VALVE BOUNCE

DECEMBER, 2020

Bryant Park again echoes to the sounds of motorsport! 2020 was a year many would like to forget, but we've made it through and we're back racing, with good people, great cars, and Australia's foremost hillclimb venue: what's not to like?!

Enjoy a fantastic Christmas and best wishes from the GCC Board for a wonderful gathering with family and friends and a refreshing break– see you all back in 2021.

- Gippsland Car Club Inc PO Box 493, Morwell, 3840 A3759. ABN 76 691 013 424
- Website: gippslandcarclub.com.au
- Track: Bryant Park, Bill Schulz Drive, Yallourn, 3852.

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MAGAZINE CONTRIBUTIONS Forward by email to icfm710@gmail.com Contributions should be forwarded by the third Friday in the month.

BANK DETAILS: Bendigo Bank, BSB 633000, Account Number 1574 73836, Gippsland Car Club

WEB PAGE: **www.gippslandcarclub.com.au**

GIPPSLAND CAR CLUB VISION: To inspire and enable people to participate in motor sport.

GIPPSLAND CAR CLUB MISSION: To provide affordable motor sporting experiences for people of all abilities in a safe and friendly environment.

CALENDAR 2020

PLEASE NOTE CHANGES TO THE CALENDAR:

- **The GCC 2020 Annual General Meeting for election of office bearers, etc, has now been cancelled, and will be rescheduled on a date to be determined at some time in the future.**
- **The canteen will not operate at any events in 2020**
- **Tentative dates for the Victorian Hill Climb Championship rounds for 2021 have been included on the Calendar – these dates will be finalised in the near future.**

DECEMBER

Saturday to Sunday 12/13	Shannons Nationals at Sandown
Sunday 13	***GCC Club Khanacross at Bryant Park***
Saturday 19	*Private track hire*

CALENDAR 2021

JANUARY

Tuesday 5	Valve Bounce Collation
Tuesday 12	Board Meeting, 7.00 p.m.
Sunday 17	VHCC Round 1 at Rob Roy
Friday to Sunday, 24/26	TCR Australia at Symmons Plains
Saturday to Sunday, 30/31	TCR Australia at Baskerville

FEBRUARY

Tuesday 2	Valve Bounce collation
Friday to Sunday, 5/7	Supercars at Bathurst
Tuesday 9	Board Meeting, 7.00 p.m.
Thursday to Sunday, 11/15	Mansfield High Country Holden Nationals
Saturday 13	**VHCC Round 2 at Bryant Park**
Saturday to Sunday, 20/21	Shannons Nationals **AND** Australian Superbike Championship at Phillip Island
Friday to Sunday 25/28	Supercars at Bathurst
Saturday 27	*Targa Florio at Bryant Park*
Saturday to Sunday, 27/28	OzEnduro Cup at Winton

MARCH

Tuesday 2	Valve Bounce collation
Tuesday 9	Board Meeting, 7.00 p.m.
Thursday to Sunday, 18/21	Australian Grand Prix at Albert Park
Saturday to Sunday. 27/28	VHCC Round 3 at Mt Leura, Camperdown

APRIL

Friday to Sunday2/4	Shannons Nationals/TCR Australia at Bathurst
Tuesday 6	Valve Bounce collation
Saturday to Sunday, 10/11	Supercars at Symmons Plains, Tasmania
Tuesday 13	Board Meeting, 7.00 p.m.
Sunday 18	**VHCC Round 4 at Bryant Park (PIARC)**
Monday to Saturday, 19/24	Targa Tasmania
Saturday to Sunday, 25/26	*Ford Four Track Hire at Bryant Park*
Friday 30 to Sunday May 2	Shannons Nationals/TCR Australia at Sydney Motorsport Park

MAY

Saturday 1	*Impreza WRX Club track hire at Bryant Park*
Tuesday 4	Valve Bounce collation
Friday to Sunday, 7/9	Supercars at The Bend, SA
Tuesday 11	Board Meeting, 7.00 p.m.

Friday 14	**GCC ANNUAL GENERAL MEETING AND ELECTION OF OFFICE BEARERS, CLUBROOMS, 7.OO P.M.**
Saturday to Sunday 22/23	Historic Winton
Saturday to Sunday, 29/30	Supercars at Winton

JUNE

Tuesday 1	Valve Bounce collation
Saturday to Sunday, 5/6	VHCC Round 5 at One Tree Hill, Ararat
Tuesday 13	Board Meeting, 7.00 p.m.
Friday to Sunday, 11/13	Australian Endurance Championship Round 2 at Winton
Friday to Sunday, 18/20	Supercars at Hidden Valley, NT
Friday to Sunday, 25/27	Shannons Nationals/TCR Australia at Morgan Park

JULY

Sunday 4	VHCC Round 6 at TAFE Logic Centre, Wodonga
Tuesday 6	Valve Bounce collation
Friday to Sunday, 9/11	Supercars at Townsville, FNQ
Tuesday 13	Board Meeting

AUGUST

Tuesday 3	Valve Bounce collation
Tuesday 10	Board Meeting, 7.00 p.m.
Friday to Sunday, 20/22	Supercars at Sydney Motorsport Park
Sunday 22	VHCC Round 7 at Broadford

