engine with two small and two much larger wheels, the contrast in size is important. Also, the large wheels need to be wide but have thin, tapered spokes.

This poses a problem: how to flow enough molten metal through the spokes to fill the rim? One way that may succeed is to extend the length of the sprue (entry port) to increase the weight of molten metal above the cavity. Another solution is to add a 5mm



Pattern on sand with sprue rod in place

backing on the pattern. Thus, the spokes will be formed, as well as this 'extra cavity', and the rim will fill too.

Patterns

Traditionally, patterns have been made of close-grained wood. Metal and plastic patterns have advantages, and now patterns can be generated on a 3D printer.

There are three types of pattern:

1. Split pattern. As the name suggests, this has two halves that align with two or more location pins. Each half creates a cavity in the two parts of the mould. The two 'boxes' – the cope (upper) and the drag – have location pins and corresponding holes that back up the location pins in the pattern.
2. Core pattern. This is a split pattern that has a 'print' that allows for the in-plant of a firm piece of sand that makes it possible to cast an object with internal shapes that could not be machined.
3. Single pattern. This makes a cavity in the cope. There is no need for location between the cope and the drag. The sand in the drag is smoothed off to form the back of the casting.

All patterns need taper (draft) – from one degree to five degrees – to assist in removal. Remember the tapered buckets on the beach when we were kids? The sandcastle bucket was also tapped with a wooden spade to consolidate the damp sand and shell. If the mixture was too dry, the sand crumbled; if it was too wet, it slopped over. Dad knew what he was doing when he tapped the bucket.

A machining allowance may be needed, and there is the question of shrinkage; for aluminium, this is 3–4 per cent, depending on the brew and the mass. A 150mm wheel casting will have shrunk approximately 4mm. Every wheel cast from that pattern will be a clone, not quite replicas of the pattern.

Wheels

The wheels in this exercise are cast from metal patterns.

Each pattern has a 10mm hole in the centre to locate a tapered rod that will

"Casting aluminium is not as complicated as it may seem; common sense is the main ingredient"



Ready for the pour





form the sprue. In our cast, the molten metal will go down the sprue hole to the cavity in the cope. Air will escape up the sprue as the metal flows in. Air will also escape into the sand, and vents can be made with a thin wire around the rim. This method is direct and simple.

Note: The sprue can be located off to one side, and a groove in the sand, called a ‘runner’, will deliver the molten metal to the cavity. On the other side of the cavity, a runner connects another hole called a riser. This allows air to escape as the mould fills, indicating a full cast as metal comes up the riser.

Moulding sand

Casting metal into reusable sand is called ‘green-sand’ casting.

In New Zealand, our natural-bonded sand comes from Green Island near Dunedin and just happens to be greenish in colour. Over time, it will darken as the clay is burnt out. Powdered clay will need to be added. When the sand is new, there should be about 20 per cent clay in the mix.

From being bone-dry, the sand is ‘tempered’ by adding water sprinkled on with a watering can as the pile is turned over and over. It may take a few days before the clay locks in with the sand. A concrete mixer would help. When a handful of sand, firmly squeezed, holds its shape and can be snapped in half without falling apart, the sand is ready to meet the sieve.

The mould

Place the drag on the moulding board.

There are cleats under the moulding board so that the entire unit can be lifted to the area close to the furnace. Shovel in sand and ram it firmly. When the drag is nearly full, sieve in sand and ‘strike off’ with a straight edge and float off smooth.

Give this surface a good sprinkling of talcum powder or chalk dust. The dry powder provides a barrier between the two parts of sand, a parting line.

Fit the cope onto the drag. Put the pattern (in this case, a wheel) on the sand in the drag with the sprue rod in place. Use a kitchen sieve to cover the pattern with fine sand and firm the sand on and around the pattern with your



The melt

“This poses a problem: how to flow enough molten metal through the spokes to fill the rim?”

fingers. Shovel in more sand to half-fill the cope and ram it firmly with the tapered end of the wooden rammer. This wedges the sand in the cope.

Fill the cope, ram the sand with the flat end of the rammer, and strike off. Before you remove the sprue rod, cut a chamfer around the rod to make an entrance funnel. Remove the sprue rod. Firm the sand at the entrance with a finger. The cope can be lifted clear. The metal pattern should be sitting on the sand in the drag. A wooden pattern will need help in the form of screws that can be gently tapped, and then the pattern lifted free.

Before replacing the cope on the drag and assuming the melt is ready, give the cavity and sprue hole a brief touch of heat with a propane torch. This will harden the surface sand, ensure a smooth surface on the casting, and blow out any loose sand. Alternatively, lightly spray with meths and ignite.

Teamwork

First, a dummy run with a helper.

Set out the equipment step by step. Mime exactly each move you will both make. Enter the de-gassing tablets into the melt. Lift the crucible from the furnace with the clamping tongs. Lower it onto the fire-bricks on which rests the lifting bar.

The bar has a crank on one end, and this controls the pour. The other end is straight and has a steel tube on it, so that the helper does NOT control the pour. ▶



The furnace

Fire

Warning: Be sure you are not about to ignite a piece of magnesium, an aluminium look-alike. Try the vinegar test. If it fizzes, you have a fire hazard.



Doing a dummy run with a helper is advisable



Extended sprue (entry port) increases weight of molten metal



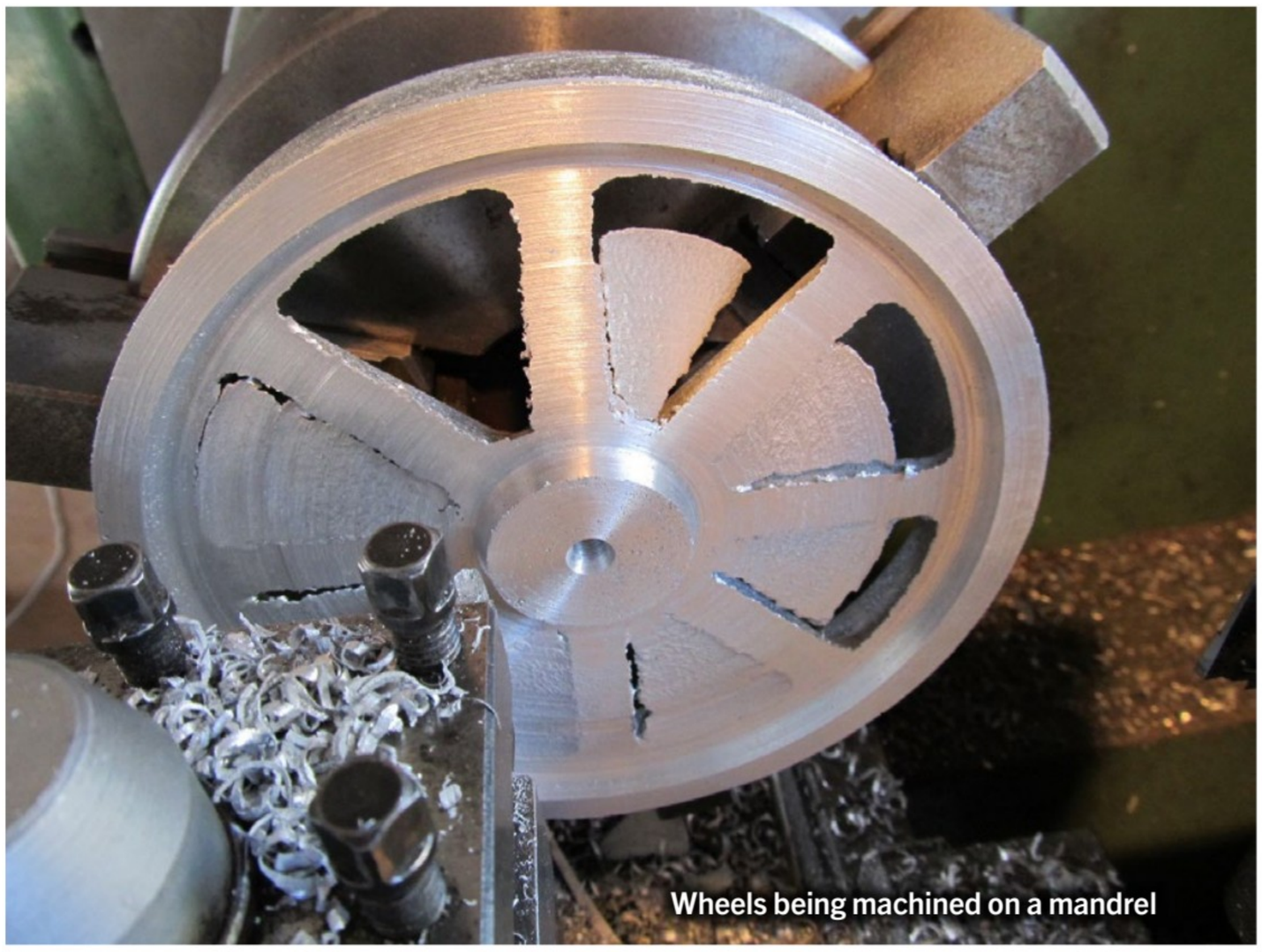
Aluminium melts at around 6500°C



Readying the pour


Surplus poured into gem trays


The sprue is hacksawed then snapped off


Wheels being machined on a mandrel

> “Mime exactly each move you will both make”

Practise removing dross from the surface. Mime the pour and, in turn, mime pouring the surplus into the cast-iron gem trays. The main thing is to have everything to hand and to keep footwork to a minimum. Pivot rather than step.

Firing up

Be sure there is nothing in the furnace floor that will stick to the crucible.

Place the crucible in the furnace with the spout lined up for the pour. Drop in small pieces of scrap to about a third.

Ignite, opening the valves to adjust the flame to neutral. Black smoke indicates an excess of fuel (carbon), and a loud roar means too much air (oxygen).

Getting the pressure right is important. If it is too low, it will take forever to melt the metal. Too high, and fuel will be wasted.

Once the metal has melted, add the scrap that has been pre-heated on the lid. Be sure the scrap is smaller than the inside diameter of the crucible. Large chunks, pre-heated, break easily with hammer blows. Keep the visor in the down mode.

The pour

Aluminium melts at around 6500°C.

The melt has a smooth surface at this temperature. I thrust a thin willow branch in and give it a good stir to see that there are no lumps and to boil up the dross. The dross is best removed with a wooden scoop and transferred to a sand tray. The moulds are set out in line within easy reach of the furnace, as we do not carry molten metal around the shed.

There will be a faint crackling noise as the melt settles in the mould; steam forms as the damp sand heats up. Weights placed across the cope are good insurance as the cope could lift, allowing metal to escape.

Allow plenty of time before you open the mould (this time will depend on the mass). Tip the sand into the bin through a garden sieve. Add a sprinkle of water and replace the lid. Hack-saw halfway through the sprue near the wheel and snap it off. There may be some flash around the rim that can be filed off.

When the casting has had the surface cleaned up (fettled) and held in the reverse jaws of the three-jaw chuck, the metal behind the spokes is faced off with a round-nosed tool. Brush on some kerosene. The rim and the boss gain 5mm, and the spokes look the part.

At this point, a hole is centre-drilled, then drilled and reamed 10mm. A



Wheels machined on mandrel, keeping both diameters the same

New wheel and original pattern

mandrel is fitted so that final machining is concentric to the bore. The mandrel is a machined 10mm bolt with washers, a nut, and a centre-drilled hole in the end. All four wheels are machined on this mandrel, keeping the two outside diameters the same. In practice, a large wheel and a small one were cast in the same flask.

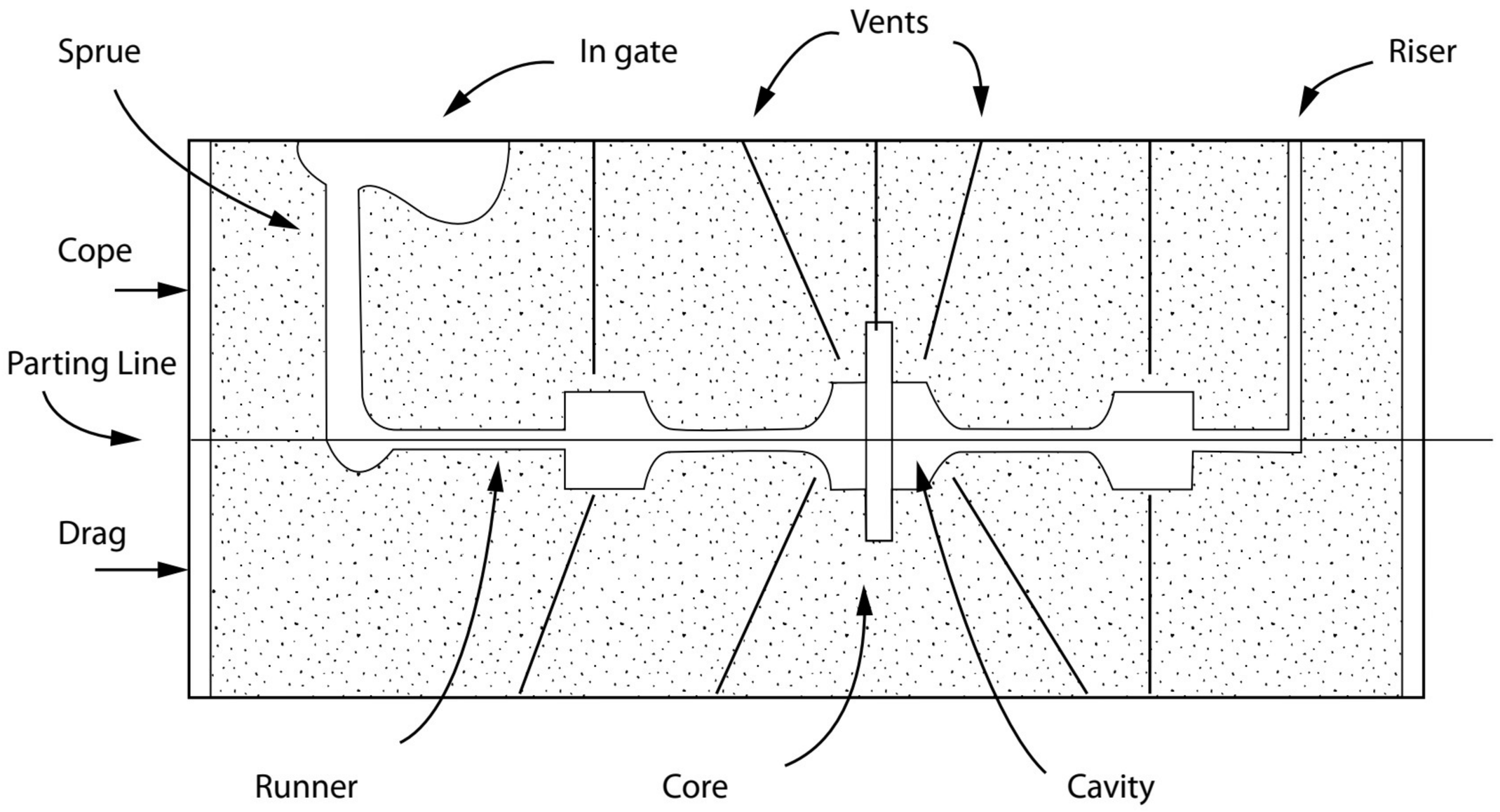
De-gassing, flux

You may choose to use commercial de-gassing tablets or make your own.

The de-gasser is potassium chloride sold as 'Lo-Salt' at the supermarket. This chemical drives off the hydrogen. The flux is washing soda, sodium carbonate. This cleans the melt, forming dross and making the aluminium flow better. It is available at swimming pool suppliers as 'pH up'. Both are used at about one teaspoonful for up to a 5kg melt.

Wrap the powder in aluminium foil. Be sure to force the tablet to the bottom of the melt. Turn away from the fumes – all our casting is done in a well-ventilated area.

Consider steel or brass, rather than aluminium, for the axles, as the same metals tend to fret (bind). Dome the ends. To hold the wheels on, machine grooves in the axles for cir-clips or drill the axles for split pins.



This drawing of a split pattern – with two halves that create cavities in the two parts of the mould – illustrates elements of sand casting. The wheel casting in the article is a single pattern

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A 100-YEAR-OLD INTERNET ALTERNATIVE?

Tall aerials in a neighbour's backyard send Nigel Young off on an adventure of discovery. He learns about amateur radio's fascinating history and the fun and responsibility that inspire enthusiasts

By Nigel Young | Photographs: Nigel Young and supplied

Aerials in someone's backyard – noticing them sent me "off on an adventure of discovery", as *Shed* editor Greg describes it – one that became personal as well as fascinating





Above: The three-volume *New Zealand Junior Encyclopaedia* set containing Martin's entry, Radio and Electronics

Right: Some of Martin's articles from the NZART publication *Break-In*, just shy of 100 years old

Driving to visit a friend recently, I passed a house with three aerials in the backyard.

Now, that isn't new – over the years I've seen them around. But in these days of the internet, social media, and generations who don't know a pre-internet – or potentially even a pre-AI – life, are they just monuments to a previous form of communication destined to end up on display in the various technical museums around the country? Or, are they not only still relevant but also with an unassuming yet vital role to play – particularly given the current international turmoil and shifting political alliances?

The state of the world might be outside the scope of this article, but amateur radio not only has a fascinating history but also many areas of both fun and responsibility that interest and inspire enthusiasts.

A family connection

My research for this article also took a more personal turn.

I contacted Craig Crawford ZL3TLB historian at the New Zealand Association of Radio Transmitters Inc. [NZART], see sidebar), and it turned out he had previously worked with my dad, Eric Young, who was the Christchurch district radio engineer at the Post Office in the early 1970s. Dad died in 1979.

Some years later, Mum married ham radio operator Martin Kimble ZL4GO and ZL2AY, who was also associated with the Pan Pacific Education and Communication Experiments by Satellite (PEACESAT) programme. Martin's involvement included writing articles for the NZART magazine *Break-In* in the 1930s and '40s.

Break-In was first published in 1928, and is still the official magazine of the NZART. Martin also wrote an entry entitled "Radio and Electronics" in the second volume (page 571) of the three-volume *New Zealand Junior Encyclopaedia*, published back in 1960. Some of you may remember them on bookshelves when you were younger.

Those letters and numbers that begin with 'ZL' and follow Craig's and Martin's names are known as 'call signs' and were established in 1923, although initially without the Z- or L-prefix. The establishment of the International Amateur Radio Union (IARU) resulted in 'Z' being allocated to Aotearoa New Zealand in 1925, 'OZ' in 1927, and 'ZL' in 1929.

Amateur Radio Emergency Corps

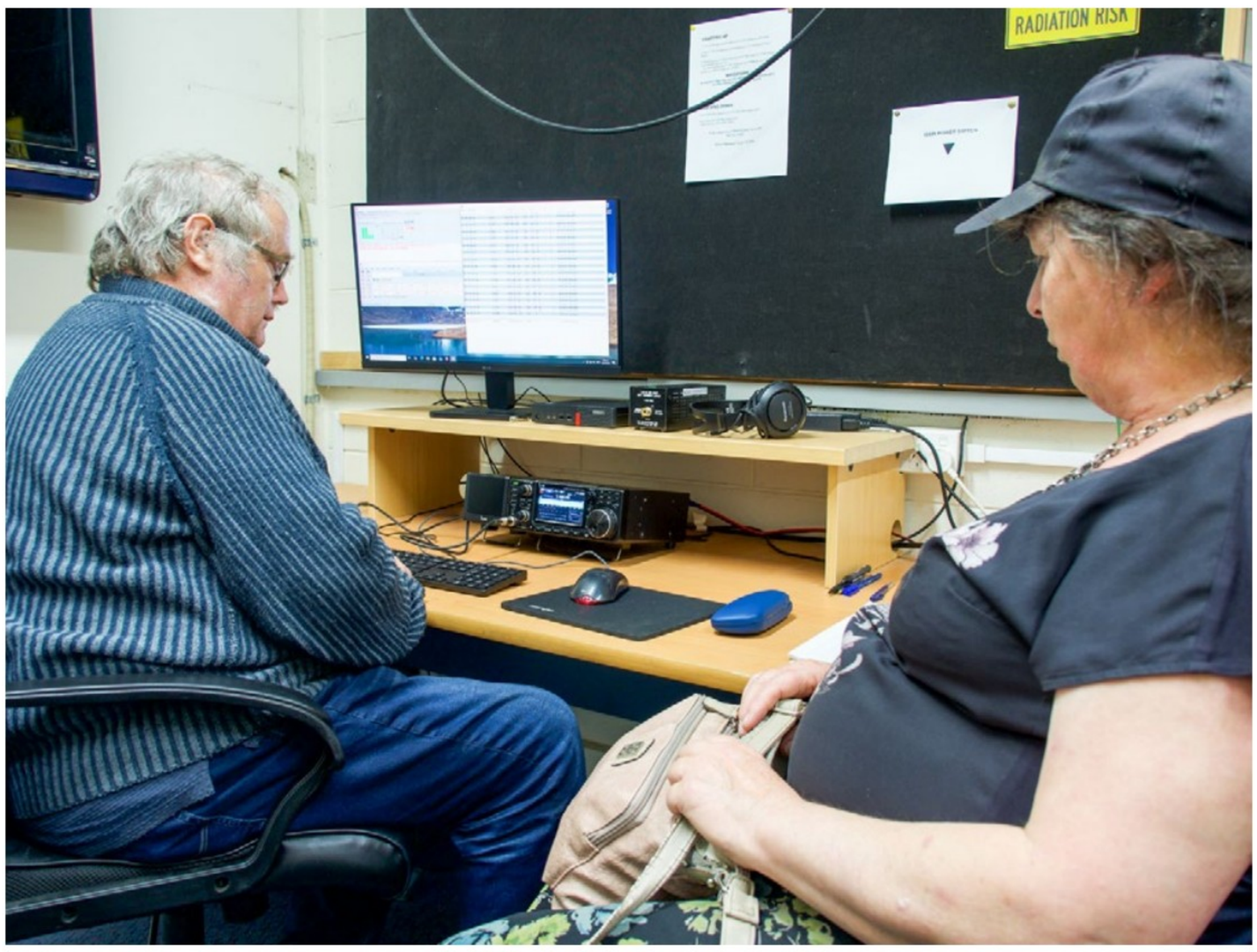
In 1949, Radio Emergency

"Or, are they not only still relevant but also with an unassuming yet vital role to play?"



Dave Brown ZL3FJ — a former colleague of my dad — working on a project at the Christchurch Amateur Radio Club, while two other members work on other projects. My thanks to Dave for all his assistance in the research and writing of these articles — Dave proofread them for me to ensure technical accuracy

> **"Resulted in 'Z' being allocated to Aotearoa New Zealand in 1925, 'OZ' in 1927, and 'ZL' in 1929"**



Christchurch Amateur Radio Club president Catherine de Croy ZL3CATH looking on as another club member communicates with another ham radio operator in Adelaide

Communications (REC) was renamed the 'Amateur Radio Emergency Corps' (AREC), which would become the public service arm of the NZART.

The year 1969 saw two related events: (1) the Māori language was permitted for amateur use, taking its place on air next to English for the first time, and (2) the use of the 'ZM' call sign during the bicentenary celebrations of Captain Cook.

New Zealand's first experiments with the wireless began with George Kemp in Gisborne in 1888, while Ernest Rutherford, the New Zealand Nobel Prize–winning physicist and chemist who was awarded the prize in 1908, "for his investigations into the disintegration of the elements, and the chemistry of radioactive substances", began experimenting with it in 1895 at Canterbury College, the forerunner to the University of Canterbury. This was prior to his time at the University of Cambridge, where he was at the forefront of research into atomic structure and the subsequent splitting of the atom.

Experiments in TV transmission



A range of old and older amateur radio tech – the items in the foreground on the table will be included in an upcoming auction. These are held on a reasonably regular basis

began as early as 1935, while the satellite OSCAR 1 was launched in 1961, extending amateur radio's range considerably.

The value of ham radio

Significant events in our history that included the use of ham radio started with the Hawke's Bay earthquake in 1931, which laid the foundation for the AREC. The 10th British Commonwealth Games in Christchurch in 1974 and the 14th games in Auckland in 1989 also demonstrated the value of ham radio, along with the Canterbury earthquakes in 2011 and, more recently, Cyclone Gabrielle earlier this year, to name just a few.

The use of ham radio was understandably banned during both world wars, with army-surplus transmitters and receivers becoming available from 1946 onwards. AREC is associated with the New Zealand Police, New Zealand Search and Rescue (NZSAR), and Maritime New Zealand. Separately, there is International Intruder Watch (1985), an in-house initiative among most ham radio societies that monitors and reports on non-allocated amateur transmissions within their allocated bands.

'Ham'? Really?

The origins of telegraphy go back to the 19th century, with one familiar example being painter and inventor Samuel Morse, who in 1837 co-developed with Charles Thomas Jackson a single-wire point-to-point telegraph system using what we now know as 'Morse Code'. This is a sequence of dots and dashes – short and long pulses – sent in sequence, each representing a letter or a character.

Subsequent to this was the introduction of a radio signal, which still used an operator with a Morse key, and which simply turned the radio signal on or off. This enabled greater transmission distances at lower cost. Morse Code, according to Wikipedia, "is still the standard for rhythmic transmission of data". Tapping came before talking, before iterating into television. Tapping meant operators needed the ability to send messages at a rate of between 10 and 40 words per minute, and those with poor skills were said to be 'ham-fisted'.

This was later applied to amateur telegraphers, who were considered a nuisance by their professional counterparts, who by this time were operating at sea, on land, and eventually in the air. A derogatory comparison was made with 'ham-actors'; however, the amateur telegraphers would later lay claim to the word – thus, today, 'ham' and 'amateur' in this context are synonymous.

How does it work?

Understanding ham radio requires a brief overview of radio and the principles under which it operates, which in turn requires a brief lesson in physics and wavelengths – and an abridged history, for that matter.

Encyclopaedia Britannica states that, 'The term radio covers the radiation and detection of signals propagated through space as electromagnetic waves to convey information. One of the chief branches of telecommunication, radio embraces wireless telegraphy, telephony, and television."

In the introduction to his book *ABC's of Modern Radio*, Walter G Salm writes,



Another view of the old and older display



The Christchurch Amateur Radio Club – what I saw when I first walked in the door

> “To prevent it from being scanned by digital pirates”

“Radio has become such a commonplace part of everyday life that most people are apt to take its wonders far too much for granted.”

Indications of this were first suggested by English physicist Michael Faraday – a name you’ll recognise from ‘Faraday cages’, designed to block radio waves, often used by the security-conscious. Think Maxwell Smart’s Cone of Silence. If you keep your credit card in an RFID (radio-frequency identification) folder to prevent it from being scanned by digital pirates, you do so because of the principles of the Faraday cage.

Three other names you’ll probably recognise are the Italian Guglielmo Marconi, the Englishman James Clerk Maxwell, and the German Heinrich Hertz, who all played significant roles in radio’s development.

Radio waves

Between them all – along with too many others to mention, although in our case we have both George Kemp in Gisborne, and Ernest Rutherford in Christchurch – they gave us an introduction to the use of the electromagnetic spectrum for radio communications.

The spectrum in terms of radio is defined by one dictionary as: “the range of wavelengths of radio waves, from 3cms to 30,000ms, or of frequencies of radio waves, from 10 to 10,000,000 kilocycles”.

Rutherford would go on to develop the ‘magnetic detector’, a key component in early wireless receivers, which effectively serves as a switch that turns both the transmitter and the receiver on or off in an accurate sequence. The introduction of wireless didn’t change the method of transmission, only the medium. A comparison could be made with digital technology in that data exists as either zeros or ones, indicating power as either off or on.

This was the tapping before talking, and the conversion of the radio wave pulses into audio, which only needed to detect this presence or absence. Skilled Morse operators were required at both the transmission and the receiving ends, having to then decode the dots



The workshop of the Christchurch Amateur Radio Club looking through to the main area

and dashes in the message onto a piece of paper – what we know as a 'telegram' – and which I remember delivering as a teenager during a holiday job with the Post Office.

Interestingly, this is different to a 'cablegram', which suggests the message was sent via an undersea cable. This in itself is impressive, as the first one here in Aotearoa New Zealand was laid by the Eastern Extension Cable Company, leaving from Le Perouse (Sydney) and arriving at Rotokura / Cable Bay (Nelson) only 11 days later. It began operating on 21 February 1876, and would prove economically invaluable, with the likes of refrigerated meat exports starting up just a few years later. We'll come back to this.

A breakthrough application

Rutherford didn't invent the concept of a detector; it already existed in the form of iron filings and their reaction to electricity, using a device called a 'coherer'.

His application of magnetism was the breakthrough, hence the name 'magnetic detector'. The first audio transmission happened on Christmas Eve in 1906 by Reginald Fessenden from Brant Rock, Massachusetts, but even then, tapping would continue and remains a requirement for an amateur radio operator to pass their registration and licence examination. It was this work of Rutherford that Marconi built on.

The development work of Maxwell and Hertz also equipped Marconi with a structure for wireless communication (1894), giving us our current wireless telegraphy. Tapping would give way to the teleprinter, the telephone, and eventually the television, or to see that in a different light, the teleprinter used a keyboard, the telephone a microphone, and the television both the microphone and the camera. The 1950s saw the introduction of the computer, giving us data storage as well as data transmission, and once the personal computer and the modem were paired, the rest, as they say, is history.

Frequencies, components and allocation

Amateur ham radio, then, is the development of the ability to both transmit and receive on a dedicated portion of the electromagnetic spectrum.



A warning sign regarding radiation risk – the amateur radio equivalent of the radiation warning on the back of a cell phone. The reference is specifically to the aerial from which any radiation comes during transmission. It's there for the usual legal reasons

This is important because it can be categorised in terms of the transmission of light and sound, as well as the invisible and visible portions of it. Infrared at one end of the light transmission 'portion' gives us the transmission of heat, while ultraviolet at the other end gives us the ability to see those hidden blood spatters if you've been watching TV crime shows. ▶

THE AMATEUR'S CODE

• ONE •

The Amateur is Gentlemanly . . . He never knowingly uses the air for his own amusement in such a way as to lessen the pleasure of others. He abides by the pledges given by the ARRL in his behalf to the public and the Government.

• TWO •

The Amateur is Loyal . . . He owes his amateur radio to the American Radio Relay League, and he offers it his unswerving loyalty.

• THREE •

The Amateur is Progressive . . . He keeps his station abreast of science. It is built well and efficiently. His operating practice is clean and regular.

• FOUR •

The Amateur is Friendly . . . Slow and patient sending when requested, friendly advice and counsel to the beginner, kindly assistance and cooperation for the broadcast listener; these are marks of the amateur spirit.

• FIVE •

The Amateur is Balanced . . . Radio is his hobby. He never allows it to interfere with any of the duties he owes to his home, his job, his school, or his community.

• SIX •

The Amateur is Patriotic . . . His knowledge and his station are always ready for the service of his country and his community.

— *Paul M. Segal*

Paul M. Segal's THE AMATEURS CODE from the 1959 edition of The Radio Amateur's Handbook.

Either end also leads us to quantum theory and the ability for light to be in two places at once, but that is not only outside the scope of this article but also outside the scope of most of us to even begin to think about.

This takes us back to amateur radio and the development of electrical components that allowed for the construction of the apparatus we know as the radio. Valves, capacitors, resistors, transistors, aerials (my dad's area of expertise), satellites, the silicon chip – all grew from the simple idea of transmitting data from one point to another. The transmission mediums have shifted from copper wires to fibre-optic cables, radio links that use the ionosphere as a reflector to satellites. Each stage brought increased bandwidth and transmission speed, ultimately culminating in a 'packet' transmission system that we now know as the 'internet'. There is currently estimated to be between five billion and seven billion kilometres of fibre-optic cable around the globe, of which about 1.5 million kilometres are undersea cables.

Frequencies

The transmission and receiving of data brings us back to Heinrich Hertz, who identified a characteristic of the wave, that of its variable length between the



The two emergency vehicles housed and maintained by the Christchurch Amateur Radio Club

tops and troughs of each cycle.

These became known as ‘frequencies’, and not only could they be identified, but they could also be allocated. Reception required an aerial – initially, receiving was all they could do – tuned to a specific frequency, with that frequency then being assigned for a particular purpose or group of users. Such as amateur radio.

Ham radio was part of the telegraph’s growth from the beginning. As early as 1911, their numbers were such that international controls had begun – not so much from any attempt to censor or restrict either the operators or content – although that would change just three years later with the advent of World War I in 1914; rather, it was the need to allocate different parts of the electromagnetic spectrum to different user groups in order to organise and manage the specific requirements of each.

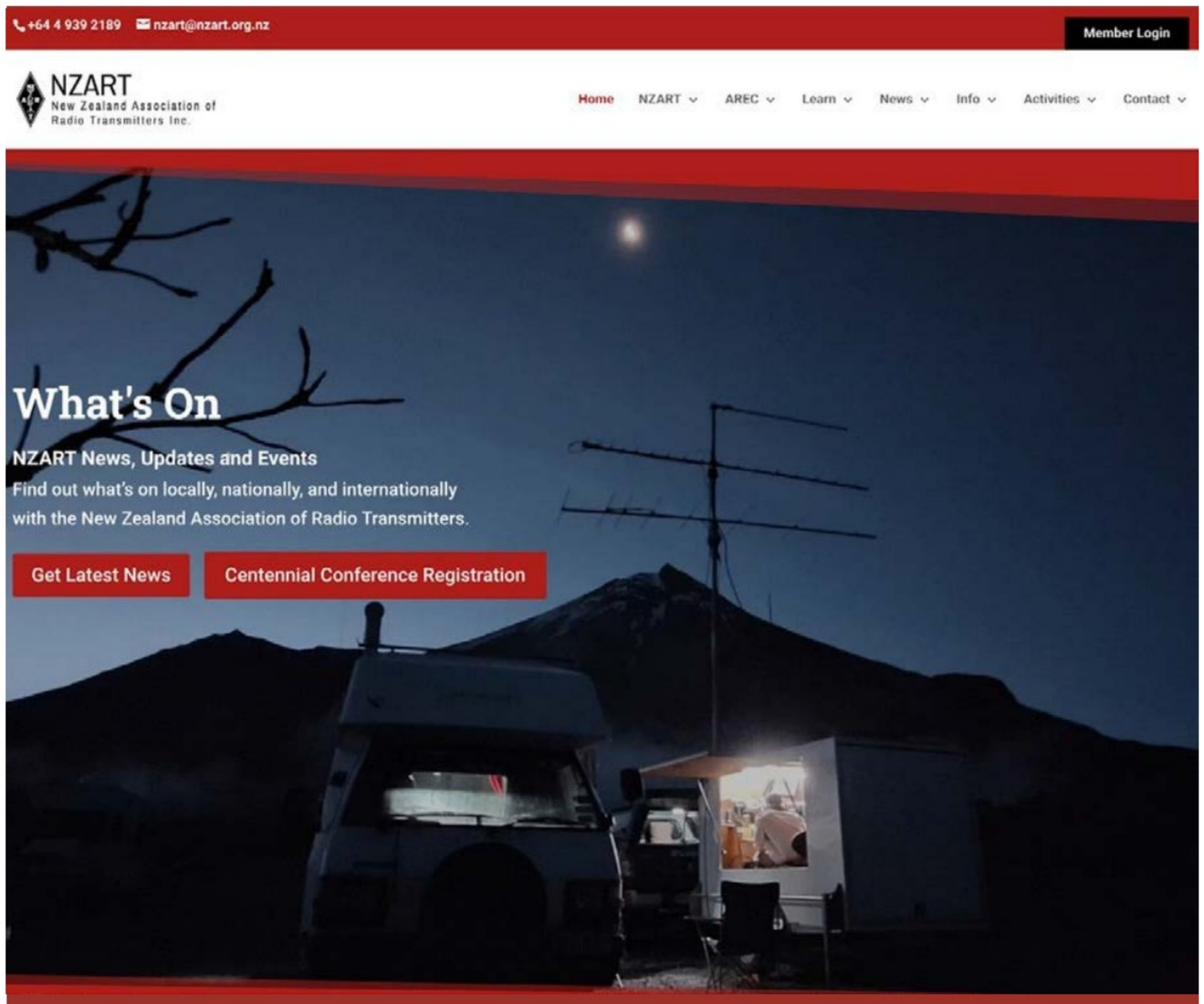
International agreements

It was a case of staying in your own lane, because, as with the internet today, your enemy was using the same technology as you were.

The need to separate different users to different frequencies led to the establishment of international agreements that were formalised with the ▶



Honour board of past NZART presidents, dating back to 1931



NZART

NZART is the national membership organisation for amateur radio enthusiasts.

The association was founded in 1926, held its first AGM in 1927, and produced its first magazine called *Break-In* in 1928. The association has been dedicated to amateur radio since it started. It works to increase awareness and understanding of amateur radio and to make the hobby accessible to everyone.

Amateur radio licences were issued to the first New Zealand radio amateurs in 1922. NZART represents the interests of New Zealand–licenced radio amateurs, both nationally (through RSM) and internationally (through its membership of IARU) and is a not-for-profit organisation (a registered charity) that:

- promotes the general advancement of the science and practice of radio communication or other relevant subjects
- facilitates the exchange of information and ideas on these subjects among its members
- aims to obtain the maximum liberty of action consistent with safeguarding the interests of all concerned.

Amateur radio (ham radio) is a popular hobby and service that brings people, electronics, and communication together. People use ham radio to talk across town, around the world, or even into space, all without the internet or cell phones. It’s fun, social, educational, and can be a lifeline during times of need.

NZART membership is open to all who are interested in radio communications. Membership gives you a voice in how amateur radio is governed in New Zealand and the opportunity to influence the direction and policy of the NZART.

NZART is a membership-focused organisation. The national governing body (executive council) is elected nationally every two years. The day-to-day management of the association is under the control of NZART’s part-time employee, who is also the general secretary/ business manager. The association headquarters is currently based in Upper Hutt.



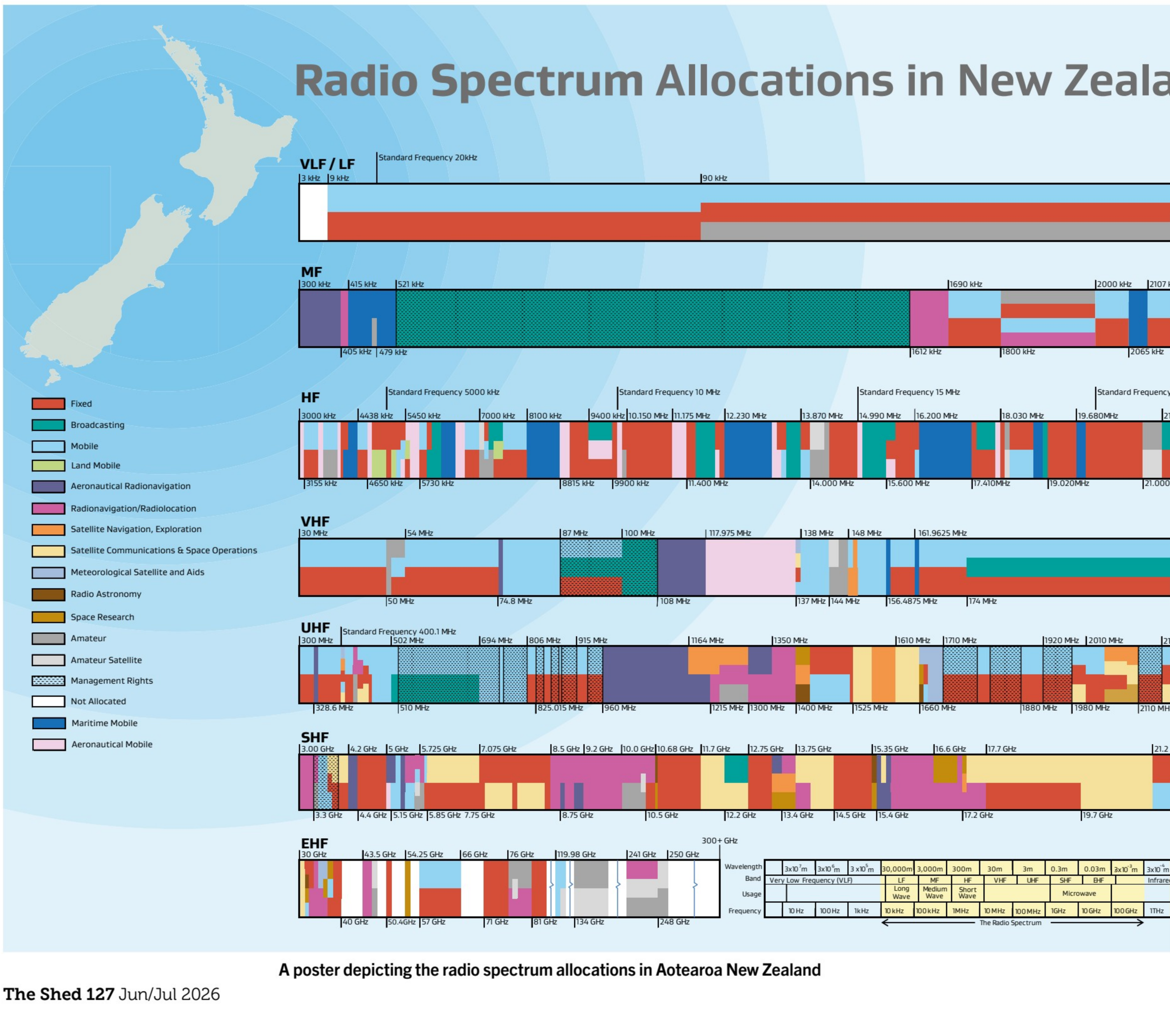
A full-scale model of KiwiSat, a ham radio satellite developed in the late '80s and early '90s by a New Zealand amateur radio satellite group. For a variety of reasons, it was never launched

establishment of the International Telecommunication Union (ITU). This included frequencies set aside for amateur use, although not all countries initially adopted these ITU recommendations.

This led to the need for amateurs to also come to agreements about how to use their allocated frequencies, leading to The American Radio Relay League's (ARRL) "The Amateur's Code", as outlined in the league's annual *The Radio Amateur's Handbook*. This states that the amateur is expected to be "Gentlemanly, Loyal, Progressive, Friendly, Balanced and Patriotic according to one Paul M Segal".

Spectrum rights

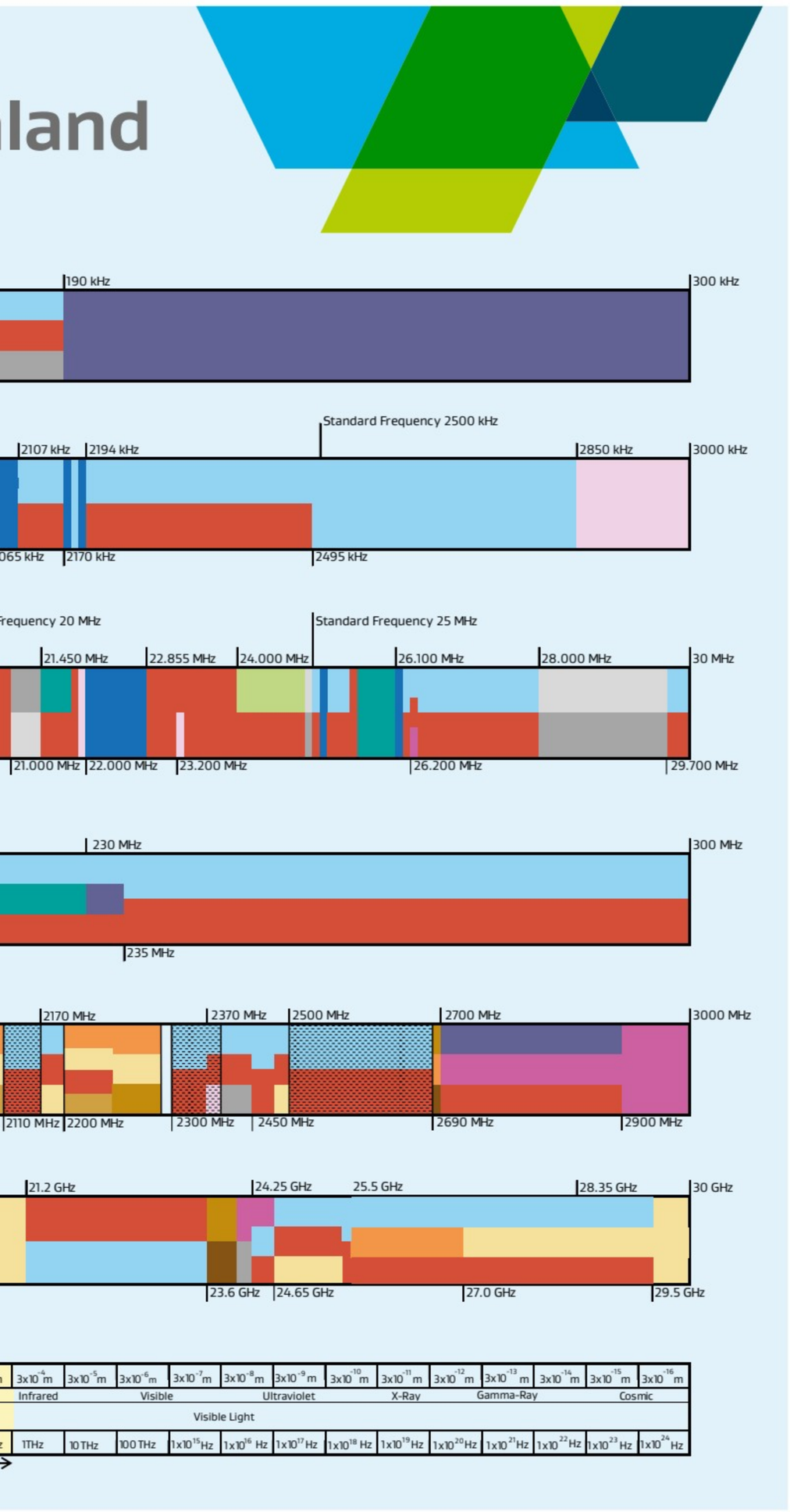
Radio Spectrum Management (RSM) – a team at the Ministry of Business,



A poster depicting the radio spectrum allocations in Aotearoa New Zealand

Innovation and Employment (MBIE) – maintains the Register of Radio Frequencies in Aotearoa New Zealand. The RSM website states that "The Register holds all information of assigned frequency use including the licence or spectrum rightholder details and the time period for which the licence or spectrum right has been allocated".

