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# THE KING OF SHEDS

Recently, this email from Pam came into my mailbox:

"Hi Greg,

"I read *The Shed* magazine on the plane on our way back from Aussie and quickly came to realise that I'm possibly married to your king.

"I've been married to Dave for 50 years this week, and he just hasn't stopped making stuff. He has no qualifications as such, just a bloody attitude, grit, and determination. Here are some of the milestones."

Following is an excerpt from Pam's letter, in which she listed just some of the numerous achievements of her husband, Dave Alexander:

"In 1968, aged 16, he helped his dad invent and manufacture the very first spraying units for motorbikes in New Zealand; they featured on *Country Calendar* and were marketed through Wrightson's.

"At 20, Dave decided to build a stock car from scratch and ended up … winning the East Coast Stock Car Championship title.

"Next, after getting fed up with spending all week fixing the stock car just to smash it again, he decided that he would build a hot rod.

"That turned out to be a 1932 roadster with a 351 Cleveland in it. He built everything, even the chassis, with very limited equipment.

"At the same time, his dad decided that he wanted to build a steam train so that's what they both did! This train still runs most Sundays at Ngongotahā, Rotorua.

"Circa 1983, Dave decided to build a log-house for us, then spent the next 18 years building them all around the North Island.

"In 2000, he decided to clone a famous American race car. It raced at the Leadfoot Festival in Hahei. Then he decided to take it to Bonneville, where he broke the record three times in a week. It also raced at Lake Gairdner in Aussie and took the class record, which was 137mph (220kph), with an old flat-head V8.

"This gave him the record-breaking disease, and he has spent the last eight years in a very small shed behind our house building a Lakester, to attempt to break the class record of 262mph (421kph).

"Dave can somehow just disappear into the shed and create amazing stuff without any formal training, and I think that is a quality worth celebrating."

Thank you, Pam, for getting in touch with us. I'm very happy to call Dave the 'Kiwi Sheddie King', and I hope *The Shed* readers will feel the same. If ever there was a sheddie who deserved the title of 'king', it's Dave.

In fact, we were so impressed with his achievements that we decided to write an article about him, and that is the cover story in this, the summer holiday edition. Now, sheddies everywhere can share in the shed life of your husband, Pam.

You can read about Dave Alexander, the sheddie we'd all like to be, on page 4.

Finally, to all you wonderful *Shed* readers – have a Merry Christmas, a happy New Year, enjoy your end-of-year holidays, and join with me as I shout:

Long live the King!

**Greg Vincent**
editor@the-shed.nz

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SALT FLATS
SIMPSON
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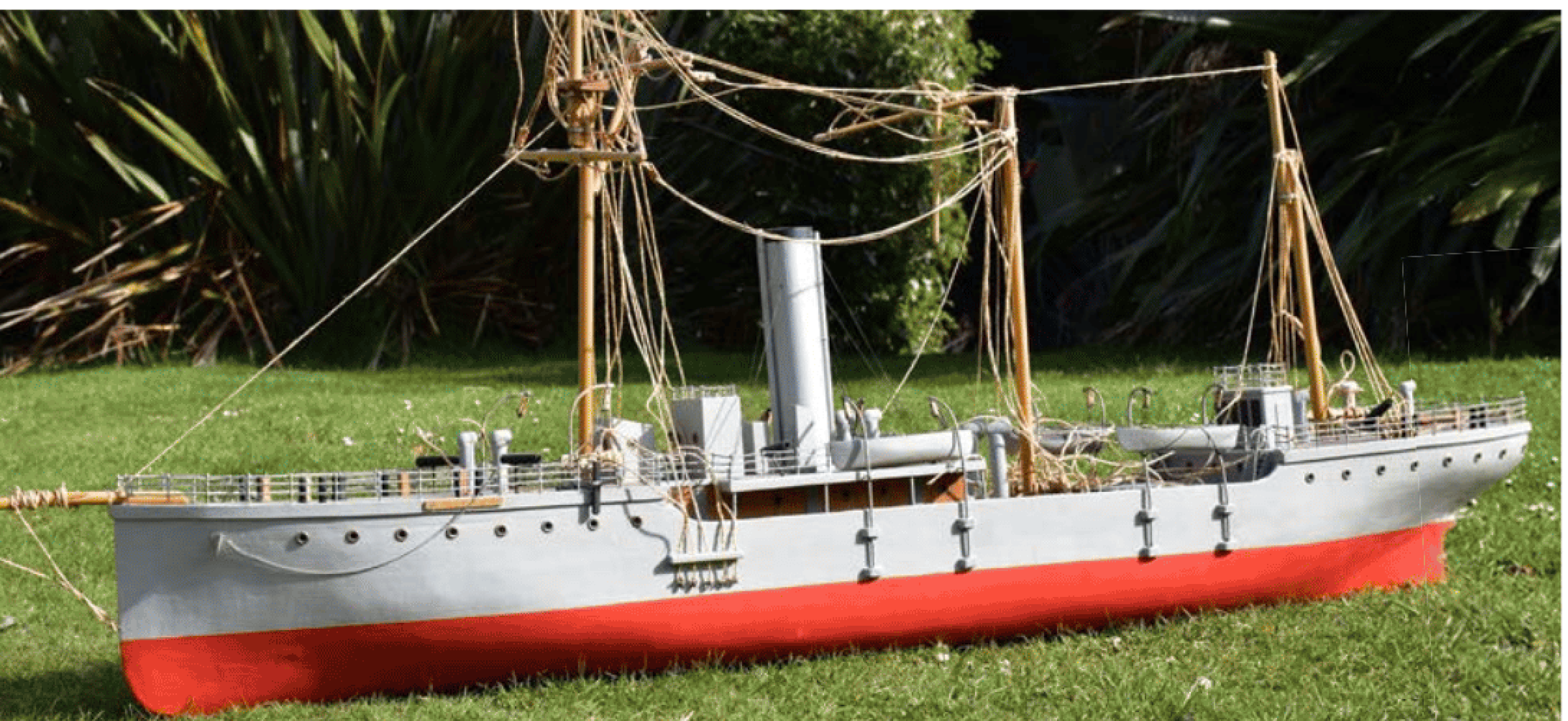



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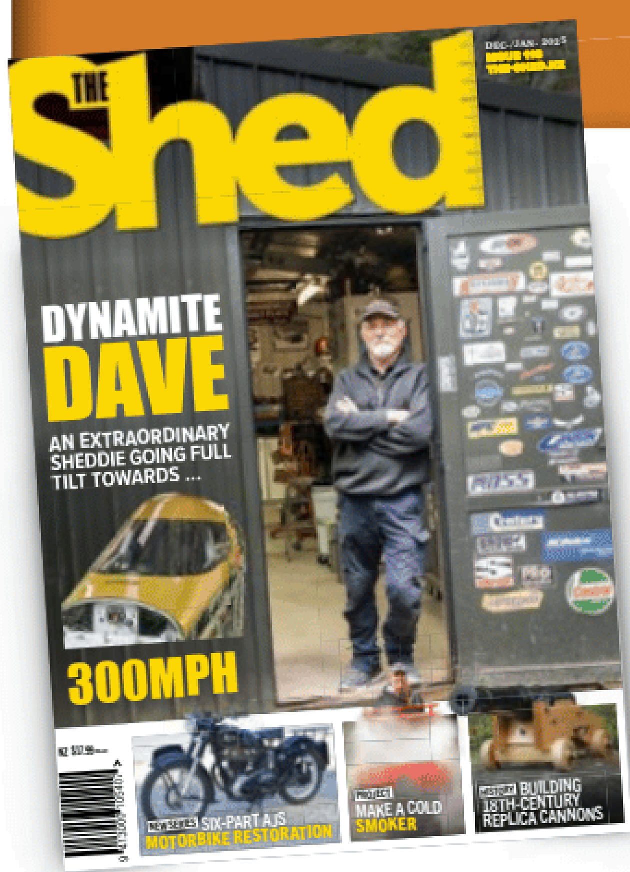

THE Shed
DYNAMITE DAVE
AN EXTRAORDINARY SHEDDIE GOING FULL TILT TOWARDS ...
300MPH

# FULL TILT WITH DYNAMITE DAVE

**Dynamite Dave has always lived his life at full tilt – but this time he's heading for 300mph**

By Jason Burgess | Photographs: Jason Burgess


Dave Alexander and his shed-built Lakester, destined for new records at Bonneville

'Dynamite Dave' Alexander is a self-taught doer, with an eye for detail, unquestionable discipline, and a passion for motorsports. He's been making things since he was a nipper, and has never stopped. He was raised on a remote Hawke's Bay farm, where the shed was his university.

Dave says he "grew up doing it", working alongside his father Neil, learning how to keep the property and equipment maintained and running. His first job was welding all the farm gates. His next was putting in a box-section chassis for a 1942 Willys Jeep, which served as the farm's workhorse.

At 18, Dave commenced his first customisation of his MkII Zephyr, installing a V8, dual headlights, and Vauxhall tail-lights. Since then, he has restored, driven, and raced an impressive list of classic muscle cars, scratch-built stocks, rods, and record-breaking Bonneville salt cars.

Now – at 70-something – this multitasking project-a-holic is closing in on his latest quest: to break 262mph (422kph) at Bonneville in his shed-built, RB-powered Lakester – a project that has been close to a decade in development.

Dave says, "I guess I could be playing golf or in the pub. But you have to do something to get you out of bed in the morning, to keep the old man out."


Customising the farm's workhorse, a 1942 Willys Jeep

## The first race

Dave reckons that his need for speed runs in his father's line.

When Dave was six, Neil built him a go-kart. When Dave turned seven, Neil thought that his son was proficient enough to race a mate who owned a pro-kart.

"During the race, I rolled it and took a chunk out of the helmet," Dave recalls, "but Dad put me back in it straight away – there was a bottle of whiskey in it for him – and I actually beat his mate."

By the time Dave got his driver licence, he was already a seven-year veteran behind the wheel, tearing it up on the shingle roads around the district.

"The old man was convinced I was going to die," he says, "so he thought, *I can't stop him, but I can teach him how to do it properly*. He turned up one day with a midget car. That went well. Then he bought a faster one for me, and he drove the one I had. We started racing together for two or three years."

## Nothing ever stopped Neil

Before Dave was born, Neil had blown a good portion of his left arm away when the hammer of one of two shotguns that he was carrying on a hunting trip caught on the seat of his boat and went off. The mate that he was hunting with carried Neil as far as he could before running to raise the alarm. Neil nearly bled to death but somehow had the presence of mind to stop his uncle, a World War II surgeon, from amputating the limb. He spent the rest of his life with three fingers locked to his palm with only his forefinger and thumb working.

"You would never know," recalls Dave. "He used to fly Tiger Moth and was a huge inspiration, because nothing ever stopped him."

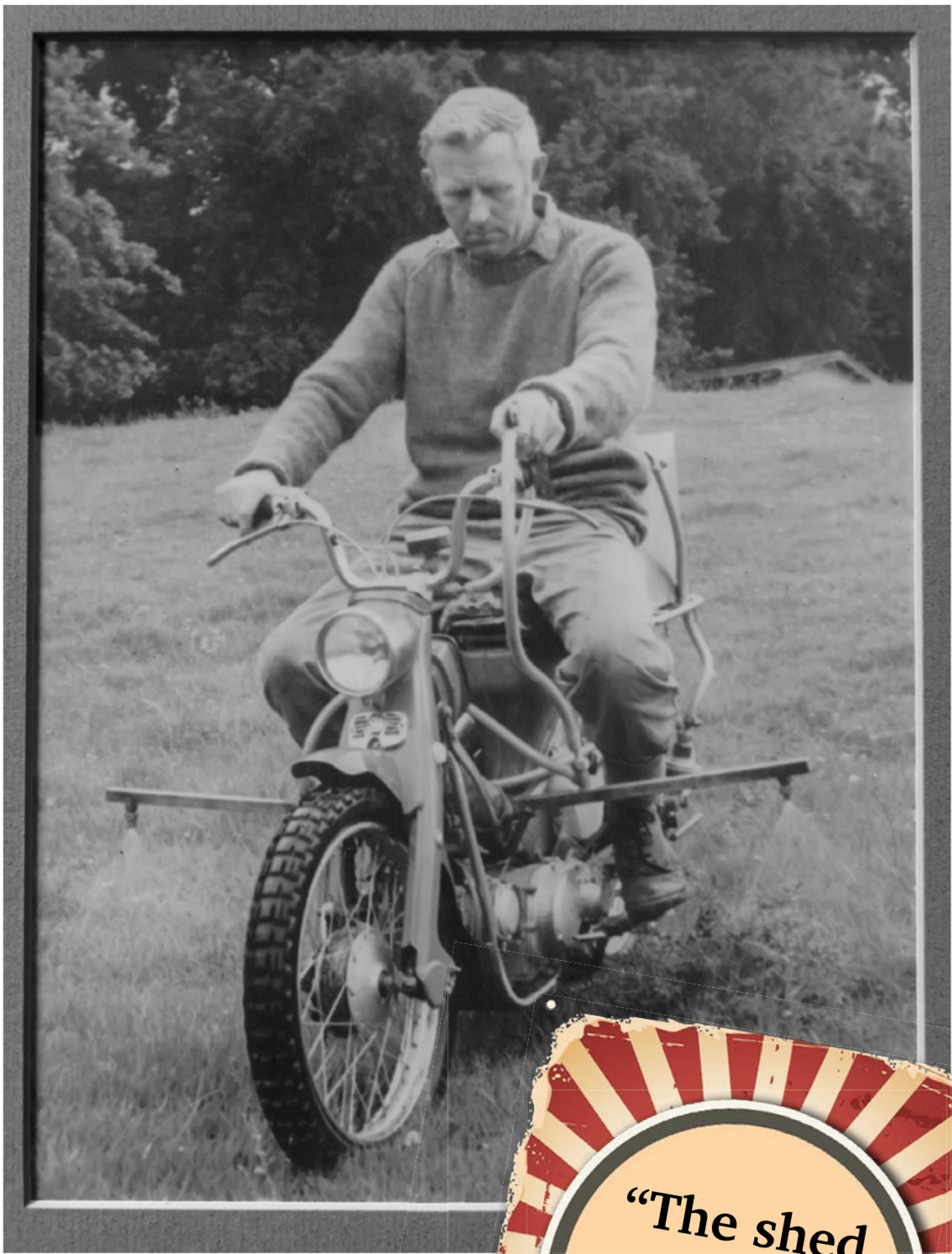
That is, until one night, during a midget car race, when another car caught Neil's back wheel.

"It rode up over the shoulder of his bad arm and put a big black mark over his overalls. That is what stopped that," Dave explains.

## Down on the farm

The Alexander farm was a 2000-acre hill-country property an hour's drive from Napier.

Dave left school as soon as he could. As a teen, he was dismantling tractor diffs for diagnosis and pulling the tracks off bulldozers. At cropping time, Neil piloted a Caterpillar D2, while young Dave followed in an Allis Chalmers HD5 bulldozer – feet up on the dash just to



Photographs left and right from the Alexander collection

Neil test-drives a farm bike with his shed-built spray kit for the *Country Calendar* TV show


Midget racing in the early days

leverage the steering clutches back; a foot on the brake to stop the track.

"The levers would just pull you forward in your seat," says Dave. "You move along a hill with the nose up and then try to keep the plough in its furrow, so you're sort of slipping along the side. If it's going to tip, you need to get the front facing uphill as fast as you can."

Dave reckons that he had some close calls, but, because of them, he says, "I had a healthy respect for machinery but had no fear."

Dave earned his nickname 'Dynamite' back in the day when it was common practice for farmers to use dynamite to blast drains through swamps, to remove stumps, and to prepare sites for planting. After detonations on the Alexander farm, young Dave would forage around collecting any of the sticks that did not explode. He admits to using them for eel fishing on the farm lakes but is best known for "making the biggest bangs on fireworks night".

## An innovation

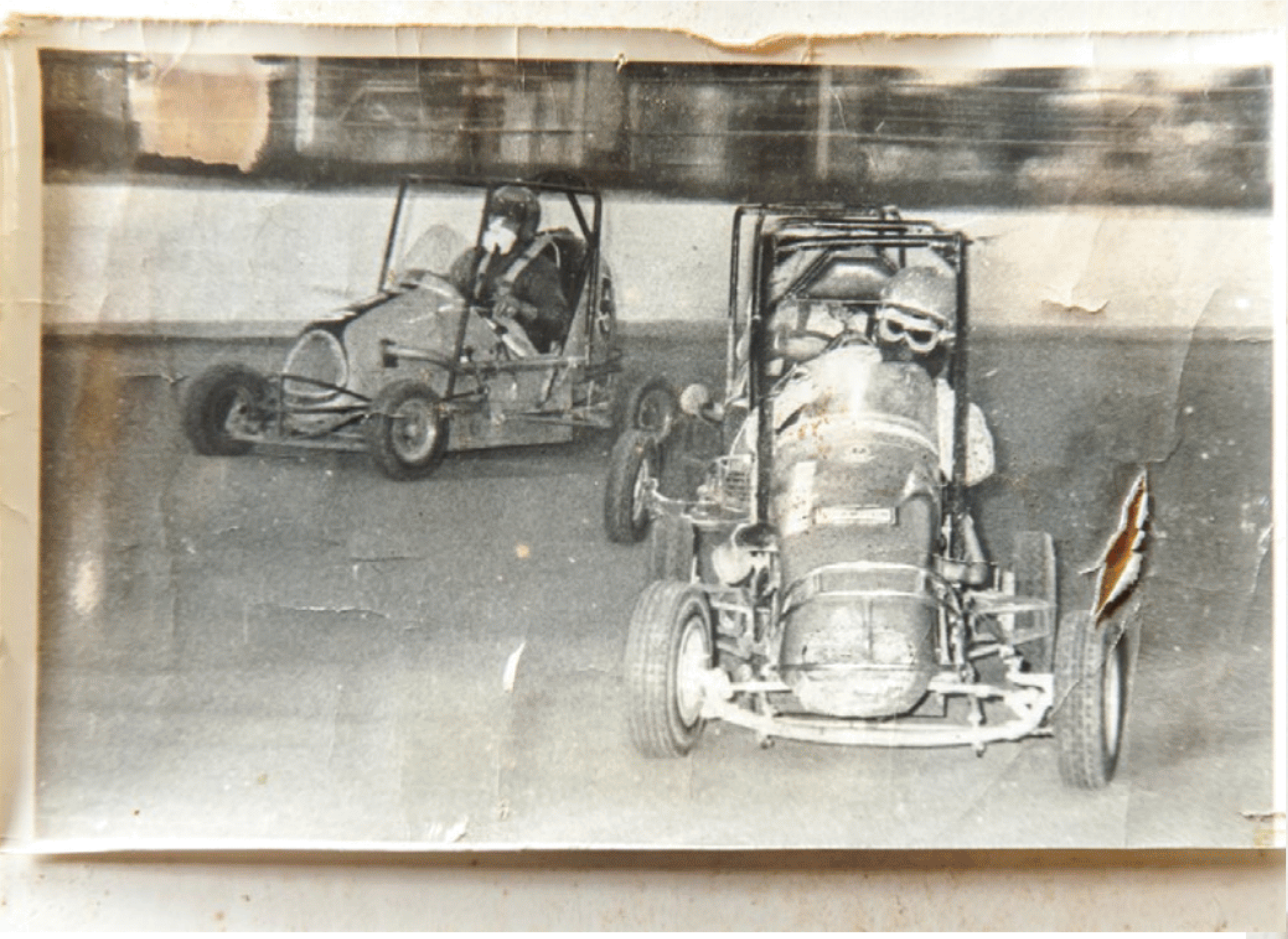
In the late '60s, Dave helped Neil pioneer his shed-grown invention: the country's first farm-bike spraying units.

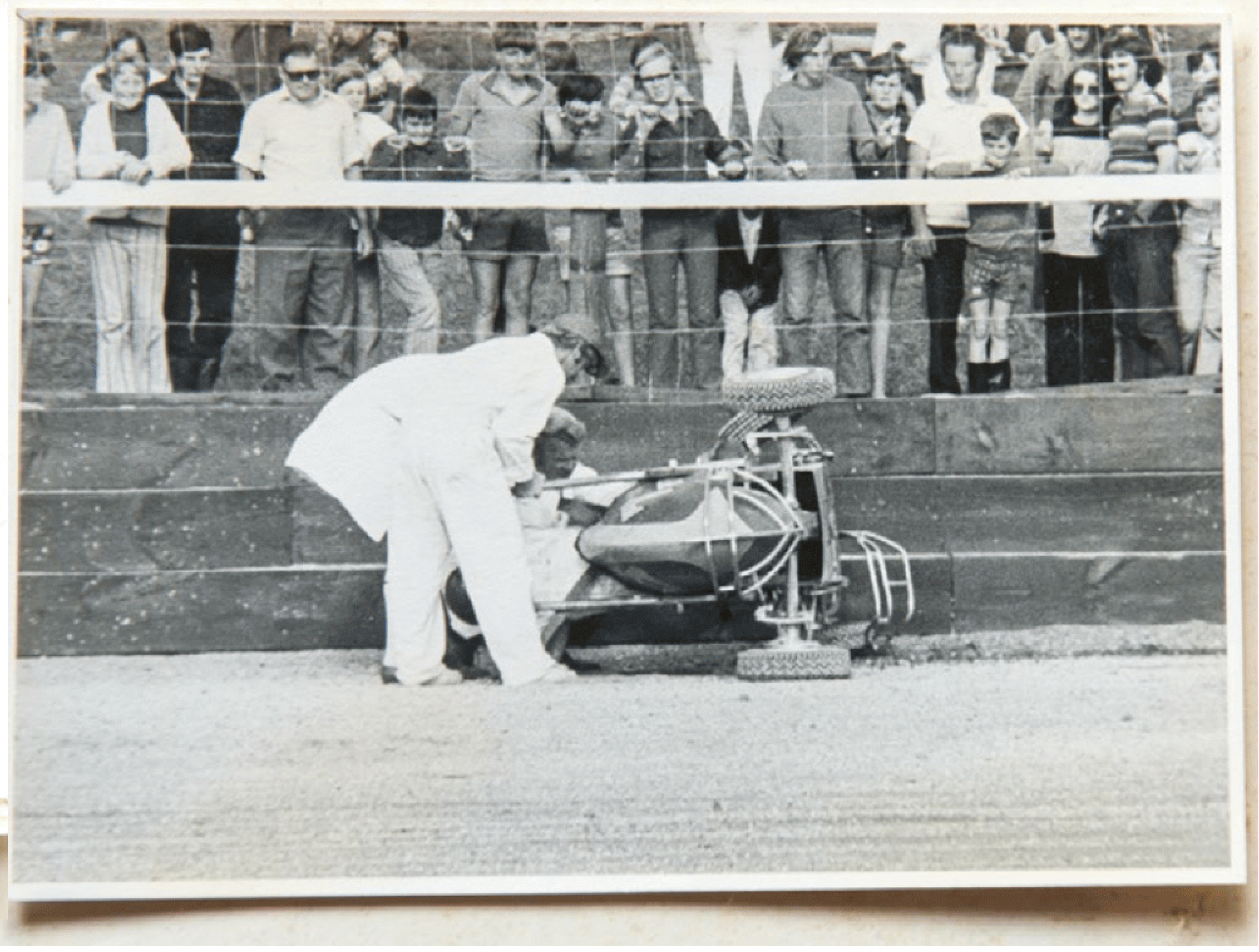
These were rudimentary but built to last: a spray boom sitting below the knees to the front of the rider's feet, a spray control trigger upright above the handlebars, and a stainless-steel tank mounted on the carrier. Father and son travelled to A & P shows around the country to introduce the concept, and farmers caught on quick.

When Wrightson started selling them, business boomed. Then *Country Calendar* ran a segment, and production on the farm ramped up. Neil and Dave spent every spare moment – between farming duties – in the shed making the spray beams and putting the units together. A plumber relation in Hastings made the tanks, and another brother also helped "make bits" for the units.

## Midgets and stocks

In his teens, Dave was tearing up the midget car circuit, winning the Hawke's Bay Midget Championship. However, by the age of 20, he already had his eyes on his next mission: to build and race a stock car. He spent a season watching the stocks





Dave's midget racing days

and took note of the two guys who were consistently out the front.

"They had the same chassis design," he says. "I befriended one of them and he mentored me through. I built a car that was basically the same, but mine was V8 powered. At the time, I couldn't even weld upside down, so I had to roll it under a gantry and over a few times to do all the welds underneath."

From then on, Dave would start each event racing in the midgets, then finish the night in the stocks. He went on to win the East Coast Stock Car Championship and progressed to teams racing for Hawke's Bay. He also raced for New Zealand against Rotorua.

"I was so proud of being able to build it, but then you spend all week fixing it just to smash it to bits the next weekend," he says. "In those days, everything was made like a tank, not to absorb impact.

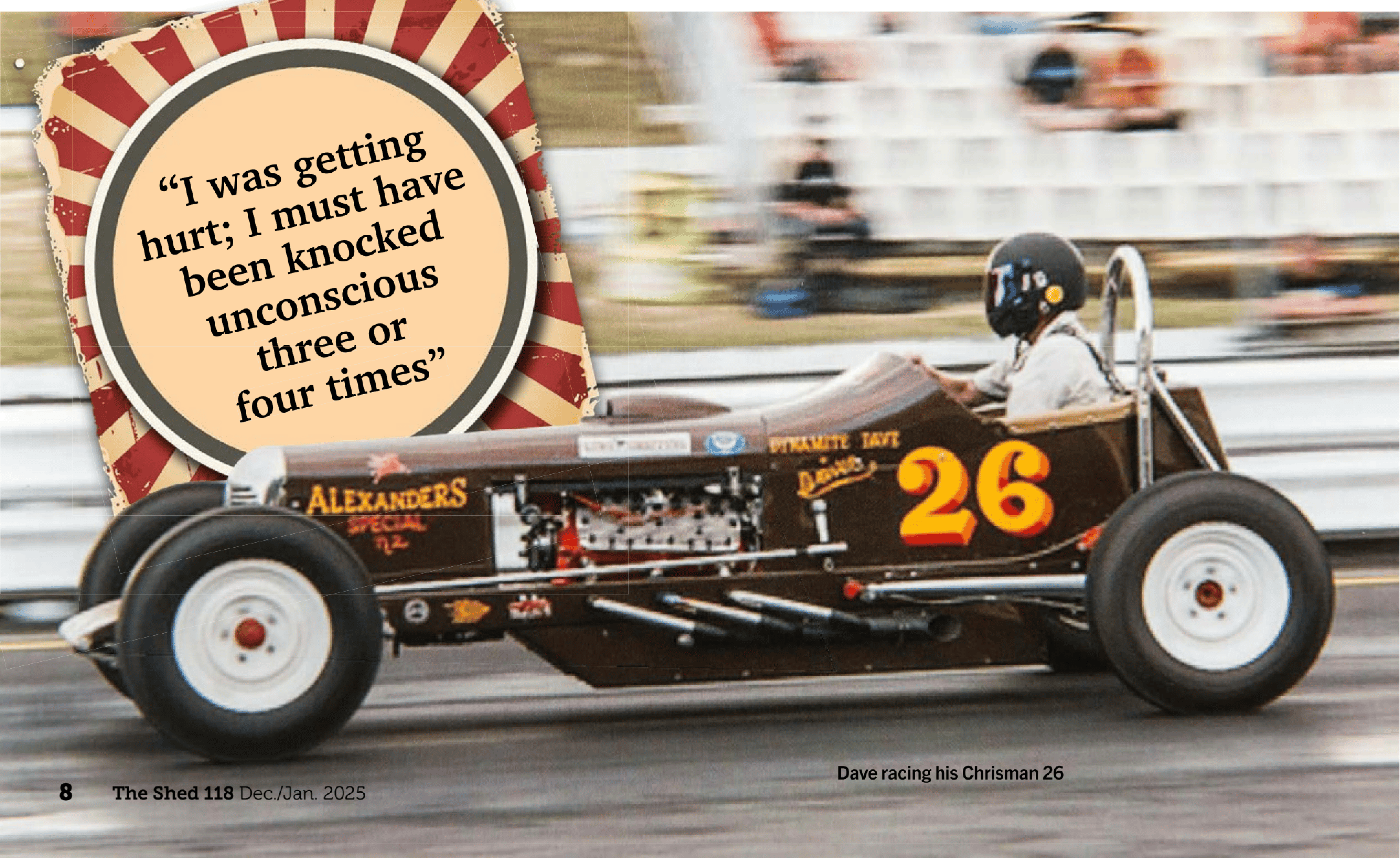
"Teams racing is brutal. I was getting hurt; I must have been knocked unconscious three or four times at Speedway, so I chucked it in and decided to build a hot rod."

## A roadster and a steam train

Back in the workshop, Dave began work on his 1932 roadster, with a Furze fibreglass body – only the fourth one ever made.

The nine-inch grinder, gas torch, and

"I was getting hurt; I must have been knocked unconscious three or four times"




Dave racing his Chrisman 26

Photographs left and right from the Alexander collection

stick welder that he used to make the stock car were all that he had on hand for the hot rod too. He says that he learned to build the chassis and the front suspension from reading magazines, then dropped in a 351 Cleveland motor.

"It had way too much power!" he says.

With wife Pam and their two young children, Dave travelled all over the country in that car.

While Dave was making his roadster, Neil was alongside him in the shed building a miniature steam train. Neil worked out the scale of the train by looking at humans beside an engine in a picture book.

"It was all done by eye; no plans," Dave comments.

Dave handled a lot of the welding on the train. "On wet days, between farming" – of course.

## The right track

The train needed a special narrow-gauge track. With special permission and a supervisor, the Alexanders spent a few days in the old goldmine shafts at Te Aroha, pulling up the lines.

"There was a huge network," says Dave. "We had to start right at the back. We were shitting ourselves, but, by the end of the day, we became blasé about it and would ride the wagons full of rails out as much as we could."

Once home, Neil created a "huge oval of line".

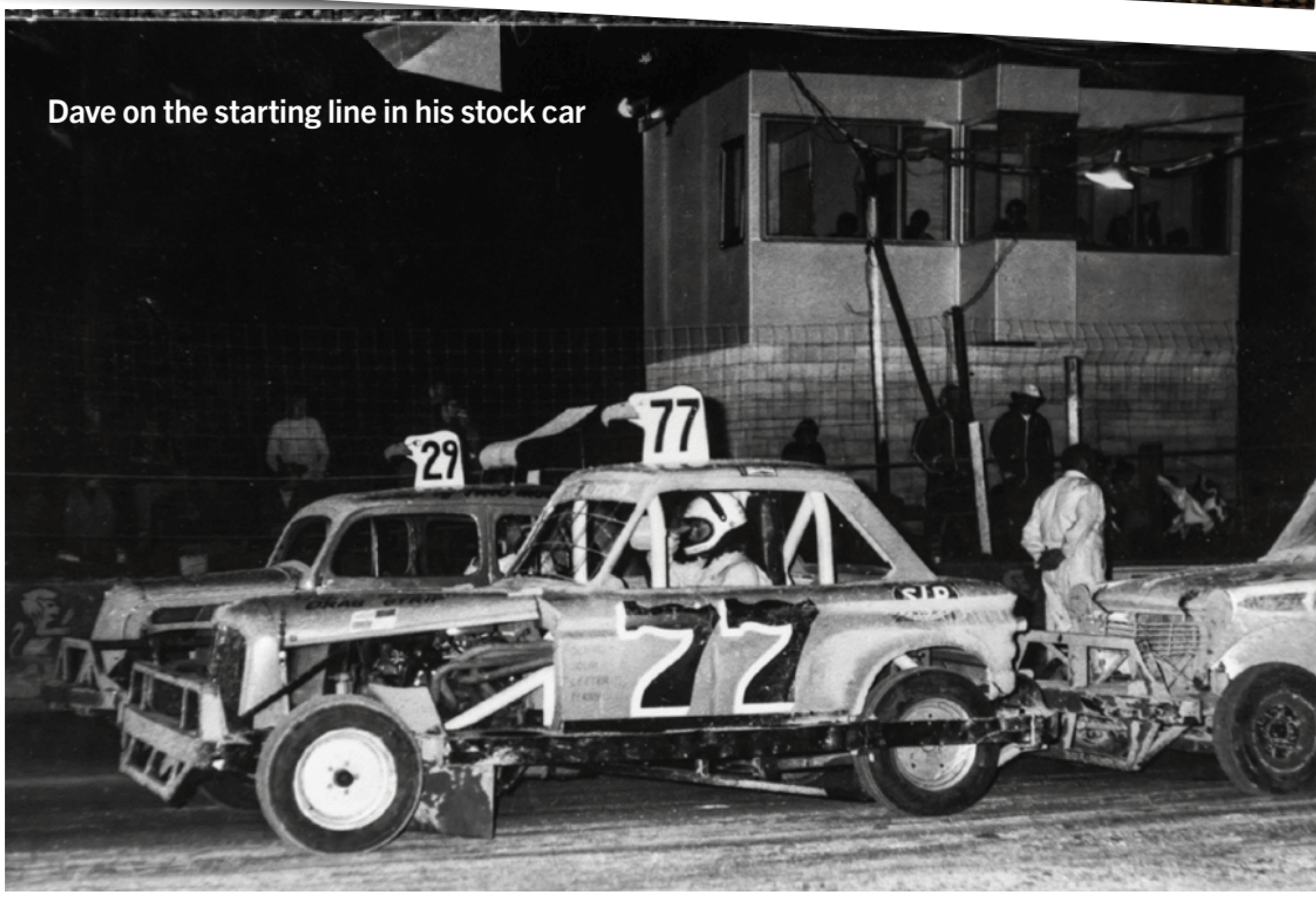
The only way to bend the tracks was with a cast-iron, Jim Crow manual rail bender. Many days were spent carefully manipulating pieces of rail by hand, because tightening the centre screw on the bender too hard or fast could damage the rail.

Neil landscaped around the line with a large embankment, then built a tunnel and bridge.

"Other train enthusiasts got wind of it," recalls Dave, "and they would drop things off to us. We had old signs on the shed, handbrakes, and other stuff off old KA steam trains."

Moving the engine from the shed to the track was an exercise in number-eight-wire logistics. ▶

The '32 roadster



Dave on the starting line in his stock car


Neil's steam railway

A house that Dave built

“That’s amazing; can you build me one?’ I thought, I really enjoyed building our one, so let’s do that”

“It weighed a couple of tons and we had to get it across the garden on two short pieces of 12x2 timber, braced apart. We had a bunch of people to help us lift it onto the track,” Dave says.

## A bit of a redesign

Initially, the train did not work.

“I had made the wheels up out of boiler tubes, and the spokes out of box section, on a straight axle, welded together. They looked the part but they were flat, where train wheels are tapered. We had made the cylinders out of thick brass tubes; when you got steam in them they would just distort,” Dave says.

A steam enthusiast working in a local foundry was called in. He redesigned the wheels and the cylinders and had them all cast.

“That cost Dad about $10K – a lot of money back then – but it all worked properly,” says Dave.

With a full payload, the train easily carried 20 kids in five carriages.

Dave reckons, “The guy at the foundry worked out that it had the power to pull Dad’s ’69 Pontiac Le Mans backwards with the brakes on.”

The train became popular with Hawke’s Bay children and charities such as CCS. When Neil decided to move to town, he sold the train and line. It is now owned and operated by the Rotorua Ngongotaha Rail Trust.

## Golden Valley Log Homes

In the 1980s, Dave pivoted away from farming to try his hand at building.

His inspiration: an article about log homes in *Straight Furrow*, a farming newspaper. The story was promoting a training course being run by a Canadian log-house builder. Dave signed up immediately. While some of the guys in the class were still learning how to file their chainsaw blades, Dave was

Dave’s train sets from the 1950s


Art Chrisman–autographed helmet in a corner of the shed already planning to build his version of 'the centrefold home' from the teacher's project book. He knew he was good for timber, as there was a Douglas fir plantation on the family farm.

Dave and Pam looked around for a business that could sustain the family while he built the house. They found a ferret farm on the road between Waihi and Whangamatā, breeding livestock for fur. Pam took care of that, while Dave concentrated on their first log-house.

"People started coming to us saying, 'That's amazing; can you build me one?' I thought, *I really enjoyed building our one, so let's do that*."

## An 18-year business

The couple formed Golden Valley Log Homes, a company that Dave ran for 18 years.

Initially, he handled all the log work but brought in chippies to do the finishing. When "the builders buggered one up", Dave decided that he would finish them all himself. He travelled all over the North Island and spent weekdays on site in a caravan, returning home for the weekends. As business grew, he developed systems to build more efficiently: "We used to prefab them all in a paddock on a dummy foundation. [We'd] make the cuts in the logs for the windows and transport them all as logs rather than pieces, as it's way faster to put them together. We'd tag all the logs in the field: a blue corner, a red corner, a green corner. All the numbers running one way and all the letters going the other way. When you are picking them up off the truck or looking for the next log, everyone knows what they are looking for and the crane driver knows which way round it needs to be. It speeds things up."

As well as houses, Dave built commercial premises: a 4WD centre in Mount Wellington, a ski lodge in Raetihi, a hunting lodge in Waverley, and the Mercer pub.

One of the most challenging builds was out on the edge of Whitianga Harbour, with no road access.

Dave recalls, "Every morning, we'd be picked up in a little dinghy and taken across the harbour. We could only load a few logs at a time on a truck trailer and bring them down a firebreak. It was touch and go."

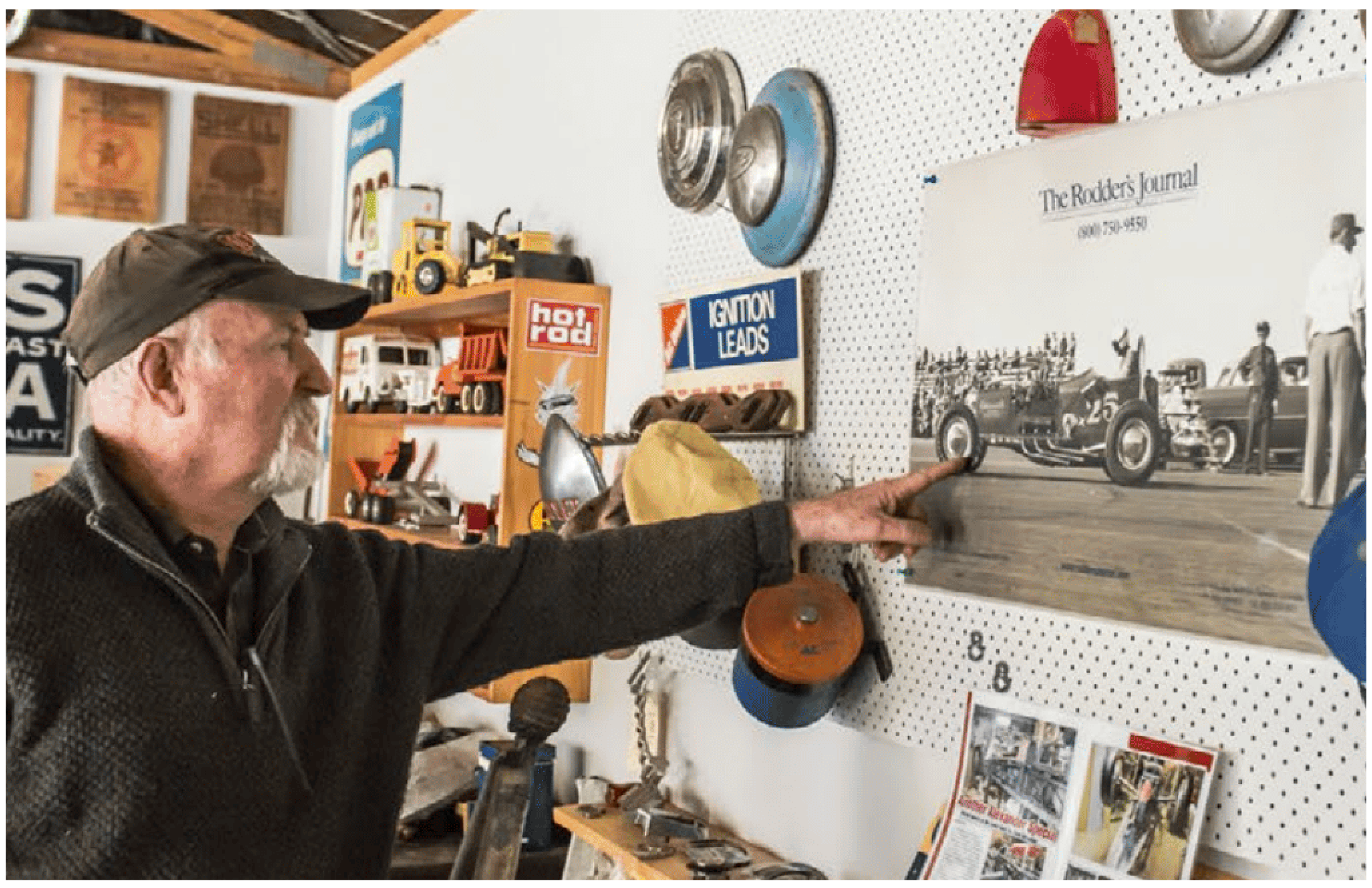
Back home in the shed, Dave was still actively relaxing – restoring, among other things, a 1955 DeSoto two-door hardtop.

## The Chrisman

After a visit to the States in 2000, Dave decided to clone a celebrated American dragster: the Chrisman brothers' number '25', considered by some to be the oldest surviving hot rod.

He aimed to be as faithful to the original car as possible – from the ground up. The original 25 was built on a 1929 Chev chassis, not so common here, but Dave found one – beyond any repair – that he was allowed to strip down for the chassis, as long as the owner got the running gear and remaining parts. Dave employed engine-builder Mike Gearing to build the engine, using an old flat-head V8. ▶


Dave and Pam's log-house interior


Introducing the original Chrisman in Dave's collections shed

Art Chrisman in the original number 25





A pair of vintage posters from Dave's motoring memorabilia collection


“Americans thought it was the original 25 and were thanking me for bringing it out”

The Chrisman ready to race

Photographs left and right from the Alexander collection

Because the original dragster was called ‘25’, Dave called his ‘26’.

“Mine was road registered, but I used it for dirt-track racing, nostalgia drags, and hill-climbs, as well as on the road. For racing, I wore a helmet airbrushed like a watermelon. At a Rod Millen event, I went off the road and hit a tree in it. The tree was the only thing that stopped it rolling over,” he says.

Dave raced it at the Leadfoot Festival, and then decided to take it to Bonneville with his good mate Paul ‘Pins’ Sattler. It was a great time for the pair.

## Record-breakers

“On the very first run,” says Dave, “I broke the existing record. So, the car goes into impound where you can work on it for a few hours. The cars that are impounded run first the next day. The cooler morning air usually means faster speeds. Two runs, and I’ve got the class record. Wow! Now it’s Pins’s turn.

He breaks my record, goes into impound for the night, then backs it up, taking my two-day-old record off of me! Fortunately, I had two days left, which gave me another chance. Somehow, I break Pins’s record, go to impound for the night, and back it up in the morning. I get the record back, with a 137mph top speed out of the old flat-head.

“The whole thing was an amazing journey. Americans thought it was the original 25 and were thanking me for bringing it out. Art Chrisman signed the dash and told us it was a good likeness of his original car.”

The 26 was later raced at Lake Gairdner in Australia, where it took the class record. Dave campaigned it around New Zealand, then took it back to the US

Photographs this page and right from the Alexander collection


> "I get the record back, with a 137mph top speed out of the old flat-head"

and sold it in California.

"The guy who bought it takes it back to Bonneville every year, but has never managed to break my record in it," he says.

## The Lakester

Breaking records in the Chrisman fuelled Dave's desire to travel faster, this time in a seven-metre-long rocket called a 'Lakester'.

For the most part, this is a self-funded venture and, to avoid dipping into his retirement savings, Dave works four days a week as a handyman to cover some of the costs. Fridays and Sundays are his shed days. He says that he is always looking for little side hustles to fund the car and is close to finishing a '64 Mustang restoration that will be sold to bankroll further Lakester requirements.

An undertaking like the Lakester is bigger than one man. Dave's reputation and years of experience in motorsports have put him in touch with some of the country's top motoring specialists, a few generous sponsors, and some solid local businesses who have helped him out for beer money.

He acknowledges his buddy, Dave Lunny: "I owe him everything. He has done a lot of fabrication, the fuel and dry-sump tanks, and a lot of the modifications; he is here most Sundays."

Needless to say, the shed's milling machine and lathe have been running hot. "The lathe," mentions Dave, "is an old dunger, but we've managed. If there was a hot rod museum, it would be in there. It came from Grease Martin's shed – he broke a 200mph record at Bonneville – and it has built a lot of cars."

## The Spirit of New Zealand

Dave has called the Lakester 'The Spirit of New Zealand', and when it hits the salt flats he will have a team of six good mates with him – highly experienced petrolheads. Back home in Pokeno, an engine-management specialist will be downloading data from the car's potentiometers after every run and making or advising necessary changes from his base.

Dave believes that, "It's easy to think about what your car is capable of, but, with a multitude of parts and connections all needing to work together perfectly on the day, that is easier said than done. It is just a big white dyno (Bonneville's dynamometer), but it's the fastest motorsport in the world, and it's still open to amateurs. It doesn't get any better."

## Zip design

The inspiration for Dave's car came from an existing Lakester built by the late Darrell Zipp, who created the Zipper roadsters.

Zipp's father was an expert in aerodynamics and did the body-design

Dave at Bonneville with the Chrisman 26

The Chrisman and the tree that saved it from rolling


Chrisman images from a *Hot Rod* magazine spread

work. The talk trackside was that it was the right body for a record-beating car. The original car was powered by a snowmobile motor and was running in a class with record times of around 130mph. When Zipp sold the car, Dave got hold of the recipient in the States, who had bought both it and the moulds for the body. He agreed to lay up another body for Dave and sent it to New Zealand, where it was cut to add another metre of length to the original. The framework has been designed to fit the new body.

The chassis is "deadline flat", fabricated from 6mm steel, with an aluminium engine plate for easy access. The box-section frame has inbuilt access points throughout each section. The front chassis rails are filled with lead pellets – 40kg on each side – to pull the centre of gravity further forwards.

Dave explains, "The heavier cars are way more stable and operate better than light cars. The weight and the

The workstation with Grease Martin's well-worn but dependable Sheldon Machine Co. lathe

Under the hood of the Lakester

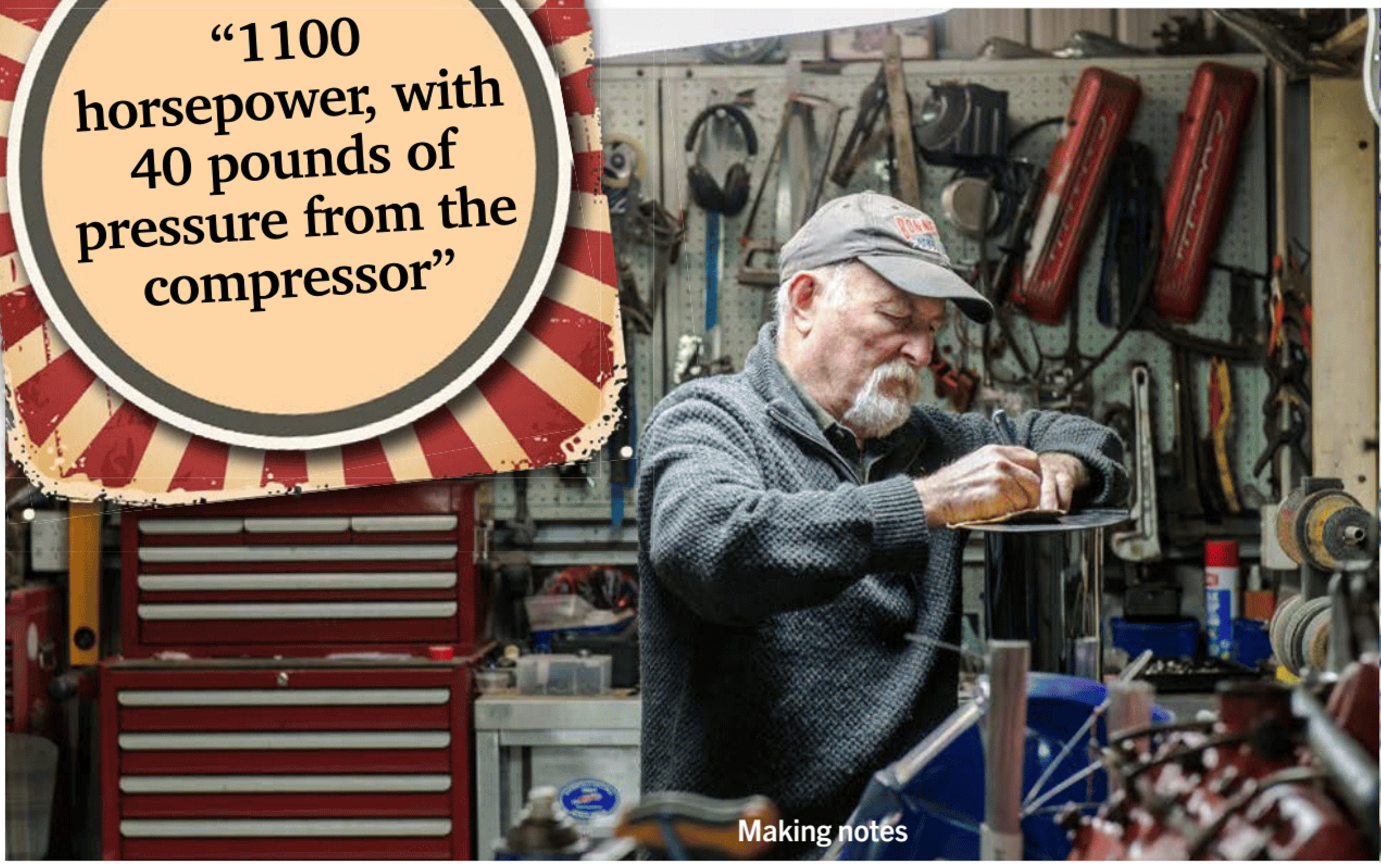
centre of gravity are as low as we can get it. The centre of gravity needs to be as close to the centre of pressure as possible (just behind the cockpit). The closer we can get that, the easier the car will be to drive. Richard Mason, of Mason Tool & Engineering in Wiri, who is a car guy, has bent over backwards to help us."

"1100 horsepower, with 40 pounds of pressure from the compressor"

## Engine room

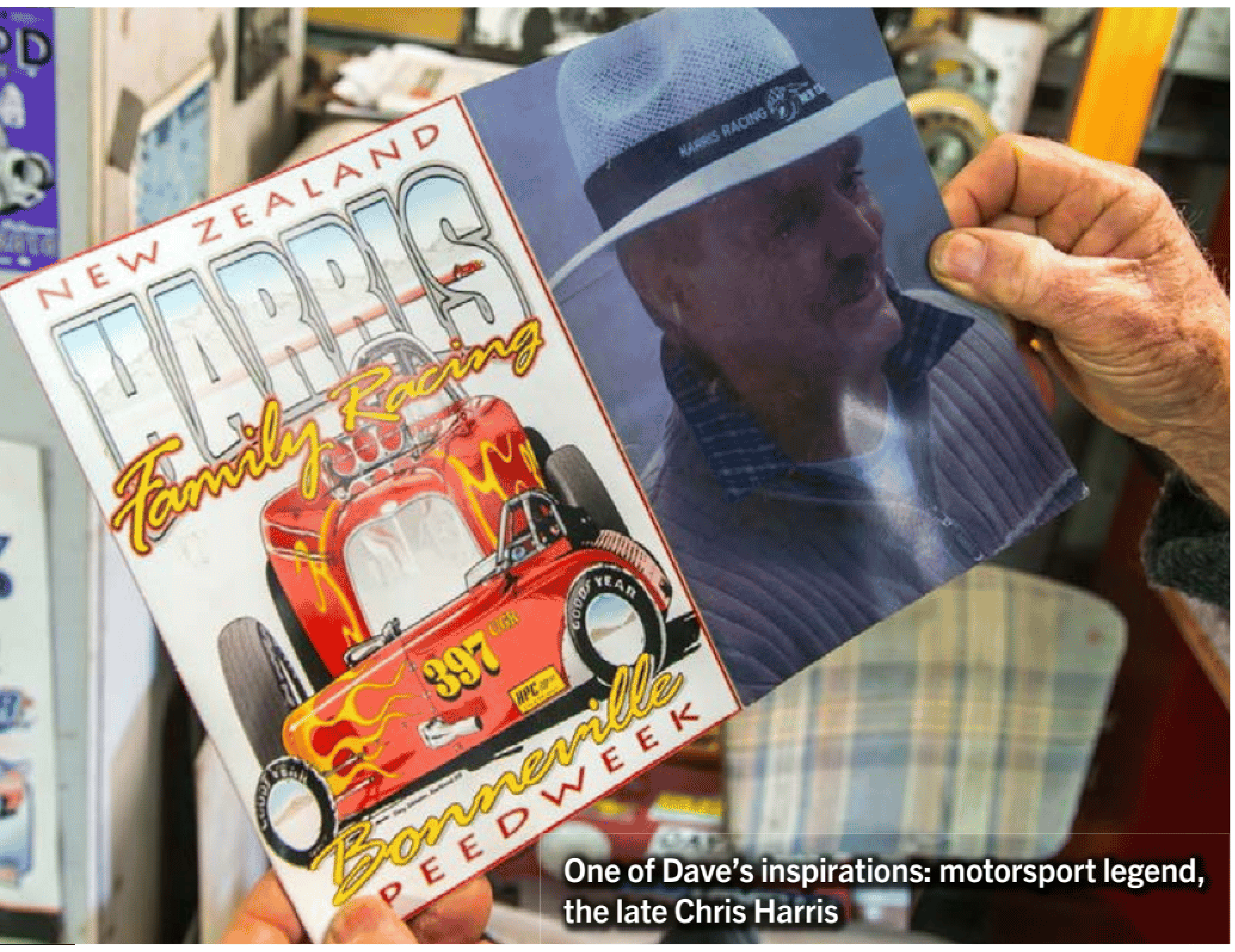
Robbie Ward, one of New Zealand's top Nissan race-car engineers, built the six-cylinder RB30 engine.

Dave says, "The RB fits in here beautifully; an ideal size. It is only three litres but it has a massive turbo and compressor; 1100 horsepower, with 40 pounds of pressure from the compressor. We have grouted the block with a 'concrete' that fills the water jacket up so that there is only water running in the head and the top 80mm of the block. That is where all the heat is generated. The grout around the bores holds the bores together while you are pumping 40 pounds or more. We can turn the pressure up to get more pressure out of the turbo without the risk of splitting the bores." ▶


Making notes


The restored '64 Mustang that will sold to fund the Lakester's Bonneville expedition

Vintage vehicle badges in the collections shed

One of Dave's inspirations: motorsport legend, the late Chris Harris

# A shed life

**Late 1960s**
Helped Neil to make and assemble motorbike spray units

**1970**
Put V8 into a MkII Zephyr

**1971–'72**
Won Hawke's Bay Midget Championship

**1974–'75**
Won East Coast Stock Car Championship

**1975**
Started building a 351-powered '32 roadster, 'Captain Morgan'
Took up hang-gliding and went off 399-metre Te Mata Peak in Hawke's Bay

**1978**
Helped Neil build a train locomotive by doing most of the welding

**1979–'84**
Bought 600-acre run-down farm in the Bay of Plenty; spent four years rebuilding house and stock-yards; renewed all fences

**1985**
Began 18-year stint building log-houses

**2000**
Moved back to Hawke's Bay and bought the car parts business of Jim Gleeson, then spent four years moving and cataloguing 67,000 automotive items

**2002**
Started building Chrisman car clone

**2008**
Took Chrisman to Bonneville and broke the existing record three times in one week, with a top speed of 137mph

**2010**
Took the same car to Lake Gairdner in Aussie and took the record at 137mph

**2011**
Chrisman was a cover feature in *New Zealand Hot Rod* magazine, and featured on Aussie Speedwell poster

**2012**
Won Nostalgia Drags

**2013**
Invited to race Chrisman at Rod Millen's hill-climb, where "a tree jumped out in front of me"

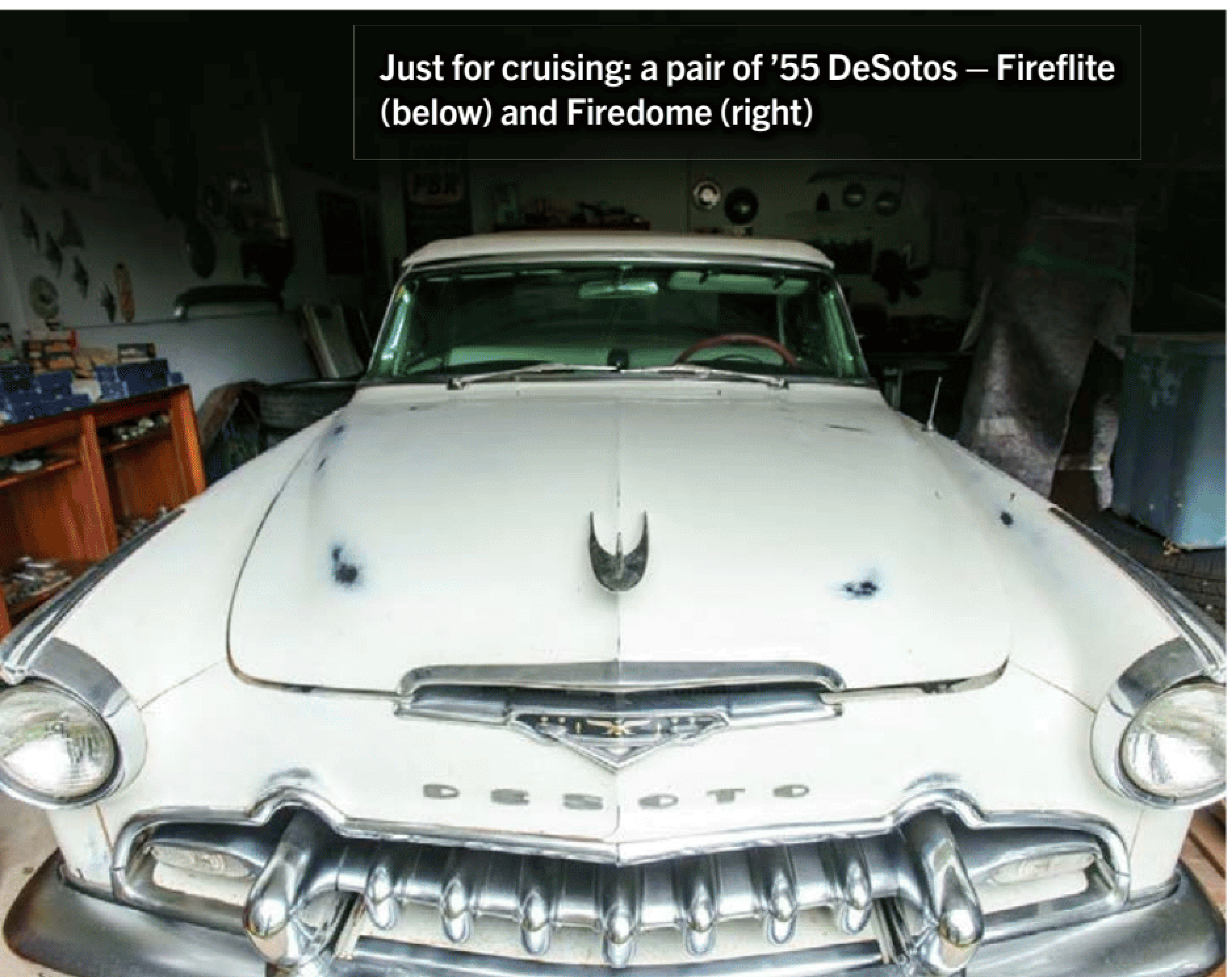
**2014**
Won Nostalgia Drags again, and won Sandy Road Sprints for fastest flat-head
Chrisman was featured in *Hot Rod* magazine and a classic car festival poster

**2015**
Started a Bonneville Lakester to attempt a 262mph record

**2020**
Article in December 2020 *Hot Rod* magazine

**2024**
"Celebrated 51 years of life with my beautiful wife Pam, who has helped me all the way through in every one of my crazy endeavours"

Just for cruising: a pair of '55 DeSotos – Fireflite (below) and Firedome (right)



## Nose end

Under the fibreglass canopy, the cockpit space is tight. For starters, the steering wheel needs to be off before Dave can slide in. Once inside, he will be wearing a five-layered fire suit; a HANS device (head and neck restraint), arm restraints, and a seat belt.

