

LOOSE FILLINGS

GREAT SPEED ON TWEED

Five air-cooled cars ran at this year's Speed on Tweed, the highly social Murwillumbah weekend which just happens to include a sprint meeting run on a 1.2km course through the town. Terry Hanly ran his Shamrock Enfield in one of the less competitive categories, but the other four seem to have kept a very close watch on each other.

Fastest time from this lot was set by Graeme Branch, who unsettled his air-cooled mates by actually changing the gearing of the 700cc Bedson Enfield after Saturday's runs. This allowed him to use third gear, rather than 7500rpm in second,

and his final run on Sunday was his fastest, at 54.93sec. Next fastest was David Reid, with his Mk3 Cooper JAP, with 57.53sec (plus bonus point for heading the Channel 9 news). Graeme Noonan (Cooper Mk7 Norton) and David Palstra (Newbound BSA) had an eventful trip from Victoria sharing a borrowed trailer, and their best times were very close, 60.26sec and 60.58sec respectively, just short of the magic minute.

General opinion was that the course took some getting used to, being tight, narrow and between almost continuous barriers, but the hospitality and enthusiasm of the

GOOD VIBRATIONS

A remarkable change seems to be coming over the Australian air-cooled scene. Reports from recent events like the GEAR day at Wakefield Park and Speed on Tweed at Murwillumbah suggest there is now a recognisable air-cooled community, and that when we get together we have fun. This tends to confirm earlier observations from events such as Eddington Sprints and Historic Rob Roy. By all means share this information with friends, but it would perhaps be wise not to have it too widely known – we wouldn't want people to think we run air-cooled cars and actually enjoy ourselves.

organizers and the crowds is outstanding – David Reid reported that spectators even gathered at the air-cooled enclosure “just to watch the starting pantomime.”

Also running at Murwillumbah was John Hazelden, owner of the Sidney Rudge, who drove his unique 1930s supercharged two-stroke Chamberlain Special.

Bugger! Arthur Hopkins reflects on the damage to his Mk8 Cooper Norton after an accident at the College Road Pukehou hillclimb in the Hawkes Bay area of New Zealand in December 1969. This car is now with Peter Bruin. Photo from the Arthur Hopkins collection.



BITS AND PIECES

- The last-ever Morwell hillclimb, in Victoria, had the tireless John Coffin as its only air-cooled runner. He reported he was "having too much fun," and was "sideways everywhere," the bottom line being a class third and a time three seconds better than his previous best. Morwell hill is located on land which is due to be used for coal mining.
- JMW driver Mike Bendeich was missing from the recent air-cooled GEAR day at Wakefield Park. He was still air-cooling, but somewhat differently – riding his pre-WWI Abingdon King Dick motorcycle through Tasmania.
- King Edward Park hillclimb, near Nobby's Beach in central Newcastle, celebrated its 50th event in late October, and had two historic air-cooled cars as static displays. One was Garry Simkin's Mk4 Cooper Vincent, the John Snow car which John Crouch drove to FTD (59.2sec) at the inaugural KEP 'climb in 1951. The other was Terry Wright's Walton JAP, with which Bruce Walton set FTD (56.56 secs) at the 1956 event, running an unsurpassed 8-80. Just two-tenths slower than Bruce was Steve De Bord's Mk8 Cooper JAP 500, which within a few months was bought by Bruce, and became the all-conquering Walton Cooper.
- The 750cc side-valve BMW special until recently owned by Chris Hill, which appeared to have acquired an elusive new owner, has now been bought by Pat O'Carroll on the NSW north coast and will be restored by him. This was the car raced in historic events by the late Hank Northey, and which had a history which could be traced back to the late 1950s. It used a well-constructed twin-tube chassis with Morris 8 steel wheels, de Dion rear

suspension and a beam front axle with quarter-elliptic springs. It is one of a number of early Australian-built 500s to combine independent or de Dion rear with beam axle front end, others including the Glynn Scott Ariel, the Eddie Thomas JAP and Wilbur Watson's EAW.