The RSM has an impressive list of publications associated with its role, including a code of practice, a compliance guide, allocations, digital television usage, coordination between aeronautical navigation and the Frequency Management and Broadcasting Coordination (FMBC), and even a five-step checklist if you believe your phone line or internet connection is experiencing interference from an electric fence. ▶





AREC

AREC is the public service arm of NZART formed by members who are individually licenced amateur radio operators required to meet standards set by RSM, part of the MBIE.

AREC is a national, volunteer, not-for-profit, registered charitable organisation providing radio and technology communications services all over New Zealand. Its highly competent, experienced volunteers establish and deliver communications wherever and whenever a search or emergency event may be.

AREC is an associate member of Land Search & Rescue New Zealand (LandSAR) and a member of the NZSAR Consultative Committee. AREC receives funding and provides Search and Rescue services under a service-level agreement with NZSAR, New Zealand Police and Maritime New Zealand. AREC has its own external website at: https://arec.nz.

AREC volunteers

The word 'amateur' in AREC recognises that nearly all operational members of the organisation are unpaid volunteers. Its professional volunteers offer their specialist communications and technical skills free to the public in support of the search and rescue sector, civil defence, and other emergency services 24 hours a day, seven days a week via the New Zealand Police, the Rescue Coordination Centre, and other lead agencies such as National Emergency Management Agency (NEMA) / Civil Defence (CD) and Fire and Emergency New Zealand (FENZ).

Areas of communication

AREC volunteers donate thousands of hours of their time every year to provide essential communications services. AREC has over 300 trained, highly skilled, experienced, technically competent communications experts covering the length and breadth of New Zealand.

In most areas, AREC provides trained communications operators and often communications equipment at the search or emergency headquarters/base, support for the setting up of equipment, provides emergency radio infrastructure, and technical advice and training for the search or emergency teams who communicate back to the headquarters/base.

Like all things, there are costs, with the RSM managing the radio spectrum licence fees in order to ensure "New Zealanders have access to radio spectrum for a range of wireless services, and that wireless services operate without interference".

Where to begin?

So how does it all work? If amateur radio appeals to you, where do you start? What does it cost?

If we go back to my introduction and the house with the aerials in its backyard, that can't have been cheap. What about the neighbours? Do you require a consent for them? (The aerials, that is, not the neighbours.) And an engineer to ensure they stay up – even during the worst of winds? A nor'wester in Darfield is a force to be reckoned with. And perhaps more importantly, in these days of the internet, why would you want to?

The place to start is the NZART website – https://nzart.org.nz/ – which will direct you to one of about 80 branches throughout the country, all of which are busy celebrating 100 years of amateur radio in Aotearoa New Zealand. I visited the Christchurch Amateur Radio Club and found a copy of *Break-In* from 1976, celebrating its 50th anniversary. It made interesting reading, with one writer commenting on the fact that amateur radio operators had two primary roles – the first was of continued research and development, which even extended into the world of the satellite, particularly OSCAR 6 and OSCAR 7, which required the use of higher frequencies as they developed (we'll expand the relevance of this in the next article).

The second is around the work being done in remote areas in both the extension and training of the amateur radio infrastructure and its use, particularly in its primary role of assisting in catastrophic events and disasters – the AREC previously mentioned.

Conclusion

This topic is huge, and what is often described as a movable feast.

In the next article, we'll look more at the mechanics of amateur radio – what a ham operator needs in order to begin, understand, and comply. Like most specialist arenas, it has its own jargon, culture, and heroes. There are licences, subscriptions, tests, call signs, a magazine, equipment to buy, along with its own regulations, a learning curve and even international implications. And fees. In these days of shifting political alliances, who knows who you might end up talking to? Or where they might be?

"Like most specialist arenas, it has its own jargon, culture, and heroes"

The Christchurch Amateur Radio Club – complete with a range of aerials and the garage that houses the two emergency vehicles maintained by the club



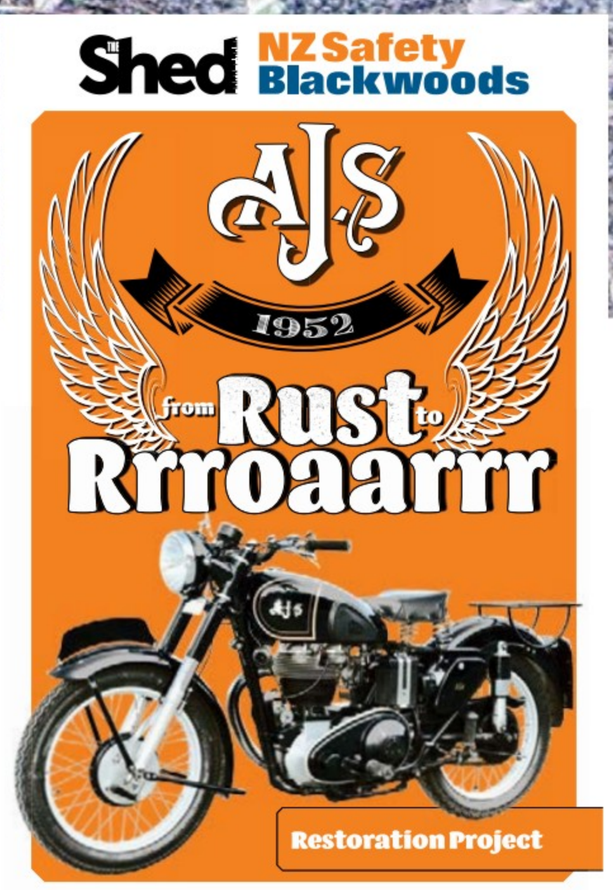
Follow the lights,
let wonder *take flight*

Winter Wonderland

26 June – 26 July 2026

AYRBURN





RESTORING A 1952 AJS

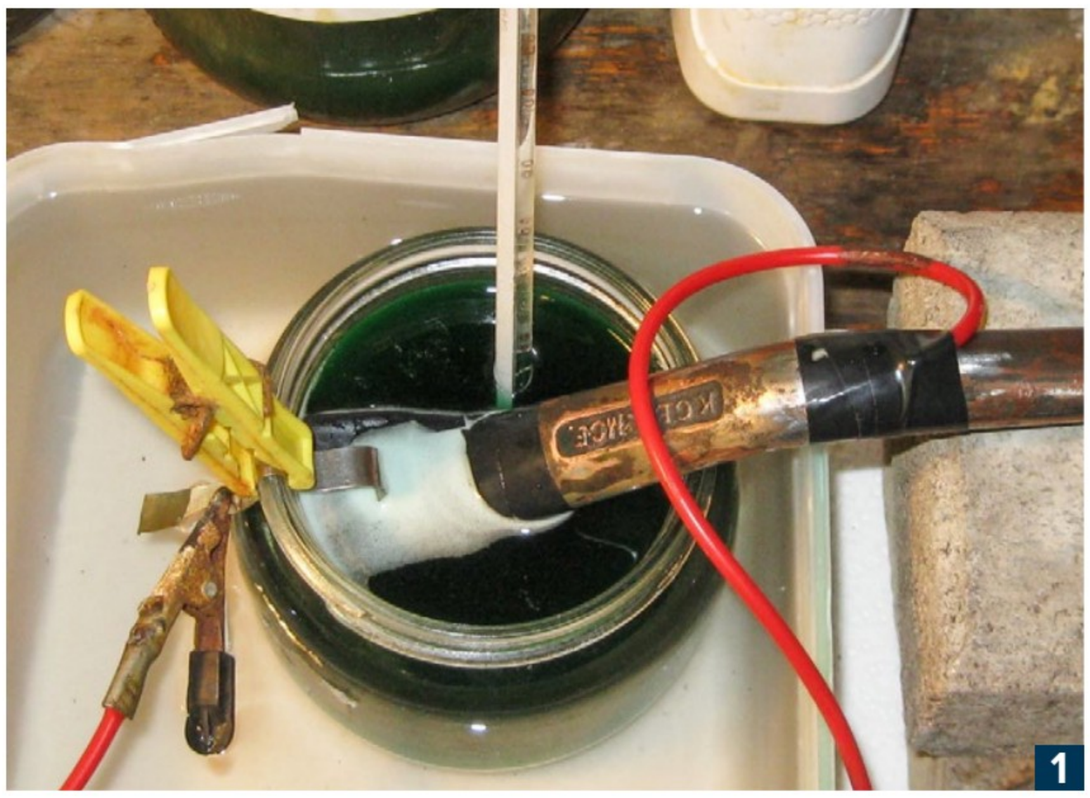
By Peter Barton | Photographs: Peter Barton

Part 10

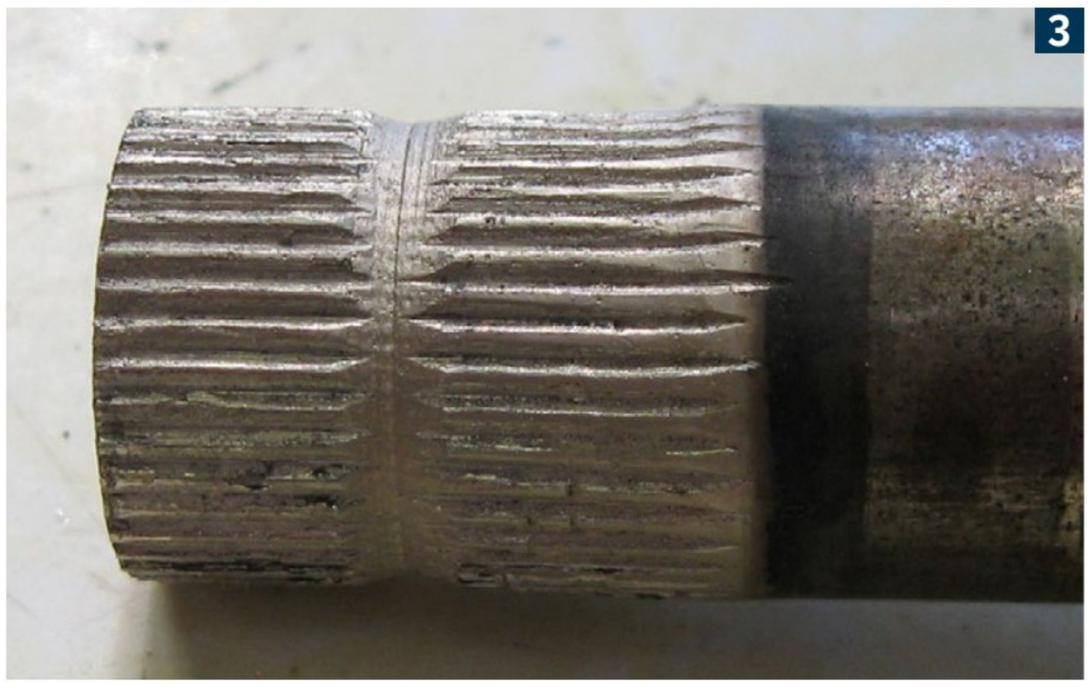
Peter's unwavering commitment to this restoration is truly admirable. He has had to redo several tasks multiple times and faced challenges with issues like plating, the kick-start spline, and getting the engine running. Despite the obstacles, he remains positive and knows that the only way to complete the rebuild is to keep pushing on

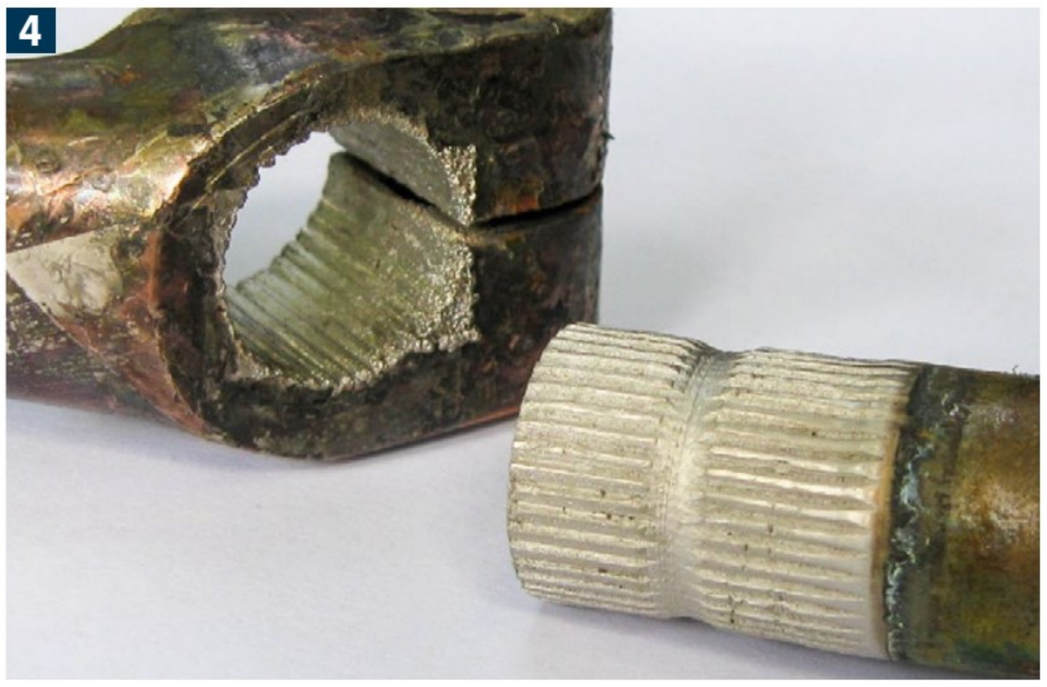
I am continuing the rebuild of an old classic English motorcycle, which has been in parts and in storage for the past 50 years.

I call it a '1952 AJS 500 cc (model 18S)', although many parts are from before or after 1952, and some are actually from a Matchless. I rode it briefly in the mid '70s, and it was apparent even then that some work had to be done. The electrics (apart from the magneto ignition) had never worked for me, the alloy head needed heat treatment, the swing arm suspension had to be re-bushed, and the steering had a bad judder at speed. Only the swing arm was fixed, but other









1. Electroplating the starter lever, like previously. The nickel anode goes through the hole in the lever. I'm careful not to short it. 2. Electroplating the pinion. Time for new clips. 3. The pinion with new nickel and looking quite good. 4. More plating in the lever and on the pinion

repairs and reassembly never started until three or so years ago. It became a retirement project.

A year should do it

I originally thought I could complete this project in a year, including some DIY nickel plating and cast-iron welding on the motor.

If you have been following this series from the beginning, you will know that the original idea of six articles to completion was wildly optimistic, like the timelines for the Auckland convention centre or the Transmission Gully. It has involved suspension and wheel rebuilds, tank repair, some filling and painting, attempts at electrical work (generator rewinding), and some successful (and some unsuccessful) nickel plating. I have likened this to a Snakes and Ladders game with plenty of snakes and no ladders.

Get your motor running

I am at the point where I want to get the motor going; I can't ride the bike yet, as some control cables, including the clutch, need to be installed. The ignition advance and retard control cable is in, and so is the throttle control. I should be able to fire the engine, but there have been problems with the kick-start (no electric start in these old machines).

The kick-start lever has lost its grip on its pinion, and more than once, I jump on the lever, and it just slides around. The lever and pinion both have splines broached into them, and they should clamp securely together. To remove and fix the pinion, the gearbox outer case has to come off.

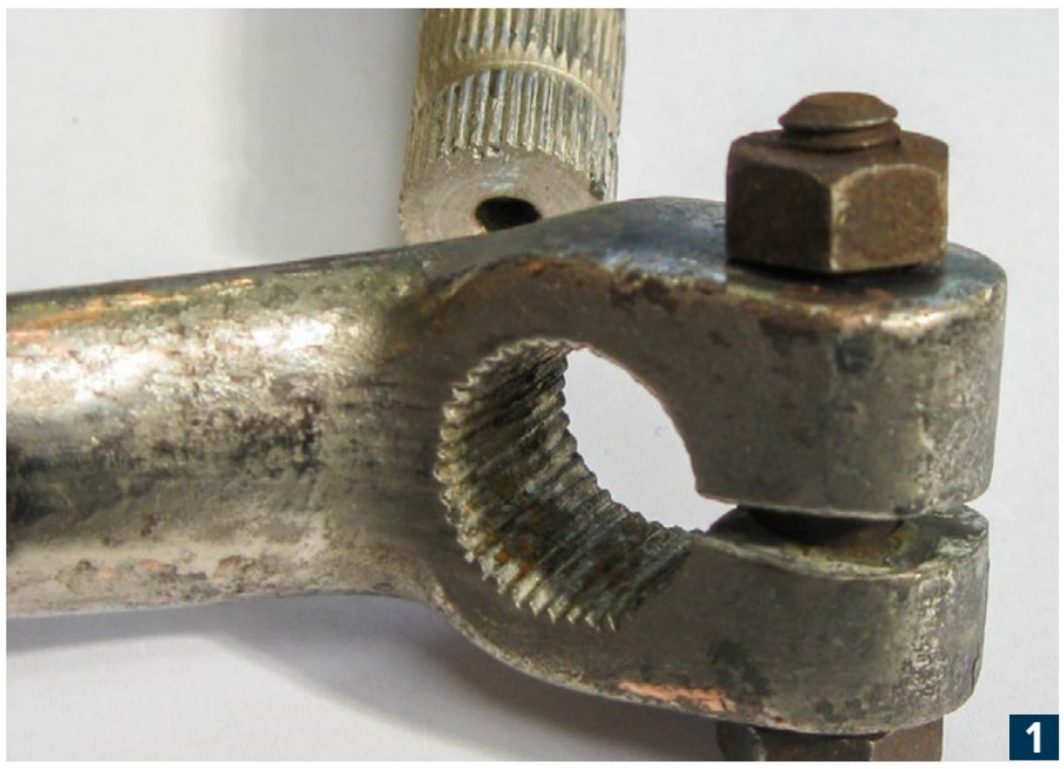
This instalment sees me making a third attempt at a repair; to build up metal (by electroplating a hard nickel) in the lever-to-pinion joint, and then some better hand broaching into the extra metal, to make improved splines in the two parts so they can get a better grip on each other. Gearbox completion, with the bike laid on its side and the gear selector carefully fitted, has to be done each time. So annoying.

The results were good

My present plating electrolyte, for 'hard' nickel, is a mix of nickel sulphate, ammonium sulphate, boric acid, and a small amount of hydrochloric acid, all dissolved in clean water.

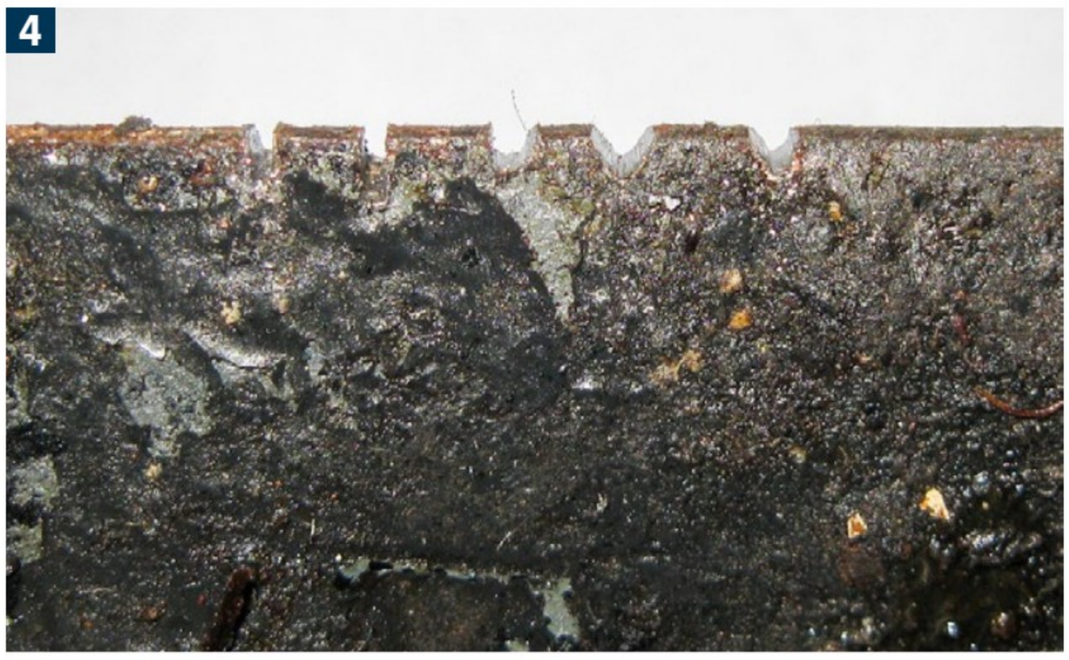
I described the process in previous articles, especially number two (*The Shed* Issue No. 119). I added several drops of dishwashing detergent and used between 0.2 and 0.3A of current at about 60 degrees. I bent the nickel tape anode into different shapes to get a good distribution of plate. The results were good: good-looking grey/silvery layers of nickel on the surfaces I had not masked with insulation tape.

I bought a set of micro files with various profiles and also ground a hacksaw blade to make narrower V-shaped cuts, more like the original grooves in the splines. Then, to get a good view of things, I taped two spectacles together and from time to time, I passed the parts through the sooty top part of a candle flame (to stop unwanted shininess). I also used a











1. Another view; fresh nickel. Lever and pinion. 2. Doubled, taped spectacles for a bigger view; scrap steel holds the starter lever in the vice and guides my hand broaching. 3. A closer view of the starter lever in the vice, and the grooves cleaned up. 4. Trying out different profiles, scrap steel, for the hand broaching. Filed hacksaw blade on the left; the right three are file edges, hacksaw blade second left. 5. Using wax to mask the lever broaching while the rest of it is plated

magnifying glass.

The nickel plate was (it seemed) satisfactorily hard; it was difficult to make a quick impression with the file or blade. There was no flaking at this point, so it seemed the layer of nickel onto steel would be able to handle some shear force. After the hand broaching, I could push the two parts together with effort.

The brake lever

I decided to smarten up the externals of the brake lever itself (while it was not yet installed on the bike) with a fresh nickel-plating system.

The nickel plate went on, and was

> “There was no flaking at this point, so it seemed the layer of nickel onto steel would be able to handle some shear force”

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then polished with 1200-grit wet and dry paper. Next, I put molten wax into the splined part of the clamp (thus making doubly sure there is no exposed steel) to protect the work from copper plating solution. After the copper plate, the lever got another 1200-grit polish, then the wax was melted out with boiling water.

Finally another nickel plate. I think the nickel-copper-nickel 'sandwich' provides a more corrosion-resistant surface than plain nickel.

The outer gearbox cover with the pinion fitted could now go on with the bike lying on its side. I had already tapped out a new gasket of brown paper. My previous article went into some detail about this tedious cover refit; the alignment of the gear shift parts is critical.

The start lever was slid (actually softly tapped) onto the pinion. To get the lever as tight as possible, I temporarily used a G-clamp along with the permanent clamp bolt, and I thought I had a very tight, secure joint. I calculated that the torque on the pinion during starting would be roughly 160Nm or more, and therefore the shear force on the broaching would be about 18,000 Newtons or 1800kg. The radius of the pinion is about 9mm.

I give it a go

Time to throb.

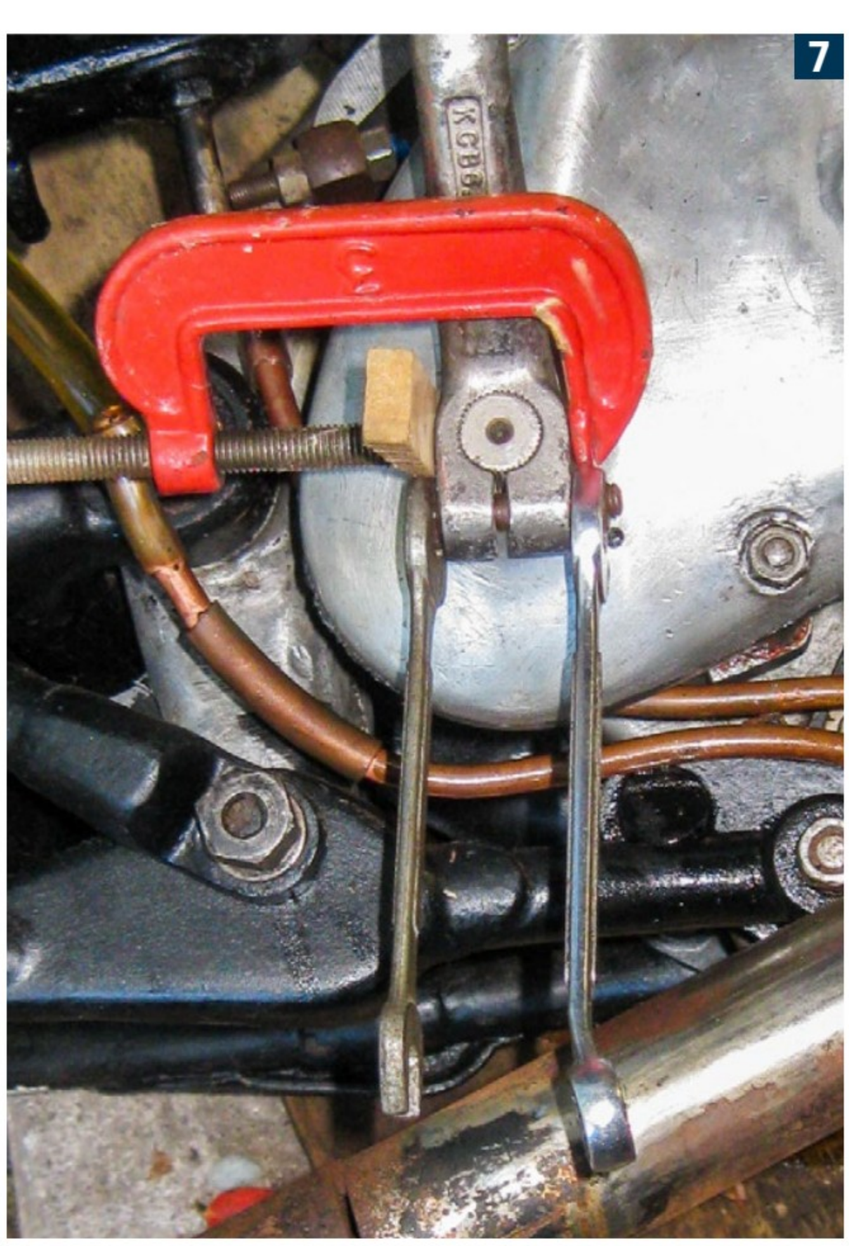
I've described it before: the ignition timing is set to retarded (a control on the handlebars), a starter aerosol is squirted into the carburettor (I had not refitted the petrol tank at this stage), and a little throttle.

A couple of jumps on the starter lever and … it gave way. A snake on the board game; I've been on this square already a few times. Time for me to have a nice cup of tea, then move on to a different task and try to get some achievement.

The tyres, tubes, and rim tapes have arrived.

The rims are 19 inch, and there's a 3.50 tyre for the rear and 3.25 for the







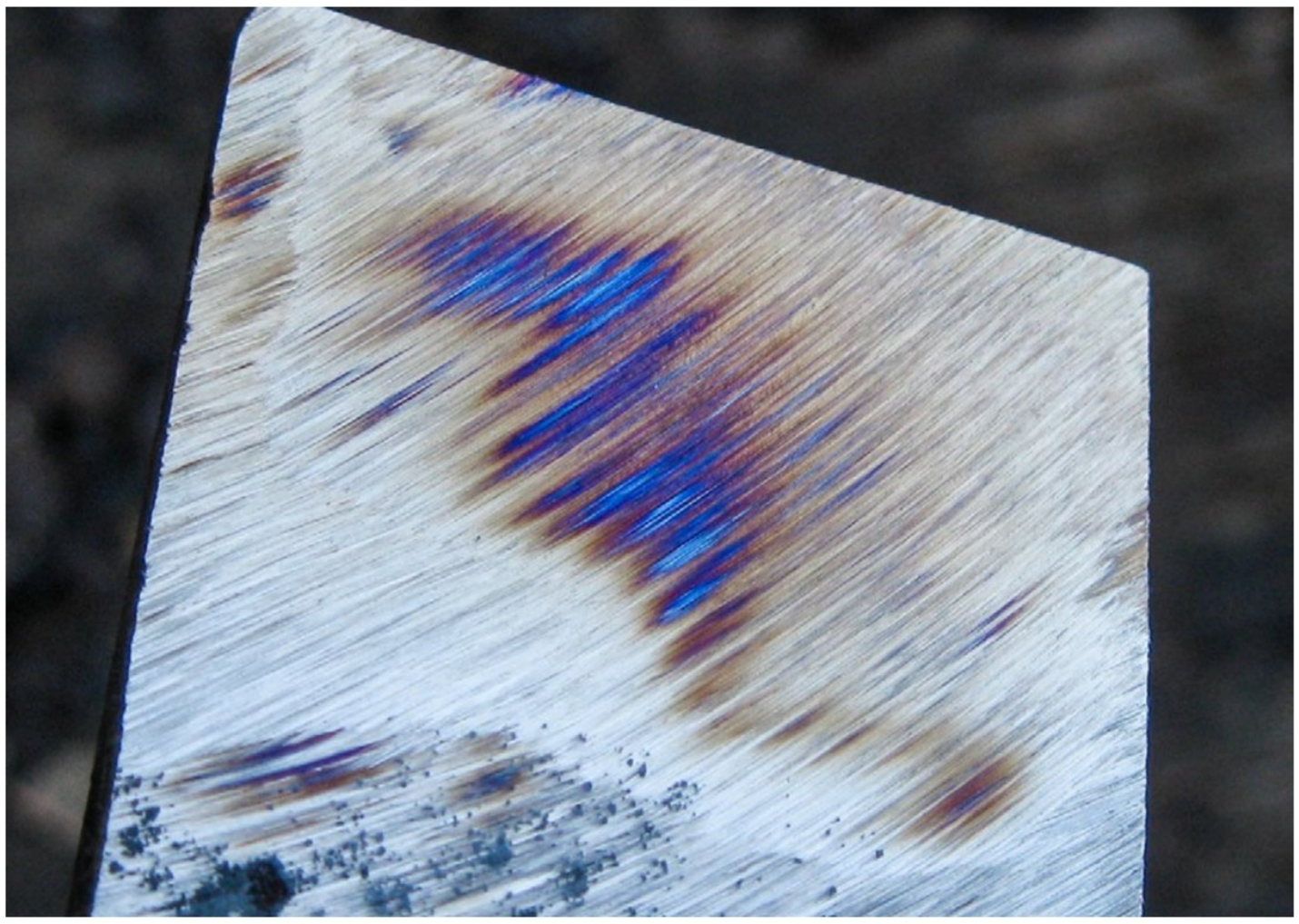


6. Refitting the outer gearbox cover. A gentle hold from vice grips holds the starter pinion in position, and a peg stops the clutch lever from fouling. Gentle soft tapping. 7. Getting a good grip. The gear lever is G-clamped, while the clamp bolt works as well. 8. Disaster. The beautiful-looking nickel plate peels off the pinion with the shear during starting attempts. 9. Part of the disaster. Lever broaching squashed flat, and flaking nickel

Rust to Rrroaarrr NZ Safety Blackwoods



Leaving the starter problems for now. New tyre, tube, and rim tape for the front wheel



Using an angle grinder to make tyre irons gave me some tempering colours, but it didn't seem to matter. This is some good ol' Hillman Hunter suspension steel

front. They are both Dunlop and classic style. I haven't nickel-plated the rims yet: in an earlier article, I described the trouble I had trying to plate one. I would need more nickel electrolyte and a way of getting a larger container of it up to the required 60 degrees. I really want to get the bike mobile now, and so I'm just using cleaned rims, but still with some rust patches. Later, I can remove the tyres and tubes and have another go at plating … we'll see.

Don't throw away leaf springs

I needed to make some tyre levers (I'm too miserly to buy some).

As a youngster, I used kitchen spoons for bicycle tyre leverage and removal, but the tyres for the AJS are a bit more muscular. I'll leave spoon-bending to Uri Geller and keep domestic harmony.

I have a stock of old leaf springs (ex–Hillman Hunter, I think) and some with the angled ends to the leaves. The excellent steel has been useful in the past for making wood turning gouges, but that's another story. Don't throw away leaf springs.

I roughed out the shapes and thickness with a 230mm angle grinder on the angled parts of the springs. I did get some tempering colours with the heat from the grinding, but I kept that down as much as possible.

It turned out to be OK, and the steel remained tough and elastic. I finished off the shaping with a 100mm grinder and smoothed off with a flap disc: I needed slippery irons for sliding around on the rim. I removed any sharp edges, of course.

Good lubricant

A potato peeler used on a bar of Sunlight soap and boiling water in an ice-cream container, gave me a good soapy gel for lubricant on the rims and tyres.

Somewhere I'm sure I have a pot of plumbers' lubricant from when I once fitted a rubber join onto a toilet pan, but I can't find it anywhere. I suppose an adult shop would have good lubricant, but I'd be too embarrassed.

The old rear wheel had a rusty rim clamp, which was meant to hold the tyre in position, but it was way too narrow for that rim. I therefore have no idea why it had been installed. I'm not going to use any clamp as my riding will be gentle, occasional, and never off-road.

I had wire brushed inside the rusty rims and painted with a rust converter/primer. The rim tape went on, with its hole matching the valve hole in the rim (of course!). I was now ready to fit the tubes and tyres, which can be a real pain. The wheels had their axles and brake drums fitted already, so for comfort, I needed to get the rims off the deck; 100x100 timbers and an old tyre got them up. I had to kneel and put my weight on the tyres as they were levered into the rims.

NZ Safety Blackwoods Getting to the nuts









Tyre fitting

I started each wheel by removing the cap and the first of the two nuts on the valve of the tube, then inflated the tube slightly, fitting it up inside the tyre.

It had to fit up the inside of the tyre, out of the way of later levering. This tube and tyre arrangement was pushed, angled over the rim, so that the tube valve only just went through the hole in the rim.

The nut went back onto the valve, so it only just engaged the thread, and the valve was then located, so later it would push through the rim at a right angle.

Plenty of soapy gel lubricant was used on the rims and tyre beads. Using my pair of tyre levers, I worked around the rim, like stepping and sliding, levering the tyre bead into the rim.

There are some YouTube videos



1. The insides of the rims were wire brushed, then treated with rust converter. 2. The tyre clamp came off the back wheel; way too narrow unless some part has disappeared. Rim tape is in position anyway. 3. I pump the tube a little before pushing it into the tube, and then fitting it to the rim. 4. Tree shadows and the slightly inflated tube up inside the tyre. 5. Still life assembly: tube valve ready to go in, soft hammer, two tyre levers, rim protections cut from an ice-cream lid, and a blue pot of soapy gel

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The timbers plus the old tyre hold the wheel assembly up off the hub. Fitting complete; soap not very visible. Valve is just visible at about two o'clock



Pumping the front tyre

"That was the theory. It may have been overkill"

showing tubed tyres being fitted. I had made a pair of rim protectors, but then didn't bother to use them, as I intend to replate the rim, and the existing chromium was tough and made things nice and slippery.

It's important to avoid pinching the tube and not try to do too much at once. My weight and knees kept the fitted portion of the bead inside the rim and stopped it from popping back out as I worked around. At the three o'clock/nine o'clock position, it felt like some sort of yoga.

Success!

Once the first bead was in, I flipped the wheel over and repeated the whole procedure for the second.

The nut on the valve was tightened up, and, thankfully, the valve poked through the rim at a right angle. The tyre beads looked evenly seated in the rim all around the circumference. Each tyre was pumped up fully and rechecked. My AJS handbook recommends 22psi for the rear tyre, and 18psi for the front. These seem a bit low, but I'll stay with them for now.

The wheels went back onto the bike, and it was time to address the starter lever issue (again). The nickel plating and hand broaching method was abandoned. I needed a method that would cope with relatively high shear force. I could have used a tapered cotter pin, but this would have involved drilling and filing (ideally broaching), as well as pulling off the outer gearbox case (again).

Comparing the ridges in the starter lever with those on the pinion, it seemed that the lever ones were more chewed, meaning that the pinion steel with nickel is harder. Another factor to be considered was the decorative finish of anything plated already.

Decisions

If I welded the pair together, the gearbox could still be dismantled, but it would mean that the lever, the bronze bush in

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Some holes in a steel block so I can trial an electrode within the holes



Two trial welds

the outer case, the case itself, the return spring, and the pinion were all one unit.

The welding could still be undone with some effort if, say, the bush needed replacing (it's OK at the moment). The weld would have to withstand the shear during my starting jumps.

I decided to drill three holes into the face of the pinion/lever combination, spaced out around the junction and deep enough for the hole walls to be parallel – that is, cylindrical holes. The idea was that, once full of weld, the hole walls would convert the shear into compressive forces within the holes.

Hopefully that would be stronger, and for any dismantling, the welds could be drilled out with an oversized bit. Care would be needed in case the difference in steel hardness made the drill bit go off course. Also, a stainless steel (316) weld was to be used, which could be useful in view of any existing nickel. That was the theory. It may have been overkill.

Showtime

I practised welding into some holes drilled in a steel block, which went well, and then went to the starter gear.

The bike is on its side again, for convenience. Drilling, welding, and grinding – all went OK. I had put a scrap metal sheet over the gearbox to protect it from any drill swarf and welding spatter. I had also lined up the starter



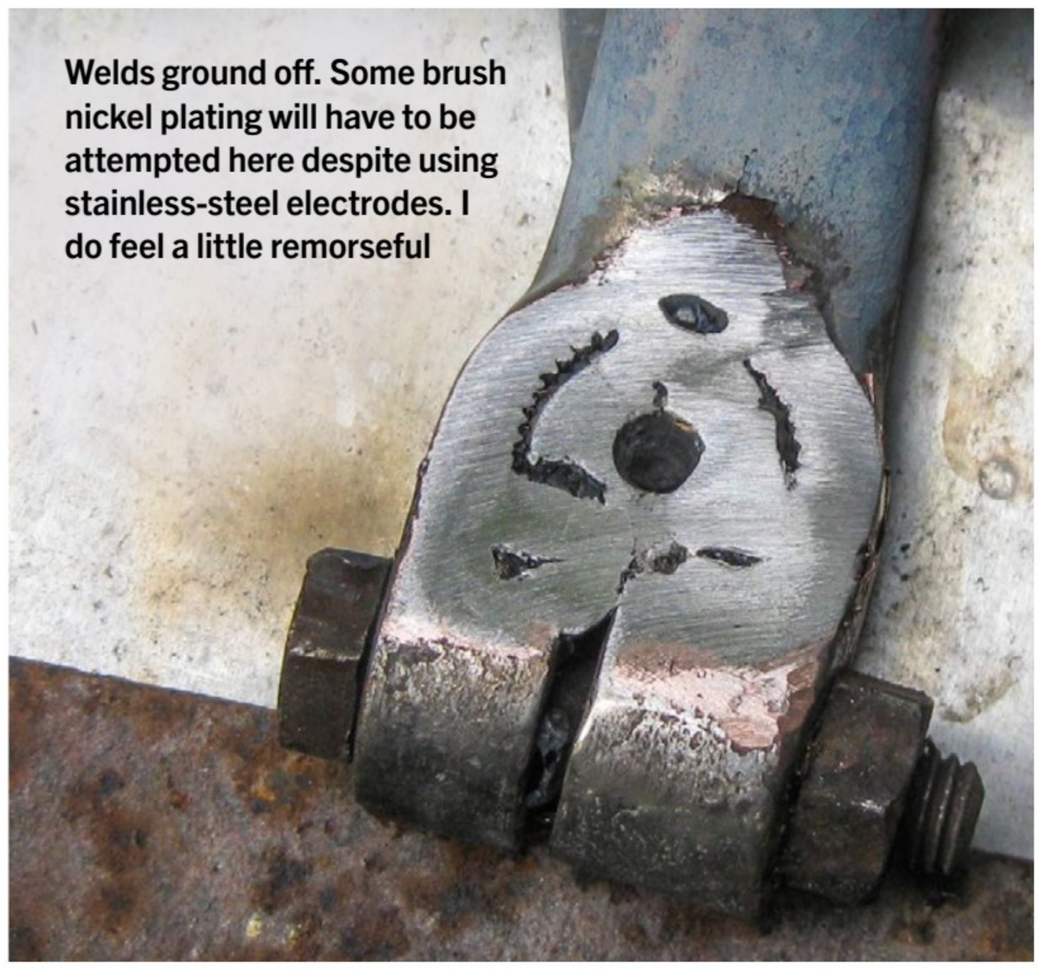
Trials ground off



Three shallow holes into the face of the assembled lever and pinion. The scrap metal sheet underneath protects the gearbox

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Two of the welds


Welds ground off. Some brush nickel plating will have to be attempted here despite using stainless-steel electrodes. I do feel a little remorseful

lever a bit farther over from vertical to compensate for the tooth that was ground off on the starter quadrant (see earlier article), thereby engaging later in the starter stroke.

Lifting the bike up from prone and onto its centre stand seemed easier now; perhaps I had a better technique or my muscles were bulking up. Time to start the engine.

The lever showed no sign of slipping on its pinion; the welds are strong enough. However, with my increasingly vigorous jumping on the starter lever as the piston approached TDC, the primary chain, with its shock absorber piece, began to slide over its mate on the crankshaft. Another snake, but looking on the bright side of life means that I could note the good compression. I'm a bit remorseful about welding the lever though.

Gentle riding

The two shaped pieces making up the shock absorber are pressured together with a stout spring.

Enough force from the primary chain (me jumping vigorously on the starter lever) saw the shaped pieces pushing apart, so much so that the piece normally held (but free to slide) on the crankshaft by splines slid off them, and there was momentarily no traction between the chain and the crankshaft.

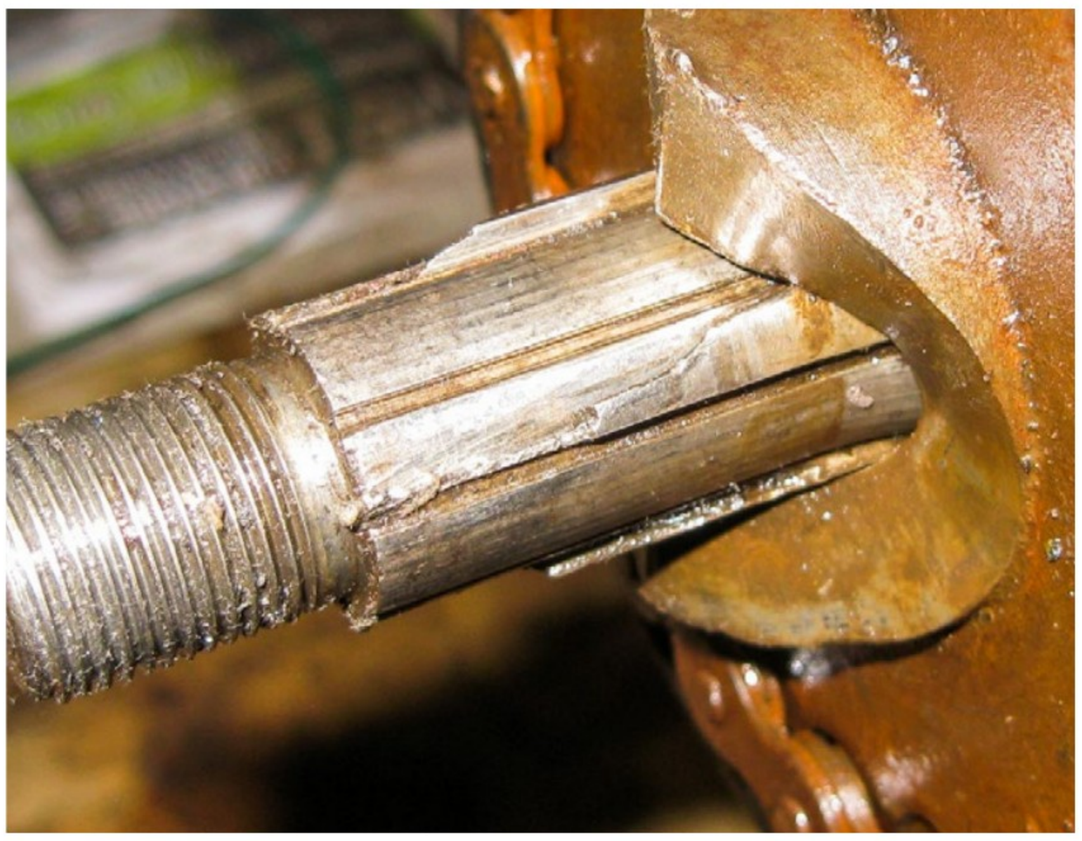
An extra washer packing the arrangement increased the compression of the spring and made less amount of movement. Problem solved, a small snake slithers away.