SEPTEMBER

Sunday 5	*Austin 7 Club OST at Bryant Park*
Tuesday 7	Valve Bounce collation
Friday to Sunday 10/12	Shannons Nationals/TCR Australia at Sandown
Saturday to Sunday, 11/12	Supercars at Waneroo, WA
Tuesday 14	Board Meeting, 7.00 p.m.
Sunday 19	*MOTORSPORT AUSTRALIA Club Challenge at Bryant Park*

OCTOBER

Sunday 3	*Kyneton Car Club track hire at Bryant Park*
Tuesday 5	Valve Bounce collation
Thursday to Sunday, 7/10	Bathurst 1000
Tuesday 12	Board Meeting, 7.00 p.m.
Friday to Sunday 15/17	Shannons Nationals at The Bend
Saturday 16	*MG Car Club track hire at Bryant Park*
Friday to Sunday, 22/24	Australian MotoGP at Phillip Island

NOVEMBER

TBA November or December	TCR Australia Bathurst International
Wednesday 3	Valve Bounce collation
Saturday to Sunday, 6/7	Supercars in Auckland, NZ
Tuesday 9	Board Meeting, 7.00 p.m.

DECEMBER

Friday to Sunday, 3/5	Supercars at Surfers Paradise, Qld
Saturday 4	**GCC Multiclub Twilight Hill Climb at Bryant Park**
Tuesday 7	Valve Bounce collation
Tuesday 14	Board Meeting, 7.00 p.m.

NOTE:

- All dates shown above are subject to change - please check with the organisers of the events to confirm the dates.
- Events shown as **Bold** are rounds of the Gippsland Car Club Club Championship (some of these dates may be changed)
- Events shown as **Bold Italics** are rounds of the Gippsland Car Club Khanacross Championship.
- GCC Practice Days are for members and associate members only, and will run from 1.00 pm until 4.00 pm.
- If you believe that any of the dates listed are incorrect, please contact John Bryant and they will be amended.

Editorial Ponderings:

You may have noticed a change at the top of the Board Members' list this edition. A casualty of the COVID-19 lockdown this year was the lack of a club AGM, at which members would be elected. This meant that serving Board members have had to continue, even though some may have intended to step down at the AGM. Fred, Janet and now Chairman Mick have each decided to retire during the quiet time of COVID restrictions. A number of people have stepped into these positions, at least to get us to the next AGM, where YOU will have an opportunity to join the Board.

On a similar note, I am always surprised at how little some car club members know about how their club is run, and the work that goes into it. In our case, it seems many members rock up to a hillclimb, run for the day then leave, without realising the paperwork that lead to the day happening; the working bees to prepare the venue; the government and MA regulations to be met; the volunteers that were there from early morning to set up cones, timing, barriers, etc – and of course, to pack it all up at the end of the day; others who stand outside in all weathers to line up cars, check safety matters, run the canteen…the list is seemingly endless! How did you think this all happened – the hillclimb fairies?

When these tasks keep falling onto the same shoulders, enthusiasm can be tested. For 2021, when you're making your other New Year resolutions you don't intend to keep, why not resolve to join the club Board? Or offer to help? Or arrive early to help set up…or pack up? Or, do a short MA course and become one of our accredited officials – all these will help carry our marvellous club into through the coming years.

And before I forget this…with the coming of the festive season, reflection on the year past, and all that: this has been a HUGE year at the editorial keyboard. I just happened to take over the reins from the masterful Bill Revill at a time when COVID restrictions kicked in, and motorsport ceased.

Faced with the prospect of many GCC people sitting at home in isolation, wanting to keep contact with the membership and maintain the appetite for motoring, the task of generating a monthly VB swelled as there were no longer event supp regs, results and photos to fill the pages. From a moderately-demanding task, there was now 44 pages to fill each four weeks! Now, the point to all this rambling (hooray!) is I'd like to offer an **ENORMOUS** thank you to all those people who wrote articles, sent in pictures, referred me to items of interest, my fellow magazine editors around the country (and in one case, overseas) who generously allowed me to pilfer items, and those of you who went out of your way to be complimentary about VB and provided encouragement to keep going. I mentioned before how there are people behind the scenes keeping this club going. You may not have thought about this, but each month I send the final VB copy in pdf form to John Bryant and his wonderful wife Carol, who print it all off, collate it, address it, and post it. While sometimes there are helpers, this year due to isolation the job has fallen to the long-suffering John and Carol, and I'd like to heartily thank them both on behalf of the Club.

We're back to running events so there is now a trickle of results and so on to occupy some pages. While I hope to continue to provide other items of motoring interest, this has relied heavily this past year on contributors such as my good mate and leading engineer Bill Freame; the widely-experienced Bill Revill, and of course, the reliable John Bryant, with his magnificent recollections of the early days of motorsport with the GCC, and Australia generally. Thank you all for your items and support during the past year. 😊

And now, to return to our normal programming:

It seems to my sometimes-blinkered view of motorsport that it is often not so much a competition between enthusiastic drivers as it is between wallets. The reality is that no matter where you fall in the hierarchy, there will *always* be people with more funds than you, and people less well-off than you are: how you view the 'unfairness' of this situation is arguably a reflection of your character.