Before he can race, Dave needs to demonstrate that he can remove the restraints, get the wheel off, open the lid, then bail, "within a reasonable amount of time".

Ventilation into the cockpit comes through the nose tube, which doubles as a towing-iron aperture. Air is flushed out through NACA ducts, and airflow is regulated by a bolt fitted to the nose tube.

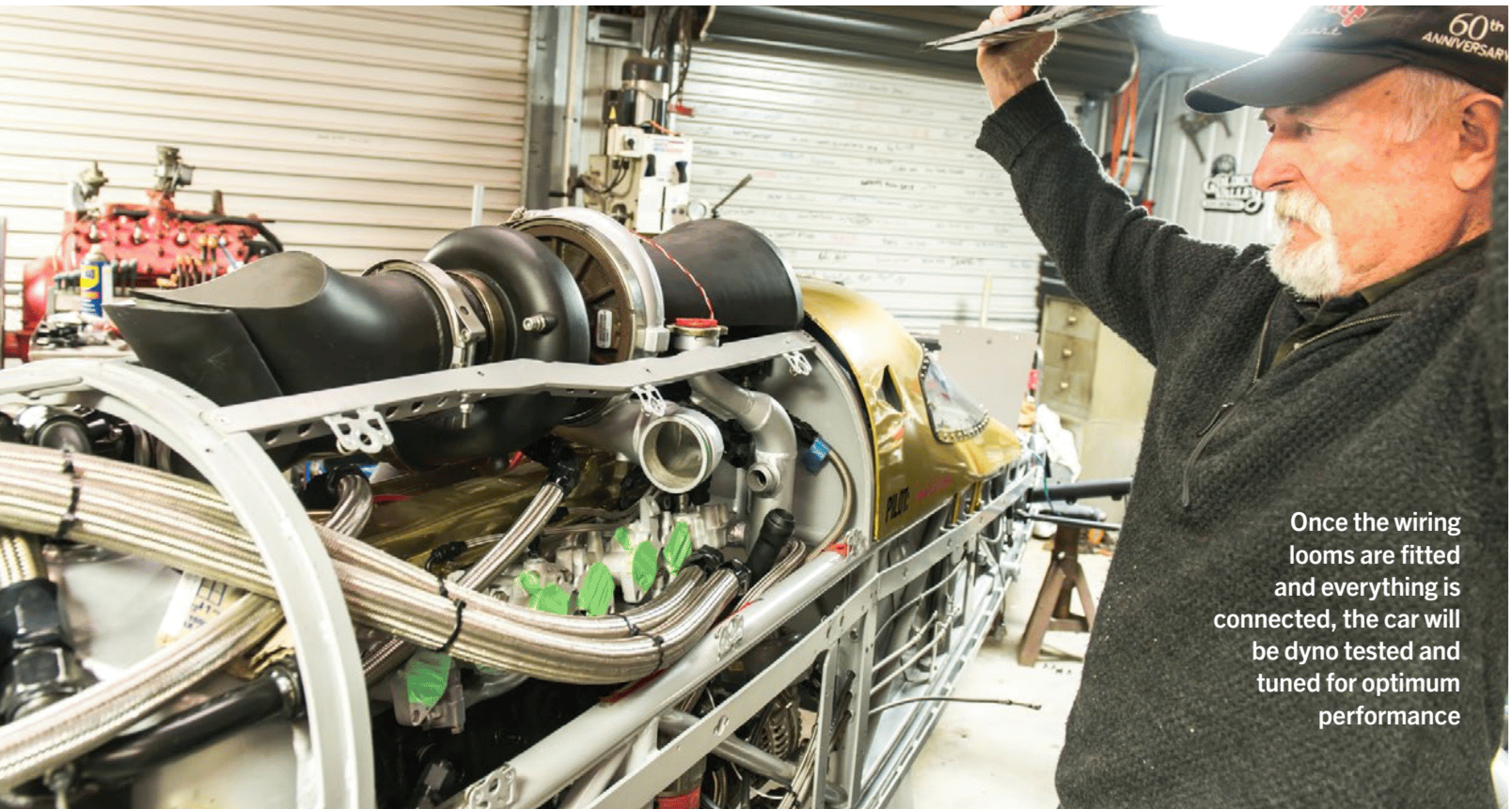
"We are aiming for 300mph," says Dave, matter-of-factly. "If we fall short, we can still get the record, which is 262mph. We have some gearing to get us to around 270 and, if it's doing that with ease, then we will put another set of gears in that will get it up to the 300 mark – if I can hold my eyes open long enough!

"You live more in those few moments than most people live in a lifetime. You can feel everything; you are completely wired. Everything is in slow motion but you are operating in that moment. It is incredible. Pumping pure adrenaline. It is something I have to do again."

Follow the progress of the Lakester on Facebook: The Spirit of New Zealand Bonneville Lakester.

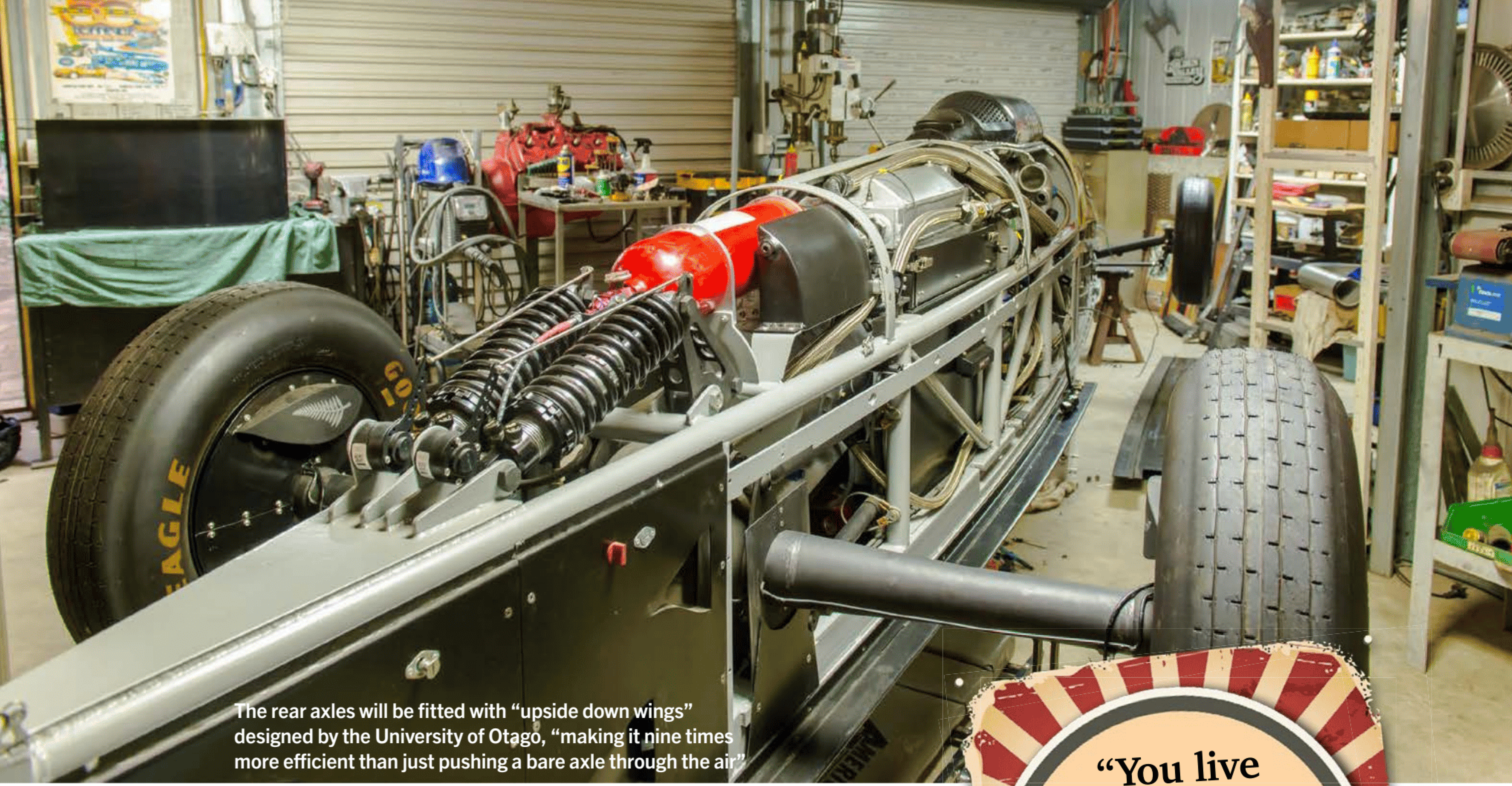
Front shocks and onboard fire suppressant


The pilot at the cockpit

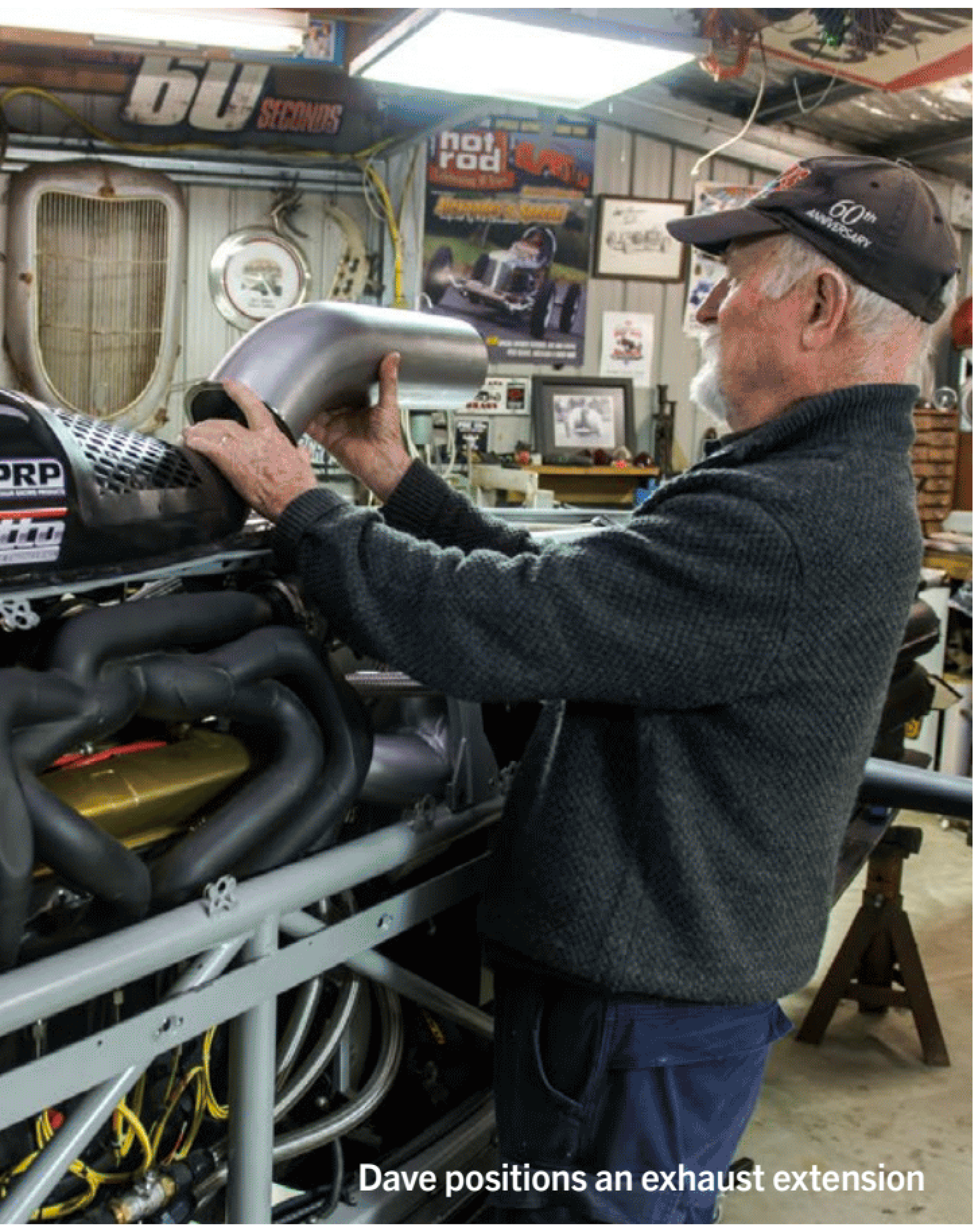

Once the wiring looms are fitted and everything is connected, the car will be dyno tested and tuned for optimum performance

On the cockpit: Dave name-checks some key figures in his motorsports journey so far



The rear axles will be fitted with “upside down wings” designed by the University of Otago, “making it nine times more efficient than just pushing a bare axle through the air”

> “You live more in those few moments than most people live in a lifetime”



Dave positions an exhaust extension



The portal to where the magic happens


# Whanganui Men's Shed SOS

## A big move needs big funds

By Helen Frances

Whanganui Community Men's Shed Trust Inc. has just two-and-half years to raise at least $800K.

This is the estimated amount needed to build and kit out new premises when the trust's current lease on the Marist Rugby Football Club rooms expires. The trust has a memorandum of understanding to lease a property owned by the Whanganui District Council in Handley Street, next to the Whanganui Camera Club, but can't do much until it has the money, says the secretary of the Whanganui Men's Shed, Gerry Gregan.

The Whanganui Men's Shed started off in 2010 in what had been the carpentry shed at the old Universal College of Learning (UCOL) campus, and joined Menzshed NZ Inc. in 2012. It enjoyed 12 years in a custom-made environment.

However, two years ago, the shed was given its marching orders, and members had just four months in which to move massive amounts of tools, machinery, and materials to make way for the 'Justice Hub' – new courthouse and police station.

### A busy shed

The Marist club rooms, owned by Powerco, were not used, so the men's shed was invited to move there, downsizing but trebling its lease costs. Powerco let it use the bunker next door for storage, but there has been no space for hot work, which was able to be done in the UCOL premises.

The members (43 financial, including five women, and a regular core of 20) do mainly woodwork, furniture repair, and a lucrative line in coffins at $600 a pop, incl. GST. They hold fundraising garage sales and do charged-out work for private individuals (they replaced a spade handle for this writer at a very reasonable rate), alongside their charitable work for kindergartens, schools, Plunket, hospice, and the like.

"We're limited because of space. We can't take in a lot of new members, because 20 working in here is enough. Hopefully, in the new premises, our membership will expand, and we'll be able to do other things," Gerry said.

### Preferred option is to build

The members investigated the cost of moving an old building onto the site and found it would be similar to constructing a new one. The new build is their preferred option.

One of the members has made a model of the open-plan, modular, KiwiSpan–type of building that they have in mind – steel on a concrete floor, 42x15m, in six sections of 15x6m – which could be built in stages.

Gerry says they have approached the New Zealand Lottery Grants Board, which distributes profits from the Lotteries Commission. Response has been mixed, he says: "The Lotteries Commission said that, with Cyclone Gabriel, most of their funds have been going to the East Coast. They haven't said no, but they require us to have, I think, 30 per cent of the funding in place before they will look at it. The application to them will be submitted providing we can get other funders on board by the end of the year. We need a [firm] commitment from somebody before we do much more."

While members continue to seek major sponsorship and funding, all donations are gratefully received. If you have any ideas or contacts for funding, contact Gerry Gregan (ph. 027 277 7241 or gerry.gregan6@gmail.com) or Ivan Stick, shed manager (ph. 027 229 0994).

*To find your nearest Menzshed, see menzshed.nz.*

> "Members had just four months in which to move massive amounts of tools, machinery, and materials"

These Boyce Moto Meters would have originally been fitted to the radiator caps of antique automobiles. They would have measured the temperature of the radiator water – alerting the driver to an overheating engine

# A busy weekend in Canterbury

## Two popular events lure a multitude of punters

By Ritchie Wilson

On a weekend at the beginning of October, two notable events took place in Christchurch.

One was the McLeans Island Swap Meet, run by the Canterbury branch of the Vintage Car Club of New Zealand (VCC). The other was perhaps less than half the size but with patrons who were just as enthusiastic.

The McLeans Island Swap Meet at the VCC's base at Cutler Park – part of the Christchurch City Council's McLeans Island Recreational Reserve – is held over three days. This year it was from Friday, 11 October to Sunday, 13 October. Cutler Park is a huge site, and can accommodate more than 600 stalls that sell everything from wire wheels to walnuts.

The swap meet has been going on for getting on for 50 years and two of the vendors that The Shed spoke to had sold from the same sites for at least 40 years.

The event is very weather dependent and some past occasions have been most memorable because of the miserable conditions, as a southerly front, racing up the South Island, has come through with thunder and heavy rain. Most veteran site holders erect some kind of shelter to protect their sale items from rain.

### Clever stall holders

This year the weather on the Friday and Saturday was sunny, and the shade provided by tents and gazebos was very welcome. Two sites had custom-built wood and salvaged corrugated iron structures mounted on large trailers to protect against rain or sun. On one, the hinged walls swung upwards to form verandas on all four sides.

The food vendors are an important part of the swap meet, and the ice cream van in particular was doing a brisk trade.

The Shed spoke to one trader whose main items for sale were Stanley woodworking planes and 1930s boys' annuals. The annuals were closely examined by a few patrons, but none sold. Only two of the planes found a buyer, even when the prices were reduced. The trader felt that tastes had changed and that he had misjudged the market: his prices were too high.

In contrast, the very experienced people at the next site, selling mainly brass lanterns of various types, reported

The Christchurch Garden Railway Group's G-scale layout. The figures and buildings are made by the German Playmobil company to the same scale (1:24) as G-scale

that they had done well. Another man said that he occupied three sites and had been so busy on the Friday and Saturday that he was too tired to attend on the Sunday. He said that he had done "fantastically". He buys at the swap meet as well as sells and was very pleased with his purchases. Ironically, he thought his best buy was a box of half-a-dozen top-quality modern wood planes.

## Big Model Train Show

The other event, taking place on the Saturday and Sunday at Cowles Stadium basketball arena, was the Christchurch Big Model Train Show, featuring model train layouts in various gauges, along with folk selling locomotives, rolling stock, and associated items.

The 23 layouts on display varied from Z-scale (1:220) to G-scale (1:22.5). The Z-scale has a track with a tiny 6.5mm gauge (the distance between the rails) while the G-scale has a 45mm gauge.

When The Shed arrived on Sunday morning, there was a queue at the entrance and the stadium was packed with aficionados of all ages. The secretary of the Christchurch Model Railway Exhibition Society, Bryan Stevenson, estimated that between 3000 and 4000 – "perhaps more" – model train enthusiasts attended over the two days.

All the layouts were highly finished and of great interest. Some were realistic (Hamburg, Rewanui), and some were more fanciful (Playmobil – which is the same scale as G-scale). In some, the level of detail was striking. One had a wedding party being photographed outside a church; the wedding photographer's camera featured a working flash.

## Prize winners

The award for best exhibit went to Ian Perry's 'Kaikoura' layout, which showed the 1960s New Zealand Railways operation in the coastal town.

Steve Cook from Wellington is the very fortunate owner of a Märklin Wonderwheel, which he was demonstrating. It is a very large model of a Ferris wheel, incorporating a circular train track, which was used to display the iconic German manufacturer's locomotives in 1950s toyshop windows. Steve said that his is one of very few survivors.

Gordon, from the Garden City Model Railroad Club, explained that the club's interesting layout was of London, Illinois in the US, rather than London, England, which was why the rolling stock and die-cast model automobiles were all American.

In a side room, the Christchurch Die-cast Model Collectors group had a very impressive display, ranging from Le Mans endurance racers to John Deere tractors.

If Christchurch had a few more weekends like this, we would be in clover.

# THE SHED ONLINE

## What's happening online at the-shed.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:*

### Wood by name, wood by nature

We visit a woodworker in the Adelaide Hills
**https://the-shed.nz/wood-fan-by-name-and-by-nature/**

### Getting up to speed

A 'how to' to calculate gears, sprockets, and pulleys
**https://the-shed.nz/getting-up-to-speed-3/**

### A video guide

How to make electronic music – part 1
**https://the-shed.nz/a-video-guide-to-creating-electronic-music-part-one/**

### Getting floored

A Christchurch shed lean-to's brick-floor earthquake memorial
**https://the-shed.nz/getting-floored/**

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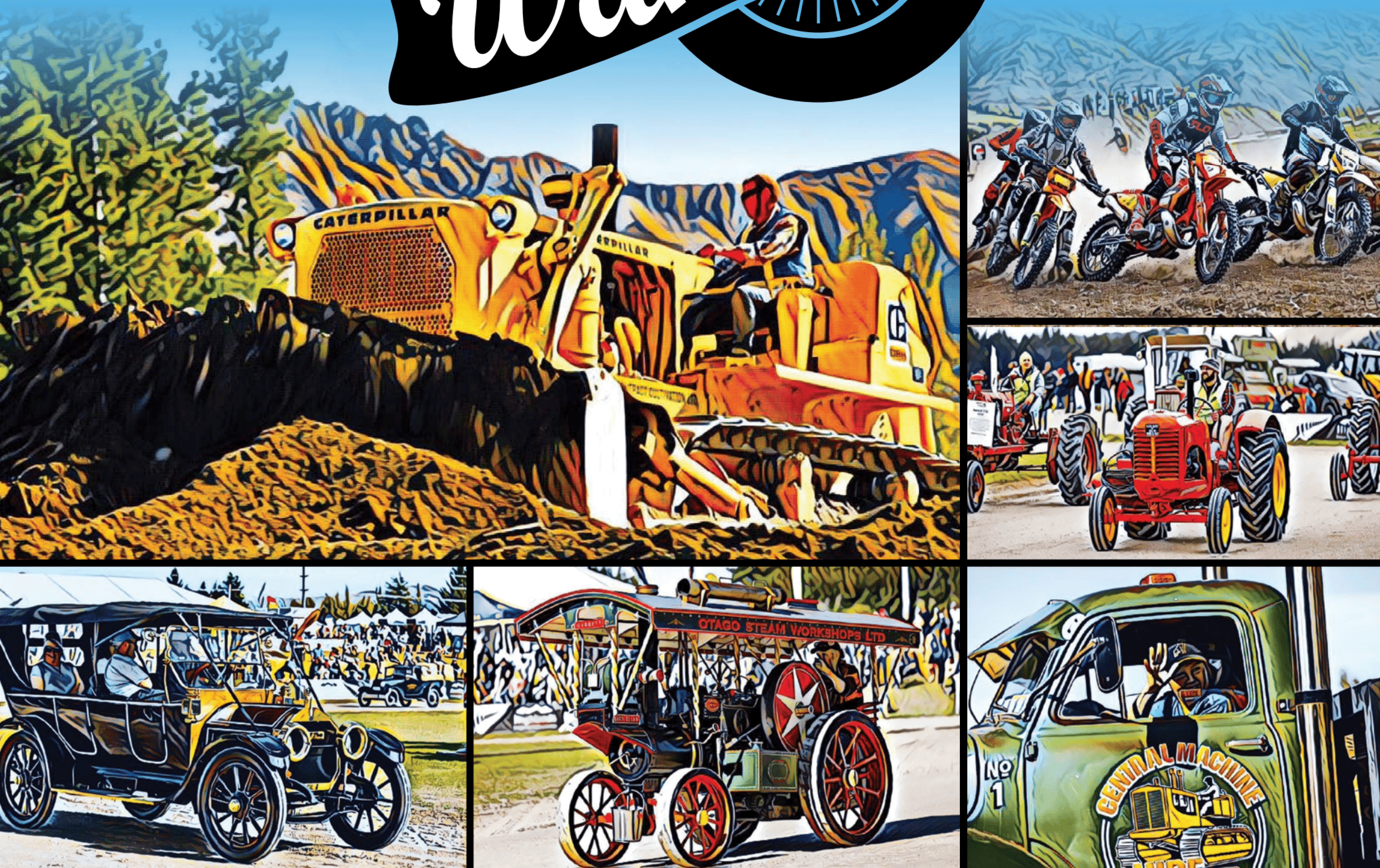


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Evan Wade and his double-barrel smoker

# SMOKIN'

## MAKING A DOUBLE-BARREL SMOKER

By Jude Woodside and Evan Wade | Photographs: Jude Woodside

When my friend Evan Wade said that he was going to build a smoker from two 200-litre drums, I leapt at the chance to cover it, as I had been wanting to cover a Texas-style smoker build for some time.

This isn't quite a traditional offset smoker like the Texas smoker; although it can be used in the same way, this is primarily a cold smoker. Evan is very partial to meat; fish; and, especially, smoked sausages. He had found the design on the internet and followed more or less the same process as the designer: jmillerid.com/wordpress/category/55-gallon-drum-smoker/.

The drums that he sourced had previously contained cooking oil, so they would be safe to use for food. Be aware of what your drums have previously contained as it could influence the taste or even the safety of what you eat. Beware of drums that have held volatile liquids like petroleum products: apart from the danger of poisoning, they can also explode – especially when empty.

### Cutting the drum

This design called for two drums welded together in a T-shape. That required cutting the bottom barrel so that it would accept the horizontal one.

It's possible to lay out the shape involved by working the design out using CAD or by developing the shape via traditional sheet-metal development draughting. ▶

Evan Wade laying out the shape of the two-barrel joint

Cutting the lower barrel


The cut barrel


Nice fit

> "The wing-it system proved quite good"


Cutting relief for the roller ribs


Trial fit

To do this (see panel on **page 32**), you will need to be able to print the resulting design at actual size, so you will need several sheets. You can then wrap the printout around the drum and cut it to the line. Or you could just wing it as we did, using a flexible rod and knowing the four points where the curves would meet to draw a fair curve between them that approximates the shape of the developed curve.

The drum was carefully cut with a thin-blade abrasive disc but it could be cut with a jigsaw. It is important to keep the cut as close as possible to the line or you could find large gaps that will be difficult to fill later when you weld the two together. It took some trimming and some additional work to accommodate the rolling ribs on the horizontal barrel, but eventually Evan got a good fit between the two drums.

The wing-it system proved quite good and resulted in a good fit for the barrels, with only a minor bit of filling at the end.

## Door

The next task was to cut a door into the main drum. To do this, Evan marked out the door parameters with masking tape. This also allowed him to get a good visual on the door size and make corrections easily. With the shape set, he cut along the back edge of the door with an abrasive disc. It's wise to attach the hinges prior to cutting the rest of the door. You can attach them with screws but it's a good idea to weld plates in place to hold the screws properly, or simply weld the hinge with plug welds through the screw holes.

It is important to clean off any paint around the area that the hinges will be welded to. These drums are usually of very thin gauge (20 gauge), barely 1mm thick, so it's important not to crank up the MIG voltage or wire speed too high. With synergic machines like the BOC Smoothare Elite, the thickness should be set to 1.6mm or less.

The hinges are stainless and 2mm thick. Evan welded alternate holes at opposite ends of the hinge to spread the heat and prevent warping. It is possible to run a weld bead along the edge too, but it pays to reduce the voltage to prevent burn-through. Avoid hinges with nylon bushes, as they might not respond well to the temperature.

## Plug welds

Make sure that both the hinges are in line and square to the door, especially if you are welding them. With the hinges in place, you can proceed to cut the rest of the door. Do it carefully – you want the door to be able to close reasonably tightly.

The next stage was to reinforce the door and provide a lip for the door to close on. Welding heavy-gauge metal to thin sheet metal is often best achieved with 'plug' welds – welds made through specially punched holes in the sheet metal or the heavier gauge. ▶

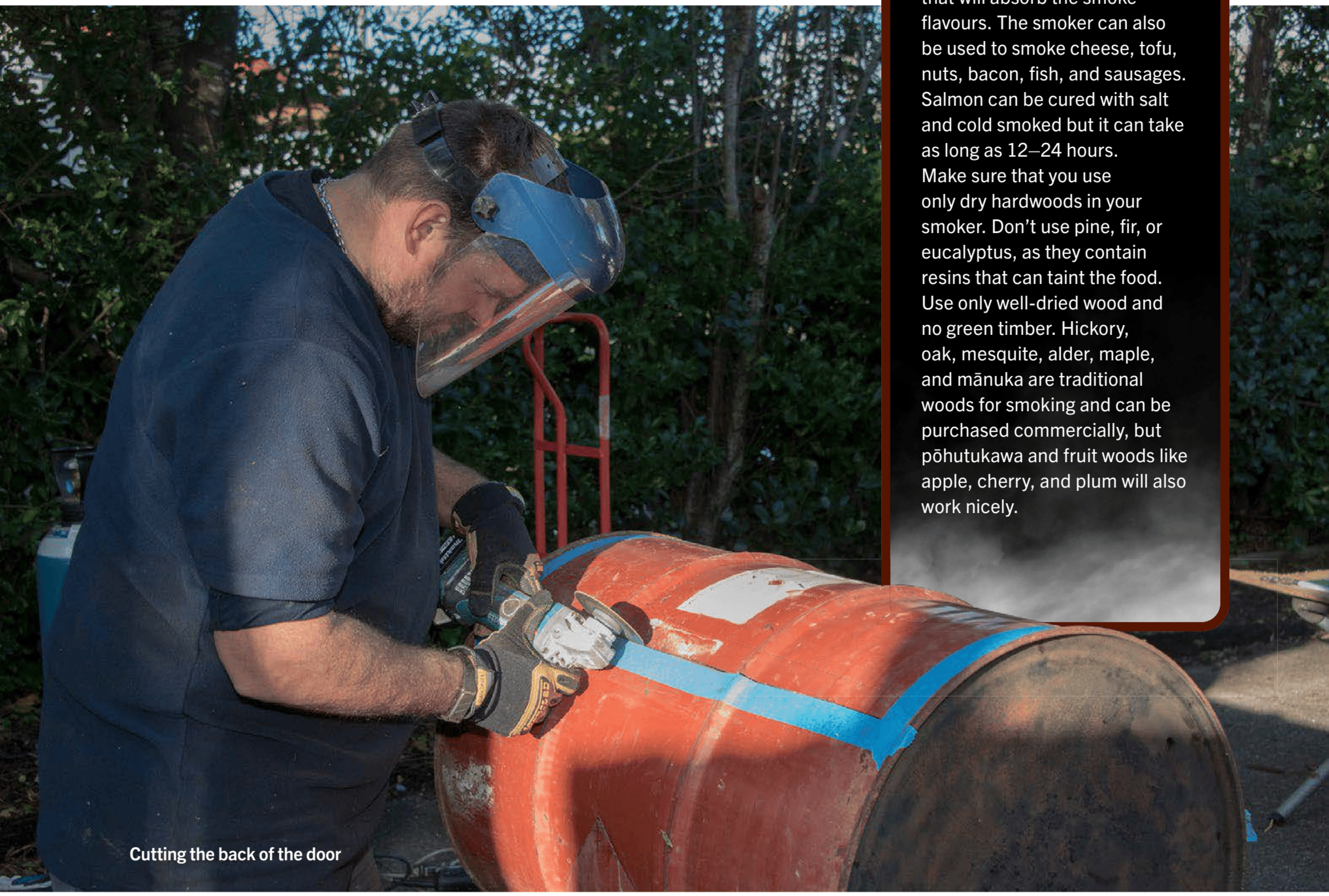
## COLD SMOKING

This is a cold smoker, not a hot smoker. It may be possible to add a charcoal burner to the base of the upper drum or crank up the heat in the burner drum to make it a hot smoker, but it is intended as more of a cold smoker.

It's important not to get too much heat into a cold smoker. Ideally, keep your smoking temperature between 20°C and 30°C. Above this can encourage the growth of harmful bacteria. This kind of smoking doesn't cook the food – it adds flavour and can help to preserve it, but the meat will either need to be cooked further after smoking or cured before smoking to remove most of its moisture.

Meat and fish should be hung to develop a 'pellicle', or skin, that will absorb the smoke flavours. The smoker can also be used to smoke cheese, tofu, nuts, bacon, fish, and sausages. Salmon can be cured with salt and cold smoked but it can take as long as 12–24 hours.

Make sure that you use only dry hardwoods in your smoker. Don't use pine, fir, or eucalyptus, as they contain resins that can taint the food. Use only well-dried wood and no green timber. Hickory, oak, mesquite, alder, maple, and mānuka are traditional woods for smoking and can be purchased commercially, but pōhutukawa and fruit woods like apple, cherry, and plum will also work nicely.



Cutting the back of the door

Welding the hinges

Cutting the door

Bending the edge strips

"The secret to welding thin metals with MIG is to keep the metal as cool as possible"

Plug welding works in a similar way to spot welding, where a series of discrete, spaced welds holds the piece. If you space the welds regularly, the final result can look very 'industrial chic', like rivets. Punch the holes with a drill or, more easily, with a joggler and punch plier as used for automotive body repair.

The secret to welding thin metals with MIG is to keep the metal as cool as possible and use short bursts widely spaced to avoid distortion or burn-through. It pays to move the weld around to prevent overheating any particular region. The welds are small enough that they are unlikely to cause any distortion provided you do spread the heat.

## Roller

Before the 3x40mm strips could be welded in place, the strips for the sides needed to be shaped into a fair curve. The ideal means of doing this is with a roller. The roller consists of three rollers set in a triangle with the middle roller able to be screwed down. The strip of metal is passed between the two bottom rollers and the top adjustable one. After each pass, the middle roller is tightened down slightly more, causing the strip to bend gradually on each pass until the desired curve is obtained.

Light-duty rollers are quite cheap, although they can roll only limited gauges – in this case, up to 5mm thick mild steel, which was more than enough


Plug welding the edge pieces

Punching the holes for the plug welding

Joggler and punch plier

for this job. Each strip was bent to fit and then tacked and welded in place.

Evan felt that the door itself was a bit thin and required some reinforcement to prevent it from either warping or twisting in use. Two more strips were cut and welded to the inside of the rolling ribs, tacked first, and then a small bead was run, taking care not to burn through.

With the door set, it only remained to add a handle, cut from 12mm square tube.

## Cleaning

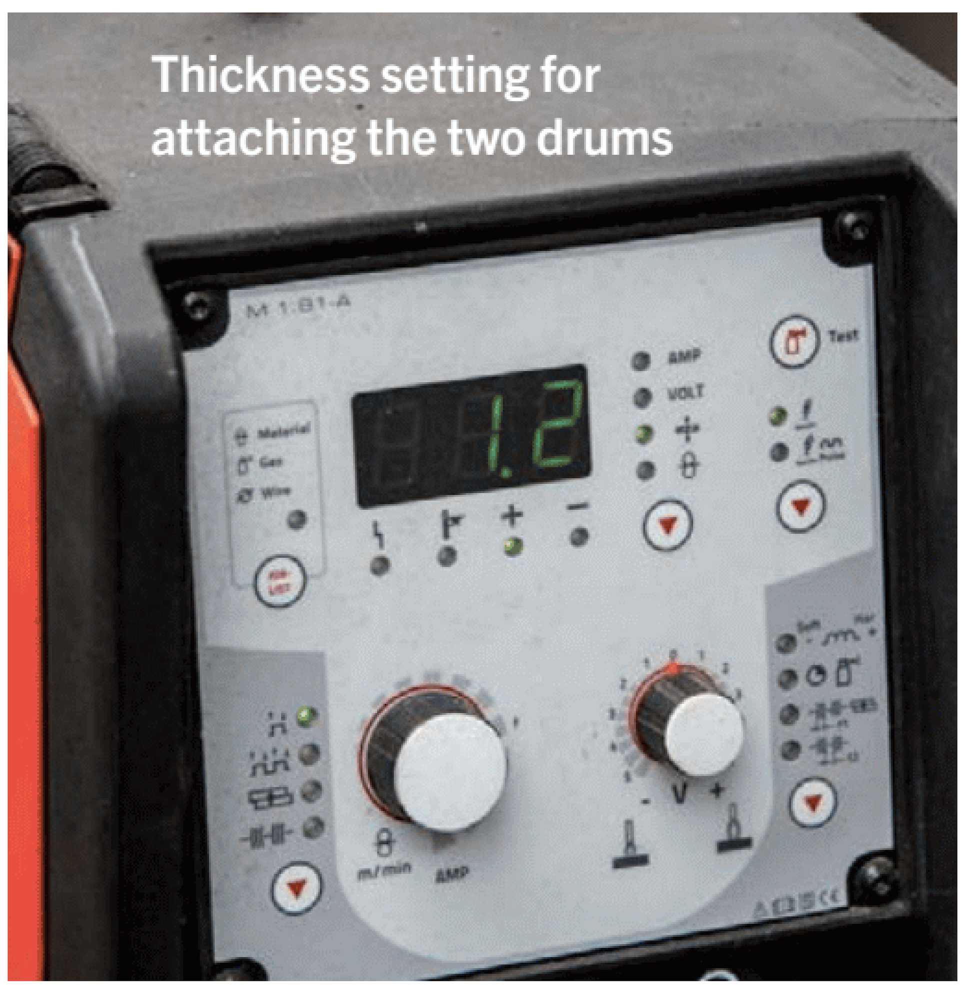
Then came the messy bit. The drums had been painted on the inside and that paint had to be ground off to prevent it from contaminating the food being prepared by releasing fumes or burning during the cooking process.

If you attempt this, make sure that you wear appropriate PPE (personal protective equipment), including a dust mask. Cover your hair (if you still have any); otherwise, you will be washing it out for days. ▶

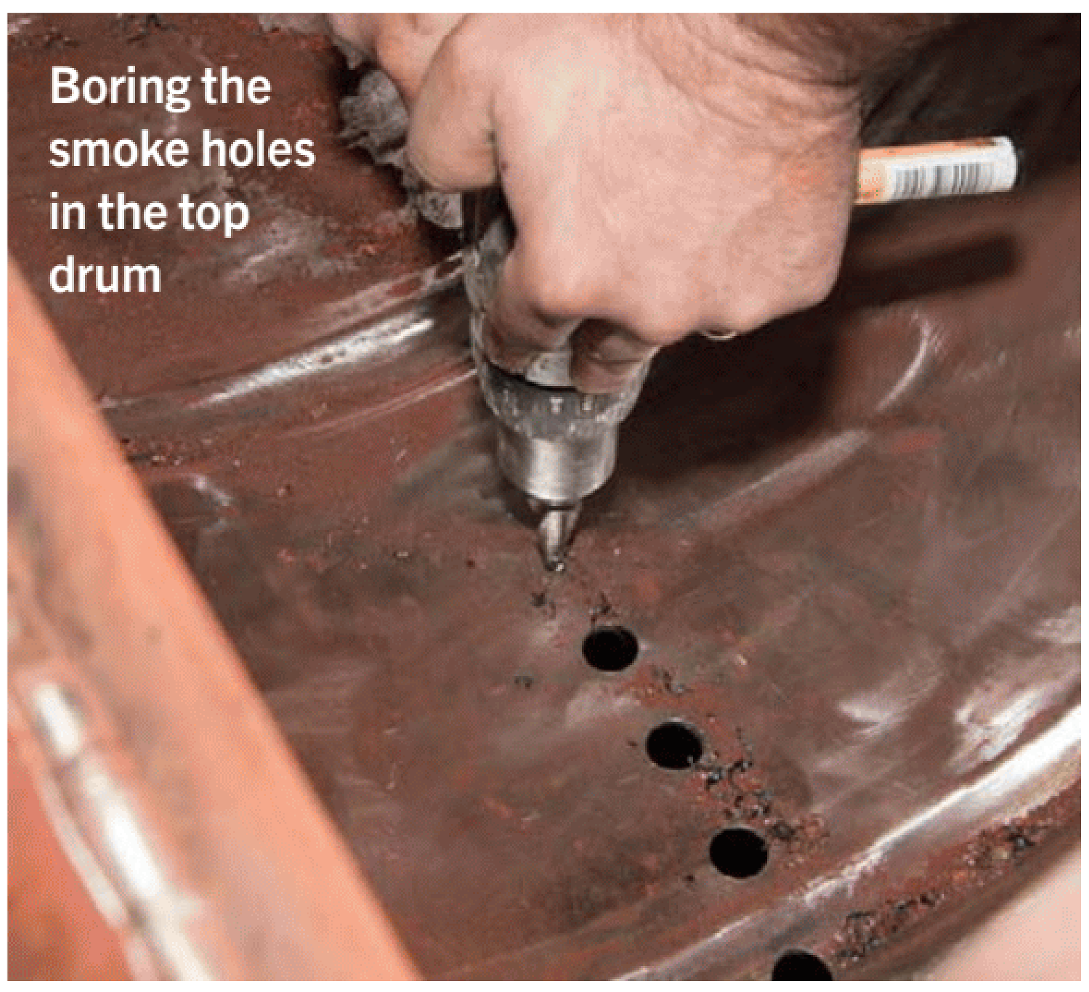

Cleaning the inside

“Paint had to be ground off to prevent it from contaminating the food”


Tacking the drums


Thickness setting for attaching the two drums


Weld in short runs


Boring the smoke holes in the top drum

Once the two barrels were cleaned of paint, they could be tacked together. First, any paint in the vicinity of the join on both barrels had to be ground off. Evan placed the drums in position and marked the contact for the upper one from the position of the lower drum, keeping the weld tacks spaced to prevent any distortions. The weld can be made complete later, but in the first instance it's enough that the two drums are connected.

With both drums joined, it was time to finish the layout of the top unit. Evan tacked strips of 25mm angle iron to the sides and back to hold a series of rods or mesh from which to hang sausages or meat for smoking. The smoke and heat will be generated in the lower barrel. A series of holes needed to be drilled through the base of the upper drum to allow the smoke to come through. These are best and most easily cut with a step drill. The holes are cut in a diamond pattern, making sure they stay within the lower drum.

## Hints

It is important to weld the two drums together with a solid bead to avoid air intake and smoke loss.

It is also important to avoid burn-through, and therefore it's a good idea to cut the voltage or, in the case of synergic machines, set the material thickness to around 1.2mm.

You will still not be able to run a long bead. It's best to work in short bursts that are well spaced and return to fill in the gaps. Where there are gaps that need filling – and, no matter how good your initial fitting, you will probably have some – build up the gap in a series of runs, allowing the bead to cool between runs. Take some time – don't try to rush it.

## Burner

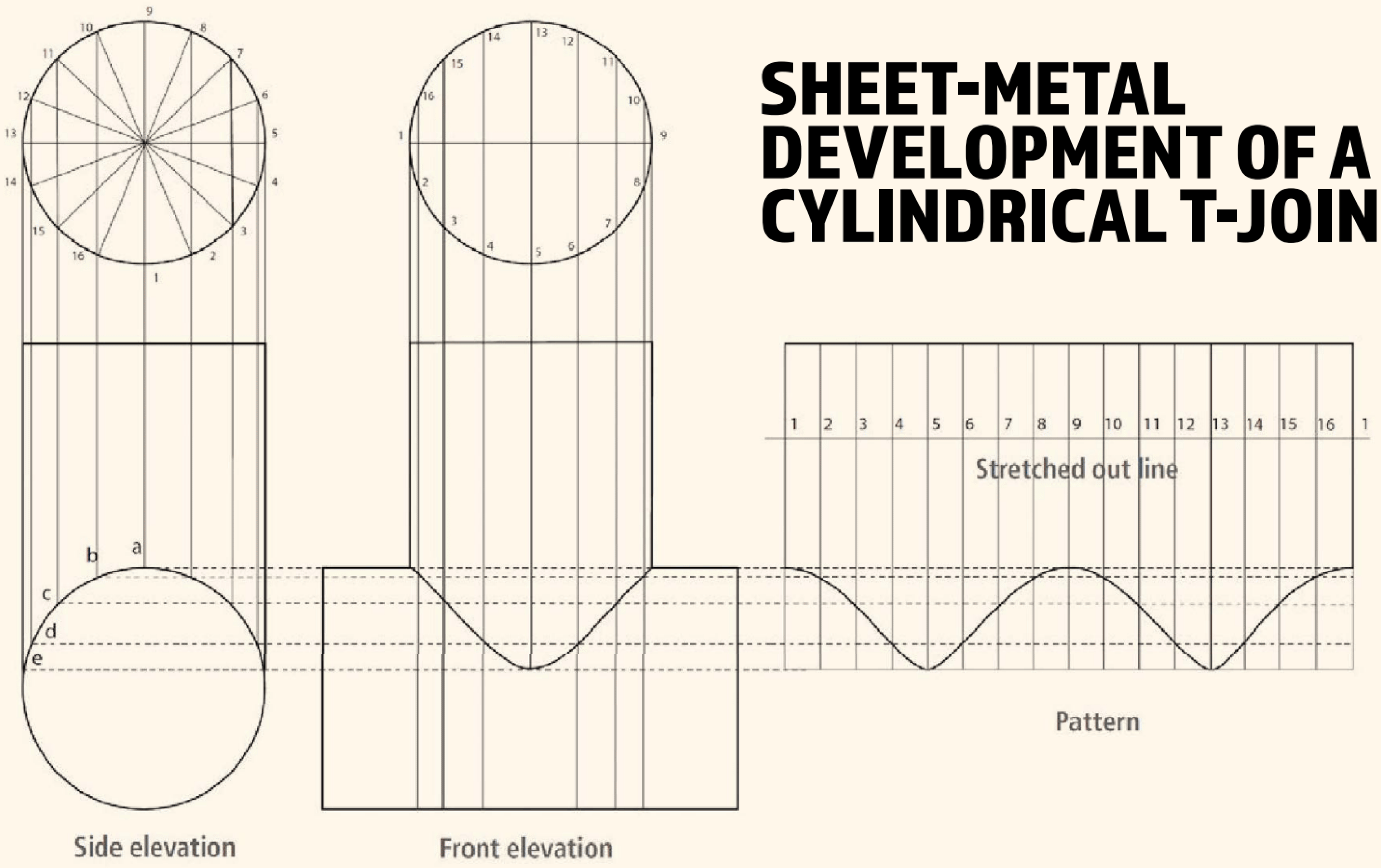
The last process was to mark and cut the door on the lower drum for the burner/ smoker. The process was the same as before. Cut the rear of the door and fit the hinges and then cut the rest of the door. Punch the holes for the plug welds and bend the curves in the steel strip to fit the curve of the drum. Holding the strip in place with clamps, tack every other hole, and then come back and fill the remaining holes. ▶

Stiffening the door

Welding the upper shelf support

Finish welding the two drums

Attaching the door handle




# SHEET-METAL DEVELOPMENT OF A CYLINDRICAL T-JOINT

This description of the process of developing a T-intersection of two cylinders shows the base cylinder or drum on top purely for ease of layout.

First, draw a plan view or profile of the base of the upright drum to scale and divide it into 16 equal parts. Draw the side elevation of the two drums together. In this example, the two drums are the same size. Run lines perpendicular to the numbered segments to where they intersect with the second drum.

Alongside the side elevation, draw another profile and the front elevation alongside the first elevation. Number the segments in the new profile. Bear in mind where the side-elevation segments are placed and make sure the second profile numbers match them, given this view is the same profile but from 90 degrees. Run lines perpendicular to these segments too. Run lines laterally from the point at which the lines from the side elevation intersect with the second drum through the front elevation. Draw a fair curve that connects the points where these lines intersect with the perpendicular lines from the side-elevation profile.

To describe the intersection pattern for the drum, draw a section equivalent to the circumference of the lower drum and divide the circumference into 16 equal parts. Again, mark the point of intersection of the side-elevation lines and the perpendicular lines. Draw a curve that connects these points.

To make a pattern to cut the drum, lay out the circumference on a piece of paper or cardboard to actual size and scale the points up by measuring the length of the perpendicular lines to where they intersect with the pattern on the scale model.

Multiply this length by the scale factor and mark each on the full-size model. It's probably easiest to measure from the top edge of the drum rather than the lower edge – that way you don't need a piece the same height as the drum, just a piece the same depth as the cut. Cut out the shape and lay this on the drum that you intend to cut. Mark the pattern and cut it out.


Welding the hinges on the lower drum


Drilling the smoke release


Smoke release

"To regulate the airflow, the burner holes were drilled with a small hole saw along the base of the burner and through a strip of metal that acts as a damper"


Cleaning up the welds


Cutting the burner door


Cutting the holes in the damper

To keep the doors tightly closed on both drums requires latches. The latches were attached with pop rivets and serve to keep the door tight to the steel strips at the edges, retaining the smoke and the heat. The top drum took two latches, with one for the bottom door.

## Regulator

To regulate the airflow, the burner holes were drilled with a small hole saw along the base of the burner and through a strip of metal that acts as a damper. The damper strip was cut from the remnant of the upright drum so that it matched the curvature of the drum. The damper strip is held in place with self-tapping screws set to let it slide to control the airflow.

A handle was made from a piece of 25mm dowel. Attaching the strip in place with tape or by tightening the screws on which it slides allows the step drill to cut


Internal grilles


Smokin'!

"A handle of 25mm dowel was then attached to the controller to regulate the smoke release"

through the damper strip and the base of the drum, at the same time ensuring that the holes line up.

Evan cut a circle of steel from the remainder of the upright drum to act as a controller for the smoke release in the top drum. The circle was bolted to the side of the top drum and holes were cut with a set drill through both the circle and the drum. A handle of 25mm dowel was then attached to the controller to regulate the smoke release.

The burner for the smoker is set in a basket in the lower drum to allow it to be removed easily for cleaning. In our case, we used an office waste-basket in lieu of a more permanent solution.

The final step was to paint the whole thing in high-temperature paint. Two standard barbecue grilles fit in the lower part of the top drum to allow meat or fish to be laid there. Rods or mesh on the upper shelves can hold sausages for smoking.


Lighting the smoker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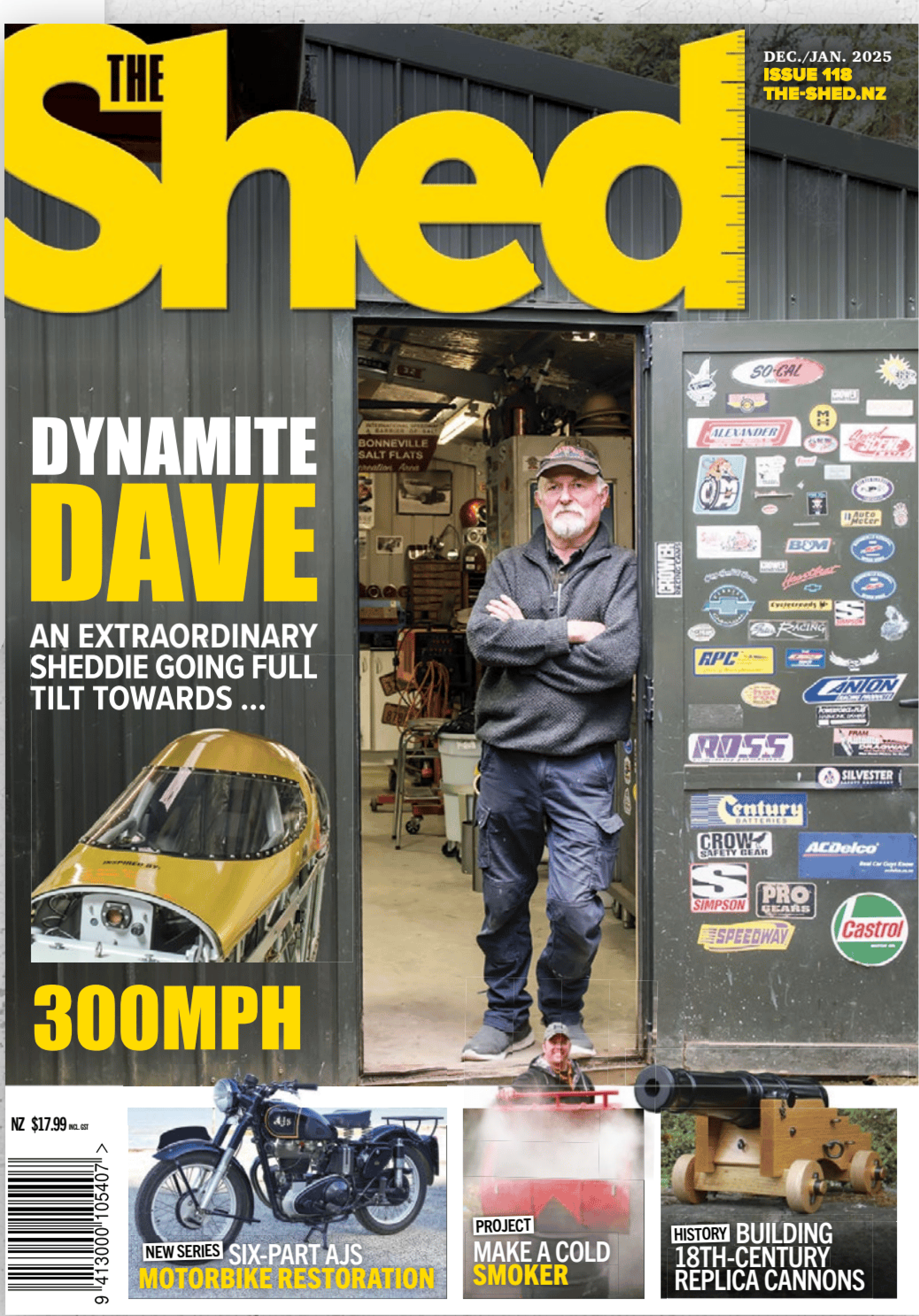


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# A WORK IN PROGRESS

PART 2

**A fresh look at the plans provides the opportunity to make changes and improvements**

*Story and photographs by Nigel Young*

My workshop at about 95 per cent sorted. The ply sheets on their side on the left have yet to be addressed. The bandsaw, table saw, cross-cut saw on the workstation, and assembly table behind them are all on wheels, as is the wooden scrap box on the right between the drill press and the bench

Since I wrote the first article about setting up a workshop (see *The Shed*, Issue No. 117), two things have happened.

The first was my wife suggesting that we reorganise the space used by household items so that I can extend my workshop to the full width of the garage. I didn't see that coming. The second was the decision to buy a new TV.

To start with the second decision, this was significant, as the unit would require a decent media centre to sit on, rather than the black-painted concrete block–and–scaffolding plank stand that we have at the moment. We also decided to make a new coffee table, two new bookshelves, and some lamps – all in the same style of our dining table, which I made some years ago.

This project would require the space, storage, and manoeuvrability described in the previous article, and will become an article in its own right – probably following this series. It was also the justification for buying a table saw to replace the Tanner and a new cross-cut saw to replace the tired existing one. The cost of these two saws and the materials that we used was around the cost of a decent media centre, making the other items free and the saws paid for in one project. It also put a degree of urgency into my workshop upgrade – I hate the word 'makeover' – as we needed to buy three sheets of 1200x2400x18mm non-structural ply and store them before cutting and assembling them. More about this process in the article that follows, as mentioned previously. ▶

The sight that greeted me after being away for two weeks. I had put a coat of Danish oil on the bench tops before going away

## Sorting our stuff

The extension of the workshop was an exercise in minimalism. I had a vague idea of what was behind the shelves separating the workshop from the household items, but much of it was stuff that had been there since we moved in around eight years ago. Need I say more?

Once the sorting, shifting, more shifting, more sorting, and even more shifting were over, and the extent of the space could be properly determined, I began planning it. Looking back, I've come to realise just how much a workshop is a work in progress – I'm still seeing changes, particularly now that the TV media project is about to begin. I started writing this series back in March, prior to my Mitre 10, 50th anniversary articles; now, in September, I have seen changes I hadn't anticipated back then, and that, in turn, have their own impact – a work in progress, as I mentioned.

The far left corner still with its shelves prior to me tearing them out. It had never worked as a tool storage area and just became a dumping ground

## The method

In the previous article, I wrote about the reorganising of my workshop to make it more efficient and process friendly. I finished with the comment: "Making your workshop work for you frees you to enjoy what you're there for. It is the means to the end and an outlet for your own plans and visions."

The reasons why we have workshops are many and varied, but the common goal for us all is satisfaction – we want to do a good job, and see it appreciated and enjoyed by those around us.

At this point, I want to wave the flag for two British TV programmes: *Good With Wood*, and *The Repair Shop*, both to be found on TVNZ+. These shows are very inspirational, and it is interesting to watch the processes as much as the attention to detail and final outcomes of the different projects. Now, they do have a range of resources that we don't necessarily have, but then your local Menzshed probably does – along with the expertise to teach you how to use them.

“It also put a degree of urgency into my workshop upgrade”

Timber and sheet materials up in the ceiling space. OK in the short term while I sorted the workshop but not a long-term solution

## Fresh eyes

Back home after being away for two weeks, I was able to see the workshop with fresher eyes.

I had done the research, sketching, planning, and list writing while away, which included the light-bulb moment of how to implement the dust extractor outlined in the previous article. So, opening the garage doors and seeing both the mess that I had left behind and the preparation work that I had done, I now had a sense of what I needed to achieve.