- A worldwide free newsletter for air-cooled enthusiasts has been started by Richard Utley, who can be contacted at editor@registrarsramblings.com. It will provide news, technical information, competition results and classifieds, but is not intended to replace any of the existing regional newsletters (such as *Loose Fillings* or *The Tangler*).

- Just as this issue went to press, Terry Perkins from Port Macquarie drove to Orange and bought Graeme Worsley's Scarab Triumph. Kevin and his wife Raewyn are classic rally enthusiasts with an MGB, and Kevin caught the air-cooled bug helping fellow Port enthusiast Graeme Branch with the Bedson Enfield.

The Scarab was built in the late 1950s by John Lumb and his brother-in-law Ted Peacock and a team which included Cliff Trefry and Henry Nehrybecki. Inspired by Bob Joass' 1957/58 Triumph-powered car (see *Loose Fillings* #10) the Scarab used Ralt wheels, steering and fibreglass nose and tail, and Joass/Britton cast rear uprights and rear-axle "triangle."

It first ran with a Square Four Ariel, but by late 1960 it had been bought by Alan Heasman and was using a 650 Triumph. In the late 1970s it was brought back to historic racing by Laurie McDonald, and later returned to its original transverse-leaf suspension by jazz clarinettist and historian Bill Boldiston, who described it as "a vibrator on wheels, not the P3 Alfa I had been expecting it to be". David Reid raced it in historic events from 1990 until it was bought by Graham Worsley.

THE LOG

This could be the most important part of *Loose Fillings*, because here we record those times when one of our cars fires up – no matter how briefly – in public. We've said it before, that a mention in The Log isn't boasting, it's celebrating. As well, The Log is a barometer of the strength of the air-cooled revival, and it is showing that more of our cars are appearing at more events - which is the way it ought to be. This page of The Log covers events since June 3 Oran Park.

- Aug 4-5 - Morgan Park historic races(Q): Terry Hanley, Shamrock Enfield
- Aug 18-19 - Leyburn Sprints (Q): David Reid, Cooper Mk3 JAP; Graeme Branch, Bedson Enfield; Terry Hanley, Shamrock Enfield.
- Sept 8-9 - Speed on Tweed sprints (NSW): David Reid (Cooper Mk3 JAP), Graeme Branch (Bedson Enfield), Graeme Noonan (Cooper Mk7 Norton), David Palstra (Newbound BSA), Terry Hanly (Shamrock Enfield).
- Sep 9 - Morwell hillclimb (V): John Coffin (Robbins BSA).
- Sept 15-16 - Eastern Creek historic races (NSW): Andrew Halliday, Cooper Mk5 Norton.
- Oct 10 - Wakefield Park (NSW) GEAR meeting: John Coffin (Robbins BSA), Garry Simkin (JBS Norton), David Williamson (Cooper Mk4 Vincent), David Halliday (Cooper Mk5 Norton), Greg Snape (Cooper Mk10 BMW), Robert Rowe (Robertson Indian), Barry Parsons (Scorpion Norton).

GEAR

Seven air-cooled cars ran at the Golden Era Auto Racing (GEAR) club's non-CAMS, non-racing track day at Wakefield Park on October 10. A number of interstate drivers who had hoped to get there were unable to attend, and finally the only non-NSW runner was John Coffin with the Robbins BSA. An uncharacteristic ignition problem spoiled David Williamson's day with Garry Simkin's Cooper Vincent, and the Halliday's Cooper Norton lost its crankshaft sprocket. Barry Parsons brought two cars from his air-cooled stable, giving the wonderful Robertson Indian to Robert Rowe to drive while Barry himself ran the Scorpion, which has an 850cc Norton Commando engine. It was also good to see Greg Snape out with the Cooper BMW.

Speed on Tweed (left to right, Graeme Noonan's Cooper, David Palstra's Newbound, David Reid's Cooper and Graeme Branch's Bedson) await the start. Picture from David Reid.