When I began competing in motorsport (are you comfortable there on my knee, sunny boy?) the 'done thing' was to drive your road-registered car to the track, generally arriving weathered and partially deaf from hours of roofless motoring on the high side of 4,000 rpm plus along the highway, arrive, toss (gently!) out the girlfriend, unpack the boot, pump up the tyres, and go racing. At the end of the day, the process was reversed and you arrived home fairly well knackered but having enjoyed yourself sufficiently that you would turn around and do it all over again in a couple of weeks. And quite possibly with another girlfriend, if today's companion turned out to be less than impressed by the day's experience. How could that be? Anyway…

After an enforced break from competing while waiting for the wallet to cool after house building, starting a family – the usual fund-sucking life events – I was taken aback to find the Phillip Island pits for a club sprint full of semi-professional level race cars, enclosed trailers and marquees. Almost everyone now trailered to the event, cosseted in their newish 4WDs with the climate control turned up and refined strains of Barry Manilow in place of the relentless bellowing of a raucous exhaust. I can't grizzle *too* much, as I have now joined this set, with my life expectancy probably the better for it.

Quite aside from how you travelled to and from the event, it seems to me now there is a chasm in the bank balance-frying value of competition cars. This seems most evident at a sprint meeting, where you still have your 'drive-it-to the-event' class, and your 'drive what the humble budget can afford' class, but beyond that the continuum stretches ever further to include late-model race cars that must have only recently been released from the professional team that built and raced them in open competition. These owners are impressive: marquees, catered meals and even their own pit crew in some cases. I have even witnessed a semi-trailer unloading a number of glossy, be-stickered go-fast machines while their owners walked fresh and enthused from on-site accommodation. Are these people doing it 'better' than the grass-roots membership? I don't know, and probably don't care that much. My point is (finally! You said?) that one of the interesting features of club-level motorsport nowadays is the breadth of entries, abilities and funding visible during a walk around the pits. While this diversity is probably healthy for our sport, it is true that trying to match the spending of people further up the timesheet in your class may not always be possible, and this can be frustrating for some. So…applause for one group trying to address this perceived inequality – or at

least keep it manageable. We're used to 'formula' racers, where such things as engine capacity is restricted, or a controlled make and model. What got me pondering this whole affair is there is actually one formula based largely on finances: I refer here to the Nugget racers, that we had visit us at Bryant Park last weekend. I visited their web site for the Nugget Nationals, and was impressed to read the regulations controlling the competition. It was refreshing to find a group who were focused simply on having the most fun possible for the motorsport dollar. I wonder if we could ever get that philosophy into 'Supercar' racing? Not likely. But such an outlook for me seems to hark back to the origins of club level competition, where it was all about just having a go, and widening the smile.

Maybe motorsport has become too serious? Perish the thought. 😊

-IM, the Ed.

Chairman's Report – December, 2020

Please see comments in Editorial, and John Bryant's 'From the Board'

What do you need to know now?

- **CLUB CHAMPIONSHIP 2020** ←**CANCELLED**

Remaining Club events for 2020:

- Sunday, December 13th GCC khanacross

Next GCC MULTICLUB HILLCLIMB

- There are no hillclimbs remaining for 2020

- **VICTORIAN HILL CLIMB CHAMPIONSHIP 2020**

…has been cancelled ☹

BUT - it's back in 2021! 😊

- **REMINDER TO ALL COMPETITORS**

Electronic-only entry **now applies** for all events. Go to the Motorsport Australia website for access.

Save the trees, forget the paper, see your event SuppRegs for more info or help if required.

➢ From the AOMC:

Feb 27, 2021

Rally Retro Festival

METEC Driver Education Centre

112 Colchester Road

Bayswater North, Victoria

Apr 17, 2021

Echuca Swap Meet

Rotary Park, Rose Street

Echuca, Victoria

Apr 18, 2021

Gippsland Vehicle Collection - Swap Meet

1A Sale Road

Maffra, Victoria

CLUB PERMIT APPLICATIONS:

If you would like to apply for a Club Permit for your classic vehicle through the Gippsland Car Club, a reminder that you need to contact our Club Permit Registrar Ken Neilson to begin the process.
Please note that:

- while he is happy to be contacted regarding club permits including eligibility and processes, all the information you need should be found on the Club website.
- Ken does not attend to club permit matters in person from home: any enquiries are appreciated by phone or email
- All club permit applications and renewals are attended to by mail as hard copies are required to be signed / kept.

You can contact Ken at:

Ken Neilson
Club Permit Registrar
P.O. box 1377, Traralgon, Vic, 3844
Mobile: 0409 427199

BITS AND PIECES, INCLUDING 'FROM THE BOARD '

- John Bryant

1. **MEMBERSHIP SUBSCRIPTIONS 2021.** Membership subscriptions are due and payable as from, January 1, 2021. **We would ask you to renew your membership for 2021 any time from now on. A membership application form is contained in this edition of Valve Bounce, and is also on the website**. Payment by direct debit would be appreciated. A very sincere thank you to all who have paid so far – this makes life so much easier for Ken Neilson to keep up with the renewals. Please remember that if you wish to compete in any events early in 2021 you will need to be a financial member.

2. **NEW GARAGE.** The framework of the new garage has been erected, and some of the Colourbond siding has been fixed in place. The aim was to have it finished by now, but circumstances have prevented this from occurring – the garage will be completed in the very near future.

3. **DEFIBRILLATOR.** Thanks to Robert O'Gorman, the pads on our current defibrillator have been replaced, and the machine is now ready for operation if ever needed, which hopefully it will not.

4. **BOARD POSITIONS.** You may have noticed a couple of vacancies on the Board in recent times. Chairperson Mick McGinn has now resigned, leaving one more vacancy. Thanks to Mick for his leadership as Chairperson. The vacancies have, however, now been filled internally. Secretary Rhys Yeomans has added Competition Secretary to his brief, John Bryant will look after the Club Points Scorer position, whilst Ken Neilson has volunteered to take on the Acting Chairpersons role until the next AGM in May, 2021.