The splines on the crankshaft are actually quite badly chewed from when there would have been some jumping in the past. I hope that gentle riding in the future will avoid further deterioration.

Rubbish!

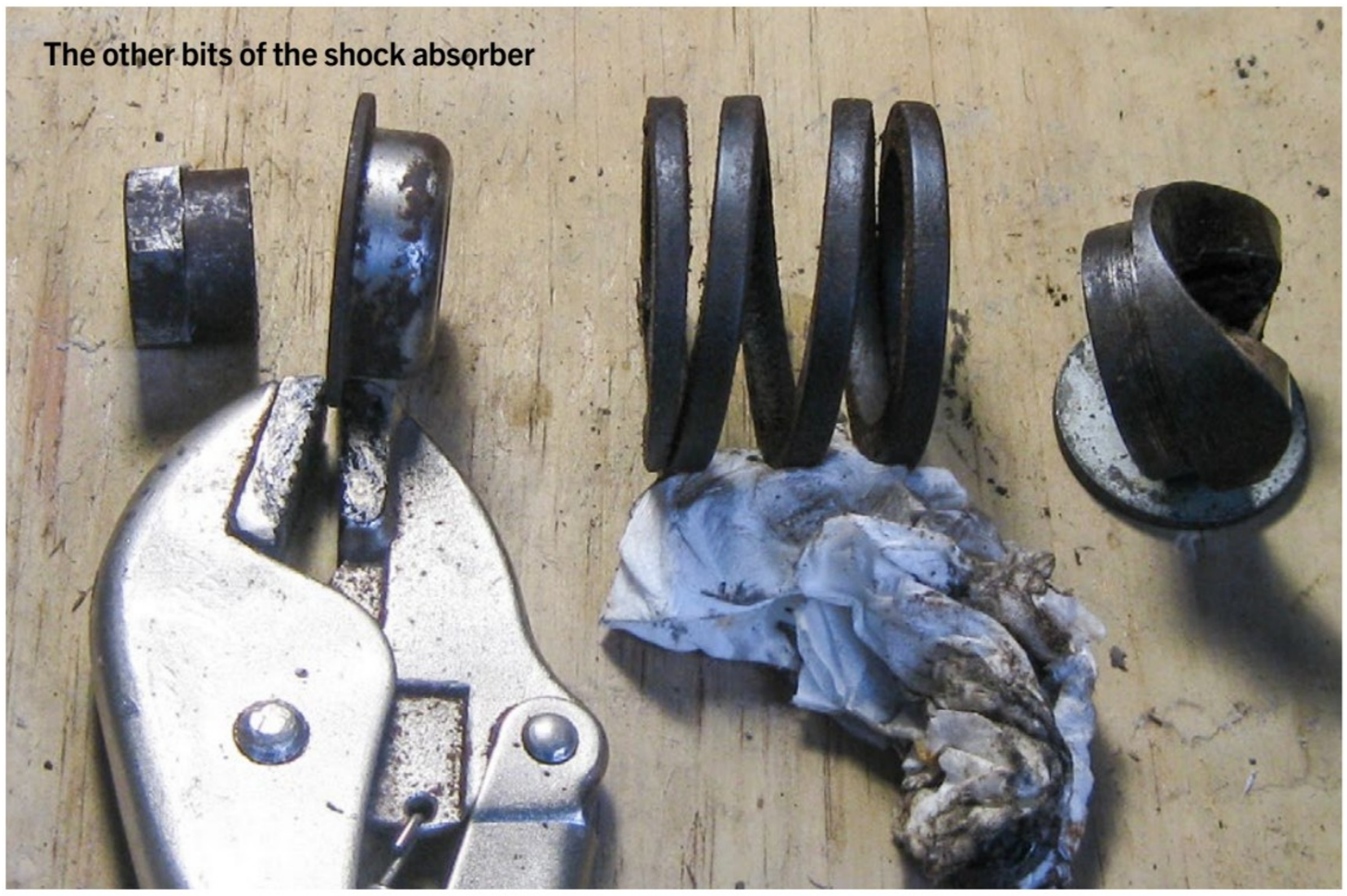
The tank and seat were still off the bike,





Left: The crankshaft shock absorber is loose, with the primary chain. Right: Badly mangled splines on the crankshaft, within the shock absorber. I hope that gentle riding, with a tightened up spring, will be OK, and that I will not need an angel investor

NZ Safety Blackwoods Getting to the nuts





The magneto which I checked. The points are at the six o'clock position. The Bowden cable, top right, goes to a manual advance/retard lever on the handlebars

from all the prone starter and gearbox work.

However, I could try to get some action with starter fluid sprayed into the carburettor. And I jumped, and I jumped. I had recently tested the magneto off the bike (powered by a drill), and I knew that it worked. I checked the ignition timing (the opening magneto gap) with the spark plug out (new plug, cap, and lead), and a rod measuring piston position. All OK.

The tappet cover was removed to check push rods and ensure that the timing is not 180 degrees off. The plug went back in. I fiddled with the advance/retard lever on the handlebars. And I jumped, and I jumped again.

The high-voltage slip ring at the other end of the magneto had to be OK, as the magneto and spark plug recently worked well with the drill. The plug came out, so I could check its gap. And there was some rubbish in it!

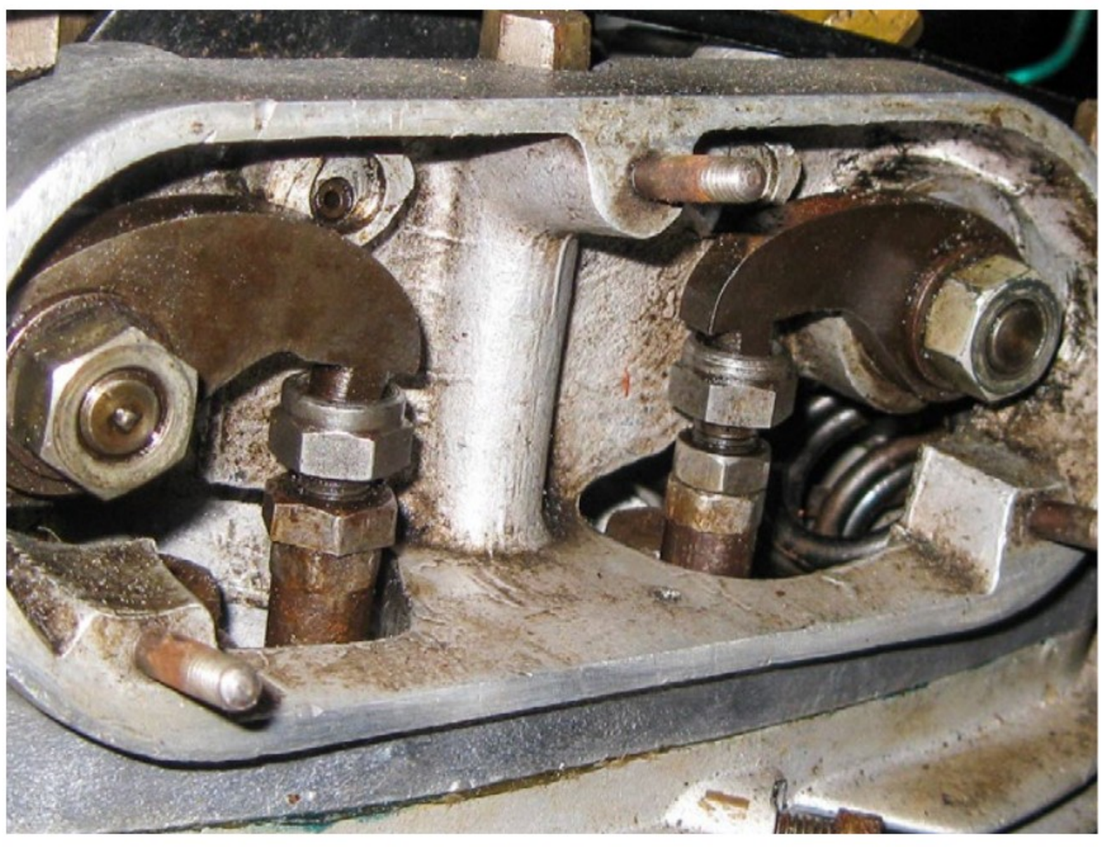
That was easily fixed, and testing with the plug out of the bike (but earthed against the motor) showed a good spark. So, plug back in, and I go through the starting routine again. And it fired; something between pops and a grunt. I'll take that for now.

The wiring loom

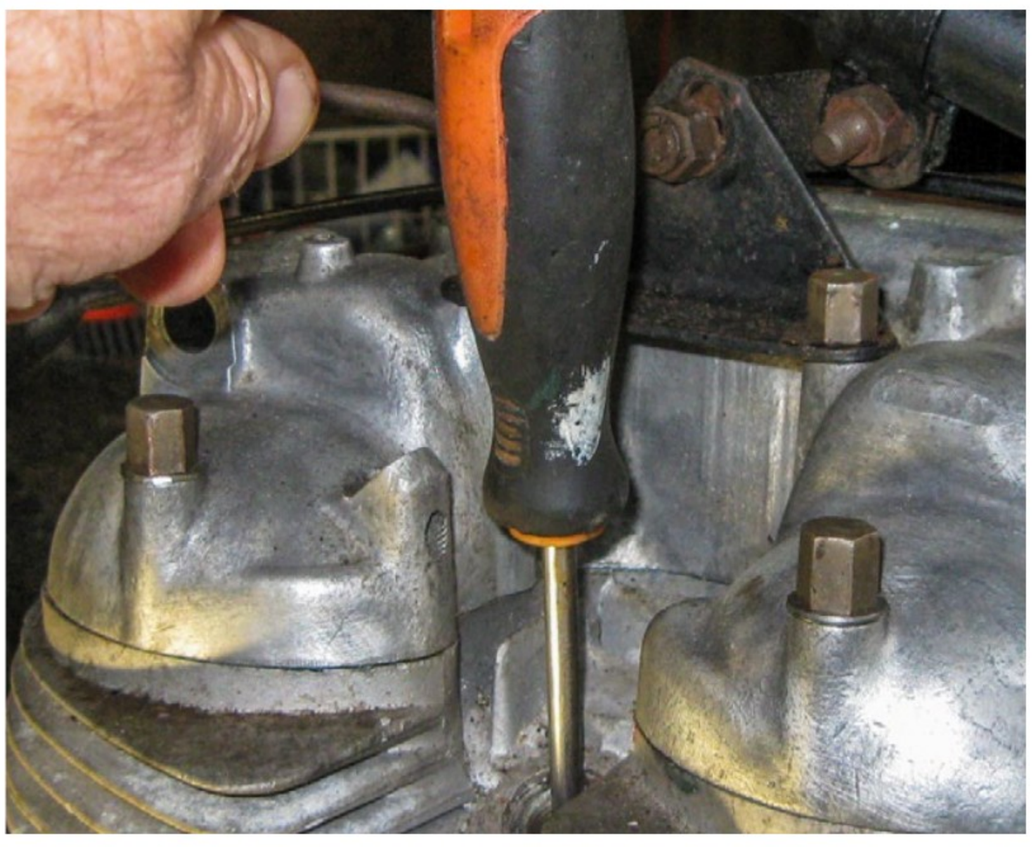
Before I put the seat and tank back on, I wanted to get the loom for the electrics into place – it runs under both of them.

There is at present no generator (I still haven't solved that problem), and therefore I will not fit the cut-out and regulator box. The bike will run without electrics (it is magneto ignition), but I need to look ahead. The circuitry is as simple as. No indicators yet.

The main loom runs from the



Checking the tappets to ensure I'm near the back of both cams for the magneto timing



The piston has to be about 12mm before top dead centre (TDC) for the spark, when the timing lever is fully advanced

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headlamp housing with its switches to the tail-/stop light. One branch goes to the left toolbox (near where the old battery used to sit), where there will be the 6V battery, a fuse block, and a master on/off switch.

Near this toolbox will be the horn and the stoplight switch. For brief periods of time, the electrics will be able to work off just the battery. And that's about it.

I used a Dune Tube for the loom, from Jaycar. It looks a bit like spiral binding around the wires. It comes with an applicator; I consulted the web about how to use it, and after wading past heaps of postings about the planet Dune and the natives' little water tubes, I finally got it figured out.

The headlamp itself has a double-filament 6V bulb, which still works. I'll keep that for now, but thank you to the readers who gave me advice about switching to headlamp LEDs. It will happen.

I will be putting LEDs into the tail-plus-brake-lights. I also got good advice sorting out my seven-pole rotary lighting switch, which sits on the headlight shell: thanks, Steve.

The loom went on, taped. Seat and petrol tank fitted to see how it all looks.

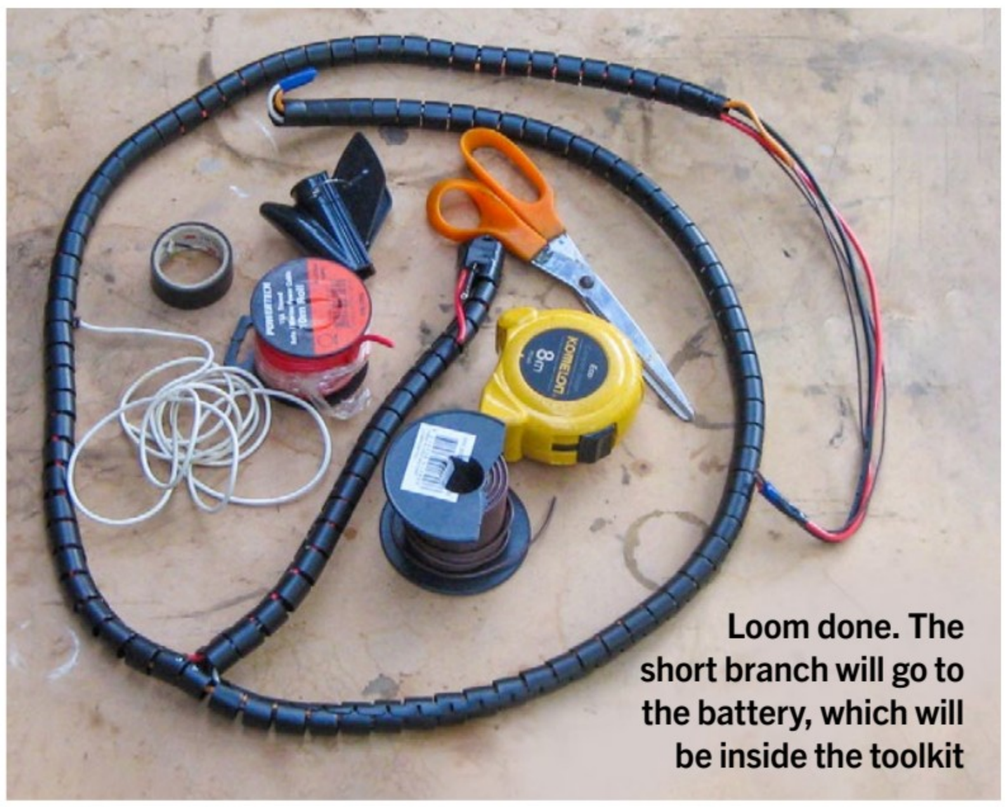
Sadly, I can't ride the bike yet.

Coming up in Part 11:
I need a clutch cable; the brakes and rear chain to fit. Plus more tinware and completion of the electrics.



The applicator in use for wiring up the loom

"And it fired"



Loom done. The short branch will go to the battery, which will be inside the toolkit



No seat, no tank, but loom taped in position



Still life: bike with loom and three hens



Seat and tank trial-positioned with loom. Tyres on

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REINCARNATION OF THE SNAKE

The Shelby NZ build team at Matamata Panelworks has endured a long and challenging journey, culminating with the highly anticipated public unveiling of the 427SC and firing up of its sonorous V8 at the 2026 Ayrburn Classic Festival of Motoring in Queenstown on 20 February. This Cobra is a New Zealand–built car with loads of character and potential.

Patrick Harlow caught up with the car, now back in Matamata, and he finally had an opportunity to get up close and personal with it. But before then, the question he asked was, "Why would ya?"

Well, there are two answers to that question. The first is easy, as mentioned in the last issue of *New Zealand Classic Car* (No. 404). It was a great way to use up all the surplus Mustang parts acquired while converting brand-new Mustangs into Shelbys. The unused new Mustang parts would be great in any kit car, but the 427SC Patrick was standing in front of could not be classified as one. This is not a kit car. The reality is that it is a high-quality, factory-made production car.

Possibly the second answer is because the CEO of Matamata Panelworks, Malcolm Sankey, wanted to build a replica of the car that is a distant relation to the Shelby Mustangs scattered around his showroom floor, a car created long before the first Mustang was even thought of, and the brainchild of Carroll Shelby back in the early '60s.

Also in this issue:

Ayrburn 2026 report, Bert Govan's Jaguar, Part 2; 1964 Chevrolet Corvette Stingray; C2; rotaries in New Zealand; 60 years of controversy, Part 1 – Ford v. Ferrari at Le Mans; Nissan Skyline; Hispano Suiza; Mercedes-Benz AMG GT 63 Coupe; Acorn kit car; Ford Mustang; classic racing reports; book reviews; classic car news; and so, so much more …



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MODEL KITS OF THE BRITTEN V1000

Legendary motorcycle builder John Britten envisioned a 'Baby Britten' model as a bike for fans who couldn't afford a real racer. Now, there's a new and even more detailed model of the V1000, and it's in very high demand

By Ritchie Wilson | Photographs: Ritchie Wilson



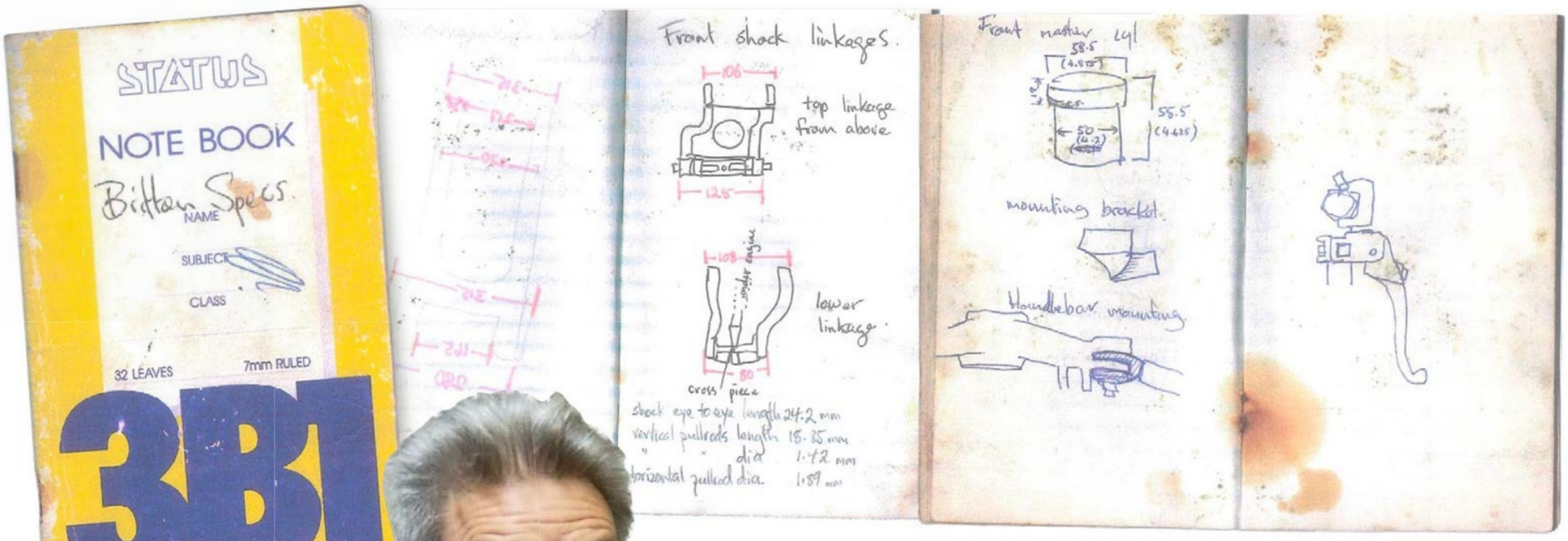
Quarter-scale Pocher model of the Ducati Panigale Superbike

For two years after he returned from a year in London and before he started living at the historic Mona Vale stables, highly esteemed New Zealand racing motorcycle designer John Britten shared a flat in Merivale with mechanic Allan Wylie.

They had become friends because they were both restoring Triumph Tiger 100 motorcycles and had decided to work on the bikes together, John refurbishing the frames while Allan did the two motors. When they flatted together, John was supporting himself by making, in his bedroom, table lamps with cast brass bases, chromed tube supports, and Tiffany-style glass shades.

In subsequent years, John established the Britten Motorcycle Company (BMC) as a successful competitor in international motorcycle racing, with its innovative Britten V1000 racer. The BMC also produced a limited number of V1000s, which were sold to customers around the world.

The two men remained friends for the remainder of John's life. Allan drove John's 1926 International camper van in his funeral procession (which brought central Christchurch to





“John wanted fans who couldn’t afford to buy a real racer to be able to ‘own a piece of the legend’”

Craig Roberts with one of the first Britten V1000 model kits to arrive from Italy



Cover of the 25-page instruction booklet for the latest Britten V1000 model kit





Contents of the new V1000 kit

a standstill) after John died in 1995.

The Baby Britten

Allan's brother Jim worked as an architectural model-maker in Christchurch and met John through Allan.

Jim had made many motorcycle models from kits and had an ambition to create his own kit, so he was receptive to John Britten's suggestion that he design a model V1000 – 'The Baby Britten' – for the BMC, which they would sell as a kit. John wanted fans who couldn't afford to buy a real racer to be able to "own a piece of the legend".

It was decided that a model kit in 1/12th scale, made of spin-cast pewter, would be produced. Jim spent 2000 hours making the masters from solid brass. He worked with jeweller's saws, small files, rotary burrs, and home-made scrapers and chisels, incorporating an amazing amount of detail. Jim had taken photographs of a bike and its parts being worked on at the BMC's Carlyle Street workshop – the one which is now on permanent display at Te Papa.

He took many measurements of the full-size bike and, dividing by 12, came up with accurate dimensions for the model parts. His notebook of measurements – labelled "Britten Specs" – is on display at the Britten Museum (see *The Shed* Issue No. 126, April/May 2026), as are the rather beautiful original master parts of the model kit. These parts were found by chance in an



Above: Numbered boxes of the BI Britten V1000 kits

Right: Box lid of the new, highly detailed Britten V1000 model kit

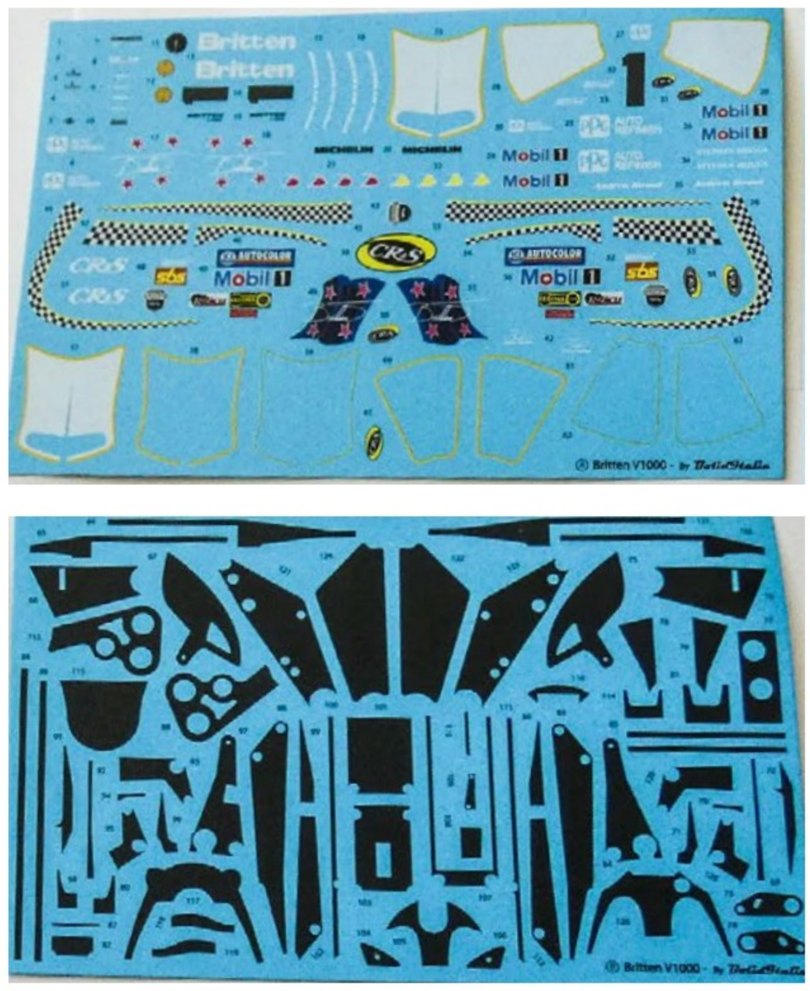


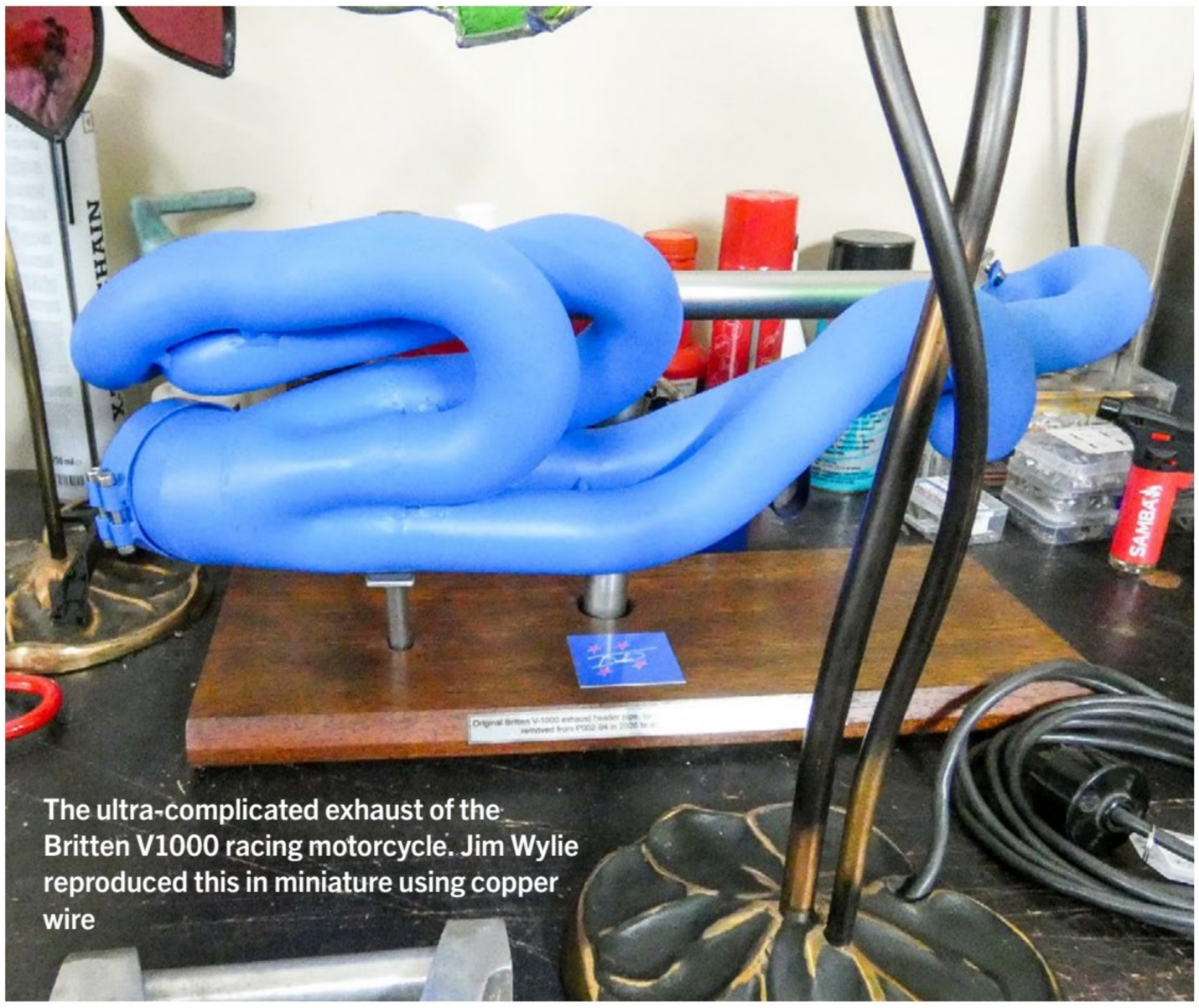
Left: Illustrated parts list from the Britten V1000 model kit instruction booklet

Below: Decal sheets from the new V1000 model kit



The different bags of parts in the new V1000 kit





The ultra-complicated exhaust of the Britten V1000 racing motorcycle. Jim Wylie reproduced this in miniature using copper wire

> “These parts were then used as masters to make silicone rubber moulds”

old paint tin in a basement storeroom of an earthquake-damaged building.

Making the moulds

These parts were then used as masters to make silicone rubber moulds, which were then spun while molten pewter was poured into them.

The solidified pewter parts were then extracted, and the moulds reused. The pewter parts were cleaned up, and some were silver-soldered together. They were assembled into kits in cavities of a polystyrene foam tray and placed in cardboard boxes. Jim painted the original picture of the Britten V1000 on the box’s lid, as there was no suitable photograph.

This whole creation process was very time-consuming. An example of this is the complicated exhaust, which was reproduced in 1/12th scale using copper wire of the appropriate diameter, carefully bent and silver-soldered together. Jim estimated that he had spent almost as much time on the model exhaust as the 70 hours the BMC spent making a real one.

About 2000 of these kits made by Jim Wylie are thought to have been produced, although some were lost in the Christchurch earthquakes.



Silicone rubber moulds for spin-casting pewter V1000 model parts

To placate impatient customers, who sometimes had to wait years for their bikes to be delivered, John would send them a model mounted on a wooden plinth that Jim had put together and painted.

BMC merchandising

For the last few years, Craig Roberts, a longtime friend of John Britten, has been managing the merchandising operation of the BMC. This involves the commissioning of new T-shirt designs, caps, posters, model kits, and so on, which are sold on the BMC website.

Craig worked at Honda motorcycle dealers Casbolts Motorcycles in Christchurch from 1981 to 2019, the last 14 years as manager. He is super keen on motorcycles and was instrumental in Casbolts adding Ducati to its brands. Craig is also very keen on motorcycle models. He has a quarter-scale model of a Ducati 1299cc Panigale Superbike by Pocher, a long-established Italian model kit company, which he has assembled. This is a pre-painted die-cast metal kit, first offered in 2015.

He also has an American set of custom-made minute bolts for the model, which comes with a DVD showing how to swap the original fasteners for the more authentic-looking ones from the kit. It comes with drill bits and taps to change the threads on some of the model's parts to fit the new fasteners. This type of accessory collection for a model is called a 'detail-up kit'.

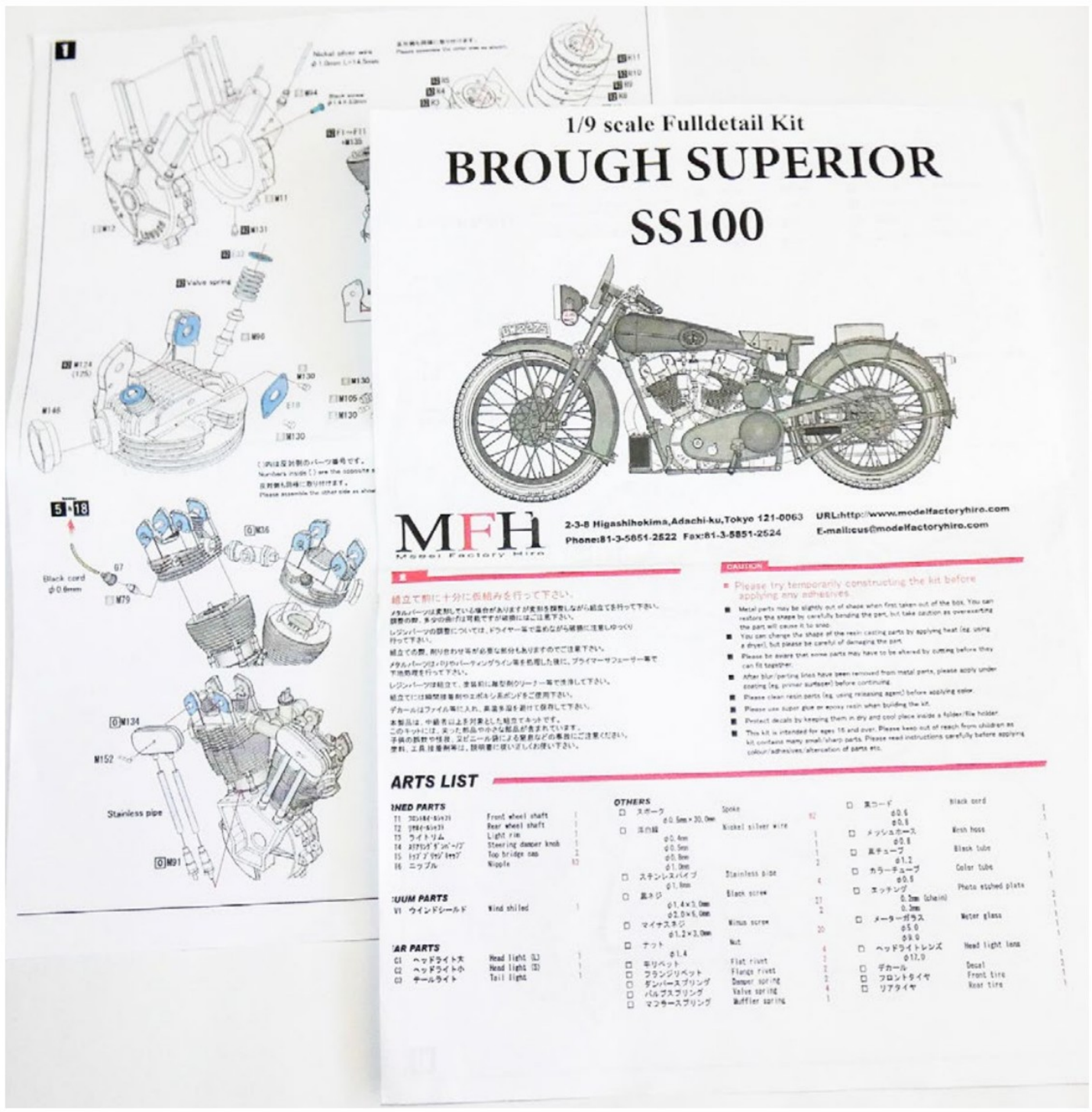
Next-level models

As a Covid-lockdown project, Craig started to assemble a ninth-scale white-metal kit of a Brough Superior SS100 motorcycle, the "Rolls-Royce of motorcycles", made by the highly respected Tokyo-based Model Factory Hiro (MFH).

This type of kit requires substantial work by the assembler. For instance, the primary and secondary chains have to be assembled on the provided jig, and the pins joining the chain links must be individually peened to hold them in place. Amazingly, the laboriously fashioned primary chain is then hidden inside the chain case and cannot be seen. Craig said that most of the parts



MFH Brough Superior model kit



Instruction sheets for the MFH Brough Superior model



Assembled and painted model of the Britten V1000 from the 1990s



The parts to make Jim Wylie's 1/12th-scale model of the Britten V1000

"It is a kit for experienced modellers with lots of spare time"

required “filling, filling, and fettling”.

The spoked wheels have to be laced together – just like real wire wheels – and a jig is provided for that as well. The cylinders and heads of the JAP V-twin engine are individual parts that must be joined together. It is a kit for experienced modellers with lots of spare time. Incidentally, MFH is best known for its models of racing cars.

A model made of MDF turns up

Craig was very excited when he came across a New Zealand–made model of the Britten V1000 racing bike made of laser-cut MDF sheet.

He approached the manufacturer, who agreed that BMC should become the exclusive seller of the model. Craig suggested some tweaks to improve the design’s accuracy and detail, which the maker was happy to incorporate.

For the last six years, Craig has been working towards getting a new, very high-quality 1/12th-scale model of the Britten V1000 made by the Italian company Bolid Italia (BI).

There had been many enquiries on the BMC website about buying a Baby Britten. A waitlist of prospective buyers was established, which eventually numbered well over 100. At the time, Craig happened to have the second Britten V1000 motorbike built, which belonged to Kevin Grant, in his garage, so he was able to take high-resolution photographs of the bike and send them to BI.

The Italians would create 3D images from the photographs and send them to Craig, who would suggest, for example, that a body line was too sharp and should be softened. BI would then send back a modified image.

There was a protracted back-and-forth for many months to perfect the design. Because the Britten V1000s were hand-made, no two bikes are identical, so the model is of Kevin’s bike rather than the one Jim Wylie based his model on. Sixty kits were produced by BI and sent to New Zealand, where they arrived at the very end of 2025. These have all been sold to people on the waitlist, to which prospective customers continue to add their names. A second order has now been placed with BI. ▶



Salvaged masters of the original Britten V1000 kit, now on display at the Britten Museum in Christchurch



One-twelfth-scale model of a Britten V1000 in laser-cut MDF

Skilled model-makers

Craig put together each kit, containing the various bags of components.

He would set up the cardboard container, add each of the bags, the assembly-instructions booklet, the decal sheets, and a piece of bubble wrap and send the package off.

Currently, sending items to the US is not as easy as it used to be, with American customers having to personally pay a 10 per cent tariff when they collect a package from their local post office. Europeans on the waitlist – of which there are quite a few – could perhaps get their kits sent from Italy to cut down on postage costs, which can be outrageous to that part of the world.

The new V1000 kit contains over 200 parts made of photo-etched metal sheet, 3D-printed resin, moulded plastic, metal tubing, and rubber. Craig says that the kit is suitable for "skilled model-makers".

There is a choice of finish – either the classic pink and blue of the factory racers or the yellow and black of Roberto Crepaldi's Café Racers & Superbikes company. Roberto was an early buyer of a V1000 and a great friend of John Britten's. He was quoted in a motorcycle magazine as saying that in his life he had known two great men – Enzo Ferrari and John Britten.



Laverda 750 SF model kit box and instruction sheet

Want to buy a kit?

Great-detail model kits take time to produce, so it will be a while before BI makes enough V1000 model kits to satisfy everyone on the waitlist.

If you want to purchase a 1/12th-scale meticulous re-creation of John Britten's two-wheeled masterpiece, you will have to get your name on the waitlist by sending a message to info@britten.co.nz. You will be offered the opportunity to buy one of the kits when your turn comes.

Hopefully, after not too long a wait.

INJECTION-MOULDED MODELS

Most plastic model kits are made by injecting molten plastic into metal moulds. These moulds are very expensive to make and limited in the amount of detail they can show, but they do allow large-scale production of model kits. One of the best-known producers of injection-moulded plastic models was the British firm of Airfix, which, in the early 1970s, was reportedly selling two million kits a year, mainly of aircraft.

Competition from Asian companies, a rapid increase in the value of the British pound, and losses from its Meccano subsidiary all affected Airfix's profitability. Another headwind the company faced was the very significant increase in the cost of the polystyrene plastic used to make the models. Polystyrene is made from petroleum, which had nearly tripled in price after the members of OPEC restricted supply following the Yom Kippur War, between Israel and its Arab neighbours, in 1973.

Airfix went broke in 1981 and has had a series of owners since. It is now owned by Hornby Hobbies. Hornby was one of Meccano's brands and was named after its inventor, Frank Hornby (1863–1936).







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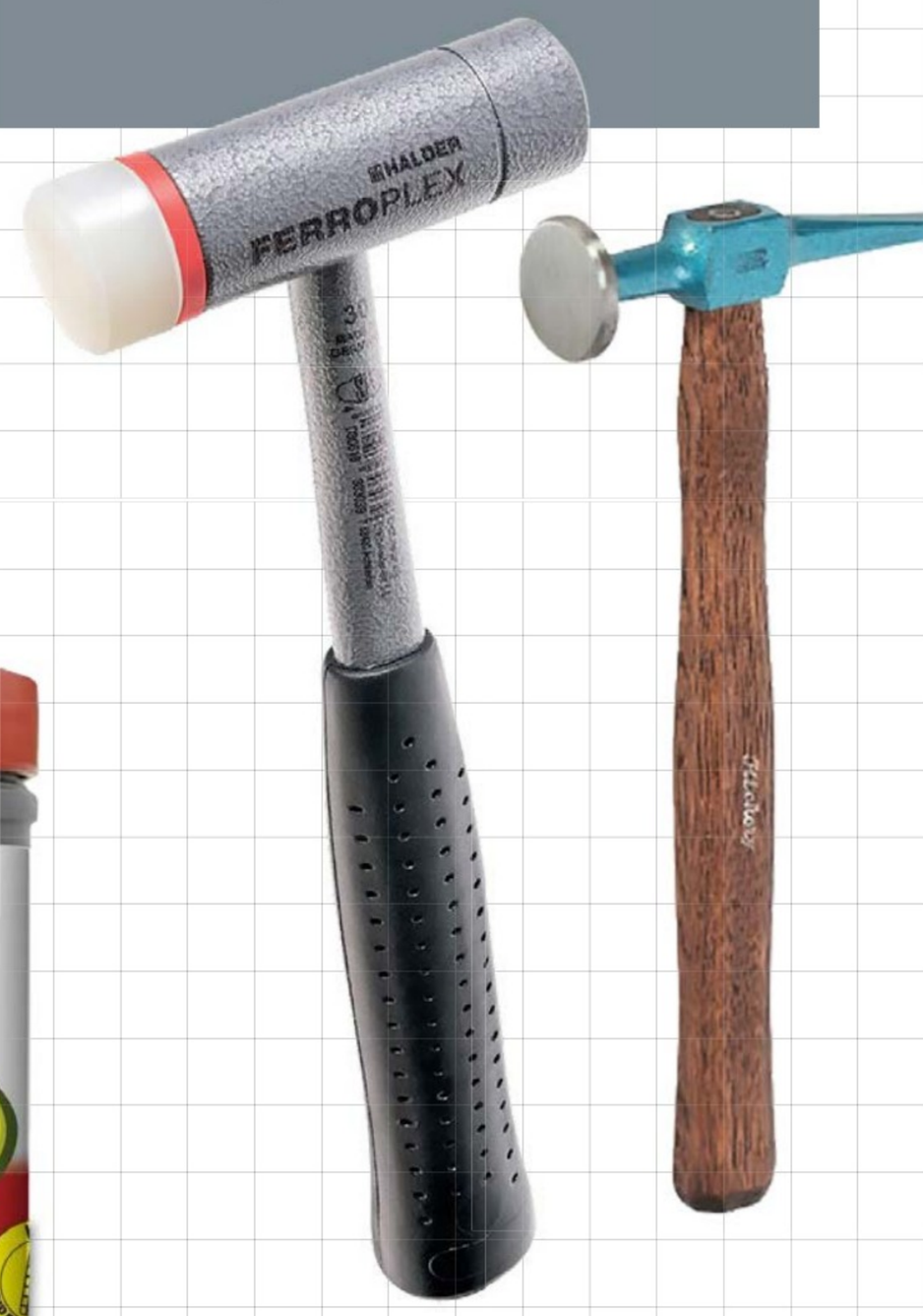
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Eddie Hegan, radio star

RESTORING A VINTAGE VALVE RADIO

Part 1

By Chris Hegan | Photographs: Chris Hegan

Accepting the challenge to learn all he can about valve radios, Chris takes a crack at restoring a classic, dead Philco Nevada 401. How hard can it be?

I travelled to Pukekohe on a two-fold mission for *The Shed* to meet radio restorer Peter Walsham (Issue No. 126) and write a story about restoring a vintage radio for readers who might want to give it a try.

I know absolutely nothing about how any sort of radio works, much less a valve radio, so I decided I was the perfect guinea pig to give it a go. I needed little encouragement, not only for the challenge, but because the warm sound of a valve radio had been a big feature of my childhood in the ’50s.

Insanely original, *The Goon Show* was the highlight of the week at 8pm every Sunday. The same day, at 6am, we had risen early to listen to the 1ZB children’s show. My father had been a radio star in Christchurch before the war, and he still wrote and performed in some of those Sunday morning shows.

What is in the case?

While I find, bid on, and wait for the online auction for a dead Philco Nevada 401 radio to reach its conclusion, I immerse myself in radio theory. Repairing and polishing the box is the only part of vintage radio restoration requiring any manual skill (although soldering in tight spots is an art in itself). Understanding the intricacies of what happens to the signal is the hard part, and for an electronic ignoramus like me, it takes a significant mental stretch.

The learning curve takes off

While I wait for my Philco 401 to arrive, I dive into the schematic diagram I am able to download from the NZ Vintage Radio Project website, Steve Dunford’s online treasure trove.