55-YEAR OLD SURVIVOR — THE MARSHALL 500

A reminder that at least some lost 500s are still out there, the 1952 Marshall 500 resurfaced on ebay early this year, and was bought by Barry Parsons in Bathurst. Although all the body panels have been lost and the chassis is so rusty it can only serve as a pattern for a complete replacement, there is no question as to the car's identity, and the car is almost unchanged from the form in which Bob Joass built it for Ash Marshall in Sydney 55 years ago (see his story in *Loose Fillings* #6, which in 2000 asked "where is this car now?").

The car first appeared at Parramatta Park in late 1952, using an alloy Triumph Tiger 100, and was later hillclimbed in Victoria by Jack Hill, using the Triumph and later a 500cc JAP. It is likely the car was still being raced in north-eastern Victoria in the early 1960s, but from then on it seemed to have vanished.

As bought by Barry Parsons, the car still had its complete front suspension and early-pattern Ralt wheels and its Fiat 500 rears. Its original Model T epicyclic steering box had been replaced by rack and pinion, and its original narrow-track rear suspension, taken from the first version of Ralt 1, had been widened but was still readily recognisable. Included in the purchase were some alloy Triumph engine castings. Restoration will require a complete new chassis and body, but so much of the rest of the car is original — as confirmed by Bob Joass, who has recently inspected the car. Barry says the car is about fourth in his priorities queue.

LOOSE FILLINGS BY E-MAIL!

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WALTON COOPER IN SWITZERLAND

The Walton Cooper ventured to Switzerland for a re-run of the Ollon-Villars hillclimb in September. Some 8km long and climbing over 800m, this course was a round of the European Mountain Championship until the early '70s. Just east of Montreux near the end of Lake Geneva, the course starts in the old winegrowing town of Ollon and

snakes its way up to the modern ski-resort of Villars-sur-Ollon.

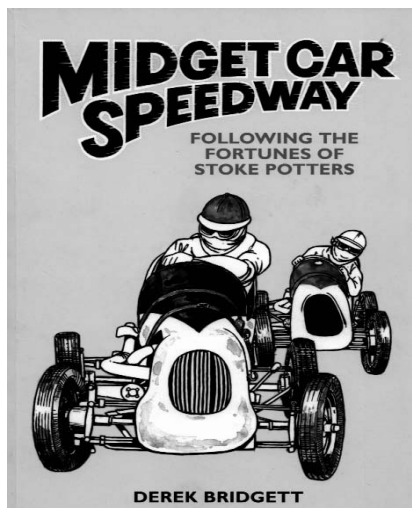
I have always wanted to do one of these classic mountain climbs and although this one wasn't timed, it was a good replica of the real thing. Apparently you could hear the big twin all the way up the valley and it was a fabulous drive.

The Cooper did three runs in all, each time smoking a bit from oil on the engine off the valve gear and chains by the time it got to the top but not showing any other signs of distress. A check showed an average head temperature of 194°C (381°F) with crankcase temperatures of 92°C (197°F). These are way above typical temperatures recorded on other occasions when heads have been measured at around 160°C (320°F).

The car is now hibernating for the winter in the UK having run there for two and a half seasons without requiring any major attention. *Terry Wright*

COOPER TWIN ORIGINS

The origins of the twin JAPs used by Coopers to win some races and multiple hillclimbs are spelt out in this



fascinating little book. (To buy direct go to www.tempuspublishing.com).

It is not well known that midget car speedway, which still thrives in other parts of the world, was briefly popular in England. Despite much opposition from solo speedway riders and promoters, a professional midget car league flourished for a few years before the War and one of the teams, the focus of this history, was based in Stoke-on-Trent.

That the league got underway was in part due to the enterprise of Harry Skirrow who built maybe 20 or 30 Skirrow Specials using a JAP V twin engine called the 8-80 which had dirt track heads, barrels and rocker gear, albeit with a modified inlet port for the 'front' or number 2 cylinder. Introduced in 1936, these engines also

found their way into other cars, notably the American origin Eltos (*Evinrude Lightweight Two-stroke Outboard*) which started life with four cylinder motors.