The other consideration was cost, which I wanted to keep to a minimum. I was determined to use just what was on hand rather than be frustrated by expensive ideas that couldn't be justified – yet. The day may come when a new thicknesser is needed, but until then I will work with what I have.

## The priorities

What became apparent was the priority of storage for materials – without this sorted first, nothing would ever work properly.

I had quite a lot of both timber and sheets, but they were all up in the roof. That was fine for clearing the floor so that I could do the painting, but as a solution for easily accessible materials, it was not. But how do you build racks when all the limited amount of wall space is earmarked for tools, shelves, and the like?

It turns out that this problem comes under the mobility arena – build a movable stand, with sheet materials leaning on one side and timber racks on the other. Furthermore, build it from existing materials – it's a great way to use scraps that are a bit of a nuisance but too good to throw out – which means that there will be a lower demand on the stand, initially anyway. Yeah, right!

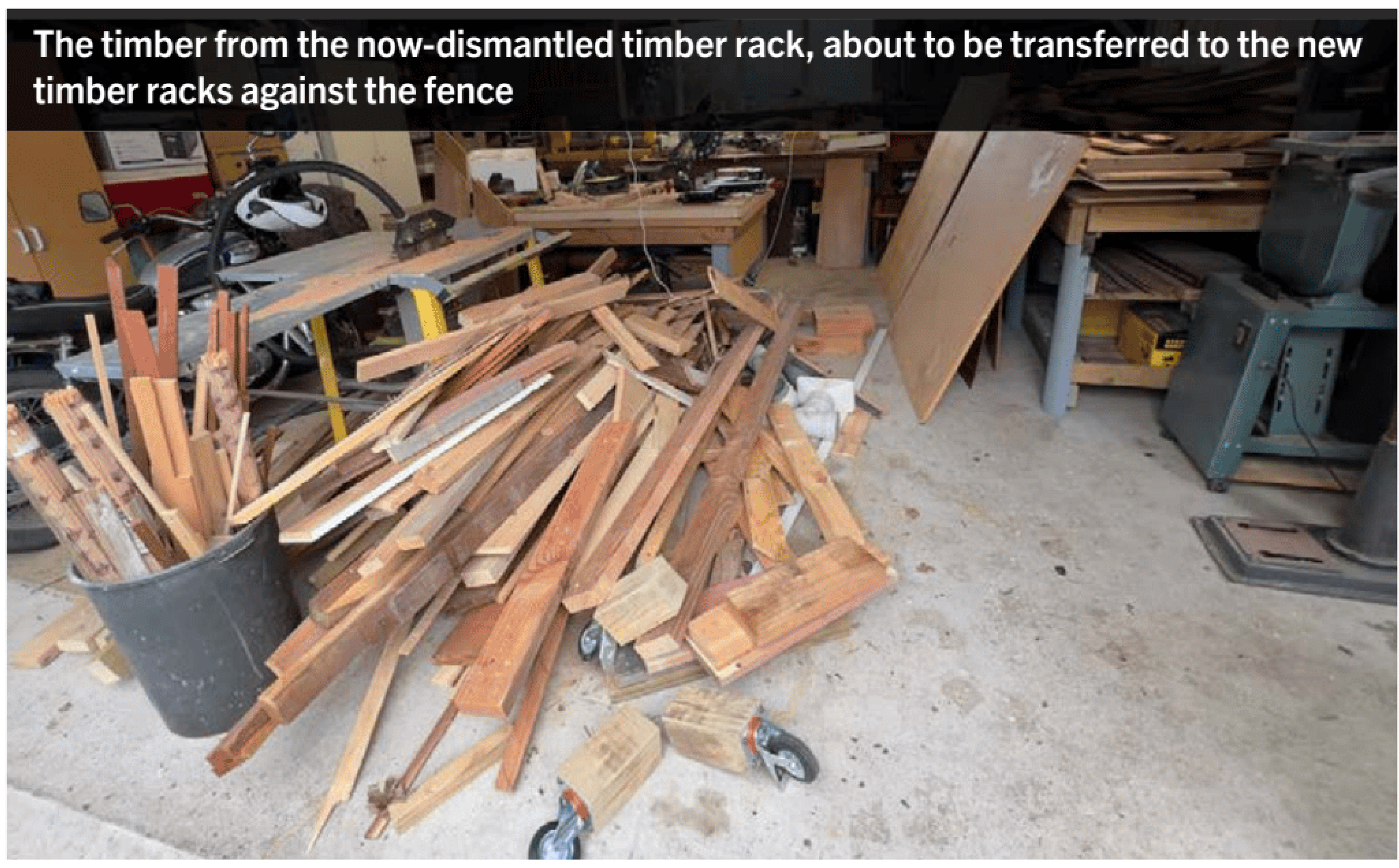
The only cost here is four solid castors, two with brakes and two without, which have a weight capacity of 120kg each. These are surprisingly cheap for what they are – I have them on my assembly table and have never had any issues with them. However, these would prove to be woefully inadequate, as the weight was considerably more than I had anticipated. It ultimately required blocks underneath while I rethought that aspect of storage.

The base of the ill-fated timber and sheet trolley, as I woefully underestimated the amount of weight that it would be required to carry. It seemed like a good idea at the time. The frame is 125x50mm New Zealand Oregon that was used in the timber stack I built against our fence. The castors were fixed to 100x100mm blocks that I had on hand

## New plan

With the changes outlined in my previous article, I had to make a new layout plan. ▶

My wood-scrap bucket in front of the overloaded and propped timber and materials rack



The timber from the now-dismantled timber rack, about to be transferred to the new timber racks against the fence

> **“It would need to be manoeuvrable, but not necessarily mobile”**

Des Thomson installing the framing to the sides of the pallet that will be the floor for the dust extractor

I cut out a piece of cardboard to represent the mobile rack and placed it, correcting any errors that I had made while I had been away. This consisted mainly of the length and position of my two workbenches, which was easily sorted. Given the weight considerations, it would need to be manoeuvrable, but not necessarily mobile. In other words, I needed to be able to get it out of the way, but I was not going to drag it either around the workshop or outside. We have a shingle driveway – no good for dragging heavy stands, no matter how good the castors are.

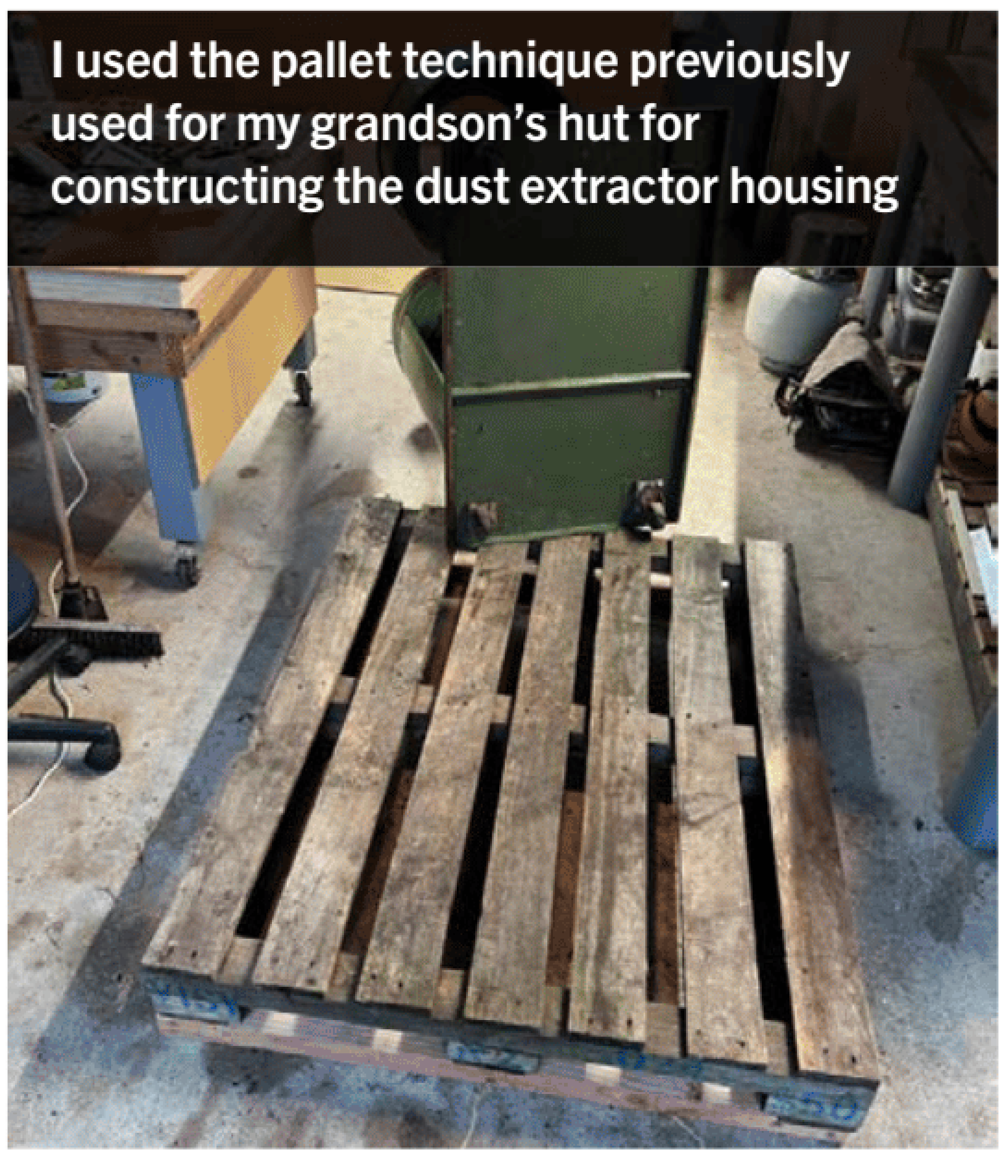
Knowing the answer to this issue at the beginning didn’t mean that I had to build it first – in fact, this would be one of the last things I would do. For now, the timber was still up in the roof and out of my way while I did everything else.

So what was my first job? The – short-lived, as it turned out – timber and sheet stand. To say I was optimistic about it is an understatement – I totally underestimated both the quantity of materials that I had and their combined weight.

The first sign of this was when one of the castors started to buckle and I had to quickly put the aforementioned blocks under either end, using a car jack and keeping my fingers well clear. It’s one thing to have a plan on a piece of cardboard; it’s quite another to have the stand dominating one side of the workshop and not be able to move it, as had been the intention.

## Reusing the stand timber

The stand lasted for a while before I pulled it to pieces and reused a lot of



I used the pallet technique previously used for my grandson's hut for constructing the dust extractor housing

A plate fixed to the top rail of the fence, bringing its top edge above the top edge of the corrugated steel fencing

Old timber that had to be cleared away to build the dust extractor hut. The extractor was parked there some time back to facilitate the planning of the dust extraction requirements of the workshop

the timber for some racks I built behind our house.

Our fence has a kink in it of about 400mm – perfect for taking one end of the racks. In tandem with this, I built a hut for the dust extractor, using the pallet technique that I had used for my grandson's hut. Once these two mini projects were finished, it was back to the workshop, now cleared of the mobile rack.

Once it was cleaned up, the sense of space was great – I could now actually walk right around inside, without having to go outside to go back inside.

I still had to deal with sheet materials such as MDF and ply, and to this end built a vertical rack in the one corner I had never been happy with – I had finally found a use for it. The only thing that it couldn't accommodate was full-height, full-width sheets – there wasn't the headroom. I have yet to resolve that issue.

Finally, I built a box for sheet scraps, put some castors on the bottom, and put it where my bandsaw used to be. A perfect spot: handy but out of the way. I have a large black bucket that I use for timber scraps. It lives with the sheet racks, so now all materials – sans the full-size sheets – have a home. At the moment, I keep two of the three sheets of 18mm ply on top of my assembly table with a cover sheet over them. It keeps them flat, but I'm nervous about them, particularly the potential to damage the edges or drill a hole too deeply through the cover sheet. This happened once, resulting in two holes. Fortunately, I could hide them, but it reinforces my point. ▶

The core structure of the new wood racks

The completed wood racks – all I need to do is to bend some galvanised steel to cover the top edge and lap over the roofing material and they are finished

## Mobility

While the attempt to make the materials stand mobile had been a failure, everything else worked.

Both my bandsaw and the assembly table were already on castors, and my new table saw came with small wheels at the front and lifting handles at the back. But what to do with my cross-cut saw? This had always been an issue – I had tried different ideas in the past, as I showed in the previous article – and I still hadn't really resolved it. I had a mobile stand upon which I had previously tried both it and my lathe. My lathe now had a new home – a small extension bench that I built next to the one on my back wall – so that was sorted.

The mobile stand was very solid, but badly fitted out with some old drawers that didn't run very well. Then fate stepped in. I keep all my fixings in a set of drawers left over from our kitchen upgrade some years ago – but the structure decided to fall apart. So now I had four more drawers, and nowhere to put them.

I pulled the mobile stand apart and rebuilt it to accommodate the eight drawers, the cross-cut saw, and the vacuum cleaner that I use for its dust extraction. It took two attempts, but I got it right using some 12mm scrap plywood, which I finished with a coat of Danish oil. Now everything that wasn't fixed was mobile.

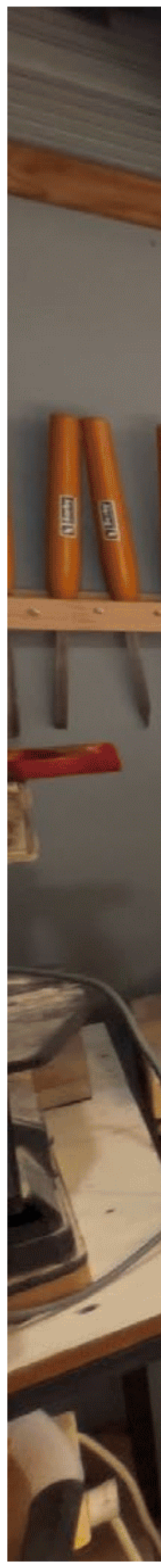
## Tool storage

Tool storage was next. Until now, I had kept rulers, straight edges, and the like on the wall behind my drill press and band saw, but they were awkward to access. The rest had been on shelves at the corner that my sheet storage now occupied, but it had never really worked and became a dumping ground.

I had some old bookshelves on the other side of the workshop, and these weren't being used as well as they could be. Next to them was a blank piece of wall, followed by my new lathe bench. The focus now shifted to the other side of the workshop – the new extended side that my wife had suggested I use.

On the other side of the shelves is a cupboard in which I keep my power

The dust extractor placed inside its hut. It will be fixed to the pallet floor and the hose will go in through the back wall of the workshop



> "Let's not forget its need for dust extraction"

My new tool corner, adapting the existing bookcases and adding the bench extension for the lathe


Looking over my mobile assembly table to the far corner where my tools were before I pulled them all out

Looking across the 95 per cent completed workshop to the far corner that now stores sheet materials tools – that didn't change. It now meant that all my tools were together in one place, and I could keep them tidy. Sort of. Not my strength – I'd have to work at it.

I demolished the old shelves, painted over the damaged bits, and decided to reuse the hook system that I had previously used with the new shelves. I also extended two of the shelves with some MDF and drilled them for screwdrivers and chisels. I hung my hammers between them, added the hooking system in front of them, and put other stuff on them. It all seems to work – for now.

## Conclusion

Workshops are a work in progress, and that will always be the case.

The important part is to be able to change your workshop with minimal disruption as and when required – hence keeping things as mobile as possible.

Dust is the other issue. While I have installed the dust collector, I have yet to install the actual hoses and tubes in the workshop itself. I need to figure out how to keep it mobile also, so that, as tools are moved around, the dust extractor hoses move with them. I have yet to set up a decent sanding station, and the lathe is in place but needs some work to make it operational. I need to keep in mind that lathes make a huge mess and consider the best way to contain this.

My other long-term goal is a thicknesser. While I know what I want, it needs the same sort of operational space as a table saw: a decent amount of room both in front of and behind it, as it is a feed-through operation. And let's not forget its need for dust extraction. One thing that I do have in mind for the dust extraction is to have a floor-level port that I can sweep dust into – they are a great idea.

The best solutions are always the simplest ones, so keep in mind how you work and try to organise a flow – a flexible flow – and don't forget to join your local Menzshed; the support you receive is well worth the modest annual fee.

The hooks that I used for my tools (above, bottom row), and how I bent (above, top row) and then attached them to the wall (below)

Waste timber is never wasted

All my tools now together at the same end – this is huge for me, as I'm not a naturally tidy person

# AYRBURN CLASSIC

**The Ayrburn Classic, a festival of motoring, will take place in the scenic grounds of the Ayrburn winery in Arrowtown, Queenstown Lakes District, from Friday, 21 March to Sunday, 23 March 2025, coinciding with Otago Anniversary Weekend**

Set to become a premier destination on New Zealand's event calendar, the festival promises to be reminiscent of some of the most prestigious motoring events globally, thanks to its stunning location and world-class execution.

This celebration of motoring heritage, set against the spectacular backdrop of one of New Zealand's finest estates, will showcase the exceptional craftsmanship of New Zealand's automotive industry.

Chosen for its breathtaking views and lively atmosphere, Ayrburn adds a unique dimension to the experience, offering visitors not just a car show but an immersive day out.

## Entries invited

Prestige luxury and classic car owners are invited to participate in this inaugural event. If you own a special vehicle and wish to be part of this landmark festival, please contact the event team to secure your spot.

Stay tuned for more information, as tickets will go on sale soon. We will keep you updated on how you can be part of this extraordinary experience.

In addition to the motoring spectacle, visitors to Ayrburn winery can experience a variety of restaurants and bars, wine tastings, and more, with music and entertainment adding to the vibe.

Whether you're spending the day with family or celebrating with friends, the precinct's expansive grounds provide plenty of room for exploration and enjoyment for everyone.

For more information or to register your interest in showing your vehicle, please contact lisa.wilson@ayrburn.com.


# METALLIC ART

*By Todd Wylie | Photographs: Cal Thorley / Supplied*

## While most people use sheet-metal tools for fabrication, Mike Mason takes things to a whole new level by using a bead roller to create custom works of art

Hamiltonian Mike Mason is a rarity these days, a true craftsman who can create almost anything out of sheet metal. He spends his days in a hot rod and restoration shop, fabricating whatever is required, but after hours he turns his hand to using his expertise to create artwork.

Asked about the transition from building cars to producing works of art, he tells us, “It all started from buying my first bead roller from Machineryhouse in Auckland. I had done some art as birthday presents and that kind of stuff, but it evolved into wanting to do it at home. That’s when I bought the machine and started up the Instagram page metallicartnz.”

He must have been doing something right, as the posts caught the attention of Rick Foster, the general manager for Hare and Forbes Machineryhouse in Australia – a sister company of Machineryhouse in New Zealand.

### Now, that’s different

“Rick saw the tool being used for something other than what it is intended for, which is automotive restoration and fabrication. He liked the look of it so called me out of the blue, saying he saw that I had their gear and that they had the latest model of the bead roller I was using in stock, and, if I wanted, they would send me one. They just wanted me to keep doing what I was doing and give them feedback on the machine.”

Following success with the new machine, Mike was asked if he would be happy to teach people wanting to do the same. Before long, he was on a plane heading to Sydney.

“That class was hosted at MotoRRetro, which is an automotive restoration shop next to Hare and Forbes in Sydney. MotoRRetro also runs metal-shaping classes out of their shop, so it’s half functional restoration shop and half metal-shaping classroom,” Mike says.

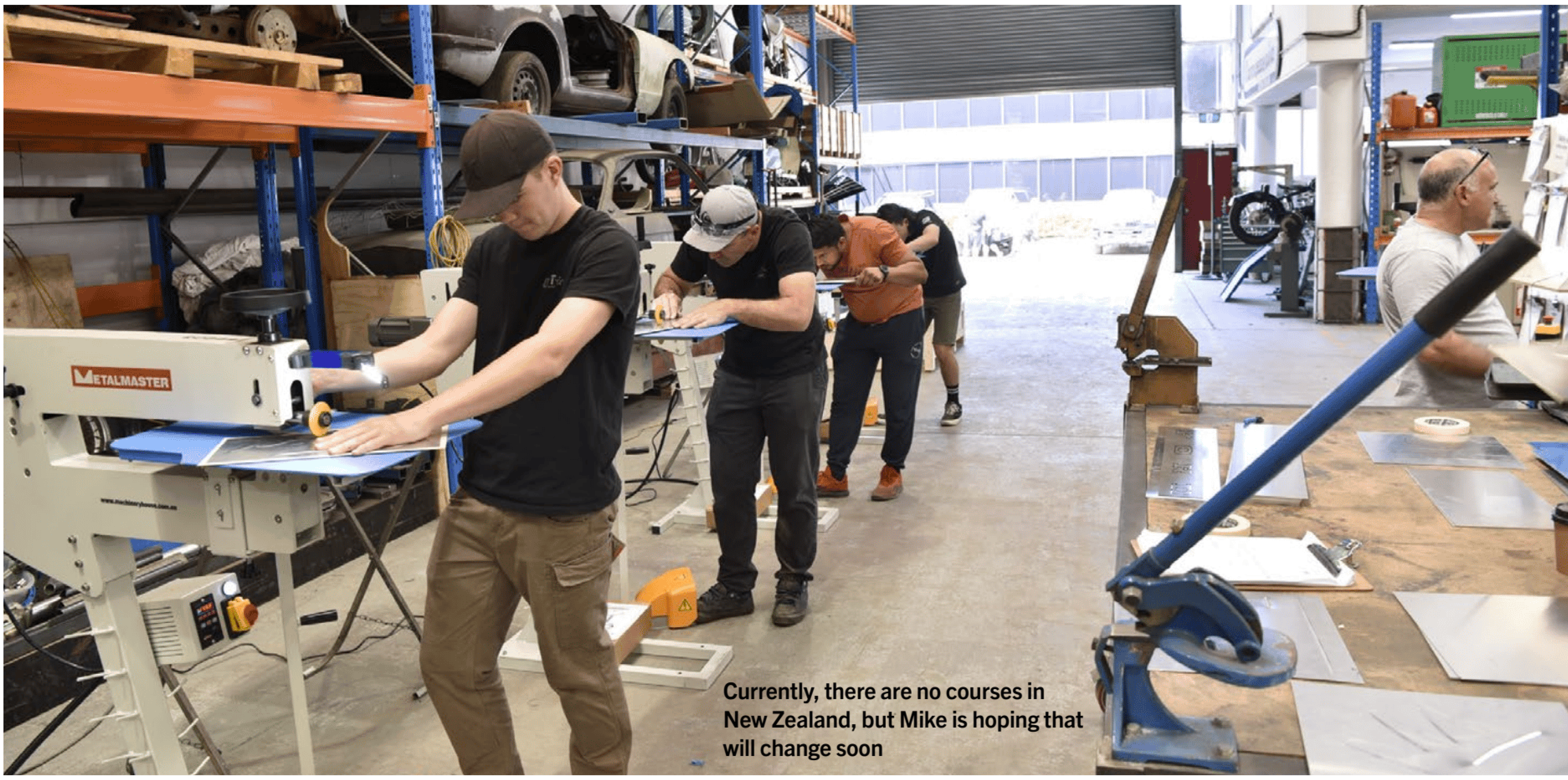
Following the success of the course, Mike was asked to head back across the ditch to run some live demos at arguably Australia’s largest indoor custom car show: MotorEx.

### Evolution of the bead roller

That trip was another success, with the transition from workshop tool to art tool proving to be a popular one.

Mike is quick to credit his years of working for artisan panel beater Bodymods for his skills. He also says it wouldn’t have been possible if the bead roller equipment hadn’t evolved as far as it has: “The bead roller is generally power driven now, but it used to be a hand-turned machine where you’d have to have someone winding the machine over while you steered the material through.”

Now that they are power operated, they’re easy to use as a one-person machine and are most commonly utilised for creating swages in replacement floor pans or similar. The machine Mike uses has a 610mm reach, but they are also available in 1070mm format. ▶




Currently, there are no courses in New Zealand, but Mike is hoping that will change soon


Now power operated, these bead rollers are easy to operate as a one-person machine

The art-specific dies that Mike helped create aid with the fine-detail work

## Mike's bead roller

Asked about the bead roller, Mike tells us, "My machine is identical to what you can buy off the floor at Machineryhouse. It comes with 12 or 13 sets of dyes, with plenty more available for specialist purposes."

That now includes a set designed by Mike specifically for artwork.

"I created a prototype for some custom dyes and Machineryhouse had them mass-produced in the factory in Asia," he explains. "They are a bit gentler on the aluminium and don't scratch it up when you're rolling."

Despite Mike's artistic abilities, he claims that he's not good at traditional drawing, which is partially what inspired him to turn his hand to using the bead roller for a new purpose: "The product knowledge and imagination blended quite well with each other, and it just worked."

What better subject matter for Mike to hone his skills on than trying to create a metallic print of his dog, Boston.

Mike laughs, saying, "He's got quite a memorable face, so I thought it'd look quite cool rolled up. Start to finish, including framing and everything like that, I would have spent about seven-and-a-half hours [on it]."

## Mike's process

The process isn't straightforward, though, as first Mike traces his desired image with carbon paper or cuts it out as a stencil to get the basic lines on the metal. When asked to mass-produce something like a company logo, he'll laser cut a template to make sure each piece is the same, but that still requires painstaking attention to detail.

Luckily for him, he loves the creative process, and most customers tend to be happy to plant the seed then let him use his creative flair to create a custom piece, not wanting to see it until completion.

Around 95 per cent of his work to date has been custom one-offs, with about half of the customers being car people. While a lot of the work has stayed in New Zealand,

Some of Mike's Australian students displaying their hard work

> "Despite Mike's artistic abilities, he claims that he's not good at traditional drawing"

Mike has also attracted a big following across the ditch and is currently receiving a lot of enquiries from the US.

So far, sending art to customers sight unseen has worked out well, with no bad reactions to date. That's not too surprising, though, as photos don't really do the works justice; you need to see how the light falls on the metal to get the full effect. The pieces are all polished, waxed, and framed before Mike sends them out.

## Skill levels

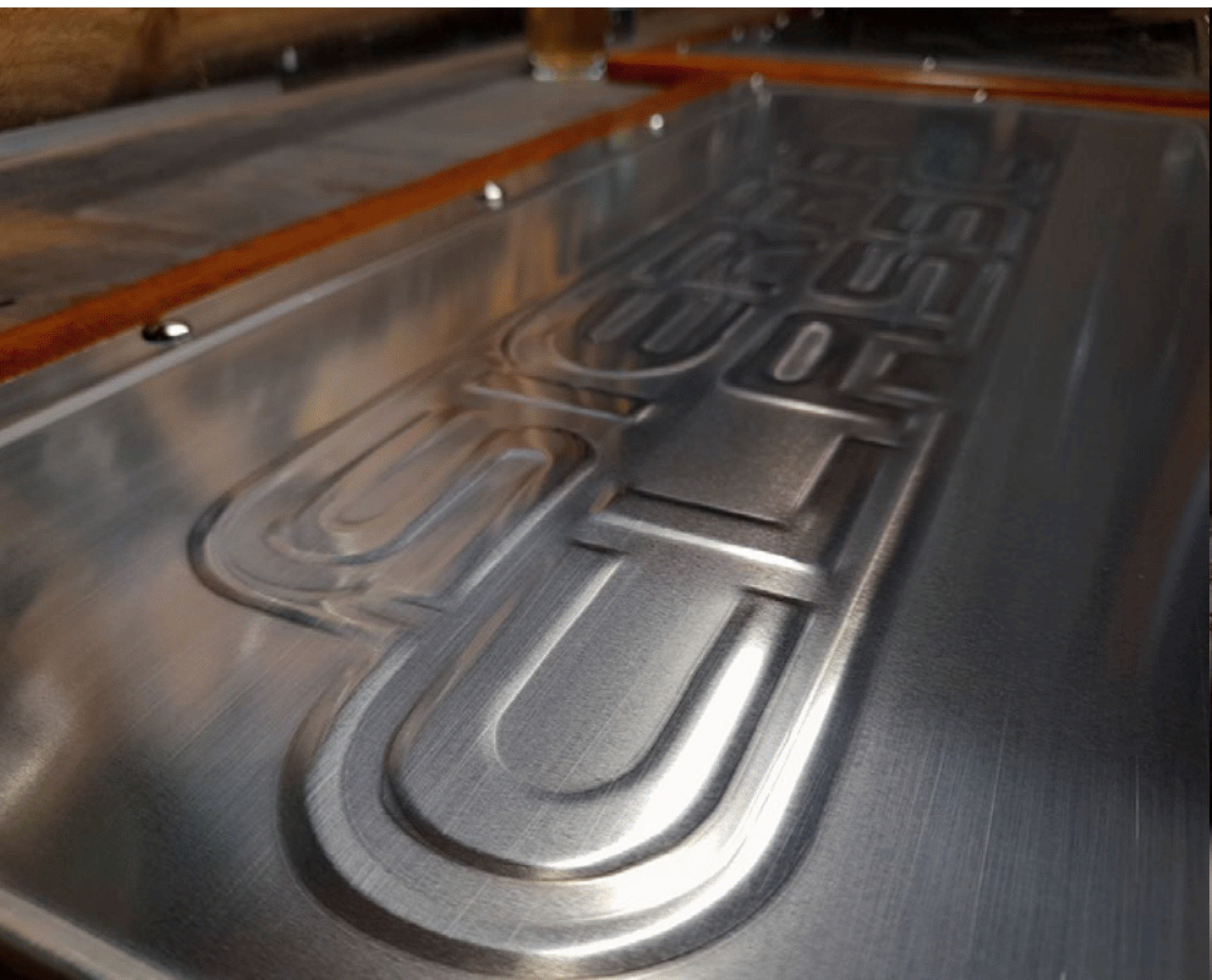
When asked about making mistakes, Mike tells us, "It doesn't happen often now, as I've honed my skills and created ways to overcome making the mistakes that I was repeatedly making at the start. But when it does happen, you just need to start again."

He's also seeing the skills that he's developed help with assisting people to pick up the skills quickly, something he's particularly proud of.

Like any artist, Mike has his favourite works – and some he'd rather not talk about.

"There's definitely some that I've done where I've hated the whole process," he says. "And that's been because I've gone down the wrong path, or I've said yes to doing something when I actually shouldn't have. But doing animals has worked really well for me, as they tend to fall nicely in the light. I don't think I've got one favourite, as every time I do something, I say it's my favourite. One


Mike's Australian students range from fabrication professionals through to home enthusiasts. Plans are now underway to offer similar courses here in New Zealand


It takes some serious skill to get tight lines like this without any errors

Mike's home workshop is well equipped and features some of his favourite pieces; however, the bead roller is where he spends the majority of his time

that stands out, though, is a picture of a lady that I did recently for my sister's birthday. It's probably also the most intricate, time-consuming piece that I've done; it was the hardest to get right."

All up, that piece took around nine hours on the bead roller, and that's on top of the planning and framing.

## Bead-rolling classes

While to date Mike has not run courses in New Zealand, he's in discussion about doing so now, following huge success in Australia.

Mike says, "At my first Machineryhouse bead-rolling class, I had a guy called Dale fly up from Melbourne, and he brought two of his boys with him. I think at the time they were 13 and 15. They did the class, then a year later they came and hung out with me at MotorEx.

"After the class, the boys had bought a bead roller and had been doing their own art. They had been having their mates over after school, and now it's had a flow-on effect. Hanging out with them on the stand for two days was really cool, seeing the progression over a year, plus the fact that they were still doing it – and they've gotten way better."

Mike's relationship with Machineryhouse has obviously prospered too, as he's now providing feedback on the machines, and has become somewhat of an ambassador for the business.

He states that a large part of his success is down to setting up the machine correctly – something that he's now been tasked with helping others to do, as it helps not just with the art but also with the more traditional sheet-metal work. ▶

Mike's favourite piece to date – a gift for his sister

This piece of his dog, Boston, is the one that started it all. His wrinkles work well with the way the light falls over the lines




These bomber-style seats were another recent project

> "A large Jaguar logo that he created, in which you can see the muscles bulging"

## Mike's process

Mike buys sheets of aluminium that are 1200x2400mm and generally cuts them into 600x800mm pieces, which work well with the size of his machine. Having finessed his technique, he now uses multiple passes over one line, increasing pressure to create a natural flowing roll as opposed to a square step. This technique has worked well on pieces such as a large Jaguar logo that he created, in which you can see the muscles bulging.

Despite the apparent complexity, Mike says it's not too hard for newbies to pick up. He believes that the main mistake people make is to over-complicate it rather than just start simple and leave lots of negative space. Of course, that's easy to say now that he's been doing it for a few years.

Like any good artist, Mike often lies awake at night thinking of what he can do next. Whatever that will be, we're sure it'll be impressive – check out the MetallicArt Instagram page for yourself.


Mike with Boston (left) and Harlee (right)

# INTRODUCTION TO ELECTRONIC MUSIC

## The fundamental element of music: the waveforms and how we can manipulate them

PART 2

By Enrico Miglino | Photographs: Enrico Miglino

In this second part of Introduction to Electronic Music, I will try to introduce the fundamental element of music – and, in general, any sound: the waveforms and how we can manipulate them.

Waveform maths covers a wide range of physics and applies not only to sounds but also to light, gases, fluids, and more.

To make it easy to understand, we will explore the aspects specifically related to electronic music, with a practical approach. What is really interesting about electronic music is how waveforms are created with electronic circuits – whether digital or analogue – and how these sounds (which can be any kind of audible sound, not only notes) can be changed.

### The audible range

The human ear can't identify just any sound propagating in the air. We can distinguish sound-waveforms between 20Hz and 20,000Hz, while other species, such as dogs, can hear higher or lower frequencies. Speech, noise, and sounds are all different kinds of music we can identify, understand, and remember.

Of course, notes – the frequencies at the base of music – are coded frequencies that stay within the audible range. Theoretically, following the mathematical progression of the notes in every octave, we know the note frequencies under 20Hz and over 20,000Hz, but we cannot hear them.

The first experiments introducing music created with electronic instruments – between the later years of the 1950s and the early 1960s – mostly followed the notes of traditional instruments, generating new kinds of sonorities.

> “What is really interesting about electronic music is how waveforms are created”

## Evolution

With the evolution of electronic music and new electronic instruments (primarily synthesisers), the range of sounds expanded to cover non-traditional notes and chords, generating sound textures based on noise and non-instrumental sounds. However, the audible frequency range and the wavelength of the octave scales between ‘C’ (Do) and ‘B’ (Si) remain the main reference to represent any score.

Traditional musical instruments (such as guitar, violin, cello, oboe, and trumpet) do not cover the whole range of octaves in the audible range; we can say that different instruments have a different ‘voice’, and can produce their characteristic sound in a more limited range. This is the same as the tone extension we hear from the voices of different singers: a contralto singer can reproduce a range of notes according to a different extension than a tenor, and a contrabass sounds different from a high saxophone.

The rhythm instruments (from conga to triangle, drums, hi-hat, timpani, etc.) produce a sound following a specific tonality.

## Sound-waves

A ‘waveform’ is the representation of a vibration. However, without a medium


**Figure 1:** The dual-channel frequency generator is used for the experiments shown in this article. This almost complete tool can generate one or two frequencies simultaneously, for which I have used the wavelength of some notes to reproduce a pure signal for an audio note. In addition, I have experimented with the impact of amplitude and frequency modulation on the sound frequency and the different perceptions when one of the phases of the two notes is shifted to some degree

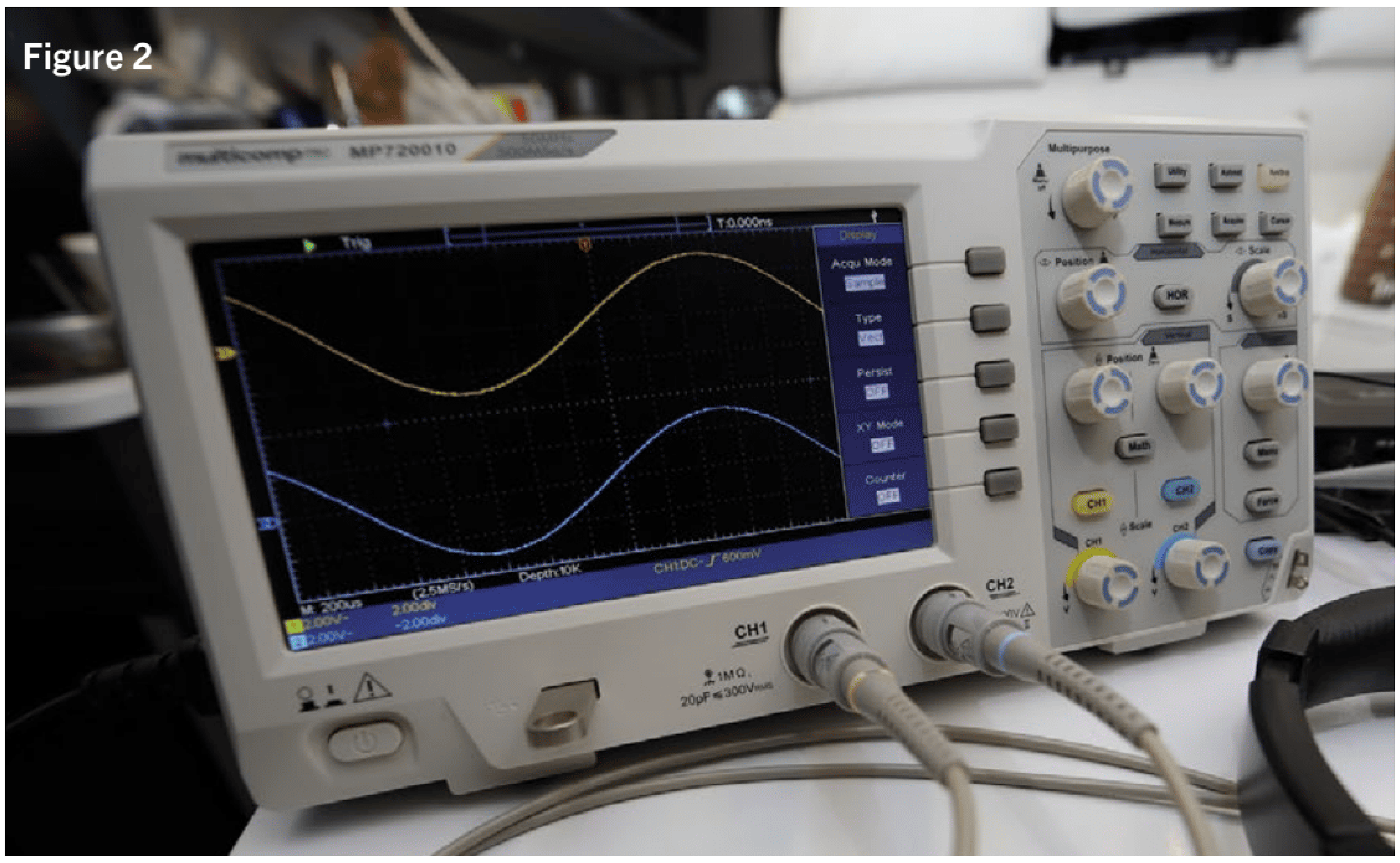



**Figure 2:** I have used a dual-channel oscilloscope to visually display the frequency and its effect when a parameter is manipulated. The oscilloscope also allows for measuring all the signal parameters in real time, including the effect of the phase shifting in a two-dimensional Cartesian graph


These images show some examples of different waveform sets. The display of the waveform generator shows the control parameters defining the shape and how these parameters influence the aspects of the curve. Changing a single parameter is enough to cause the same sound (the notes, according to the frequencies) to be generated with a different timbre

with which to propagate the vibration, there is no sound. Musical instruments generate waveforms (sounds) following a mechanical or electronic process. Conventionally, a specific tone, sound, or chord refers to the sound-wave propagating in the air. The string of a guitar or any other string instrument vibrates when excited by the finger or a tool; the vibration propagates in the air that vibrates, consequently generating an audible sound.

The vibration will also propagate in a solid object or in a liquid, with different effects. Different mediums – due to their physical characteristics – propagate the same waveform at various speeds.

## Waveforms

The most common way to represent a wave is the sinusoidal shape. However, depending on how the wave is generated, it can assume different shapes: square, triangular, ramp, pulse, and sinusoid are the most common.

Depending on the waveform, we perceive the same sound differently.

Sound-waves can be measured by the parameters that define their characteristics (amplitude, wavelength, frequency, duty cycle, etc., depending on the wave type), which shape the wave mathematically. Electronic circuits can also create the shape and characteristics of the waveform.

The tone or 'voice' of a traditional instrument, such as a violin, generates a specific waveform depending on the instrument's physical structure. Sound-waves, or the single notes generated by an instrument, are not single frequencies but interact together; these interactions can be set up to create new sounds.

Different kinds of sound interaction are basically the principle followed by electronic effects to process the sounds. The simplest way is to create 'chords', which are created by playing different notes together.

'Synthesisers' are electronic instruments in which some of the waveform parameters can be altered dynamically to generate effects

## Music Note To Frequency Chart

MixButton

| NOTE | OCTAVE 0 | OCTAVE 1 | OCTAVE 2 | OCTAVE 3 | OCTAVE 4 | OCTAVE 5 | OCTAVE 6 | OCTAVE 7 | OCTAVE 8 |
|---|---|---|---|---|---|---|---|---|---|
| C | 16.35 Hz | 32.70 Hz | 65.41 Hz | 130.81 Hz | A piano middle C 261.63 Hz | 523.25 Hz | 1046.50 Hz | 2093.00 Hz | A piano's highest note 4186.01 Hz |
| C#/D♭ | 17.32 Hz | 34.65 Hz | 69.30 Hz | 138.59 Hz | 277.18 Hz | 554.37 Hz | 1108.73 Hz | 2217.46 Hz | 4434.92 Hz |
| D | 18.35 Hz | 36.71 Hz | 73.42 Hz | 146.83 Hz | 293.66 Hz | 587.33 Hz | 1174.66 Hz | 2349.32 Hz | 4698.63 Hz |
| D#/E♭ | 19.45 Hz | 38.89 Hz | 77.78 Hz | 155.56 Hz | 311.13 Hz | 622.25 Hz | 1244.51 Hz | 2489.02 Hz | 4978.03 Hz |
| E | 20.60 Hz | A bass's lowest note 41.20 Hz | A guitar's lowest note 82.41 Hz | 164.81 Hz | 329.63 Hz | 659.25 Hz | 1318.51 Hz | 2637.02 Hz | 5274.04 Hz |
| F | 21.83 Hz | 43.65 Hz | 87.31 Hz | 174.61 Hz | 349.23 Hz | 698.46 Hz | 1396.91 Hz | 2793.83 Hz | 5587.65 Hz |
| F#/G♭ | 23.12 Hz | 46.25 Hz | 92.50 Hz | 185.00 Hz | 369.99 Hz | 739.99 Hz | 1479.98 Hz | 2959.96 Hz | 5919.91 Hz |
| G | 24.50 Hz | 49.00 Hz | 98.00 Hz | A violin's lowest note 196.00 Hz | 392.00 Hz | 783.99 Hz | 1567.98 Hz | 3135.96 Hz | 6271.93 Hz |
| G#/A♭ | 25.96 Hz | 51.91 Hz | 103.83 Hz | 207.65 Hz | 415.30 Hz | 830.61 Hz | 1661.22 Hz | 3322.44 Hz | 6644.88 Hz |
| A | A piano's lowest note 27.50 Hz | 55.00 Hz | 110.00 Hz | 220.00 Hz | 440.00 Hz | 880.00 Hz | 1760.00 Hz | 3520.00 Hz | 7040.00 Hz |
| A#/B♭ | 29.14 Hz | 58.27 Hz | 116.54 Hz | 233.08 Hz | 466.16 Hz | 932.33 Hz | 1864.66 Hz | 3729.31 Hz | 7458.62 Hz |
| B | A 5 string bass's lowest note 30.87 Hz | 61.74 Hz | 123.47 Hz | 246.94 Hz | 493.88 Hz | 987.77 Hz | 1975.53 Hz | 3951.07 Hz | 7902.13 Hz |

The frequencies correspond to every note in the full-scale range. The green labels show some examples of how not all musical instruments can play the complete tonal extension

(Source: https://mixbutton.com/mixing-articles/music-note-to-frequency-chart/)

and sounds. While the first devices were 'monophonic' – they could not play chords – modern 'polyphonic' synthesisers can apply these dynamic waveform changes to multiple notes simultaneously, extending the range of possibilities.

## Musical notes

Every audible note plays at a specific frequency. The octave notes range from the 'C' (Do) lower frequency to the 'B' ( Si) higher frequency. Multiple scales go from the lowest seven notes set to the highest. For example, a traditional piano has a keyboard of 88 keys covering a range of seven full octaves; the piano keyboard encompasses the full range of notes – full extension. By convention, the reference is the central octave, where the 'A' (La) note is 440Hz.

"A 'waveform' is the representation of a vibration"

Figure 3


**Figure 3:** I used this soundboard to play the sound (notes) of the generated frequencies. Note that I connected the probes on the input side for a precise and clean visualisation of the signal on the oscilloscope. The audio board has its preamplification stage, which the measure should exclude

## Waveforms with electronics

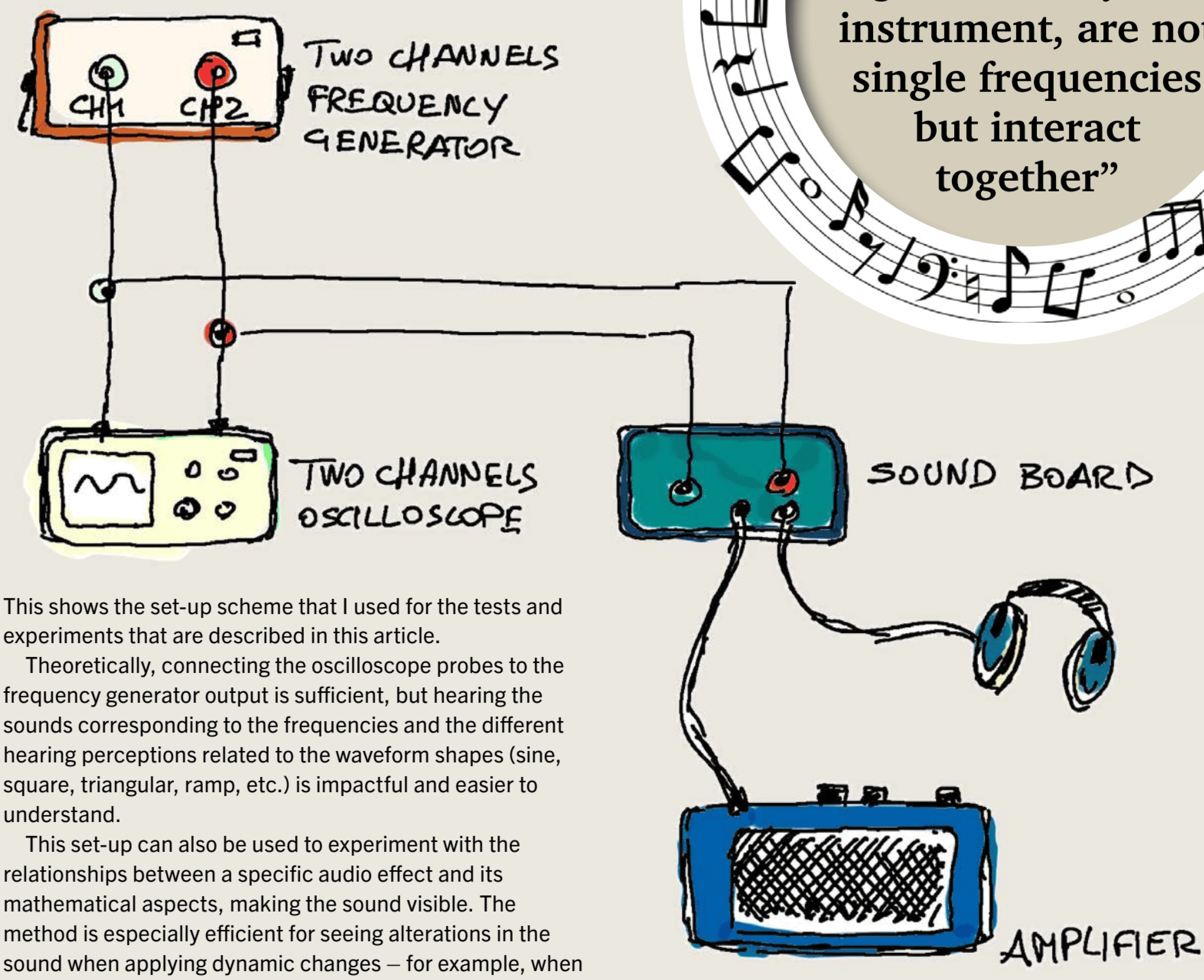
We have now learned that waveforms are vibrations that become audible when propagating in the air, and vibrations are just oscillations of a support (strings, surface, the air inside an instrument, etc.). To produce the same effect, we need an electronic oscillating system that generates a continuous variation of current (low voltage). The generated waveform current variations need support, like an amplifier and a speaker, to transform the waves into air vibrations that can propagate in nearby space.

Many electronic components can be configured as a vibration system at the desired frequency; we can identify two big classes: analogue and digital oscillators.

Analogue oscillators use exclusively analogue circuitry, such as transistors. In contrast, digital oscillators use integrated circuits that can produce the same effect without the need for many discrete components (capacitors and resistors).

Two transistors can create one of the most basic analogue oscillator circuits. This creates an astable circuit that can continuously switch between two states. The few discrete components define the

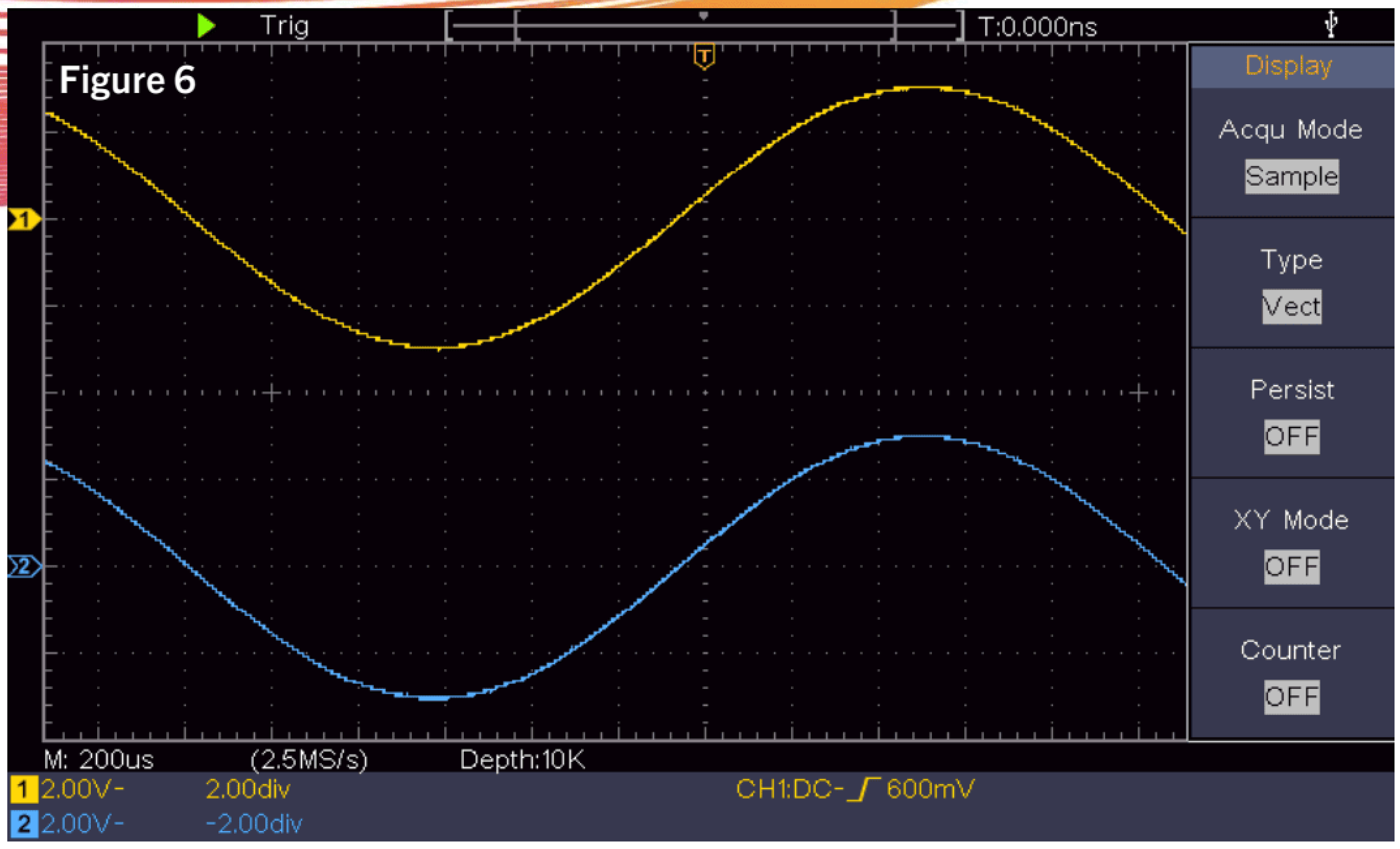
> "Sound-waves, or the single notes generated by an instrument, are not single frequencies but interact together"

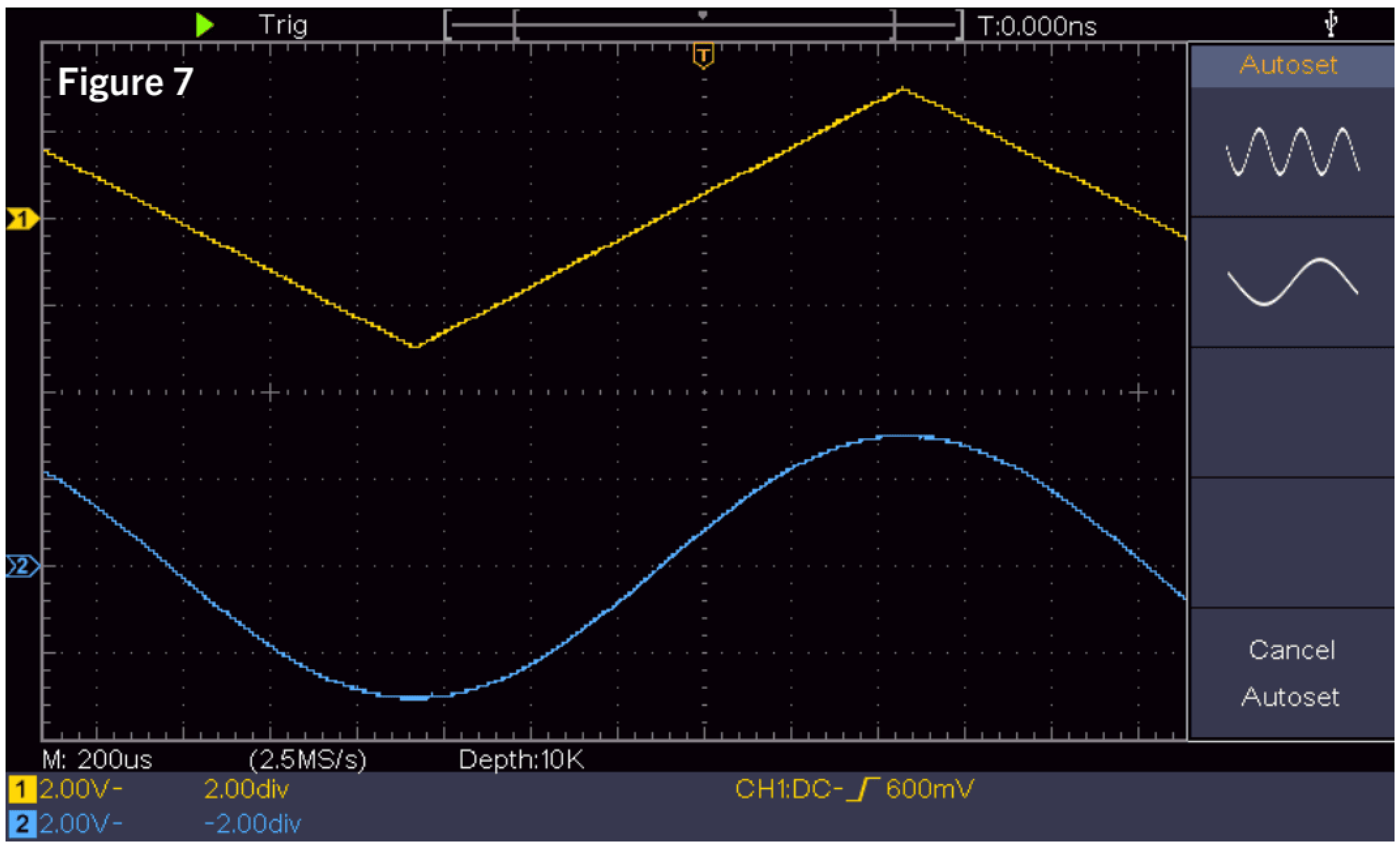


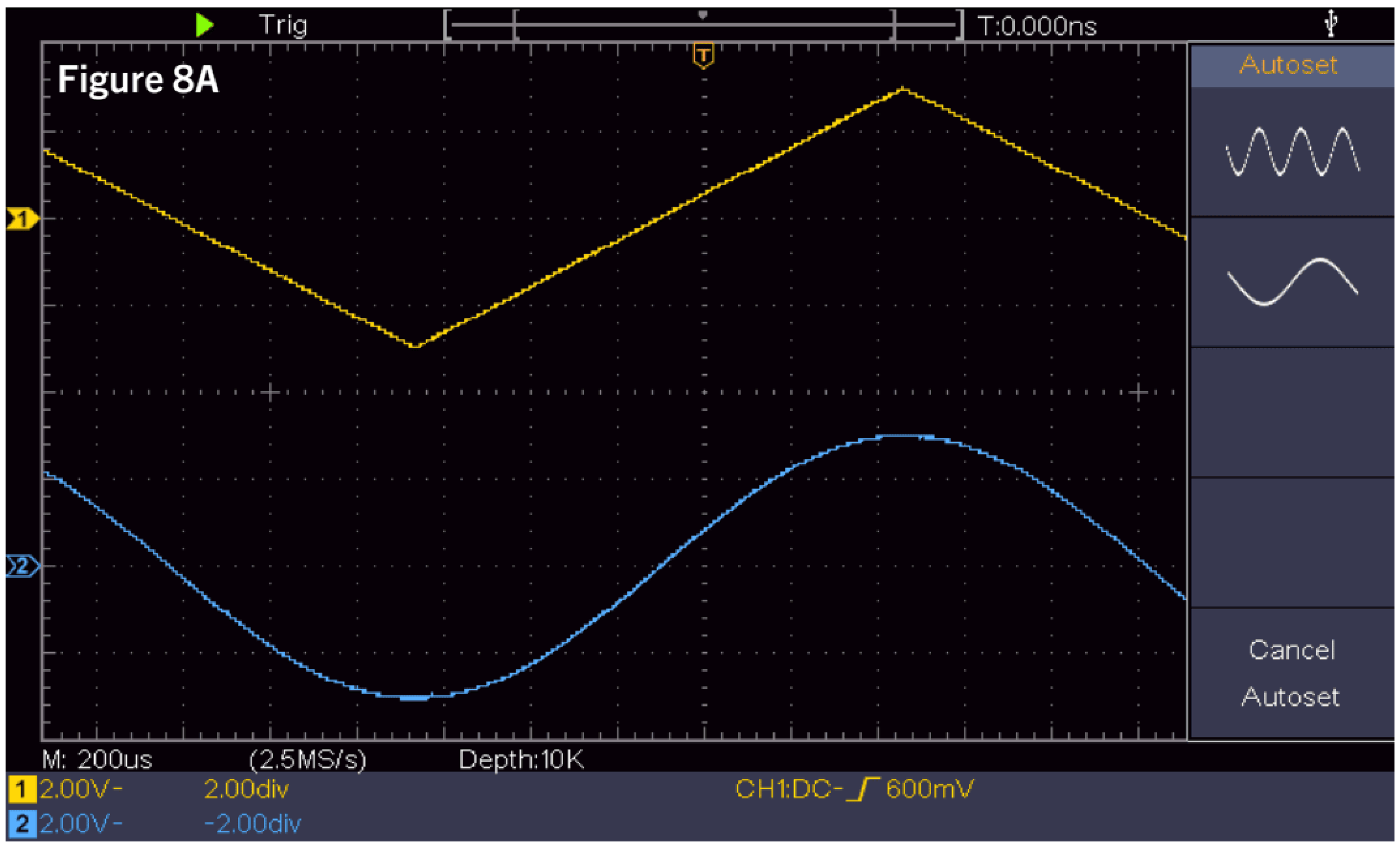

This shows the set-up scheme that I used for the tests and experiments that are described in this article.