5. **POSITION VACANT – CANTEEN.** After a number of years looking after the Canteen, Helen Jennings has retired, as she has to care for her elderly father as well as tending to her normal household and work duties. A very big thank you from all in the Club to Helen for looking after our Canteen. Her resignation has now left us in the proverbial pickle – do we have any members prepared to take over this voluntary position? If you believe that you might be able to assist, please contact Ken Neilson or Rhys Yeomans with your offer of help.

6. **CALENDAR 2021.** The Calendar as it currently stands is included in this edition of Valve Bounce. At this point in time, there are only three hill climbs listed, and no sprints and no khanacross events. Hopefully the remainder of the hill climb and all of the khanacross events will be included in the January edition, but sprints may prove to be a problem. East Sale events may or may not occur in 2021 – this will not be known for some time. Do we pick out half a dozen other sprint events at Winton, Sandown and Phillip Island to make up our sprint championship, or do we not have a sprint championship at all in 2021? The problem with sprints at these tracks is twofold – distance and cost, with a further complication that open wheeler cars cannot run in sprint meetings at Sandown. The question is – do we or do we not run a sprint championship in 2012, or do we just confine our Club Championship to hill climb events?? Your opinion would be appreciated.

7. **OFFICIALS.** We are in desperate need of people to act as officials at our hill climb events. The only area of officialdom that we appear to have an adequate number is that of scrutineering, whilst all other areas are distinctly light on. We desperately need people to train as:
    - Stewards
    - Clerks of Course
    - Timekeepers
    - General Officials

    Most of these courses can now be done online, and on the job training after completing the online component is easy. At the moment we only really have one Clerk of Course, one Steward, possibly up to three timekeepers (one of these competes on a regular basis), and whoever we can accost on the day to be a starter etc..

    The current Clerk of Course, Chief Timekeeper and Steward are all close to the end of their tether. The steward will not be available for much of next year, and the same may also apply to the Clerk of Course and Chief Timekeeper. Are you willing to undertake the relevant course to take up any of these positions in the near future?? The more people who are prepared to assist, the less each one would have to do, and then the person would not necessarily have to be at all of our hill climb and khanacross events, as is currently the case.

    Age or gender is not a barrier to undertaking any of these positions – one of my sons was a CAMS-accredited timekeeper at the age of 12 many years ago. Wages are not necessarily good, but conditions are pleasant, with undercover air conditioned/heating accommodation provided. Contact Ken, Rhys or myself if you are interested in any of the above.

Understanding the Weber Carburettor

…….by Bill Freame, together with advice and information from Phil Buggee.

(Ed: Bill provided an excellent and informative article in last month's VB about the history, evolution and applications of the Weber carburettor – this month he explains how the carburettor operates - and its pitfalls!)

Triple DCOE carbs Source: www.fordsix.com

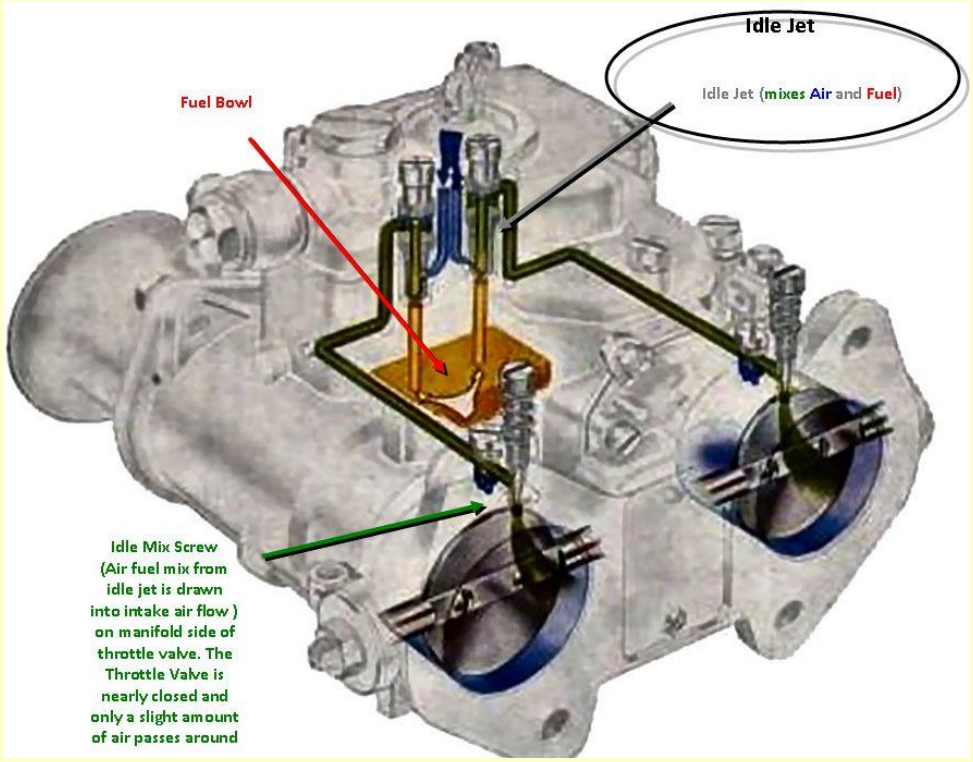
Performance carburation or mechanical fuel injection were the choices available for racing engines after the Second World War ended. Mechanical Fuel Injection came to the fore because of the need and requirements to keep working under massive 'G' forces when performing aerobatic manoeuvres in the heat of fighter aircraft battles. Racing cars generally only had to contend with horizontal 'G' forces, limited by the available grip from their skinny racing tyres: the Weber, the Solex or the SU carburettors could successfully perform under those stresses. They were very popular then because the best racing mechanics at that time understood how they worked and how to tune them. Mercedes Benz successfully utilized Bosch mechanical injection on their 1950s race cars: this is less complicated in operation and provided injection fuel pressure many times higher than with carburettors. Fuel is forced through from the metering unit to the injectors, thus generating high pressure, whereas by comparison, the fuel in a carburettor is only at normal air pressure in the float bowl - the fuel level maintained by a float and controlled by a fuel valve. With the quite recent introduction of electronic fuel injection controlled by computers, all the injectors are connected to a pressurized fuel rail. Using a computer to operate the injection has now become very attractive to the younger generation. They can drive a keyboard on a computer so they don't need to understand how a carburettor works or how to tune them. That is, until they get involved in historic racing categories!