One of the leading Skirrow drivers was 'Spike' Rhiando and post-War Spike was one of the first to place a production order for a Cooper — the Mk2 which came out in 1948. Spike (it is said) came up with the idea of using his Skirrow 8-80 in the Cooper and John Cooper followed suit with great success.

For 1949 JAPs developed a new crankcase for the 8-80 which was now described unimaginatively on its drawings as the 'Dry-sump 8-80.' The success of this engine in the Cooper is a story yet to be properly told.

For 1950 JAPs added new aluminium heads and barrels while beefing up the drive side of the crankcase and this engine was prosaically described on its drawings and in its catalogue as the 'Mk1'. Despite its poorer porting and less rigid rocker gear this engine dominated hillclimbing throughout the 1950's in the UK and Australia and in many other parts of the Empire. It was notoriously unreliable as a circuit race engine.

There never was a 'Mk2' that I have been able to identify. *Terry Wright*

JOHN BODINNAR

John Bodinnar died on August 30, aged 75, having been an occasional competitor and a long-time enthusiast. In 1962 he bought the Cooper Mk4-based B-series powered Cooper BMC, based on the chassis of the John Nind Mk4 JAP 1100, which he raced in Victoria until 1964 and never sold. In 1988 he also bought the locally-bodied Mk4 Cooper which Rob Kirkby had earlier brought back to Historic racing. His most notable motor sport result may well have been his fourth overall, and class third, in the 1962 Armstrong 500 in a Ford Falcon shared with Caelli and Edwards.

After leaving school he joined the RAAF, flying Mustangs. He served in the Korean War, then switched to the Army, rising to the rank of Major in the Cavalry. He served in Vietnam and did a tour with the UN Military Observers Group India and Pakistan (UNMOGIP) in the disputed territory of Kashmir.

After retiring from the Army he ran the restaurant at the top of Arthur's Seat on the Mornington Peninsula for a couple of years, but moved to north-eastern Victoria after being diagnosed with cancer. His specialist's initial prognosis was that John had six months to live. That he survived for nearly fifteen more years says something about his strength of character and determination. *Mark Taylor*

FACTORY AIR-COOLED CARS IN NEW ZEALAND

FOURTH IN AN OCCASIONAL SERIES BY MAX FISHER

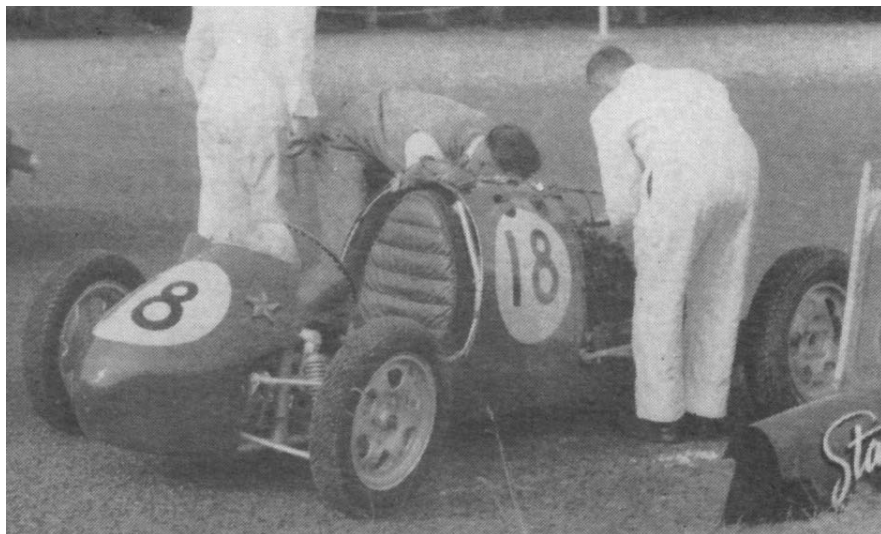
In 1953, Mr Geoff Mardon a New Zealand speedway rider, brought this car (photo below) back to New Zealand where it arrived in early 1954, fitted with a 4B JAP engine. Geoff had used this car in England at private meetings during the week at Brands Hatch along with a number of expat New Zealanders who, due to being speedway competitors could not circuit race at weekends e.g. Ronny Moore, Mick Holland Bob Wigg and many others.