Theoretically, connecting the oscilloscope probes to the frequency generator output is sufficient, but hearing the sounds corresponding to the frequencies and the different hearing perceptions related to the waveform shapes (sine, square, triangular, ramp, etc.) is impactful and easier to understand.

This set-up can also be used to experiment with the relationships between a specific audio effect and its mathematical aspects, making the sound visible. The method is especially efficient for seeing alterations in the sound when applying dynamic changes – for example, when the main frequency (the sound) interacts with a secondary waveform that transforms the shape with FM (frequency modulation) and AM (amplitude modulation)



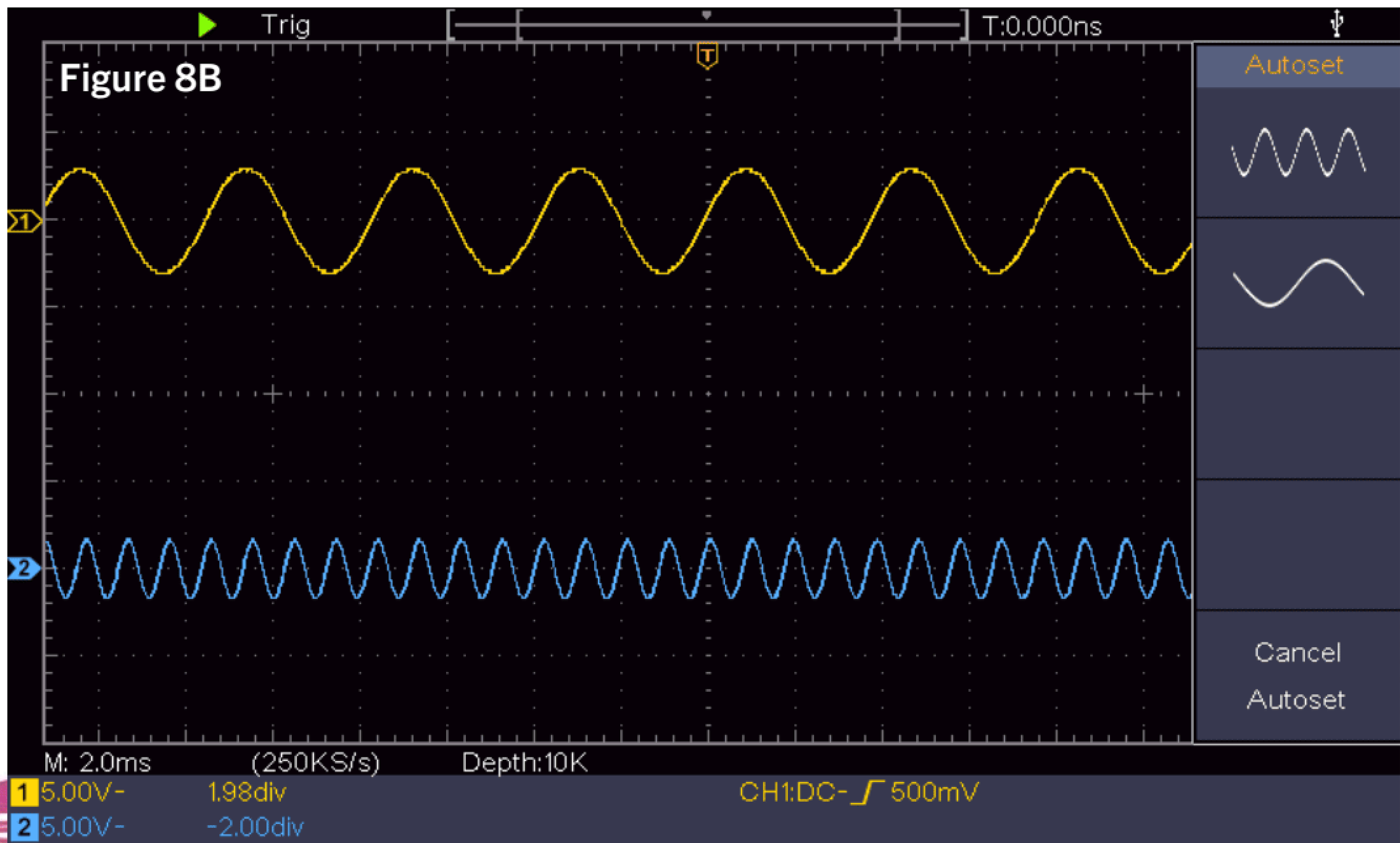




**Figure 6**: Graphical representation of the same note (same waveform, synchronised) on both channels; this effect is sufficient to change the tone. It corresponds to when the same note is played at two different points of an instrument, generating the 'unison' effect. In this case, where the two frequencies are exactly the same, the perception is a higher volume (amplitude)

**Figure 7**: Graphical representation of the same note with two different waveforms; the shape change between the two frequencies generates a note with a unique sound. With polyphonic synthesisers, mixing wave shapes is a method to create particular sonorities

**Figure 8, A and B**: These two images show a simple example of a basic chord obtained with two different frequencies; note that the two waveforms have the same shape but different frequencies

frequency and the kind of waveform that can be shown.

## A simple, old-fashioned, analogue synth

Creating vibrators – or frequency generators – using only transistors makes the circuit challenging to control.

Here, we will see another vintage analogue way to create a simple synth using some NE555s, a very popular oscillator that can be configured for several applications. With these components, and some discrete resistors, capacitors, and potentiometers, it is possible to create resonating circuits to create complex sounds: a basic three-voice synthesiser.

I was inspired by PJ Skyman's prototype project (pjskyman.com/) and added modern technology features to make the settings easy to control. ▶

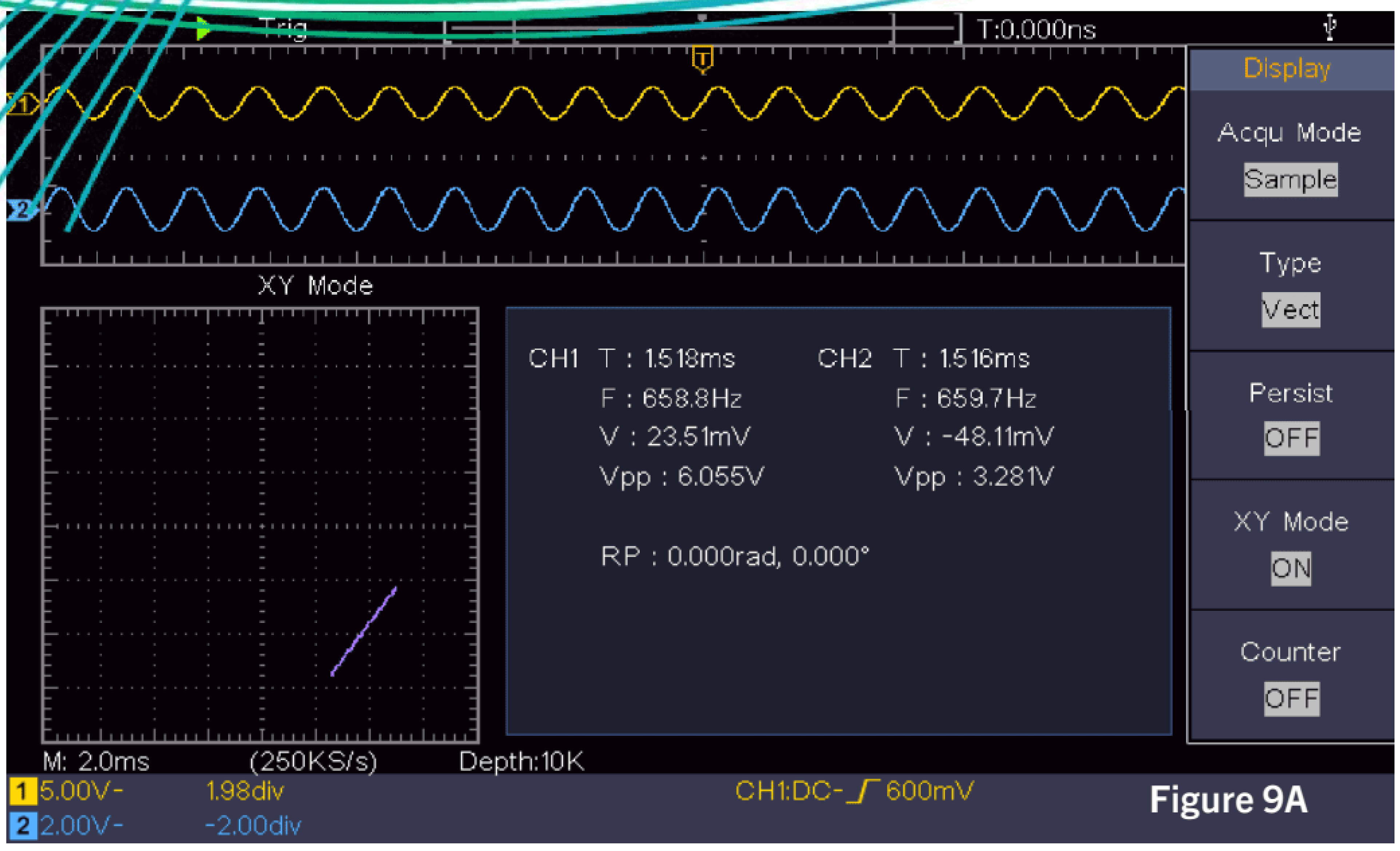


Figure 9A

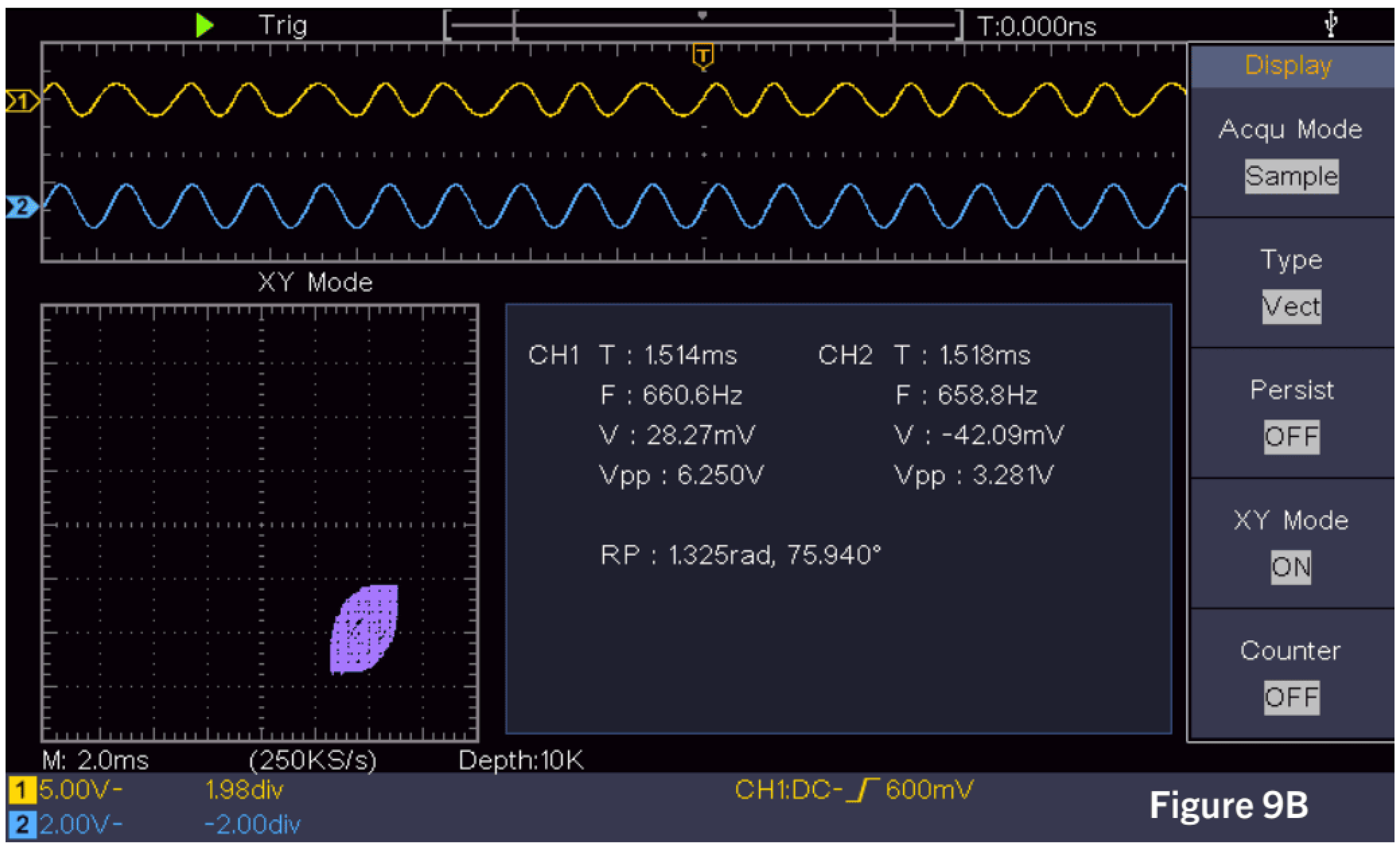


Figure 9B

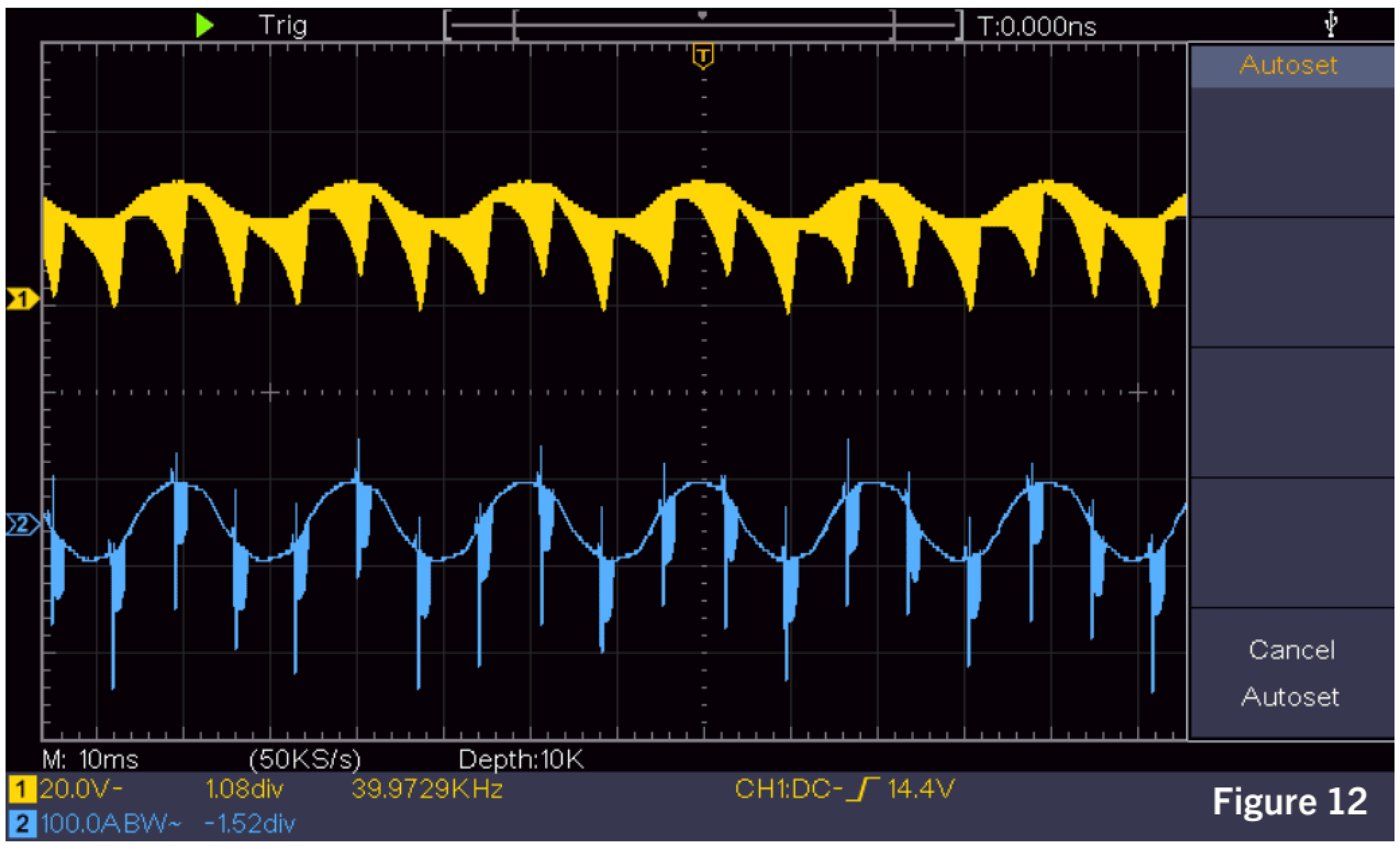


Figure 12

This circuit has three groups of two NE555 oscillators for the three audio output signals. In every module, one NE555 is set in a bistable configuration, while the other resonates in a monostable (pulse with modulation [PWM]) configuration. The three audio outputs are mixed in a single channel at the end of the circuit.

According to Skyman's suggestion, different capacitors can change the octave set at which the oscillators can work. I have added a rotary encoder for each channel controlled by an Arduino Nano and a seven-segment LED display to select the capacitor bank, easily displaying the chosen current bank.

The circuit worked fine, and the project is available on GitHub (https://github.com/alicemirror/synh555).

My thanks to Alex Stirner and Luis Garcia for their contributions to this series of articles.

**Figure 9, A and B:** Phase shifting alters the phase relationship between two identical audio signals, where one shifts the phase of certain frequencies. The musical phaser effect creates notches in the frequency that sweeps up and down, producing a characteristic sound effect modulated over time. The first image shows the same note from both channels: the X-Y spatial graph represents the two waveforms perfectly aligned along a straight line (the amplitude). The second image shows the same frequency, where the two waveforms are phase-shifted about 76 degrees. In this case, the interaction is represented on the X-Y spatial graph as an ellipsoid area

**Figure 12:** The oscilloscope screenshot shows how the two modules resonate with each other to generate the digital synthesised frequency

**Figure 10:** Schematic of a simple oscillator created with two NPN transistors in a stable configuration. This circuit produces two identical square waveforms to the output. Also, if it can be considered in some way a synthesiser, we can classify it as a vibrator

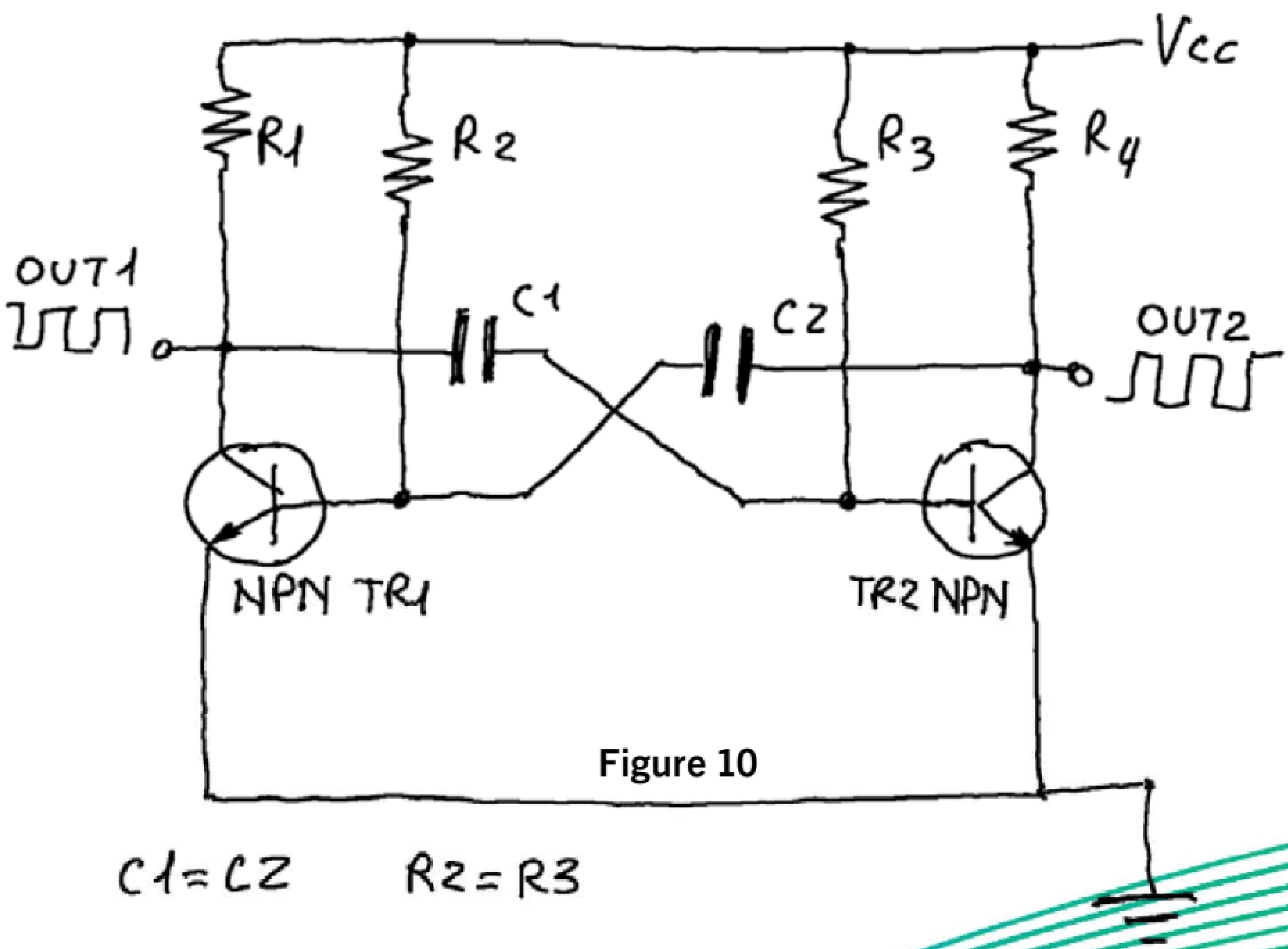


Figure 10

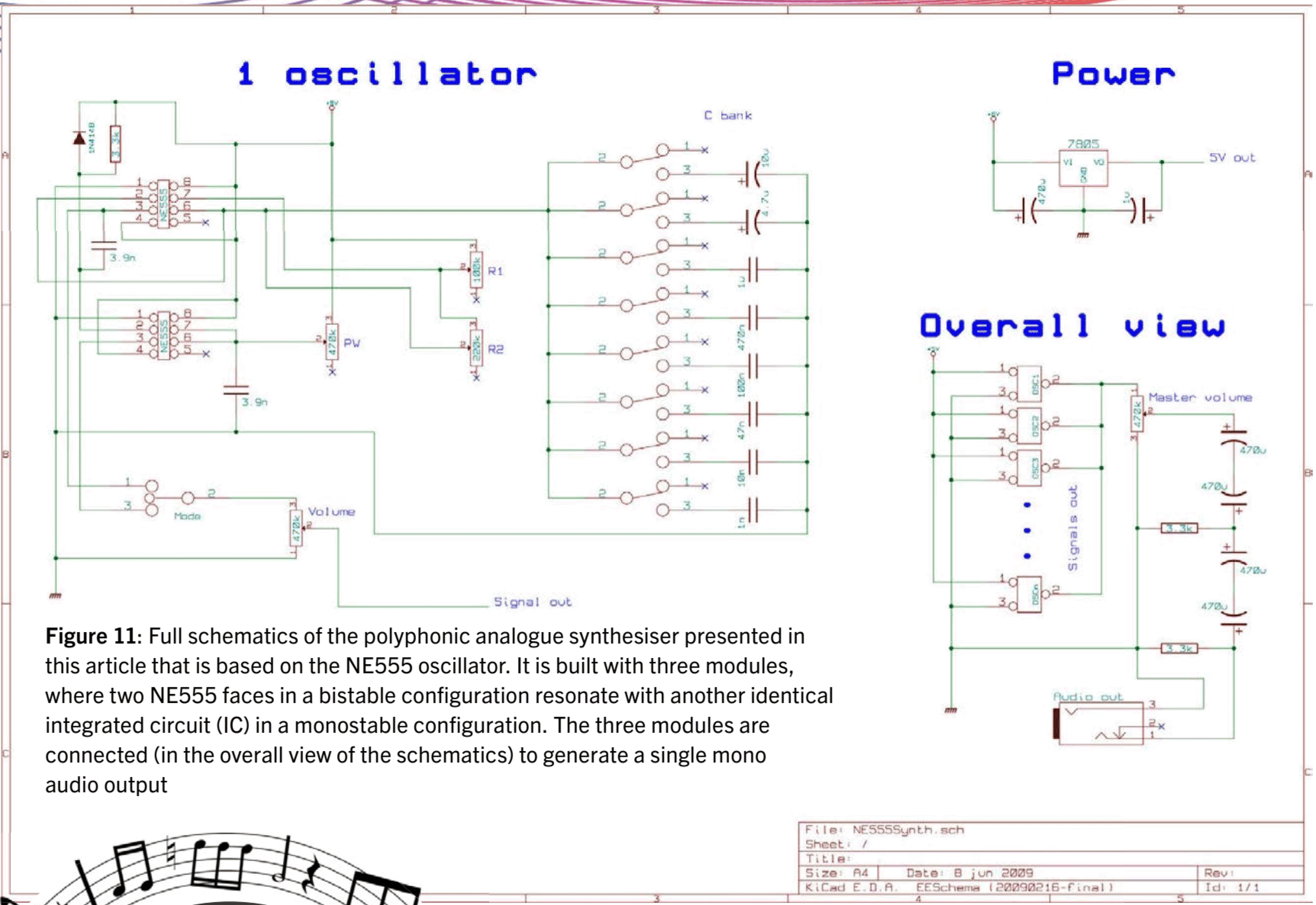



**Figure 11**: Full schematics of the polyphonic analogue synthesiser presented in this article that is based on the NE555 oscillator. It is built with three modules, where two NE555 faces in a bistable configuration resonate with another identical integrated circuit (IC) in a monostable configuration. The three modules are connected (in the overall view of the schematics) to generate a single mono audio output

"It is possible to create resonating circuits to create complex sounds"

**Figure 13**: The complete building of the polyphonic synthesiser with all the modules assembled and connected. You can see the three Arduino Nano modules (one for each oscillator) – these are used only to control the capacitor banks to select the desired octave range. The sound section uses exclusively analogical and discrete components

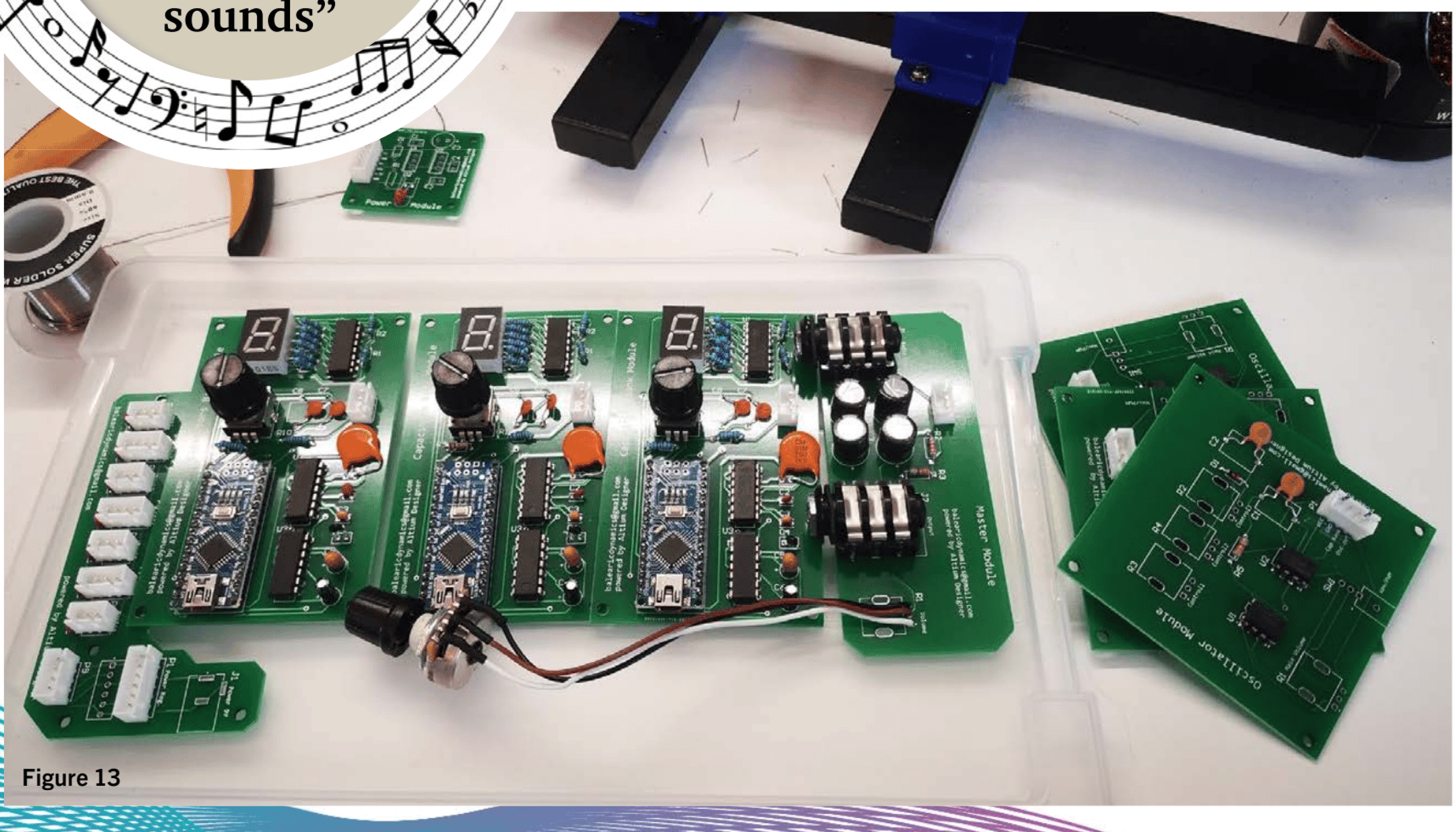



Figure 13

# from Rust to Rrroarrr

**PART 1**

By Peter Barton | Photographs: Peter Barton

## After storing his bike for 50 years, Peter has begun to restore it. He doesn't want his bike to look flashy and new; he just wants it to run well and look the part

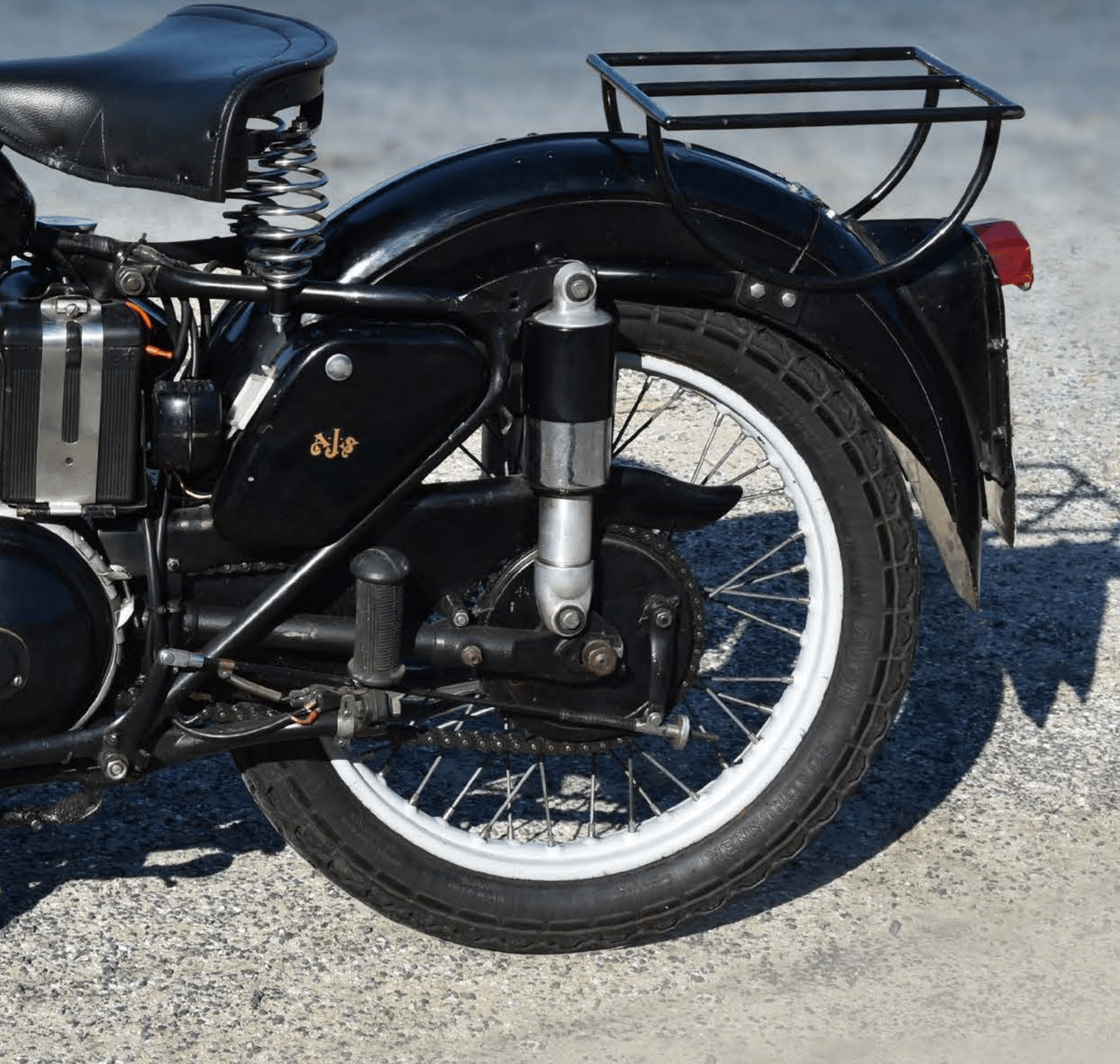

I've had the motorbike – an AJS 500cc single of about 1952 production – in storage and in bits for about 50 years. Calling it an 'AJS 500' is a bit misleading, as the engine number on the crankcase is for a 1953 Matchless 350 (same manufacturer – AMC, England). Other parts are also mismatched; it's a bitser.

So, the most I can say for the reassembly is that I wanted the machine to be reasonably tidy; run well; and, at a superficial glance, look the part. Spending big on authentic parts and professional chrome plating would have to be avoided as much as possible.

Hence this series of articles on how I have managed to develop some quite good electroplating methods (I think) for the parts that are meant to be shiny, plus how I fixed other bits such as cooling fins, wheels, seat, and electricals.

### First: the engine

Engine work came first; I wanted to see how it would run. It had been stored in a partially disassembled state – head off and out of frame. The aluminium alloy head was badly scored around the



An already restored AJS owned by Peter Borthwick (photo: Peter Borthwick)

**RESTORATION TIMELINE:**

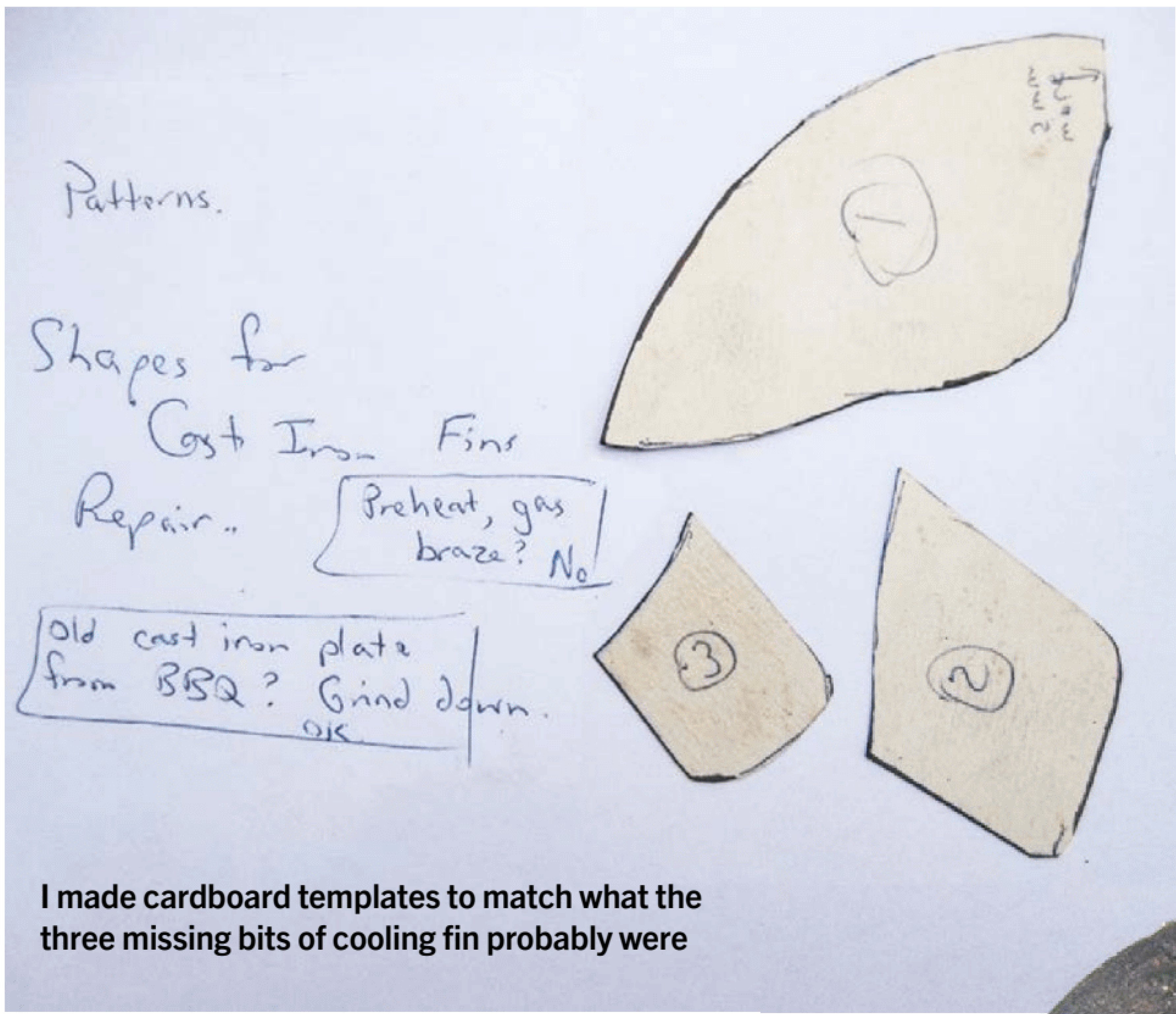
**Part 2:** Nickel plating methods, gearbox assembly

**Part 3:** Frame painting, gearbox, primary chain case, and motor install

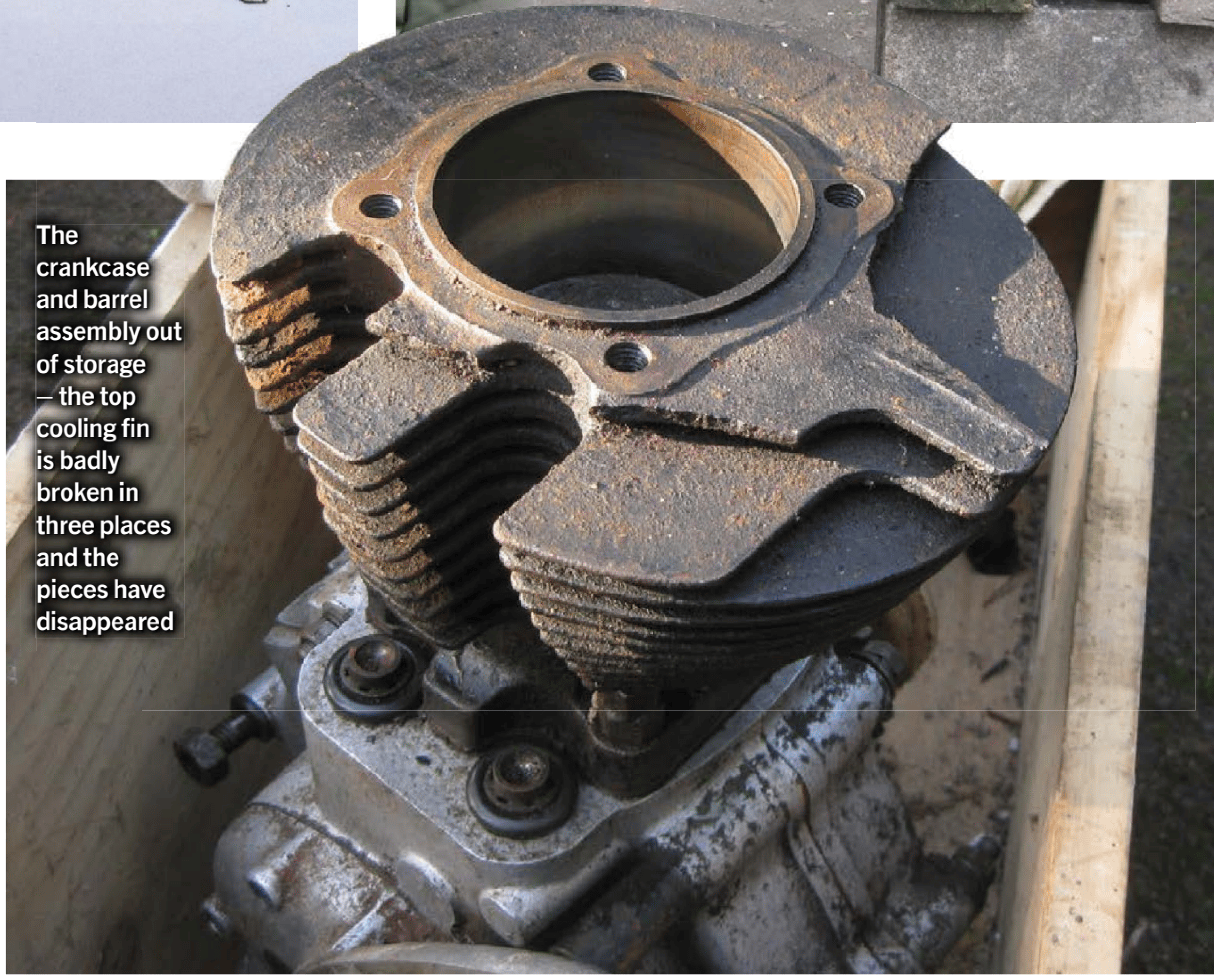
**Part 4:** Electricals, upholstery, and tank

**Part 5:** Suspension repairs, front, and back

**Part 6:** Re-lace wheels, fit brakes, and speedo



I made cardboard templates to match what the three missing bits of cooling fin probably were


The crankcase and barrel assembly out of storage – the top cooling fin is badly broken in three places and the pieces have disappeared

head bolt landings, but the valve seats and guides were fine; only a little valve grinding was needed. Happily, the valve guides gave my finger good suction as the valve stems were pulled out.

The specialist that I took the head to – for planing and building up the head bolt landings – dropped a steel ball bearing down a glass tube onto the alloy surface and remarked on a poor bounce. So, first, the head was heat treated to improve its hardness. I took it to Heat Treatments in Ōwairaka, Auckland, where the company did work described as 'LM25 H-HSPNF' (solution and precipitation of non-ferrous, I think?) on the invoice.

The specialist was happy with the new bounce – so the head was sorted, with planing and landings cleaned up. The only problem is that the head was soda blasted and looks in almost mint condition to a casual onlooker; further down the line, I will probably try to match its appearance to that of the other alloy parts (crankcase, rocker cover, gear-box). Soda blasting?

## Head reassembly

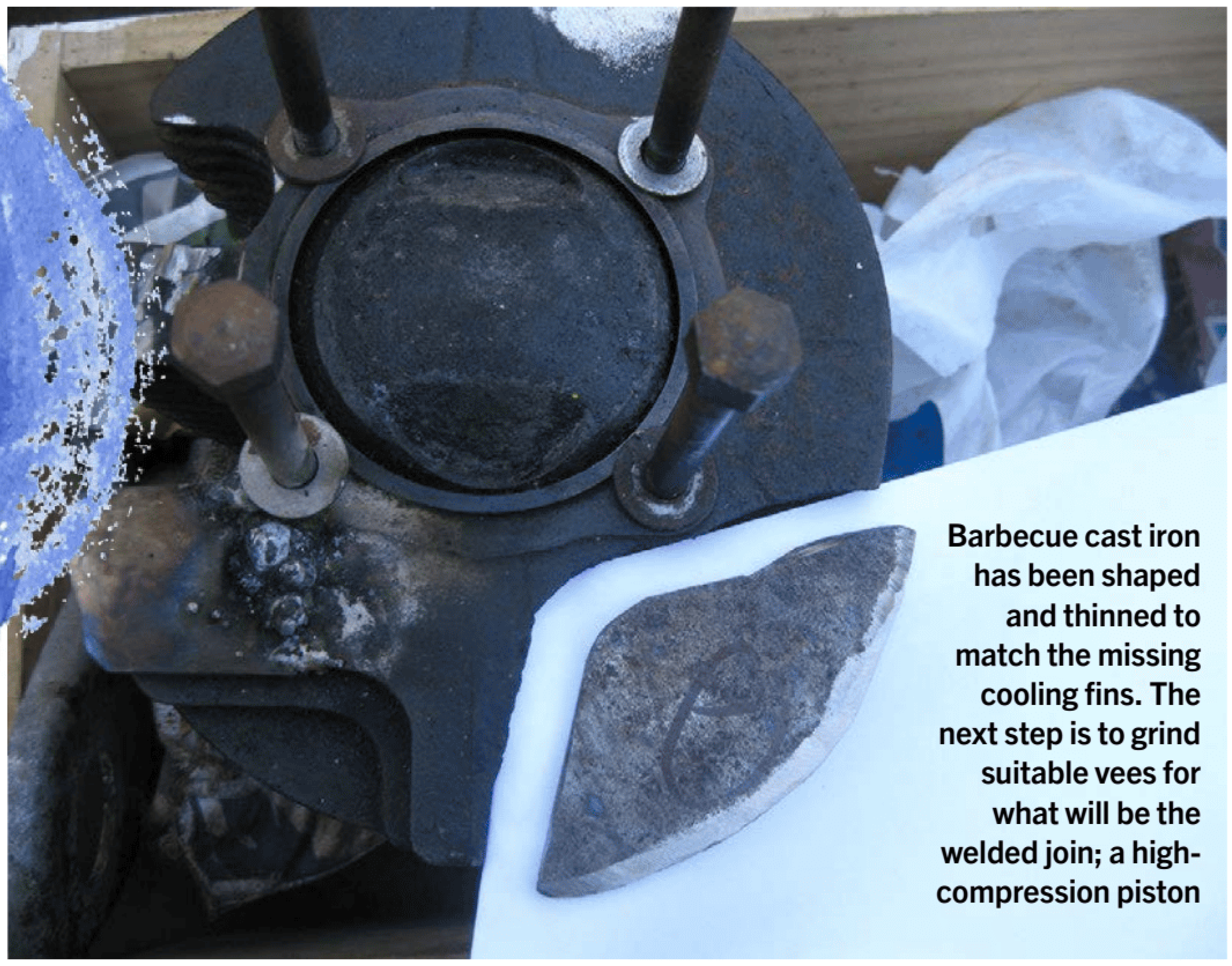
A very light valve grind with the fine grade of carborundum paste, general cleaning, and oiling the valve guides, and I was ready to start reassembly of the head.

I made a tool from a bit of steel tube so that I could fit the unusual valve springs onto their trays, a bit like a shoehorn. Since I have developed my versions of electroplating, I might nickel-plate the tool so that it won't rust in storage. Electroplating is like that: you want to coat everything.

For measurements, I have Mitutoyo non-digital vernier callipers (old but good at what they are designed to do) but nothing better. A precision engineering company kindly allowed me use of its micrometers during one lunch hour (a slab of beer). I found that the piston and bore were 60 thou (1.5mm) oversize, with excellent rings, shapes, and clearances. There was very little ridging at the top of the bore. Clearly,

“Here is where I made some mistakes”

Left: The cardboard templates gave me the shapes to cut and grind from the cast-iron hotplate of an old barbecue; outside work to avoid fires from the sparks



Barbecue cast iron has been shaped and thinned to match the missing cooling fins. The next step is to grind suitable vees for what will be the welded join; a high-compression piston

some work had been done on the motor not long before I bought it.

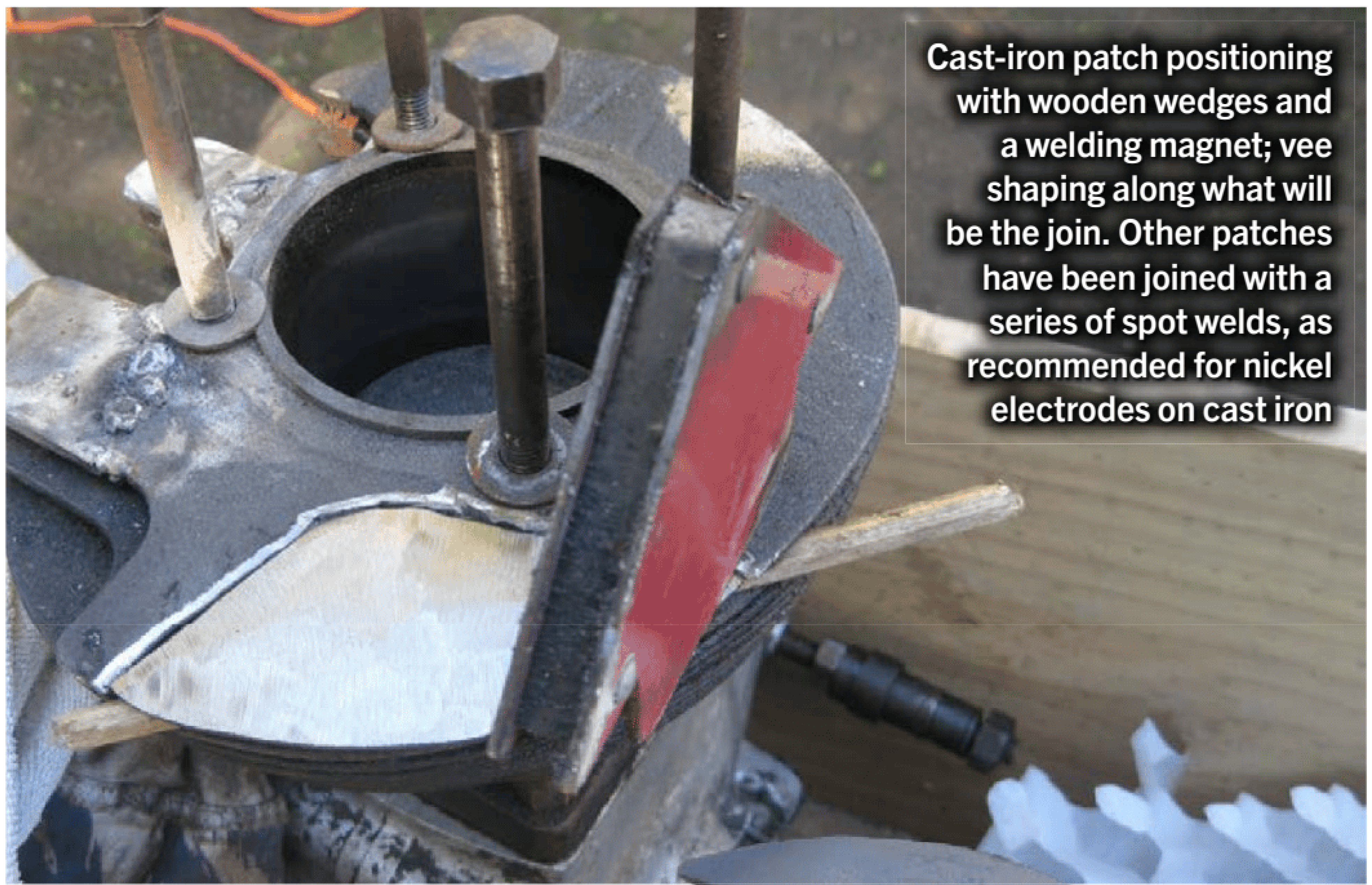
## Fin damage

Three parts of the top cooling fin on the cast-iron barrel had been broken off, perhaps in storage, and were gone. For heat dissipation and good looks, it had to be repaired.

I once repaired a cast-iron garden bench by brazing and it has lasted for years. However, I did not want to do the same with the fin because I wasn’t sure how the brass would behave with the heat and vibration of a running motor. I had heard how difficult it is to weld cast iron (needs preheating, and so on), but with a web search I found that nickel could be used for cast-iron repair and that preheat management was not necessary. Brazing (maybe with a small support pillar at the edge, onto the underneath fin) could be plan B if the nickel is not successful once the bike is on the road.

## Welding repairs

I bought a few loose nickel rods (ESAB 9218, 3.2mm, and 92 per cent nickel) from a specialist welding company in New Lynn, and this is where my



Cast-iron patch positioning with wooden wedges and a welding magnet; vee shaping along what will be the join. Other patches have been joined with a series of spot welds, as recommended for nickel electrodes on cast iron

I’ve completed the welds, ground them off, and put on a thin layer of stove black; the joins will be mainly hidden under the head

Rust to Rrroaarrr NZ Safety Blackwoods

(1) Before the cylinder head could be fitted, the pushrod cover tubes had to be fixed up. After the rust was sanded off, small dents were filled by brazing and then sanding by flap disc. A thin layer of nickel plate (strike), then a thicker layer of copper, which is polished, and a final plating with nickel. (2–4) Polishing the pushrod cover tubes using a small angle grinder with my homemade 1200-grit sanding disc

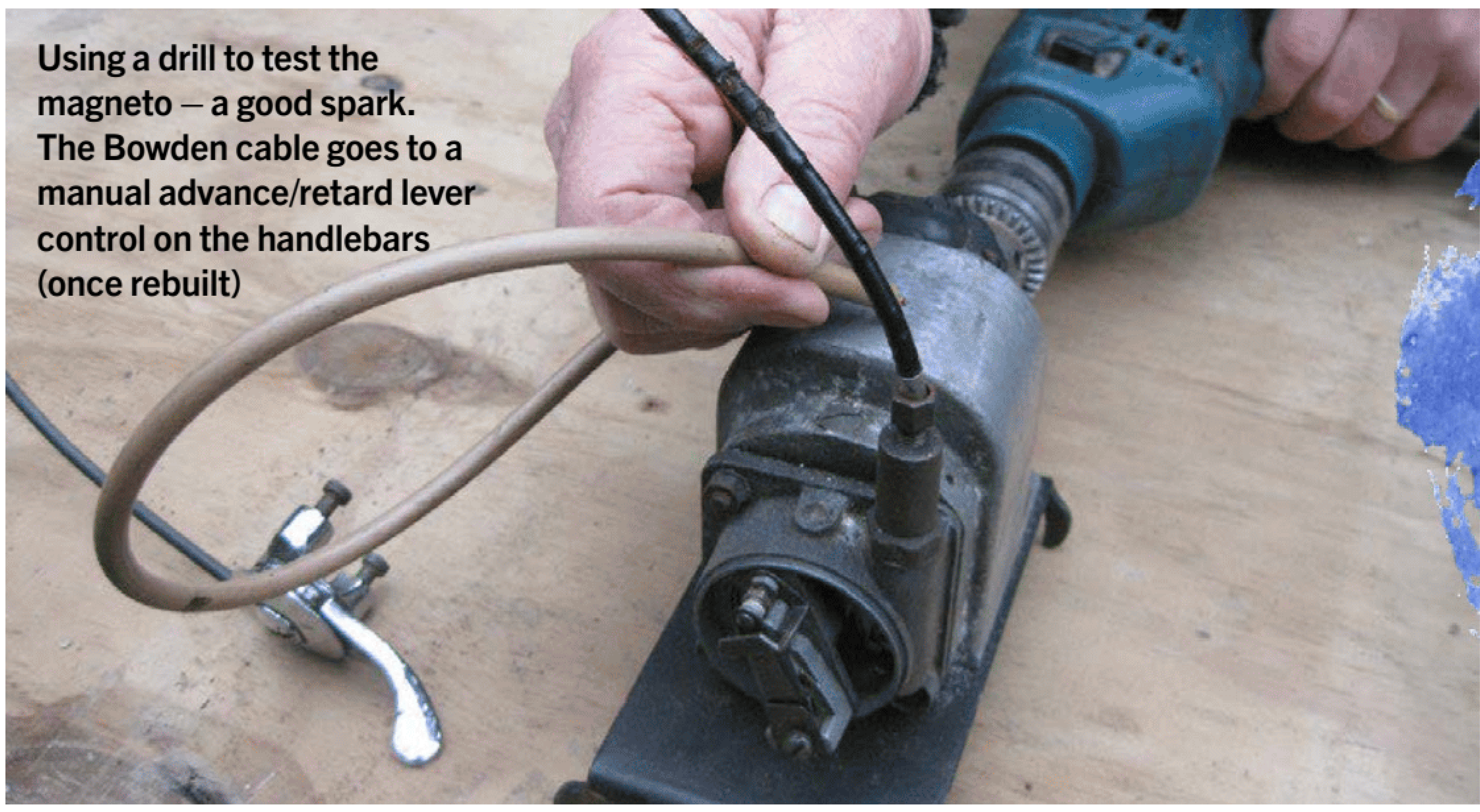
later decorative (as well as structural) electroplating comes into distant view. I practised on a spare cast-iron barrel and found that the nickel rods were easy to use.