The Weber and SU carburettors are the popular choice in historic racing because when they are sized correctly for the application, they can give outstanding performance. As the heading of this story clearly mentions understanding Weber carburettors, we will be concentrating on their strengths and adjustability, paying particular attention to the DCOE side-draught Weber. Weber have also made less flexible budget carburettors for production cars, with fixed chokes and simple jetting configurations, all to a manufacturer's production car price. They have also made carburettors for ever-tightening emissions regulations, until electronic injection became the sensible solution for all production cars.

The Weber DCOE range of carburettors were available from 38mm butterflies all the way up to rare 58mm butterflies. The most popular choices were and still are 40mm and 45mm, with a broad range of chokes relatively easily acquired and available from tuners and resellers. The choke sizes selected for driving at Phillip Island will possibly be a couple of millimetres larger than selected for a tight hill-climb track where the sensible tuners will be seeking more bottom end of the rev range response.

The DCOE in detail:

The fuel flowing into the float bowl at up to 3 PSI must pass through a very fine mesh filter before it is controlled by the needle and seat valve, which is operated by two joined floats in unison. The needle and seat unit are a combination that is available in several sizes, the larger sizes used when high fuel demand or richer air/fuel mixtures are expected, as when using E85 or Methanol. Cleverly, using two joined floats that are set widely apart, is very effective at controlling the fuel level in the float bowl during high 'G' loads of braking or cornering. The DCOE is a twin-choke carburettor whose centres are about 90 millimetres apart: the float bowl extends down between them and fuel for all the circuits are drawn from near the bottom of that bowl, but above where any sediment or water would settle.

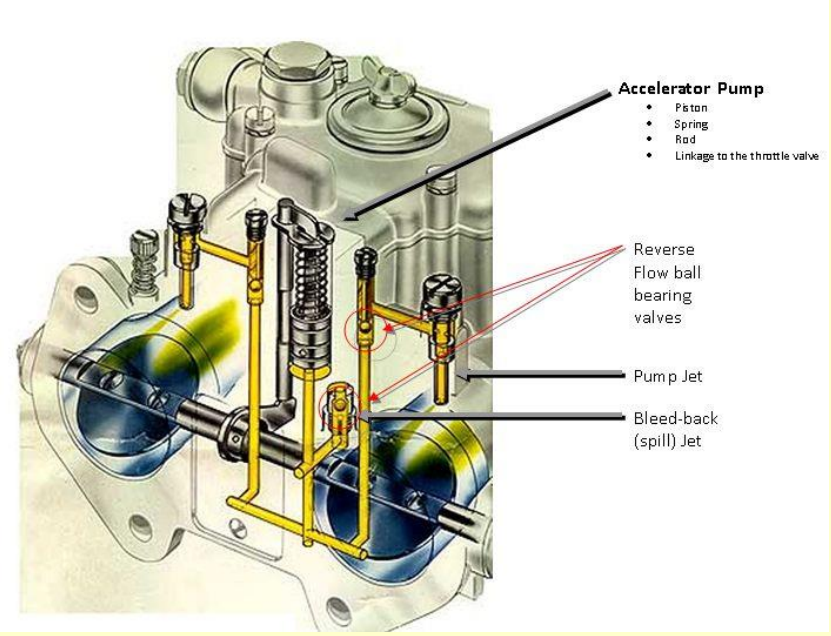


There are multiple fuel circuits that draw from low in the bowl and these will now be covered in order (*Ed: please refer also to the diagram above)*:

- There are two idle jets and two main jets that are easily accessible from the top of the carburettor. The idle jets draw fuel from the float bowl and discharge into the restricted air flow created by the almost-closed butterfly. The fuel can enter just above the closed butterfly and also just below the butterfly where it is controlled by an idle mixture adjusting screw. The idle jet range provides a coarse mix of fuel to the air flow, while the mixture adjusting screw provides a finer adjustment.
- Above the main jet is an emulsion tube and above that is the air corrector jet. All of these are able to be easily removed to be changed to adjust the air/fuel ratio in various parts of the rev range or when changing the choke size. The fuel from the main jet and emulsion tube is mixed with air from the air corrector jet and introduced to the centre of the intake air flowing through

the carburettor via the nozzle in the centre of the auxiliary venturi. Additionally, the idle jet will continue to contribute to the overall air/ fuel ratio.