The car was purchased from Mike Erskine in Southampton as a roller complete with gearbox and a new conventional alloy body. Geoff raced the Staride once in New Zealand and then sold it to Bruce Wood of Dunedin. An interesting side note was that when Geoff purchased the car in Southampton he had no trailer, so Ronny Moore towed the car behind his road car, with Geoff in the Staride. Just out of Southampton it started to rain which did not slow Ronny Moore down. Geoff claims it was like water ski-ing and in his words "bloody dangerous."

In New Zealand the car was modified to take a Manx Norton engine and a replica streamlined body fitted (fibreglass). It was claimed that this car had been run at Montlhery in France in this form by Mike Erskine and John Hegbourne for record attempts. Brian Wood raced this car quite successfully in both the South Island and in the North at Levin alternating the body-work.

The car was ultimately sold as a trade-in to Syd Jensen in Palmerston North who on-sold it to a Mr Carpenter, an air accidents inspector at Wellington. The car was then driven by Mr Robson and Mr Birch at Levin. The car was then extensively modified and fitted with two 500cc Matchless vertical twins which were supercharged and fed from one supercharger. When going it was very quick but was also very temperamental. It finally blew up and caught fire.

The remains were sold to Colin Wittrick who used some of the components to make up a clubman's type sports car. The remaining pieces were dumped.



CLASSIFIEDS

For sale: Gilbert JAP 500, built 1968 by Roy Gilbert with 1938 4-stud JAP 500, upright Norton box, 10-inch steel Mini wheels. Spares include registered trailer, small Shorrock blower, some engine, gearbox and carburettor spares. \$10,000 or offer, John Cooper, 02 4982 6370, 0407 202 436

For sale: Cooper Norton Mk.5, driven by Garry Simkin at Laguna Seca Cooper tribute, 2006. Ian Gordon, Sears Point, California, gordonracing@msn.com or phone: 001 707 996 1546

Must clear: One each 3.50 x 19 and 4.00 x 19 tyres suit Morgan Three-wheeler, new, \$40 each. Subaru Liberty heavy duty tow hitch, new \$50. Hayman Reese Load stabilising hitch \$50. Terry Wright 02 9418 2974

Historic racing car collection for sale

1951 Cooper Alta sports, chassis 51848, 930cc 4-cylinder Alta engine, aluminium body. Not road registered. HRSCC log book, VCC identity card

1953 RGR Triumph F3 single-seater, chassis 53302, alloy body, some engine spares included, HRSCC log book, VCC identity card, registered with UK 500 Owners Association

1949 Cooper Mk 4 F3 single-seater, ex Peter Collins UK, Alan Freeman NZ. Massive history. This car comes as a rolling chassis, new alloy body, complete with Norton gearbox and clutch. It can be had as a complete package with the engines and spares listed below. Registered with UK 500 Association.

2 x 4-stud JAP engines, disassembled. Some road-race components and a heap of both new and used spare parts. To be sold as a package, as I will not split engine parts. Would prefer to sell with the Mk 4 Cooper.

All the above are in storage in NZ. Sensible offers only, no dreamers. Max Fisher, phone/fax New Zealand 09 534 2245, 93a Mellons Bay Rd, Howick, Auckland NZ

The drum assembly consists of these major components: backing plates; wheel cylinders; brake shoes; return springs; brake drums. Let's examine them in that order.

Backing plates. The backing plate is the mounting platform on which the cylinders and shoes are attached, and through which the braking forces are transferred to the chassis. Therefore it stands to reason that the plates must be strong enough to perform this vital function without flexing, or worse still permanently bending under heavy braking loads (like when a wheel locks up and tries to tear the backing plate off the car).