I got some cardboard and trimmed it into three shapes that looked to be good matches for the missing iron. For cast iron, I used a hotplate from a discarded barbecue, traced the shapes onto it, used an angle grinder to cut them out, and then ground the pieces (sans the meat juices) to the same thickness as the rest of the fin – about 2.5mm. When on the road, the bike may still smell of steak and snags.

The iron at the proposed joints had to be ground to a 45-degree angle on both sides, making a 90-degree vee when butted, to a depth of about halfway through the thickness of the fin. The cast-iron shapes were then put into position and held there using wooden wedges against the under-fin and a welding magnet. I put the head bolts into place so that heat could be better spread and there would be less chance of distortion. As I had been advised, I made the joins as a series of spot welds rather than continuous runs, using a 70A setting. The welds sounded good, ringing, as I chipped off the slag. The final stages were to grind off the welds and cover the fin with a thin coat of black stove paint.

## Pushrod covers

I took a moment to test the magneto by spinning it with a drill; it gave a good spark between the high-tension lead and the magneto body. The points at the end of the magneto did not spark much, so



Using a drill to test the magneto – a good spark. The Bowden cable goes to a manual advance/retard lever control on the handlebars (once rebuilt)

> “When on the road, the bike may still smell of steak and snags”

that meant that the condenser was OK.

The head could not be fitted onto the barrel at this stage, as running from the crankcase up into the head and sandwiched in place between the two were a pair of pushrod tube covers, and these needed to be cleaned up: rust removed and replated. I did not realise at the time that one of the tubes was badly corroded inside; not much steel was left in places.

Internet pictures of AJS and Matchless bikes show shiny crankcase studs, shiny exposed pushrod tubes, and a shiny cover over the magneto points. Of course, I had to have the same. The studs and nut threads all have the usual 26 threads per inch used on old British bikes; Whitworth spanners were needed. I did not want to go to stainless-steel metric replacements; I wanted to re-chrome items myself, but regulations (and common sense once I had checked out chroming methods) ruled this out.

More web searches showed that nickel-plating was a possible alternative. I could use my surplus nickel-welding rods as anodes and to make the plating solution (the 'electrolyte'). Online comments are very positive about the appearance of polished nickel.

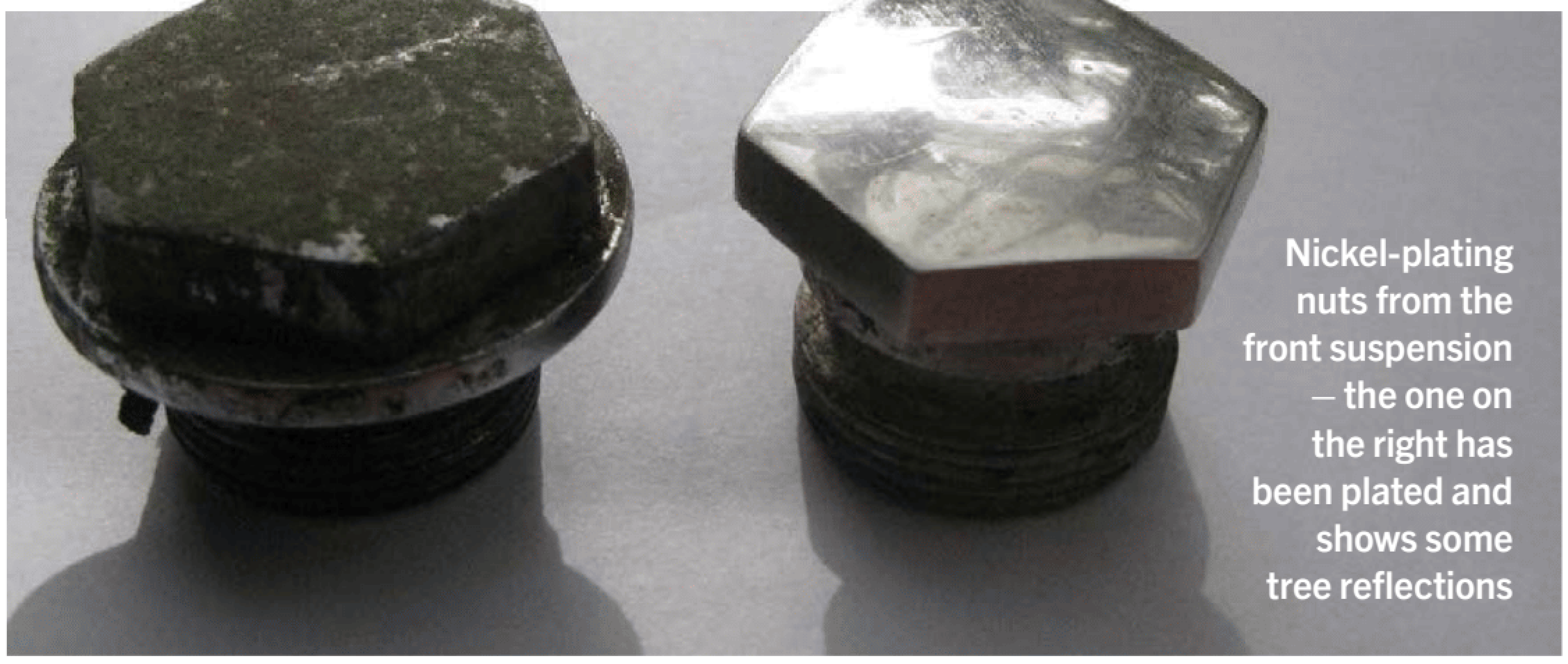
## The versatility of nickel

Like chromium, nickel is used in stainless steel and also forms a very thin protective oxide layer – that is, preserves its shine. As well as being a decorative substitute for chromium, nickel plate easily takes solder (unlike steel) and plating can be used to build up worn shafts, as it is quite hard. Later on, I used nickel-plating to build up the kick-starter shaft in the gear-box.

I started a trial by smashing the coating off one of the welding rods, putting the bare rod into a white vinegar and table salt mixture (3g of salt, 6 millilitres [ml] of white vinegar, and 30ml of water), and connecting it, via a soldered wire, onto the positive end of a torch cell. This made the anode. ▶

Getting ready for a light valve grind

The valve grind



Nickel-plating nuts from the front suspension – the one on the right has been plated and shows some tree reflections

Part of the kick-starter shaft being plated to compensate for wear. Yellow tape masks the quadrant gear from plating

My homemade tool in action for levering the hair-clip valve springs into place

“The penny cathode fizzed with gas bubbles”

The kick-starter shaft with some extra nickel, top right of photo

In the same manner, I connected a clean (scrubbed with a Steelo pad) 1952 penny to the negative end of the cell and put it into the electrolyte (the salty vinegar). This made the cathode, which was to be plated. The anode and cathode were well separated to avoid a short circuit.

The penny cathode fizzed with gas bubbles: hydrogen. Starting at the nickel anode, a green colour built up through the electrolyte. This colour was from positive nickel ions formed from the welding rod and travelling to the negative penny. At the penny, nickel ions should change back to nickel atoms when they meet the electrons from the electricity; that is, make a nickel plate.

## Not a uniform result

A silvery layer formed on both sides of the penny cathode surprisingly quickly. However, the side of the penny facing the nickel anode had its layer flake off easily. The side facing away from the anode had a durable layer. There are various possible reasons for this: the penny may not have been cleaned and degreased enough on the first side; the electrolyte probably did not contain enough nickel for the larger current landing on the anode-facing side; the hydrogen gas bubbles may have interfered with nickel trying to settle on the penny.

Fast forward two years and I have found that a lot of the amateur discussion on the web about electroplating is simplistic or misleading. Electroplating kits are available, but it seemed that they were small, expensive, and possibly better suited to jewellery making. The professional sites often get very technical and refer to sophisticated equipment and chemicals unavailable to the ordinary sheddie, at least in New Zealand.

I now have procedures that work for me, and they are relatively easy to set up and especially easy to use once all the gear and chemicals are laid out.

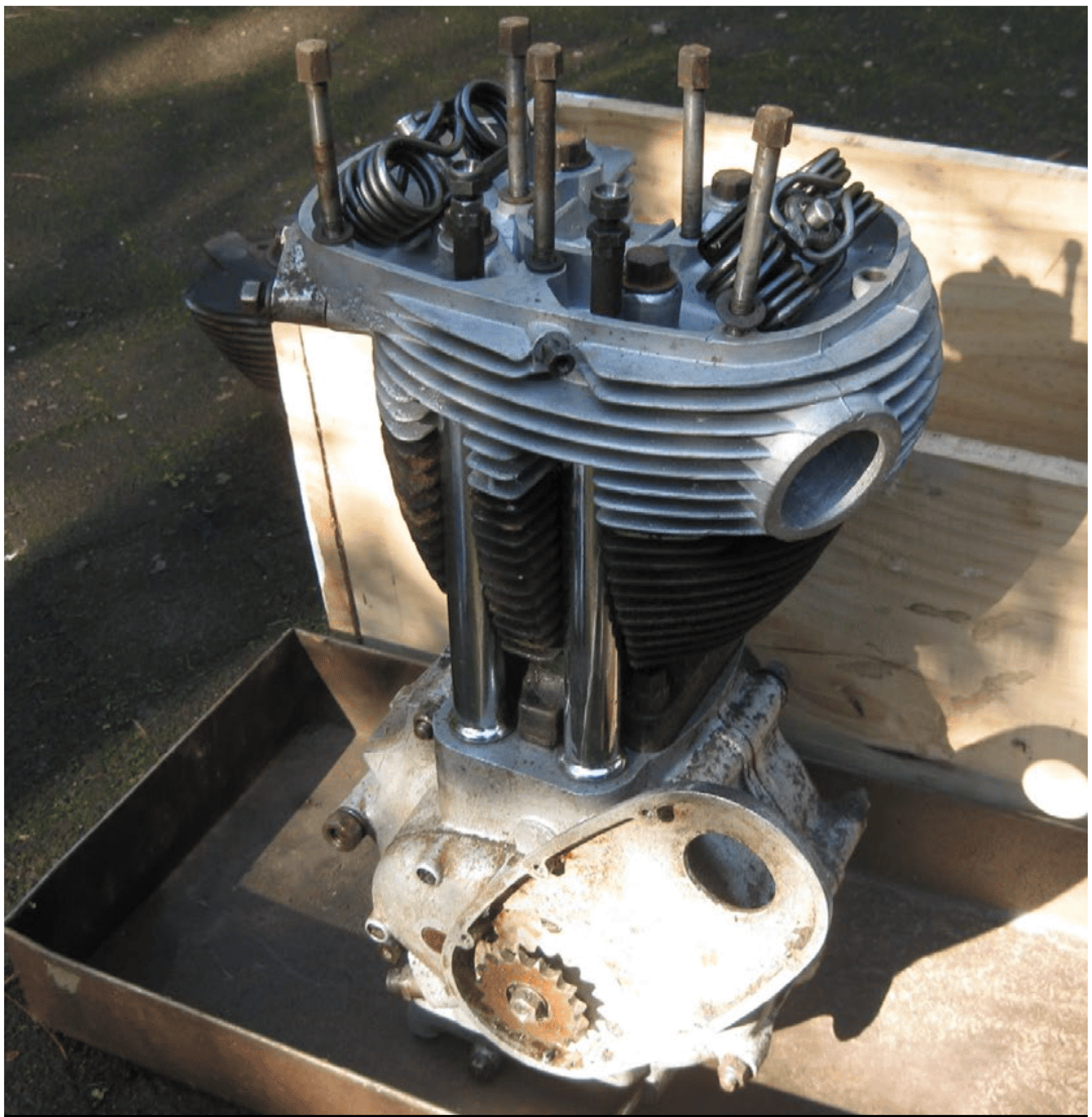
## Tank plating

I do 'tank' plating, which is a modified and scaled-up version of the penny method described. This requires relatively large amounts of nickel for anodes and for making the electrolyte (plating solution). It is good for medium-sized parts like the pushrod tubes, which can fit into my tank – cut-down plastic two-litre and four-litre former water containers from the supermarket. (Any similar container can be used – for example, plastic buckets. However, metal containers are no good.) I also copper-plate using the tank method.

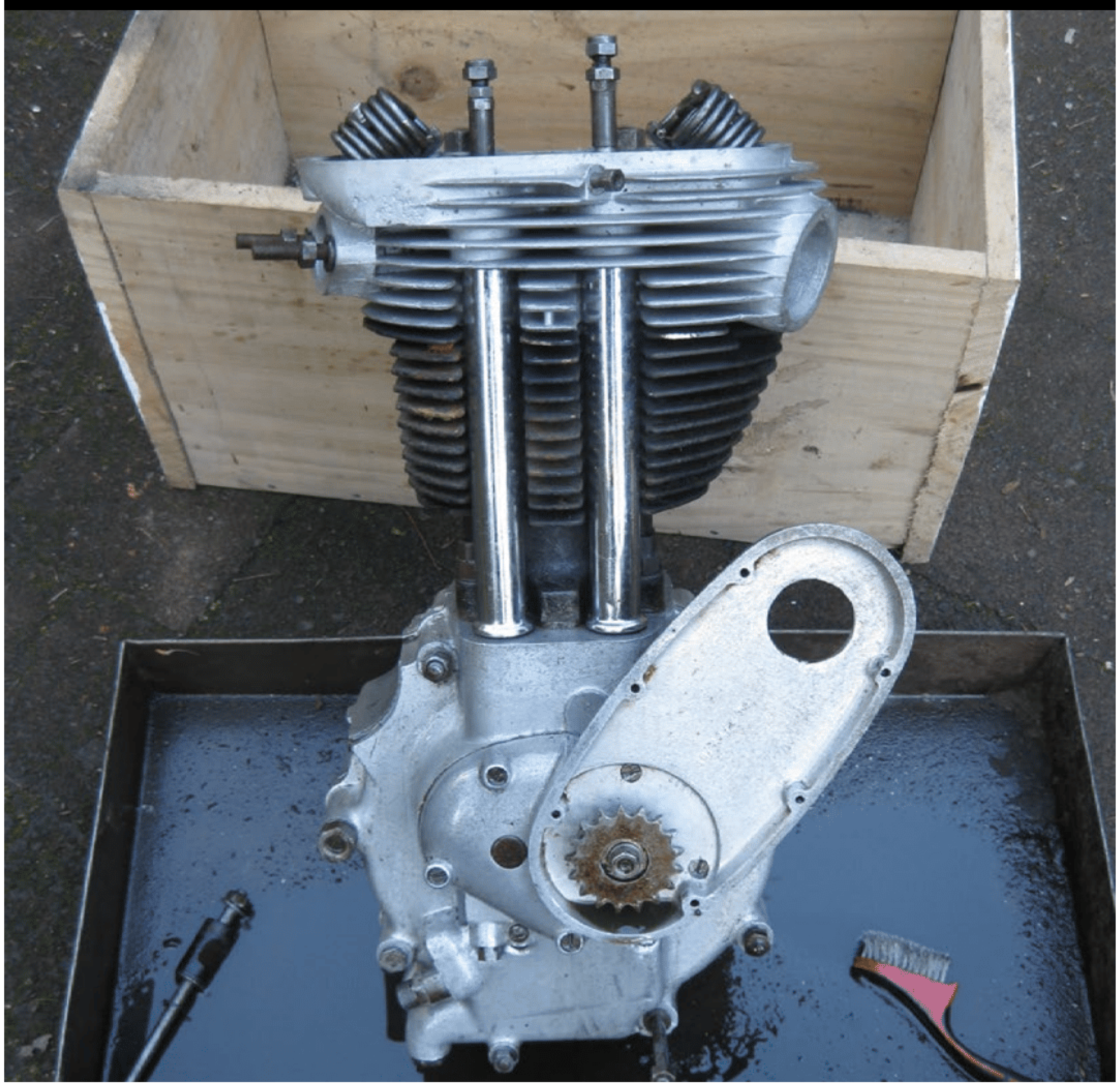
For bigger items, such as wheel rims, and for very small plating areas, I use brush (DALIC) plating. This requires far less plating solution, and it is superficially like painting. If you are making jewellery, this is probably the method you would use.

## Plating those pushrod tubes

Now, the pushrod cover tubes. One of the tubes had some bad pitting and a couple of small dents, and both had general rust. Time for electroplating. ▶



**Above: The head fitted, with the pushrod cover tubes held in place between the head and the crankcase. Some of the rocker cover bolts are sitting loosely in place – their heads have yet to be nickel-plated. Below: another view of the engine. The pushrods show that it is on its exhaust stroke**



Rust to Rrroaarrr

The fuel tank out of storage – some existing dents and surface rust

The rear end – no tools in the tool kit and not the original AJS 'jam-pot' suspension

Above: The old seat – the tray is rusted through and the foam rubber has turned into a rigid and brittle block of 'hokey-pokey'

Here is where I made some mistakes. I used a commercial flap disc on an angle grinder to sand off rust and existing plating. I would not do this again, as one of the tubes had internal corrosion and the sanding at speed made the thinness of the tube walls dangerous and very noticeable. Sanding marks were obvious.

It took a considerable amount of plating to cover the score marks on the steel – more than I expected. My usual method now is to strip the existing chromium plating using an electrochemical method (chromium always has to be removed) and then sand by hand with wet and dry sandpaper. If I do use an angle grinder, I make my own circular discs using 1200-grit wet and dry paper. If any existing nickel or copper plating is good enough to stay there, I let it remain. I can 'activate' any old such layers and plate over them.

## Copper plating

I decided to plate a thick layer of copper onto the tubes before electroplating the decorative nickel because copper is cheaper, easier to obtain, and easy to polish; therefore, I should be able to cover the scoring. Everything is very clean.

"Here is where I made some mistakes"

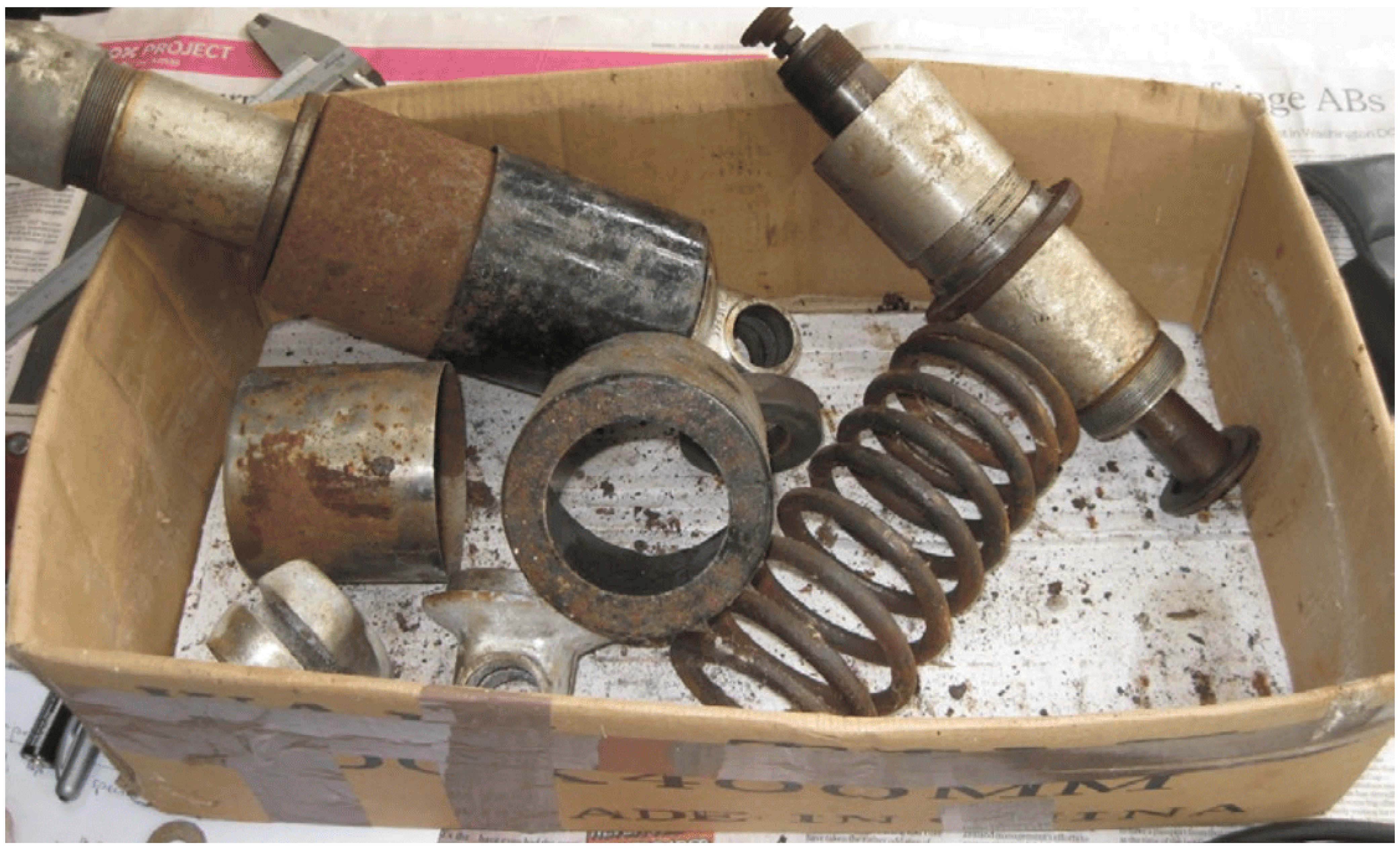
I have discovered through web discussion groups that you cannot put a layer of copper directly onto steel unless you use a cyanide process – not viable for me. First, I would have to electroplate a thin layer of nickel – a quick first strike of nickel – then the copper, and finally the decorative nickel plate.

I made a Watts bright nickel solution (electrolyte) and plated the tubes, following instructions I got from the web. It took only a short time for the surfaces of the tubes to look slightly yellowish, as to be expected with the nickel just deposited.

Then the copper plating. This was a disaster, with bits peeling off and underlying pitting. I realised that my first layer of nickel had not been uniform and thick enough, and that I was getting non-permanent 'immersion copper', whereby the copper solution reacts directly with the iron. I needed to sand all the copper off and start again.

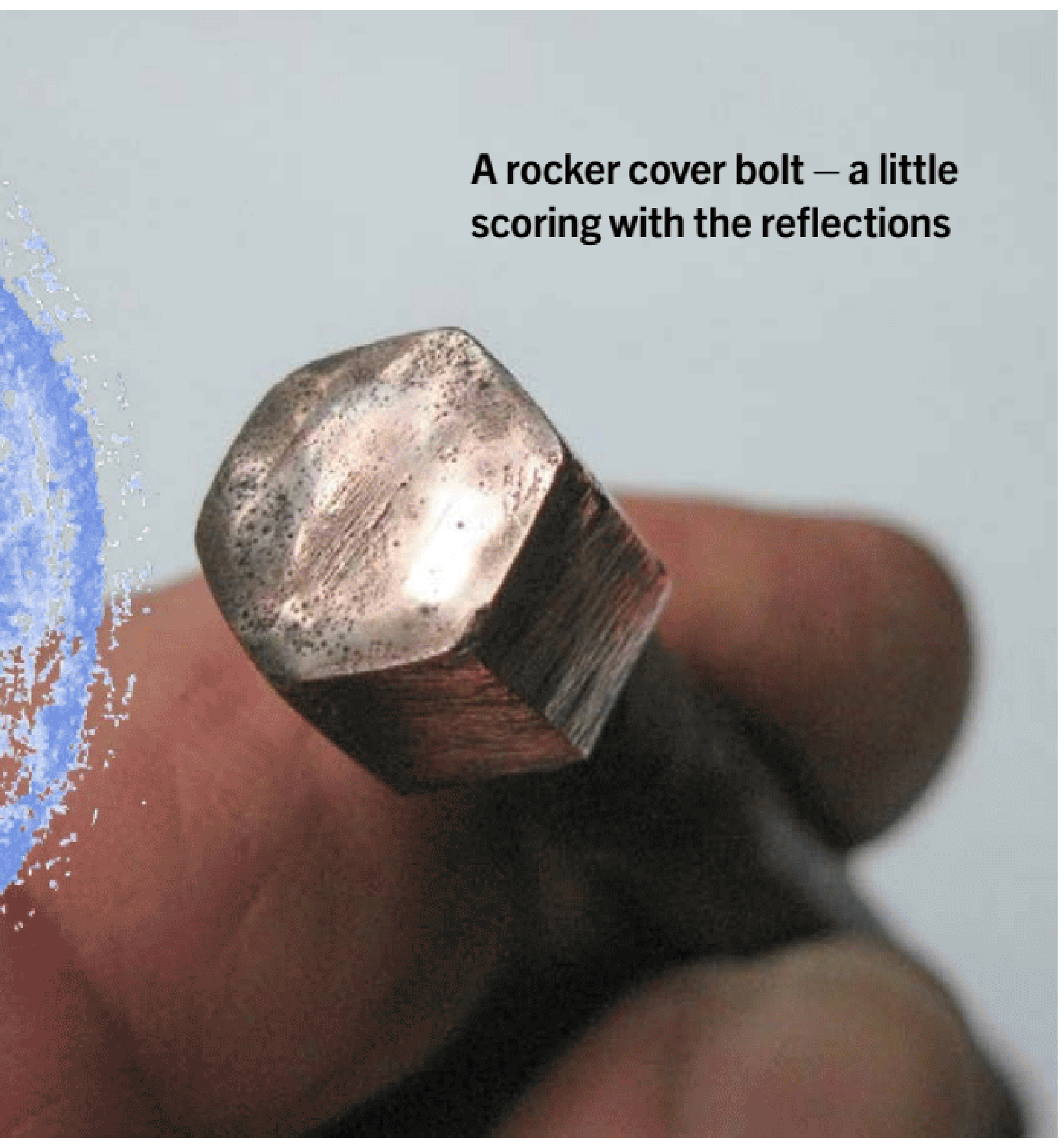
## The solution

The fix is to use a thicker first layer of nickel (longer time for plating, and a hotter solution), test the workpiece by dipping a cotton bud into copper electrolyte, and then dabbing the bud



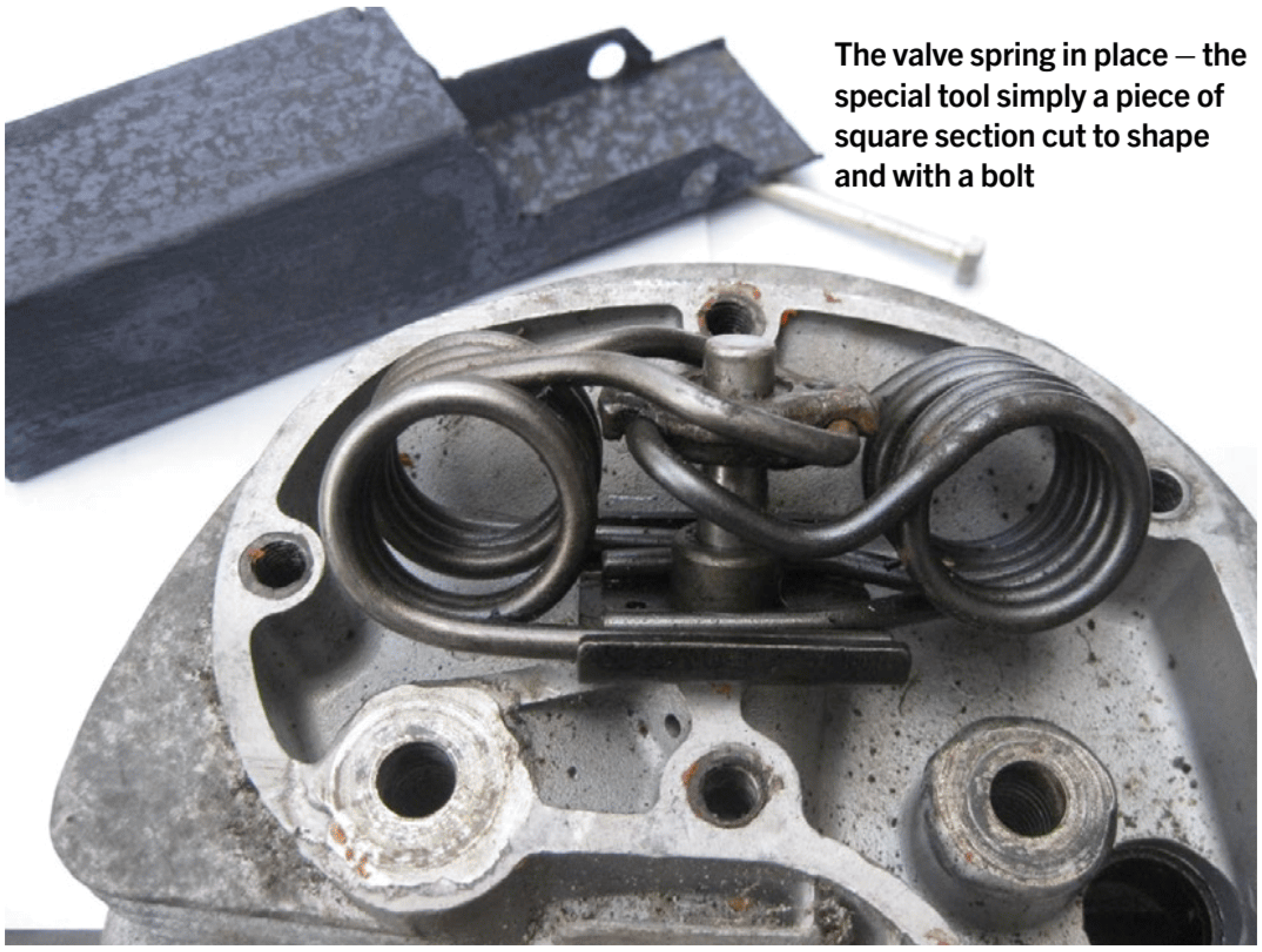
The original rear suspension 'jam-pots'; one is partly dismantled

Copper-plated rocker cover bolts ready for the heads to be nickel-plated



A rocker cover bolt – a little scoring with the reflections

Tapping out a brown paper gasket for the rocker cover – bolt holes done first for holding the gasket in place



The valve spring in place – the special tool simply a piece of square section cut to shape and with a bolt

The head gasket, a simple piece of copper. Can be reused after annealing

onto the piece. If it shows a pink/brown colour of copper, then the nickel is not thick enough.

The dents were fixed by filling with brazing and left proud. This went well, and filing/sanding got a good surface. (On later pieces I tried using solder with a propane torch to fill small dents, but it was very difficult to get a decent polished surface at the solder/nickel junction, as the solder is too soft.)

Once the matte copper layer was sorted – and it took a good polish – I plated the final nickel at a temperature of about 60°C for 30 minutes, again using Watts solution. It had a matte finish but then polished beautifully.

The internally corroded tube was about 30g heavier than originally and felt much more substantial. There were some defects, but they could be turned away from sight, towards the engine barrel.

*Part 2 of Motorbike Restoration will look at details, chemicals, recipes, and gear.*

"This was a disaster, with bits peeling off and underlying pitting"

My AJS will look very similar to this bike owned by Peter Borthwick (photo: Peter Borthwick)

Beautiful Bertha

# THE RAIL VOLUNTEERS

## Meet Rick Schreuder – firefighter, surf lifesaver, railway restorer

By Chris Hegan | Photographs: Chris Hegan, Graham Anderson

Rick Schreuder gets around. Living in Waiuku, 60km south of Auckland, he does shifts as a surf lifesaver at Karioitahi Surf Club, works as a firefighter at Manurewa, and for the past eight or nine years has been a frequent volunteer at the railway workshop at MOTAT in Western Springs. If it was not for Rick's Suzuki Z650 motorbike, he would spend half of his life in a car.

Rick was born and spent the first 11 years of his life in rural Holland. He still speaks the language fluently, which, as we will see, sometimes comes in very handy. His other great asset from MOTAT's point of view is his training as a mechanical engineer, qualifying as a designer and skill at using CAD software.

"I've always liked to be hands-on. During my degree I had to do the practical, so a lot of it was spent with engineering firms machining and welding, all that stuff," he says.

Rick's CAD skills played a big role in restoring the plate work on the two locomotives that the workshop has recently finished.

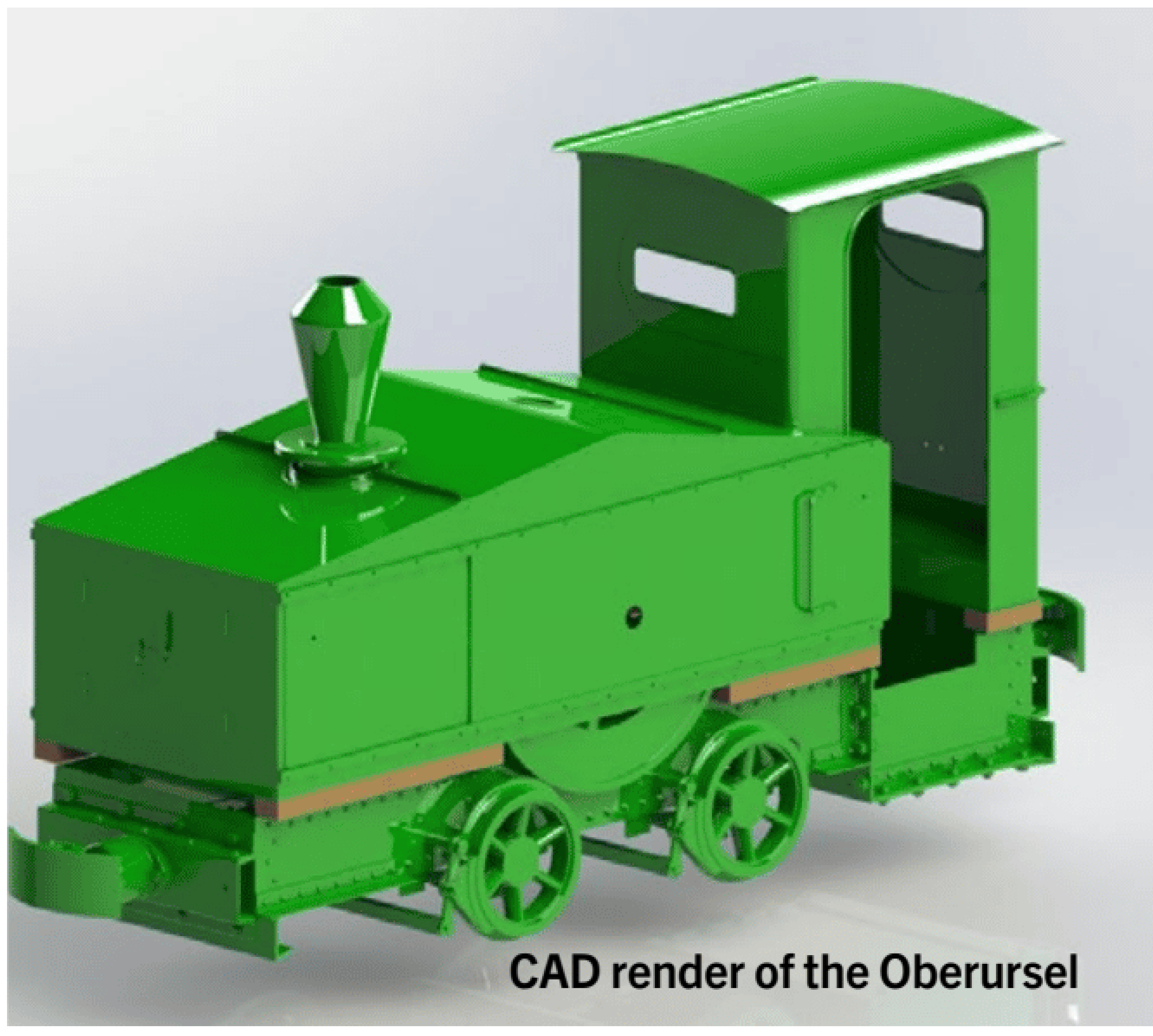
"On 'Bertha', the cab and the bunkers, and on the Oberursel, the whole of the cowling top and sides had to be reverse-engineered from the little that remained, down to having to overlay photos and scale bits from other bits," he explains.

### The rotisserie

Taking a walk to look at the finished result, we pass a firebox, the working core of a steam engine, mounted on what is quite accurately known as a 'rotisserie'.

A mounting has been welded to a huge ring gear so that the massively heavy iron unit can be rotated

Rick with the Oberursel



CAD render of the Oberursel


Marty's rotisserie, rivet-ready


Rick with his riveter

"They took exception to the German wording, ripped the plates off, and threw them into the harbour"

into position for riveting and painting.

Rick says, "That gear is the slew ring from a tank turret, a spare part lying around the military stores that we were never going to use. That was Marty Radford's doing – a very resourceful guy, but you have to be around here."

He stops to show me one of his own creations: a heavy riveter for putting big rivets into steam boilers: "Marty had salted away the hydraulic cylinder, which can deliver up to 30 tons of pressure. I dusted off my books from uni and worked out what size and shape of plate we needed to withstand 30 tons of load. That can handle a rivet up to half an inch thick."

These two devices are examples of one of the most appealing aspects of volunteering at MOTAT: dealing with equipment a century and more old, the volunteers often have to devise and make the tools and relearn or reinvent the skills to carry out operations used in the construction and, now, restoration of the machines.

## Meet Bertha

We arrive at the pride of the fleet: Bertha, a small but immaculate, gleaming black, iron and brass steam


Bertha at Goldfields, missing the Patrick oilers (photo: Graham Anderson, MOTAT)

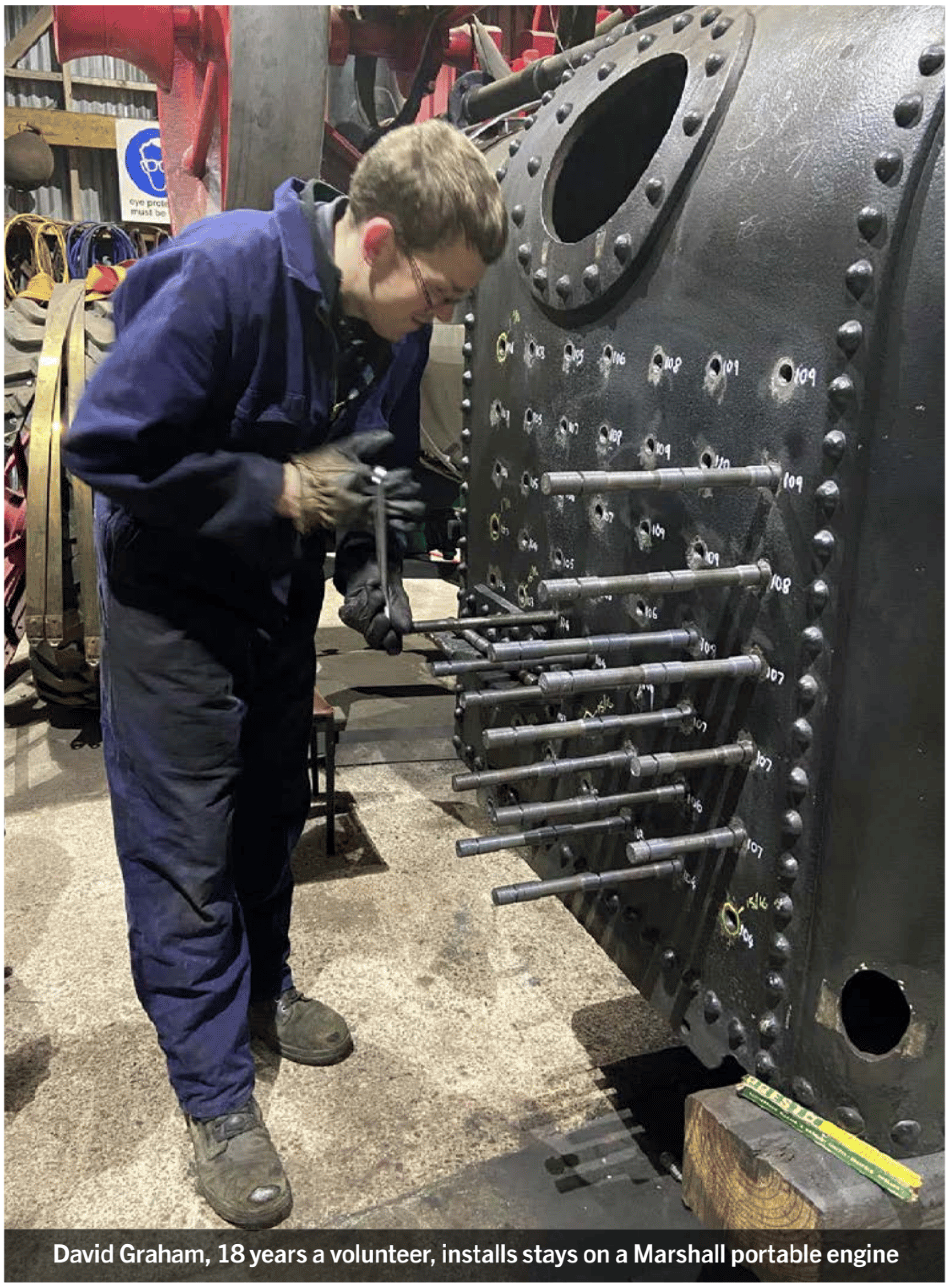
locomotive made in 1904 (works No. 1411) by Orenstein & Koppel as a coal-mine workhorse.

The brass-makers' plates look pristine – surely the originals? In fact, those were long gone when MOTAT took possession.

"There's a rumour that someone at the Portland Cement Works in Whangārei, where this spent a lot of its working life, had lost someone in World War I," Rick tells me. "They took exception to the German wording, ripped the plates off, and threw them into the harbour."

So these plates are reproductions that Rick designed and had made three or four years ago with the help of some photos taken when the engine was fairly new by a photographer called Percy Godber.

"Museums Victoria in Australia has a similar plate in its collection, which gave me the thickness and other dimensions," Rick explains. "So I made up the patterns in CAD and had them 3D printed and cast locally. That proved that this CAD stuff really works for us. From that flowed on reconstructing the bunkers and the cab from hours and hours of poring over photos, trying to work out how it was constructed." ▶


David Graham, 18 years a volunteer, installs stays on a Marshall portable engine

Bertha's plates – perfect reproductions

> "Split in half and widened for the more standard three-foot six-inch gauge"


Old and new – but the same

I am intrigued by the smaller plate on Bertha, identifying the makers of the *Steuerung*. What? Steering? On a railway engine? Turns out that, in the world of steam engines, the term relates to the valve gear and the linkage of rods that makes the engine run forwards or backwards.

Bertha is a beautiful piece of work that looks as if it has just rolled off the factory floor. Not so, Rick tells me: "It came out here fully assembled as a two-foot-gauge locomotive and began its working life as that. When Portland moved it from Limestone Island to be its lightweight wharf engine in 1918, it was sent to Andersons in Christchurch, [where it was] split in half and widened for the more standard three-foot six-inch gauge. That is what we have restored it to."

## Oiling the wheels of history

Looking closely at Bertha's finer details, I notice that one of the brass lubricators is slightly pitted with age; the others are unblemished and apparently identical copies.

Says Rick: "I designed the patterns and Skellerns foundry used the traditional core box and sand casting to make the cups, because they're hollow, and in-house machinists machined them up for us."

From these simple wick oilers, we move to the pièce de résistance: the Patrick oilers.

"These were there in the early photos but when we got Bertha they had been thrown away and an oiling system run from the cab installed, because the engineers at Portland, a notoriously rough and ready outfit, couldn't figure out how they worked. The last photos we have with them on date from 1914. I don't blame them for not being able to work out how they functioned. It's a bit of black magic, almost," Rick comments.

"On my last trip to Europe, I purchased a couple of Dutch engineering books. I'd seen the oilers in the photo and wondered what they were. I flicked through one of the books and, sure enough, there was an engraving of a section drawing that was very much like those oilers. So that gave me the name – the 'Patrick oiler'.

"More research took me to a guy

in Germany, who had some fully dimensioned drawings. That was enough for me to fully reconstruct these oilers – with a bit more help from the Frankfurt Feldbahnmuseum, which helped us out on the Oberursel as well. [The museum] had incomplete examples. At that point, I was able to make detailed drawings, have them cast by Skellerns, and have them machined here at MOTAT. They are the only examples in New Zealand."

## A bimetallic strip

Rick removes one and takes it apart, showing how a needle-pointed steel screw in the centre is tightened down hard into a hole in the bottom of the oil cylinder. As bronze expands at twice the rate of steel, when the engine heats up, the bronze expands away from the steel, allowing the oil to feed through to the shaft. Essentially, it is a bimetallic strip.

Rick explains, "If you were asked by an engineer today to design something that feeds oil under pressure only when the engine's running, and not when the engine isn't, you'd end up with a complicated system of multiple sensors, a programmable little computer somewhere, and a couple of pumps – and it would probably fail within a year when one of the sensors burned out. This thing achieved the same job with no moving parts; you just poured oil in and it would go on doing its job forever. That's what I love about this old technology; it's so well thought through and so simple at the same time."

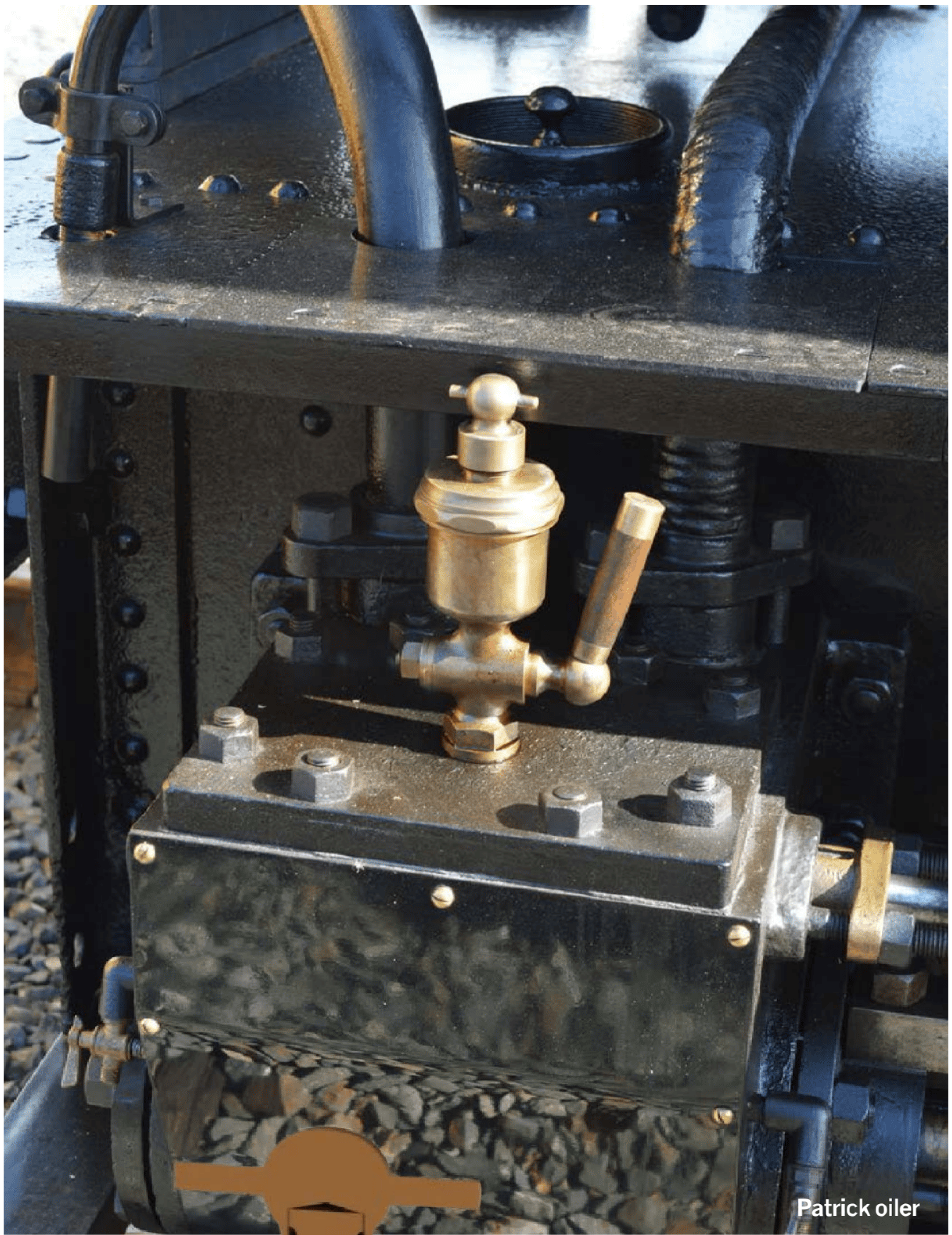
## Backing the volunteers

"The awesome thing about volunteering here," Rick says, "is the way volunteers get exposed to all sorts of neat ideas and cool things that you don't come across these days."

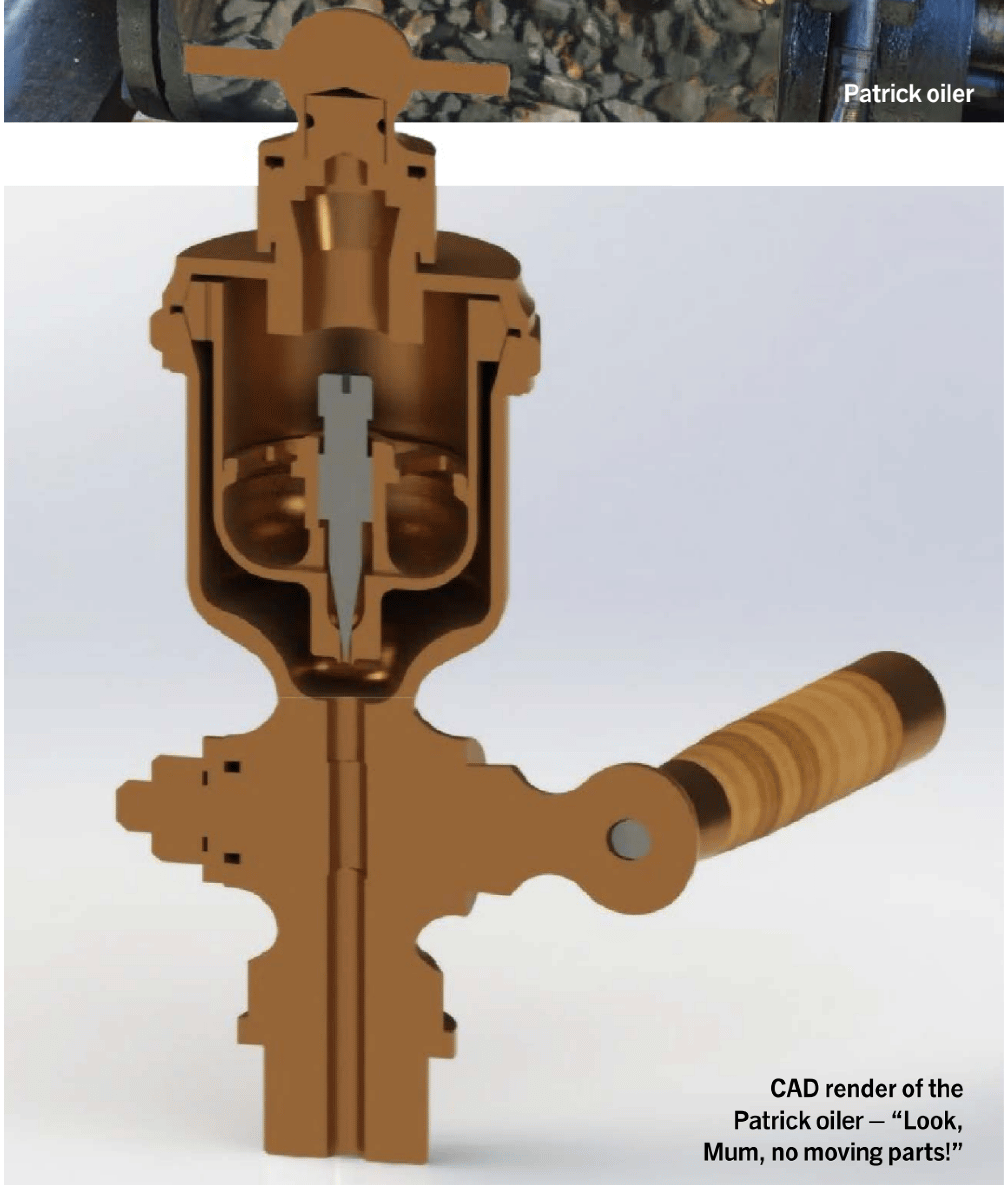
Implementing the ideas needed to solve problems often involves significant expense, and Rick and the other volunteers count themselves fortunate to have the confidence of volunteer manager Graham Anderson.

"If we can make a reasonable case, he'll usually go with it. We're very lucky that way," he says.

Thanks to assured funding from Auckland's local bodies, Graham Anderson does not have to



Patrick oiler



CAD render of the Patrick oiler – "Look, Mum, no moving parts!"


Knocking it into shape – Dan Scott blacksmithing the steamroller's firebox (photo: Graham Anderson, MOTAT)


Making the sparks fly


Learning the skills

scrape around for donations just to keep the museum alive, but detailed restoration is never cheap, and constant fundraising is needed to deliver the innovation and excellence that Aucklanders have come to expect of the museum.

Although Rick counts himself fortunate to own a home, many of his peers can't – let alone have a shed with tools in it.

"Some of the fellas and – fellaesses? – who come through the door haven't had the opportunity to touch so much as a handsaw. We take them under our wing, teach them practical woodwork or metalwork skills, and fill them with all these ideas of how machinery used to be."

## Steam-era products

Rick points out a notable distinction between modern engineering products and those of the steam era. He grabs a handle in the cab.

"If I take the reverser here, and move the handle forward, you can see there's a lever that drops down and the arm attached to the valve moves. And you can see it all, see how it works. Today, everything working is hidden under plastic or metal covers, almost as if the engineer is ashamed of the thing he produced. Back in the day when this was the most advanced technology, the engineers were all about, 'Look at this technology. Look at it move.'

"They were proud to show it off. Look at these oilers. They'd work just as well as a simple block, but they thought, *While we're at it, let's give it some shape, make it easy on the eye. Oh, we've got a funnel. Let's put a decorative ring around it, just to make it look a bit nicer.*"

## A lovely old example

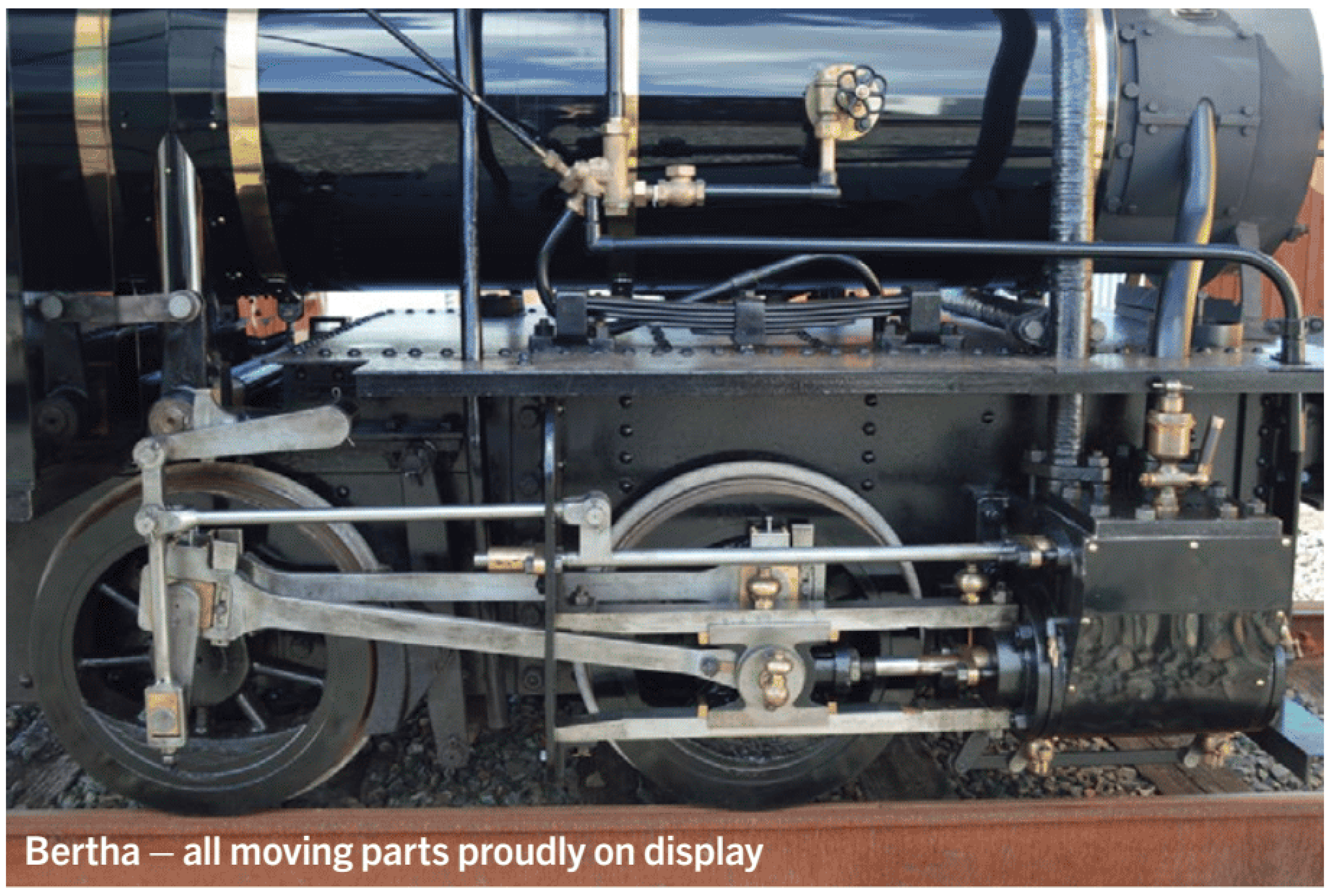
The Oberursel is one of only four surviving in the world.