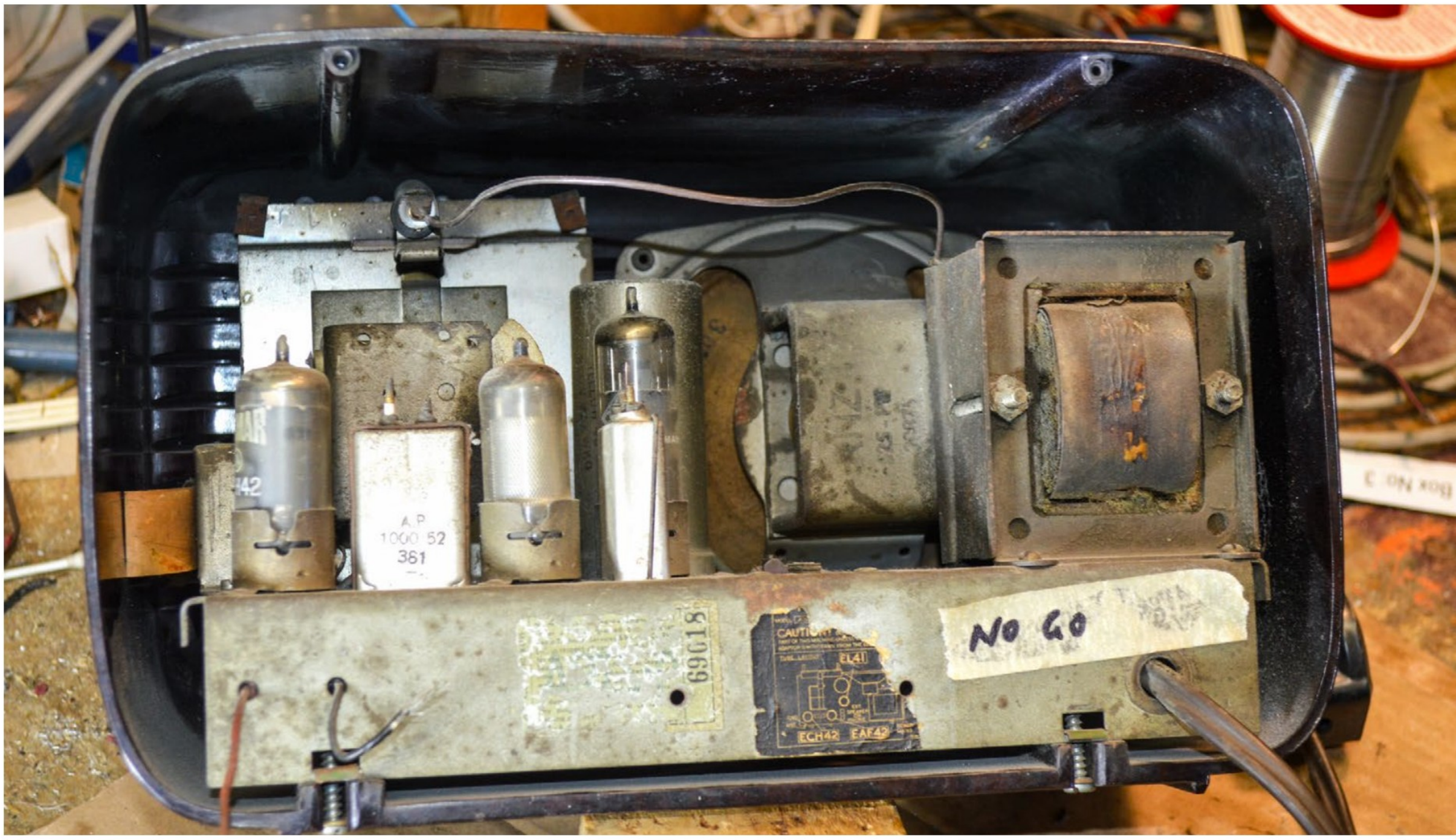
At first, it is all Greek to me, but I have a stroke of luck. A web search turns up a 1952 US Army manual entitled *C-W and A-M Radio Transmitters and Receivers*. The US military is famously good at producing comprehensive manuals for technical recruits, taking them from the barest outlines to deep levels of expertise in plain English, and I will return to this document again and again.

It contains far more than is necessary to understand an AM valve radio, but

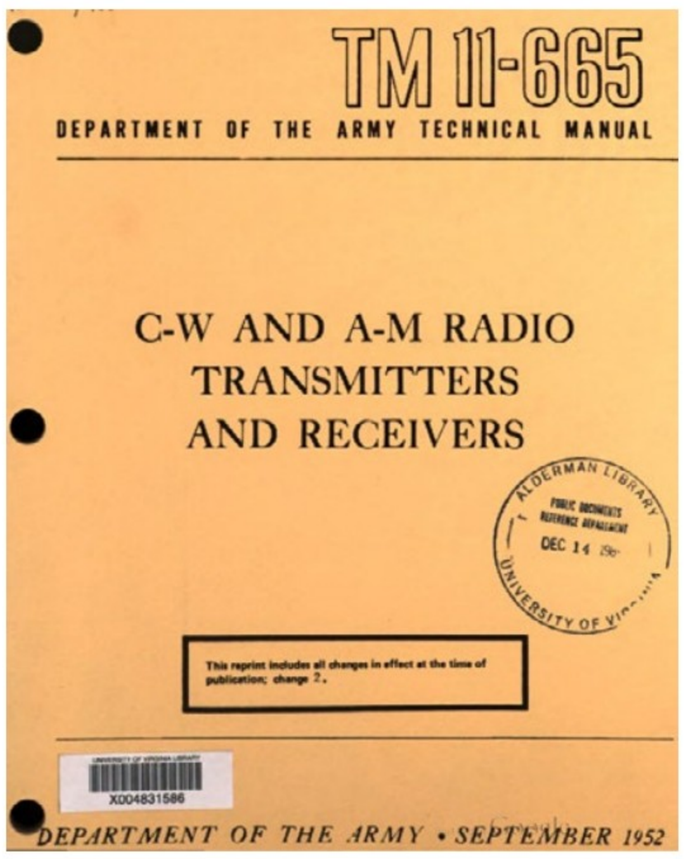
The master at work



The challenge



What will we find in there?



Manual for C-W and A-M radio



Filter block printed contents

the relevant chapters are thorough and clear. I am gratified to discover that I understand it (mostly). The only skill needed to comprehend these basics is a grasp of simple algebra, which I discover I still have. I soon come across an odd term, the 'B+ rail', referring to the main power supply. The radio boom of the 1920s took off well before the universal adoption of reticulated electricity, and early radios ran on batteries of different voltages, requiring two and sometimes three batteries. 'A+' had a low voltage, which heated the valves and the 'B+' had a higher voltage, which powered the working parts.

Sometimes, a 'C+' supplied a control current to the plate of the valves. Now all power comes from a single transformer, but radio techs still call the main power circuit the 'B+ rail'.

Get the picture?

The part of the schematic in blue is the power system.

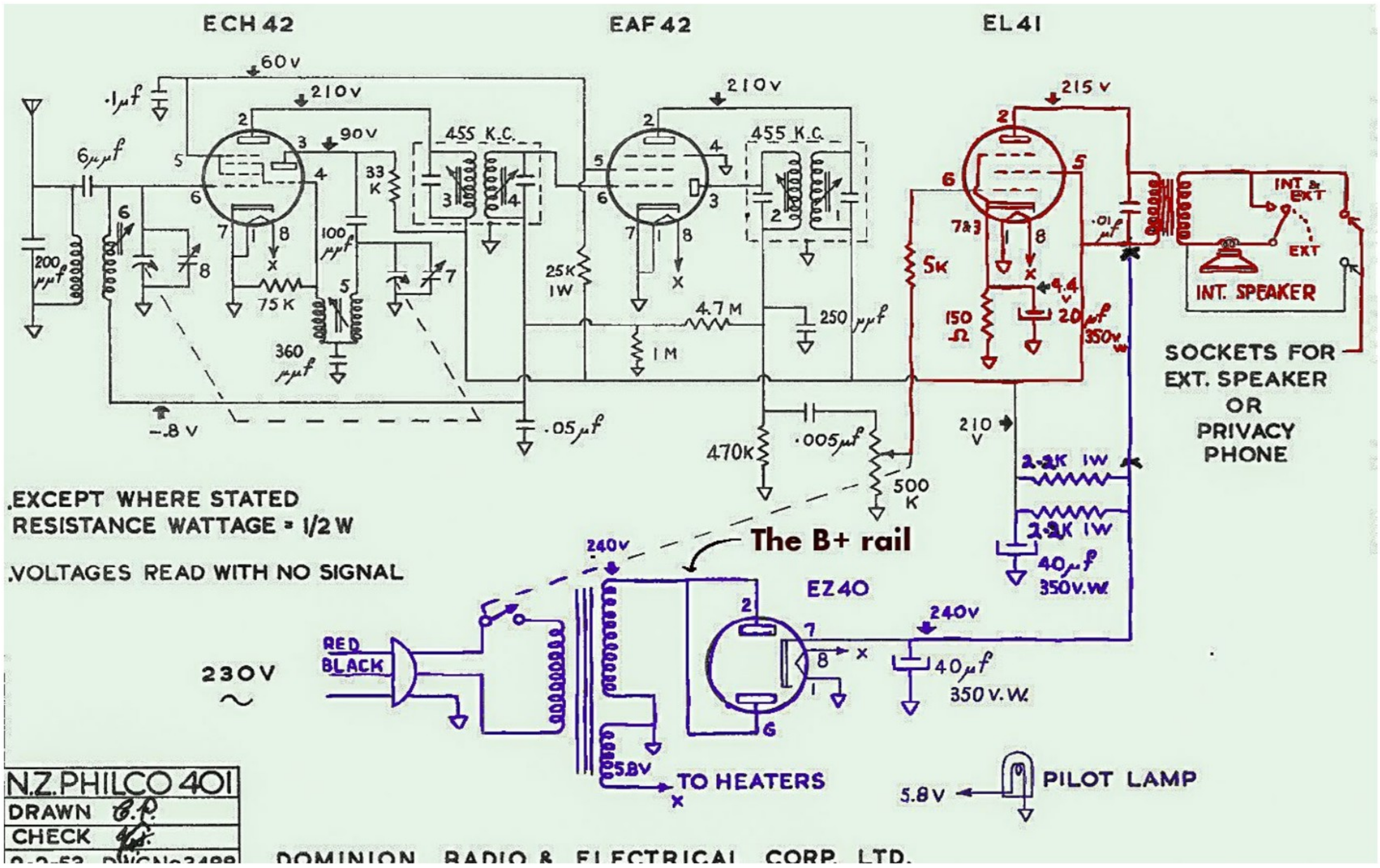
The three coils represent a transformer with two windings, putting out 240V for the working parts of the radio and 5.8V to run the heating units in the valves and the light over the dial. The 240V is passed to an EZ40 valve, which rectifies the alternating current (AC) to direct current (DC). This comes out with a 'ripple', an artefact of the AC, which is suppressed by two 40 microfarad (μf) capacitors and a 20μf one – all located early in the circuit on the diagram. Known collectively as the 'filter block', they are physically housed together in an aluminium cylinder, which grounds them to the chassis.

The part in red is the audio system. The intermediate frequency (IF) carrying the signal has been stripped out by the detector diode, shown as the little rectangle on pin 3 in the EAF42 valve, leaving the pure audio signal to be amplified by EL41 and passed through the transformer and fed into the speaker.

The foundation of all consumer radios

The rest of the system in black is too complex to describe in detail here, but it carries out the function which is the foundation of all consumer radios, based on the superheterodyne principle devised by the same EH Armstrong who achieved FM broadcasting.

The ideal frequency range for AM broadcasting, around 550kHz to



Philco Nevada 401 schematic

1500kHz, is too technically complex and expensive to handle with valve radios.

Armstrong came up with the idea of converting the received frequency to a lower, standardised ‘intermediate frequency’ (IF), almost always 455Khz for AM radios and 10.7Mhz for FM. It does this by adding a frequency generated by a variable local oscillator, tuned so that the difference between the two frequencies is always 455Khz.

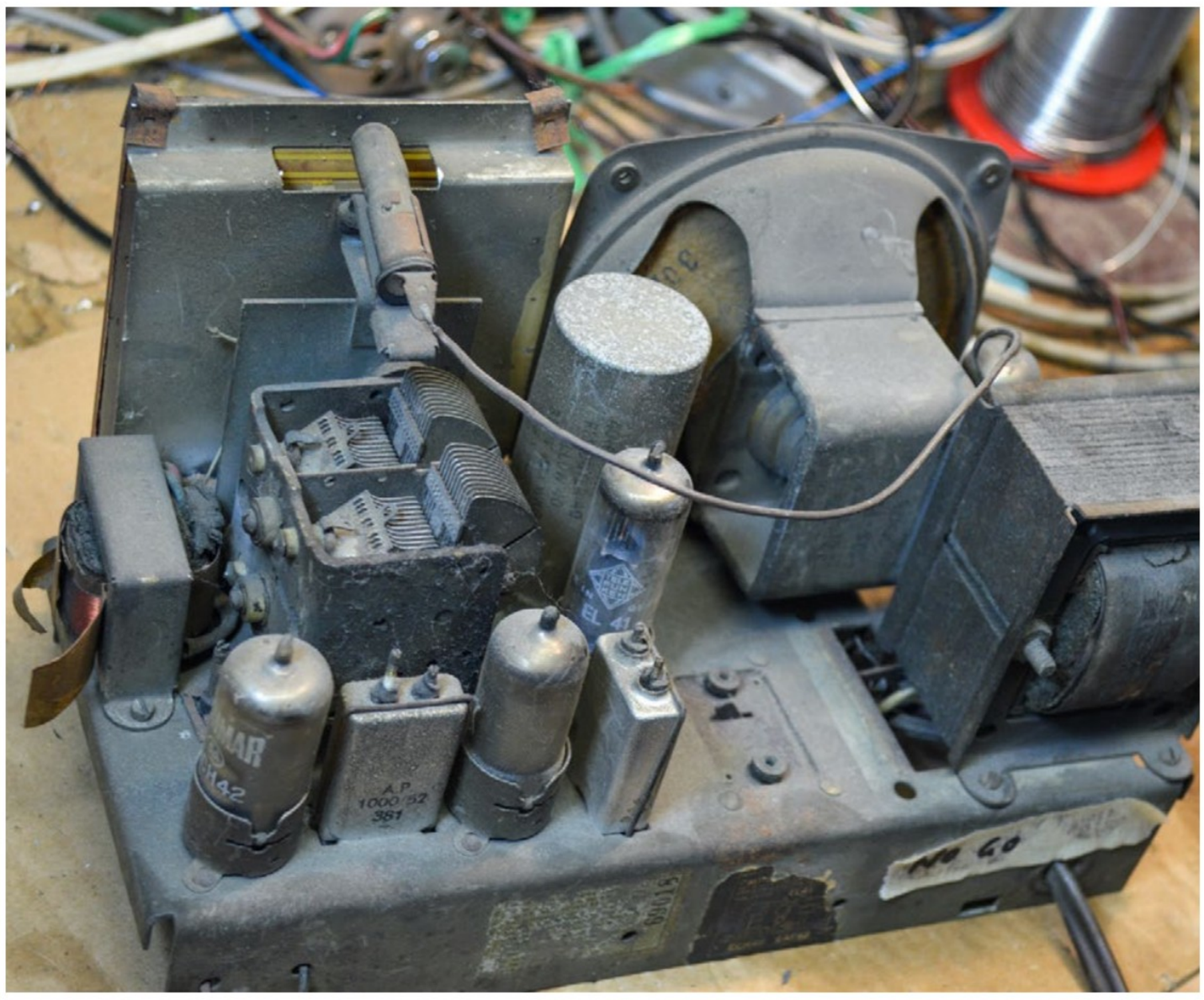
This IF, its amplitude still modified by the audio signal, is created, refined, and handed on to the audio system by the equipment represented in the schematic in black.

Visual inspection

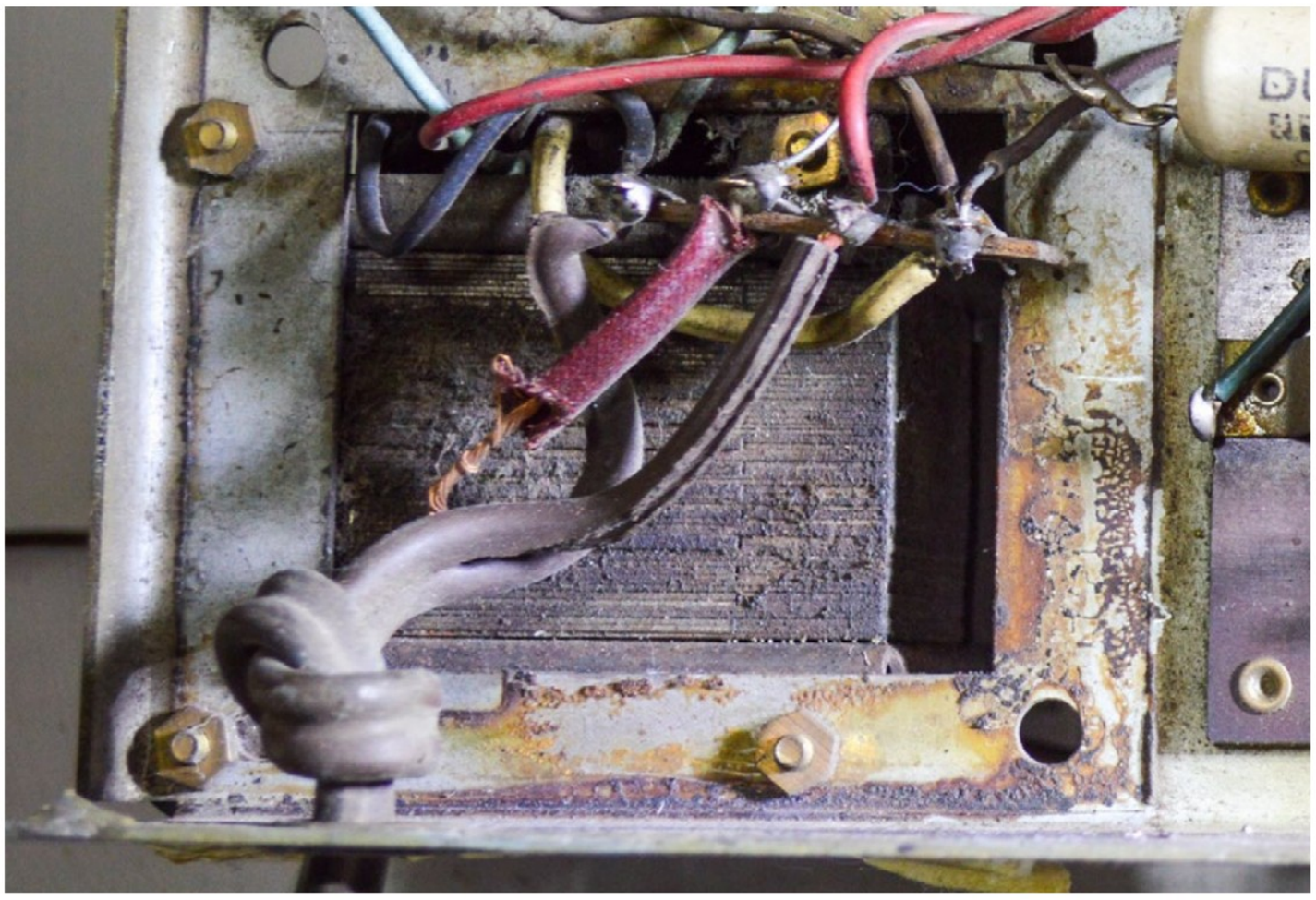
I am not about to touch the inside of a live radio without Peter’s guidance, so I sling the Philco into my backpack, power up my Harley, and head to Pukekohe. With the set on the bench, we first inspect the power cable; perhaps not surprisingly, it comes up wanting. The insulation is heavy-duty PVC, so no problems there, but it is secured by a knot tied in the end under the chassis, allowing the cable to rotate freely, which will eventually cause trouble.

I will fix this by cable-tying it tightly

> “The only skill needed to comprehend these basics is a grasp of simple algebra, which I discover I still have”



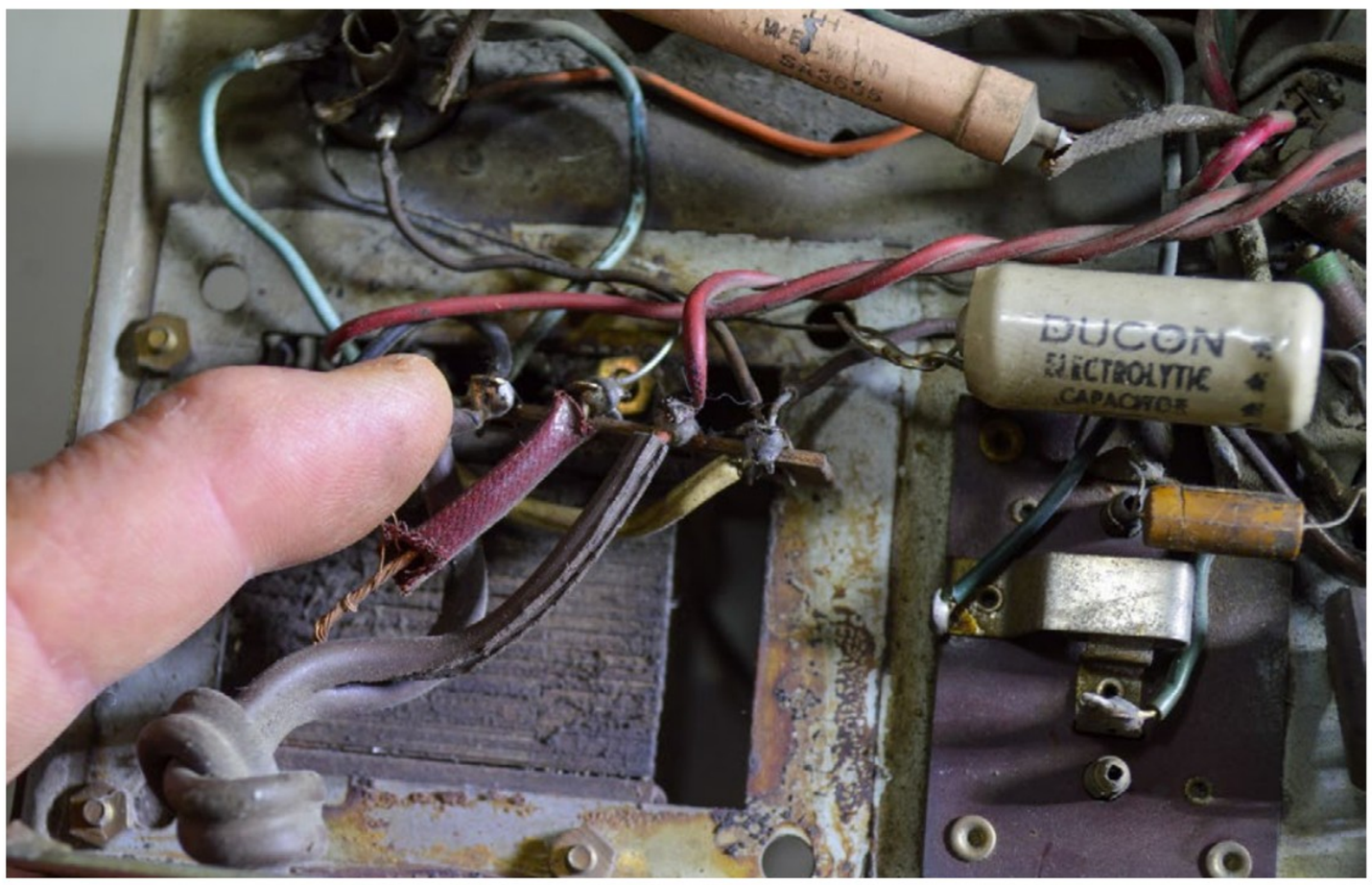
Seems simple enough



Asking for trouble



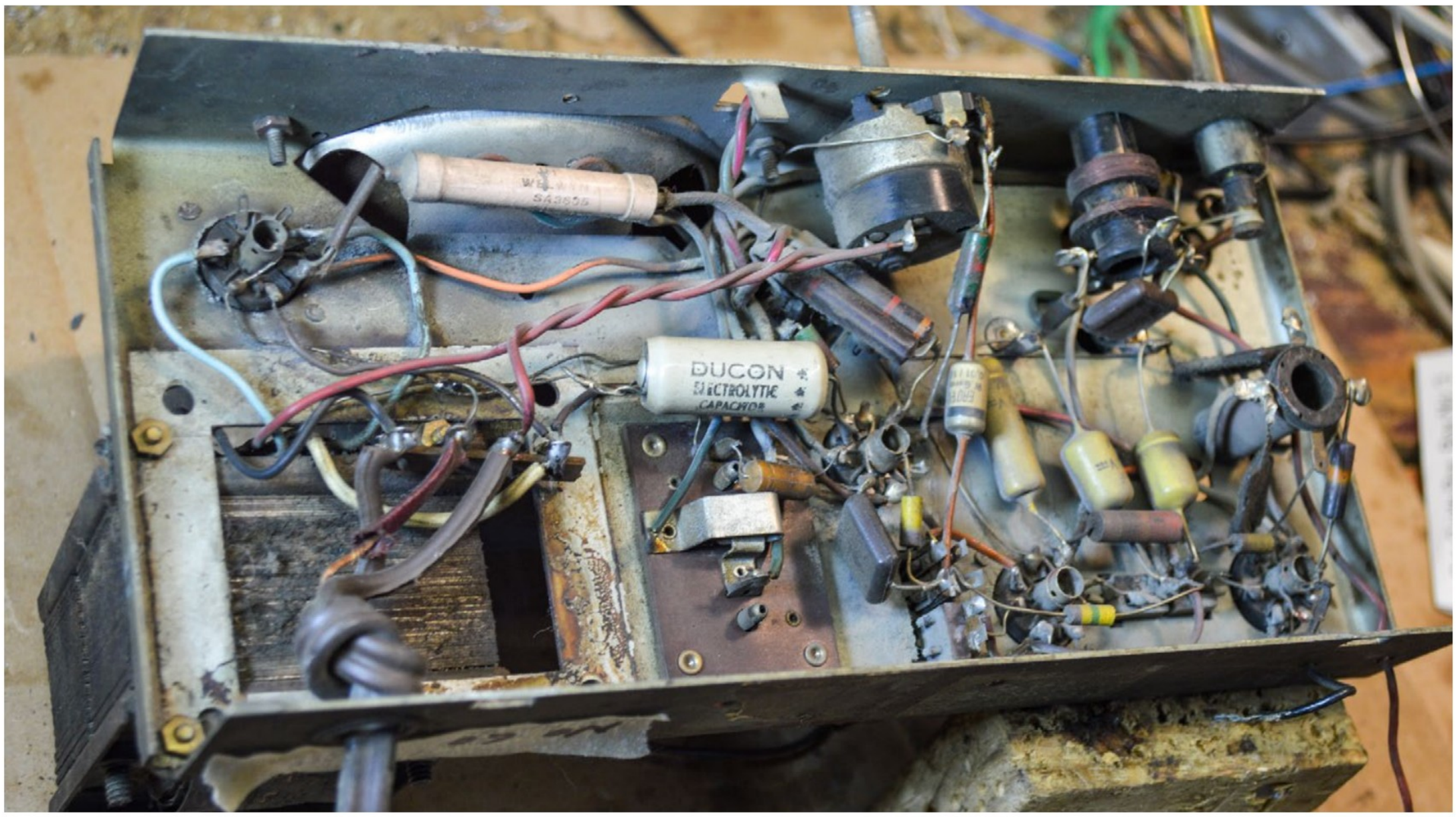
One strand can kill



Failing the finger and cable tests

to the side of the chassis. Inspect cables closely – many old power cords have an inner insulation of asbestos, cotton, or some other material that can decompose without anything being visible from the outside. Test it with a meter or dim bulb tester for zero resistance, confirming continuity. If in any doubt, replace it.

Check the plug. Sometimes, one fine strand of a multi-strand cable can poke out between the front and back of the plug – very dangerous. And there is always the possibility that the plug has been incorrectly wired.



Signs of repair

> “There is always the possibility that the plug has been incorrectly wired”

What is underneath?

Turning my Philco upside down turns out to be revealing.

First, several components are newer than the radio, telling us that the radio has been repaired at some stage. Not only do we see resistors and capacitors from the ’70s or ’80s, but the transformer has been replaced in a manner that is dangerous. As the components in this small shelf set are tightly packed, cooling requirements rule out a protective back cover, so the finger rule applies: no live parts should be able to be touched by a finger.

The Philco fails this test badly. The terminals of the transformer are exposed and easily touched. There is room for a finger to fit beside the chassis and reach in to touch other live terminals. Peter suggests that I rotate the transformer onto its side, putting the terminals under the chassis and out of reach. To do this, it appears that I may need to replace the speaker, whose back juts out to almost touch the transformer, but it may be possible to turn the speaker on its side to fix this. Time will tell.

Dim bulb tester

Before we put power into the radio, we need to make sure we don’t damage it. If there is a short circuit in the transformer, a common fault, it will heat up very quickly and cause havoc.

Some technicians use a machine called a ‘variac’, which feeds a slowly increasing voltage to the machine ▶



Only four pins shows its era. Later valves had eight or even nine

THERMIONIC VALVES

If you think a radio valve looks a bit like a light bulb, that’s because that’s where they originated.

The early bulbs used to steadily darken as carbon was deposited on the inside surface, and scientists realised that this happened because, in the electric current, the negative plate emitted a flow of electrons towards the positive, depositing a layer of carbon atoms from the filament.

A result of that one-way flow was that AC could be turned into DC, and the first thermionic valves were rectifiers. It was soon discovered that by placing another plate, called a ‘grid’, between the cathode (negative charge) and anode (positive charge), the flow of electrons could be controlled and the signal amplified.

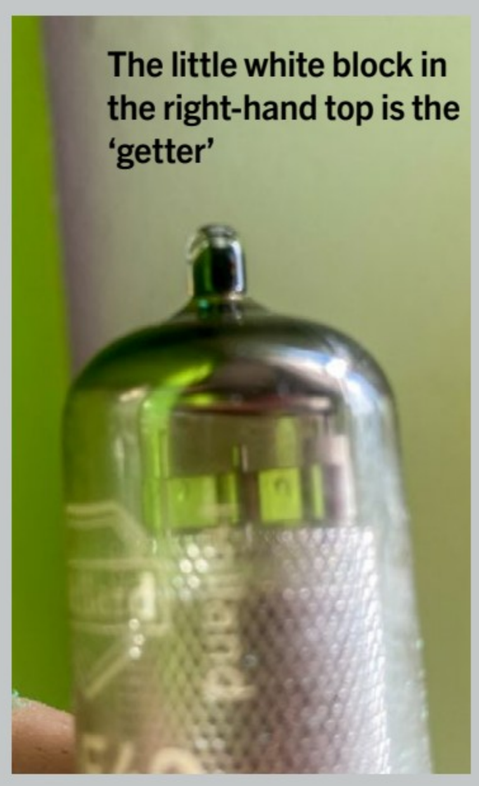
In the first decades of the 20th century, many experiments with more and more grids and various other components resulted in an ever greater range of uses for various types of vacuum valves. As they expanded their functions, they also grew smaller as manufacturing techniques improved.

Even in my four-valve Philco, we see some of the roles a thermionic valve can accomplish. One turns AC into DC. Two amplify a weak electromagnetic signal and finally remove the carrier frequency to hand the pure audio information on to the valve that amplifies it.

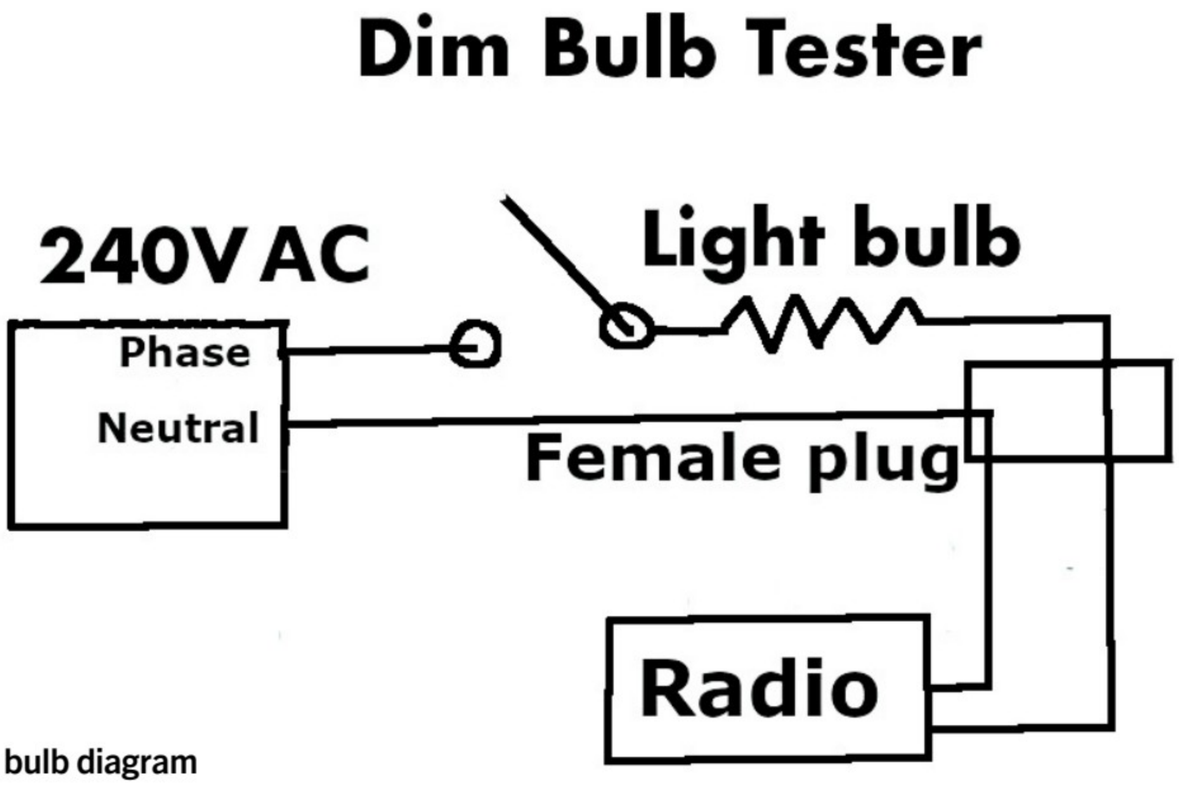
By the way, the coloured film on the inside of many valves is not the same as the carbon on early lightbulbs and has nothing to do with the valve wearing out. It results during manufacture when the last of the oxygen is removed from the inside by combustion of a ring or patch of a sacrificial material, usually barium, called a ‘getter’.



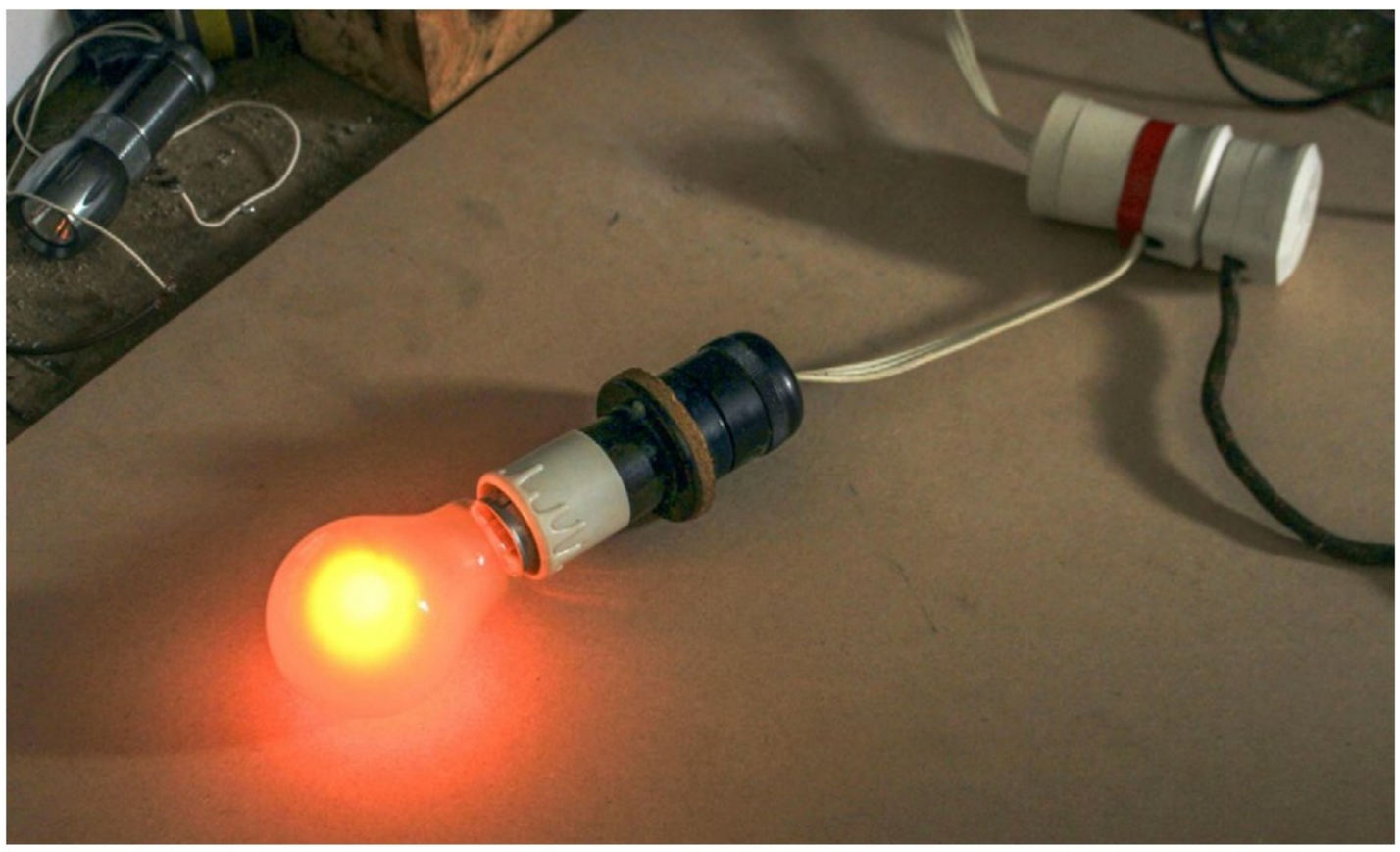
The same valve as it evolved over the years



The little white block in the right-hand top is the ‘getter’



Dim bulb diagram



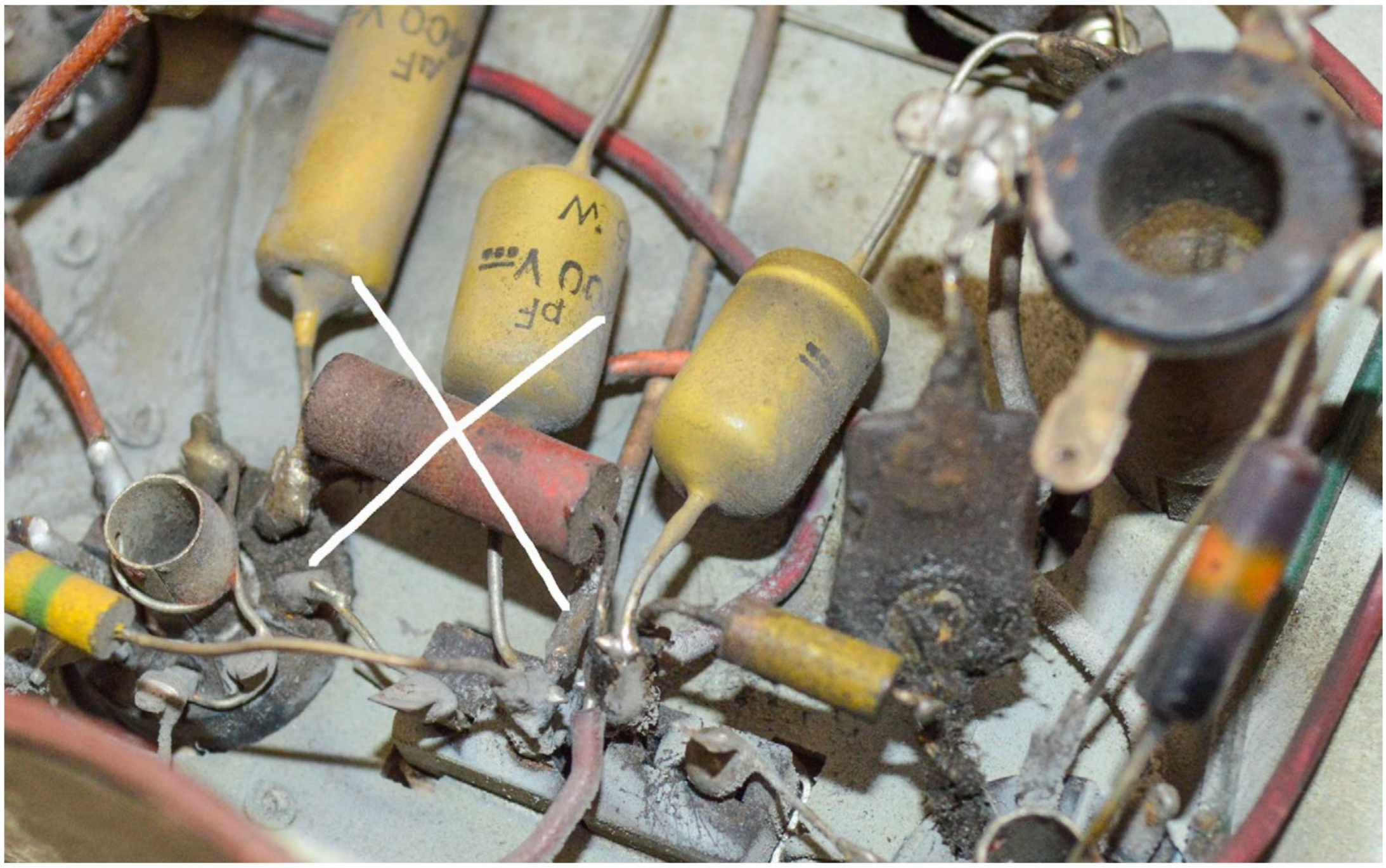
Dim bulb tester in action

while a monitoring meter is connected to the terminals. Variacs are expensive but not necessary; Peter has been repairing radios and TVs for half a century and has never owned one. As a first step, you can set your meter to its ohms range and, before powering up, test resistance across the terminals of the transformer, which should be zero or close to it.

But a better method is to use an alternative to the variac, known as a 'dim bulb tester', which you can make yourself. Essentially, you put a high-load resistor into the circuit between the power source and the radio, and the best resistor for this purpose is a high-wattage incandescent bulb (not an LED) – 200W is ideal, but it should at least well exceed the current rating of the radio.

If there is a short in the transformer, the power will be consumed by the bulb, which will glow at a strength corresponding to the seriousness of the short. Using one is incidentally a good visual lesson in how resistance works.

The tester consists of two plugs and a light bulb. The positive terminal of the first plug is connected through the light



Dead resistor

bulb to the positive pole of the second plug, into which you plug the radio. There are any number of short videos on YouTube on how to make one, or just follow the circuit diagram.

Progress

My transformer tests fine, but the radio does not work.

No static, nothing. Old-style capacitors had a limited life, and the first step that vintage radio restorers take is to replace them. Often, this will make the radio at least work, although other faults or failed components can affect the strength and clarity of the output. But some of the capacitors in the Philco, while not exactly new, are of a more modern type, so Peter tests them, stepping through the power circuit with meter probes, and finds a small resistor that has died.

He temporarily patches in a replacement, and we immediately have a working radio. But it is not very loud, and checking along the B+ rail, he finds that the voltage never goes above 150V. The diagram shows a minimum of 200V. This will be work for another time, although one of my jobs is to replace the electrolytic capacitors in the large aluminium can, which may well be the culprit. Another capacitor is showing suspicious corrosion signs – that will have to go.

Going it alone?

I have work to do and a shopping list, starting with an analogue meter, a few capacitors, and a resistor.

But I also learned something when Peter went swiftly through his checks. He kept up a commentary on what he was doing and why, which I more or less followed – no mean achievement for someone who had recently known nothing about radios. But it was enough to answer a question which the editor and I have been asking: Is it realistic for a rank amateur to undertake the restoration of a vintage radio? The answer is: not without help or, possibly, a long period of prior study.

Mains electricity is simply too dangerous, and many parts of a radio ▶



AM radio still best down on the farm

AM OR FM?

Until the early ’80s, all domestic radio broadcasts in New Zealand were on the AM band, standing for ‘amplitude modulation’.

From the early days of radio, this was believed to be the only viable method of broadcasting until radio genius EH Armstrong proved that frequency modulation (FM) was not only possible but produced a better sound. But AM signals travel up and down hills and bounce off the ionosphere, while FM is line-of-sight like the cellphone. This is why National Radio, at least, should and probably will always maintain an AM broadcast for rural listeners.

By the time FM broadcasting reached New Zealand in the early ’80s, transistors had replaced valves, so any old valve radio you find will be an AM set.

How does AM work? A signal of, for instance, 1300kHz sends an impulse 1,300,000 times per second as an electromagnetic wave, a ‘carrier wave’ of a certain fixed height, called its ‘amplitude’.