It is common to find backing plates on racing cars almost drilled out of existence in an effort to direct cooling air into the brake assembly. Worthy as this objective is, a bent and/or flexing backing plate (multiplied by four) will result in the brake pedal feeling decidedly soggy on hard application, particularly when the wheels are rotating.

So make absolutely sure the backing plate is not already bent through accident or misuse, because the brake shoes will then not lie square with the drum, resulting in excess brake pedal travel as the shoes square up under pressure. If you find plates bent, replace or straighten them, even reinforce them if necessary. If you want to drill holes, drill them at the outer diameter of the plate to encourage air flow over the brake linings and inner surface of the drum, where the heat is actually being generated.

Wheel cylinders. A single leading brake assembly has one wheel cylinder per wheel. A twin leading brake has two. A twin leading shoe brake is preferable to a single leading shoe, because the inherent self-energising characteristics of the leading shoe result in lower required pedal pressures. (In a typical single leading trailing brake assembly, for example on an MG TC, the leading shoe gives three times the braking effort of the trailing shoe for the same applied hydraulic pressure).

Obviously then, a twin leading shoe brake setup is best, particularly on the front wheels which do most of the braking due to weight transfer. Factory Coopers mostly used the 2LS Lockheed brakes front and rear as fitted to the front of 1950s Morris Oxfords. These 8 dia. x 1 1/2 wide brakes are ideal, and more than adequate for our needs, considering the low weight and speed of our air cooled cars.

Note that that the energy of motion (kinetic energy), which brakes change into heat energy as they stop the car, is directly proportional to the weight of the car, and to the square of its speed. Technically therefore we can say that brakes are simply energy transformers. The quicker they get hot, the more efficient they are. The trick is

DEMON TWEAKS ON BRAKES PART 3

to cool them off between corners, so they remain efficient. If our brakes are set up right, our lightweight cars should be able to outbrake any other drum-braked car out there, which helps compensate for our comparative lack of horsepower, and makes racing them fun!

The main essential for any hydraulic cylinder is that it doesn't leak. Our Lb cars are now 50 years old, so wheel cylinders should be double checked for corrosion and bore size. A corroded bore surface will quickly damage the rubber seals. And don't be fooled if the bore looks OK.

JAKE'S LAMENT

*There once was a racer called Jakes,
Whose car was one of those makes
That went very fast
But he always came last
Because he neglected his brakes.*

*One day at the track
Jakes' pedal went slack
When he looked like having a win.
He changed back two gears,
Which locked up the rears,
And he went off the road in a spin.*

*When Jake pulled off a wheel
The damage was real
The brake shoes fell off on the track.
The springs were all shot where they'd
been stinking hot
And the linings were charred and
burned black.*

*Now Jakes wife standing by
Started to cry,
She said "Darling, why don't you retire?
Just look at that mess!
I can't stand the stress!
Your car looks like it's been in a fire!"*

(Long pause)

*Now one night when in bed
A voice to Jake said
"Now listen and take goodly heed,
Your brakes need to cool
Between corners, you fool,
If you want to stay long in the lead."*

*So Jake grabbed a big drill
And switched on his mill
And drilled holes to let in the breeze,
He made scoops and finned drums
And now whistles and hums
And dives under Dick Willis with ease!*

Measure it for size: it could have been honed several times in the last 50 years and be way too big. Rubber seals are like piston rings - insufficient tension equals leaks. A cylinder more than 3 thou over-size should be replaced, or preferably sleeved back to standard diameter. A stainless sleeve is impervious to future corrosion and will last forever. Piston clearance should be not less the 2 thou, and not more than 6 thou.

Insufficient clearance may cause the piston to seize, maybe not while in use, but while standing long periods between meetings. On the other hand, with oversize bores, the rubber cup will have less wall tension and will leak prematurely.