"It's an example of an early combustion engine made with steam technology. The funnel makes lots of people mistake this for a steam engine, and once it gets hot, it does produce steam – from the radiator," Rick explains.

"It has a whopping great flywheel like the ones you see on steam engines but the power plant is a single-cylinder diesel engine. It's actually a stationary engine that someone had the bright idea of putting on railway wheels. They were very popular on light railways and in mines."

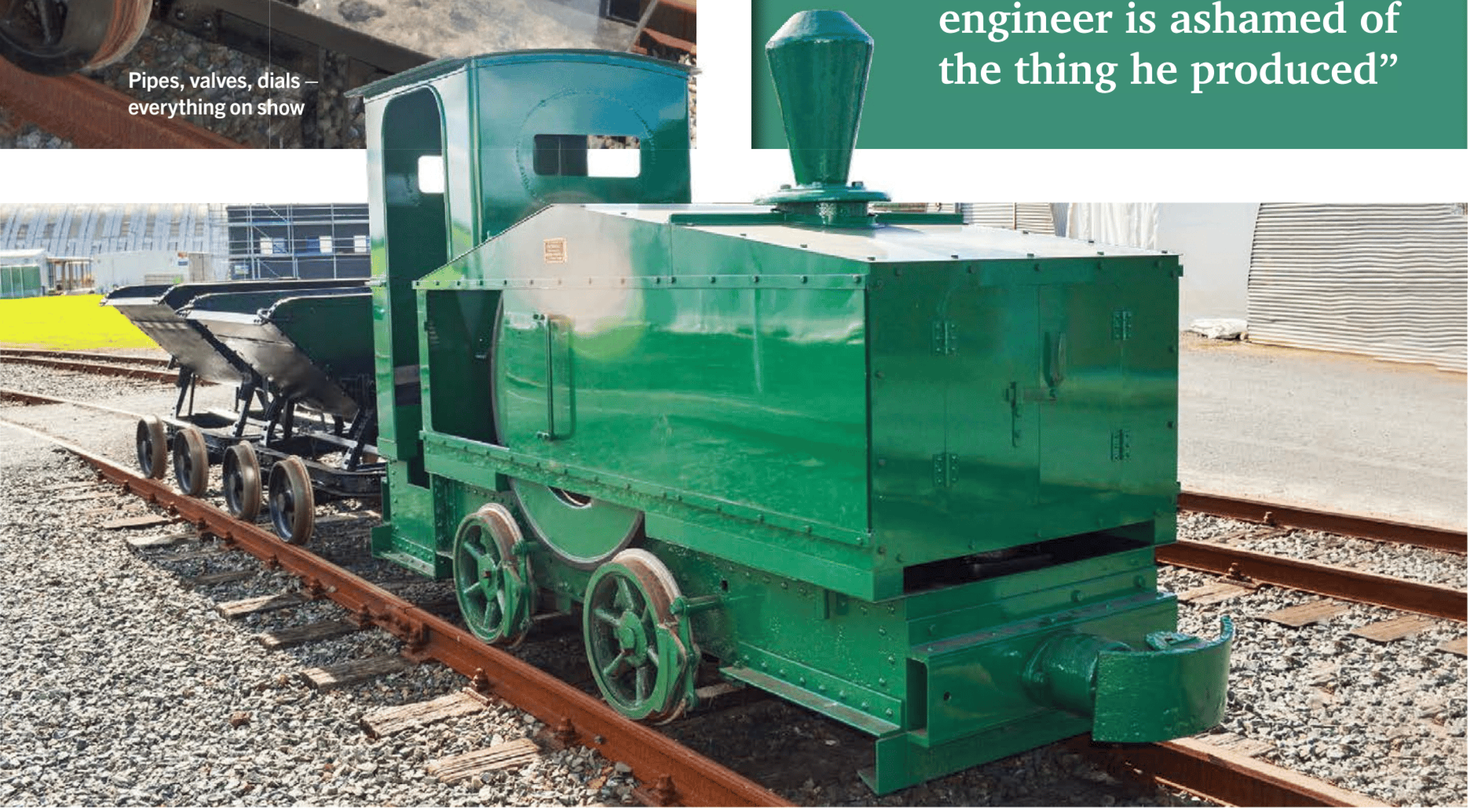
With the engine cover off, you can see Rick's point about steam technology. ▶


Pipes, valves, dials – everything on show


Bertha – all moving parts proudly on display


Surprise! No coal, no steam

"Today, everything working is hidden under plastic or metal covers, almost as if the engineer is ashamed of the thing he produced"


The 1912 Oberursel single-cylinder diesel

Tip me over, pour me out

The motor is massively over-engineered, with a heavy cast-iron rocker arm and a thick steel valve cover among many other items.

The Oberursel was used for the Thames Drainage Board's draining of the Hauraki Plains and the construction of the road across the plains in the early 20th century. The workers laid lightweight, movable tracks alongside where they were going to build the road and ran the train from the quarry for the road metal to the works site. This was the standard road-building method at the time.

"With its original six hoppers, each carrying up to two-thirds of a ton, this was the dump truck of its day," Rick explains.

He demonstrates how the hoppers are so finely balanced that one man can tip them over to empty the contents.

## Northland mining career

After the Hauraki Plains job, the Oberursel disappeared until 1941, when it reappeared in the Puhipuhi mercury mine in Northland. At that point, it had been regauged to three feet, six inches, a job done by a local blacksmith very much on the cheap (understandable, because a succession of businesses had failed to make money from the mercury).

"The wheels used to be inside the frames," Rick says. "So, he drilled through the ends of the axle boxes, stepped the shaft down to go through the bearings, then put the collars back on, which is all sorts of engineering bad practice. But it worked, and it was cheap.

"So then they had a rolling chassis. Great! Plonked the engine back on top. 'Oh dear. Now the flywheel is hitting the wheels. What are we going to do? I know – we'll go down to the timber yard and grab some three-by-three, put those under the engine, and we'll get it to clear.' And it works, sort of. Now the flywheel misses, and only just misses, the wheels. Great!

"Except … when they went to put the cowling back on, the raised flywheel was now hitting the cowling. Back to the timber yard! Good. They plant blocks all around under the lower edge of the cowling. Then the window was too high. Replacing the window properly would have been very expensive. So they head off to the car wreckers, grab two back windows off a Ford soft-top Model A, weld some plates in, and bolt in the windows. Cheap and nasty, but it worked.

"When we got this, everything was shot; the cowling was on the verge of collapse, engine bearings, everything flogged out," Rick reveals.

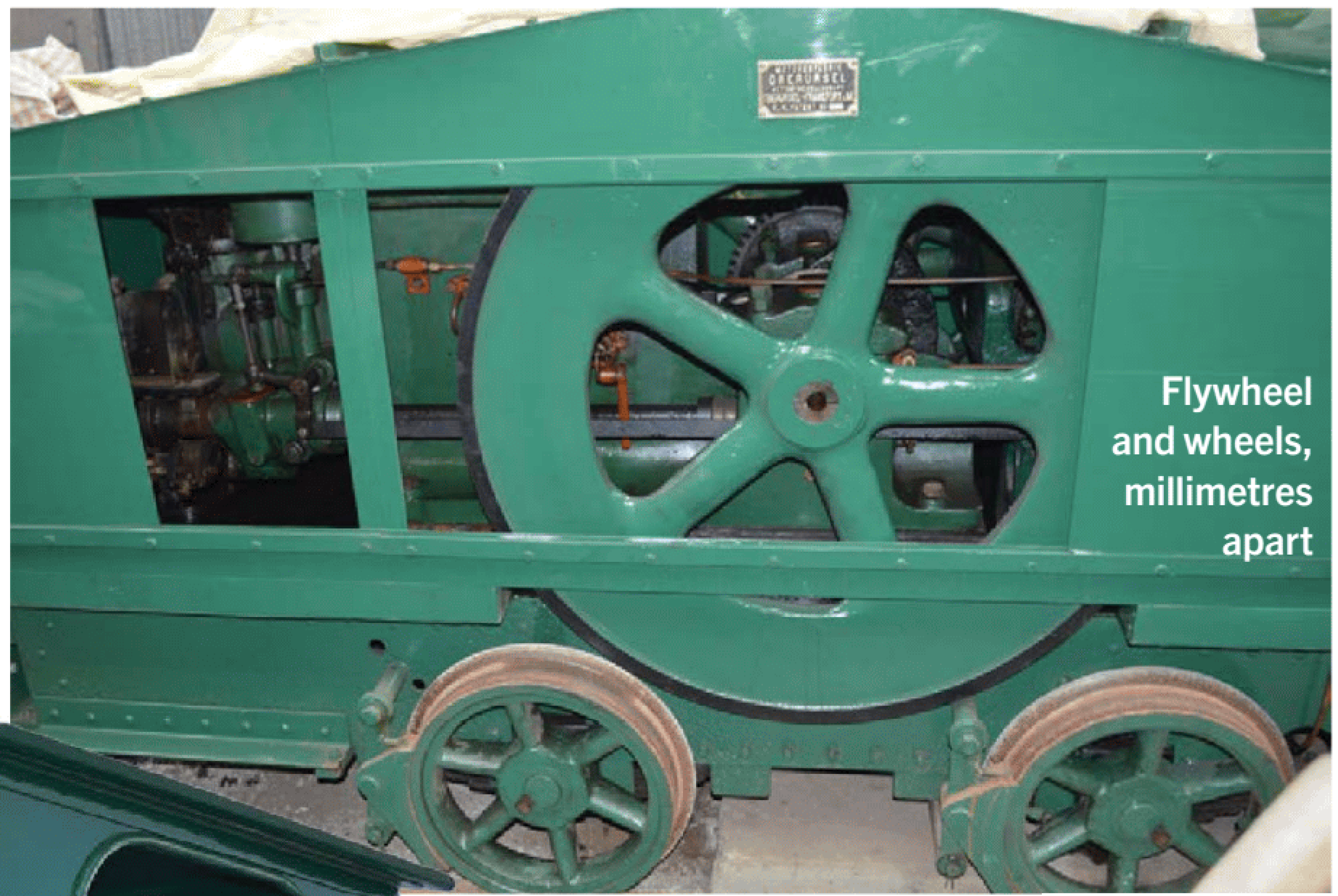
So, after a lot of CAD drawing (thanks to the lockdown) and remanufacture, and with some help from the Frankfurt Feldbahnmuseum, which has the only other working model in the world, the team won the Best Internal Combustion Restoration at the 2023 Federation of Rail Organisations of New Zealand awards.

## Start 'er up

Rick is a young, fit surfer, and it's just as well.

He opens the partial compression release valve at the front of the Oberursel, takes a large crank handle, inserts it into the centre of the huge, heavy flywheel, and puts his back into getting it spinning. The flywheel's momentum then gives him time to


Up she goes!


Flywheel and wheels, millimetres apart


And the award goes to …

get back to the front and close the compression release valve.

"This is its great advantage over steam," he says. "With a steam engine, you spend a quarter of all your man-hours powering it up and on maintenance. You can get this thing going in five minutes, even with oiling it up."

As we make our farewells, I ask Rick if he still surfs.

"I do; I love the ocean, and, especially with some of the stuff I see as a firefighter, it's a great place to let all those problems just fly away," he says. "Same with coming here. It's so rewarding to recreate these things and bring them back to their original glory, to have the opportunity to work with such beautiful materials – stuff that I'd never be able to afford myself." ▶

"Cheap and nasty, but it worked"


Wind 'er up

Precision woodwork

Smell the era


Chain mortiser

# HIS HIGHNESS'S

The carriage undergoing restoration – a huge job for several volunteers – tells a story of decline.

First fitted out as luxury transport for the Duke of Gloucester's royal visit in 1935, it was then converted to a first-class carriage on long-distance service. When it became too shabby for the elite standard, it was downgraded to economy class and finished its days on Auckland's suburban rail. The restoration will see it presented as an immaculate version of the last of its three lives.

Explains Rick, "We started on this six years ago. I started it going with the thought that others would take it over but I've ended up as the project leader. There were three of us when we started. Two of those have now retired through old age, and the average age of people working on this has now jumped down by decades. It's great that we are getting a lot of younger people, although it does mean that I, a trained metal worker, am now teaching people woodworking. But it's a great opportunity for them to work with tools that you'd be hard-pressed to find anywhere else, such as our chain mortiser, which we got from the Devonport naval dockyards when they stopped working with wood."

## What's that?

A 'chain mortiser'? Rick shows me what he's talking about.

"If you take a chainsaw, make it much narrower and angrier, and rig it up like a drill press, you've got a chain mortiser that makes perfect rectangular holes in big bits of wood. There would have been at least one of these in every railway workshop in the country. This is one of very few survivors," he says.

We climb into the carriage and head for the toilet and washroom compartments, which separate the two seating sections.

"We started in the middle because, why not? It is the smallest room."

This is the only part that is finished, and memories flood in of overnight trips to Wellington on the Limited Express in the '60s. It even smells right, thanks to the cream enamel paintwork.

"We've tried as much as we can to be true to the time when it came out of service," Rick says. "It was brand new in 1935 and, as a first-class carriage, it

The reference section

Cleaning hands for 70 years


Paper cup

# CARRIAGE

looked a fair bit different to the period when it was significant to us, which was the late ’70s to early ’80s.

“This is a fairly new thing with museums. If you go back 40-odd years, museums were keen to strip out everything and make it look as old as possible but now we tend to make things look as they were when they were most familiar to people.

“If we look at this washroom, we see how we have gone from a sustainable way of living to using a lot more to do the same job while still trying to call it sustainable. So here we have the glass soap dispenser – no springs, no moving parts; you tip it over and out comes the soap. That was topped up from a steel tin – just screw off the cap. Now, you’ll have a plastic soap dispenser that probably won’t last 10 years. This globe has lasted at least 70.”

## Staying true

“Look at these paper cups. This is from a collection of old stock that someone managed to get hold of. Compact, stackable, and sanitary. Far more resource friendly and sustainable than any paper cup you can buy these days,” he says.

I notice the plywood panels have been held in place using old-fashioned flat-head screws, although Rick has told me that they are going to be covered by a piece of trim. Then why not use Philips screws – or, even better, square-drive screws?

“If someone 200 years down the road wants to know how they built these cars, there is a record. We’ve left it as we found it,” he says.

The trim will also be screwed on. How do they know how to do that?

“This is the cunning part. This carriage is in two compartments.”

We walk through the toilets into the other half of the carriage – a dusty, untouched section.

“This has been left as we found it, and this is our reference material for putting it back together. I can’t tell you the number of times we’ve gone to reassemble something that was taken apart in the ’80s. (A half-hearted start was made on the project shortly after MOTAT received the carriage.) Or maybe [it was] something I did three years ago and can’t remember how it was done. I can just walk through this door and, ‘Ah! That’s how it’s supposed to look.’”

> “This is the cunning part. This carriage is in two compartments”


A perfect reproduction


# MYO DRINKS

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# THE THREE WISE MEN

## The time of year when there's magic in the air

By Mark Seek | markseek@rocketmail.com

It was a balmy Christmas Eve; from memory, it was 1983. It started off as any normal evening before the big day: wrapping presents and placing them around the tree. My final job was in the shed.

With the family tucked up in bed asleep, I crept downstairs to attend to what I thought would be an easy assembly of parts. I had the roller door halfway up and the clock on the wall read 12.45am. Inside the large box in front of me was a boy's bicycle. My task was to put it together to bring delight to a young boy on Christmas morning.

I opened the box and tugged at the little red bike until the plastic and polystyrene gave it up. The shiny two-wheeler had travelled all the way from the Raleigh factory in the north of England, and I expected it to arrive with an instruction manual and tools to assemble it. That was a big mistake.

### No instructions!

I gave the box a good shake, hoping to release said instructions and tools that might be wedged inside. To my disbelief, the box was empty.

"No way!" I cursed. "This can't be happening."

I started to panic; the boy would be up in a few hours. I sat there with parts strewn across the shed floor. I could feel a bead of sweat on my forehead as fear started to grip me.

"Don't panic, mate," I whispered to myself repeatedly.

I decided it was time to make a cup of tea and assess my plight. Sitting there alone on my stool, I pondered my predicament. It was then, in the quiet of the early hours, I heard the distant rumble of an exhaust. The sound got louder and louder.

The mysterious automobile drew up alongside the kerb and idled with a distinctive V8 burble. The headlights gave the impression of a chrome grille and equally shiny wheels. I strained my eyes towards the inky black outline of the car and its three occupants.

"Can I help you, gentlemen"? I said, as three shadows came walking up the driveway.

"No, man," said the bloke with the long beard in a distinctive Texas drawl. "We've come to help you out – kind of like the Three Wise Men," he chuckled.

### A bit weird

"You see, mate, we've been following a bright star to your place."

"Oh, OK; that's a bit weird."

I rubbed my eyes and looked back at the tall bloke; he was obviously the one in charge. The bloke in the middle wore a white jumpsuit with tassels; he had a helmet painted red and white with blue glitter stars tucked under his arm. The third chap – younger than the others – wore a baggy tee-shirt showing some distinctive tattoos, with his head adorned with one of those trucker caps.

The introductions followed in that order. Taking his sunglasses off, the tall, bearded chap reached out his hand. I noted he had a guitar-shaped ring on one of his fingers.

"The name's Bill Gibbons but you can call me Billy."

The older one said he had a showbiz title. "Proud to make your acquaintance; I'm Evel."

I didn't doubt that for a moment.

Evel had a bit of a dodgy knee, so he sat down on my stool and put his helmet beside him. I turned around to the quiet one.

He slapped me on the back and said, "Jesse James; I'm from the West Coast."

### Akaroa bound

Now, you could have excused me for thinking something had been slipped into my cuppa, but, no, there they were, in plain sight, by the shed door.

Billy explained they'd come from the Far North, doing a road trip to Akaroa. "That star you see" – he pointed towards the night sky – "led us to your place so we're here to sort out any problems you got going on, then we'll head off to Banks Peninsula and Akaroa."

I didn't ask him why they were going there because time was ticking fast. I pointed to the bike bits.

"There's my problem," I said.

With that, the younger chap disappeared and came back with a large red metal toolbox covered in stickers. He and Billy began to put all the parts in some orderly fashion – wheels with forks, seat with frame. I watched as they collaborated and, before you could say "Merry Christmas", they told me that they had a plan.

It was at this point I realised that the old bloke in the leather jumpsuit was missing; he must have slipped out.

### What do you think you're doing, mate?

I eventually found him out the back of the section.

"Oi, what are you doing, Mr Evel?" I asked.

On venturing nearer I saw he was carrying some 4x2s and had collected

Billy


Evel

sheets of ply from the neighbour’s driveway. He looked at me and explained that the others had decided he should test the bike before they gave it back to me.

“I’m building a ramp so I can jump it; let’s see if it has what it takes. I’ve been known to have the odd crash – well, more than a few to be straight up with ya.”

I thought he was being a bit optimistic, especially with that knee and – oh no, it was 4am already!

Without thinking, I grabbed my hammer and a handful of nails – I mean: if you can’t beat ’em, you might as well join ’em!

I ran back to the shed after banging some nails into the plywood. It was obvious that the Texan and Jesse knew what they were doing. I noticed they were fitting a brand-new set of handlebars onto the bike. Jesse explained he always carried around a pair of chopper handlebars.

## Dawn is fast approaching ...

I could hardly argue with that, I suppose.

I turned my attention to the tyres, which I inflated with my small, rarely used compressor. The clock on the wall was telling me that it would be sunrise in an hour or so.

As we wheeled the fine-looking machine out of the shed lights, the reflection of the star bounced off the handlebars. I had to admit that these fellas had created a smart-looking machine.

*Wow, my boy is going to love this,* I thought.

Click, click, click went the back wheel as I reluctantly wheeled the new two-wheeler up to Mr Evel, who had not convinced me that he had a reasonable career at jumping bikes and had already strapped his helmet on his head. Before I could say “God save the Queen”, he had swung his leg over the machine and begun to head towards the steep incline up the back of the neighbour’s house.

We watched him from a safe vantage point and gave him the all clear. He made sure his homemade ramp was perpendicular to the row of parked neighbourhood cars and, before I knew it, the blurry image of a man in a jumpsuit and cape came bolting down the hill going like the clappers.

“Geronimo!” he shouted.

With that, he hit the plywood ramp and flew a good eight feet, careering over the first car (admittedly only a Morris Minor), clipping the roof rack of old man Johnson’s ute, and landing in the hedge at the end of the cul-de-sac.

## Bloody dangerous

Both rider and bike disappeared, swallowed up by the botanical mass.

With disbelief and in nervous unison, we hooted and hollered – and I quietly thought that that was bloody dangerous but cool at the same time.

After a few anxious moments, Mr Evel emerged dazed, confused, and probably chuffed that he was unharmed and with my boy’s new bike in one piece. I gave it the once-over. Remarkably, under the circumstances, it still looked new apart from a little graze on the front mudguard.

I shook the stuntman’s gloved hand and said that I had been grateful for the help when I thought I was up shit creek without a clue.

The sun was rising, and I could see the streetlights were turned off. I bid farewell to my new friends, saying that nobody was going to believe my encounter with the ‘Three Wise Men’.

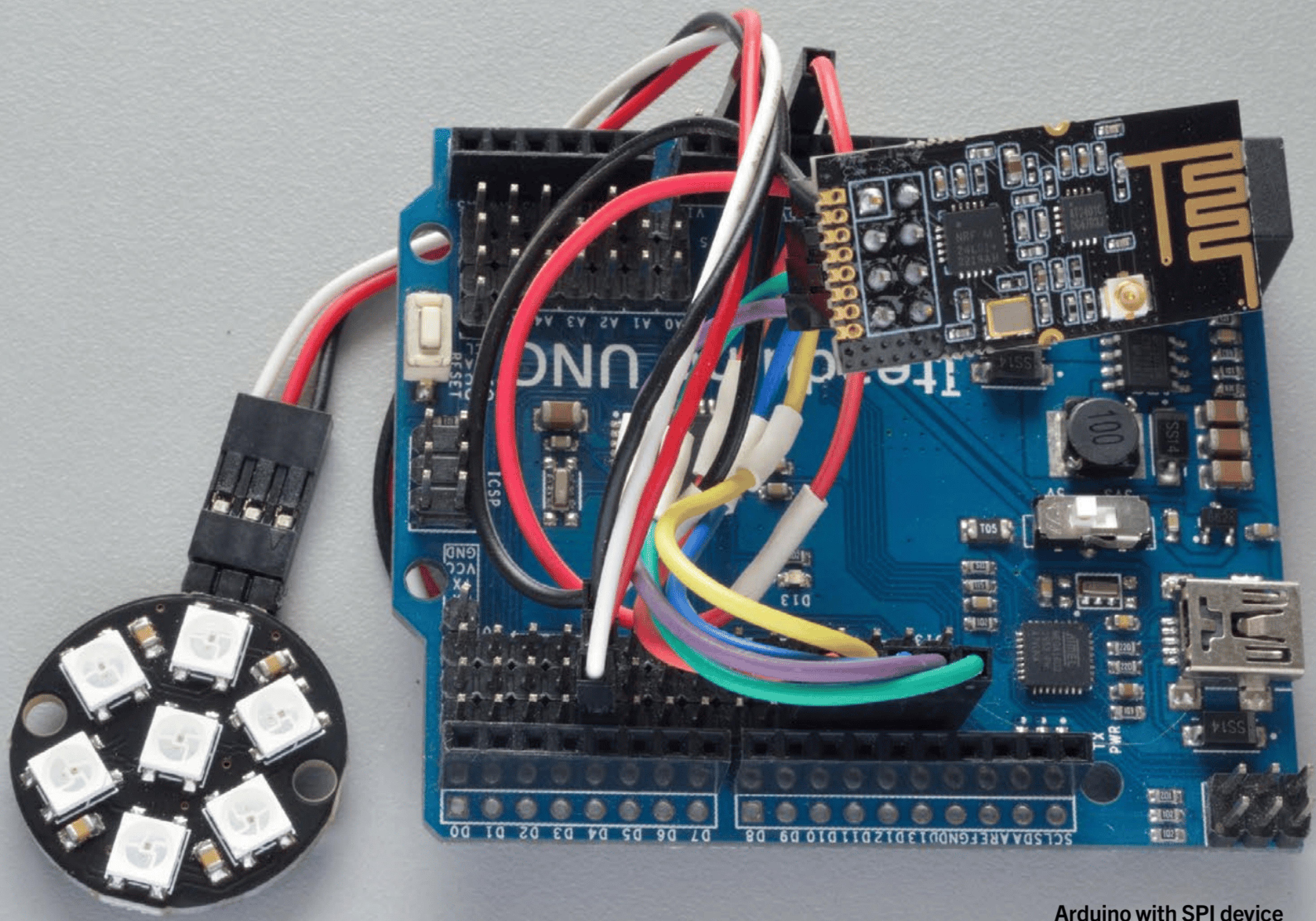
Jesse

With that, the V8 was fired up, all three blokes gave me a nod, and the car disappeared in a haze of blue smoke just as all old V8s should.

Every time I hear that familiar V8 engine rumble, I look out from under the bonnet of my little Healey and have a bit of a moment – and, of course, I consider that I’m lucky to be able to use the tools they left behind with a note attached: “Enjoy wrenching on us! Bill, Jesse, & Evel”.

Thanks, fellas; Merry Christmas!

Moral of the story? That’s up to you, readers, but from me, *The Shed* Shrink: Merry Christmas; see you again in 2025.

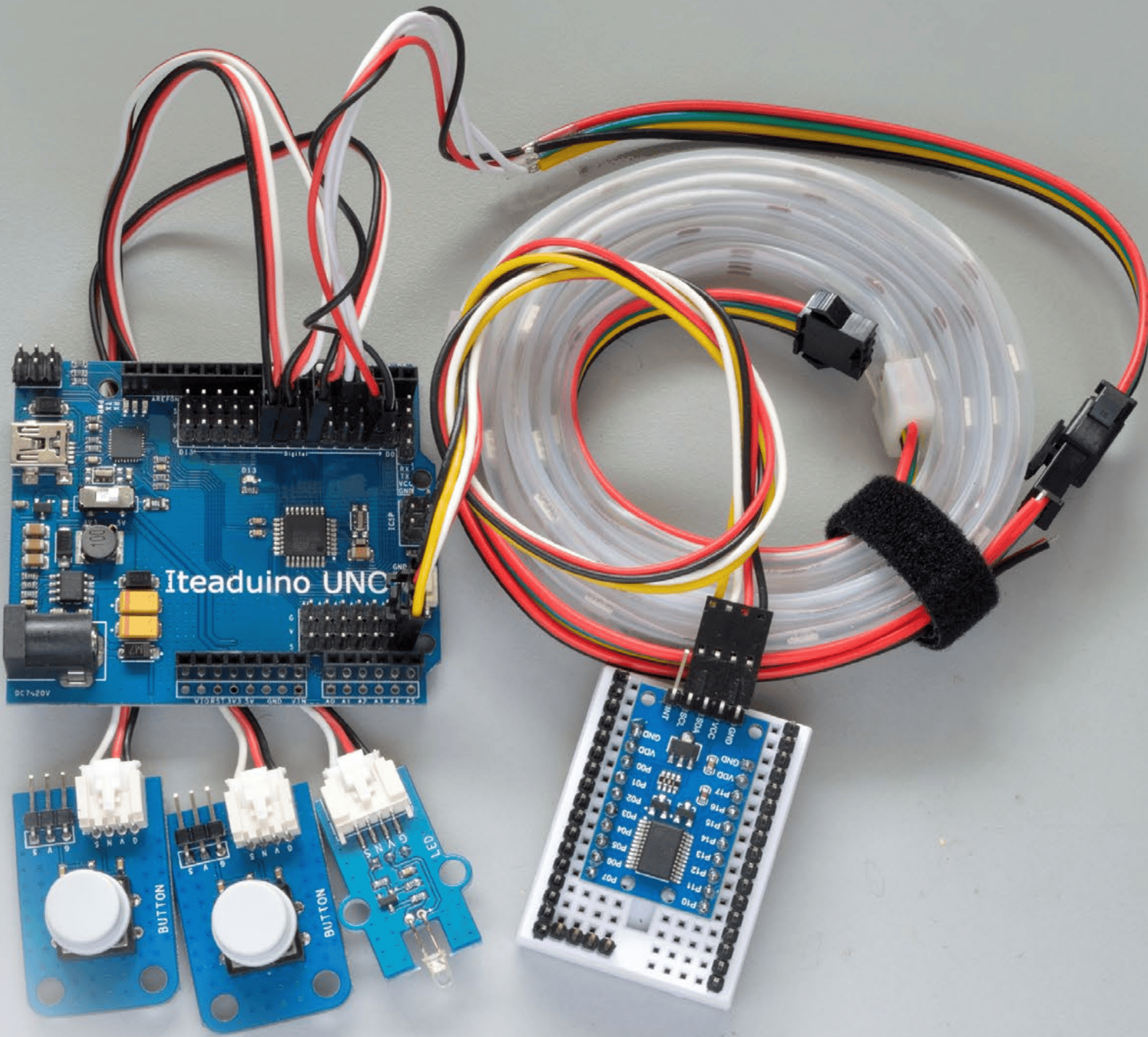


Arduino with SPI device

# ARDUINO 102 INPUT

**Inputs – what they are and what you need to understand about them**

*By Mark Beckett | Photographs: Mark Beckett*




IO expander connected to I2C pins

Hopefully, this article will help understanding of the inputs on an Arduino (and other microcontrollers) and what you need to be aware of when using them in sketches. I'll show how you can detect and respond to multiple inputs and reveal one method of increasing the input number.

## What is an 'input'?

An 'input' is when the microcontroller receives information – and it can be a digital (1/HIGH or 0/LOW) change of state, analogue (0–5V), or a data stream. Regardless of the type, the microcontroller does something with it either immediately or later; it would be a waste otherwise.

Eventually, the result of the input information is that the microcontroller produces an output. This could be digital, pulse width modulation (PWM; sort of analogue), or a data stream (LCD, neopixel, Wi-Fi, serial, or writing to an SD card), or a combination of these.

The official documentation for an Arduino UNO R3 states that "it has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs", which is very informative, but to understand what 'pins' are, you need to look at the pinout diagram.

There is an official version but, as I referenced in the previous article (Arduino Basics 102: Time, *The Shed*, Issue No. 117), Alberto Piganti has produced an excellent series of pinout diagrams. They are now archived on GitHub: https://github.com/BelKed/pighixxx-uploads-archive/tree/master/pinouts.

The Arduino UNO is here: https://github.com/BelKed/pighixxx-uploads-archive/blob/master/pinouts/Arduino/UNO/2013/uno.pdf,

and I suggest you download it, save it, and print it out to use when designing your next project. ▶

## Pinouts

It is important to look at the legend to understand what all the numbers mean. On the right side are the 14 digital IOs (numbers 0–13). The first column is the actual pin number on the IC, while the second column is the port number.

The third column is what the Arduino IDE uses in sketches to refer to an input (or output) – for example, 13 for the internal LED.

On the left side are the analogue inputs, and again it's the third column we're interested in: A0–A5.

As you can see, the 14 digital pins on the right side are input or output, while the analogue are only input. Many of these pins have other special functions, which are shown in the last columns. Some of these will become obvious in later articles, but for now, note that 0 and 1 show RX and TX, respectively. These are the same pins used to communicate through the USB (sketch upload and serial monitor), so my advice is to avoid using these whenever you can.

There is an internal LED attached to 13, which makes it difficult to use as an input. That leaves 11 other digital IOs that can be used, but you can also use the 6 analogue pins as inputs or outputs.

Many pinouts refer to these as 'D14–D19' but you should use the 'A0–A5' designation – that is, const int Pushbutton1 = A5 – so that the code will work correctly on different boards.

By my count, that gives 17 IOs, one LED output, plus a serial Rx/Tx to the USB. In a later issue, I'll show how you can easily increase that number.

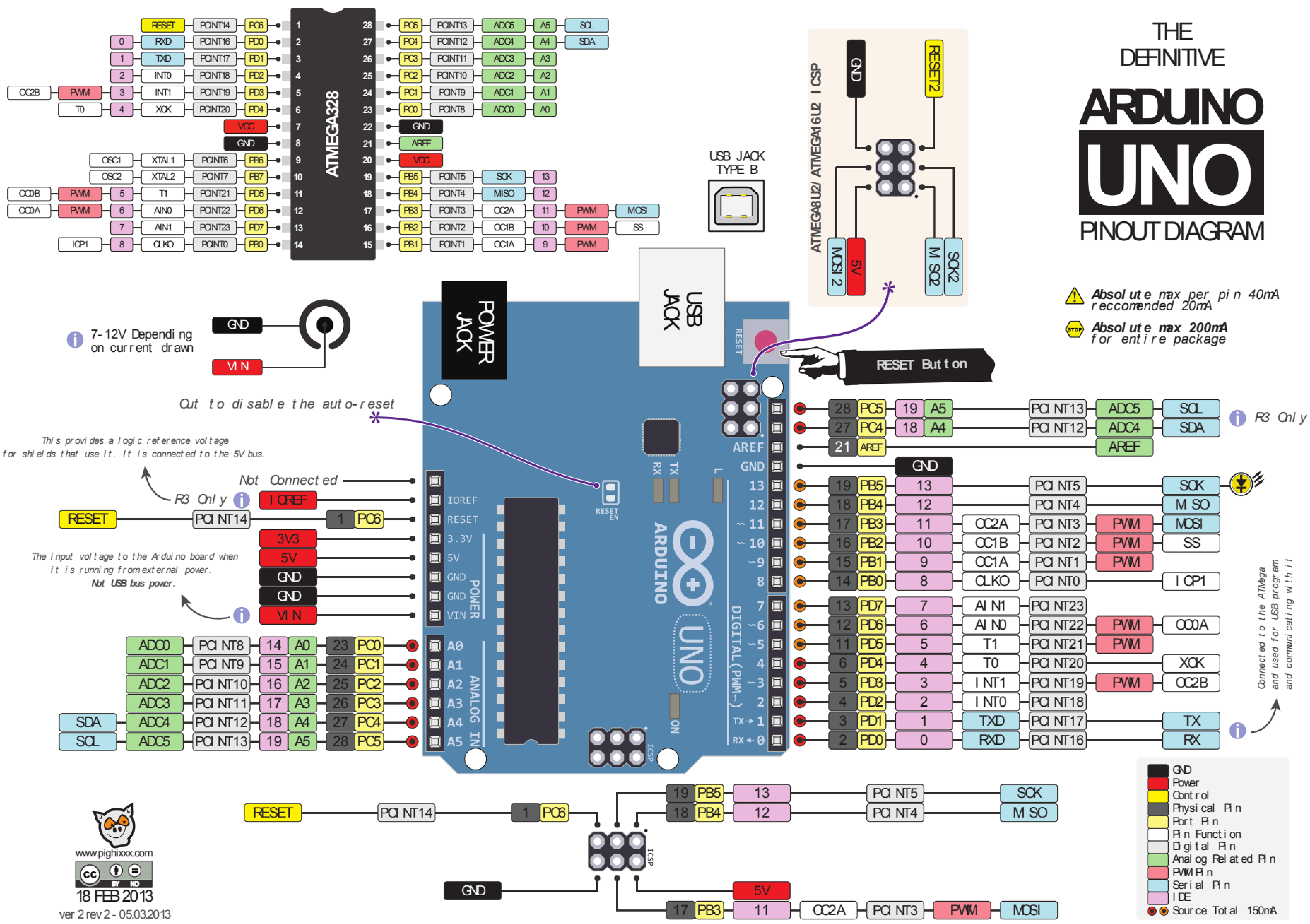
## Special pins

The Arduino and other microcontrollers have pins that can be used for certain features. The best analogy I can give is to imagine a large field/park with lots of entrances. Some of the entrances are a fixed size for pedestrian or vehicle access. During an event, some could be designated as entry and others as exit. Some could be designated for emergency vehicles only or VIP access. Once that event is over, the entranceways default back to their normal state ready for the next event, which may configure them differently.

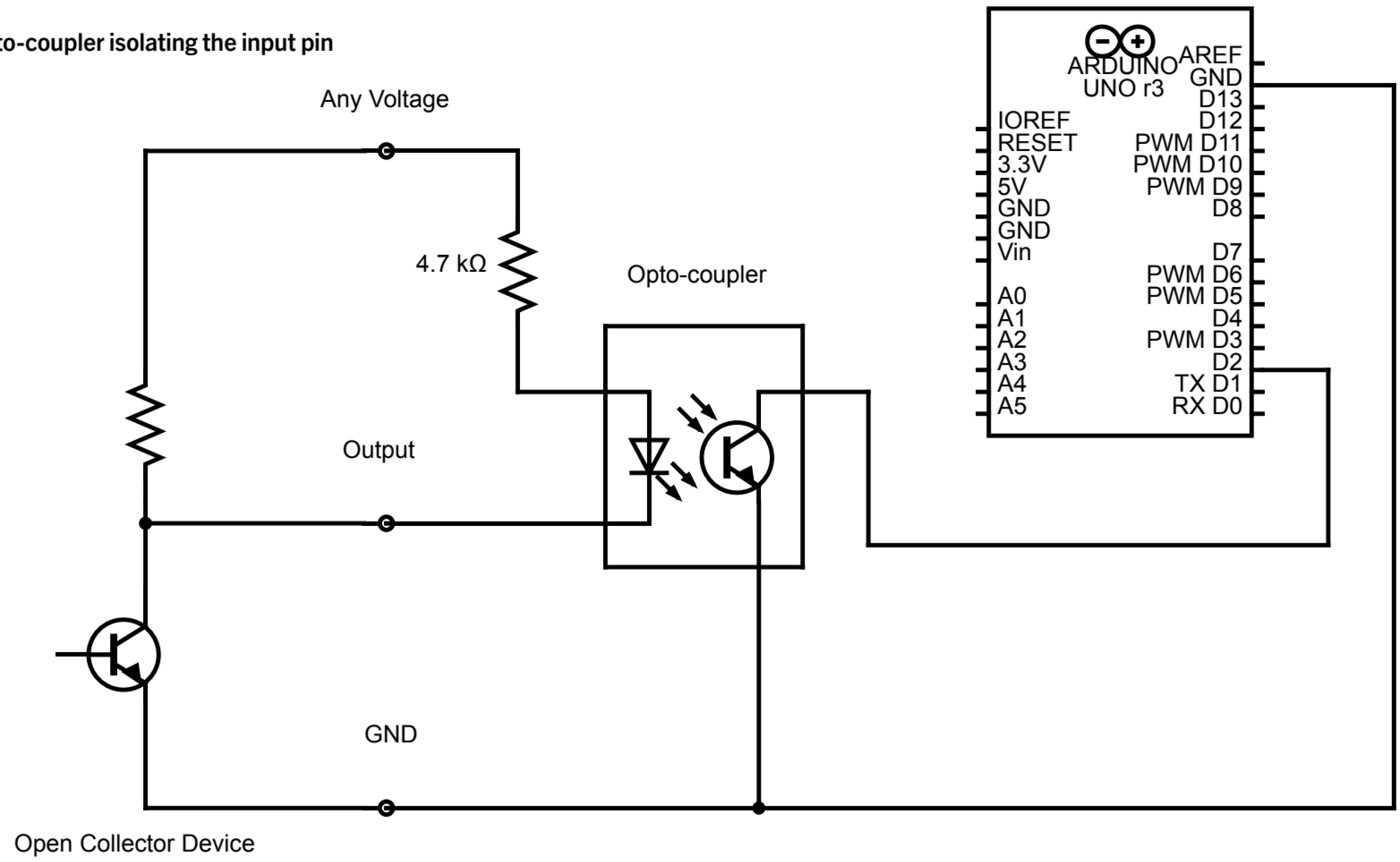
I2C (Inter Integrated Circuit) uses A4 and A5, and the SPI (serial peripheral interface) uses 13, 12, 11, and 10 to communicate between Arduino and other devices.

https://docs.arduino.cc/learn/communication/spi/ gives much more information. The SPI device photo shows a 2.4GHz wireless module connected to the SPI pins for a project that I did where six units communicated in a master/slave arrangement to control sets of lights.

Most of the modern microcontrollers



**Opto-coupler isolating the input pin**




have similar functions, but they may be on different pins, so the key is to check the pinout and be aware when deciding where to connect your IO. This will be more relevant in later articles.

> **"Is unlikely to cause any damage or melting of the wiring"**

## High v. Low

In the previous article, I stated that I don't switch 5V onto the pin; instead, I prefer to connect switches between the pin and ground. This is sometimes referred to as 'Active Low'. Some of our everyday appliances use an Active Low – for instance, the interior light in a vehicle.

Arduino pins are very high impedance (100K), so they can float and change states with stray voltage, but thankfully the ATmega chip has internal 20K pull-up resistors.

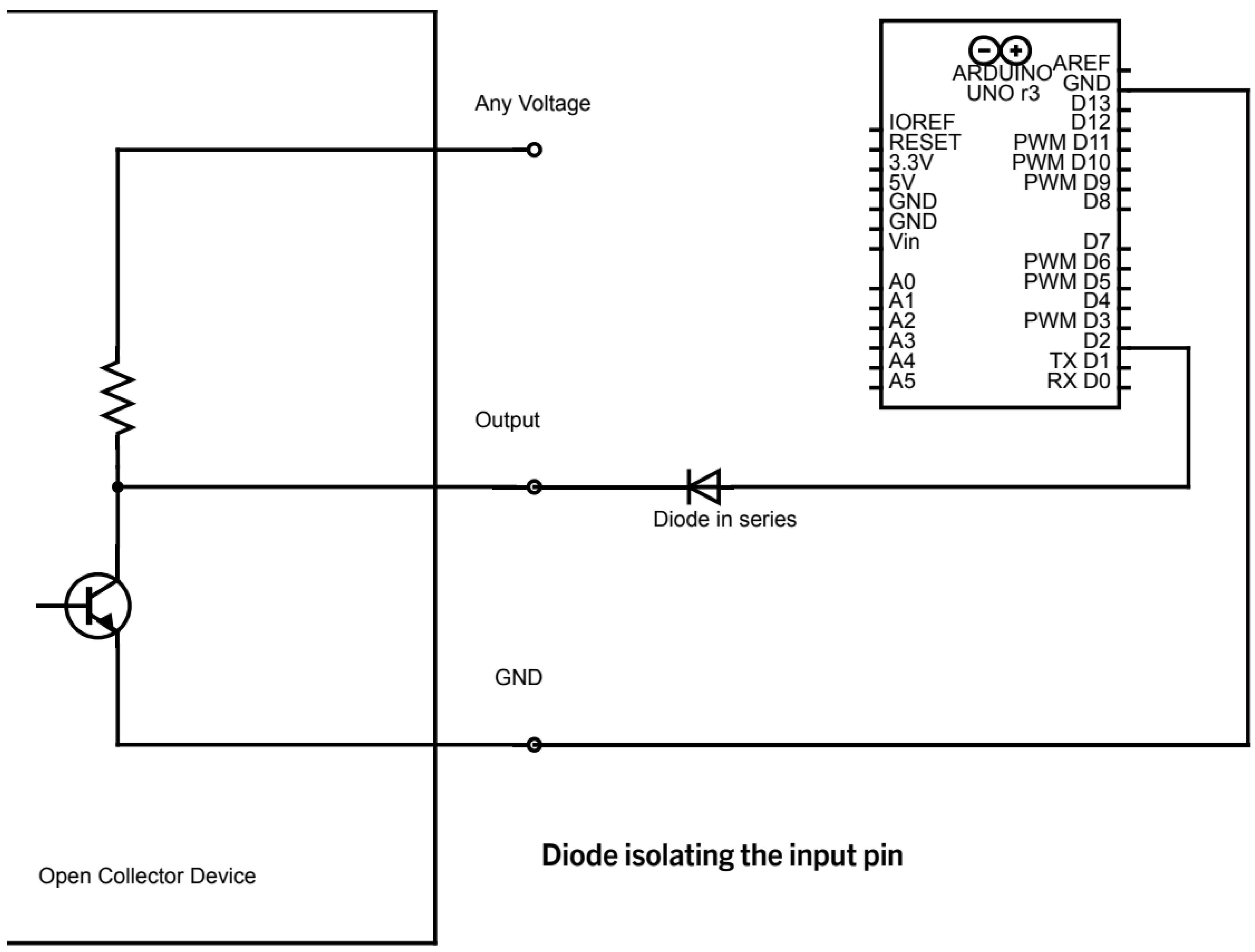
These are accessed by setting the pinMode() as INPUT_PULLUP.

By pulling the pin High (or Low) it is always in a known state and not affected by stray voltages. There is some further information here: https://docs.arduino.cc/learn/microcontrollers/digital-pins/.

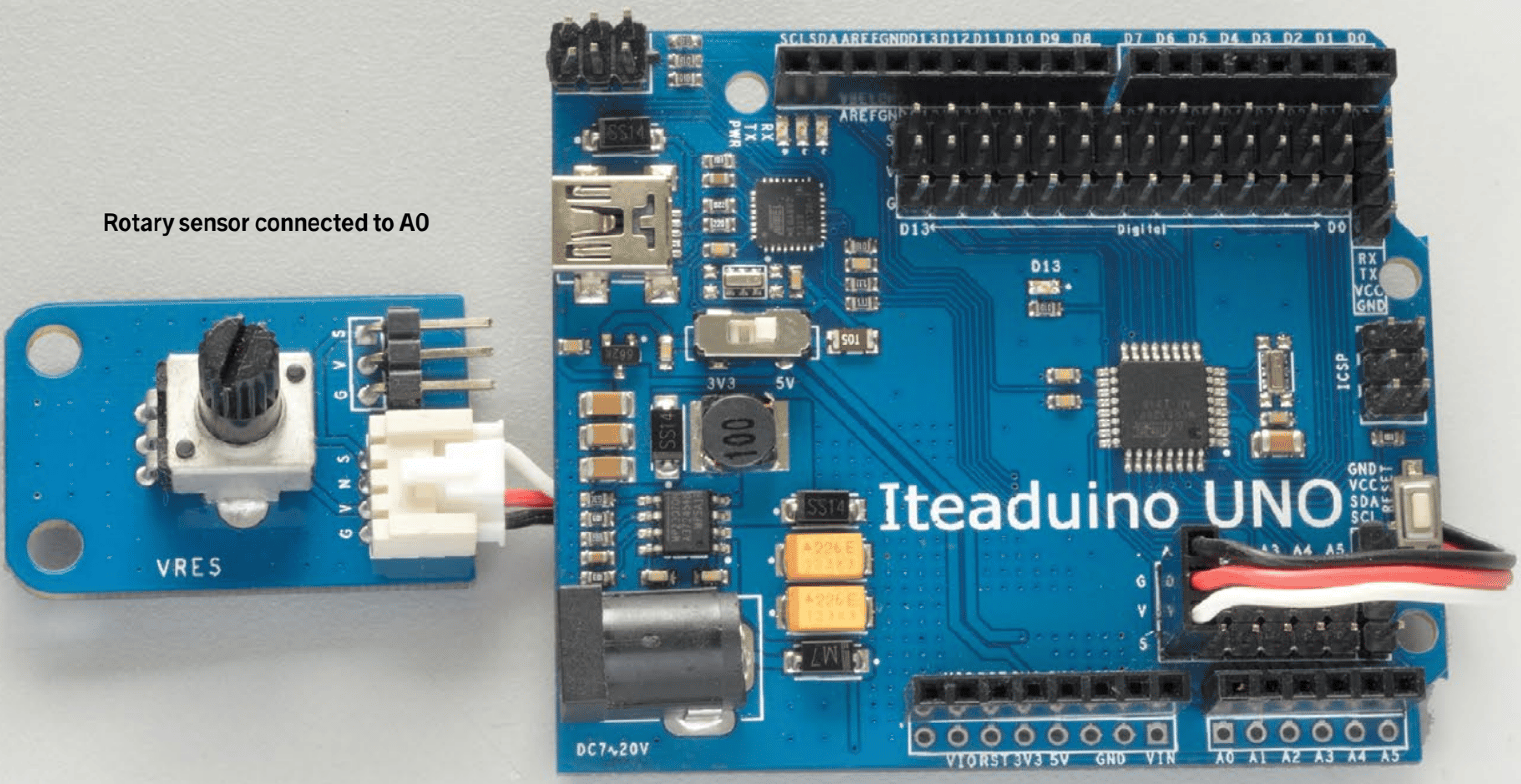
Switching to ground is called 'Active Low', and it interfaces nicely with transistors or anything that has an Open Collector (or Open Drain). I've shown a picture of a proximity sensor that has an NPN transistor output but an internal pull-up resistor to the input voltage, which is 10–30 VDC.

The basic rule of nearly every electronic IC is never to put a voltage on a pin that is higher than the supply voltage. For our UNO, that's 5V, so, if the device doing the switching uses a voltage greater than 5V, then you need to add some protection using an opto-coupler or a diode.

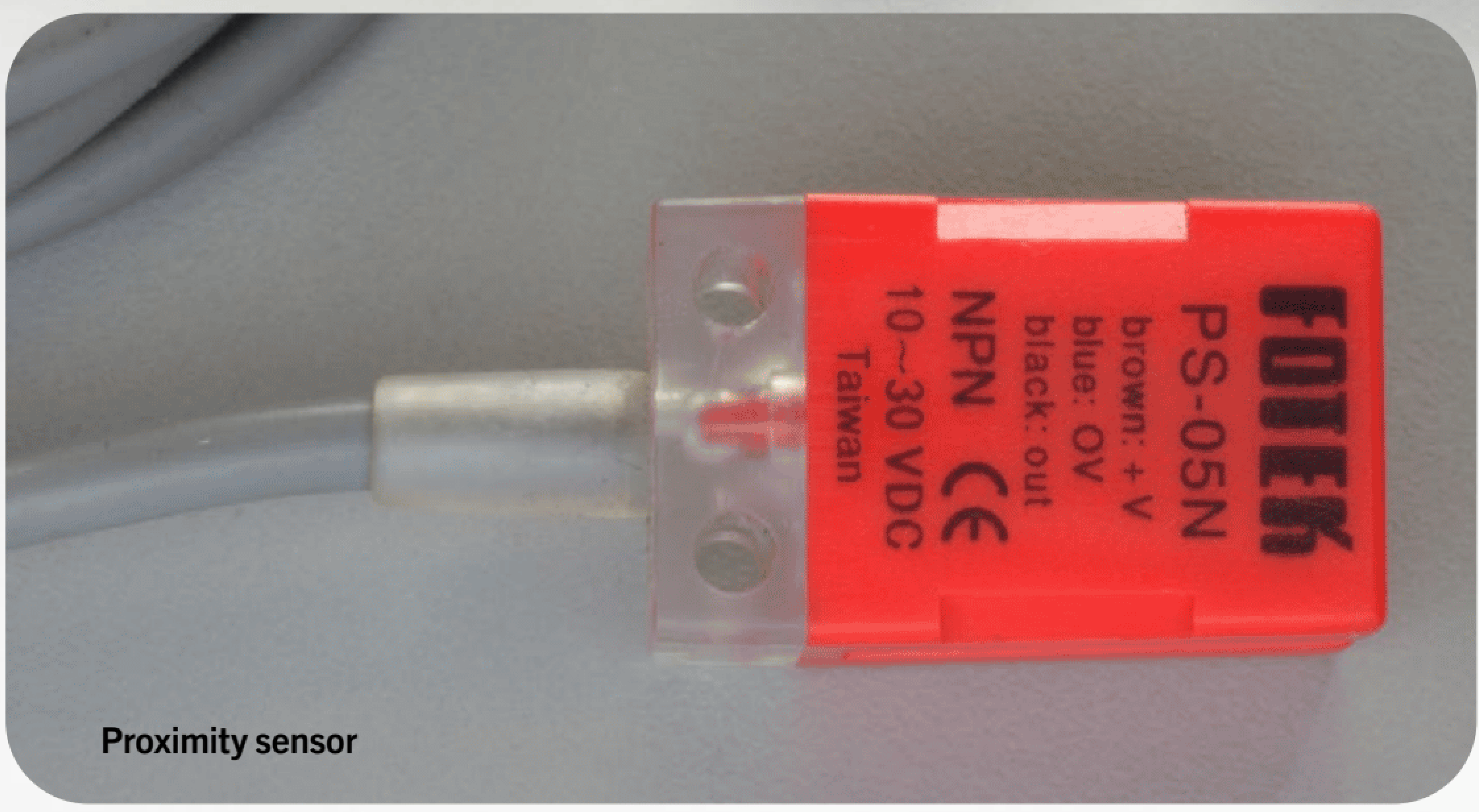
One other advantage of switching a ground (rather than 5V) is that, if your interconnecting wire becomes shorted, it is not likely to drag the 5V line down and is unlikely to cause any damage or melting of the wiring. ▶




**Diode isolating the input pin**



Rotary sensor connected to A0



Proximity sensor

## Analogue inputs

The analogue inputs can be treated as digital input or output pins, but they can measure a voltage between 0 and 5V.

The value provided is not in volts but a value from 0 to 1023. For those interested in maths, it is 10-bit resolution and, if you're using 5V, each step is 4.882mV.

The Arduino built-in example uses the analogue sensor to change the speed of flashing and, apart from rotating a knob to set a value or change the brightness of an LED/light, I've used an analogue input to decide which of seven push-buttons was pressed using only two wires.

I've provided a sketch you can download but the principle is that a series of 2k2 ohm resistors has a push-button between each junction and ground. The analogue pin has its internal pull-up set pinMode(A0, INPUT_PULLUP); and, when you press a button, the resulting voltage is read by the analogue pin. The value is compared to a list that corresponds with a button number.

In the example, I got values 14, 75, 128, 175, 217, and 255, and, as you can see, more resistors and buttons could be added before reaching 1023.

I ran the example to get the values shown, and applied an error amount of plus or minus 10 to ensure that it still worked with any hardware or voltage differences. If you check the internet, you'll find that there is disagreement between coders regarding whether a PULLUP is available for the analogue pins when you do an AnalogRead (despite the ATmega328 documentation confirming it). It worked in my application, but I did note it wasn't 0–1023.

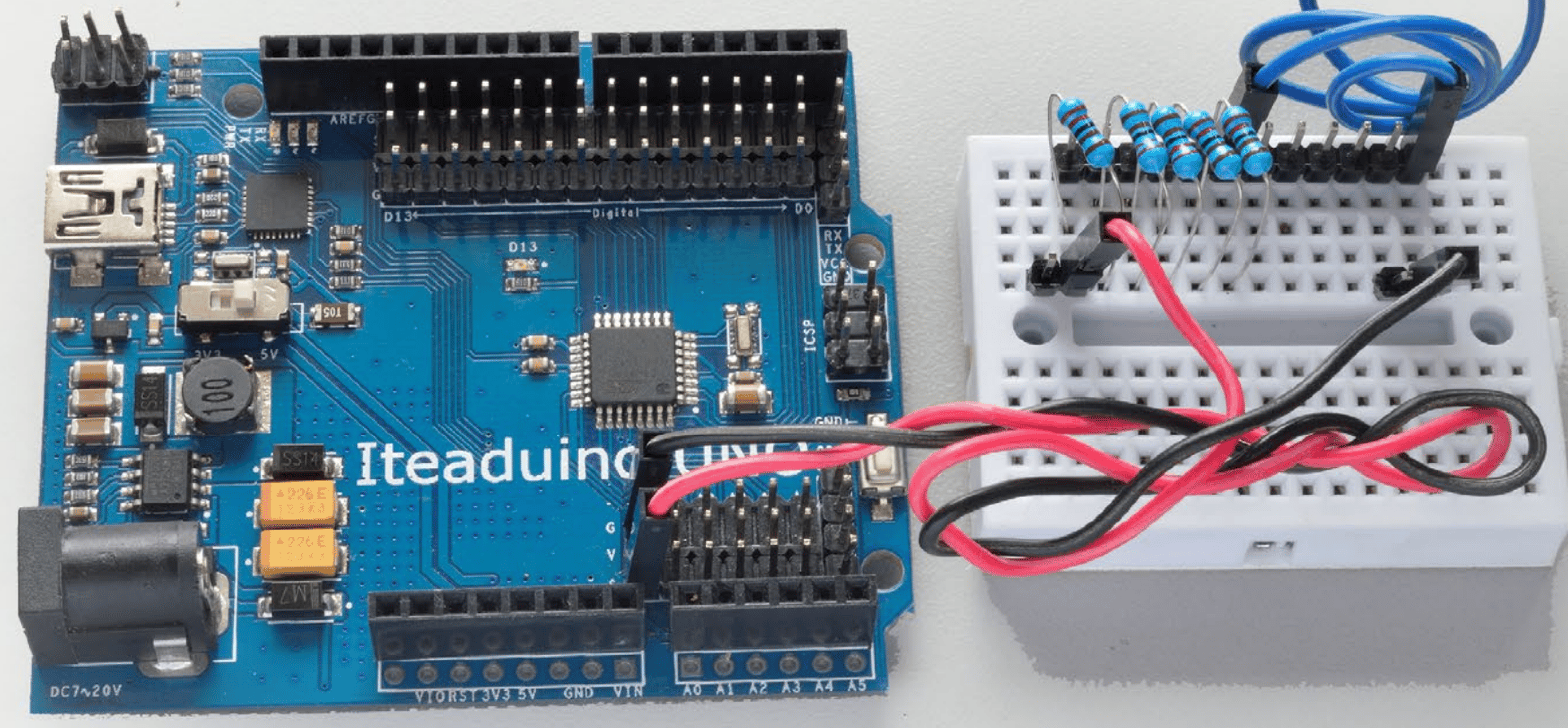
In the next article, in Issue No. 119, I'll demonstrate using an analogue input to vary the LED brightness, and point out a few features of LEDs when trying this.

## Multiple input changes

For some applications, you want to detect any change over multiple inputs at the same time. Arduino has split pins 0–7 onto port D and pins 8–13 onto port B. Digital D14–D19 (A0–A5) are on port C, with each pin represented by a bit. (The pinout diagram shows these in yellow.) You can use 'bit masking' to select the ones you want and ignore others, but bit masking is confusing unless you understand the principle.