When a signal, such as noise, is fed into that frequency, it causes its amplitude to change slightly; that is, the wave gets alternately stronger and weaker. That variation in the



EH Armstrong

wave exactly corresponds to the sound waves in the air generated by the original noise. This is also true of FM, only in that technology, it is the frequency rather than the amplitude of the carrier wave which is being modulated. So what we hear on such broadcasts is the real, original sound, rather than one digitally analysed, turned into ones and zeros, then reconstituted at the receiving end. The valves in a vintage set also generate faint harmonics, and it is the combination of these two factors that makes the sound of an AM broadcast on a valve radio sound somehow more real than a digital stream on a computer.

and its circuitry are too easily damaged for this to be undertaken by a beginner alone, even with the abundance of downloadable printed material and online videos. The physical work is doable, but it must be checked by someone who knows what they are about. Since the NZ Vintage Radio Society's primary aim is "to encourage the preservation of all types of early radio equipment and documentary material pertaining to the history of radio in New Zealand", joining up and, if possible, taking your dead radio to a monthly meeting is the obvious place to start.

Although half the membership is in Auckland, there are meetings in other centres. One of their activities is getting together to swap and sell parts, so that may be useful if something unusual or rare needs replacing. Surprisingly, valves are not usually a problem. They are not the kind of thing you blithely throw away, and even new ones of many types are available – at a cost. The rapid switch to transistors left manufacturers holding stock, which resellers in a number of countries snapped up.

Of course, in many cases, although not this one, there will be plenty of work to do on the cabinet, restoring veneer, finish-polishing, finding knobs and other parts, perhaps restoring the dial, all well within the amateur scope.

In the next chapter, I get down to brass tacks and glass valves. Peter has shown that the radio works, at least, but there is some way to go before I can park my Philco Nevada on the shelf and enjoy a day's cricket commentary.

In the next issue, No. 128, all will be revealed.

For valve radio help and advice, contact the Radio Saviour, Peter Walsham, peterwalsham@xtra.co.nz.

"Is it realistic for a rank amateur to undertake the restoration of a vintage radio?"

More resources:
vintageradio.co.nz



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LEARN HOW TO MAKE A DOVETAIL JOINT



By Edward Prince | Photographs: Edward Prince

Named for its resemblance to a dove's fanned tail, the dovetail joint is one of the oldest known woodworking techniques, dating to before written history. In this instalment of his woodworking tutorial series, Edward Prince explains how to master the various types of dovetail joints

In the world of woodworking, few techniques are as iconic or revered as the dovetail joint.

You can buy clip-together drawer boxes fitted with full-extension soft-closing runners – so what's the point of learning how to hand cut dovetail joints in the centuries' old tradition of fine craftsmen? Known for its strength, durability, and elegant simplicity, this interlocking method of joining two pieces of wood has been considered the pinnacle of a cabinetmaker's skill for years, a hallmark of fine craftsmanship.

One of the oldest known joinery techniques, the dovetail predates written history. It gets its name from its resemblance to the fanned tail of a dove. Evidence of its use dates to ancient Egypt, in furniture entombed from the First Dynasty, the tombs of ancient Chinese emperors, and on stone pillars in India, indicating its widespread use across civilisations for thousands of years.

The mystical dovetail

In medieval Europe, the dovetail began to be used and gained a mystical reputation. It was believed to possess a near-magical ability to lock in the spirit of the wood. Carpenters were far more attuned to the materials they worked with than they are today. They saw trees as living entities with souls or essences. When a tree was felled to make furniture, its spirit was believed to linger, restless and unbound, causing the wood to warp or split over time. The dovetail joint, with its precise, interlocking 'pins' and 'tails', was said to trap this spirit, binding it into the piece and ensuring its stability.

A well-made dovetail was a talisman of sorts; it could appease the wood and guarantee the work's longevity. This belief was so strong that some master woodworkers would refuse to teach the technique to apprentices until they'd proven their respect for the craft, rather than risk the release of the wood's spirit into the world, where it might wreak havoc in subtle, unpredictable ways.

Avoiding screws and nails

In early times, it was necessary to have an effective method of connecting wood that did not rely on handmade screws and nails, which were relatively



expensive and could rust and expand, sometimes cracking the wood they secured. Glues of the period sometimes weakened and were not moisture-proof. Craftsmen needed their products to resist wood movement caused by temperature, humidity, seasonal changes, and age.

The solution was the two broad groups of woodworking joints: the mortise-and-tenon and the dovetail.

Dovetails have great strength; they hold pieces of wood in perfect alignment over long periods of time.

The gold standard

In European cabinetmaking, the dovetail joint began to be widely used around 1650 and soon became a hallmark of quality craftsmanship, especially in drawer construction. Fine, hand-cut dovetails were the gold standard of good furniture craftsmanship until about 1870, when machines were developed to mass-produce furniture. Machined dovetails are more uniform and less intricate than hand-cut versions. Close inspection of mass-produced furniture reveals none of the irregularity or variation seen in the work of a skilled craftsman, but rather a precisely and identically manufactured, machined joint, each tail and pin being exactly matched.

The modern approach

Nowadays, there are many jigs and aids available for making dovetails with a hand router.

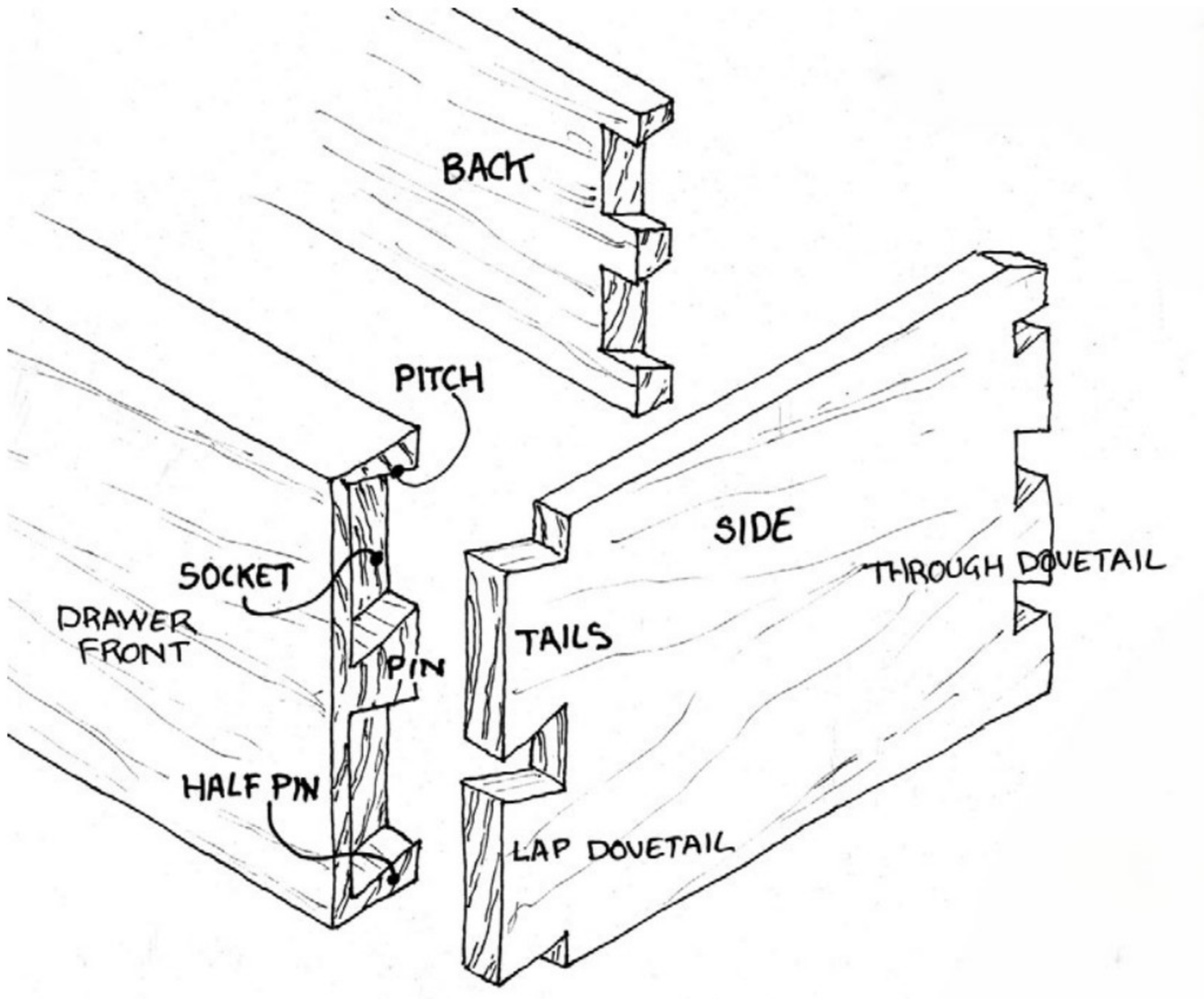
Unlike early times, when dovetails were covered with mouldings or ornamentation in the form of carving and veneers to hide construction, today, the modern craftsman uses the exposed dovetail as both a structural and design element, proudly showing their meticulously executed joinery in harmony with the elegant appearance of natural wood.

There are many dovetail types, each with different functions to construct carcasses, connect rails, shelves, and frames. These include through dovetail, lapped, double lap, mitred, sliding, stopped, single dovetail, end to end, asymmetrical, bevelled, and various decorative variations.

Dovetails are possible in almost any length, thickness, or width of wood. This article focuses on carcass joints. ▶



A machine-made dovetail



Anatomy of a dovetail

The theory and terminology

We will start with a review of dovetail anatomy and some terminology to avoid confusion.

Tails: These are wedge shaped, which resists forces and holds the components together.

Pins: The spaces between the tails and the end/half pins on the outside of the board.

Socket: The space on the lap dovetails into which the tails fit.

The single dovetail joint can either be a complete pin or a complete tail. Multiple dovetails usually end with a half-pin at the corner. Half tails are usually avoided.

The dovetail angle provides the mechanical lock. If the angle is too slight, the pin can slide between the tails and the locking mechanism is insufficient. If the angle is too great, the wood at the corner becomes too fragile and will easily break under stress. The general rule of thumb is an angle of roughly 80 degrees or 1:6 for softwoods, because the fibres compress easily, and 83 degrees or 1:8 for hardwoods. A dovetail router bit is an angle of 14 degrees.

The spacing of the dovetail pins relative to one another is an important design consideration. A 1:1 ratio is strong but not very interesting and is mechanical looking. This is the type of joint created by a router jig or an industrial dovetail machine. It is not considered consistent with high-quality work.

To avoid a mechanical look, the pins and tails are spaced so they are not all the same size. The layout must find a balance between strength and the elegance of a narrow pin. Beyond the dovetail's symbolic association with craftsmanship, its use is for all the best reasons: it is attractive, resists wood movement, and is very strong.

Making a basic dovetail joint

The construction principle underlying the dovetail joint is its ability to resist pulling forces due to the joint's wedge action and the large surface area for glue.

Don't be put off by something that looks hard; sharp tools and a methodical, step-by-step process will lead you to produce something of elegant beauty that you can justifiably take pride in. The process of making the joint is far easier than you would think; a box should take about an hour.

There are so many YouTube videos of woodworkers performing in front of a huge collection of hand tools, which almost certainly rarely get used, espousing some very dodgy advice. I would recommend watching *Jim Kingshott – Dovetails*. Jim is a genuine



Through dovetail

master craftsman, so any subtleties are not missed.

For this article, I am going to assume we are making a traditional drawer with a lapped dovetail on the front and a through dovetail on the back

Tools

Preparation: Jack plane, edge plane, shoulder plane, rebate plane
Marking out: Ruler, marking gauge, 1-6 / 1-8 dovetail template, or a sliding bevel, square, marking knife
Cutting: Dovetail saw, coping saw, mallet, bevel-edged/dovetail chisels
Assembly: G-clamp and sash clamp, screwdriver

Timber preparation

Cut the parts to size.

Use a shooting board to plane the end grain perfectly square. Clean up and sand the inside face, making sure everything is flat and true. If you are making a drawer to fit in a carcass, the sides, front, and back are planed to fit the carcass before any joints are cut.

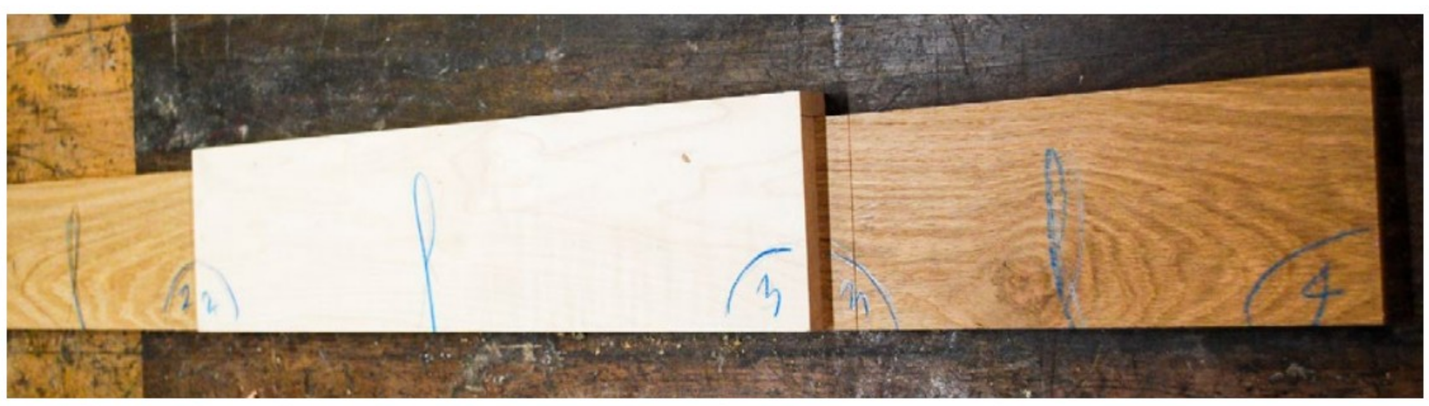
Mark the face side and edge on the outside faces, line up the parts and mark an arc on the bottom corners. Number each in sequence, so when you are marking out and cutting the joints, you do not get the orientation of parts mixed up, which is ridiculously easy to do.

Scribing shoulders

Set a cutting gauge to the thickness of the sides, scribe a light shoulder line on the inside of the front and back and the rear of the drawer side. You will mark



Hand tools used to make dovetail joints



Marking the face side and the edge, and numbering the sequence of parts

> “I usually work on about 3mm for the lap, depending on the wood being used and the size of the drawer”



Scribing the thickness of the sides . . .



. . . and the length of the tails with the marking gauge



Measuring the tail spacings



Transferring the angle with the dovetail template or sliding bevel



Sawing the tails with a dovetail saw

the line on the outside later when the tails have been established. Reset the cutting gauge and mark the length of the tails on the side and drawer front. There is no rule for how long the tails are. I usually work on about 3mm for the lap, depending on the wood being used and the size of the drawer.

Mark out the tails

Start with the end/half pins measurement, usually about 6mm from the edge. If you have multiple tails, the easiest way to establish their size without resorting to maths is to scribe a line from the middle of the end/half pin.

Then, with a ruler, angle it from side to side so there is an equal measurement – that is, four pins are required to measure 120mm. Divide by four, so for each tail mark a line every 30mm, then transfer this line to the end of the side.

Pins width

Decide how wide you want the pins to be.

Personally, I think small pins look more elegant, though they are not as strong as large ones. You will be constrained by the width of your narrowest chisel. Use a dovetail template, sliding bevel or saddle square set to 1:8 and mark the tails. Transfer these marks across the top with a pencil and square, then on down the other side.

Then, on the outside face, use the cutting gauge to scribe the shoulder line between each tail and the edges, so you have a line around the drawer side. I find it very helpful to scribble in the waste area because it is incredibly easy to cut out the wrong part.

Cutting tails

Hold the sides in a vice and saw out the tails.

Because you are cutting two drawer sides, clamp them together and cut them simultaneously. Use a dovetail saw or a Japanese *dozuki* saw with fine teeth, 25ish teeth per inch (TPI).

Guide the start of your cut with your thumb. Cut on the waste side of the line and stop just before the shoulder line; accuracy here is not critical. Flip 180



Sawing out the waste with a coping saw

degrees and cut the other end. Double-check which is the waste between the tails before you cut it out with a coping saw. Saw off the end/half pins.

Chiselling shoulders

Before you do any chiselling, sharpen them so they are razor sharp.

Blunt chisels will lead to frustration and disappointment and are likely to crush rather than cut the wood fibres. Do your chiselling on a scrap piece of wood so you do not damage your benchtop. Chiselling out the waste is ideally done with a dovetail chisel. These have the sides fully ground at an angle, enabling you to get right into the corners.

Angle the chisel back slightly; don't try to take off too much wood. Make fine cuts from one side to the other, then flip the side over and repeat. Finally, cut away the bump in the middle so the shoulder is square – avoid undercutting, as this reduces the joint's strength.

You can clamp a block to the shoulder line to help guide your cut and get it square.

Marking out the pins

The same procedure applies to both through and lap dovetails.

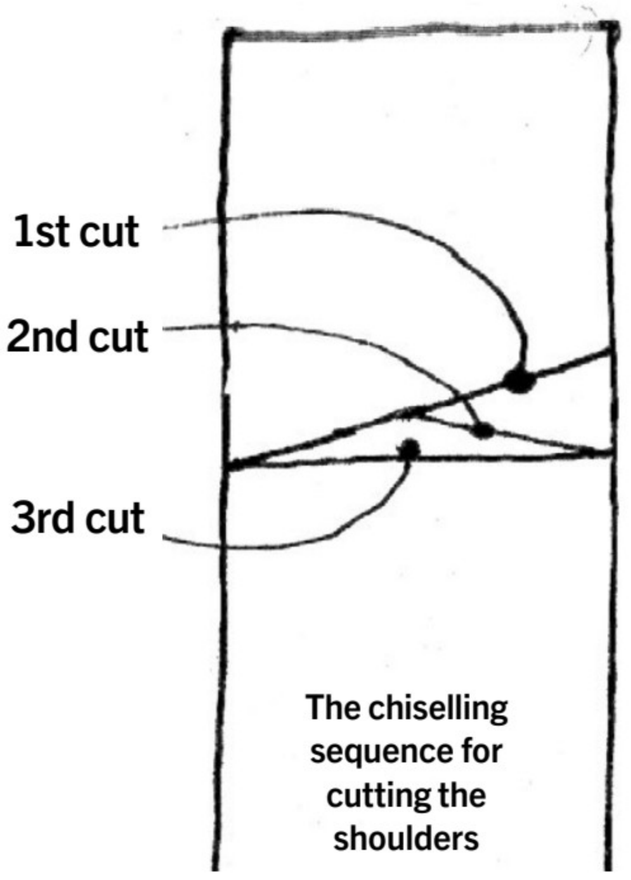
If you are using a dark wood, seeing the marking outlines can be a challenge, so use white chalk to cover the end grain and your lines will stand out.

Clamp the drawer front in a vice, level with a block of wood.

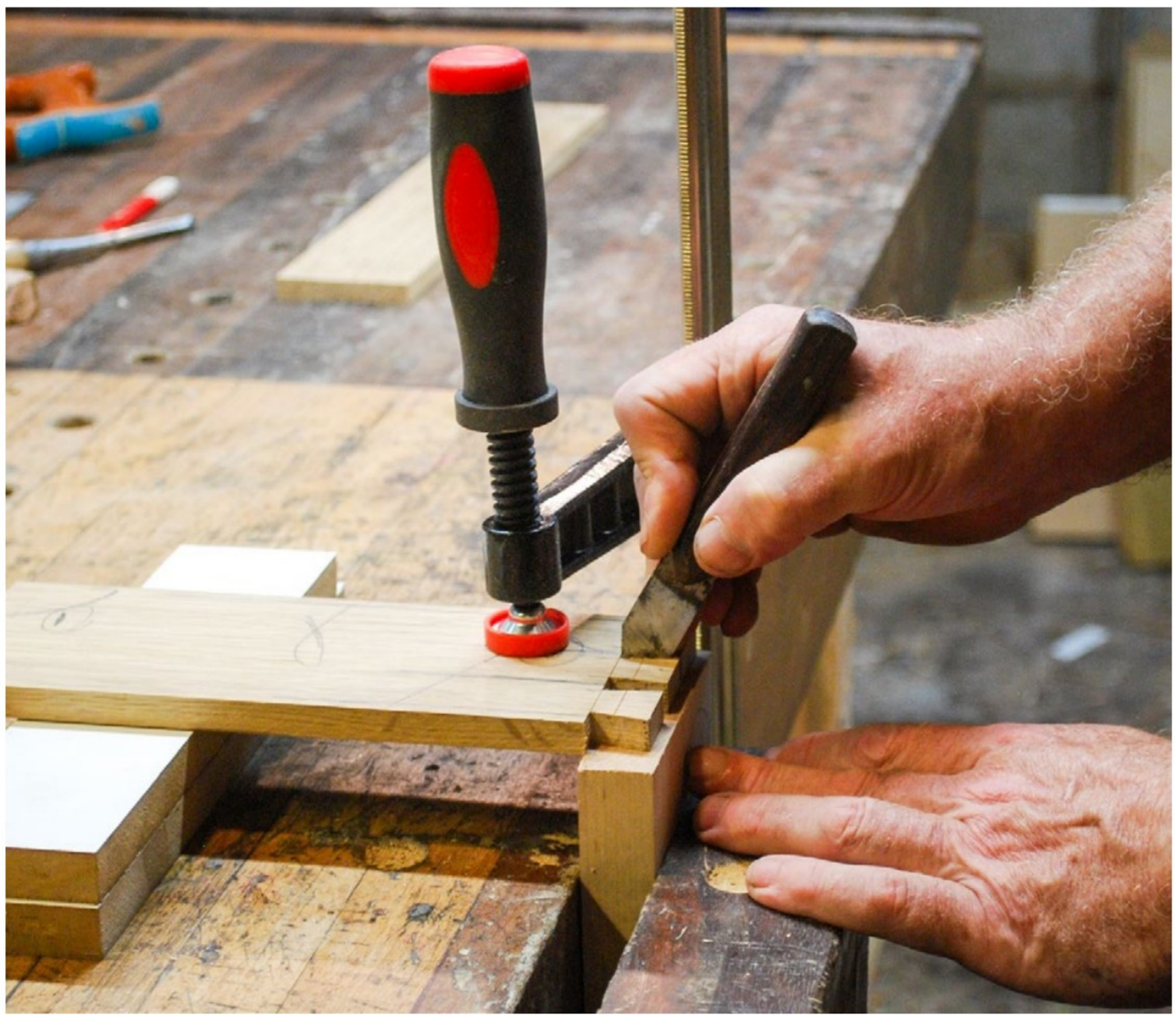
Check that your face side/edge and corner markings are correctly aligned. ▶



Chiselling the shoulders of the tails



The chiselling sequence for cutting the shoulders



Marking out the pins from the tails



Marking the waste



Sawing out the pins

Clamp the side in place, sighting the tail's shoulder to the inside edge of the front, and gently tap them into place so the outside edges are perfectly flush. Clamping ensures that the parts do not move when you are marking; any discrepancies will result in gaps.

Mark the tails with a fine knife blade or a pointed marking knife. Ensure the knife line is fairly deep, as this helps you later with the chiselling. Use a square to transfer the knife lines onto the face.

Cutting the pins

For through dovetails, saw through the wood just on the waste side of the knife line; you should still see your line when you have finished sawing.

For the lap dovetail, saw at an angle from the top to the bottom corner. Again, mark out the waste so you do not cut out the wrong part.

Cleaning up the sockets

The through dovetail is done the same way as the tails: mark out, remove the waste with a coping saw, then chisel the shoulders square.

Trim the sides of the pins bit by bit, cutting down to the knife lines with a wide chisel. The final cut will locate in the knife line and be perfectly square.

Take care with the wood grain; you may need to approach the cuts from the sides, so the grain does not follow into the pin.

For the lap dovetail, place the work on the bench and carefully cut down. Remove the main waste slowly, taking off a fine shaving each time.

This is not a time to force a chisel; you need 100 per cent control, and you will be glad your chisels are razor sharp.

Clamp the side in the vice and cut carefully back to the knife and pencil lines. Make sure all the waste is removed right into the corners. Finally, chisel a very slight chamfer on the inside



Chopping out the waste for the pins



"You need 100 per cent control, and you will be glad your chisels are razor sharp"



Trimming the pins

corner of the tail. This helps with both location and preventing fibres breaking free, and stopping the joint from going together flush.

Assembly

Your joint should now be a perfect fit.

The assembly of the joint should really only be done once, when glueing up. However, you can test the join by partly assembling and trimming any tight spots. With a brush, spread glue on all mating surfaces. Push the joint together, then place a block on the side and tap it together. When the glue has dried, trim any protrusions flush with a smoothing plane from both edges to avoid splitting the wood.

Variations on a theme

If you are feeling like a challenge and fancy having a go at making a secret mitred dovetail, cut the pins first, as there is no space for marking if the tails are cut first. Then carefully chisel the mitre, finishing with a shoulder plane.

The images pictured at right show examples of different ways that you can experiment with the decorative potential of the dovetail and tailor something that will challenge your skills.

Now, let's put all this into practice with a project. ▶



Final fitting of the joint using an offcut to avoid bruising the wood



Secret mitred dovetail

Varying the size and spacing of the dovetails. This has the technical advantage of strength, preventing the wood from moving at the edge

Using a contrasting timber on the sides of the tails

Curve the shoulder of the tails and pins or just the tails to create a gentle arc

Extend the tails and pins so they stick out from the surface, then slightly chamfer the protruding edges.

A simple mitre joint strengthened with a dovetailed spline of contrasting timber inserted into dovetail slots

A simple mitre joint reinforced with dovetailed tenon saw cuts with a contrasting veneer glued into the saw kerf



Timber machined to size for the stool and drawer

The Dovetable project – table, stool, step

The original design for the Dovetable started life as a 'what if' question. Looking at a half-made drawer, I thought, *What if this could be scaled up to be a table and feature the joints?*

It was a trip up the motorway, looking at bridges, that inspired further refinements to the underside of the top, in addition to experimenting with proportions of the parts.

The project lived in the workshop and during this time kept being used as a stool and a step, as well as a handy small table. At this stage, it became obvious that it needed to be easy to pick up and move.

That saw the addition of the hand-hold in the middle and has resulted in a really useful object. I have added the drawer for this article because … why not?

I used purpleheart for the legs and maple for the top, both of which are very hard timbers that leave no room for error. If this is your first go at dovetails, *keep them simple and use softwoods*; they are far more forgiving of slight inaccuracies. Prepare the materials to size. Sand the inside faces of the stool. Be careful not to round the edges.



The top view, showing the completed dovetails

Decide on the layout of the joint. Mark out and cut the through dovetail joints for the stool. Because the sides and top are thick, it will be easier to remove the waste with a jigsaw or bandsaw.

Make and fit the back panel

You can join the back panel to the stool ends with dowel joints, biscuits, or with a housing joint as I did. I planed the tongue on the back then chiselled a groove on the stool sides.

Mark out the handle slot in the top, 120mm wide and 30mm wide. If you are making a two-part top, clamp them together to drill the holes.

Drill a hole at either end using a Forstner bit, which will leave cleanly cut sides and avoids you having to do tedious sanding later to remove torn grain.

Drill out the rest of the waste and clean up the sides with a chisel, rasps, and files then finish off the handle with a rounded top and bottom edge.

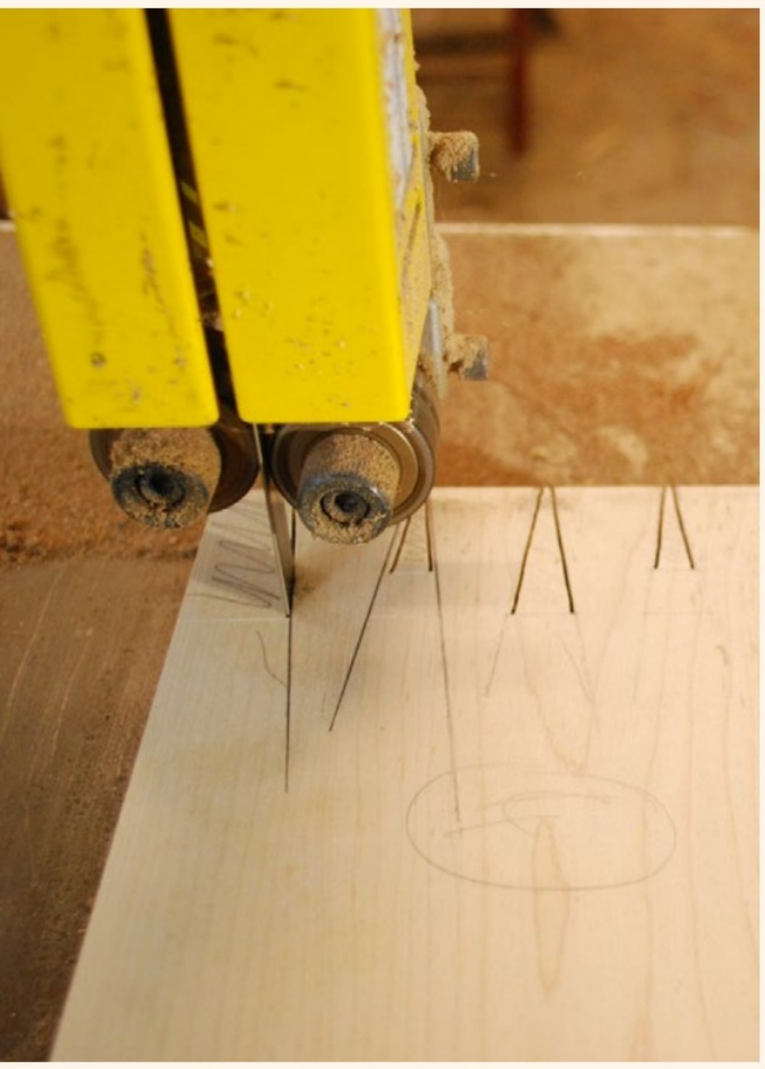
Attach the drawer runners by marking a line the height of your drawer sides, then screw the runners in place.

I made the runners 25mm wide, slightly wider than the drawer sides' bottom edge, and 15mm thick. This is less than the drawer front's overhang of 20mm.

The drawer runners

If your dovetails are not a perfect fit, you can make clamping blocks to hold the stool whilst the glue dries.

Ideally, the joints will fit without any trimming. I used a good-quality cross-linked aliphatic resin, but most adhesives will work for this project. Clamp the sides to the top, cut a supporting block exactly the same size as the internal width of the stool to keep the sides parallel, and check everything is square. Clean of any excess adhesive and leave for 24 hours to cure. ▶



Bandsawing the tails



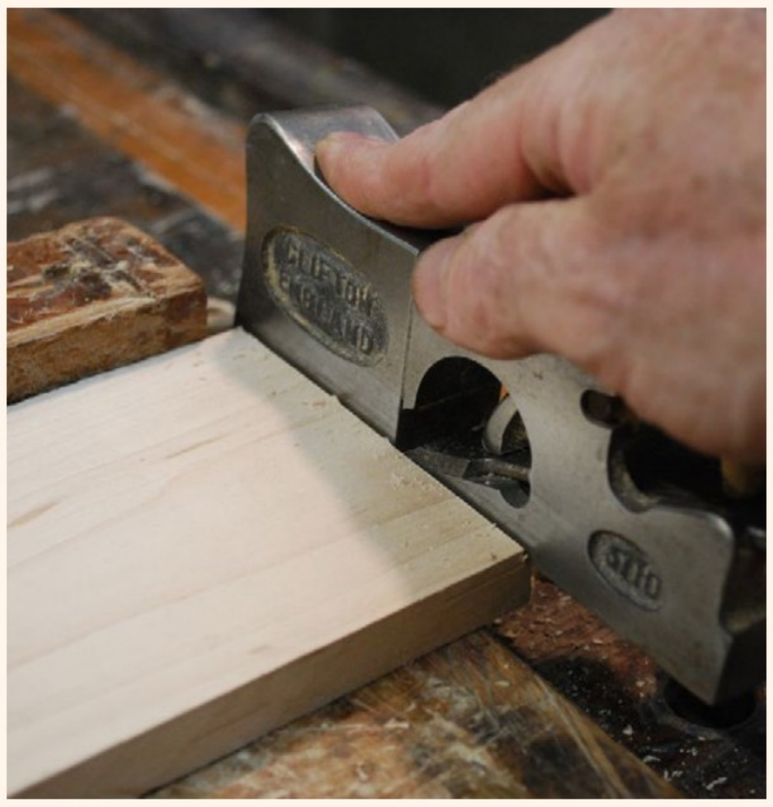
Chiselling out the waste to the shoulder line



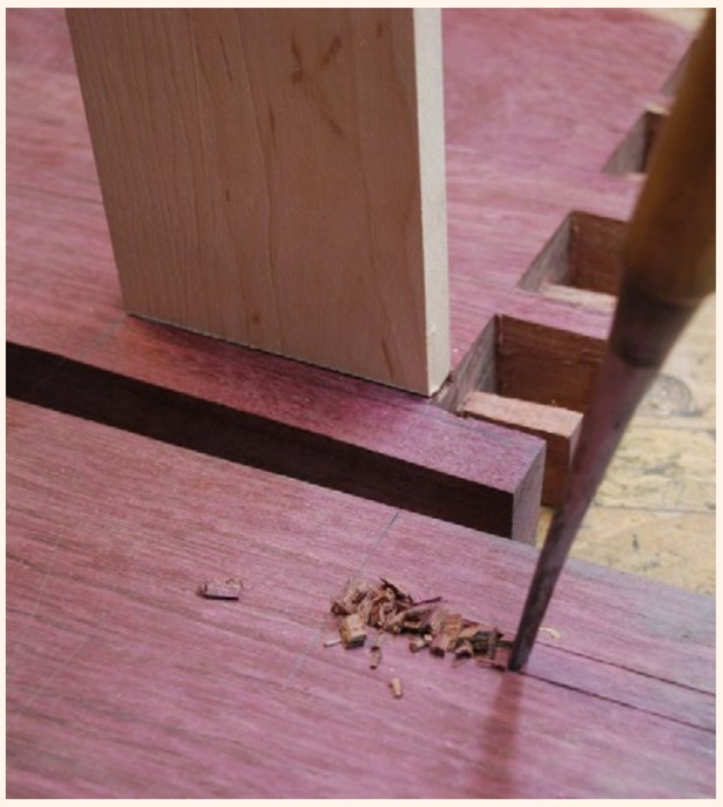
Transferring the tails to the sides for the pins with a marking knife



Trimming away the waste to the knife lines



Planing the back panel housing joint shoulder



Cutting the housing joint groove and fitting the back panel



Screwing the drawer runners in place



Glueing the stool together. Note the use of blocks to avoid bruising the wood



Chamfering the bottom of the legs with a block plane



Finished Dovetable stool step

Finishing

Sand the outside to get everything flat and smooth.

If you do have any gaps, you could use wood putty, sawdust mixed with CA, or epoxy, as they are best because they do not shrink. I prefer to use coloured wax sticks or beeswax tinted with pigment powders.

Use a block plane to chamfer the bottom edge and then polish. My preference is either two coats of Rustins shellac sealer and beeswax, or three or more coats of Briwax Danish oil.

Traditional drawer construction

A high-quality traditional drawer is made using lap dovetails at the front to avoid end grain showing on the face. The back is connected to the sides with through dovetails. The back is generally lower at the top to allow air to escape as the drawer closes. The base has the grain running from side to side the length of the drawer and is made of cedar to repel clothes moths.

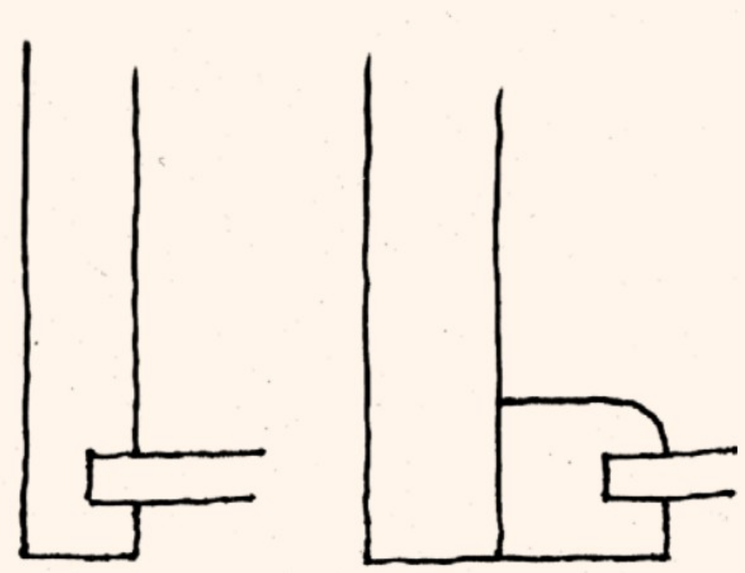
The base fits into the drawer slips, which increase the surface area of the sides and minimise wear on the runners. Grooves in the sides weaken the sides with heavy loads and wood movement.

Prepare all materials

Drawer making is one of the few stages where the wood is fitted and finished before joints are cut. This means you plane and fit the sides to the carcass space and fit the drawer back and front to the opening.



Traditional drawer construction, with lap dovetails at the front and through dovetails at the back



Alternative ways to fit the bottom, showing drawer slips

Avoiding frustration

Mark out and cut the tails in the drawer sides, and clamp the pairs together to save time.

Transfer the tails for the lap dovetails on the drawer fronts and through dovetails on the back, then cut the sockets for the pins. Make sure the face and edge marks and the number sequences are together. Double-check these marks, as it is so easy to cut the joints with sides pointing in opposite directions, and for the tops and bottoms to be mixed up. This is the one rule in this process that will save you a lot of frustration and disappointment.

Cut a groove in the drawer front using a table saw, a router, or a plough plane. The groove should pass in the space where the tail fits, so it will not be seen when the drawer is assembled.

Cut a 6mm groove in the drawer slips using either a table saw, router, or a hand plough plane. Cut them to the size of the inside length of the





Left: Marking the face, edge marks, and the sequence of parts

Below: Planing the parts to the exact size, flat and square



Marking the dovetails with a sliding bevel



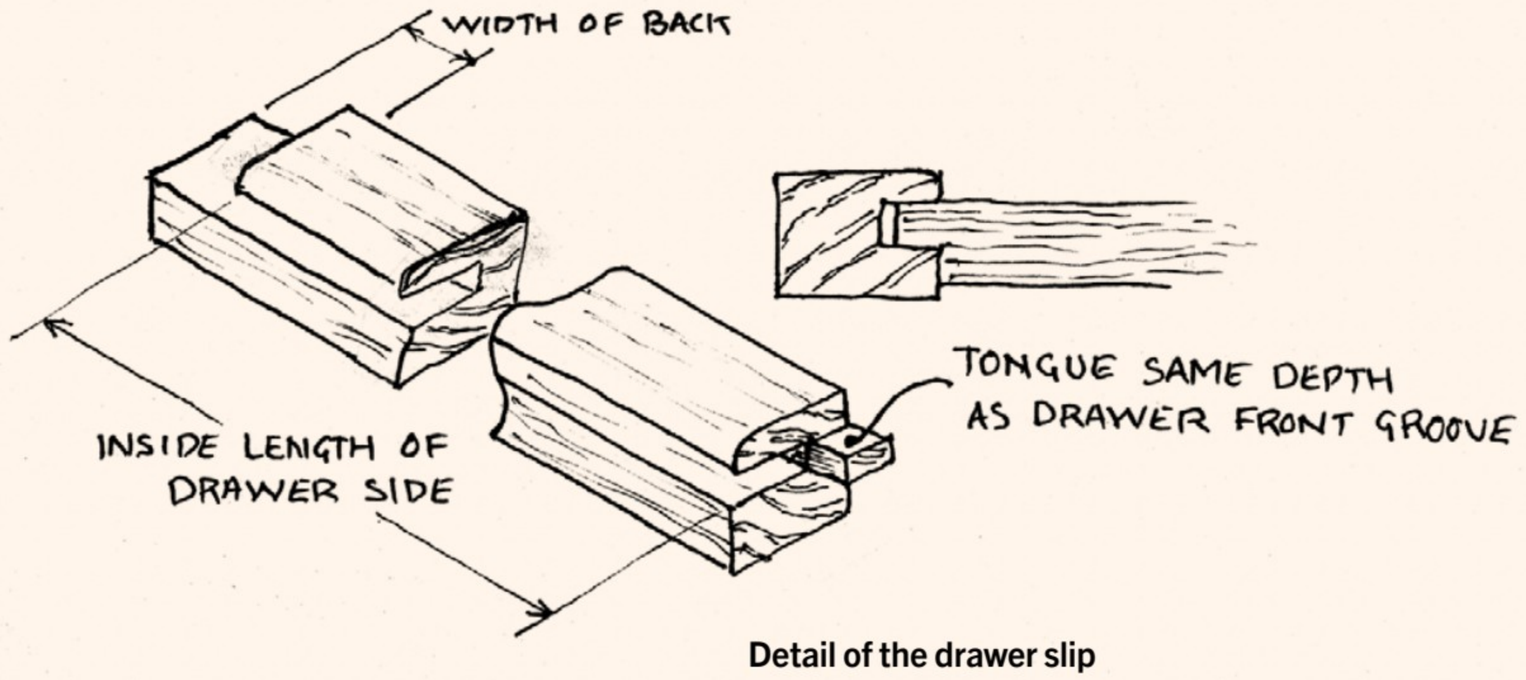
Sawing the waste with a coping saw



Chiselling the waste on the pins



Routing the groove for the drawer front



Detail of the drawer slip



Planing the groove for the drawer slips with a plough plane



Clamping the drawer slips in place and checking the diagonals for square



Glueing the box using clamping blocks to apply pressure to the tails

drawer and allow for a pin to fit into the groove on the drawer front and a rebate on the back to fit over the drawer back.

Assembly

Assemble the drawer, coating all mating surfaces with aliphatic resin; if necessary, make clamping blocks that apply pressure only to the tails.

Glue and clamp the drawer slips in place. Wipe off all excess glue, then check that the diagonals are the same size so that the drawer is square. Allow it to dry on a flat surface to avoid the drawer being twisted.

Measure the space of the drawer bottom and cut it to size.

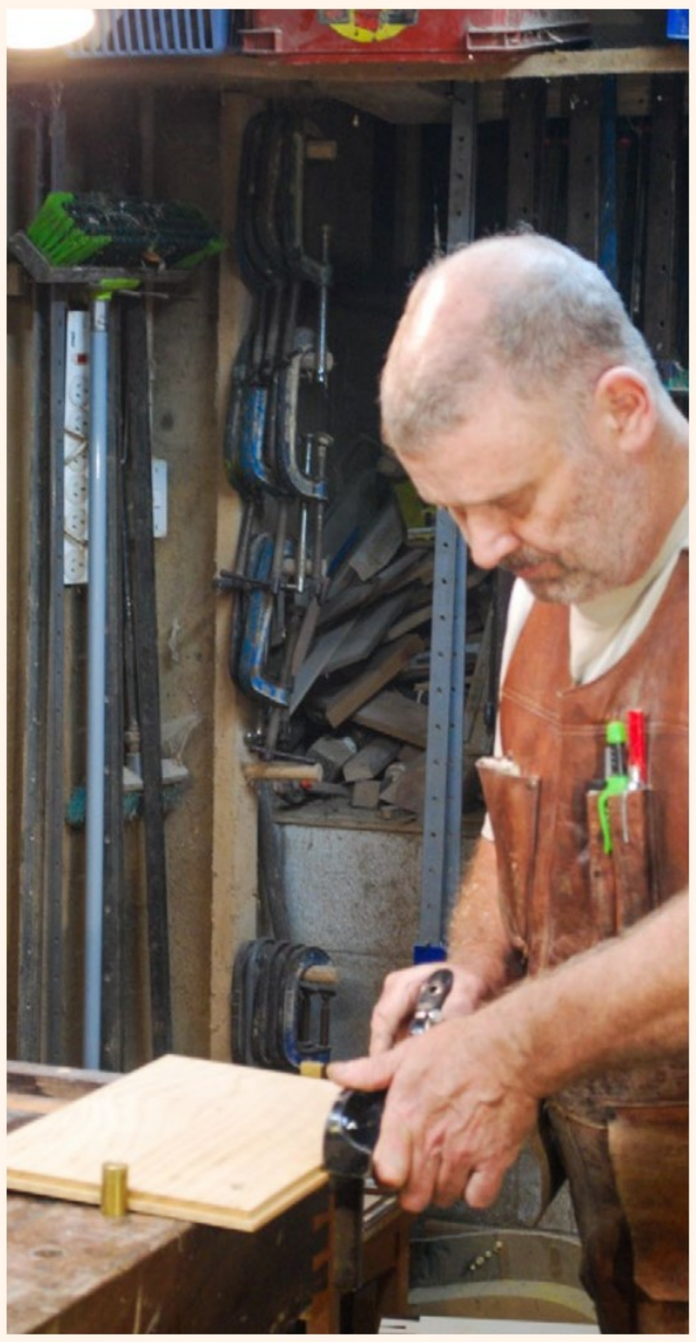
I used cypress because I love the smell of wood when I open a drawer; macrocarpa works just as well.

I needed to make a rebate on the underside so it slid into the 6mm drawer slip groove. To do this, I used a rebate/fillister plane and tidied up with a shoulder plane.

Slide in the drawer bottom and screw it in place on the back edge.

There is no need to glue the base on the sides or front. With a solid wood base, glue prevents the wood from moving and can cause distortion and cracking.