Also while bleeding the brakes, a rubber cup with insufficient wall tension may collapse on the return stroke of the master cylinder, and draw air back into the system as fast as you are getting it out. Excess piston clearance also allows the sharp inner edge of the piston to tilt, and nibble away at the back edge of the rubber cup under pressure.

If the cylinder has rubber boots always replace them. If you are assembling the cylinders yourself, lubricate the pistons with special rubber grease available in small tubes from speed shops. General purpose grease makes the rubbers swell. Brake fluid is a very poor lubricant and dries out quickly. Unlubricated pistons will get sticky in their cylinders if left standing too long between race meetings.

Brake shoes and brake linings. There's not much we can do with the brake shoes except make sure they're all the same and not bent or damaged.

If the brake lining has worn thinner on one side of the shoe than the other, it's a sure sign either the shoe or the backing plate is bent. Hold the shoe in your hand and sight down the web. This will give you a pretty good idea how straight it is. If it is obviously bent, and a replacement isn't available, some careful levering might improve things. Always do this before replacing the linings.

Don't be too worried if one end of the lining is more worn than the other. This happens in some floating-shoe brake designs and there's not much we can do about it. Do not be tempted to drill the shoes for lightness, as this will inevitably weaken them, and allow them to flex under pressure. Make sure the shoes are all exactly the same radius and shape, and haven't been welded on the tips by a blacksmith in order to get more life out of the linings when all the adjustment's been used up. It happens.

Now the brake linings: this is the difficult part. Once upon a time we could say, "Use Ferodo AM4 brake linings and your problems will be over." However since the Health and Safety people around the world

banned asbestos-based brake linings, nobody has produced a lining for drum brakes anything like as good as AM4, because the market is too small. The next best product is a non-asbestos material meant for classic bikes, but which works well in lightweight cars. In SA phone 08 8390 1626 and ask for Chas, or Queensland 07 3264 5950 and ask for Mike. Either of those two sources should be able to supply linings only, or bond your own shoes if you wish.

The linings will be oversize, and will need to be ground back to a thickness and radius to suit your drums, which will almost certainly be over standard size after all these years.

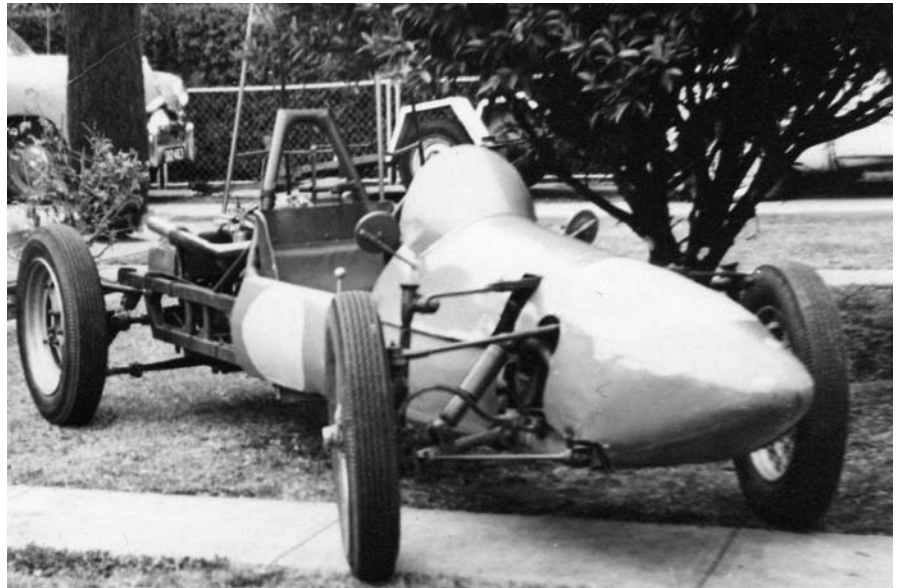
Bonding is preferable to riveting. The bonding process strengthens the shoe, and the lining lasts longer. After bonding, the lining should be ground back to its correct thickness and radius (dependent on drum diameter) in a special machine known as a radius grinder. This gives a 100% lining contact immediately, and eliminates the old fashioned bedding-in process, so that after a couple of gentle laps you're ready to race.