- To avoid a lean-out flat spot when the throttle is suddenly banged open, there is an enrichment circuit that is called the accelerator pump, which is an adjustable jet to tune out the flat spot. This comprises a brass piston that is spring-loaded to force the fuel through the circuit (*see diagram)*. To control how much fuel is delivered, there is a pump spill jet in the base of the float chamber that will allow some of the fuel to bleed off so that there is less fuel delivered into the air flow. As the spill jet is at the bottom of the float bowl, it can only be reached by removing the top of the DCOE, which will then expose the floats to careless damage! Accelerator pump fuel is added to the air stream near the bottom of the main venturi to quickly enrichen the air/fuel ratio before passing through the butterflies.



What I have been referring to as a choke is actually correctly called a venturi. In the DCOE they are able to be replaced; they are easily removed to be interchanged with a larger or smaller inside diameter venturi. The internal shape is critically important to optimise the airflow through the venturi, with the choke point airflow fed by a radius to maximise the draw upon the fuel feed at the choke point. Beyond the choke point it gently tapers up to almost the butterfly diameter, all the time trying to keep air flowing through the venturi attached, rather than tumbling. So please understand that the air flowing through the venturi meets a radius that compresses it down to the choke point, then allows it to pass further through an expanding taper until it exits into either side of the butterfly and then enters the inlet manifold, searching for an open inlet valve.

To change the venturi size there are a few things that need to be removed first. The air approach side is where the venturi is removed and installed from, so the trumpets or air filter housing will probably need to be removed. Next to be removed is the auxiliary venturi which locates via an outer ring that minimally disturbs the air flow. There is also an inner ring that has a projecting nozzle that can dump fuel into the centre of the venturi airflow. Just like almost everything else on these Webers, there is a range of auxiliary venturis that can help tune the air/fuel ratio.

On some DCOE's the main Venturi is located and retained by a pointed screw, as is the auxiliary venturi. These are needed to prevent these venturis from moving up or around. It shouldn't be necessary to advise that they don't need to be tightened very much: just enough to stop the venturis from moving. Frequently it will be discovered that some previous operator has overtightened them, probably when they installed the wrong (too big) size venturis.

I sometimes feel that we can't impress upon tuners enough how important the blend from the neat radius to the departing taper is in the primary venturi. Consider it like an aeroplane wing where the correct curve shape will give you lift to take off. However, when some hotrodder has access to a lathe and bores them out larger, (now just a tube,) he wonders why it didn't make more power. I

refer you back to the aeroplane reference above. His 'plane is using flat planks of timber for wings - there is no lift from the wings and he will never have enough runway to get airborne! A fuel injection throttle body can be a straight, parallel or tapered tube as it doesn't need to provide a venturi effect: the fuel in an injection system is being delivered by the injectors, under several atmospheres of fuel pressure and usually further down the inlet manifold, below the butterfly, but not always.

Finally, because the main circuit jetting is easily changed with just a screw driver, it is not unknown for some crews doing events such as Targa High Country to swap the main jets, emulsions and air correctors as complete assemblies to swap them over at Sawmill Settlement before the end-of-day stage run up to Mt Buller ski resort where the air is much thinner at 1800 metres and sea level jetting is found to be far too rich at that elevation.

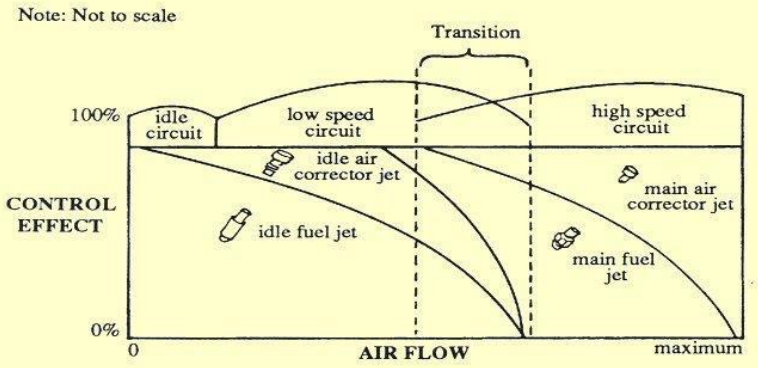
Interchangeability:

The 40, 42, 45 and 48 DCOE Webers all have the same mounting flange bolt pattern, (as also do the Dellorto carburettors) so are fortunately interchangeable on inlet manifolds. This is very useful when you want to keep the choke to butterfly ratio within a quite sensible range. Experience tells us that 38mm chokes will work better with a 45mm butterfly than a 40, but also just might work on a 42. Likewise, a 32mm choke will probably work better with a 40mm butterfly than a 45. What must be taken into consideration is the type of motorsport that we are tuning for. Doing a club sprint at Phillip Island isn't going to worry about fuel economy compared to doing a stint at Winton in the AROCA 12-hour regularity, where economy is very important for maximum track time and a good team result.

Intake trumpet lengths from zero to 100mm, curved or straight are available and can help spread the torque flexibility especially when the choke to butterfly ratio sizes are slightly wrong. The longer trumpets will usually improve the bottom end of the rev range response, but only if they have clear air height above them that is preferably equivalent to their diameter. This is often overlooked inside air filter housings and air-boxes, where external space may be extremely limited.