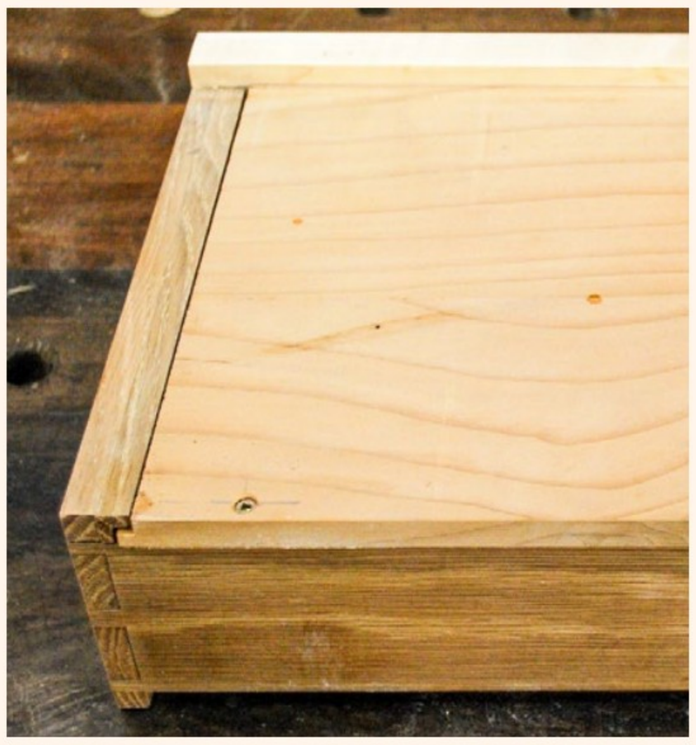
https://edwardprince.co.nz/
bespokefurniture@proton.me



Rebating the drawer bottom so they fit in the drawer slip grooves

Scan the code to go to Edward's website





The completed drawer with the base screwed in place on the back edge

MENZSHED®
NEW ZEALAND

THE MEN'S SHED MOVEMENT IS ABOUT MAINTAINING MEN'S HEALTH AND WELL-BEING IN AN ENVIRONMENT CATERING FOR THEIR INTERESTS



A shed brings men together in one community space to share their skills, have a laugh, and work on personal projects or within a group for the shed or community.

To learn more and to find a shed near you, scan the QR code with your phone or visit our website at www.menzshed.nz

Sheds and their members decide the projects to undertake. However most sheds throughout New Zealand take on some community projects, examples include repairing toy library stock, building playgrounds for early learning centres, repairing old bikes for community distribution, building planter boxes for the main street of the local central business district, the list goes on.

The shed is a great place for blokes to learn new skills. We see builders teaching engineers some of their skills and vice versa.

Sheds have been operating in New Zealand since 2008. The last decade has seen the number of sheds across both urban and rural areas increase to 140.

A KIWI WORKSHOP ICON WITH A STORY BUILT ON PRACTICALITY

How a global maintenance brand found a natural home in thousands of New Zealand sheds, garages, boats, and backyards

For generations, CRC has been more than just a product on a shelf; it has been a trusted problem-solver in workshops. Whether it's loosening a rusted bolt, silencing a squeaky hinge, protecting tools from corrosion, or restoring a weathered piece of machinery, CRC has become an essential part of Kiwi maintenance culture. In many households, the familiar red-and-white can is as common as a hammer, screwdriver, or the Buzzy Bee.

However, behind this everyday familiarity lies a story that spans over 60 years – one built on innovation, practical chemistry, and a strong connection to the way New Zealanders live and work.

Humble beginnings

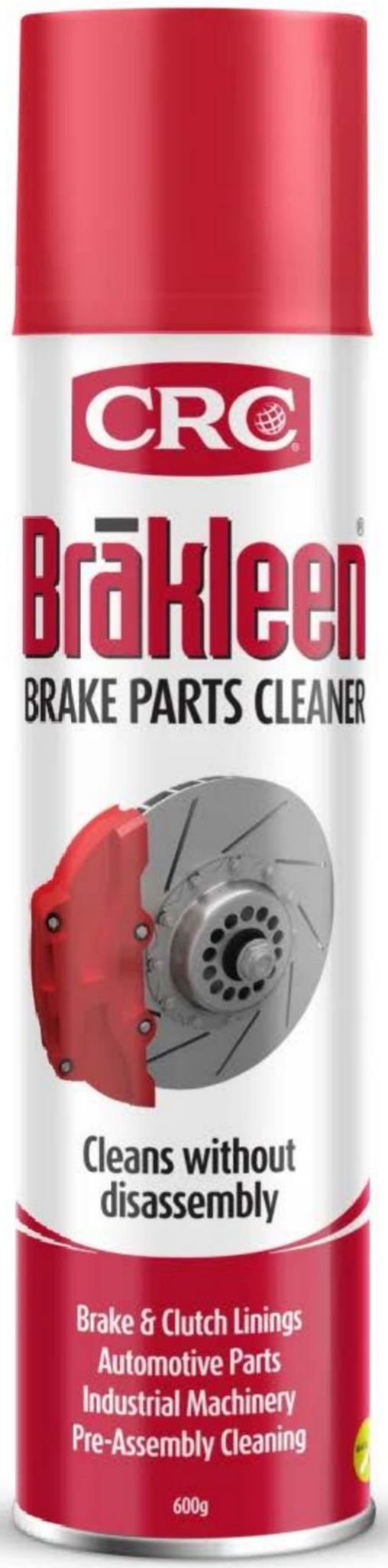
CRC was founded in 1958 in Pennsylvania, US, originally under the name Corrosion Reaction Consultants. The company was established with a clear mission: to develop chemical solutions that addressed real-world maintenance issues. Following World War II, the industry was thriving; machinery was becoming more advanced; and businesses needed improved methods for preventing corrosion, lubrication failures, and equipment breakdowns.

In its early days, CRC focused on protecting metal surfaces and enhancing reliability in a variety of demanding environments. The initial products were primarily targeted at industrial users, but their practicality quickly demonstrated a



CRC 5-56

BEST USE – to stop annoying squeaks and keep everything moving



CRC Brakleen

BEST USE – brake and parts cleaner and degreaser

broader appeal. One of CRC's earliest and most significant innovations was a moisture-displacing lubricant designed to protect, loosen, and preserve moving parts. This formula eventually evolved into CRC 5-56, a product that would become internationally recognised as a standard in maintenance.

Unlike highly specialised industrial chemicals, CRC's products offered a simple solution: they worked quickly, addressed common frustrations, and required minimal technical knowledge. This combination proved to be highly effective.

Finding a natural fit here in New Zealand

CRC arrived in New Zealand in the early 1960s and entered our market, which was perfectly suited to its strengths.

New Zealand's climate has always created maintenance challenges. Coastal air carries salt deep inland, and moisture lingers through winters. Our outdoor living and the large number of rural industries expose tools, machinery, vehicles, and household fittings to constant wear. Products designed to protect against corrosion and keep equipment running naturally have found high demand with Kiwis.

Initially sold through trade and automotive channels, CRC quickly gained popularity among mechanics, electricians, and marine users. But it didn't stay confined to workshops for very long.

As Kiwi DIY culture grew through the 1970s and 1980s, CRC moved from professional environments into home garages, garden sheds, and utility cupboards. New Zealanders have long valued practicality and self-reliance – it's in our DNA. Rather than replacing broken equipment, many preferred to repair, maintain, and extend the life of what they owned. CRC fitted perfectly into that mindset.

The company established a formal New Zealand presence in the 1970s, eventually operating from Auckland to support growing nationwide demand. From there, CRC became embedded in daily life.

But it's more than a lubricant

For many people, CRC's reputation began with a single spray can.

CRC 5-56 became the product that introduced generations of New Zealanders to the brand. It was versatile enough to sit comfortably in nearly every environment – from

"CRC was founded in 1958 in Pennsylvania, US, originally under the name Corrosion Reaction Consultant"



CRC Evapo-Rust

BEST USE – effective rust removal for tools, hardware, car parts, gardening tools, and much more!

automotive workshops to fishing boats, home toolboxes, and farm sheds. It solved dozens of common frustrations.

A seized lock after winter rain. A gate hinge that squealed every time it moved. Rust that was beginning to form on tools stored in damp conditions. Moisture affecting electrical contacts. Stubborn bolts refusing to budge. One quick spray often made the difference.

That versatility became central to CRC's identity. Rather than producing chemicals for highly specific niche uses only, CRC positioned itself as a practical companion for everyday maintenance. Over time, the brand's relationship with homeowners expanded.

As New Zealand homes evolved through the decades, so did the types of maintenance challenges people faced. Outdoor furniture required protection from harsh UV and coastal exposure. Lawn equipment needed seasonal care. Bikes, trailers, BBQs, garden tools, and garage equipment all demanded upkeep. CRC adapted alongside these changing needs.

Growing with our homes

The CRC of today looks very different from the company that began with corrosion prevention in the 1950s.

While lubrication remains central to its identity, CRC has broadened into a much wider maintenance philosophy – helping us preserve, restore, clean, and protect the things we own.
For homeowners, this means CRC products often appear throughout the maintenance cycle rather than as a single-purpose fix.

A weekend DIY project might begin with a cleaner to remove grease or grime, followed by rust treatment to prepare a surface, then protective coatings to extend longevity.

The same homeowner maintaining a trailer may use one CRC product to clean mechanical parts, another to protect electrical connections, and another to guard exposed metal from corrosion. That progression reflects

"As New Zealand homes evolved through the decades, so did the types of maintenance challenges people faced"



CRC Rust Converter

BEST USE – used on cars, truck frames, boats and trailers, railings, fences, iron or steel furniture, equipment, tools, and more



CRC Metal Armour

BEST USE – used on cars, trucks, boats, trailers, equipment, tools, railing, fences, and much more!

how CRC has matured from a single-use spray brand into a complete maintenance partner.

Importantly, many of these products still appeal to everyday users rather than specialist businesses. The rise of home workshops and sheds, hobby restoration, backyard mechanics, and DIY renovation has strengthened CRC's place in the domestic market. Today's homeowners are often more willing to repair than replace – especially as sustainability and cost-conscious living become more important. CRC actively supports that mindset by making maintenance approachable.

A brand built for coastal living

New Zealand's geography has played a major role in CRC's success, as few countries have such close relationships with water.

Boats, trailers, fishing gear, marine electronics, outdoor equipment, and coastal housing all experience accelerated wear from salt exposure. Corrosion is not just an inconvenience – it is a constant reality for those of us living within a few kilometres of the coast.

CRC products naturally became popular among boaties and marine users because they addressed these salt-spray-infused issues directly. Protection against rust, moisture, and salt build-up remains one of CRC's strongest advantages – applying products before problems begin. That preventive mindset aligns closely with our practical and DIY maintenance culture.

CRC in the modern home

Today, CRC exists well beyond the garage.

Modern households use maintenance products in ways that were far less common decades ago. Outdoor entertaining areas require regular upkeep. E-bikes and scooters, which are now so common, need regular cleaning and protection. Kiwi home workshops are now increasingly prevalent, and all those tools are viewed as long-term investments rather than disposable purchases. CRC has quietly adapted to this shift.

Its presence in hardware stores, automotive retailers, marine suppliers, and DIY outlets means the huge range of CRC products remains highly visible to homeowners. And, importantly, CRC products continue to appeal because they solve problems quickly. In an age where convenience matters, CRC still offers immediate practicality. There is little complexity involved.

A squeak disappears. Rust is slowed. Dirt lifts away. Moving parts loosen. Equipment lasts longer. Problems solved.

That simplicity remains one of the brand's greatest strengths.

Why CRC still matters

Brands survive for decades when they become consistently useful.

CRC's longevity comes from trust built through repetition of use and results. People use it once to sort out a problem – then remember it the next time something jams, sticks, rusts, or wears out.

Here in Aotearoa New Zealand, CRC has become woven into a culture of maintenance and repair. It sits quietly in cupboards, garages, boats, workshops, and garden sheds, waiting for its next problem-solving task.

Its story is not just about chemicals or manufacturing – it is about practicality. It's about preserving the things people value and put their hard-earned cash into. And in our country, where fixing something yourself still carries pride, CRC remains right at home.

DÉJÀ VU ALL OVER AGAIN

By Murray Grimwood | Photographs: Murray Grimwood

So many of our sheddie interests start in our early years, and Murray is solid proof of that. Reading a book on sailing as a young 'un led him to a life on the waves – and has now drawn him back to a model boat seen through a neighbour's window 63 years ago



Too glossy, but showing promise

It was an interesting year, 1953 – worth remembering, given what is happening currently.

Elizabeth was crowned queen of a dying empire. Its spy agency, MI6, combined with its US counterpart, the CIA, to overthrow the government of Persia, now known as 'Iran', because they wanted to regain access to Iran's oil. They incited riots in the streets prior to attempted regime change. Now, why does that sound familiar?

Meanwhile, back in Lizzie's decaying England, a talented model boat designer put pen to paper and came up with something reminiscent of the craft being hired on the Norfolk Broads.

A boy with mumps

Skip a few years to 1963. A bored bedridden boy with the mumps got given a library book to read: *Swallows and Amazons* by Arthur Ransome (see sidebar).

By the next morning, he had devoured it, and in the coming days, he requested and read the other 11 books in the series. That series must have introduced thousands to boating and to cruising – it was clever teaching too; by the time you've read them, you know a great deal seamanship-wise. In one of the series, set on the Norfolk Broads (Coot Club, also made into a film), was a Norfolk Broads motor cruiser.

That boy walked home from school, often via a little dog-legged street on the bend of which was a two-storeyed house. Upstairs was a wardrobe, visible from the street. Atop that wardrobe were two models – they were there for decades – one of which I'm near certain was the Norfolk Broads–style model in question. So much so that when I traced the old owner of my acquired example, I asked him if it was the same boat – but it wasn't. Regardless, the one on the wardrobe always reminded the boy of the one in the book, and now he has the real thing, and anyway, what's a 63-year wait?



Hammersmith Model Makers

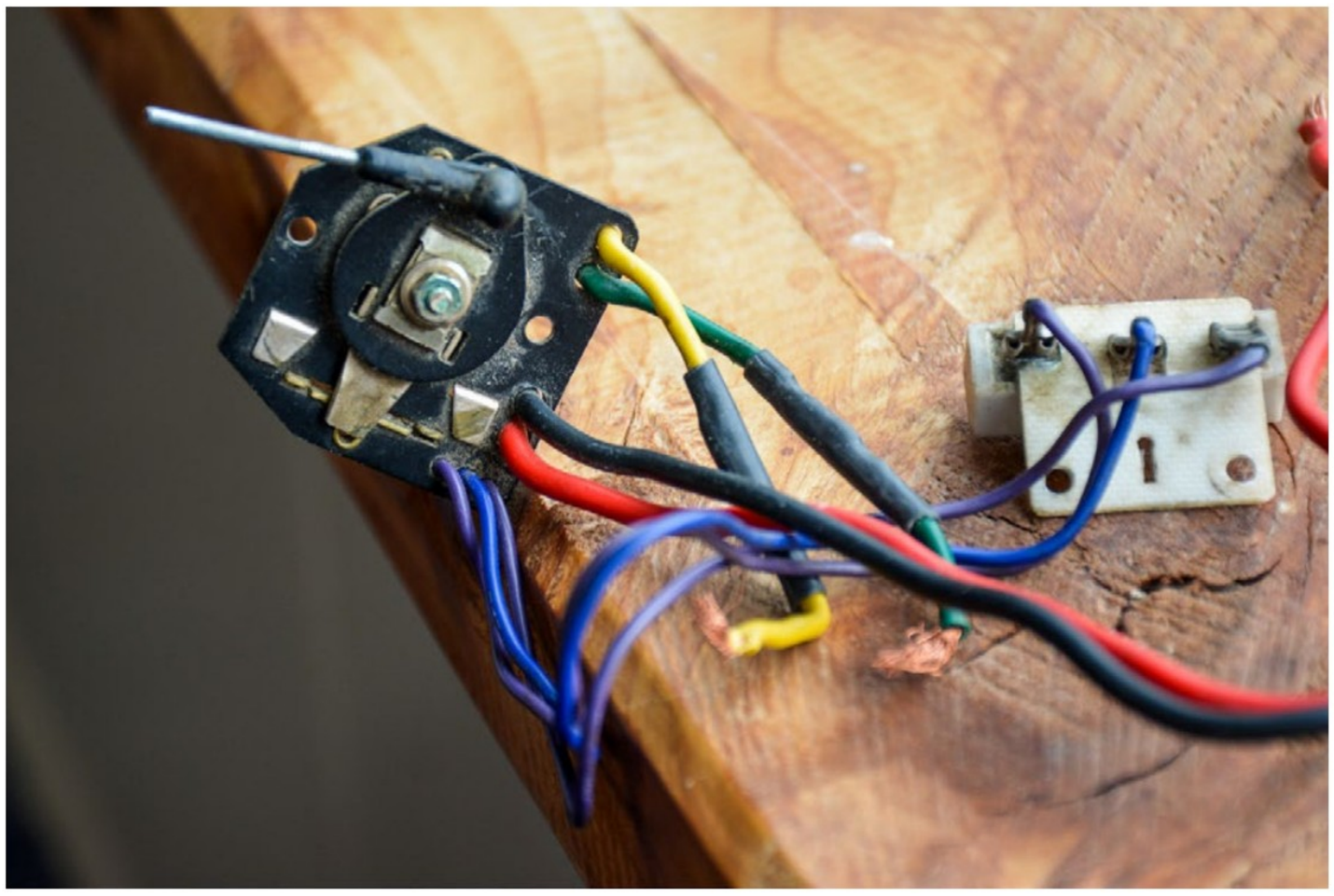
According to the Model Boat Mayhem website, “The Wavemaster was originally produced by Hammersmith Model Makers and designed by LJ Rowell in 1953. In later years, it was produced and marketed by Yeoman Kits, owned by AA Hales Ltd.” It is still being sold as a kit, and a perusal of ‘HMM Wavemaster’ or ‘Yeoman Wavemaster’ even shows a time-lapse build of its smaller sister (the 25-inch version – search for ‘Buxton Model Boat Club 44’ on YouTube, or youtube.com/watch?v=httqt87bvnc).

There is even a blog featuring an original 1953 example, complete with period radio-control gear. It was a large-displacement model because of the weight of the later model at that stage in its development. It was also designed with 2.5–5.0cc internal-combustion engines in mind; the only realistic way back then, to get such a scale hull planing (nowadays we have brushless electric motors and lithium batteries, which are much more convenient and somewhat easier on the ears. They are also a tad easier to start; the original glow-plug motor in mine had a grooved flywheel around which you threaded a shoelace, held it tight and pulled one end sharply – I can only imagine the frustration …).

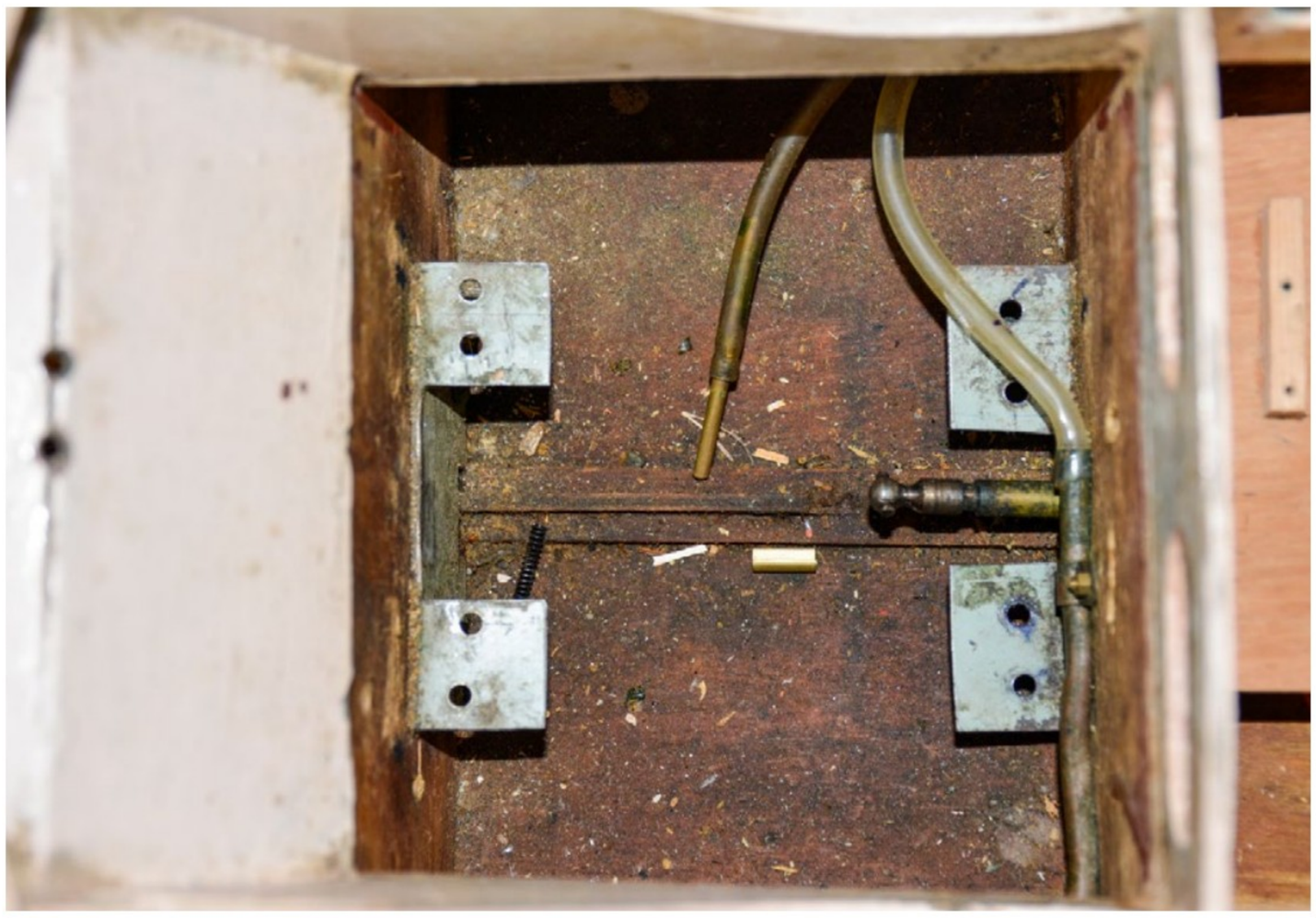
My example

As I mentioned in the last issue, my example was bought around 1970, from a Dunedin model shop.

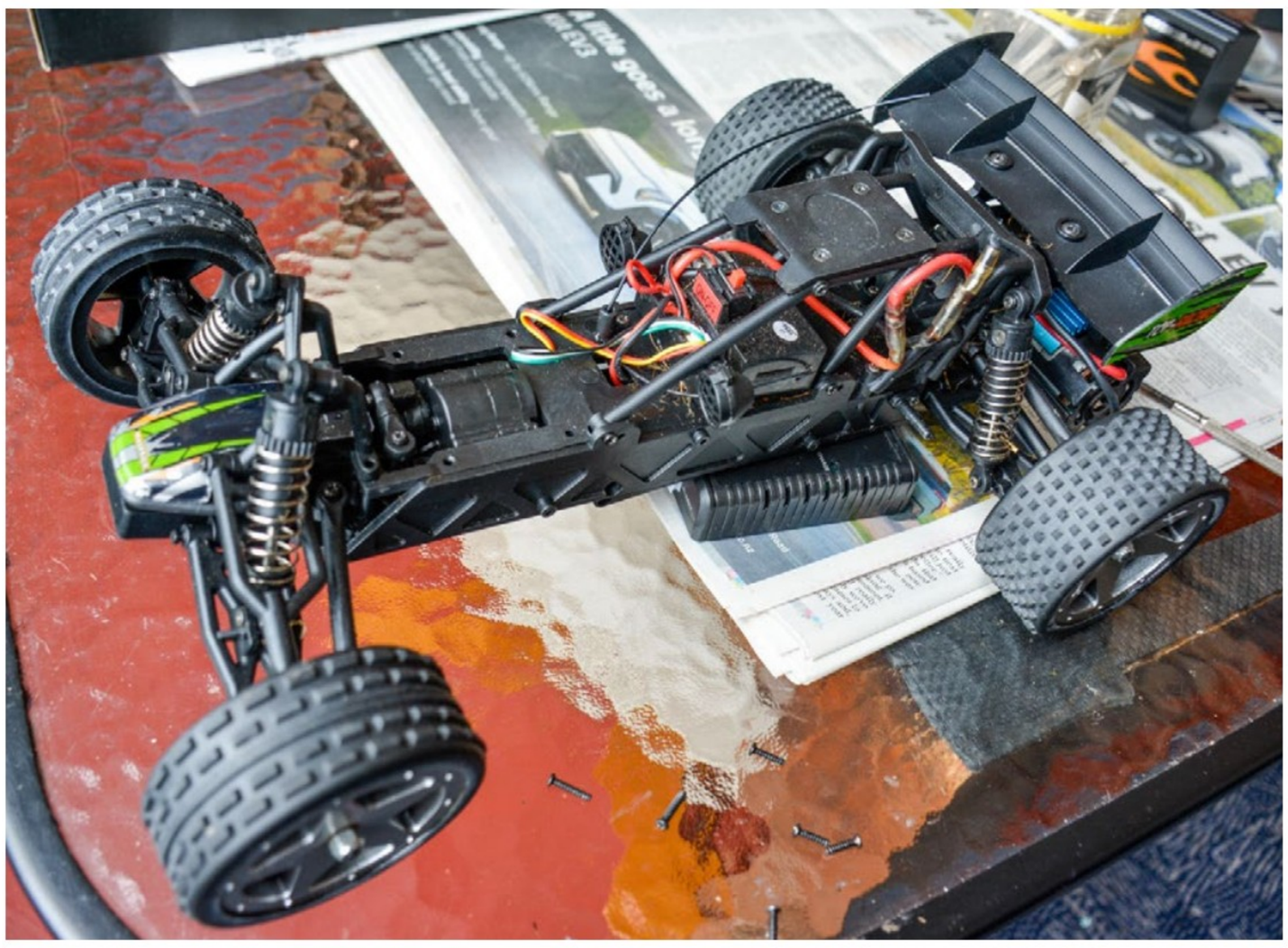
I wasn’t interested in the palaver of the internal combustion motor, which was still in it, and the bow rail – while well done – wasn’t something that fitted my mental image of such a vessel. Digging further, I also decided that the individually-fitted Perspex windows, while representing the builder’s obvious tenacity, didn’t either (photos of period



This gorgeous old forward/reverse switch, driven by a servo, was in the bottom of the boat



The manky engine bay, after the internal combustion motor was removed. Tubes were water cooling for the motor



The buggy I cannibalised for its control gear

vessels show wooden window frames not brass, interestingly – maybe hire boats and brass polishing don't go together) with the glass recessed inboard of the timber panel face.

I decided to keep the patina but re-paint everything, given that this is not an accurate replica of anything in particular and that small grandkid appeal is high on my list. I also decided to electrify it and to install a cheapo radio control. Also on the list was putting lights inside and out – for night work on the Model Engineering pond. A perusal of the internet threw up some examples of Wavemaster restorations, including one where the colour scheme leapt out at me as being ideal. Painting such a beast had me thinking hard about sequencing – how to mask which first, how not to lift new paint when removing the tape, all that. It was going to be time-consuming enough anyway, but the weather introduced dampness as a time-sapping factor, and the clock for this article's deadline was always ticking.

Radio control

I'm always loath to buy new if I can use what's around.

Many years ago, Dad had a stroke and ended up in a wheelchair. Being an old petrol-head and having often asserted his wish to "go out with demerit points" – he found his circumstances somewhat frustrating. I attempted to alleviate that by buying him a radio-controlled off-road buggy, which we could take places together. It wasn't a substitute for his real itch, and he only got to use it a few times. Then he died. It then sat in its box, maybe for the grandkids. But they have heaps of toys, and biking/swimming, and climbing real-time is more important at that age than remote-controlled stuff.

So I decided to cannibalise the buggy for its control gear, given that it had all I wanted: forwards/reverse, speed, plus left and right (no sails to pull in; power boats have it easy).

Further cogitation suggested that I could solve the heat-sink issue (speed control tends to produce heat) and the manky cockpit issue (legacy from the internal combustion motor) by using a piece of aluminium as the dashboard



The lounge table during bachelor weekend. The cannibalised buggy, some lithium batteries, and a motor being tested

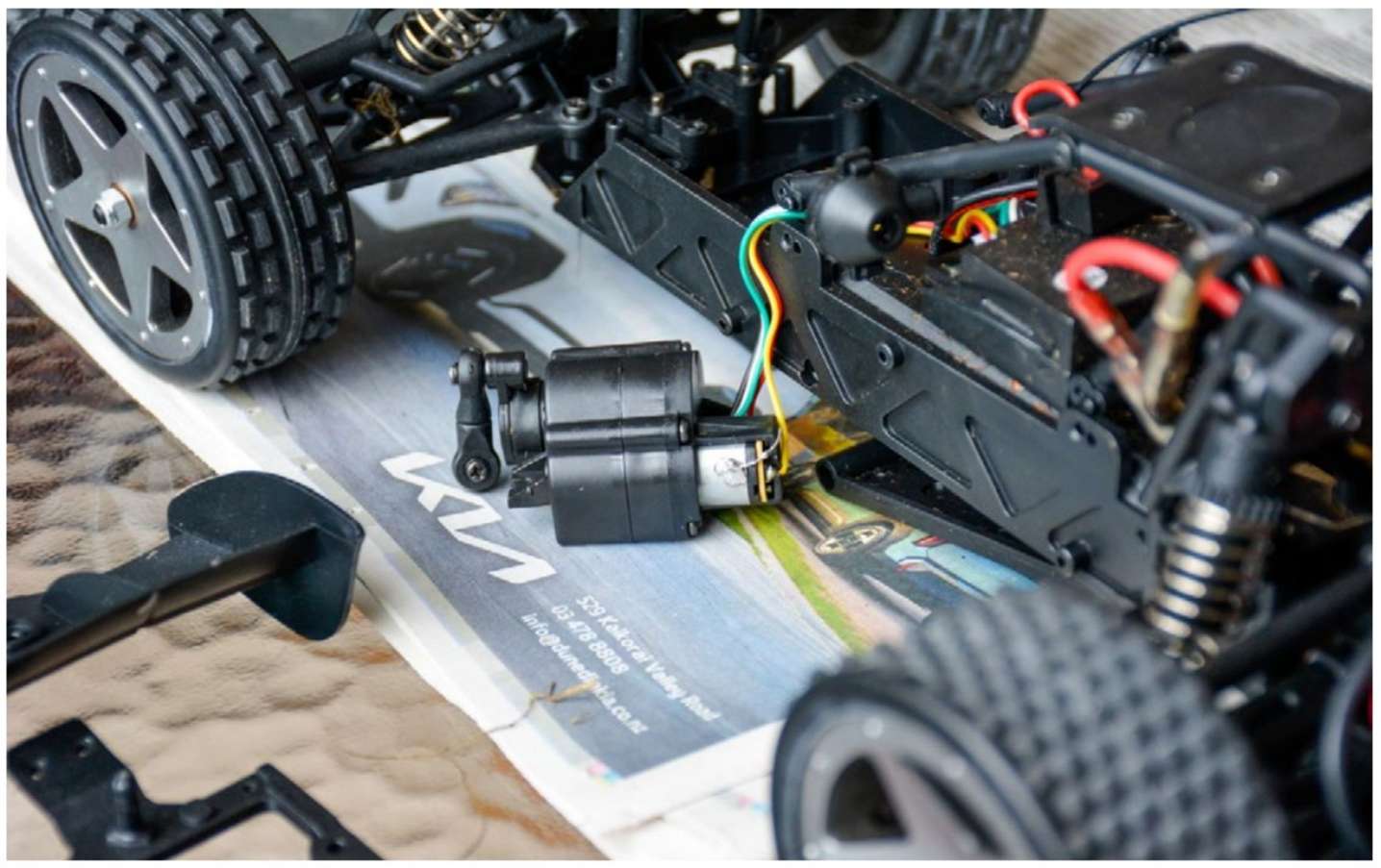
and mounting everything on it. That meant the steering servo – an interesting motor-driven five-wire affair – would need its wires lengthened, since it had to be at the other end of the boat.

The painting

That all went smoothly enough, and after one false start, I had the control stuff all mocked up on the coffee table and running fine. Or so I thought.

So I turned to the painting …

After a light sand of the cabin sides, I brushed on two coats of gloss enamel and re-learned a lesson I'd forgotten: gloss doesn't work for models; satin is more appropriate. And it wasn't the best brushwork I've ever done either. There are always ways out of such dilemmas –

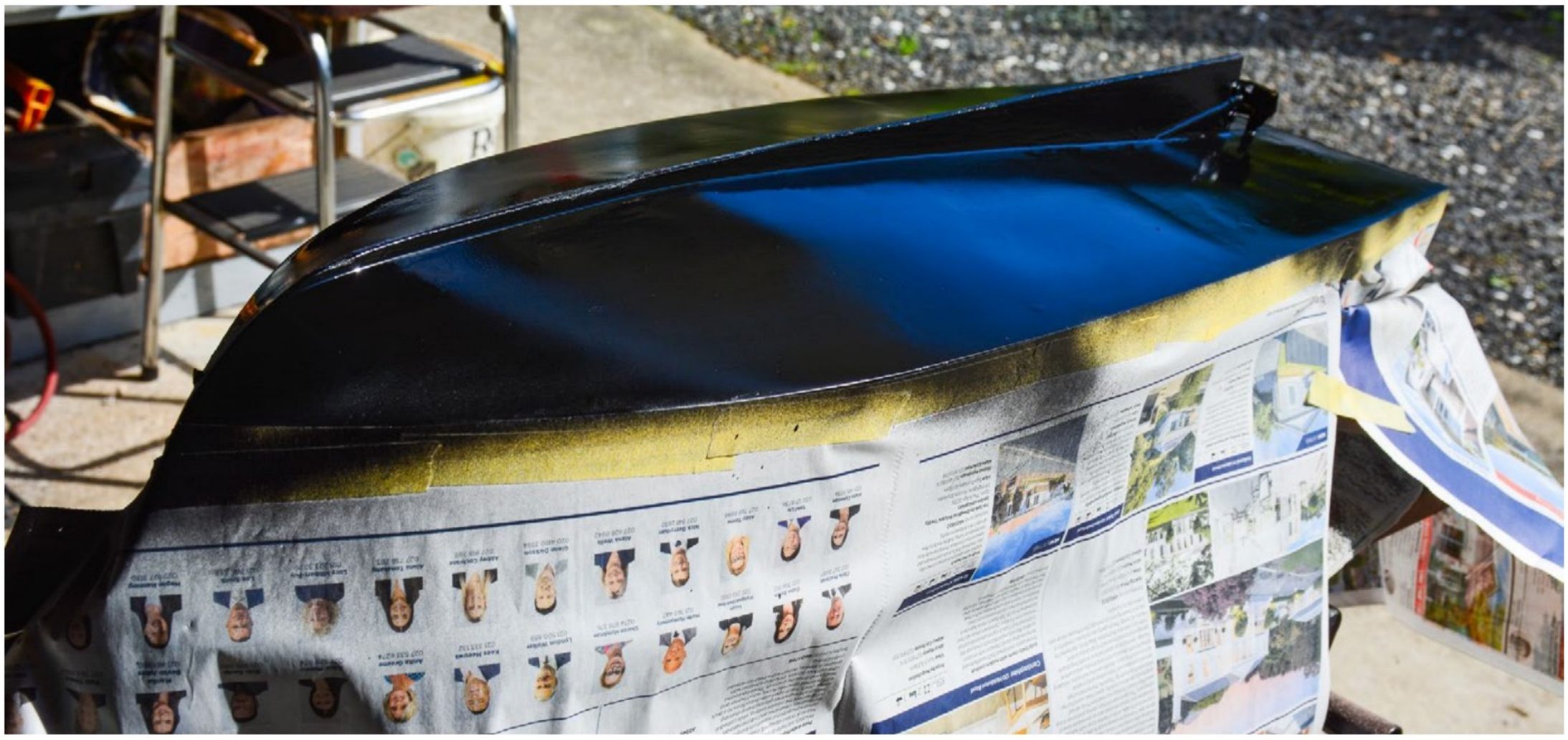


The five-wire steering 'servo', out of the buggy



The bow rail was nicely enough made, but not my style

> "I had the control stuff all mocked up on the coffee table and running fine"



Sequencing: bottom painted. One problem with these old ply-on-frame kits is that you tend to get 'flats' between the frames over time. Best to call it patina and move on; they are what they are



Sequencing: brown done, yellow to go



Heat sink/ dashboard — maybe one day it'll get a wheel . . .

usually involving time and elbow grease! I decided I could live with the surface if I waited until it hardened and sanded it. Then, if I sprayed satin clear over it …

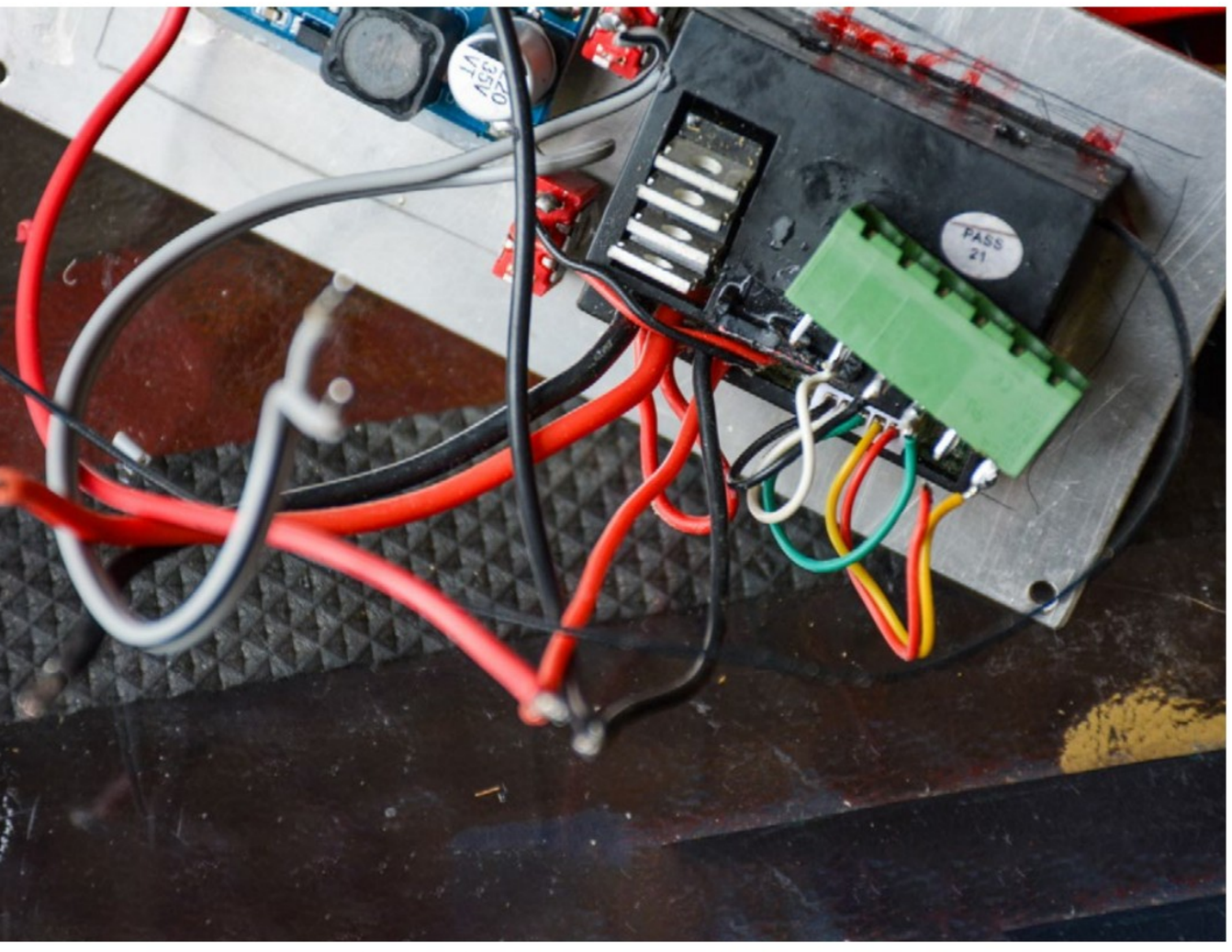
I soldiered on, masking and spraying the bottom and sides, deciding to leave doing the deck until I'd finished off the inside work (soft enamel and tools tend to be a bad mix).

The bachelor weekend

Then she said she was going away for the weekend (well, that's what she said; Monday would tell!).

So I mentally choreographed a plan: Friday sort the radio control, Saturday paint the deck, maybe Sunday fit polycarb strips as windows. Friday frittered itself away (note the blame-shift!) on chores and living. Saturday, the radio-controlled steering decided to play up. It took a while to diagnose an intermittent pin connection; I'd not

> "So I mentally choreographed a plan"



The inboard face of the heat sink / dashboard. Buggy receiver, voltage step-up, switches, and plug for lengthening the steering connection



The plaque thanking the wellhead F7, Masjid-i-Sulaiman, for its bounteous giving . . .

liked the look of them to start with and thought I'd cut that one off at the pass by glueing a clip-together plug nearby. Apparently not.

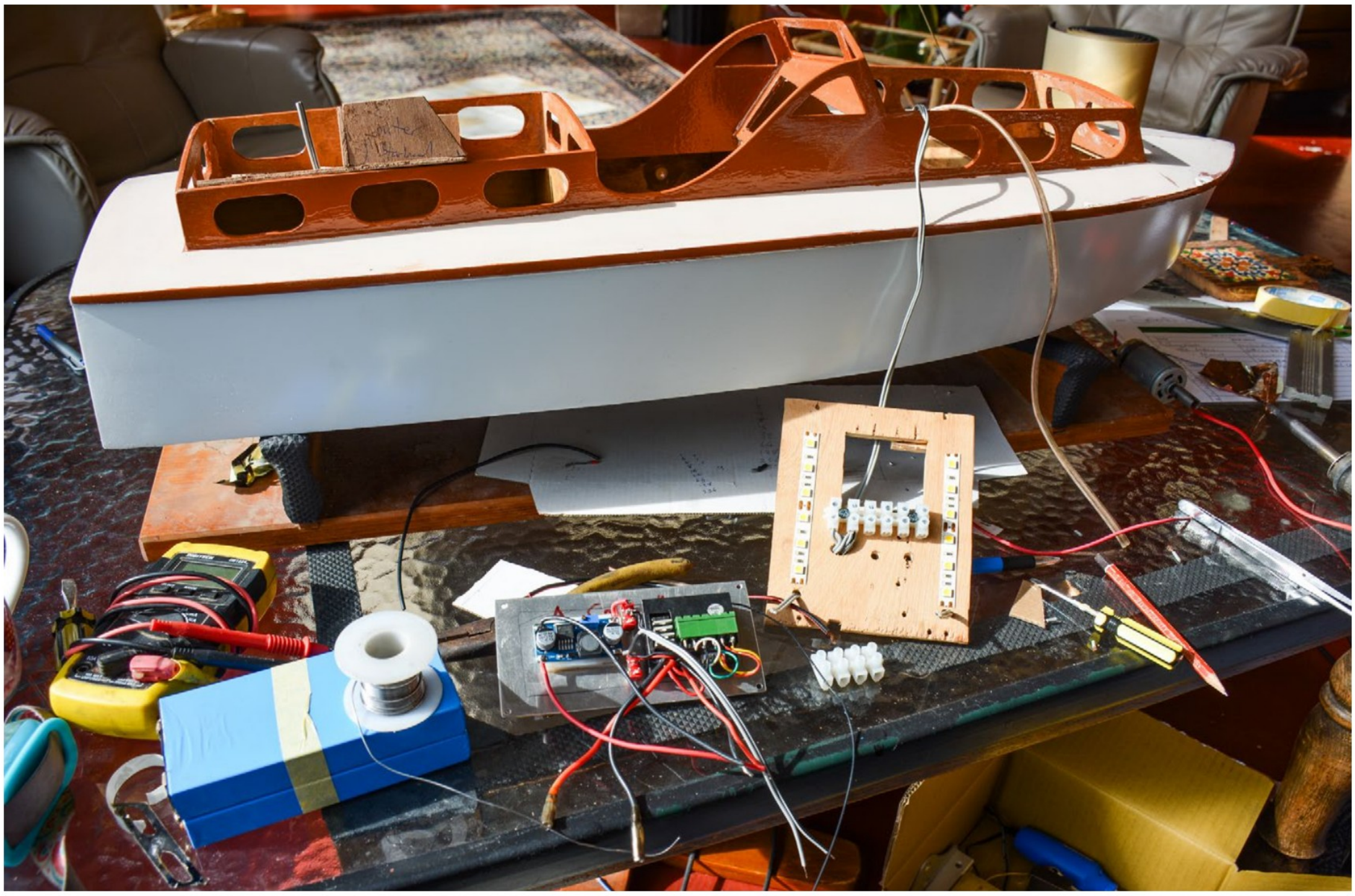
Saturday frittered itself away (where have I heard that before?). I spent some time defending a piece I'd written (about global energy – somewhat topical, given that this was the weekend Vance pretended to negotiate in Pakistan).

Global energy – particularly oil – has been my pleasurable learning space over the last 20 years, and the picture of the wellhead at Masjid-i Sulaiman is one of my favourites. Capped (emptied) in 1927, it was an early reminder of the inevitable fate of all oilfields. (If you Google 'interest.co.nz', then my name, you'll find it – if you go to YouTube, then search my name, you'll find a talk with slides, going into more depth).