I tried to find a decent explanation or analogy for bit masking and failed, so my analogy is: imagine you have a building with eight windows. There are people standing behind every second window (01010101), but, with all the blinds down (00000000), you can't detect what's behind the windows. If we were only worried about the middle four windows, we could apply a mask (00111100), which lifts the blinds for those four windows. The end result would be: can't tell on

Using analogue pin to detect switches




the first two or last two but we can see that windows four and six have someone (00010100). There is a whole page on bit manipulation at https://docs.arduino.cc/learn/programming/bit-math/.

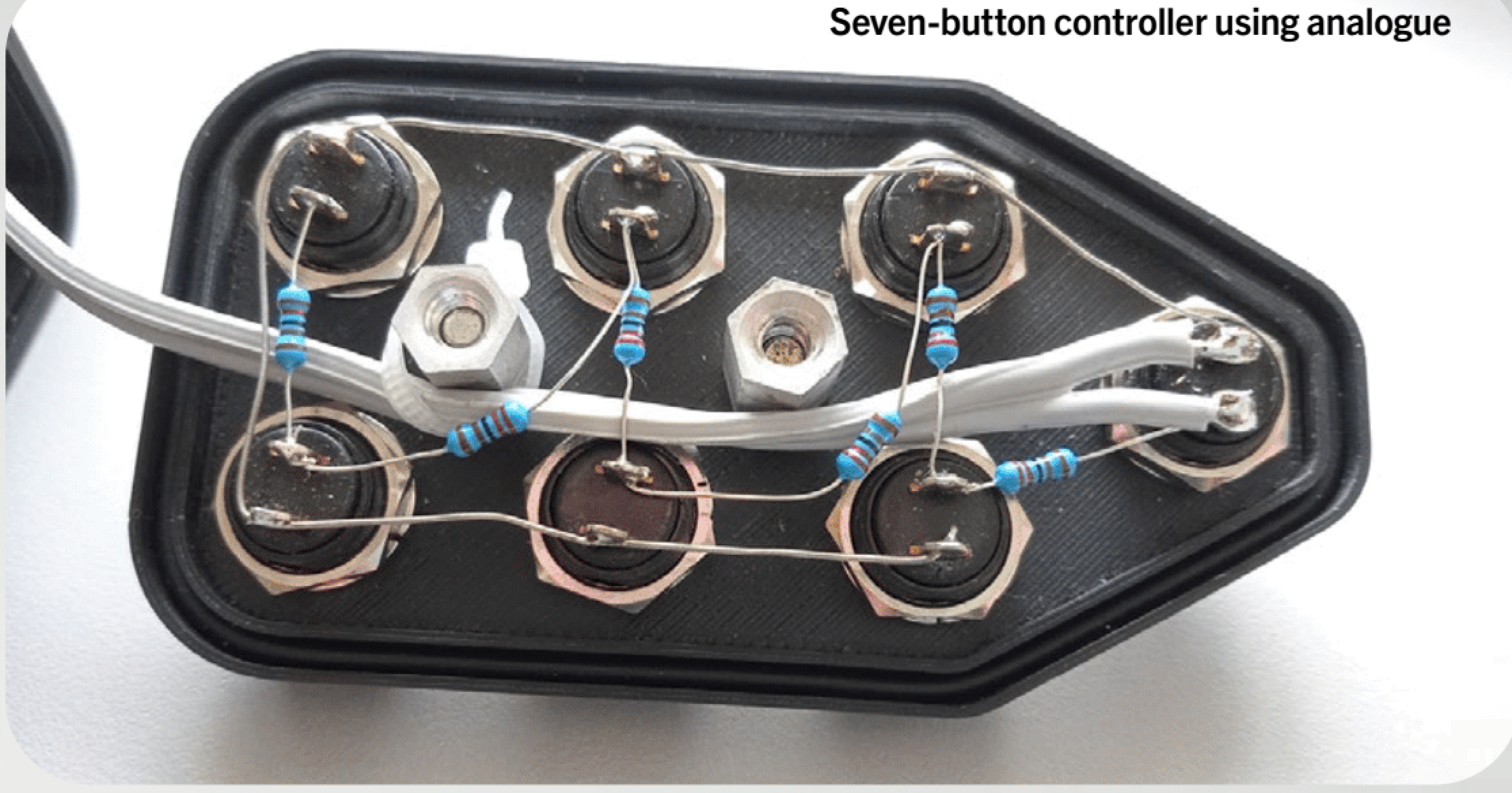
Just remember that, unlike my analogy, we're talking about a binary number, so the lowest is on the right with the highest on the left. Try it on your calculator in programming mode. I don't intend to provide an example sketch, but I have used port reading to detect whether any of eight inputs change, so it can be very useful.

Using port reading is faster than reading each pin and can save code space, but in the previous article, we said that the Arduino can detect a change in 4.9 microseconds (µs), and theoretically we can read all 11 digital inputs in 53.9µS.

If we wanted to read each input in turn, there are at least two methods. One is simply to code it in a loop, while another is to put them in an array. I've provided a sketch demonstrating each method.

Port reading and the array method use the pin number rather than the variable name so they are 'hard coded', but the array version means they don't need to be contiguous.

Seven-button controller using analogue



## Interrupts

Most microcontrollers have the ability to set an 'interrupt' on one or more pins. These can be triggered with a change, High or Low, and it allows your code to run without you constantly having to monitor an input.

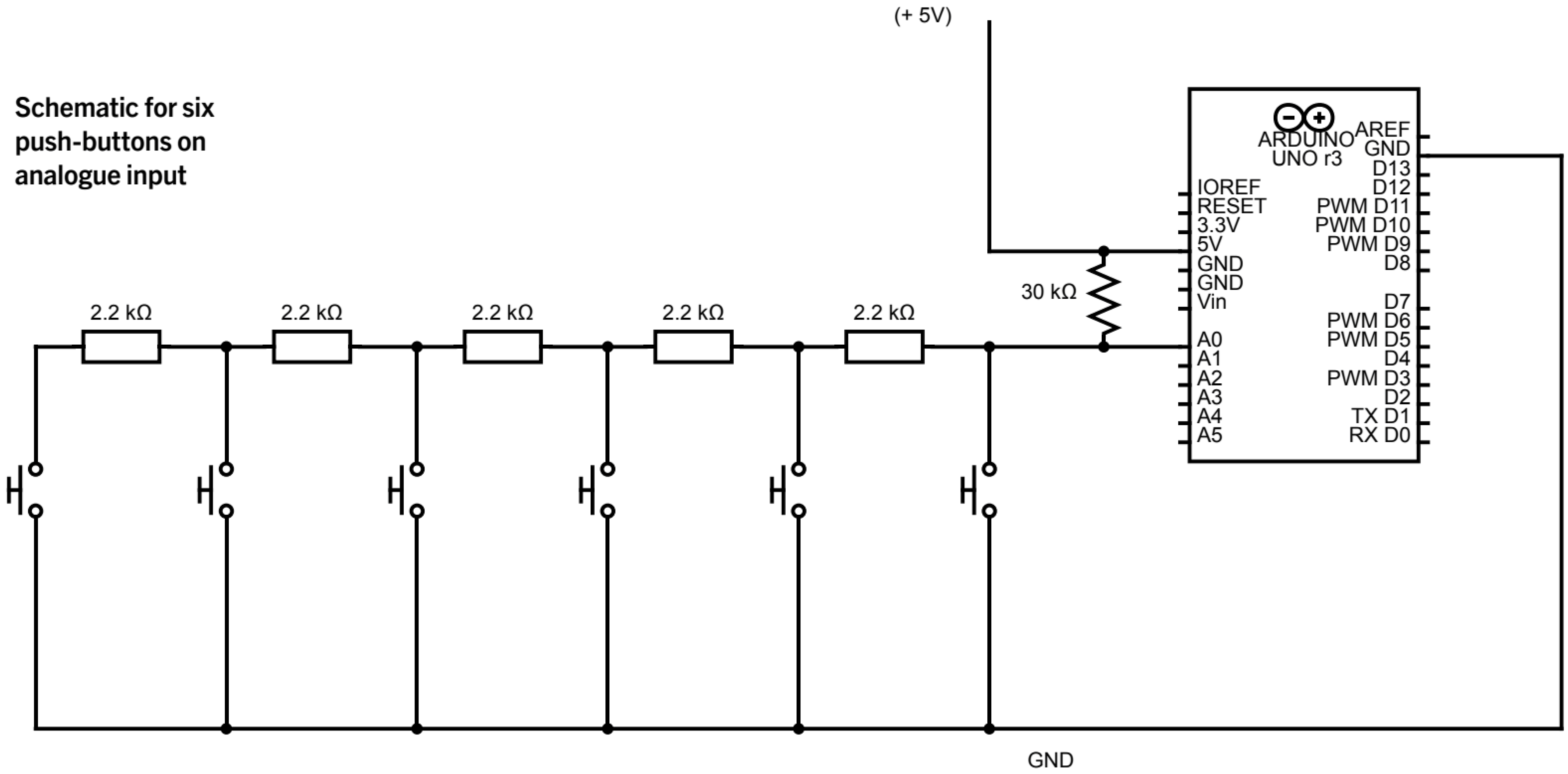
Think of an 'interrupt' as someone tapping you on the shoulder to give you an important message while you're deep in conversation with others. While the tap on the shoulder signifies that there is a message, you still need to find out what the message is. This is referred to as 'interrupt service routine' (ISR), and when you start dealing with which input (or inputs) changed state, the coding becomes important. A simple output change will be quick but some other options may introduce a delay.

Arduino UNO has only two interrupts, pins 2 and 3, and there are some dos and don'ts you need to be aware of regarding the ISR code.

See gammon.com.au/interrupts for information.

## What is an 'array'?

Arrays seem to cause untold confusion, and I suspect it is because people forget that we use one nearly every day of our lives – a calendar can be considered an array. ▶




**Schematic for six push-buttons on analogue input**

Each month uses the name or a number to represent it – for example, June is the sixth month and there are 12 months total.

If we were to code that, it would look like this:

```
String Month [12] = {"January",
"February", "March", "April",
"May", "June", "July", "August",
"September", "October",
"November", "December"};
void setup ()
{
 Serial.begin (115200);
 Serial.println ();

 for (int i = 0; i < 12; i++)
 Serial.println (Month [i]);
 Serial.println ();
 Serial.println (Month [6]);

 } // end of setup
void loop ()
 {

 } // end of loop
```

As with all programming, the counting starts at 0 (zero) – hence the print for the line Serial.println (month [6]); will be July.

An 'array' is a series of numbers or strings that can be accessed by parts of your code. They can have the number set or, if it's left blank, the compiler will fill it. IE String Month [12] …. and String Month [ ] …. Both compile correctly.

To access the information, your code provides the number where that data is – that is, the sixth month is June. Serial.println (Month [5]); would point us to June (remember we start at zero). Try the sketch provided.

In the six-button sketch, I used an array to store the analogue value corresponding to a button number.

When the analogue pin value was read, the code stepped through the array to find a match and sent the step value as the button number back to the rest of the code. const int ButtonValue[6] = {14, 75, 128, 175, 217, 255 }; // AnalogRead values based on 2k2 resistors.

Arrays can be very powerful, and even our calendar example can have multiple dimensions. Each month has a number of days. For example: what day is the third day of the third month? (3 March was a Sunday in 2024.)

## Which input do I use?

Obviously, you can use any of the inputs to detect a change of state. The problem is when you need to provide an output. Referring to the pinout diagram, we can see that the UNO has six pins that can do PWM, so, if your code includes that functionality, you'll need to avoid those pins.

I usually start by working out what functions I need to use (I2C, PWM, or SPI), which takes those pins away. I then work out how many inputs and outputs I need and juggle the position to suit.

It helps to be consistent so that you can easily cut and paste code, and I find it useful to list them as a note in the upper section (see sketches). It also means that anyone using the sketch can see what goes where.

I hope this has provided some insight into another aspect of the Arduino and makes it slightly less confusing when trying to write a sketch or working out why someone else did it this way.

> "Arrays can be very powerful, and even our calendar example can have multiple dimensions"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# A BRACE OF CANNONS

**Neville Watkinson's project – to build a pair of one-fifth-scale replica cannons and gun carriages – involved not only creating his own blueprints but also delving into the history of 18th-century armament manufacture**

By Ritchie Wilson | Photographs: Ritchie Wilson | Diagrams: NSW

The brace of cannons guarding the Old Stone House in Cashmere, Christchurch

A generation ago, in cities in the south of New Zealand's South Island, very large Edwardian houses, formerly home to bank managers or successful doctors, fell out of favour. Today, they are B & Bs run by childless couples escaping Auckland or, in Dunedin, highly sought after student flats.

However, for a short period, they were within the financial reach of folk who weren't especially highly paid. When he was first married, Neville Watkinson and his wife owned such a house, a mansion really, with several very large reception rooms, window and door furniture imported from the US, and a truly imposing front entrance: wide, curving steps led to a deep porch and a tall and broad door flanked by stained glass panels.

## Quite an entrance

By chance, Neville saw an American magazine whose cover illustration was of just such an entranceway, except that a ship's cannon was positioned either side of the doorway. An article inside the magazine explained how the imitation guns and their carriages could be made in wood.

Neville sketched the diagrams in the magazine and took the drawings with him as he moved, first to Auckland and then to Christchurch. He owned a couple of businesses along the way, the last a woodworking concern with a very large Calpe-brand industrial wood lathe, made in Spain. The time had obviously come, after only several decades, for him to make the cannons.

## Researching plans

Unfortunately, Neville couldn't remember the name of the magazine, although he was certain it was from the 1980s.

After fruitlessly searching for the cover online, Neville decided to make detailed plans of the guns himself, loosely based on the surviving sketches and using the computer drawing program that he used in his business. He was greatly assisted in this by fortuitously coming across a reprint of *A Treatise of Mathematical Instruments*, third edition (originally published in 1775), by John Robertson (1712–1776), who at that time was librarian to the prestigious Royal Society in London.

The treatise contained an appendix on ship guns, with comprehensive information on the various types of ship's cannons used by the British Navy circa 1750 and the construction of the wooden carriages on which the guns sat. While working in a previous position at the Royal Naval Academy in Portsmouth, Robertson had gained permission to measure the Royal Navy cannons passing through Portsmouth Harbour's gun wharf.

## Past knowledge

Neville had some knowledge of ship's guns, because he had made several model man-of-war ships, including Lord Nelson's


The metal components of the carriages and the jigs used to make them. John Robertson's book is also pictured

> "After fruitlessly searching for the cover online, Neville decided to make detailed plans of the guns himself"

The wooden components of a carriage. Neville's booklet on the design of cannons and carriages is also pictured

*Victory*. What immediately struck him was the differences between Robertson's measured drawings and the scale cannons available to model-makers.

Neville was sufficiently motivated to correct modern misconceptions, particularly about the construction of the gun carriages, by writing a technical paper – *The 24-Pounder Ship's Gun* – on the subject, which is available online at milfordboats.com.

## Construction

The actual cannons were made from eight pieces of European beech glued together. The core was three pre-drilled square blocks, 50x50x200mm, glued end to end so that a full-length bore could be obtained.

Neville felt that drilling the bore after the cannon had been made was fraught with difficulties. The core was cased in thin planks glued to its four sides. His business made wooden rolling pins for commercial kitchens, using the Calpe lathe, which had a hydraulic copying mechanism that produced a three-dimensional version of a flat pattern.

Once the pattern was made according to the dimensions set out in John Robertson's book, the large, capable machine turned the laminated blanks into the model cannons in short order. While still on the lathe, they were finely sanded and stained black.

## Resistant to stain

The closed-grained beech timber was reluctant to take the stain and was ultimately finished with varnish containing black earth pigment. Multiple layers of varnish were burnished between coats with a nylon pad. The final coat was Black Bison Paste Wax ("good stuff", says Neville).

Finishing is something that Neville takes really seriously. The aim was to give the appearance of cast iron that had been rubbed, like the original guns, with beef fat. The fat was known on board the ship as 'slush', and was produced during the roasting of beef in the galley. Traditionally, half the slush went to the ship to be used on the cannons and their carriages' metalwork; the other half went to the cook, who would sell it. The cash generated by selling the slush was known as the 'slush fund'. Today, a 'slush fund' is a source of off-the-books money used for illicit purposes such as bribing politicians.

"The cash generated by selling the slush was known as the 'slush fund'"


One of Neville's favourite finishes: "good stuff"

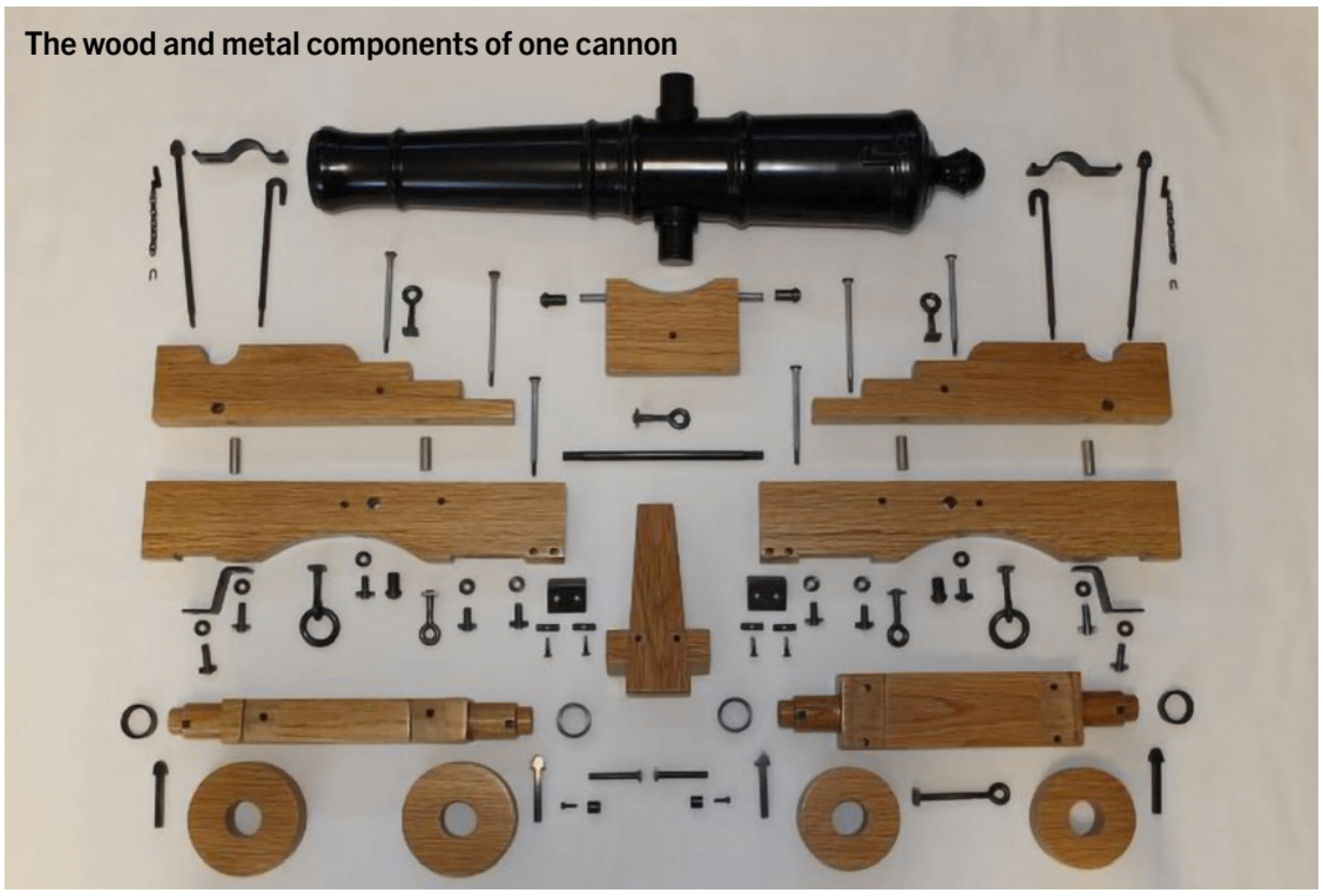

Pigment used to colour the wood finish

## No original survivors

The carriage design was also based on Robertson's 1775 book; Neville is unaware of any gun carriages that have survived from the 18th century. The carriage that supports the cannon from Captain James Cook's *Endeavour*, on display in Te Papa, is a modern recreation, made in Australia by the Department of Shipping and Transport in 1970, and differs in detail from those described by John Robertson. Lord Nelson's *Victory*, on display in Portsmouth in the UK, has some original guns but most are fibreglass reproductions. All of *Victory*'s gun carriages are reproductions – and that is what the Te Papa carriage is based on. The prototypes of these reproductions may well have been guns from the famous flagship, but they were probably much younger than the ship, as the guns were removed during each of *Victory*'s several refits. The ones subsequently reinstalled may well have been more modern. The carriage in Te Papa is a modern recreation of a much more recent design, so is not correct for the cannon it supports.

## Accuracy is difficult

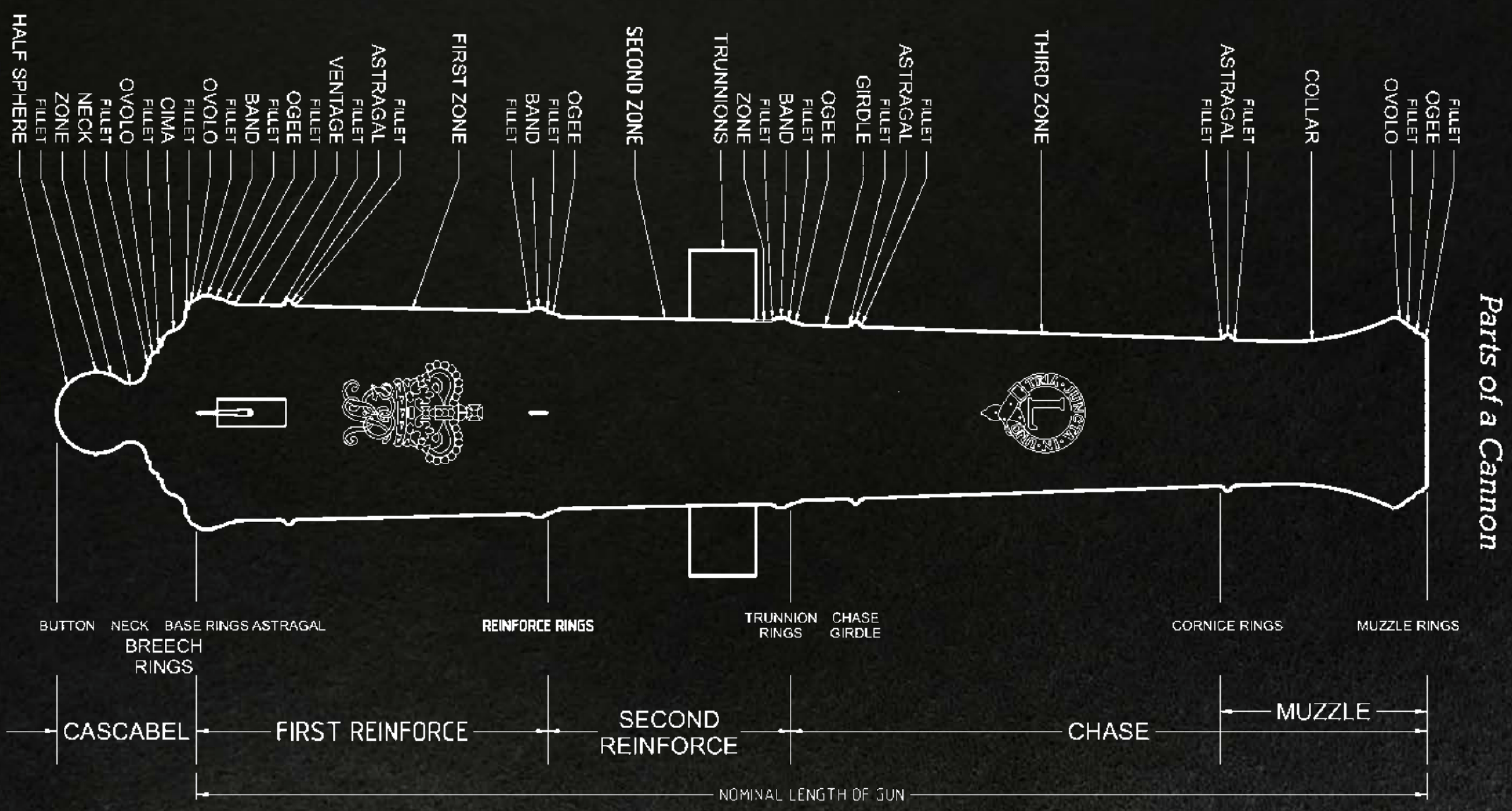
The lack of originals from the middle of the 18th century means that some aspects of the carriage's construction are uncertain. Were the holes, through which the fastenings passed to hold the carriages together, round or square? An argument could be made for either. Square holes in the miniature versions that Neville was making would have been challenging to make, so all the holes are drilled – they are round. ▶


The wood and metal components of one cannon


Neville Watkinson in his workshop. Note that the cannon still has some waste wood attached


Assembling a carriage


Trial fitting of the cannon to the carriage's brackets



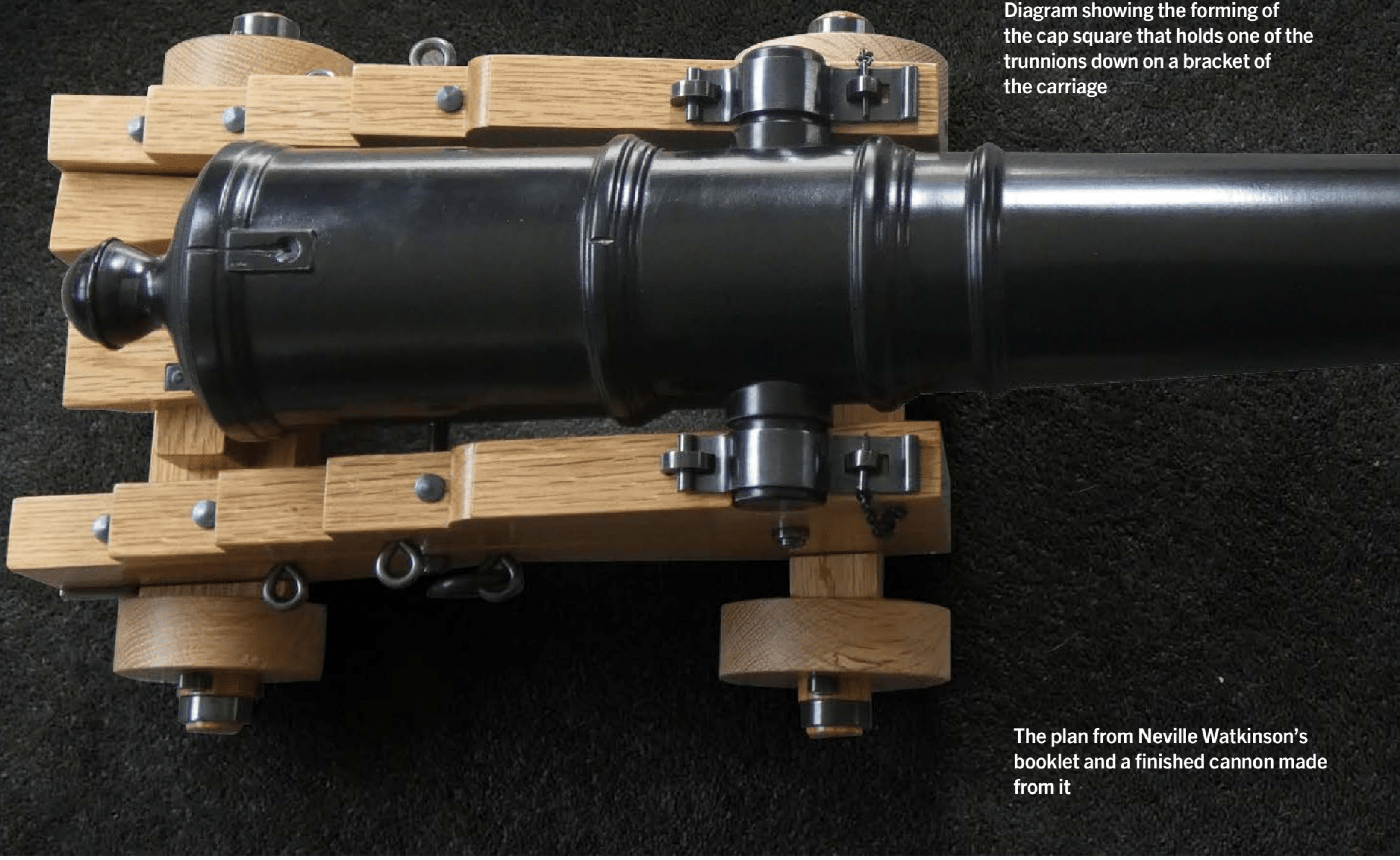



**Diagram showing the forming of the cap square that holds one of the trunnions down on a bracket of the carriage**

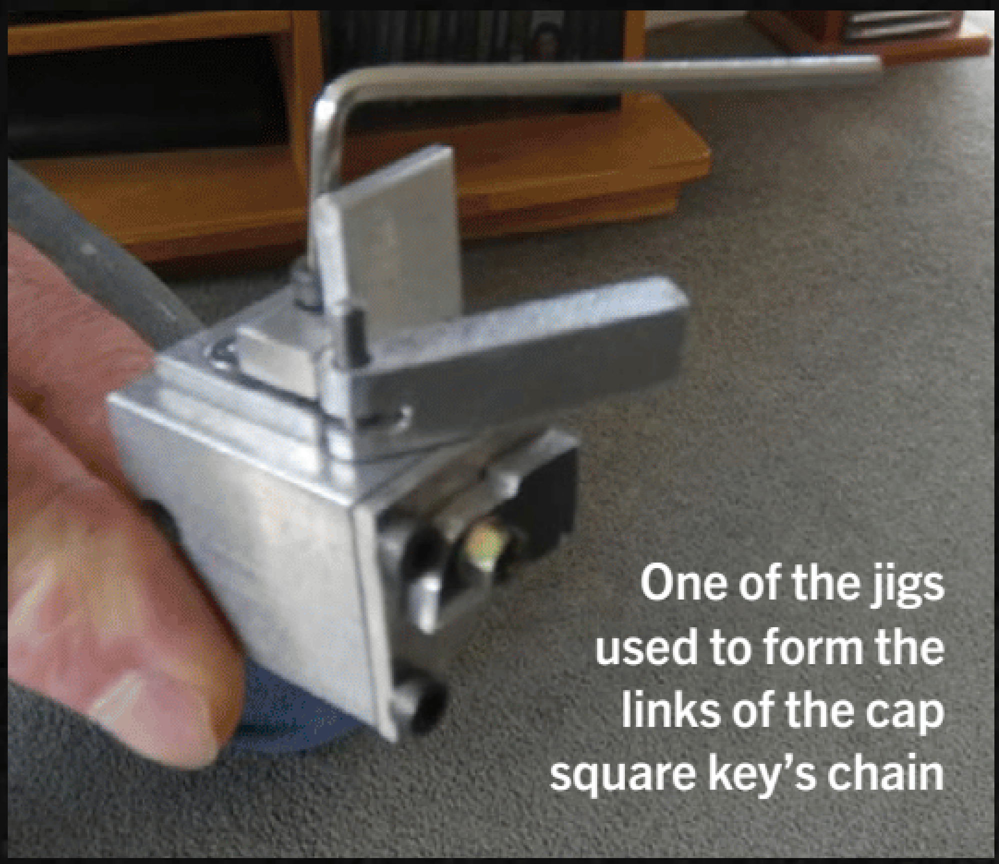
**The plan from Neville Watkinson's booklet and a finished cannon made from it**

The fastenings on the original carriages would have been rivets, with one end preformed and the other hammered over a washer while in place to form the fastening. Again, riveting would be difficult on a relatively fragile scale model, so Neville has used threaded fasteners, made to look like rivets.

Which raises the question: why weren't nuts and bolts used on gun carriages in 1750? The surprising answer is that they didn't have them in 1750. Threads in wood date back to antiquity, but they were very uncommon in metal until the development of the screw-cutting lathe in about 1780.

## Woodwork

The white oak used in the wooden parts of the gun carriages was prepared in Neville's business: dimensioned, drilled, and sanded. The oak is noticeably open-grained, so Neville applied multiple coats of thinned epoxy then used a hand scraper to remove most of the polymer once it had hardened, leaving



One of the jigs used to form the links of the cap square key's chain

The brace of one-fifth-scale guns

"Making all the very numerous metal parts of the carriage to precise scale dimensions was challenging and very time-consuming"

A homemade collet used to hold circular components

a smooth surface. Then he used a progressively finer abrasive pad, going from red to green and finishing with grey – equivalent to 000 steel wool – to get the smoothest surface possible on the wood.

He then applied Woodoc Polywax finish – made in South Africa – with cloth pads. He made these in batches of 20 or so from 200x150mm squares of 100 per cent cotton cloth, which he folded into pads about 100x40mm, held together by masking tape at one end. Wearing disposable gloves, he dipped a pad into the Woodoc and then wiped the finish over the wood's surface. The pads were only used once.

If applications of Polywax are repeated within a few hours, it isn't necessary to sand between coats. However, Neville rubbed down the finish with the grey nylon abrasive pad after every three coats. In all, 20 coats were applied, giving an appearance that Neville is very happy with.

## Metalwork

The cannon's carriage has a lot of metal parts. The sides of the carriages, called 'brackets' or 'cheeks', are made of two wooden pieces held together with steel fastenings made to look like small versions of the long rivets used on full-size carriages.

The metalwork on the carriages of naval cannons was also protected with slush. On Neville's cannons, the metal parts are 'blued'. This is a method of protecting steel from rusting by forming a layer of magnetite on its surface.

Magnetite is a black mineral and, when oiled, is moderately protective against rusting. It has a formula of $Fe_3O_4$, while rust is an association of $Fe_2O_3$ and water.

Rust doesn't protect steel at all against further corrosion because it is permeable by water. The water easily gets through the rust layer and converts the iron in the steel to more rust, until the steel is completely rusted away. It is more difficult for water to get through magnetite, so rust doesn't form as quickly and therefore the steel lasts much longer. Traditionally, bluing required the metal parts to be heated, but modern cold-bluing solutions – of which there are a considerable number – work without heating.

## The trunnions

The 'trunnions' are projecting gudgeons on each side of a cannon, on which it pivots. In a battle, the cannon would be aimed by moving the carriage with block and tackles and changing the elevation of the barrel – the trunnions being the fulcrum – by using wedges. Neville's cannons' trunnions are cylindrical wooden cylinders glued into holes drilled on each side of the barrels and finished in the same way as the barrel.

In the mid 18th century, the placement of the trunnions on the cannon varied a bit. Neville has located his along the centreline of the barrel, where real ones were positioned for a decade or so, this being slightly simpler than off-setting them. The trunnions form the connection between the barrel and the carriage, and are held in place by metal plates called 'cap squares' – even though they are rectangular. These are bent in a half-circle to capture the trunnions, which sit in a semi-circular cavity (called the 'trunnion hole') on the top edge of the bracket. ▶

Neville Watkinson: happy to have seen a very long project through to completion

## Fastenings

The cap square is held at one end by the curved top of a square-sectioned fastening, which passes down through the bracket, its bottom end being retained by a rectangular pin, called a 'bolt key'. The other end of the cap square is held by another long fastening, the 'eyebolt', whose head passes through a rectangular hole in the cap square. A wedge, called the 'cap square key', fitted through a hole (the 'eye') in the eyebolt's head, holds the cap square securely down on the trunnion.

When a ship's gun was in action, the cap square must have had to be removed (perhaps to allow the barrel to be elevated or depressed), because the cap square key has a chain joining it to the bracket so that it doesn't get lost in the heat of the battle.

Making all the very numerous metal parts of the carriage to precise scale dimensions was challenging and very time-consuming. For example, making the cap square key's chain to the correct dimensions was an exacting process. The links had to be the correct length, the wire used had to be the precise diameter, and the material had to be able to be finished in the same way as the rest of the metal parts. The finished chain also had to look right. Neville's solution was to make two jigs, firstly to cut the material to the very precise length and secondly to bend the cut sections exactly in the shape of a chain link.

## Jigs required for precision

The first jig was a steel block, exactly the same length as the required sections of wire, with a 1.5mm hole drilled through it and with a grub screw on one side to hold the wire securely.

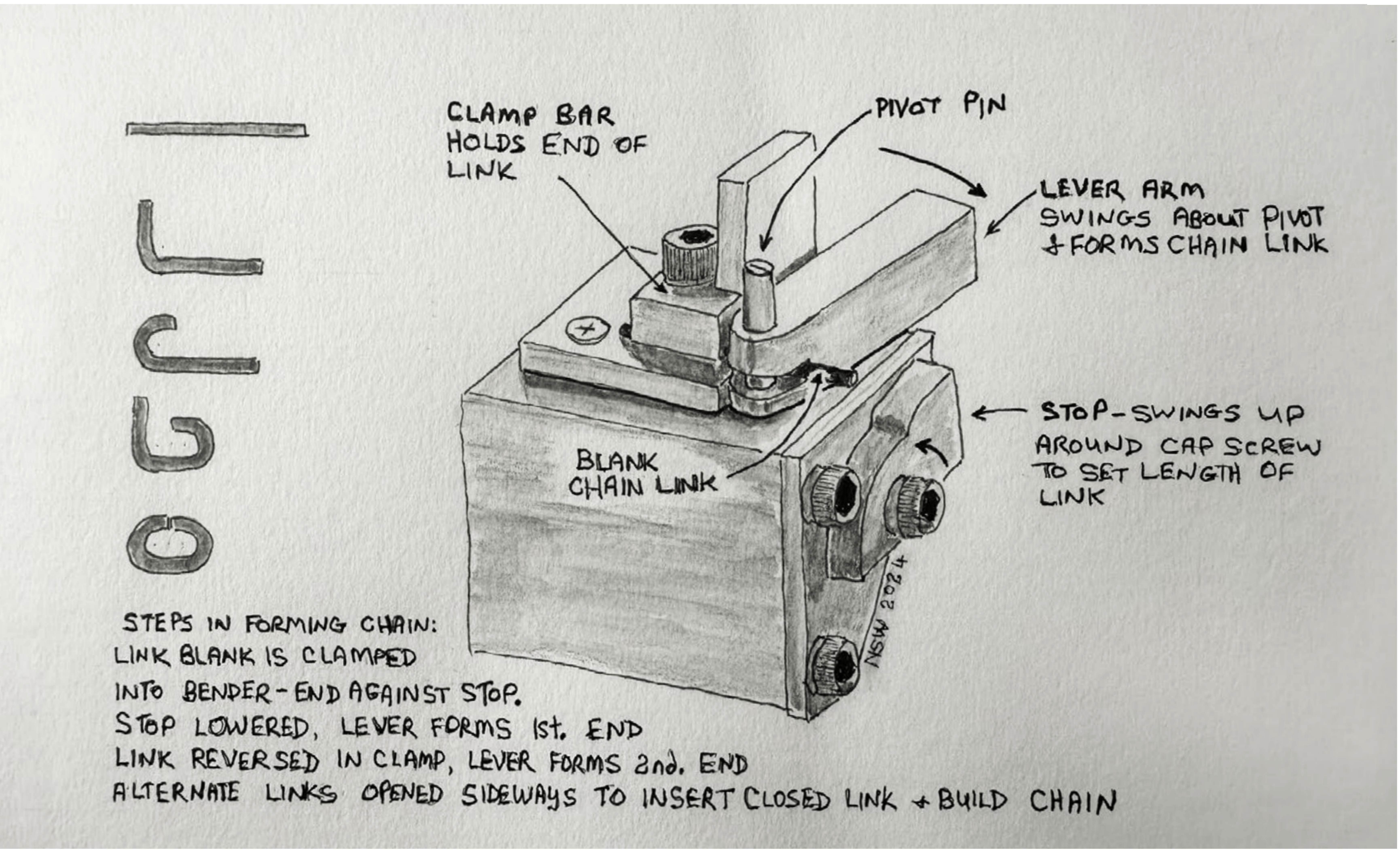
The 1.5mm diameter wire was first cut, slightly overlength, with side cutters. The cut piece was then clamped in place in the jig and a slightly protruding end was filed square, using the end of the jig as a guide.

The other end of the wire, which also protruded slightly, was also filed level with the jig's end. The wire piece was now the exact length required and had square ends. The second jig has two pins, around which the wire piece was snuggly bent using a lever pivoting on each pin in turn, the two ends meeting exactly to form the link. The formation of the cap square also required a jig to form its precise curvature.

## Caps and more

The full-size cap squares were 18mm in thickness, so a one-fifth-scale version would be 3mm thick. The 3mm steel plate was cut to shape using a hacksaw and files. The two square holes in each were formed using a drill and a square file. One end of the cap square is curved where it pivots under the head of the joint bolt and required a length of half-round to be braised along its edge. Neville formed the half-round sections by cutting in half rods of the correct diameter, turned to size on the lathe, again using a hacksaw. The jig used to form the curved cap square consisted of two sides, one a steel block with a convex curve of the correct diameter projecting from one side, the other with a matching concave depression, the male part fitting exactly into the female part.

The prepared pieces of metal plate were precisely positioned between the two parts of the jig, which were then crushed between the jaws of a large vice. The pressure of the vice's jaws pushed the two sides of the jig together,

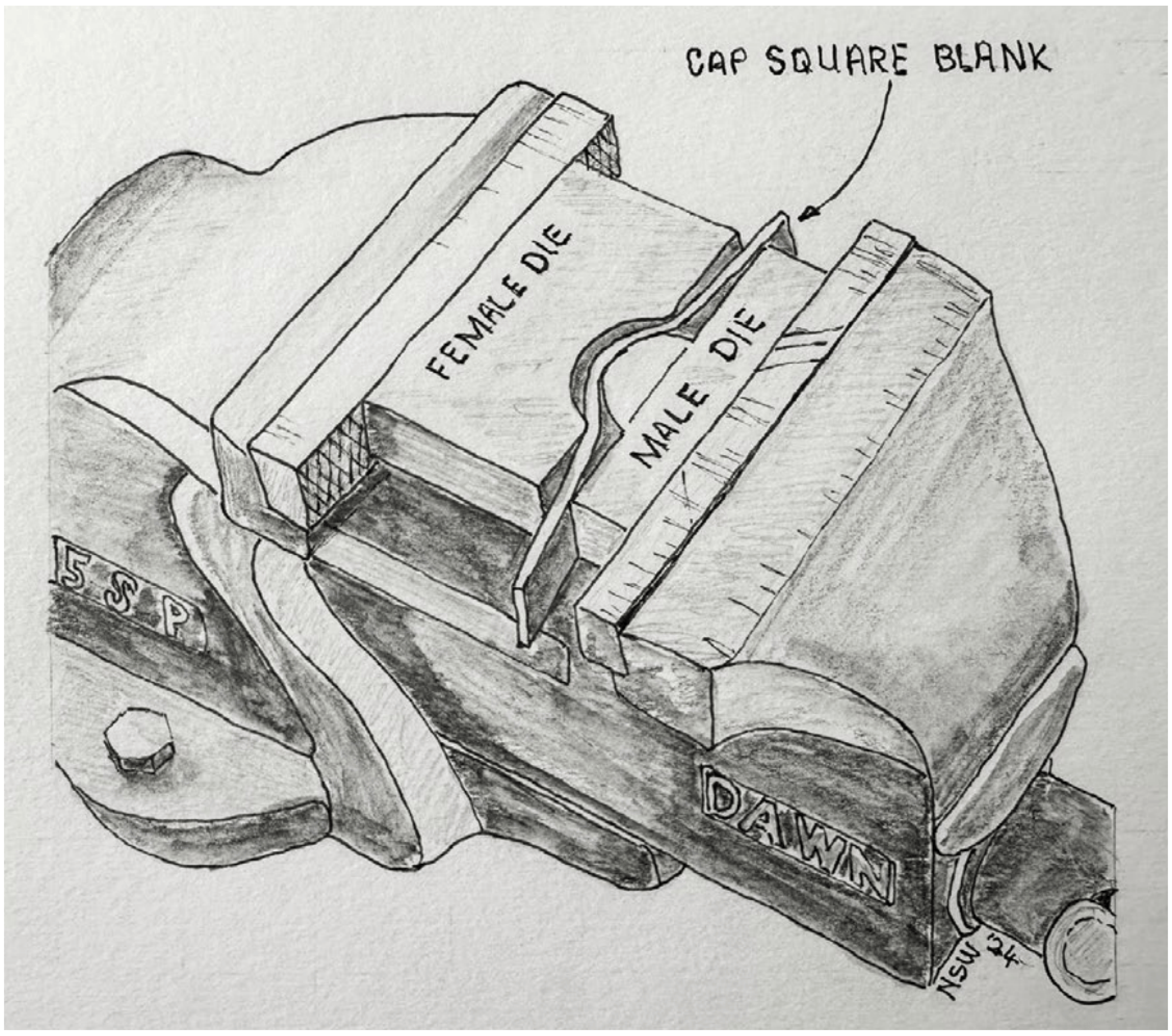



forcing the metal plate to form the required shape.

## Not quite right

Neville isn't completely happy with the scale cap squares – the 'springy' steel plate didn't retain the exact curvature of the jig when the vice's pressure was released, so the trunnions aren't held as tightly as they could be. You would have to look closely to notice, however.

The Chinese lathe has been critical in the making of the metal parts of the carriages. Neville was particularly impressed with the very good results he achieved, as a relative novice, in reducing the thickness of flat metal parts by fly cutting. He had to do this to get metal of the correct gauge to form the cap square key. He fastened a piece of 3x3mm angle to the lathe's faceplate and reduced one face by fly cutting to the required 1.5mm – the real key being 8mm thick.




## Getting parts is tricky

Some of the metal parts – steel rings and eyebolts, for example – could be expected to be easily bought in the required sizes. However, some parts that were available when Neville first began the construction of the model cannons' carriages were no longer obtainable when he came to buy more.

Some items were available in the correct sizes, but only in stainless steel – which, because it doesn't rust, doesn't react with the bluing solution, so would look incorrect.

In the end, Neville made the steel rings from round mild steel bar, which was heated to red hot and then bent around a suitably sized rod to form a spiral. The coil was then slit down one side, forming a number of circular pieces. The gap was TIG welded by an obliging neighbour to form the rings. ▶

The single-use cotton pads used to apply the Woodoc wood finish. They are numbered so that Neville can keep track of how many coats he has applied

The cotton pads are folded so that there are multiple thicknesses of cloth. Masking tape around one end holds the layers together. Neville makes the pads in large batches

## Finishing

Neville has a lot of experience in wood finishing and uses unusual methods.

He uses abrasive pads, rather than sandpaper, to prepare the wood's surface. He also uses a finer final abrasive than is usual. Perfection is his goal. He will sometimes apply a coat of finish and rub the surface with a fine abrasive pad while the finish is still liquid.

His preferred method of applying the various finishes is by cloth pads. This means that he can discard the pad after each coat and doesn't have to worry about cleaning brushes. He has a very large cache of disposable gloves, which he also discards after each use. He likes the Woodoc brand of wood finishes because it is easy to apply and has a range of compatible pigments, which give a wide range of colours.

His first step with any finish is to decant it into a number of smaller containers. This ensures that a skin doesn't form on the surface of the stored finish if it isn't all used immediately. He has worked on some large wooden projects and is very familiar with the high cost of top-quality finishes, so is most unwilling to waste any.

The guns are not only very attractive but also historically accurate

# LOOKING FORWARD AND LOOKING BACK

A taste of the past – facilitated by two timely and fortuitous recollections – helps to balance Murray's concerns about the future

By Murray Grimwood | Photographs: Murray Grimwood and via the National Library

Readers will know by now that I love nothing more than detective work. Recently I've been indulging in two such sleuthings, a happy delve reducing the frustration of a more serious one.

The happy one is a significant piece of New Zealand maritime history that fell into my lap by accident. The serious one is off-the-grid – or is that on-the-grid? – related; let's just say that it has been a yin-yang, bittersweet few weeks, causing much thought about thinking in systems and about whether we can learn from history.

## Hello, *Amokura*

I walked into the auctioneers, as I do weekly. Many ship models this time; presumably an aficionado had died, or shifted/downsized. Some were museum-quality shipyard-produced half-models, and one at least was about to sell for thousands.

A big (1.4m long), damaged, and slightly amateur model caught my eye. *Three-masted; steamship; naval; ugly-as; late 1800s?* were my thoughts as I edged closer.

The hand-printed nameplate read *Amokura*. I mentally flashed back to a sunny afternoon spent cavorting in her remains in Kenepuru Sound. A further flashback to a remembered connection with Frank Worsley (Shackleton's captain/navigator). I said to the model, sotto voce: "Forget the rest; you're a significant part of our history; you're coming home and getting restored."

## Hello, hard questions

About the same time, I attended a talk by a university researcher, ostensibly under the 'sustainable energy' label (too often, sustainability is greenwash; sustainable this, sustainable that – my definition is: long-term maintainable).

This person was on about the 'need' to

double the size of our grid, the 'need' to add offshore wind (from 'space nobody is using'; reminiscent of John Clarke's unforgettable "out past the environment" – see sidebar on the last page of this article). Business as usual (BAU) was clearly not in question. Even when questioned …

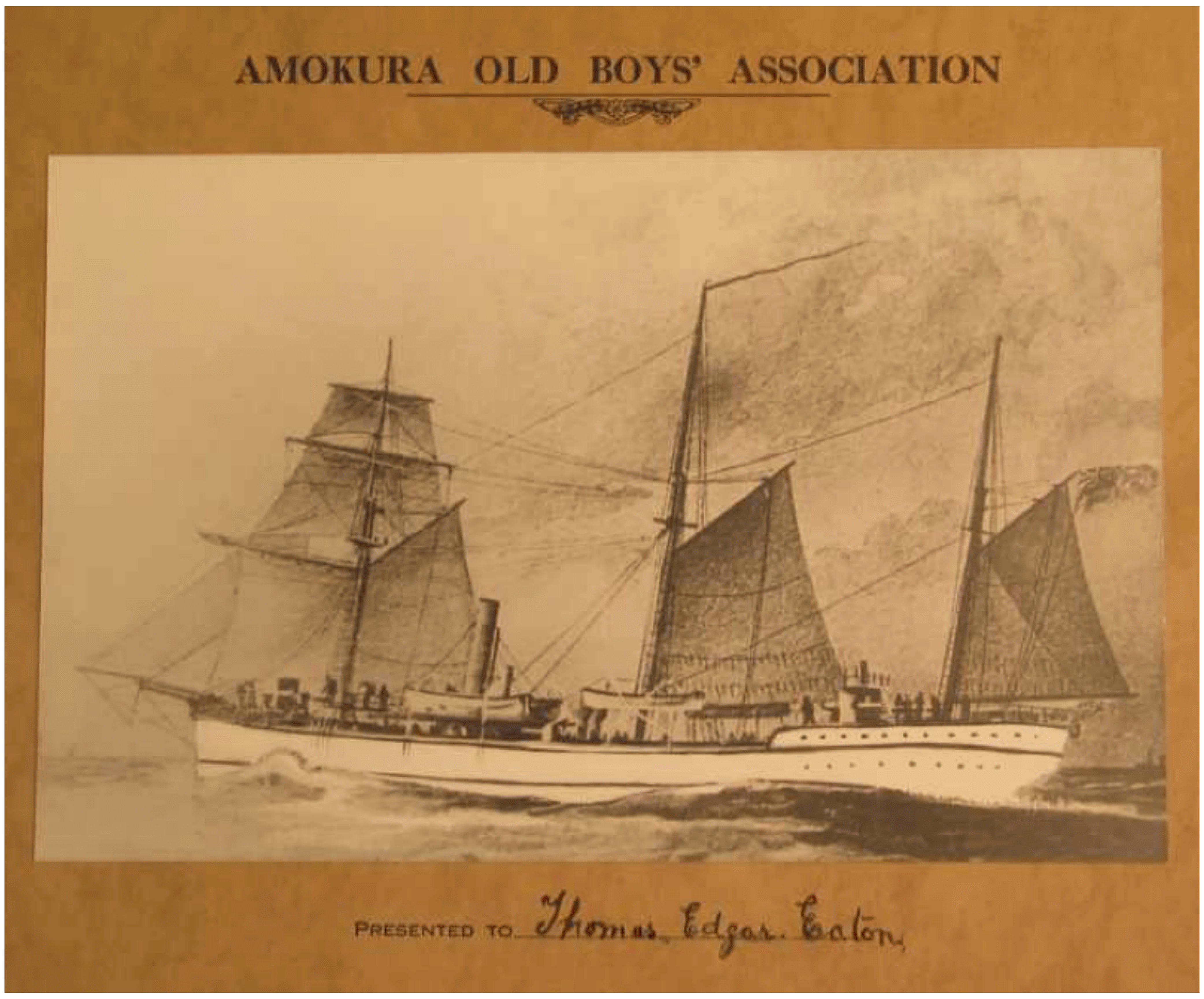
I was 'there' once; I co-chaired an outfit called 'Solar Action'; became an early adopter; championed; advocated. I believed, then, that we would end up running this society on renewable energy, and that the sooner we went there the better.

That was nearly 20 years ago. Since then, I've done enough delving into energy, and via energy into *The Limits to Growth*, to know better.

I now regard 'renewable' as 'rebuildable' – dams, windmills, photovoltaic (PV) panels, controllers, inverters, batteries, grids – and I have yet to see one producing another (a dam's power constructing a dam or PV panels producing PV panels). The surplus energy left over after the build is never questioned by these bright-eyed anthropocentrically arrogant advocates.

I now believe – know – that without fossil-energy input, much of the grid-reliant infrastructure that the researcher was assuming to be a 'given' will decay, fail, and be abandoned. It's not as if this information isn't available; I've given a talk about this very predicament, in that person's very department.

Further up the chain, it gets no better; one of that university's top science people recently opined to me that "all we need to do is plant a trillion trees".




Displacing what, where? And then what? So much for the business-model version of learning; I give that reply an 'F'.

## The happy rabbit hole

Learning about *Amokura* was – and still is – an enjoyable journey. Nobody who sailed on her is still alive, of course; photographs are few, and words are pretty scarce too. First, I reached out to the auction house to see if I could trace the history of the model via the estate executors. They misunderstood my request and closed the door, but others in the model-building arena soon gave me a name, plus the knowledge that this was a dead-end pathway (so to speak); the person didn't build the model, for sure.

Reaching out to TS Amokura – the Navy Cadets in Wellington, and presumably related – elicited a prompt, helpful, and informative reply from their Lieutenant Commander.

Search the National Library, search Victorian gunboats, search, search, search … I learned that *Amokura* was built in 1888, commissioned in 1889, initially named HMS *Sparrow*. One of nine Redbreast-class gunboats, she saw action on the coast of Africa, helping to 'quell a rebellion' among more routine flag showing. Gunboats like *Amokura* were the first to adopt steam (small


"Gunboats like *Amokura* were the first to adopt steam"

Fire drill, seen from the quarterdeck – note the bare feet. Later, the guns (upper, left of centre) were removed

happens before big) and the last to leave sail (they didn't need to be fast and couldn't carry much coal).

It was decommissioned in Sydney in 1905, bought by the New Zealand Government, and Frank Worsley – later famous as Shackleton's *Endurance* captain and as his companion and navigator during the epic voyage of the *James Caird* – was her early captain. She became a cadet training ship the following year, and remained so until being decommissioned – again – in 1921 (one suspects war-weariness and debt were factors in that decision). Some 527 youngsters of between 12 and 16 years old voyaged annually as far as the Auckland Islands and the Kermadecs, checking for castaways and replenishing shelters.


By 1919, the wheels have a protective wall (seen between upper-right boys' shoulders)

## Mate in sail

One Temuka-born cadet – a capable wordsmith named James Gaby – left an account of life on *Amokura* in his book *Mate in Sail* (Antipodean Publishers, 1974). Luckily, I found a copy in a Wellington bookshop for $8, postage $6 – a bargain.

His tale of a 16-year-old and two 15-year-olds wrestling with the twin steering wheels (non–worm drive, so directly susceptible to rudder kickbacks and without the footbrake with which some later full-rigged ships were equipped) in a Southern Ocean gale echoes poignantly down the years. After that trick on the helm, they were sent aloft, furling sails in a series of hailstorms.

Gaby writes, "but looking back, I always counted myself a sailor from that watch on".

From that book and from the surviving photographs, I know much of what is right and wrong with the model. Which gets me no closer to knowing who built it, and when? Clearly, the builder had a more-than-passing knowledge of her – but she was never grey; operationally, she was always white. (Britain was into announcing its presence in those days, not camouflaging it.) Its masts and funnel raked aft, not

Sail-making practice – fold-up gun platform to left, double wheels and binnacle at upper right

On the slip – is this Wellington?

forward. The aft conning-station base was smaller, with fewer windows. There was a very obvious belting along the midships gunwales; two conspicuous gun-mounting sponsons (outcrops) on each side; the dual wheels were visible under the open forward end of the poop deck; the bowsprit was two-piece; the propellor two-bladed; the portholes less numerous and on two levels.

Yet you could not build what is there without knowing a good deal. If this was built by an ex-cadet – *Amokura* boys went on to be a significant percentage of the serving New Zealand officers during World War II – then it must have been done late in life, with fading memory (nobody could easily forget wrestling those dual wheels, for instance). Someone visiting her in her later iteration as a coal hulk, then back-imagining, is my second guess. Either way, the plastic-tube funnel suggests a '60s build at the earliest. I suspect – given the timelines – that this is *Amokura*'s second deceased-estate experience, if not third.

**"Britain was into announcing its presence in those days, not camouflaging it"**

## Lessons

There are lessons here.

This may be the only model of *Amokura* in the country – certainly at this 1:35 scale. Another 100 years, and it could well be taken as accurate – why would it not be? But it is not. Not only is it not, but few people alive today know enough to know that it is not. This is an example of why I am sceptical of histories recorded later than events; too much is lost too fast in human memories.

There is also the question of who to respect, to remember, to honour?

One argument is to make this as accurate a rendition of the vessel in new/pristine condition as possible. That was the way folk 'did up' vintage vehicles in the early days of restoration, but latterly there has been a trend to value 'patina' – to preserve the life history of the particular vehicle, warts and all.

That approach asks the question: should such a model just be 'restored' to the style and quality in which it was built?

## The unhappy rabbit hole

Another talk; this time I attended two renditions, to make sure I got the feel of it. A top honcho from the Reserve Bank was involved this time – but I've long been sceptical of the narrowness of economic scoping. 'Electrifying New Zealand' was

the grand title (see link to full report in sidebar).