Needle and seat combinations begin at 1.50 and go all the way to 3.00, in 0.25 increments. Main jets begin at 100 and go up to 300, idle jets start at 035 and go to 115 in the available range from various suppliers. Larger sizes can be produced by good tuners who know what they are doing, and why. Emulsion tubes are numbered in no logical order, however there are tuning charts available that can help with their selection when seeking incremental changes. All of the above are interchangeable between the 40, 42, 45 and 48 DCOEs.

The larger the needle and seat combination, plus the larger the main jets in a multiple carburettor set-up, the more consistent the fuel supply must be to maintain around 3 PSI. This delivery pressure is to prevent mixtures going lean during long, wide open throttle conditions where the fuel level in the float bowl chambers will drop due to insufficient fuel supply, indicated by a drop in fuel pressure when under high demand. This is best observed during the dynamometer tuning session where a run can be terminated quickly before any pistons get burnt.



As can be seen from the accompanying graph (*above*), there is a transition phase that involves both the idle jets and the main jets contributing to the delivery of fuel into the airflow through the carburettor. Understanding this phase can help smooth out the effect of light and mid-throttle response. These carburettors are very adjustable but there are a few areas in particular that need to be considered. There are two types of float available: the original hollow brass floats for naturally-aspirated applications that should be set at 8.5mm gap with the paper gasket in place; and the modern, solid plastic floats set at 13mm with the gasket in place. These can also be successfully used for blow-through turbo applications, an application that will collapse hollow brass floats. The height settings are critical for consistent response. I probably don't need to mention that for multiple Weber installations the floats all need to be of the same construction, plus set at the same float level height, but I will because it is very important.

Something to be mindful of is that Webers (and electric fuel pumps) don't like being stored with stationary fuel in them. The fuel passages within the body of the carburettor and the jets can dry out and tend to become blocked with sediments and crud. This makes tuning old or second-hand carburettors much more difficult for the unwary and uninformed dynamometer operator. That's something to keep in mind when considering buying used carburettors from the internet.

It probably goes without saying, but I will; multiple DCOE installations need to be all of the same model: the early DCOEs are most often type 9 or type 13, or the modern emission Webers of type 151 or type 152 as an example! That will stop you going crazy because all the drillings, passages and machinings will be the same. My preference for throttle operating on multiple set-ups has the butterfly shafts all interconnected with all the throttles operated from only one place. Once they are all synchronised at idle, they will all open exactly the same amount through their range of travel.

The alternative method that has a shaft parallel to the butterflies with each carburettor connected to it by individual linkages is inferior because they usually don't open the butterflies exactly the same amount through their operating range. With individual levers attached to the shaft, they all need to be at the same angle so they will all swing in unison. They usually aren't exactly in line in my experience, sometimes one will have slipped slightly so one carby will be continually opening ahead or behind the others. The major disadvantage is that the shaft and levers usually need to be all assembled on the inlet manifold, requiring lever alignment by eye, or guess. A classic example is the popular Datsun 240Z and 260Z fitted with triple 45 or 48 DCOEs. Getting all those butterfly shafts synchronised is difficult and very time consuming, but well worth the effort in part-throttle driveability when finally achieved.

There are very good books available to help with sorting tuning problems on Weber and Dellorto carburettors, if you really want to have a go yourself. They usually provide a better explanation of their operation than I have provided in the above article!

Weber carburettors were originally designed and manufactured in Italy, however, since the 1980's manufacturing transferred to Spain. The Italian Webers command a higher price on the second-hand market, but the Spanish Webers work and tune just as well as the Italian ones. Recently China has released a range of carburettors very similar in looks to real Webers, at a ridiculously low price. Let the buyer beware is my only comment! Real Webers have 'Made in Italy' or 'Made in Spain' cast into the body.

98 ULP always loses the aromatics, (the light or high ends) very quickly so be prepared to consume it within a few months from date of purchase. The lower ends in the fuel will burn in low compression engines, but not well in high compression engines that are expecting to be burning fresh 98ULP. Cars in long term storage between races need to be regularly fired up to burn off any condensation in the engine oil and to circulate fresh fuel through the carburettors before it can dry out. What we refer to as 'Avgas', 100-octane leaded petrol that we used to race on, could only be stored at airports for up to six months, as an air safety stipulation to ensure the fuel was always fresh.

The DCOE is an incredibly versatile carburettor that will remain in demand for historic racing until these events are eventually outlawed or cease to be attractive to the younger generations.

Acknowledgement:
Special thanks to Phil Buggee, at BOI Performance, who continually provided drawings, advice, explanations, dismantled DCOEs and then multiple corrections to the above article.

(*Ed: as for last month - while in no way detracting from Phil Buggee's considerable expertise and knowledge at BOI Performance in Dandenong, GCC members should also note we have a local company (BTR) who advertise in this magazine and offer Weber tuning.)*

Lost Circuits – Catalina Park, NSW

-Ian Maud

Catalina Park, tucked into an excavation amidst the impressive Blue Mountains outside Katoomba (NSW), is another of the 'lost circuits' of Australia. I have only competed at this (hidden) track once, but it has stayed in my memory for a number of reasons.

It was about 1980 or so and we were travelling from around Australia for the (then) annual National Challenge of Sprite Car Clubs. I had left my home in Kerang and was spending two days each way towing my bugeye Sprite with…a 1600cc Nissan Homer van! I can only look back at such times and marvel at how patient I must have been! From memory, it would slowly build up to an impressive 55mph with the trailer behind, still faster downhill and only limited by the bravery of the pilot – their senses probably dulled by eight hours of sitting directly on top of the revving motor, with only a sheet of panel metal and a headlight separating them from anything they might run into. But I digress.