Easy like a Sunday evening

Anyway, by Sunday evening, I thought I had the electronics and the internal hardware all sorted.

Monday morning, the steering was back to its old tricks, and this time I couldn't make it stop. The deck was still unpainted; the windows not in – and

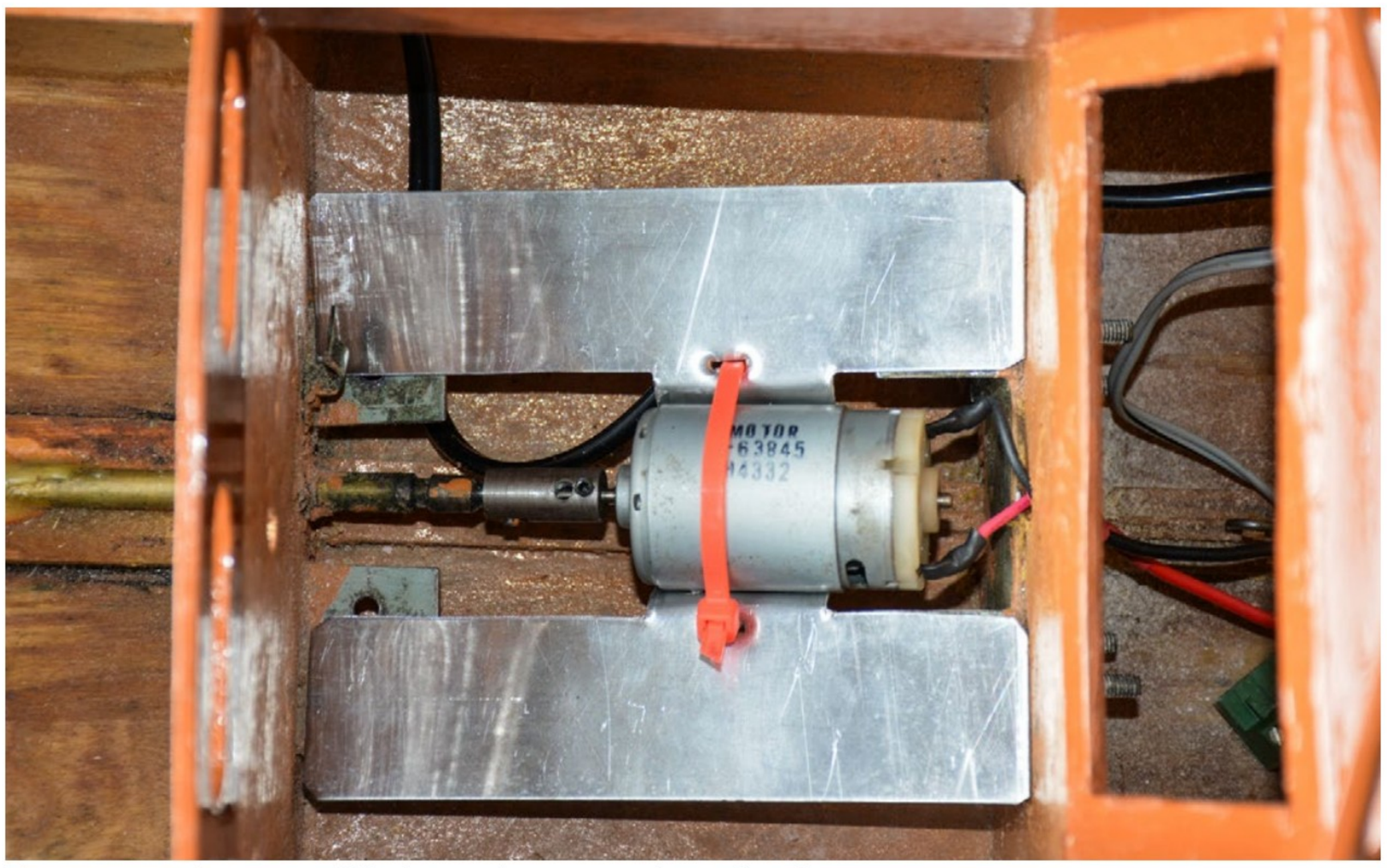


Batchelor weekend – ain't it grand how much chaos we can create in so short a time?

there are still chores to do and life to live (and a clean-up from bachelor squalor to tidy house before she returns). The deadline now two days away, I pulled the pin on trying to make it. This is meant to be fun anyway, and better done well than skimped.

So I backed off and did the thing I'd been looking forward to most: masking up the deck and giving it the first coat of the delicious yellow that Rainbow Paints had come up with. And a day later, a second.

I've dropped the concept of a target date; it'll just take as long as it takes, but that won't be long. Unless I'm overlooking something, I might have to rewire the steering servo, and if that doesn't work, maybe replace the whole system – because I'm not sure how to make the five-wire system run a three-wire servo (although I'll give it a 'nothing to lose' try before throwing the whole system out). Assuming the world is still in one piece two months hence, I'll report progress then.



Temporary engine mount. Who knows, it may never be replaced . . .



Yellow done, satin to go



Ransome is an interesting part of British Empire history. He was a journalist stationed in Russia during World War I and took part in post-war negotiations (once famously crossing and re-crossing a battlefield with proposals and counter-proposals) before returning to England with Trotsky's secretary Evgenia in tow.

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Project Binky, the beginnings

REAL-WORLD ARDUINO

Our Arduino expert has been following an intriguing project online for the past 12 years, but raises some valid points and a different approach for the electronics with this unique project

By Mark Beckett | Photographs: Mark Beckett

In recent issues of *The Shed*, I've introduced readers to features of Arduino. We've touched on past projects or articles, as well as talked about some current projects that utilise an Arduino.

Over the last 12 years, I've been following a couple of clever and talented guys (Nik Blackhurst and Richard Brunning) in England. Their goal was to put all the running gear (including a turbocharged engine) from a Toyota Celica 4WD into a Mk1 Mini while keeping the overall dimensions and four seats.

Most of the work was done in a garage on weekends, using basic tools. This is not some bodge job but a properly engineered and executed project.

Episode 1 gives the intro: **youtube.com/watch?v=7hCPODjJO7s**.

The project has been held up lately while they grapple with adding gauges and repurposing classic Mini switches to fit their new purpose and integrate with the new electronics.

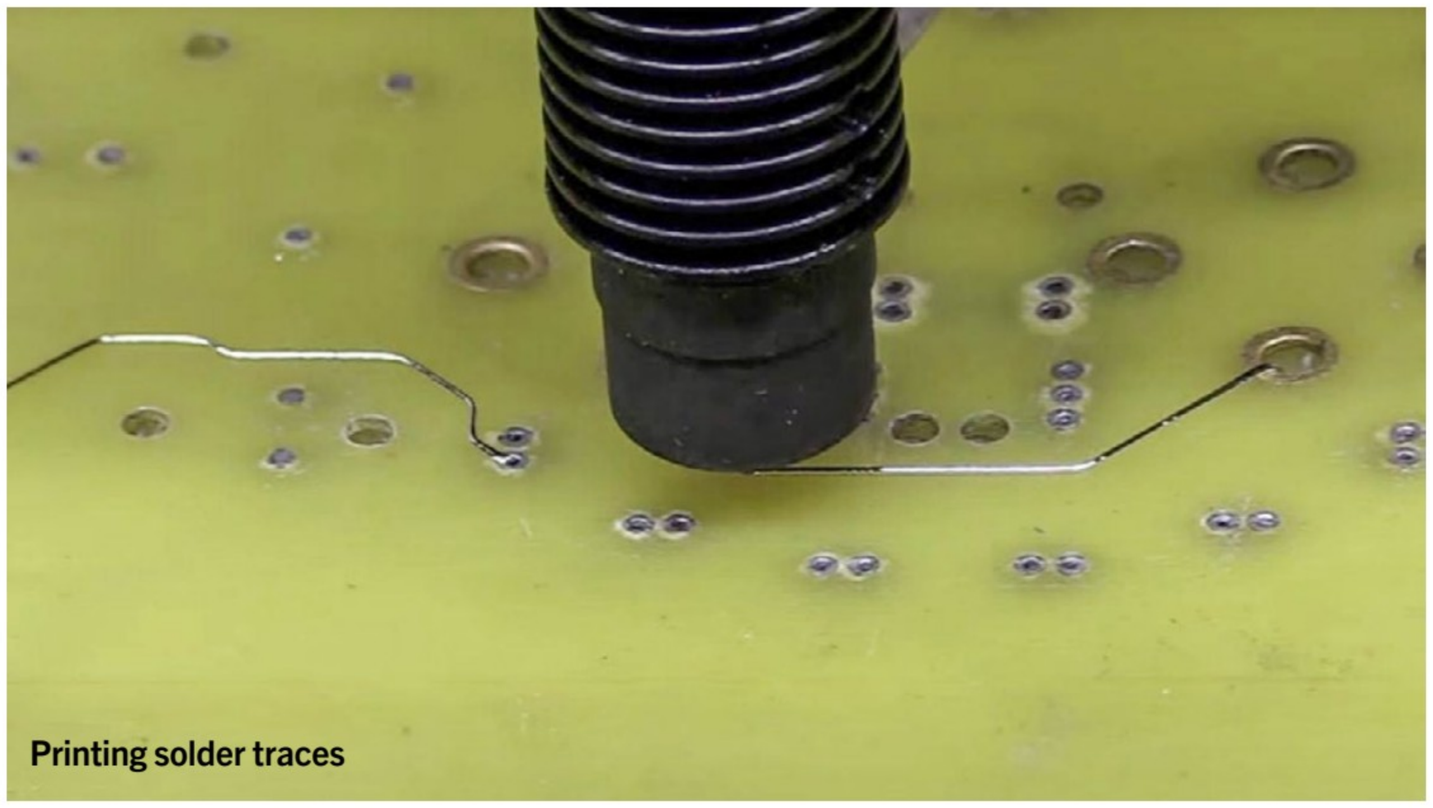
Integration

One episode outlines how they integrated the dash lighting, gauge needles, and other features using a couple of Arduinos … along with 3D-printing solder traces to connect it all together: **youtube.com/watch?v=DYkzphOn7co**.

Richard makes a comment about using AI for some of their coding.

While it suited their needs, in my opinion, I'm not sure that's a great idea in the longer term.

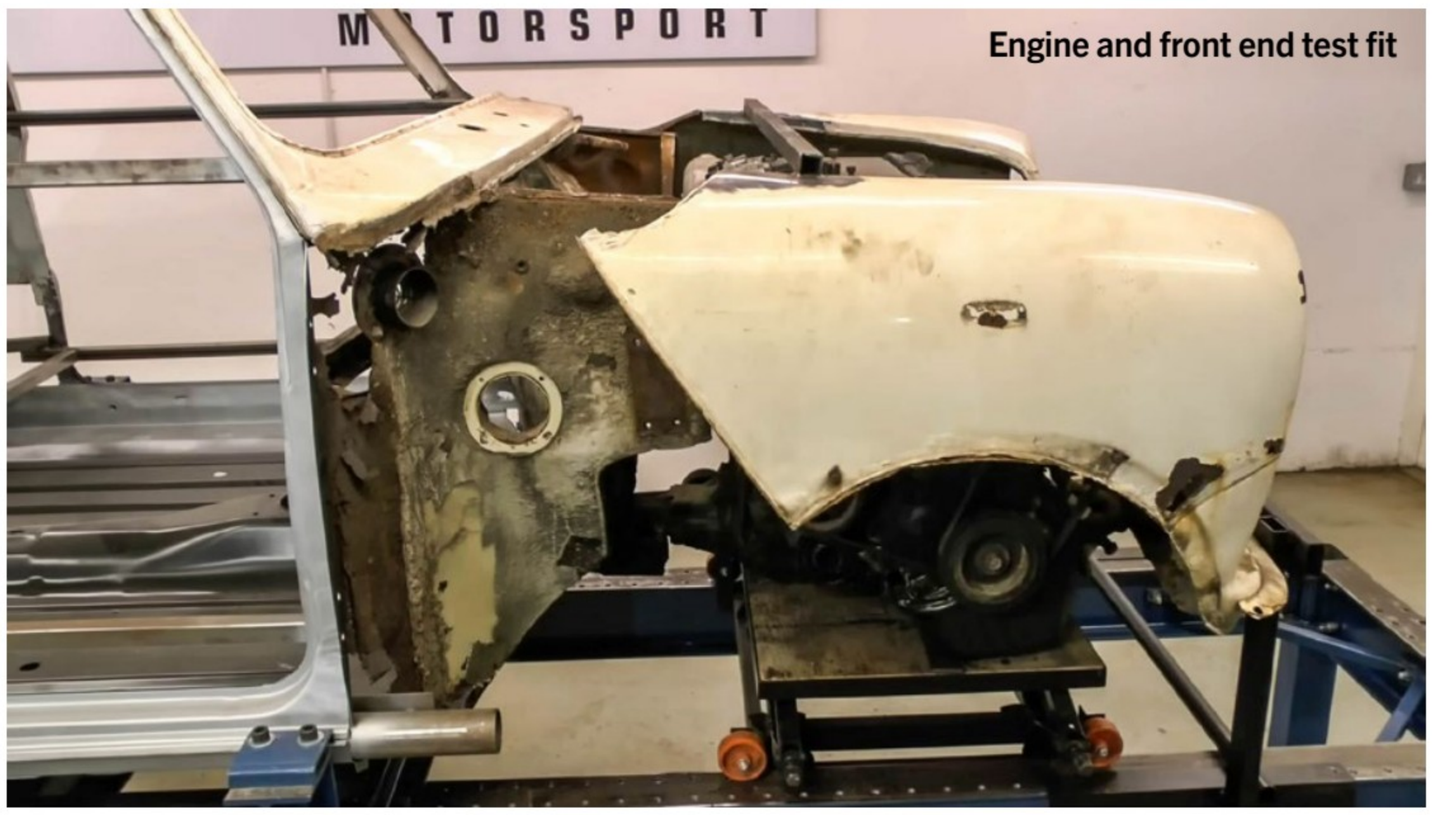
Understanding how the block of code functions is part of developing the whole sketch for your project. It becomes very important when you're trying to debug it, or you may want to include features for the future; that is, you need eight inputs, but you're planning for 10 later.



Printing solder traces

Broken

I was intrigued by the pile of broken Arduinos, but Richard explained later that they may have applied 12V to the inputs, which would explain it. For what it's worth, despite the mishandling by students, we've never broken one, but we've kept to the rule of 'never apply a voltage to any pin that is greater than the supply voltage'.



Engine and front end test fit

Printed circuit boards

It's worth mentioning that while 3D-printing traces seems a quick and easy way to make a board, looking at all the holes and other work involved, I'll stick with the traditional methods.

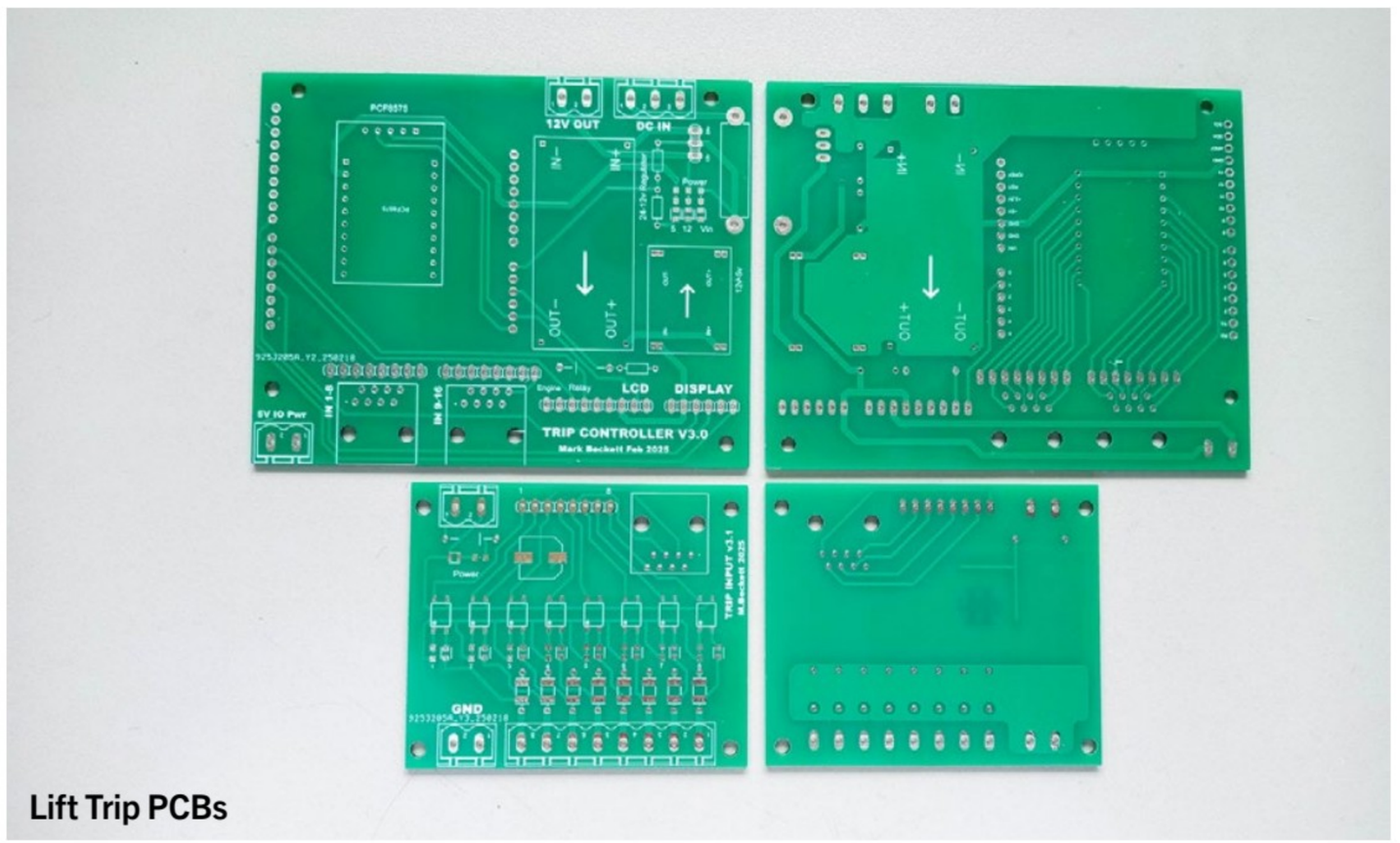
For my Lift Trip Safety System, I'm using EasyEDA software and https://jlcpcb.com for the boards.

The software is free and integrates with JLCPCB by using its design rules to ensure your board can be made.

The initial order was 10 x Main boards and 20 x Input boards, which cost US$22.75 including freight.

I submitted it, paid for, and reviewed it the same day, and the finished items were shipped out two days later.

With the low cost and the turnaround time so quick, I'll be doing more printed circuit boards (PCBs) and less module joining with wires.

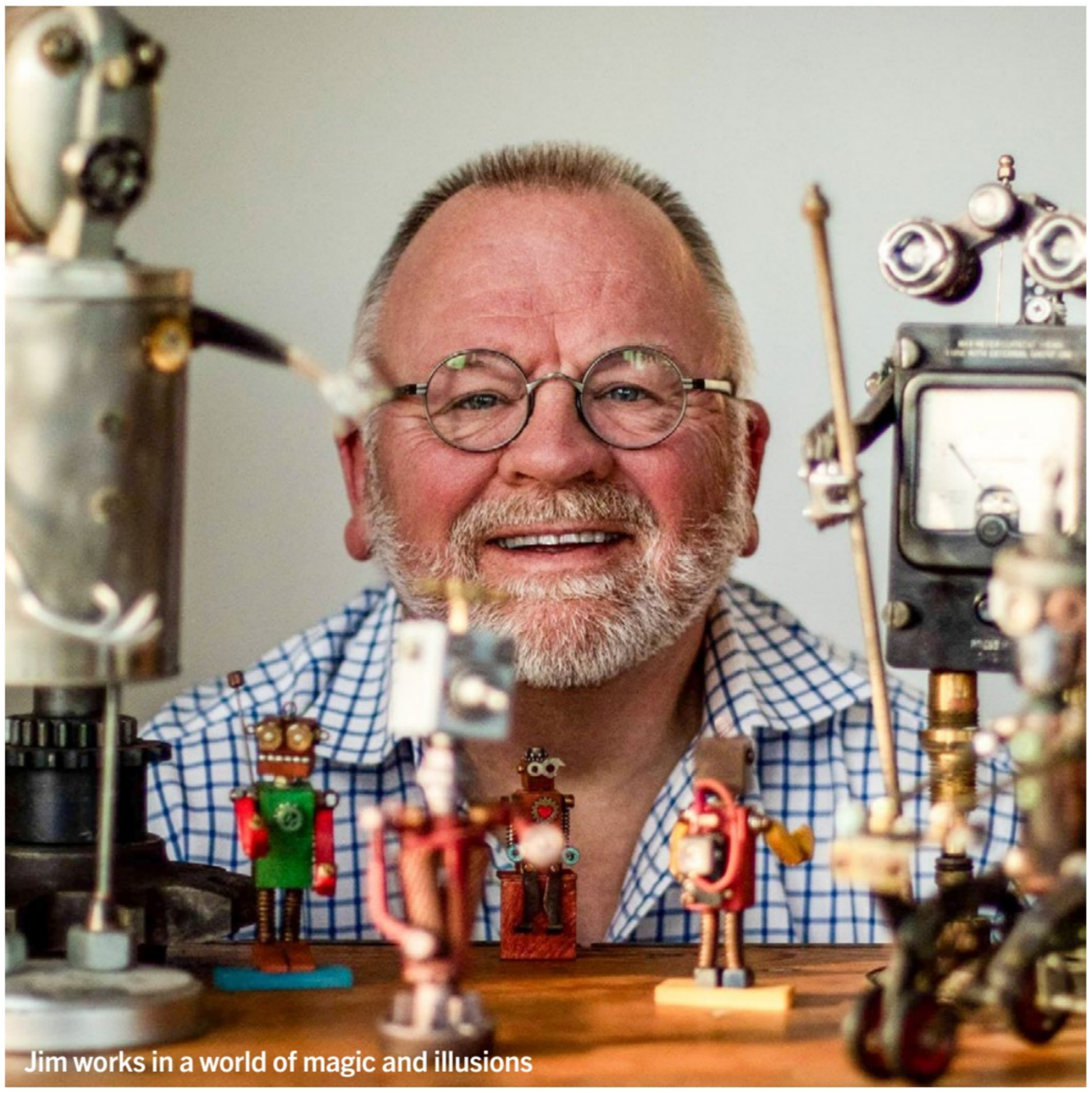


Lift Trip PCBs



Project Binky, the end result

Jim makes use of tiny pieces of scrap metal and paint to craft otherworldly robot beings



Jim works in a world of magic and illusions

JIMBOTS
A world of illusions

Seated at his workbench in a tiny shed in Paraparaumu Beach, Scotsman/Kiwi Colonel Jim Dryburgh looks a little like Pinocchio's maker, Geppetto. But instead of crafting puppets, Jim creates robots from scrap metal

By Vicki Price | Photographs: Vicki Price and Jim Dryburgh

Originally from Argyll on the west coast of Scotland, Jim Dryburgh grew up in the small seaside town of Dunoon, which is similar in size to where he now lives on the other side of the world, in Paraparaumu. A long military career brought him to New Zealand, and he has now spent some decades here. The robots he makes preserve vintage items in the process, sometimes memorable items.

He explains, "One of my favourite things is that people will come to me with a piece. They might have had a grandfather or a father who had a shed like this, and of course, when they pass on, as will happen when I do, the family will say, 'Bloody hell, what are we gonna do now?' Because nobody wants this junk. And then they'll have the job of clearing it, and quite often they'll come to me with a piece and say, 'Can you incorporate this into something whereby we can remember them?'"

Thinking robots

The robots are cleverly made from bits and pieces bolted together, and with just the slightest angle given to a head



Jim as a young fencer in Scotland



Jim and his father, who both had long and stellar army careers



Jim's family are all into his robot hobby and like to contribute where they can. Left to right: Heather, Katie, Flora, Jim. Absent are George and Sophie, who live further afield



Jim has transformed a bird aviary into his shed where the output belies its size

made from an old dial or block or oil can, it can give the viewer the distinct impression that the robot is looking out at the world and thinking deeply about it.

"It's fascinating that you say that there are expressions," says Jim, of the robot faces, "because of course they're not! You are seeing an expression; there are a couple of bolts and a bit of nail!"

Jim says he likes to think he works in a world of illusions. Just a little bit of magic. And others see this too.

As the steady stream of robots marches out of his shed, Jim has found his passion for toys and miniatures has bloomed into something the whole family can enjoy.

Empirical science at work

In beginning a new robot, Jim explains that there are two things that happen. He points to one robot to explain.

"I found that old meter in a junk shop, and I dismantled that and cleaned it up, because I knew exactly what that was going to be. And then I came home, got the other bits and pieces, put them together, and assembled it.

"So, either that happens – and similarly, Cyclops was built around his head – or I actually just put three or four bits on the bench and start thinking about what would fit together."

Jim points out what appears to be a fuel tank he bought at a junk shop in Paeroa about six months ago.

"I know that's going to be a robot body," he says. The piece had been tinkered with before it arrived in the shop. "I think somebody had started to build an old steam engine and never quite got around to finishing it.

"That's the thing when you've been doing this for a while – everything starts to look like a robot."

The robots might be made from combinations of things like a tea caddy, car engine parts, and candlesticks. People have gotten to know about Jim's hobby, and sometimes he will arrive home to find a box at the door full of items he could use.

Jim has often donated robots for charity auctions.



A selection of Jim's robots, lined up and looking ready to take on the world

Welcome to the wonderful world of tomorrow, yesterday

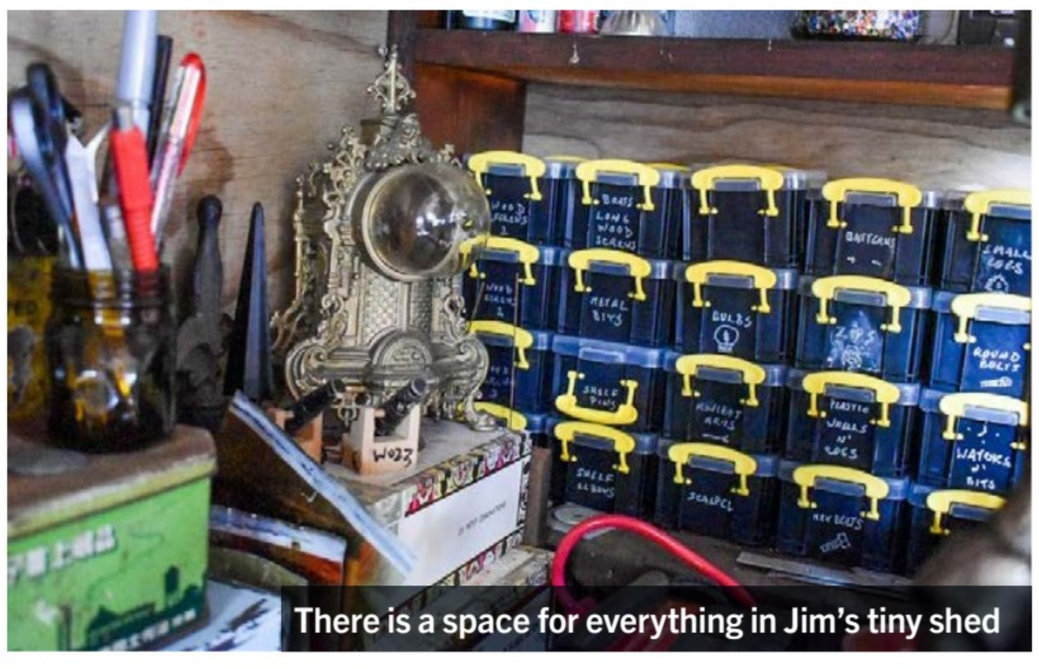
The shed began life as an aviary, but when it was transported to Jim's place, it was transformed into an efficient and workable space. Its bright red door promises adventure within.

Jim's shed is filled with myriad tiny drawers and shelves that hold collections of nuts, bolts, wire, metal pins, dials, springs, worn leather offcuts, and any scrap metal that could be used to create the robots, or 'JimBots' as Jim calls them. From the ceiling and walls hang tools, parts, and signs that express a dry wit, such as "Beware of grumpy old man" – which couldn't be less descriptive of Jim, whose long military career was in relating to people and bringing out the best from them. ▶


A small workspace lends itself to excellent storage ideas, such as these vintage filing drawers

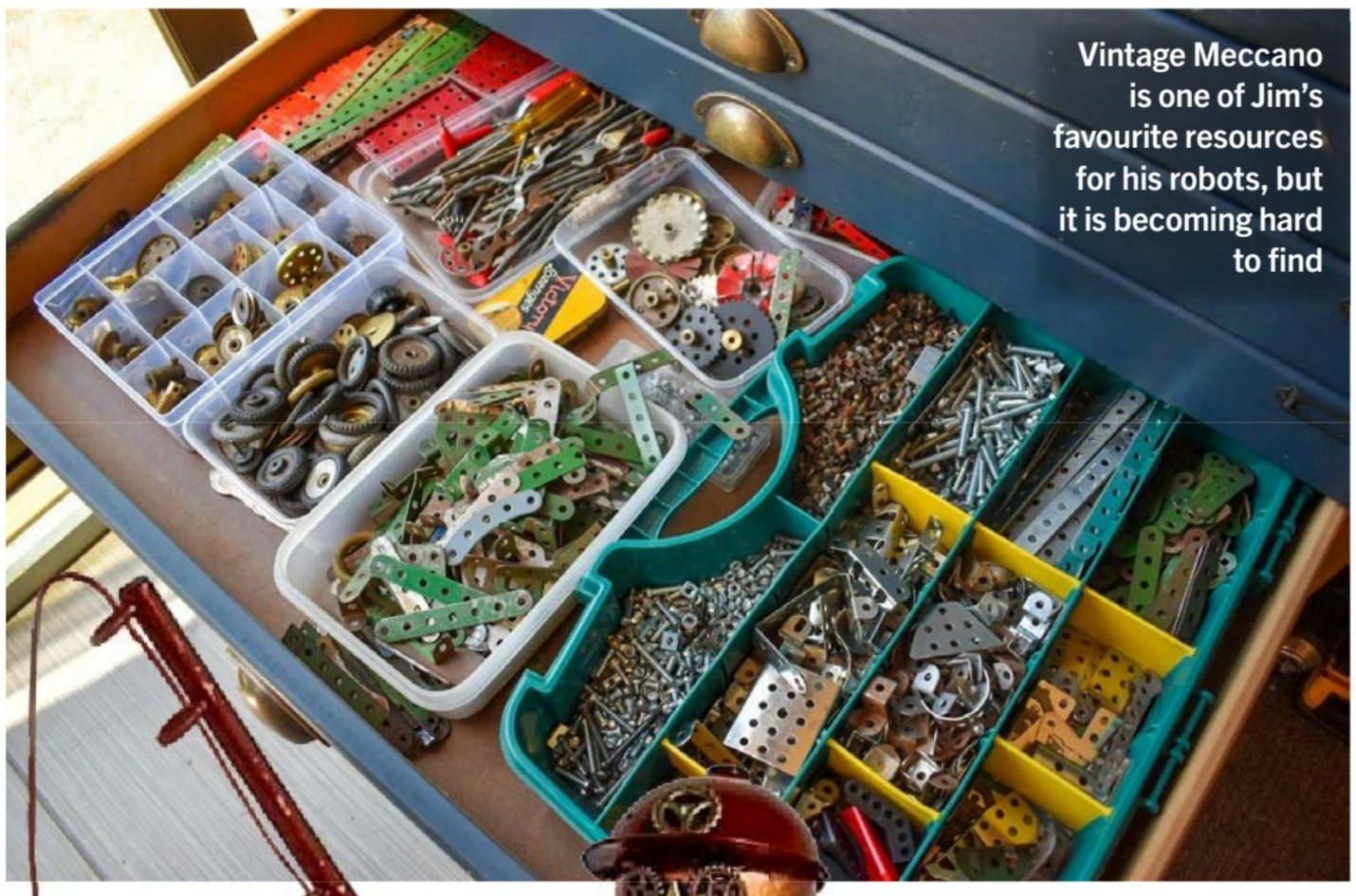
"That's the thing when you've been doing this for a while – everything starts to look like a robot"


Each drawer is filled with potential and sorted accordingly


There is a space for everything in Jim's tiny shed



With everything within arm's reach, Jim has created an efficient workshop space



Vintage Meccano is one of Jim's favourite resources for his robots, but it is becoming hard to find



They are parts joined together, but it is the viewer's imagination that creates the magic, according to Jim

The shed has worked well as a creative space, but with the increasing output of robots, it was inevitable that work and display space would need to grow.

"It's not because of the floor space," says Jim of recent efforts to expand his work area. "It's the surface space to actually work. I've gathered the stuff for making the robots over the years, and it's kind of evicted me."

With the bots, or rather, their parts, taking over, Jim now also uses part of the house beside the shed. Here, he has benches to work on as well as enclosed areas in the path behind the house. Last winter, he closed in three bays to house his drill press, belt sander, and a bandsaw. There are plans to build an extractor fan system that will pipe into a single duct from each bay. It won't need to be heavy or industrial, Jim notes.

Stacks of parts

Beside the bays are boxes stacked with parts. In one area are heavy springs.

"I bought those from a mechanic over in the Hutt, and I think they were from clutch assemblies for trucks and cars," he says.

Jim has collected a decent stash of otherwise useless scrap metal to make his robots and their eclectic parts – whether limbs, torso, or head – giving a real industrial charm to them.

An unusual piece is from a 1950s analogue adding machine. Some of those parts have already been incorporated into robots. One robot has pulley wheels from an old laundry hanger; another has a lever out of a 1920s typewriter.

Jim always has a commission on the go. There is one on his bench under construction that he is making for a fire chief in Auckland. The robot has a centre point, which is an old fire alarm, and the firetruck it will ride in was the body of a vintage Singer sewing machine. "I'll mount that onto a base and put wheels on it, ladders, and bits of copper and whatever – pipes and such like," says Jim. This robot will become a tribute to the chief's career.

He did a Staffordshire police dog recently as a gift from the dog handler's wife. The dog was fashioned from a three-legged gravy boat, which was filled with a clockwork inner.

To join parts in the construction of robots, Jim uses all types of fixings: “I use mostly nuts and bolts and occasionally I use some glue. I try to use glue very sparingly. When I first started, a long time ago, I hadn’t developed all the techniques.”

The only glue Jim uses is Avetek gap filler in a two-ounce bottle. “It costs me about 60 bucks,” he says, “but that will last me a year or more. I’ve done some soldering, but not to fix bits together. If I’m soldering, it’s because I’m putting lights in or whatever, just to give them a little interest.”

Clockwork automaton

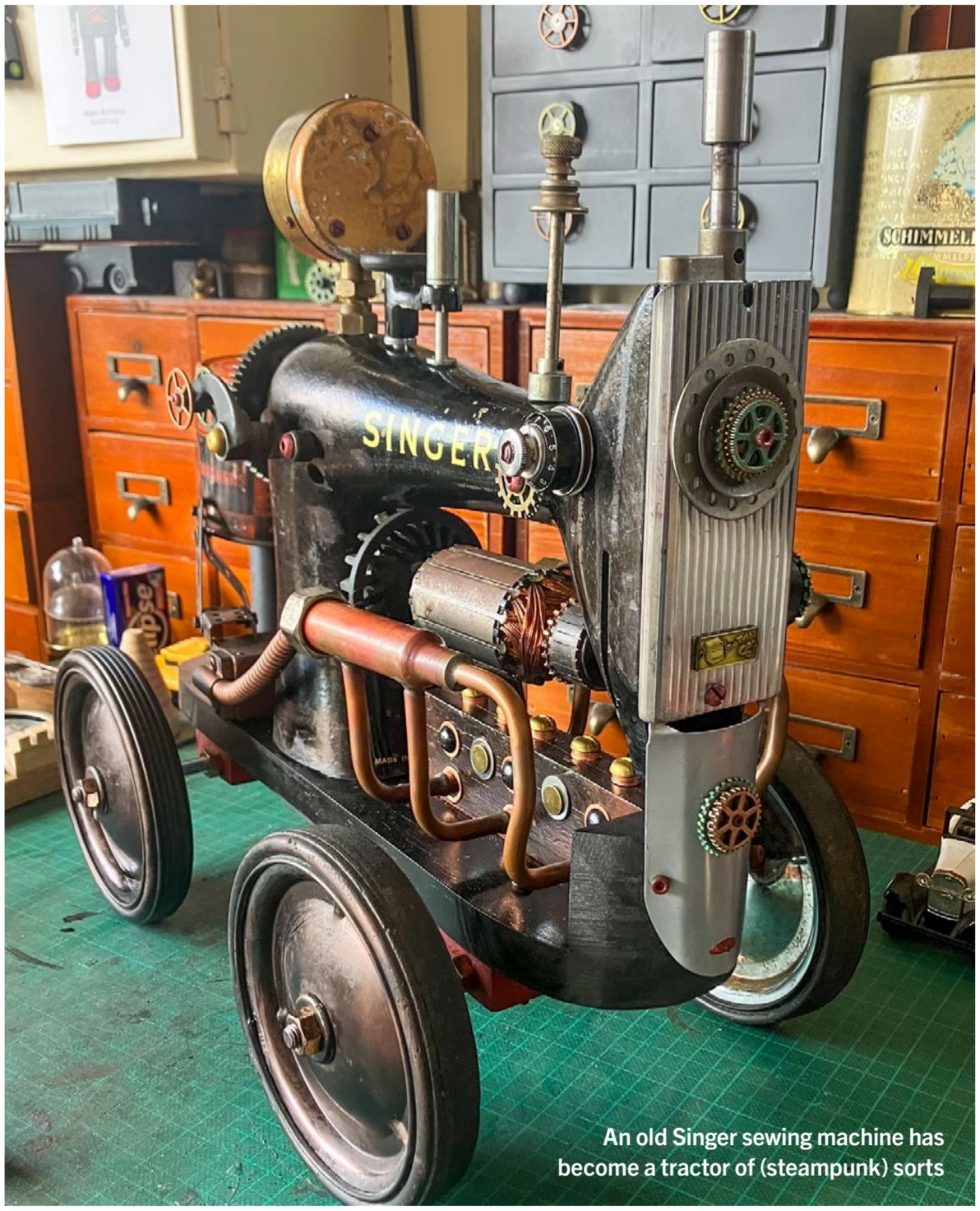
While Jim builds his robots into lifelike little characters, he is not squeamish about dismantling them if he’s not pleased with the result.

As his style has evolved since making his first JimBot, he has developed a keen eye for proportions and symmetry. One early robot holds a lamp on its head at the end of a metal staff. “My style’s developed so much since I built it,” he says. So, it’s actually going to get dismantled: “I love the lamp, but the legs actually don’t work with that body, and that head’s out of proportion, so that’ll get replaced. The legs will get replaced. I’ll take that backing off. I have done that with some over the years, as they’ve sat there for a while, and I’ll decide, actually, that’s not what I wanted to do for this. It’s not up to the standard I want to be known for.”

For many of his robot creations, Jim says they take a few weekends to make. If they have an antique teapot in the construction, usually Georgian in style, they take longer, because other than the teapot, he doesn’t have a complete plan in his head. “They grow as I’m doing them.” As to knowing when a piece is finished, Jim says it is absolutely true that “less is more”.

One of Jim’s friends and a source of some inspiration is YouTuber Colonel O’Truth (Colonel O’Truth’s Miniature Issues), who makes model airships, buildings, and other miniature-scale models in the steampunk style.

“He has a beautiful eye for painting,” says Jim. ▶



An old Singer sewing machine has become a tractor of (steampunk) sorts

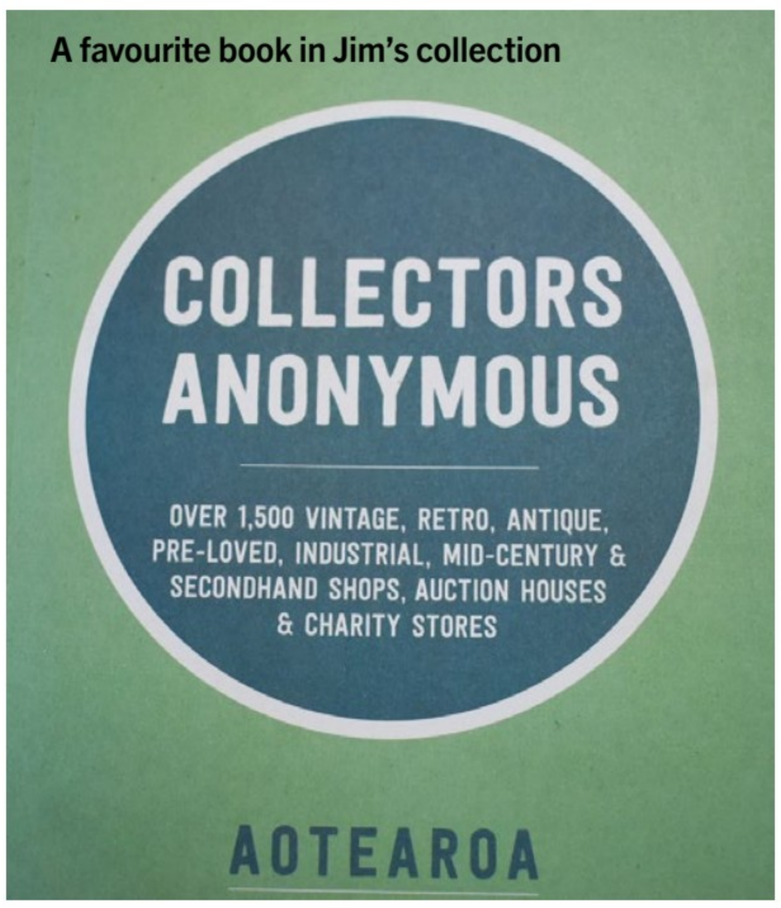
“It’s not up to the standard I want to be known for”



Vintage teapots make for excellent robot vehicles



This flying airship was made by one of Jim's contemporaries, YouTuber Colonel O'Truth



A favourite book in Jim's collection

"Upstairs in a secret room behind a bookshelf (yes, really), he shows us his collection of toy cars"

Cast-offs to contrivances

Rubbish tip shops were a useful haunt for Jim, looking for interesting parts for his creations, but he says that since Covid-19, they have become somewhat disappointing.

"Tip shops were a real treasure trove, but since Covid, and to some extent I think this is good, people are keeping things longer, people are repairing things, which I think is excellent," he says. "But it has meant there is less scrap to fossick through."

Metal and wood are the preferred media for JimBots. Jim avoids plastic, giving his creations a retro appeal. If the parts have peeling paint or worn edges, all the better.

"One of the things I was trying to do was try to keep stuff out of landfills for a bit longer," he says.

Jim also likes to collect vintage Meccano because it fits the robots' aesthetic. The metal "make and know" model construction sets, invented in 1901 by Frank Hornby in England, became popular worldwide for their ability to be made into all sorts of mechanical forms. Like JimBots, models could be constructed using nuts and bolts and a bit of engineering nous.

While most of Jim's raw material for the robots comes from op shops, sometimes pieces come from further afield.

"There was a really cute robot that I



Even tiny pieces of scrap can be made into tiny characters with big personalities

made that I could have sold five or six times over, which was built using a pair of opera glasses that I bought in a flea market in Tokyo," he recalls.

Retro-futurist scientific romances

Jim says his robot-making hobby stems from a love of science fiction, especially 1950s sci-fi movies like *Forbidden Planet*.

"I was born in the late '50s, of course, a lot of those '50s movies were showing in the late '60s when I was growing up, and that was an influence, and I love toys, I've always loved toys," he says. "When I was 12, I got up on Christmas morning, and there were no toys, and I had a wee nervous breakdown. So, when I became an adult, I made up for it, and I've been collecting toys and making them, of course."

Upstairs in a secret room behind a bookshelf (yes, really), he shows us his collection of toy cars he still has from his childhood amid wall-to-wall bookshelves, leather couches, a flying ship, and memorabilia from his Scottish heritage. Jim began dabbling in robots around 2021. He soon found his creations were piling up around him: "My wife said, 'We probably have to get another house.' And then about that time, one or two friends started saying, 'Oh, would you make me one for a birthday or an anniversary?'"

He was also enamoured with a visit to Oamaru during the steampunk festival held there, and if you haven't yet noticed, steampunk is also a huge inspiration for Jim.

"I'm one of those people who gets dressed up as an airship captain to go to Oamaru for the festival," he says. "Steampunk has this lovely romanticism of looking at the future from the view of a Victorian who only knows about clockwork and steam."