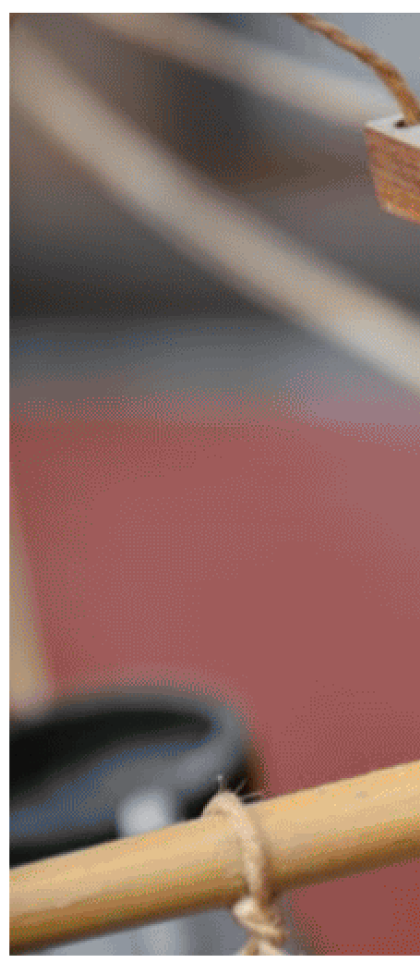
It was pretty much the same story as peddled by that university researcher: we've just got to solve climate change – no other limits, apparently – by electrifying everything, which we can do because "solar is so much cheaper". In essence, 'economic growth' but green of hue; nothing about human overshoot, nothing about resource constraints, nothing about energy return on energy invested (EROEI).

Now, I fully concur that we need to leave the remaining fossil resource in the ground – not just because of climate change, though, but because it is a finite, irreplaceable feedstock (think plastics, think bitumen) worth more, ultimately, than gold. Therefore, we need to wean ourselves off our discretionary squandering of it. That we will end up on solar energy, plus derivatives (hydro, wind), regardless. That we should go there now, while we still have manoeuvring time.

However, I don't assume that we can/will maintain our current collection of stuff, or level of consumption, nor that we can/should add to it, nor that we can/will replace it like for like. In fact, all my research tells me there will be fewer of us, doing less with less – much less.

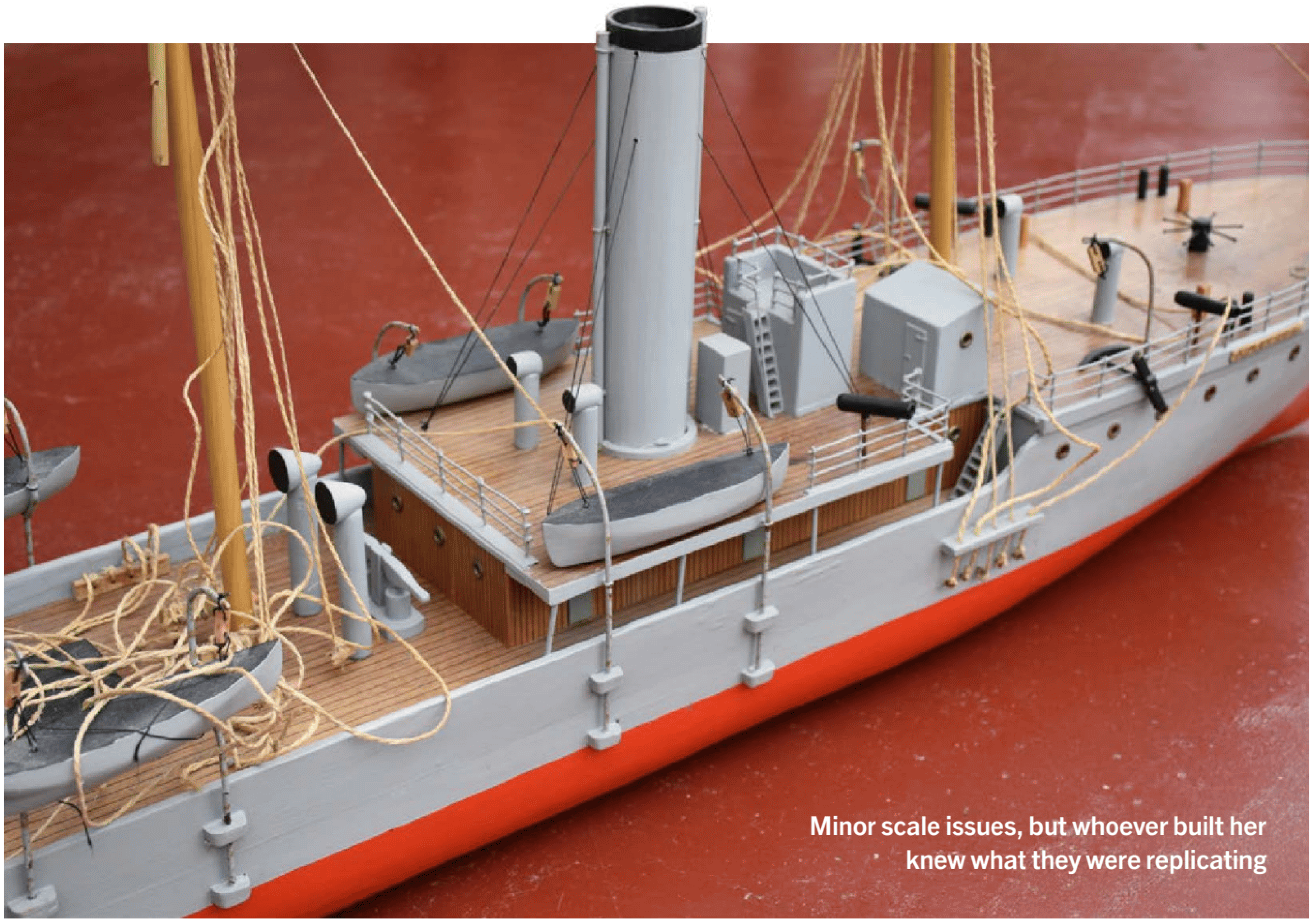
## Perspective

After those talks, I spent some time writing, rebutting, and explaining. No response. I'm used to that, and think I understand why: the need for income and the need for peer approval, usually. This



Damage and the coarse string aside, there is some great detail and even greater potential

As she arrived home: smashed rigging but showing potential



Minor scale issues, but whoever built her knew what they were replicating

"All my research tells me there will be fewer of us, doing less with less – much less"

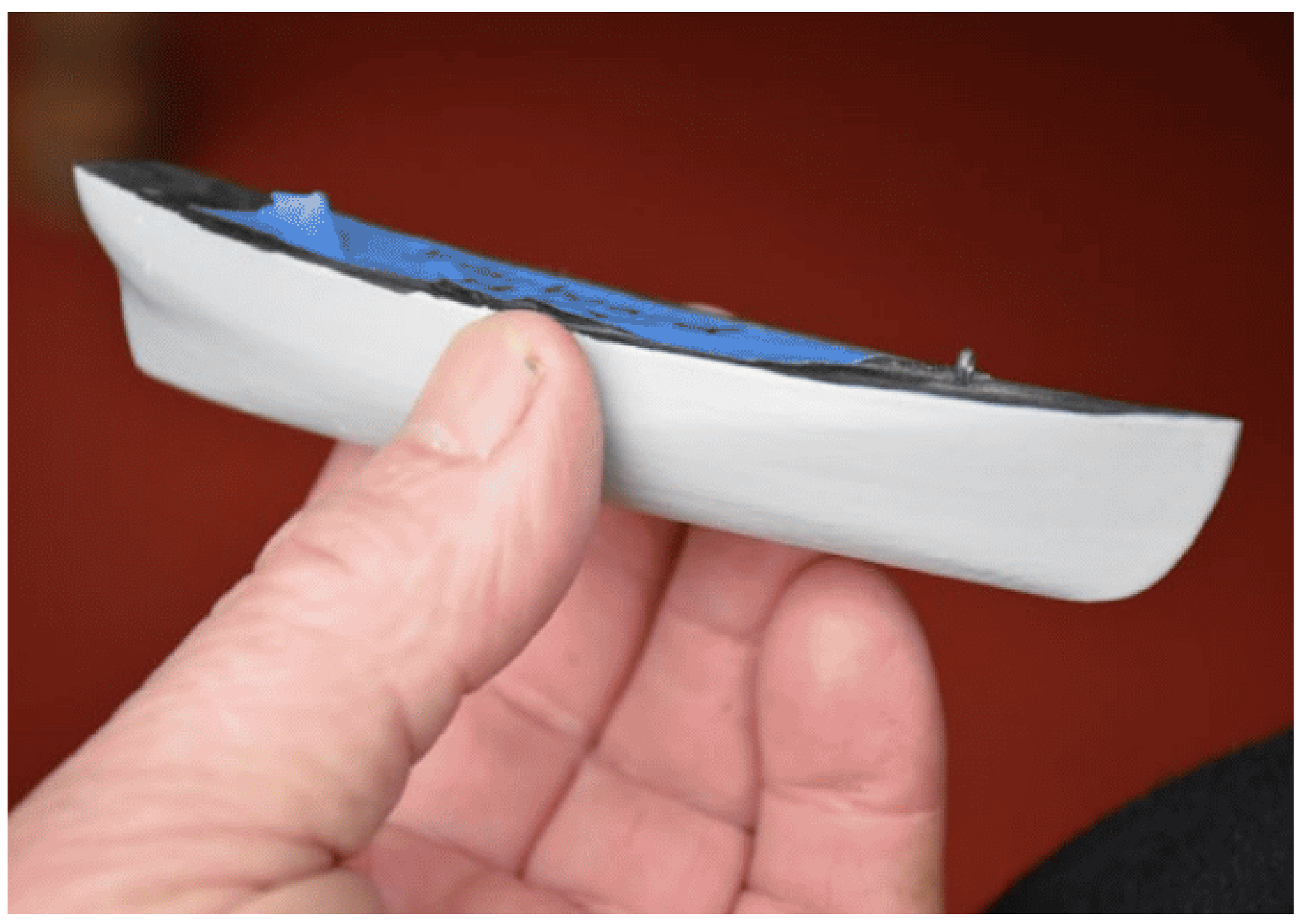
could be frustrating, if one didn't have something like the *Amokura*-delve to be yin to the frustrating yang. *Amokura* puts our current predicament into perspective. Active for 70 years (35 commissioned; 34 a coal hulk) then – made doubly obsolescent by our step-up to oil – a decaying wreck for the following 70.

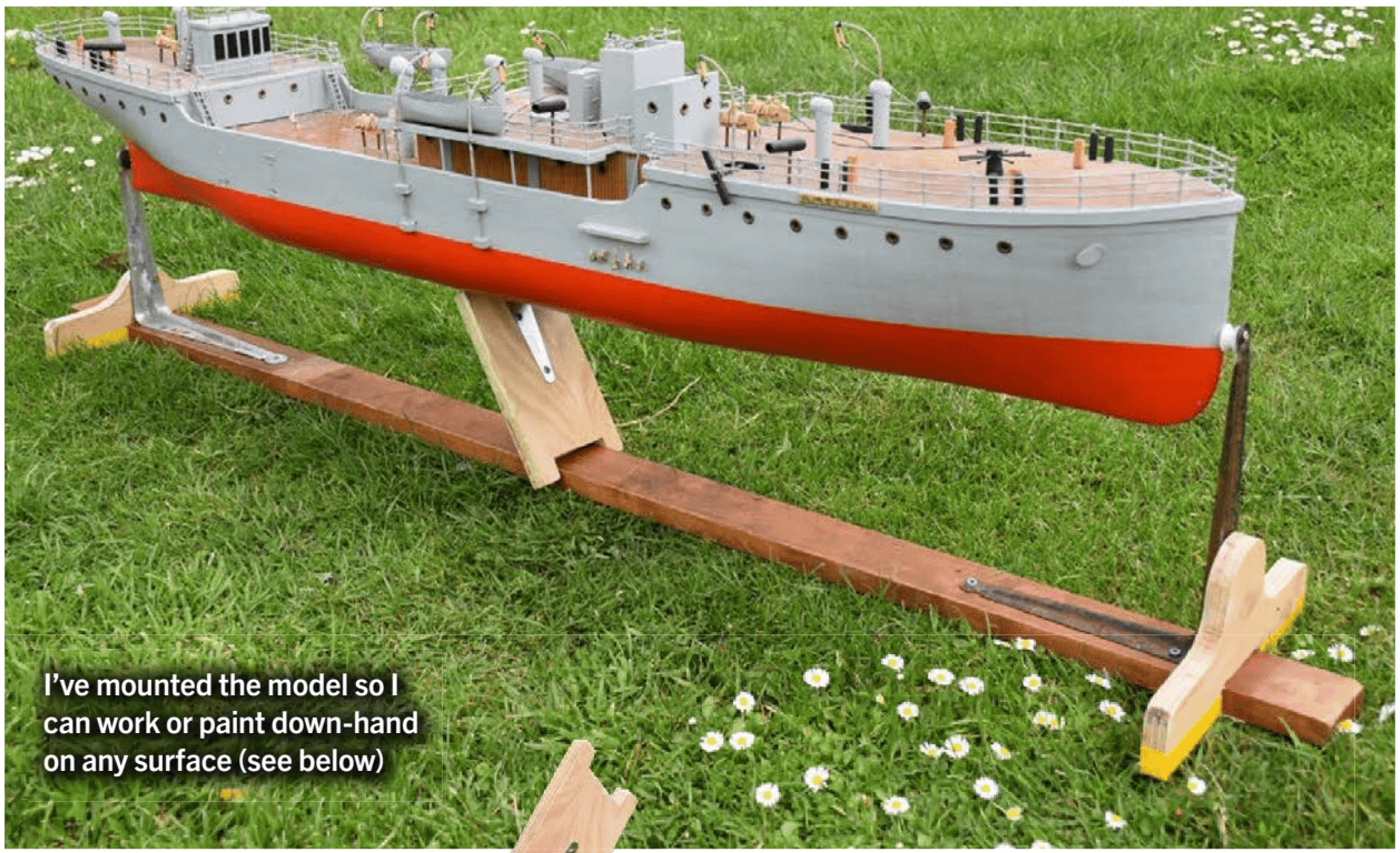
No infrastructure lasts forever; dams are designed for 100 years, windmills for 20–30, PV panels for perhaps 25. Is that all the time those rebuildable technologies will buy us? What kind of a social construct can we maintain, which has to be run on the leftover energy while we're continually building the replacement dams, windmills, and panels? We haven't even used the thus-far uptake of 'renewables' to displace fossil energy; contrary to conventional assumptions, we've just added it, even as we've burned more fossil stock than ever before.

## Time to teach skills

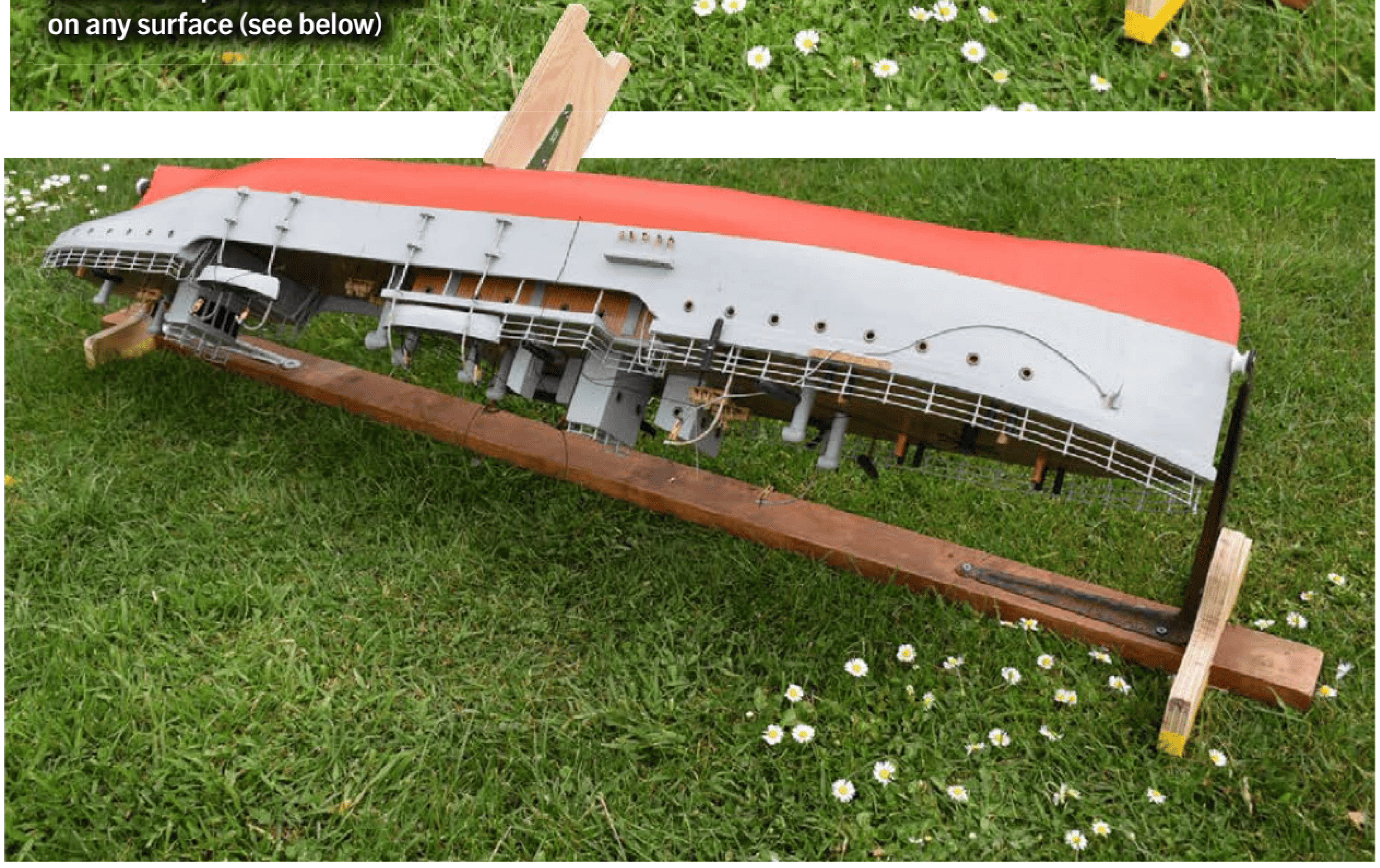
The attempt to keep BAU will subsume all other efforts. And it will fail. This means that some of us have to teach the skills – including repair, repurposing, and rebuilding – that will be relevant in the future. Meanwhile, much of what we are told – often by people in high academic places – doesn't survive a systems analysis of the facts. 'Systems' is a way of thinking/describing things in terms of an interrelated weighting of stocks, flows, and feedback loops (see 'Meadows' in the sidebar).

I found it ironic that, as I was penning this, Radio New Zealand





I've mounted the model so I can work or paint down-hand on any surface (see below)



(RNZ) aired an interview of a fellow urging us to look backwards to assist us in looking forwards. It was a breath of fresh air (see sidebar).

A quick search showed that the interviewee is a member of the Club of Rome. A systems thinker then; how unsurprising! I once wrote an article suggesting that universities mesh their siloes in a systems manner (see sidebar again, folks). We can learn much from the past; for instance, I'd back a TS Amokura – or *Spirit of New Zealand* or Outward Bound – cadet long before I'd rely on the product of our proposed boot camps.

## Call made

I have made the call to restore the model, staying short of the point at which it becomes something other than what it was while still doing justice to the place of *Amokura* in our history.

Over that time – I'm guessing it'll take a couple of years – I'll amass everything that I can find written about her and about those who were associated with her. The late Maurice Shadbolt once spent time interviewing Gallipoli veterans. He called it "a smash-and-grab-raid on history". I think such recordings – be they documented, restored, or modelled – are important, or what is it that we are about?

**Postscript:** I put the question out, re. *Amokura*. Back came word from the family of five who had stayed with us during lockdown. Turns out that the lady's great-grandfather captained *Amokura* as a coal hulk. Her grandmother and great-aunt went by dinghy to school from her; grew up on her. How small is our world?

## Links and more

If any readers have snippets of knowledge about *Amokura*, those who served on her, or about this model, I'd be keen to hear. Seems to me someone should assemble everything known in a single document/book; *Amokura* and her cadets are an important part of our history. Unless someone else is already on the case, I'll give it a crack.

**John Clarke link:**
youtube.com/watch?v=3m5qxZm_JqM

https://en.wikipedia.org/wiki/Redbreast-class_gunboat

rewiring.nz/tomorrow

https://en.wikipedia.org/wiki/Thinking_In_Systems A_Primer

***Afternoons* for Tuesday, 10 September 2024:**
rnz.co.nz/national/programmes/afternoons/audio/2018954932/how-you-can-use-the-past-to-navigate-the-present

interest.co.nz/opinion/95590/murray-grimwood-aka-power-down-kiwi-delivers-short-treatise-unflawed-thinking-arguing


Erick Akeley and his rural rented shed

# A MORRIE HAVEN

**It's not whether you actually own your shed that's important; it's the treasures it contains**

*By Ritchie Wilson | Photographs: Ritchie Wilson*

The interior of the shed with the strip-planked canoe

Erick Akeley is in a rather tricky position. He doesn't own a house, but he does own five Morris Minors.

Erick shares a rented house in Christchurch that has garaging for only his 1957 ute; the other four Minors he keeps in a rented farm shed on the outskirts of the city.

Over the past couple of decades, Erick has rented various spaces around town for working on his cars. He approached a farmer after spotting an empty building on the farmer's land. The farmer said that the building wasn't available, but he had another that was. This is a long, narrow, low-ceilinged, much-modified construction, of no obvious agricultural purpose, at the end of a long drive. Immediately adjacent are sunlit fields of long grass, with a handful of sheep.

When *The Shed* visits, a very large swamp harrier is cruising the fence-line, drifting and wheeling through the still, hot air, hunting field mice in the tranquil afternoon.

## Shed fit out

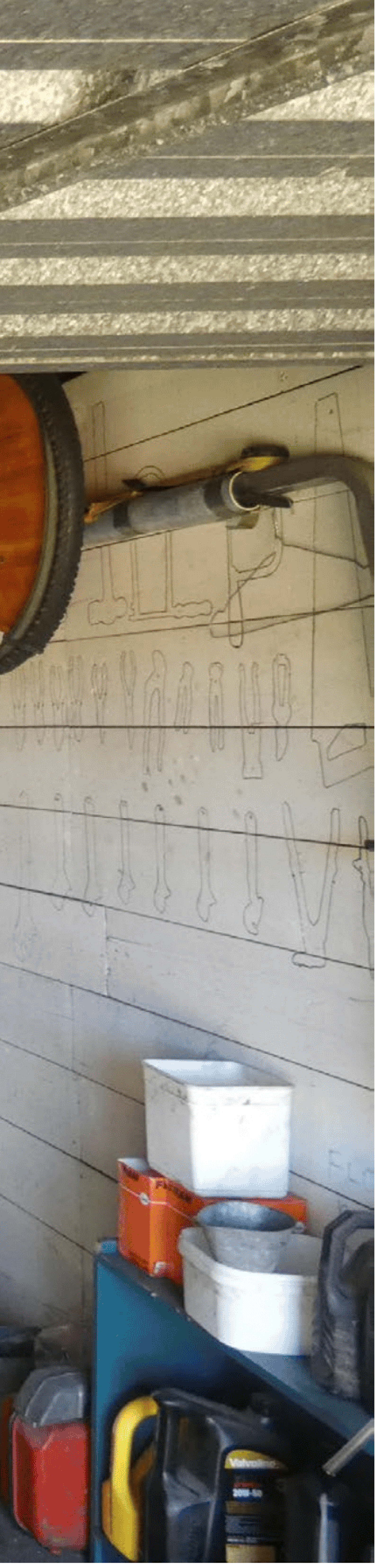
The shed's walls are clad in asbestos-cement sheets (known here as 'Polite' and in Australia as 'fibro'), which used to be manufactured in Christchurch.

The interior is partially lined with wide pine planks, some painted white. The concrete floor is level with the ground, so Erick has covered it with plastic sheeting to restrict the entry of damp. On top of the plastic sheet is a wooden floor made from shipping pallets, and on top of this are various large pieces of ancient carpet. This has proved quite satisfactory – except that the '57 ute has narrow tyres that sometimes break the pallet boards when it is parked inside. Erick has a reserve of boards to replace the broken ones.

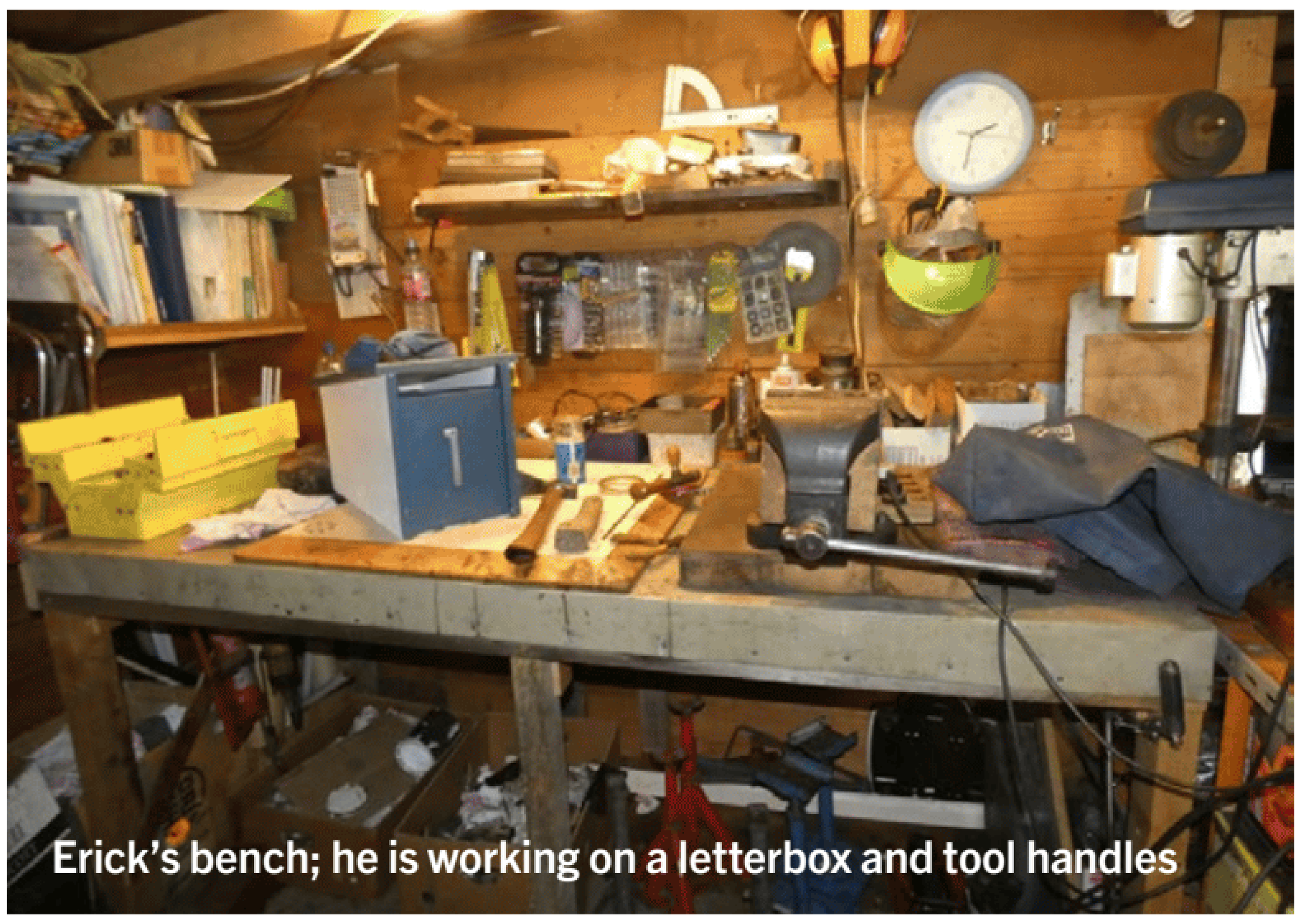
## Erick's workshop

Along the lower ceilinged side of the shed, Erick has his work area. He has storage for tools, oils, and paint, and a sturdy workbench with a small drill press, a grinder, and a large Record No. 6 vice.

Erick's collection of spare parts is stored in a partitioned-off section behind the work area. Here are wheels,



Erick Akeley in his shed



Erick's bench; he is working on a letterbox and tool handles

> "He has picked up his restoration skills by trial and error"


Under the shed's second-hand carpet is a layer of pallets

Mounted on a heavy wooden base, the grinder is portable

The workshop area of Erick's shed with bench and vice

“Apart from books and old typewriters, he doesn't have collections”

Erick and the New Zealand—built strip canoe; he also has an American canoe of the same length

Erick, his Humber bicycles, and his pair of guitars; he says that he doesn't have collections, but he does tend to buy two of the things that he likes gear-boxes, electrical gear, and a lot of small items in stacked banana boxes.

On the opposite side of the shed are Erick's two canoes. He says that, apart from books and old typewriters, he doesn't have collections, but he does tend to have pairs of things. For instance, he has two Humber 26-inch-wheeled bicycles of about the same age as his cars, two guitars, and two axes for which he has made new handles.

The canoes are 18-footers. One (cedar strip) is New Zealand made; the other (canvas on cedar frame) was made in the US by the Merrimack Company, which is still in existence and was able to send Erick information on his craft. The canoes get regular use on the nearby Styx River. Erick has made a sturdy aluminium carrying rack for the '57 ute so that he can transport them.

## Regret

The rental of the shed includes power and water, although Erick uses very little of either. There is space outside for working on the larger components of the Morries and for storing timber and metal.

Erick regrets that he didn't take the opportunity to study "auto shop" while at high school. As he doesn't have a technical background, he approaches problems with an open mind, saying that he has picked up his restoration skills by trial and error.

## Soft jaws

Erick's very heavy vice, which he purchased from a local used-tools shop, is not bolted to his workbench. Instead, like his bench grinder, it is attached to a thick piece of timber so that it can be moved around – perhaps taken outside. A concrete block sitting on the wooden base provides some stability. Soft jaws for the vice are fashioned from pieces of 25mm thick pine, about 175mm square, with a recess cut out along


## ERICK'S APPROACH TO CAR RESTORATION

Erick does all the routine maintenance himself: tune-ups, oil changes, changing brake shoes, bleeding brakes, and the like. He also does some more challenging jobs, such as swapping engines and gear-boxes.
A rundown on what he's done to the individual cars would look something like this:

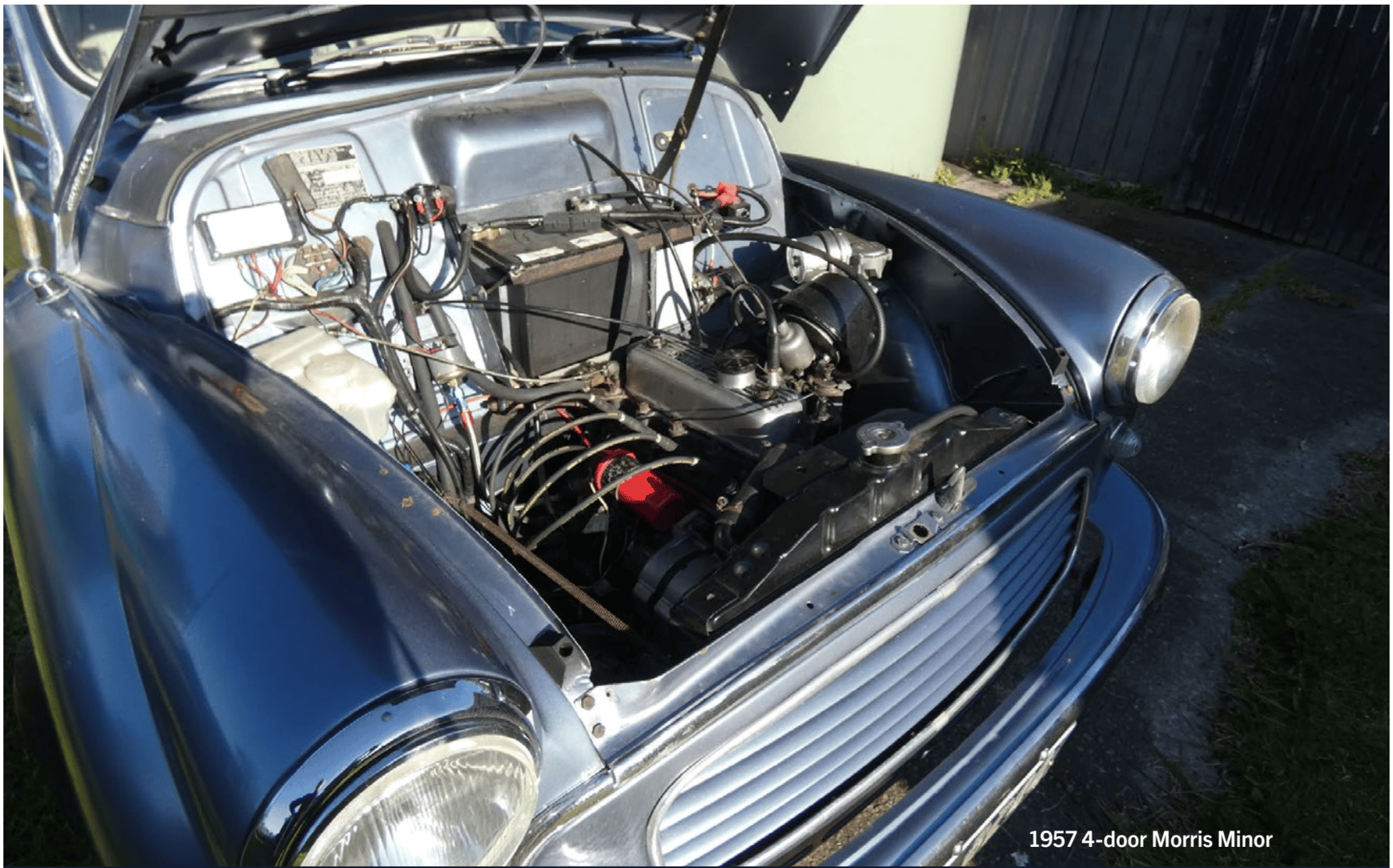
### 1969 VAN

This one is stock. Erick had the engine rebuilt some years ago but then put it in the '57 two-door, with the engine from the two-door going into the van.

### 1957 TWO-DOOR

This is Erick's latest and biggest project. He bought the car online and found out only after it arrived from Wellington that it had suffered serious front-end damage, which had been poorly repaired. He bit the bullet, ordered chassis rails and engine-bay panels from the UK, and had a panel beater rebuild the damaged areas. He doesn't weld, so this was definitely something for an expert.
Suspension, brakes, exhaust, and fuel pump have all been upgraded. Erick removed the Japanese heater and windscreen wiper units, which had been grafted on, and replaced them with stock Morrie items. Morris Marina front disc brakes were fitted, and he added water-temp and oil-pressure gauges. All the modifications have been certified. It only requires some wiring to be sorted and the car will be back on the road.

*(Continued on page 123)*



1957 4-door Morris Minor

# The A-series engine

During World War II, the Austin Motor Company in the UK manufactured the K5 three-ton truck for the British armed forces. It was powered by a four-litre Austin six-cylinder pushrod overhead-valve (OHV) petrol engine. More than 12,000 of these were built between 1941 and 1945. It is supposed that the engine design was based on the British Bedford six-cylinder truck engine, which itself was a version of the pre-war Chevrolet car engine introduced in 1929, which is popularly known as the 'stove-bolt six' because of the fastenings used in its construction. Bedford and Chevrolet were both owned by General Motors.

The A-series engine used in the Austin A30 and the later Morris Minors was a four-cylinder version of the K5's engine. It was introduced in 1951 and first fitted to the Austin A30. It had a cast-iron head and block, a three-bearing crankshaft, and eight overhead valves actuated by pushrods and rockers.

When Austin and Morris merged in 1952 to form the British Motor Corporation (BMC), the original side-valve engine in the Morris Minor was replaced with the A-series unit. At the time of the petrol shortages following the 1958 Suez crisis, the designer of the Morris Minor, Alec Issigonis, was instructed by the head of BMC, Leonard Lord, to design an ultra-small four-seater car using the 948cc A-series engine. This was the original Mini. Over the years, several combinations of bore and stroke have been used in different versions of the A-series engine.

A friend of Issigonis was the very successful Formula 1 team owner John Cooper, who drove a Mini and also used modified 997cc A-series engines in his Formula Junior racing cars. He suggested to Issigonis that BMC produce a Mini with a 997cc engine. The Mini Cooper was launched in 1961 and remained in production until it was cancelled, in a typically inexplicable BMC management decision, some 10 years later.


## 1957 Morris Minor wellside deck ute

At one time it was advantageous for companies assembling motor vehicles in New Zealand to incorporate as many locally made components – such as tyres, paint, and upholstery – as possible. In the case of Morris Minors, the Wilco rear tray fitted to New Zealand–assembled utes was made by the Wilton Motor Body Company Ltd of Grey Lynn, Auckland.

**The unique wooden soft jaws in the Record No. 6 vice**

the bottom edge so that they sit squarely between the vice's jaws.

Erick has never seen the soft jaws that Record (now Irwin) manufactures for its vices – these are made of sheet metal, shaped to grip the opposite sides of the jaws, with softer fibre attachments to protect the work being held from scratches. Neither is he familiar with the homemade equivalents fashioned from aluminium or brass, common to most New Zealand sheds, or the modern ones that use magnets to attach soft jaws (or dies to fold sheet metal) to the jaws of a vice.

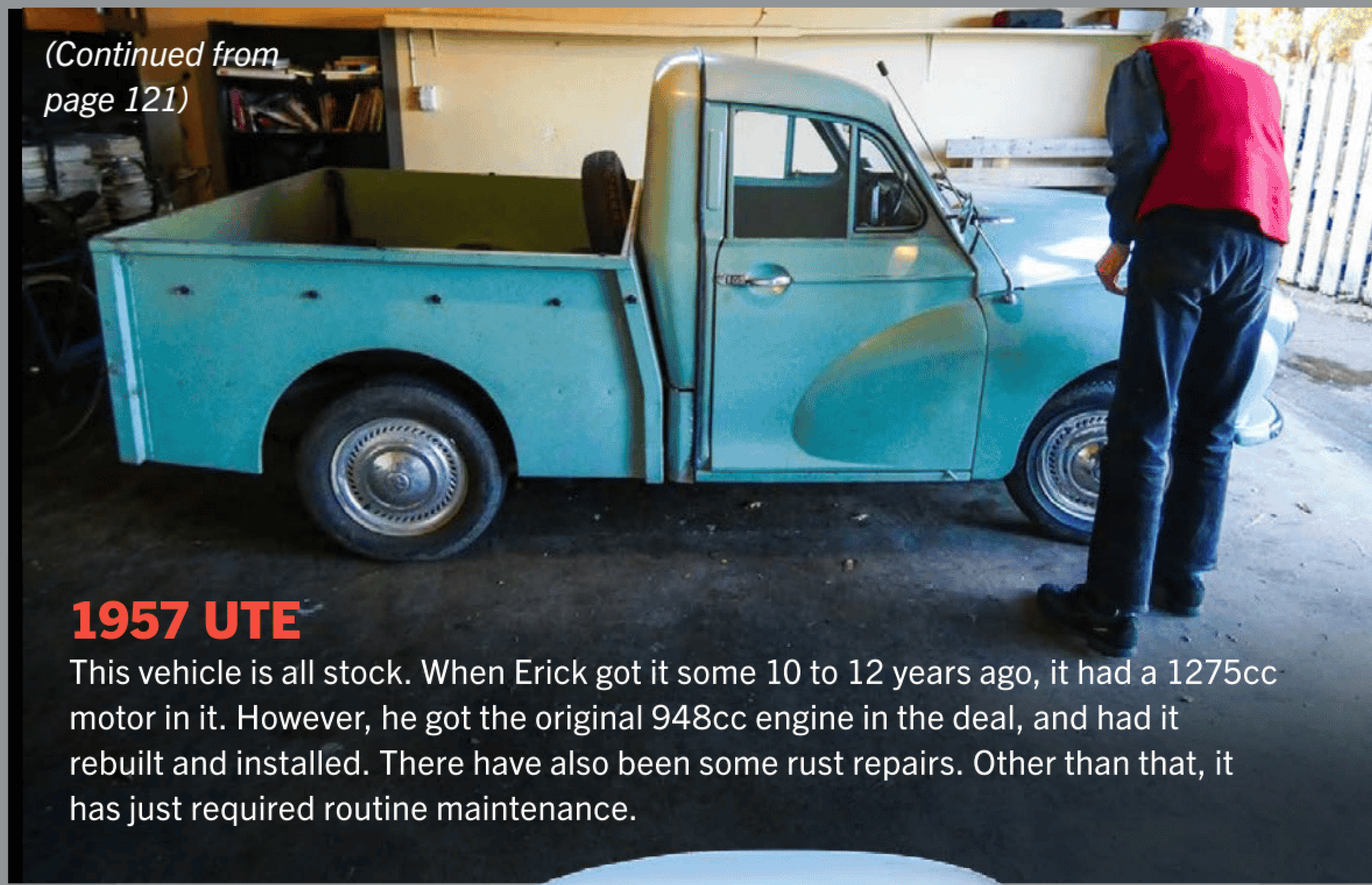
He gets me to identify an 'as new' Stanley 151 spokeshave, which he has recently bought from a Salvation Army op shop for a mere $5 – ($5!). This will be used to make tool handles. Erick has already sourced some pieces of mataī for this purpose.

## University days

Erick comes from the American Midwest and majored in biology at the University of Montana. He volunteered for the Peace Corps in the early 1980s and was sent to teach for three semesters at Marawi City's Mindanao State University, located in a predominantly Muslim part of the Philippines; paradoxically, most of the students were Christians from other regions of the country.

A set text for one of his classes

*(Continued from page 121)*



### 1957 UTE

This vehicle is all stock. When Erick got it some 10 to 12 years ago, it had a 1275cc motor in it. However, he got the original 948cc engine in the deal, and had it rebuilt and installed. There have also been some rust repairs. Other than that, it has just required routine maintenance.


### 1957 FOUR-DOOR

This has a 1275cc Morris Marina motor with a Toyota five-speed gear-box – a common upgrade back in the day. The car had a Hillman Hunter clutch that was very heavy and tended to grab, so Erick replaced it with a stock Morris one. He also had the camshaft reground – the former owner had a racing profile installed, which caused a rough idle – and replaced the Weber carb with a stock SU one. The car now runs very well and is a pleasure to drive.


### 1959 TWO-DOOR

Erick no longer drives this one – he swapped out some good parts to go into the '57 two-door, but it is still running and could be warranted. As prices are appreciating, he's just holding onto it for the time being and may eventually sell it.

was a work by Nick Joaquin, a Filipino journalist and novelist, who wrote (beautifully, according to Erick) in English. Erick had never previously heard of him. When Erick returned to the US, he commenced a PhD at Northern Illinois University (NIU) – on Nick Joaquin – which he completed in 1994.

One common type of modern English literature is the campus novel, set in a department (very often the English literature department) of a university where competition for jobs and advancement is intense. This is the world of 'publish or perish'. Probably the best-known, and funniest, of these novels is Kingsley Amis's *Lucky Jim* (1962), in which Jim is not so lucky when it comes to getting an academic job.

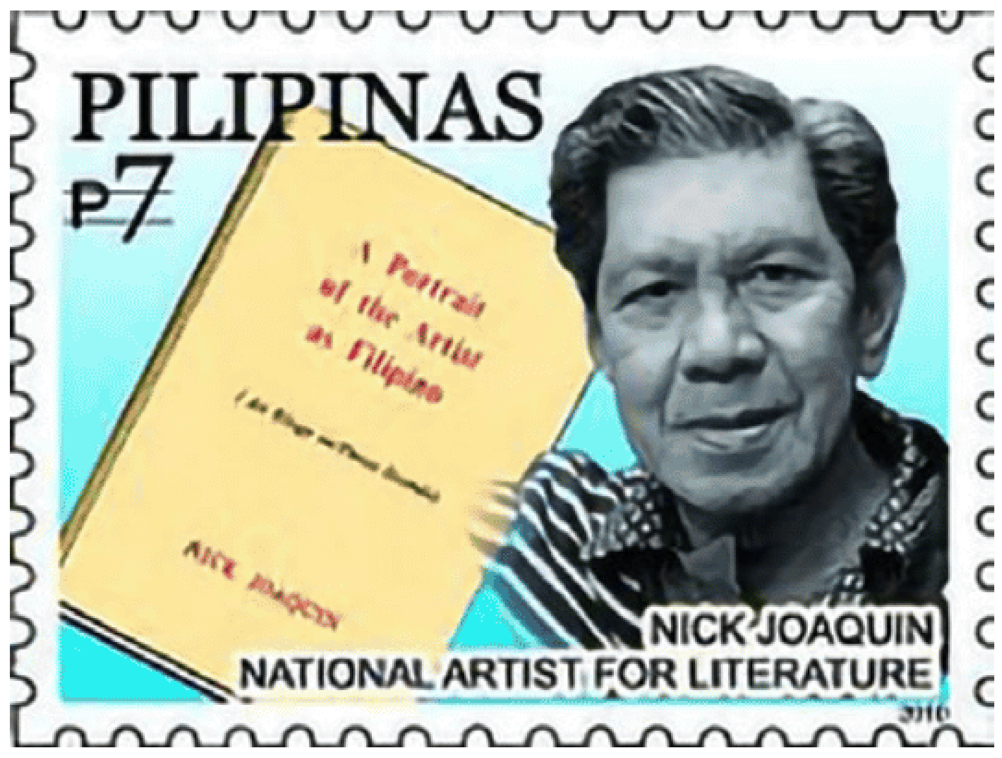
Similarly, Erick found that a doctorate from NIU (ranked 331st in the hierarchy of US universities at that time) wasn't sufficient to get him a permanent job at an American university.

## Godzone bound

Erick had a long holiday in Australia and New Zealand in 2000 and came up with a scheme to open a second-hand bookshop in Canberra. He returned to Australia in 2002 with a pallet of books with the intention of settling there. While he was negotiating with the immigration authorities, he did the Cambridge CELTA (Certificate in Teaching English to Speakers of Other Languages) course in Sydney.

It turned out that Erick was too old to qualify for a resident's visa in Australia, so he decided to settle in New Zealand instead. His aim was to set up a combined English language school / second-hand bookshop. He started work at an established English language school in Christchurch and discovered a previously unsuspected talent for English for speakers of other languages (ESOL) instruction. His tone of voice is rich, his diction precise, and he has a pleasant, mild American accent. He also found that he got on well with the mainly Asian students that he was teaching.

He bought the Morris Minors, joined two local Morris clubs, and now divides his time between ESOL teaching, reading very widely, canoeing, and working on the collection of Morris Minors in his shed.


Right: Erick Akeley did his PhD on Nick Joaquin, a famous writer and journalist from the Philippines

> "They are easy to maintain and I am able to work on them myself"


## Why I like Morris Minors – Eric Akeley

When I first came to New Zealand and saw a Morris Minor, it immediately appealed to me because of its retro styling, obviously influenced by the bulbous bodywork of 1940s Detroit sedans.
The Minor's designer, Alec Issigonis, said it was designed during his "American period". In contrast, the owner of Morris Motors, Lord Nuffield, described it as "looking like a poached egg". Personally, at first sight I wanted to own one.
They are relatively inexpensive to buy. They are easy to maintain and I am able to work on them myself.
They are very nice to drive, with their rack-and-pinion steering and torsion-bar suspension, which Issigonis had used on his homemade racing car, the Lightweight Special.
They can be used both around town and on motorways, especially when they have larger engines and five-speed gear-boxes fitted – as many of them do.

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## GOOD THINGS TAKE TIME – NISSAN SKYLINE GT-X KGC10 HAKOSUKA

It took 19 years for Steve Radich to achieve his dream of owning a Skyline Hakosuka, but what he ended up with is perfection in this extremely low-kilometre example.

Back in 2005, Steve hatched a plan one day to own his dream Skyline: the legendary Hakosuka. Over the next 15 years, the list of Skylines that Steve bought and sold went as follows. First was a 1998 Nissan Skyline GT with two doors too many. It was replaced with a red GT-T of the same year but with the correct number of doors! Finally, in 2020, Steve found himself looking at a white 1999 GTR sitting in his shed.

"I was well down the path of getting to the dream of trading my way to owning a Hakosuka," he says.

## ALSO FEATURED IN THIS LATEST EDITION:

1967 Fiat 500 F Bambina; 1965 Morris FG60 truck; 2024 McLaren 675 LT Supercar; 1971 Holden Kingswood; three 1963 Chevrolet Corvettes; Austin A90; 2023 Saker; and much, much more. See classiccar.co.nz for a complete and illustrated content rundown.

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> "Among the pills and potions that sustain me, I have one that apparently reverses ageing"

# Intimations of Im-mortality

## The miracle drug that isn't – but it's not all bad news

By Jude Woodside

I've just had one of those birthdays that doesn't end in a 0 or a 5 but nevertheless gives you a bit of a chill that something is coming to an end. I am entering the 'end stage' of life – not in the dramatic sense, I hasten to add.

Relax, dear reader – I could feel your shock then; I am merely being philosophical. I am transitioning out of middle age. I expect a few more robust years ahead; indeed, I was heartened to read that, among the pills and potions that sustain me, I have one that apparently reverses ageing. I have to report that it doesn't seem to be working quite as well as the marketing would suggest.

The drug in question is metformin; something of a miracle drug. It's used for diabetes – one of my afflictions – but, although its benefits are well documented, how it works is not well understood.

Like all good drugs, it is derived from a common weed – in this case, French lilac (*Galega officinalis*), used in the past for treating diabetes.

### A clever drug

Earlier studies showed that, apart from its use in diabetes treatment, it was instrumental in cancer treatment. Specifically, it seemed to prevent tumours in a number of common cancers. Now, a new study suggests that it can not only do all of this but will also enhance cognitive abilities and potentially stave off dementia.

It appears also to reverse ageing in internal organs. This, of course, was seized on by the media to trumpet that it was a miracle anti-ageing drug. Alas, no – as the following citation from the study may clarify:

"We conclude that despite data in support of anti-aging benefits, the evidence that metformin increases lifespan remains controversial. However, via its ability to reduce early mortality associated with various diseases, including diabetes, cardiovascular disease, cognitive decline and cancer, metformin can improve healthspan thereby extending the period of life spent in good health" (Mohammed et al., A Critical Review of the Evidence That Metformin Is a Putative Anti-Aging Drug That Enhances Healthspan and Extends Lifespan, *Frontiers in Endocrinology*, volume 12, 5 August 2021).

### An erratic past

That can't be all bad. I may last longer than many of my mentors suspected, given my erratic past.

It's also comforting to know that I may hold off commitment to the dementia ward for at least a while. I have recently become aware of the impending horror of such a fate, having seen a good friend, who does not have dementia, being confined in something similar due to a debilitating disease.

While I understand that these places mean well, the awful one-size-fits-all institutionalism, with docile patients doped up, parked in front of the TV, and left there to linger in a partial fog, is abhorrent and must be devastating to someone who has lived on his intellect and is now effectively trapped inside a non-compliant body. All I can do is despair and try to visit as often as possible – and pray that it doesn't happen to me.


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# FREE 2025 THE Shed CALENDAR


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# January 2025

**Terry Dalton's cathedral of collecting**

Interested in collectables of the '50s, '60s, and '70s, Terry has a few classic cars and motorcycles. He had a very large barn built behind his residence to house his collections. Big as it is, the barn is – inevitably – not quite big enough.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | | 1 New Year's Day | 2 Day after New Year's Day | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 Wellington Anniversary Day | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 Auckland Anniversary Day Northland Anniversary Day Shed ON SALE TODAY | 28 | 29 | 30 | 31 | | |


# February 2025

**Don Pelvin's national service**

At nearly 70, Don is still doing a form of 'national service': finding and bringing military vehicles back to life. For 15 years, he has been quietly pursuing this hobby in his spare time in the sheds behind his Timaru home.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3<br>Nelson Anniversary Day | 4 | 5 | 6<br>Waitangi Day | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24<br>Classic Car ON SALE TODAY | 25 | 26 | 27 | 28 | | |




# March 2025

**Steve Roberts, legendary panel maker**
Called everything from artist and magician to a guru of alloy, Steve is more comfortable with the handle 'tin basher'. At 83, he is as passionate about his work as he is humble about his achievements. In the 1980s, he earned the Inventor of the Year prize for his 'Plastic Fantastic' bikes and in 2017 took his rightful place in Motorcycling New Zealand's Hall of Fame.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| 31 | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10<br>Taranaki Anniversary Day | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24<br>Otago Anniversary Day<br>Shed ON SALE TODAY | 25 | 26 | 27 | 28 | 29 | 30 |


# April 2025

**John Borrows' titanic shed**
John has needed a shed all his life for his thinking and creating. His current shed, the basement double-garage of a suburban Auckland home, has in it the ship *Titanic*, the airship *Hindenburg*, the locomotive *Evening Star*, the Red Baron's Fokker Dr I World War I triplane, sundry clocks, and still room to park his restored 1965 Ford Thunderbird convertible

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 Daylight saving ends |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 ClassicCar ON SALE TODAY | 15 | 16 | 17 | 18 Good Friday | 19 | 20 Easter Sunday |
| 21 Easter Monday | 22 Southland Anniversary Day | 23 | 24 | 25 Anzac Day | 26 | 27 |
| 28 | 29 | 30 | | | | |



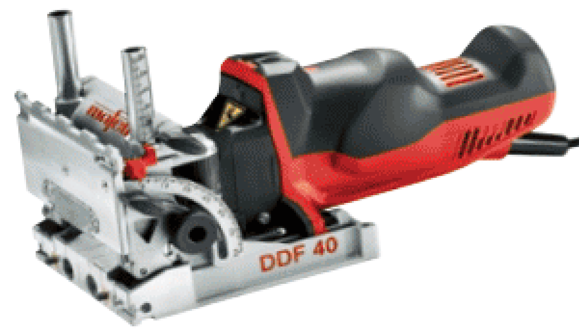

# May 2025

**Peter Neal's woodworking shed**

"I have always had an interest in making my own furniture, and made all of it in our house – chairs, table, desk, glass-fronted cabinet, CD cabinet, even the doors. I could go on – 'glutton for punishment' did I hear you say? But once the house was catered for, I got started on stuff for other family members."

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 Mother's Day |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 Shed Magazine ON SALE TODAY | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |








# June 2025

## Keith Steel's quarter-acre dream Cadillac shed

Many sheddies are quite happy to have a shed on their quarter-acre section to potter in. In Hawera, Keith has done one better: he has a shed to potter in that takes up a quarter acre – big cars need a big shed! "We'd spent a long time looking for a big shed, and when we found this 11,000-square-foot one, that was it. I'd only ever dreamed of having a shed this size."

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| 30 | | | | | | 1 |
| 2 King's Birthday | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 Matariki | 21 | 22 |
| 23 ClassicCar ON SALE TODAY | 24 | 25 | 26 | 27 | 28 | 29 |


# July 2025

### The magnificent Seven – Athanasius Santamaria

When Athanasius made an “impulse decision” to buy a pile of old Austin parts in 2015, he didn’t really have a project in mind. At the time, he was a DOC ranger working in the Nelson Lakes National Park with a strong interest in making things. However, for $1500, he landed himself an original chassis, a radiator, three cylinder heads, a crankcase, and 10 wheels from a 1929 Austin Seven.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 Shed ON SALE TODAY | 29 | 30 | 31 | | | |


# August 2025

**Geoff Merryweather builds a gantry crane**
"When I was asked to clean out my late father-in-law's workshop, I knew that it would not be an easy task. The main problem involved how to get the machinery out of the workshop and onto a trailer for the 3½ hours' drive to Auckland, then offloaded at the other end. This machinery included a lathe weighing around 750kg. The solution was a portable gantry crane that could be taken up north in parts and then assembled on site."

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 ClassicCar ON SALE TODAY | 26 | 27 | 28 | 29 | 30 | 31 |

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# September 2025

**John Blyde's motorbike restoration shed**

*I really want an old dairy factory* – that's what John thought when contemplating the move from Katikati to Taranaki a few years ago. "Well, I need a shed, a bed in the corner, and a place to stuff around with my motorbikes." John was looking for something that was cheap enough. It didn't have to be flash, but needed to suit his passion for building and customising motorbikes.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7<br>Father's Day |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22<br>South Canterbury Anniversary Day<br>Shed ON SALE TODAY | 23 | 24 | 25 | 26 | 27 | 28<br>Daylight saving starts |
| 29 | 30 | | | | | |




# October 2025

## Mack Jones – a master smith in the making

Mack is 15 and has been making knives for three years. In 2023, he entered The Auckland Blade Show awards and came away with Best Damascus and Best Newcomer. He is in a hurry to become one of the best knife-makers in New Zealand. His knowledge of the process seems encyclopaedic, even though he admits that he has a lot to learn.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
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| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 ClassicCar ON SALE TODAY | 21 | 22 | 23 | 24 Hawke's Bay Anniversary Day | 25 | 26 |
| 27 Labour Day | 28 | 29 | 30 | 31 | | |




# November 2025

**Gary Petersen – 'The Mad Modeller'**
Gary readily describes himself as 'The Mad Modeller' and admits that he is obsessed with making the best possible model; his creations border on art. A keen modeller since school, a visit to Gary's impressive workshop is an eye-opener. Some may think these creations are just toys, but they are far from it – they are very important to their owners and their families.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 Marlborough Anniversary Day | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 Canterbury Anniversary Day | 15 | 16 |
| 17 Shed MAGAZINE ON SALE TODAY | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |


# December 2025

**Gary Norton's shed – one man's paradise**

As shed sizes go, Gary's is a megastore. It needs to be, because, despite the square footage, space is at a premium, crammed as it is with "a bit of everything" and no end of enterprises in various states of progress.
Note: Gary also graces the cover of this 2025 *The Shed* calendar.

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|
| 1<br>Chatham Islands Anniversary Day<br>Westland Anniversary Day | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15<br>ClassicCar ON SALE TODAY | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24<br>Christmas Eve | 25<br>Christmas Day | 26<br>Boxing Day | 27 | 28 |
| 29 | 30 | 31<br>New Year's Eve | | | | |

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| Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
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| 31 | | 31 | | 31 | | 31 | 31 | | 31 | | 31 |

2025

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# 2025 Calendar