Don't adjust the linings too close to the drum in an effort to get a super high brake pedal. A little air space between the lining and drum surface allows more effective cooling. A brake that's rubbing just gets hotter and hotter, the coefficient of the lining decreases as the temperature rises, then comes the dreaded brake fade!

Brake shoe return springs. Not much to worry about here other than to make sure that they are matched left to right, are not stretched, and have not lost tension because of overheating at some time in their exciting lives.

Brake drums. Factory Coopers have the ideal brake drum. The heat generated on the inner face of the drum is conducted through a thin cast iron sleeve directly into a magnesium wheel, which is not only moving forward, but also rotating. This huge heat sink stirs up the air as the car progresses and so cools itself rapidly.

Specials however usually have detachable brake drums. If they are currently made of steel (like TC MGs), the brakes will never be very good, because steel has a much lower coefficient of friction than cast iron. Try to find alternative cast iron drums and adapt them. It will be worth the effort. Brake drums must run dead true, and be perfectly round. If when adjusting the shoes, you find a 'tight/loose' situation as you rotate the wheel, you have drums that need truing up. Ideally they should be mounted on the hub on which they run, and machined in a dedicated brake-drum lathe. Holding a brake drum in a three- or four-jaw chuck is not the way to go, no matter how carefully you hold it. Apart from the



The Linton 500 (above) was laid down by Bruce Walton and Garth Rhodes in the late 1950s, and completed by Garth and Don Uebergang, using an MSS Velocette engine and BSA gearbox. Don named the car the Linton, after his property Linton Grange, near Tatura, and raced it at Darley, and ran it at hillclimbs at Templestowe and Lakeland. The car later spent a long time in South Australia, then was bought by a pilot who lived around Bacchus Marsh. It has since dropped from sight, and a longtime friend of Garth's, Colin Sullivan (03 9570 6699, or 0419 312 299), is trying to find it. Contact him if you can assist.

difficulty of setting up accurately off a worn surface, excessive pressure on the outside of the drum may distort it. Removal of the drum from the chuck then allows the drum to relax and go out of shape. Drilling a few holes in the outer circumference of the drum, again in line with the brake linings (not of course on the braking surface), will act as an extractor fan and draw air through the backing plate, assisting the scoops if fitted.

Assuming all of the above is in order, all that remains is to adjust and bleed the system. Always adjust the shoes first, then bleed. It's always easier with an assistant. Top up the master cylinder reservoir(s), and undo the most distant bleeder screw. The traditional method of bleeding is to loosen the bleeder screw on the downstroke of the pedal, and tighten it on the upstroke. This certainly does the trick, but it also wears out the bleeder threads, and leaves the assistant confused sometimes as to whether he's supposed to be 'up' or 'down'.

If you have the Girling centre-valve 'claypipe' type master cylinders fitted, try just undoing one bleeder at a time, leaving it open, and pumping the pedal up and down, at about one stroke a second, catching the displaced fluid in a glass jar, so your assistant can see when the bubbles stop). When they stop, tighten the bleeder and do the other wheel cylinders the same way. Keep the reservoirs full or you'll have to start all over again.

With a bit of luck you will end up with a

good high pedal. If not, go back to the old up-on/down-off routine. If you still have a low pedal (i.e. lots of travel) after you have adjusted and bled your brakes, buy or improvise some hose clamps, and carefully clamp off all the brake hoses. Theoretically the brake fluid will now have nowhere to go, so apart from the free play the pedal should be immovable. If it isn't, check the master cylinder. If the pedal is immovable, as it should be, hold your foot on the pedal, and have your assistant (wife, child, grandma), release the hose clamps one at a time. The pedal drop should be equal for each wheel. Any excess pedal drop on one wheel points to a problem in that wheel.

There is much more to the subject of drum brakes than the abovementioned, but needs be we stop here. Good luck and be careful! *Demon Tweaks*

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