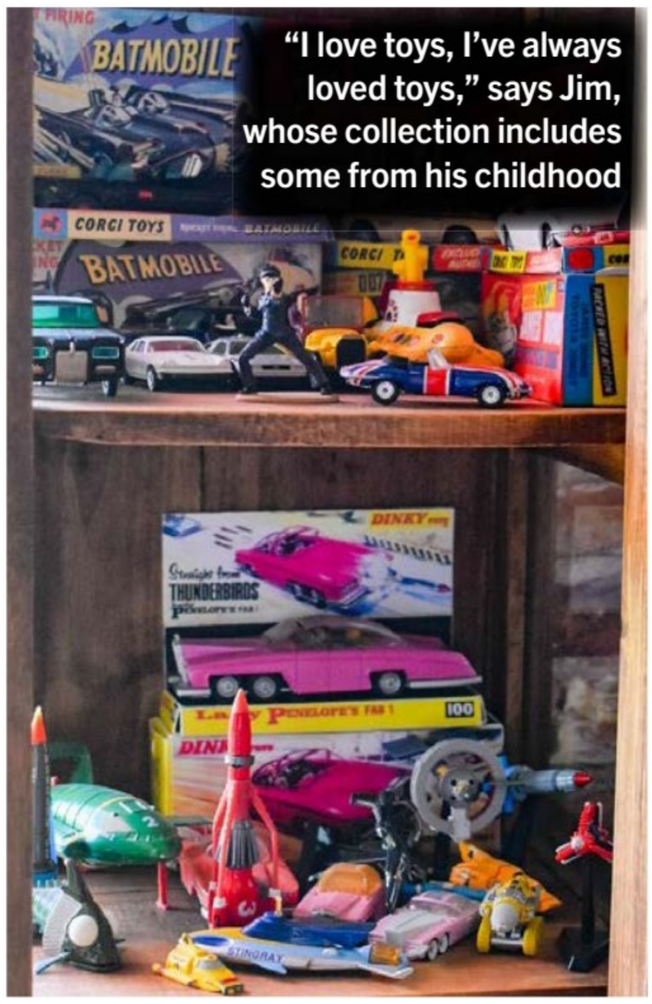
"Nobody is gonna be interested in these"

Jim did some commissions in those early JimBot-making days, and then, about three-and-a-half years ago, his friend Wendy, who had been in the Kāpiti Coast Art Trail for a couple of decades, suggested he get the robots on the trail as well.

"I said, 'Don't be ridiculous, nobody is



From inside the secret room, behind this door is the bookshelf concealing the entrance



"I love toys, I've always loved toys," says Jim, whose collection includes some from his childhood



Jim holds a replica Tardis, from the iconic *Doctor Who*



Robot making has expanded into the house



Opera glasses and an old voltage meter have never been so cool



Jim starts with a vintage teapot and makes it up from there for robots on the move

gonna be interested in these.'" But Jim's friend insisted, and now Jim's shed has been a popular space to visit for the last three years. He believes it is the unique nature of his robots that draws the crowds, with most other studios being for other arts, such as painting, potting, and the like. After a humble start, last year, there were over 500 people who came to admire his shed and the JimBots.

When the art trail is on, the family helps to set up and look after the shed and display area, because there is a steady flow of visitors. In the most recent art trail, Jim had a large robot on display made from a large wooden radio case, with arms, legs, and a head, but with no back on it, so you could see the inner workings of the radio. A smaller robot had a biscuit tin on the back, which concealed a surprise, says Jim: "When you opened the biscuit tin, there were three mini robots inside, running a control room and running the robot."

The couple who bought that JimBot intended to send it to a private museum in Timaru.

"After they'd bought that, the woman came back the next day on her own and said, 'I'd like the big radio box as a present for my husband, I'd like you to put a back on it, and I'd like you to build a scene in it.'"

After agreeing on a price, Jim set about building two levels of workings within the radio robot and says he enjoyed creating the miniatures aspect along with the robot making.

On the popularity of his robots, Jim recognises the appeal.

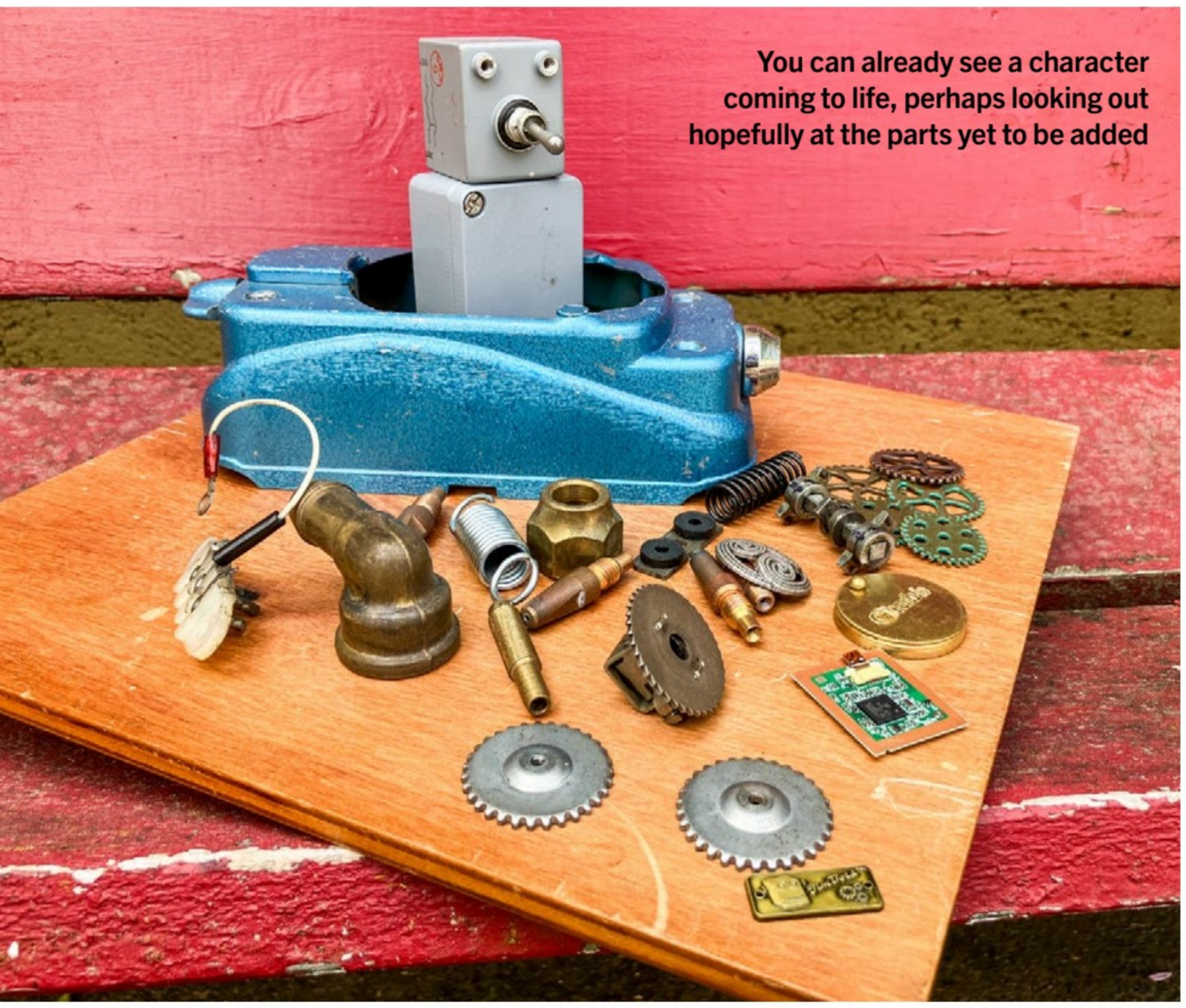
"If you think about it, it's probably one of the easiest subjects in the world, because nobody's comparing it with anything else. And the robot is basically a body, a head, two arms, and two legs, and then the rest of it is all imagination. What I like to say is that I'm in the world of creating many illusions."

The household applies its ingenuity

The robots have become a family affair.

"That's the other great thing, the family are into it," says Jim.

"So I got my daughter doing the stories, but we're all great op shoppers, so they do a lot of the picking, and



You can already see a character coming to life, perhaps looking out hopefully at the parts yet to be added

quite frequently they'll go to the local op shops or op shops when they're on holiday, and they bring back things because they know what I'm looking for. So, everybody plays [a part]. This includes youngest daughter Katie, who likes to op shop too."

Each JimBot is accompanied by a small card of text telling a little of the personality of the robot. These are written by Jim, together with his daughter, Flora, a musical theatre performer and writer.

"You're not just getting a junk robot; you're getting a character," says Jim, such as this sample of text for one robot: "His bolts might squeak, and his knees creak, but his loyalty is smoother than a fresh oil change."

Flora studied musical theatre in Wellington and has performed in large productions such as *Les Misérables* and *Phantom of the Opera*, as well as producing a couple of her own shows in the Wellington Fringe Festival. But it was while she was working in a gift store that the idea came to her to write little biographies for her dad's robots.

Text gives them personalities

Flora says she noticed how a piece of art comes to life with a little piece of text giving background information. Sometimes, in naming a robot, she will look at a newly finished robot and say, "I

"Each JimBot is accompanied by a small card of text telling a little of the personality of the robot"



SPARKY

"Help me, Sparky, help me, Sparky" is a haunting phrase embedded in the minds of many childhood listeners of the radio story *Sparky and the Talking Train*.

The seed of doubt that machines were only machines was sown in the minds of countless children of the '50s onwards.

Sparky's plaintive message to the young lad in the story, who believed the train was talking to him, was that there was a problem with the "right front wheel, right front wheel" – and we all knew the thing was alive!



Jim's daughter Flora writes little biographies to go with the robots, really bringing them to 'life'

know who you are, and sometimes Jim will have given them a name already. Many times, the robot will name itself."

Many of the robots have a vintage tin for a body, and the name of the tin will be the genesis of their name.

It was 'Nigel', a robot that became a 'kiln guardian' for the New Plymouth potter who bought him, that spurred Flora into writing short bios for the robots, along with the upcoming art trail at that time, and they have been a real hit.

Jim drew up an idea for a little brass plaque attached to each JimBot, with his name on it. His graphic designer daughter Sophie turned that into a design, then Jim got them mass-produced in China. Each robot has one of these plaques attached to it, adding to its authenticity. Sophie has also designed the posters for the JimBots that promote Jim's shed, whether on the art trail, open days, or other events they are a part of.

The family are planning on doing an illustrated book featuring the robots, and the charm of this will no doubt appeal to all ages.

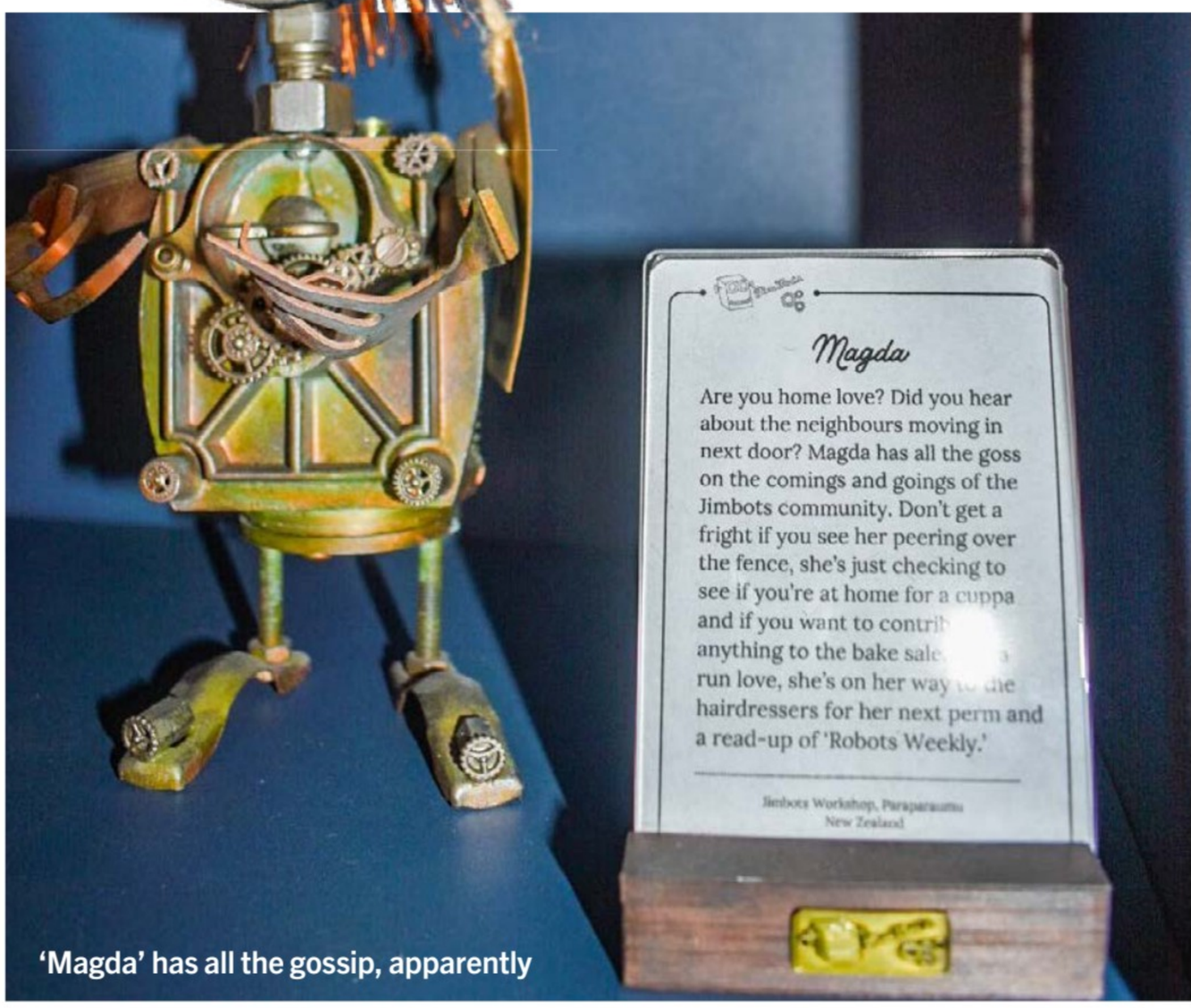
The clockwork legions rise

As the number of JimBots that are moving into people's homes grows, this hobby of Jim's is beginning to get noticed.

Jim loves a little bit of rust and worn paint – it adds to the vintage vibe



'Cyclops' – maybe some mustard got in his other eye



'Magda' has all the gossip, apparently

The aftermath of the art trail keeps Jim busy too.

"Usually after the arts trail I have a year's work ahead of me, which is really, really cool," he says.

Jim has a method for his commissioned work: "I sit down with an individual, and we agree on a budget. I will never go over a budget. And quite often, it will come in under budget. And then my promise to them is, OK, I'll build it, and at the end of it, if you don't want to, don't take it, I'll just put it on my shelf. Nobody's invoked that option so far, touch wood."

Twenty-seven JimBots went to new homes as a result of the November 2025 Kāpiti Coast Art Trail.

"Over the three years that I've been doing the arts trail and the four or five years I've been building, there's gotta be 100–150 robots that have gone to new homes."

The number is actually much higher because the small robots Jim makes, some of them on keyrings, go much faster due to their low price.

"And I do have an open day once a month, which sometimes nobody comes to, and sometimes I have a really good day. But again, it doesn't bother me, because I'm sitting in here working anyway," he says.

Nostalgia plays a part for both Jim and his customers. "Quite often, the reason people will buy a robot or collect them is that they recognise an element of the construction and say, 'I remember that when I was a kid!'"

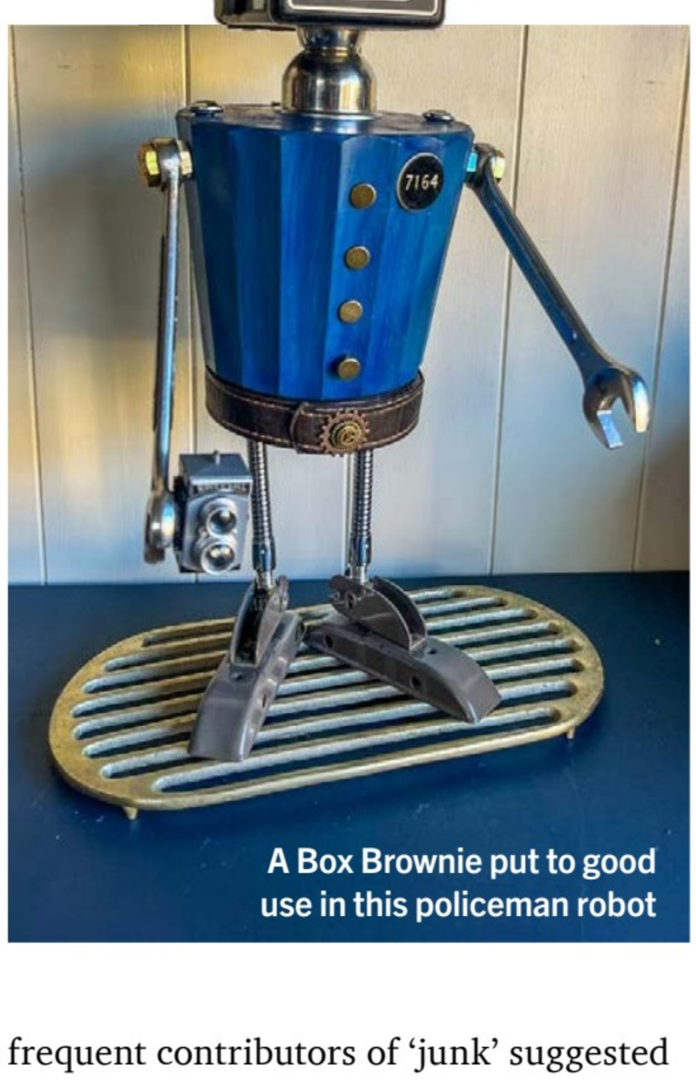
Children are huge fans of JimBots, too, and Jim was asked by a local school to come and talk with the kids who were doing a project on junk bots. He took a dozen of his model robots to the class and did a 20-minute presentation to the kids. "And a lot of those kids have come and visited me here ever since and showed me the robot they've done or whatever," he says.



Robot keyrings are popular with visitors to Jim's shed studio



Looking like a harassed parent, this robot may have bandages on hand 'just in case'



A Box Brownie put to good use in this policeman robot

Jim reckons about 100–150 of his robots have gone to good homes

House of clockwork

Finding a retail space for his creations was not a priority for Jim, who has had four or five galleries offer to sell them in their stores.

He felt the galleries weren't the right space for his robots, but then one of his frequent contributors of 'junk' suggested a new local store that sold upcycled and vintage items. The store, House of Puck in Raumati, instantly felt right to Jim, whose robots now stand centre stage there and are popular with the customers. But Jim admits that because he isn't requiring his creations to pay the bills, he can be relaxed about sales.

"It might have been different if I'd had that imperative," he admits.

Unsurprisingly, with creativity running in the family, Jim's son George is also a creative.

"He runs his own makerspace and is a YouTuber (@Refitretro), so he will make anything," says Jim. "People will come to him with an idea and they discuss it." A typical example, he says, "is a couple of years ago, a guy had a vintage car



Jim often does commissions for people who give one to celebrate a career in a particular field

and one of the wing mirrors had been broken, and a new one was going to cost him $2500. So, he went to George and said, ‘What can you do?’ George scanned it, then made a 3D print, made a mould, and then made a new one in metal, then chromed it and fitted all the bits. That cost the man a third of the price.”

Ingenuity knows no retirement

“I was very lucky,” Jim says of his army career. “I characterise it as a 50-year paid adventure. And lots of people said to me, you’ll miss it when you go. I don’t actually. I think if you do, you’re probably lacking in imagination.”

In the year before Jim retired (30 years with the British Army, then about two months short of 20 years with the New Zealand Defence Force), he was working in the old IBM building in Petone as a programme director and took himself on a 12-week night class on welding.

One of the reasons Jim wants to do welding is because sometimes when people see his robots, particularly ‘Tellus’, who is quite a large robot (made from an old Tellus vacuum cleaner, with a couple of old altar candlesticks for legs), they ask if they can go outdoors, and they can, but they might not do very well outside for a length of time. Jim reckons Tellus’ body would be fine, but other bits might not weather so well.



Jim and Heather in full steampunk regalia

“But if you do welding, you can do things in such a way that you can make them outdoor proof,” he says.

The army has served Jim well

Jim’s early training in the army has been helpful for robot building too.

“I joined the army when I was 16 years old, in the UK, and I was trained as a systems engineer. I was really a telecommunications systems engineer, not that I really practised my trade, because, as I was approaching the end, I was asked to go and do officers’ selection.”

Jim spent many years in both command and staff appointments throughout the world before making the move to New Zealand. Nowadays, he leads a busy life as a judicial Justice of the Peace (JP) in the District Court, serves as vice president of the Wellington JP Association, and also runs training for ministerial JPs. He is also a keen member of the Kāpiti Rotary Club. With all this going on, Jim carves out two or three days a week in his shed.

“What is funny is that, even after five years, say I come in here on a Sunday morning, and I wake up with an idea in my head, and I grab a cup of coffee, and I come here at 8.30 in the morning and start pottering away and then Heather will come, knock on the door and say, ‘It’s time to eat’, and I say, ‘Is it lunch time already?’ And she would say, ‘No, it’s dinner time!’”

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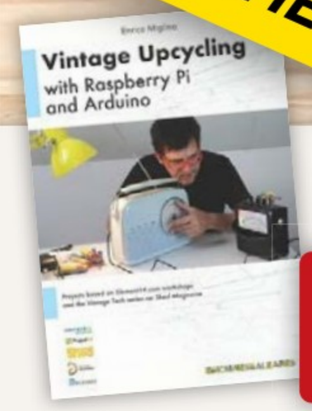
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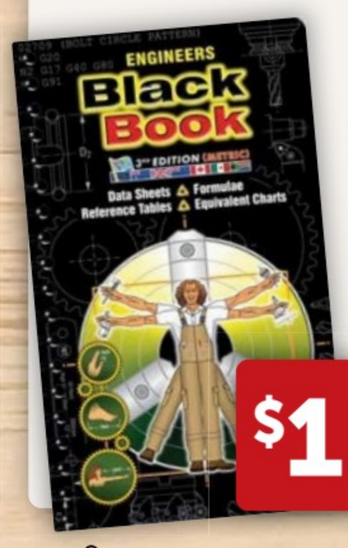


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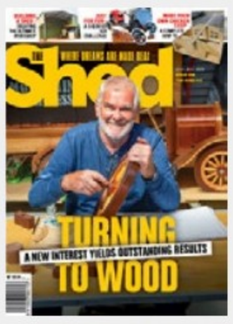
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ONE VERY COSMIC DUDE



Music, art, and meeting people are what make Don Williams a very happy and contented fella. Our *Shed* shrink spends some quality time with the guy who has been to more concerts than you have had hot dinners

By Mark Seek | markseek@rocketmail.com
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Rockets, space and alien UFO craft are hot topics right now, what with the launch of *Artemis II*, the first crewed flight to the moon since 1972.

NASA disclosed that it intends to create a moon base near the lunar south pole by 2030. Wow, it's all happening in our lifetime – living on the moon could soon be a reality; stuff we could only read about in comics as boys in shorts. So not one to miss out on any of this space action, I decided to track down a chap, Don, aka Cosmic Dude.

I was told this guy had some interesting music to listen to, some cool old Harleys, and an impressive shed. Armed with this information, I jumped on my time machine (the old HD Softail) and teleported myself to another galaxy.

I got some space rock

My coordinates and the assistance of Siri landed me right at Don's front gate. He had told me over the phone previously that he had some space rock he wanted to introduce me to. "Is space rock a thing?" I enquired. "Yeah, sure is," was Don's reply.

I did my homework. Fact: space rock is a genre of rock music that emerged in the late 1960s, characterised by long, hypnotic, and atmospheric soundscapes with science fiction or interstellar themes. It blends progressive and psychedelic rock, often featuring heavy reverb, echo, electronic effects, and synthesiser-driven instrumental passages, creating an otherworldly feel.

Now and again, you get to meet people who seem to be able to squeeze a lot more into their day than the rest of us, and I found out that Don was one of these extraordinary blokes.

Quite a shed

Entering his shed is quite the experience, as you can see from the photos. But wait, there's more, he tells me as I follow him up the path and through a gate where there's another building, again meticulous in every aspect, only this is where music is created.

Don has an impressive mixing desk, synths, and recording gear, plus several walls displaying his own artwork and some gorgeous guitars, each one with a story attached.

"In this shed, I create my own version of space rock music," he says as he shows me five completed albums he produced in a relatively short time. The cover art is mostly Don's own work too (impressive).

He goes on to mention that he has been in a position to support a couple of bands outside of New Zealand, Space Collective and Doctors of Space, for over a decade, and that he recently got to meet the current members at a festival in Portugal, their home base.

This was a once-in-a-lifetime experience for him.

The love of music

The friendships he maintains are purely through the love of music. The sound quality of Cosmic Dude is world class, folks, and Don explains that the raw music is mastered by these fellow musicians.

Don has a website. You can look up his website for product reviews and one-



Cosmic Dude in his creative space





Rock gods and others on canvas

off art products. Some of his favourite recording artists – Bowie, Iggy Pop, and Lemmy, to name but a few – are rendered on canvas. Yes, Don can paint, and very well too.

It is obvious that what I am seeing this morning should be shared with *The Shed* readers, so I suggest that now would be a good time to discuss his background and where he found such exuberance. We sit for a while, we converse about the importance of his life, and whether he wants to share anything in particular.

Nothing like a chat

Don wishes he could open his world to others, as for some, accessibility to music or art can be intimidating, and the importance of good conversation for men's mental well-being should be a priority – I couldn't agree more.

Don is a good example of someone who chooses to fill his cup with music; art; friendship; family; and, of course, something I relate to: motorcycles. The Harleys in Don's possession are all in pristine condition and are part of his love for life.



Some time travelling machines for those trips up the coast

He says his solo excursions up the Kaikōura coast – a favourite ride – offer him a chance to be quiet and mindful of how blessed he is to be a husband, father, and grandfather.

He's the sort of guy who gets back to you and loves to share plenty of funny anecdotes about the bands he's met and the gigs he's attended, and believe me, he's been to more than most of us. Happily, I can't see this guy slowing down anytime soon, but I encourage you to check out his website.

Cheers, Don, for sitting down with me; making me feel very welcome; and inspiring me and, I hope, some of you.

cosmicdude.nz

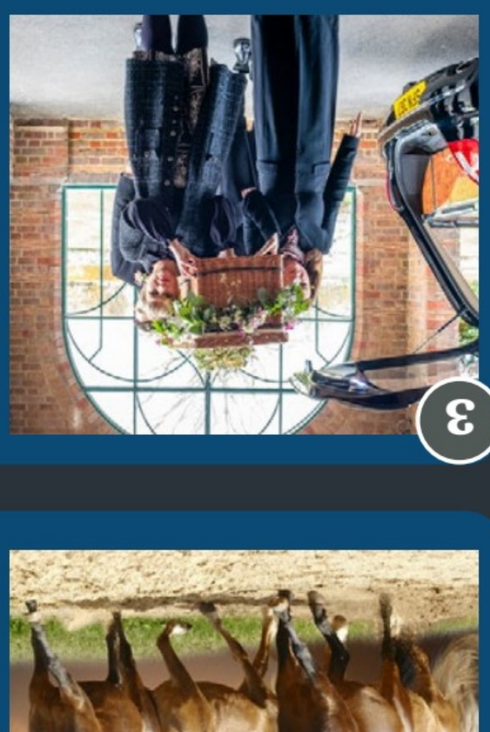
Know your stuff

THE Shed QUIZ NO. 8

TEST YOUR SHEDDIE KNOWLEDGE

1 Who coined the term 'horsepower'?

a) James Watt
b) Benjamin Franklin
c) Henry Ford



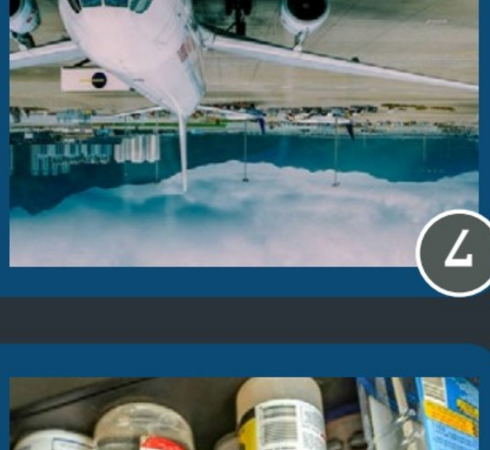
2 Are Perspex and polycarbonate the same?

a) Yes
b) No



3 Funeral directors use superglue to keep corpses' eyes closed.

a) True
b) False



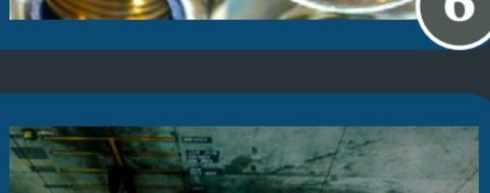
4 What is 'Brittania metal'?

a) Sheffield steel
b) A type of pewter
c) Solder



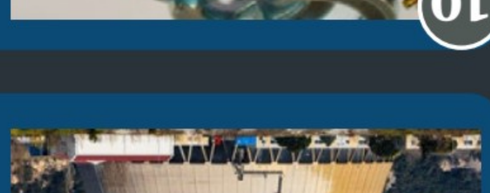
5 What is used to fuse pieces of Perspex together?

a) Methylated spirits
b) Nitric acid
c) Chloroform



6 When comparing cross-type screw slots, are Pozidriv and Phillips just different brands of the same thing?

a) Yes
b) No



7 Which is more energy dense?

a) Hydrogen
b) Petrol
c) A1 jet fuel

8 A site was reserved in New Zealand for a nuclear power station back in the 1960s. Where was it?

a) Taupō
b) Whanganui River
c) Kaipara Harbour

9 Ideally, how many times should a nyloc nut be reused?

a) Never
b) Once
c) Twice



10 What type of washer is typically used under an earthing screw on a light fitting?

a) Spring
b) Belville
c) Star



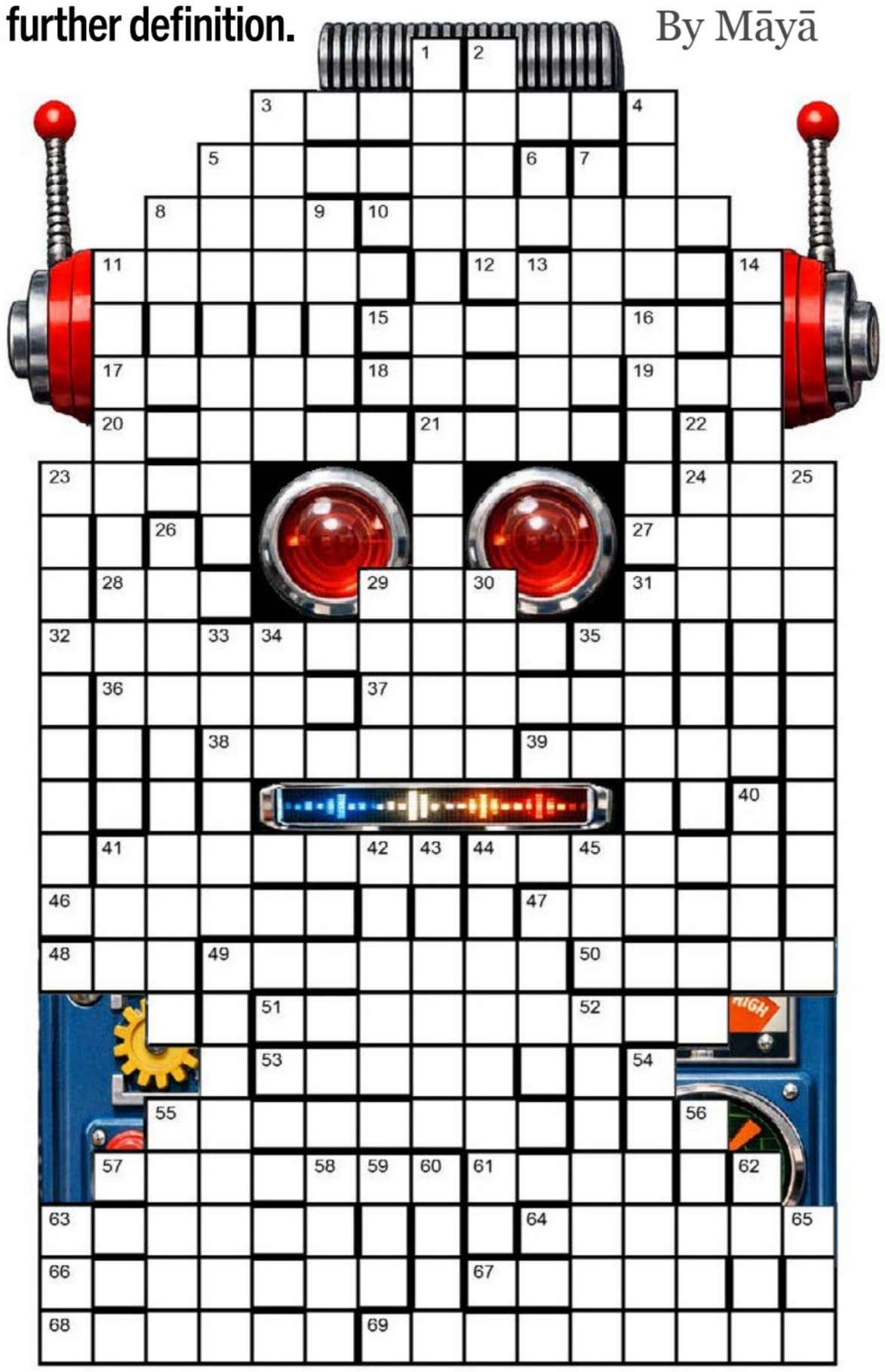
1. (a) James Watt; 2. (b) No. Perspex is a brand name for polymethyl methacrylate, an acrylic-type plastic. It is more brittle than polycarbonate, but tends to be clearer (glass-like) than polycarbonate; 3. (a) True!; 4. (b) A type of pewter. It is actually mostly tin (92 per cent) together with antimony (six per cent) and Copper (two per cent); 5. (c) Chloroform. It acts as a solvent, melting edges together at the molecular level; 6. (b) No. While both may look the same, on closer inspection, Pozidriv has less angle on the sides of the slots, meaning that there is less tendency for the screwdriver to be pushed out of the screw head. Faint lines between the slots on screw heads show that it is the Pozidriv type; 7. (a) and (c) Hydrogen is the most energy dense by weight, but A1 jet fuel is the most by volume (per litre), just slightly ahead of petrol; 8. (c) Kaipara Harbour; 9. (a) Never. Ideally, they should only be used once, as the tension of the nylon insert against the thread is never as good as the first time it is used. In practice, they are reused but should not be used more than once in critical applications; 10. (c) Star. The star washer has more points of contact, which bite into the surface of sheet metal work.

THE SHED CROSSWORD NO. 5

Starred clues relate to 21 down 43, some without further definition.

By Māyā

**(Questions or comments?
Visit https://mayaofauckland.substack.com)**



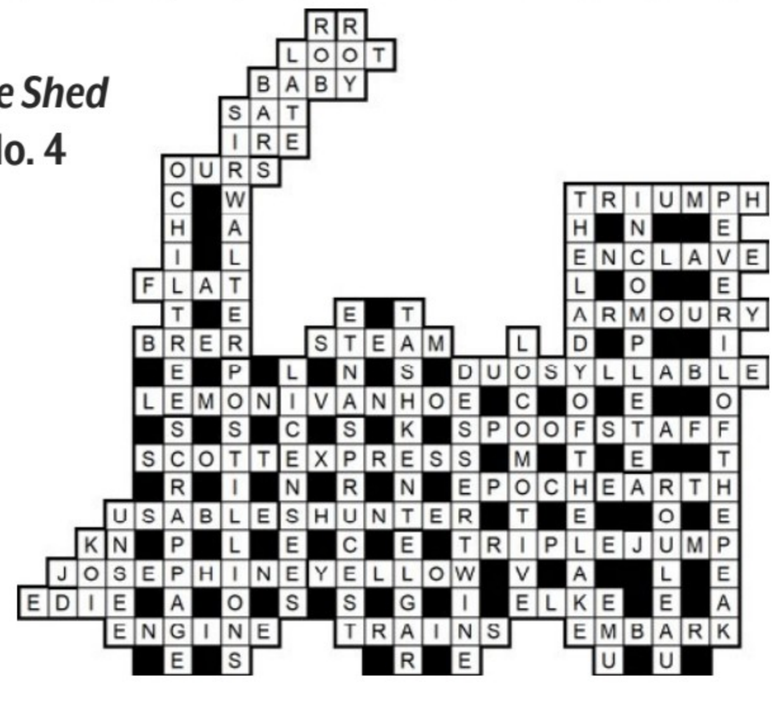
Across

3* A Prime example? (7)
5* Feathers-controlled trousers ("35 8 down") (6)
8 Letter from Greece to Britain's capital (4)
10* Aliens had hunt on base; he refused to open door (7)
11* Blue android's rehab leads to French wine (6)
12* Jason met him blowing gas from claws (5)
15 Love steaming small sea snails (7)
17 See 68
18* Smart associate: "Hey, I'm unkempt!" (5)
19 Appear in "Bare Facts" (3)
20 Coughs his head off by kilns (6)
21* Whistler's brats woo Edith, who's regularly ignored (2-2)
23 See 47
24 Juvenile to a 'T'? (3)
27 Detective following edges of kneecap (4)
28 "DVD killed the ___ star"? (1.1.1.)
29* Keen to drop a film (its twin followed Ma) (3)
31 Touching back in horn opus (4)
32* "Nuts! I retort" - man who'll be back? (10)
35/49* 5-thriller (sequel to "Deus" ?) (2,7)
36 Landlord left e.g. 10 by road (5)
37 6 artists go to the Amazon (6)
38 Right, throw out refuse! (6)
39 Bag End missing - left ring in drones? (5)
41 Cabin I'm mad to transport (7)
44 John drawing actor (6)
46/23/55* "Warning, Noble Lord!" is translated (7,3,8)
47* City borders city (5)
48 This 6-footer, when in wing, is subpar (3)
49 See 36
50* After short month, Ronald gives up second point for a doll (5)
51* I almost 38 returning 48 (4,5)
53 Scottish town once returned hot food (5)
55 See 47
57 Traitor's deity backed luminary (3,4)
61 Rule: no grass (4)
63 Eric Stroller? (6)
64 Blamed chaotic chaos! (6)
66* Broke bears swan around (7)
67/17* He created 21 down 43s in 1920 - "peak Clarke"? (5,5)
68* Call out a number? (6)
69 Spooner rushed money into cover (9)

Down

1 At last, Flipper has a friend (7)
2 Young fish bearing shed in US (5)
3 Works exercises without 41 down (7)
4* 32 told of meal scoffed with fears of ancient nomads? (1-3)
5 Lighten vessel parking in pork pie? (4,4)
6* Doctor's companion to darken up? (2)
7 Doctor's companion to mislead Angelina (5)
8 Agency as an opposite? (4)
9 Enterprising chap, King Harry? (4)
11 Writer about Prince: "All I've composed is subsonic" (11)
13 Eager to play this on a 28? (4)
14* City bunker left over? That's beneath me (10)
16* Doctor's enemy's Agent Cooper's last peak (5)
21/43* Gibbon cries to rude mechanicals (7,6)
22* Vet reversed into town of strangely docile women? (8)
23* Bond captures worst crook where 21 down 43 are revolting (9)
25* Rust-phobe can pursue diamond geezer (3,7)
26 J ust manage to enter a port, since at sea (6,4)
29 Broke end off wooden mallet (4)
30* Was he raised a caveman? (4)
31 Traits 22 men tried to put into 21 down 43 (7)
33 Note band getting stuck (6)
34 Intense rage engulfed leaders (3)
40 Raise price of mount (4)
41 Groom party guy? (3)
42 Hate Jack Henry Gold (5)
43 See 22
44 Opening enough hollow Brazil nuts (8)
45 McCoy addressing 9's P.T. (3)
47 Sugar said to be a killer (4)
49 Unilingual bunch covered by day return? (8)
52 City solution: replace bend with junction and parking (7)
54* Second letter to 32 (6)
55* Steal past? (5)
56* We take everything (4-1)
58* Film Ratty after change of heart (4)
59 Pa's drunk - legless! (3)
60 Lead heart of true love heartlessly (4)
62* A bit over Lieutenant Commander (4)
63 S hip's chest (3)
65 Found in mound, oddly? Expectedly (3)

Answers: *The Shed* Crossword No. 4

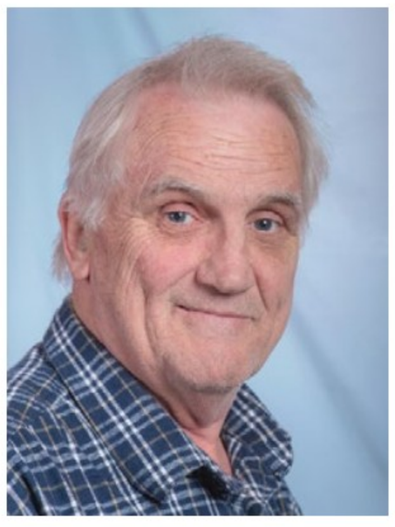


Comments, questions, etc - http://theshedcrossword.substack.com



Smug as a bug in a rug

TIGHTENING MY HALO



Is it time for Jude to slow down a little? Well, now that he has purchased an electric "nana car", he doesn't have much choice

By Jude Woodside

Back when the world was trying to give up smoking, there was a saying – "Kiss a non-smoker and taste the smugness".

It's been a bit like that recently as we try to wean ourselves off fossil fuels. All the electric vehicle (EV) drivers had a subtle sense of smugness. I used to think that if their halos were a bit tighter, they'd all get migraines.

To be fair, I think they are doing the right thing, but I just couldn't afford it. I'm still not an EV convert, but I can now afford to be a little smug too. I have just purchased a hybrid. It's not anything flash – just the opposite, actually. After my last car died, I had been considering getting a hybrid, but the rocketing price of fuel was the final catalyst.

A nana car

For the past few months, my only transport has been my ute, a Ford Ranger.

It's not ideal – the ute has a 3.2-litre engine and is several years old, which makes it a bit expensive to run. Even more at present.

Up to now, I have always had SUV-type cars, and lately they have been diesel. My new ride could hardly be considered in that category; it's a Toyota Aqua hybrid. A nana car.

"Kiss a non-smoker and taste the smugness"

My rationale for buying a nana car is still valid: I only need a small car to get groceries. Anything larger, I always have the ute. This Toyota Aqua hybrid is not the version frequently stolen; it has a push-button start. It has features such as collision avoidance, lane keeping, and automatic wipers and lights. It doesn't have cruise control, but I'm not planning to do much highway motoring.

0–100 in 5min

It's a very nice car in some respects: comfortable, good all-round vision, and it handles well.

It's not a pocket rocket though: 0–100 in about 5min. I was relieved to discover that it held only 30 litres and had a projected range of 620km. I doubt my diesels could match that. I am still learning its foibles and trying to drive it without the throttle indicator going into the red for long periods. I am having to learn to slow down, only because I can't go any faster. It doesn't exactly match my windswept and interesting persona, but that may be fraying a little anyway, given my advanced age.

I took it to Wellington recently, and, apart from struggling up the Rimutakas, it performed well on the claustrophobia-inducing roads of the Wellington CBD. I'm sure I look like grandpa out for a drive. At last, I have an age-appropriate vehicle.

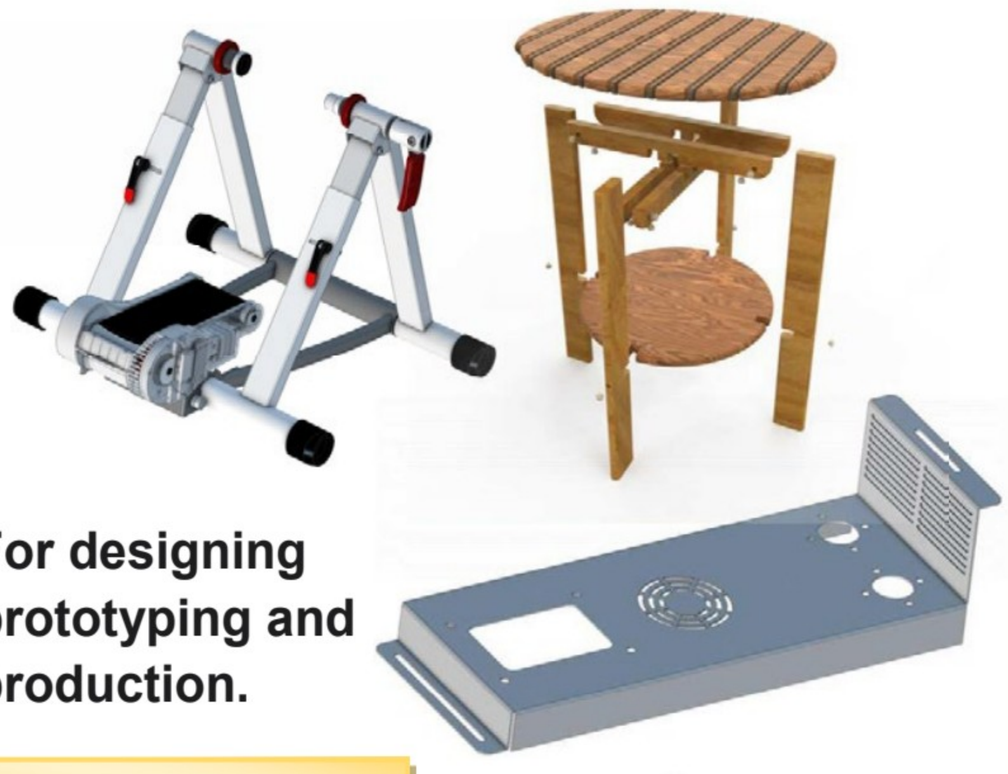
Should you be tailgating me in your gas guzzler, be warned, I shall proceed a little more slowly, just to wind you up, all the while feeling smug about saving the planet.

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