Map of Catalina Park: a deceptively simple shape.

Source: www.RacingCircuits.info

My first view of the Park was late in the day as I arrived in northern NSW. I had endured a long, hot and noisy day in a vehicle with no air conditioning, and to my amazement the day was now chilling and a fog was rolling in, which soon made looking around the circuit unlikely. What I had seen was intimidating: a narrow, curvaceous track winding its way around a hillside, with the track sides continuously lined by a combination of impressively solid-looking wooden sleeper wall; tall earth embankment; unforgiving Armco railing; or a sudden drop down into the scrub! Run-off areas, a feature of any active 2020 venue, often consisted of about one foot-width of dirt! Clearly, any over-exuberant driving was going to result in tears and a substantial lightening of the wallet.

We all found our way to the various hotels, motels or campgrounds, and gathered again the next morning, ready for the fray. The fog had not yet lifted, so we amused ourselves waling the track while visibility improved. What we found was a fairly simple layout, quite suitable for a club sprint, but I found it hard to reconcile the track width and omnipresent barriers with the stories and photos I'd seen of full-on open racing here – what a spectacle it must have been! Fields of humpy Holdens, swarms of open-wheelers or clouds of screaming bikes all charging up and down hill, raucous exhausts resonating around the gullies, jockeying for position as the sinuous roadway sneaked left and right among the trees. Not only was the course winding, but it rose and dropped rapidly, often leaving a vehicle unsettled and the unfamiliar driver daunted, not to mention needing a focused visit to the loo after the chequered flag had fallen. One infamous section of track was dubbed "the Tunnel of Love," later shortened to "the Tunnel," apparently attributable to the understanding that there was basically only one race line through that corner, and drivers off that line were going to kiss the wall – and often did!

Due to the Park's novel construction, spectators enjoyed a closeness to the action we of the next century can only dream of! They could (and commonly did) perch atop the walls while race gladiators rushed past only centimetres away. And the crowds! Photos from the period show spectators packed around the corners – it was certainly popular, and why not? Some of the biggest names of the era competed at Catalina: Gardner, Geoghegan, etc.

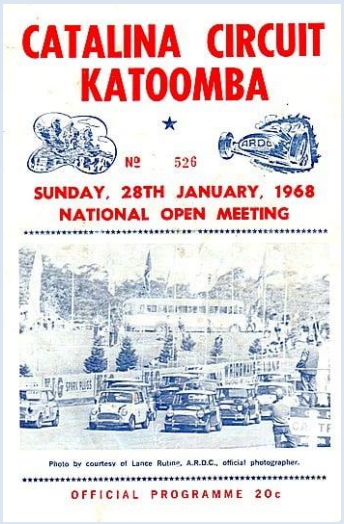
Do you remember Rallycross? As a kid on a cold, rainy winters' Sunday arvo I would sit cross-legged on the loungeroom floor, eyes glued to a black-and-white telly the size of a microwave oven, drinking in the excitement and spectacle as people like Brock, Watson, Moffat, Bond, etc slipped and slid in battle amongst the worst conditions organisers could arrange – and Catalina Park, together with Calder, was the Mecca for Rallycross.

As it was, we were witnessing the all-too familiar sight of a track in its death throes: track edge crumbling, pits unkept, abandoned timing huts and scrutineering bay falling into disrepair.

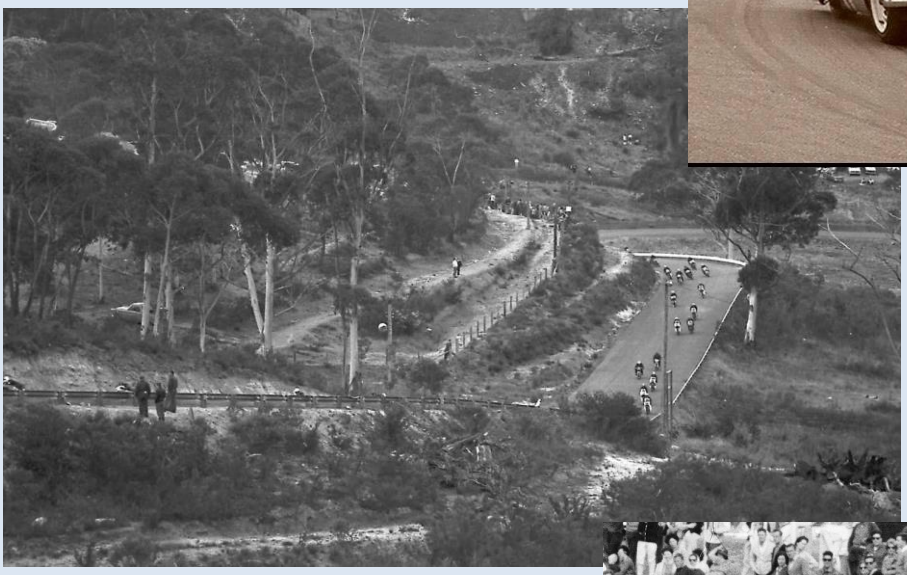
Then and now. At left, the Le Mans start of a touring car race. See the BP sign on the pole on the right-hand side, behind the FJ ambulance? That's it in the photo on the right, but turned 180 degrees. Most of the track is now an aboriginal bushland reserve, and used largely by exercise walkers.

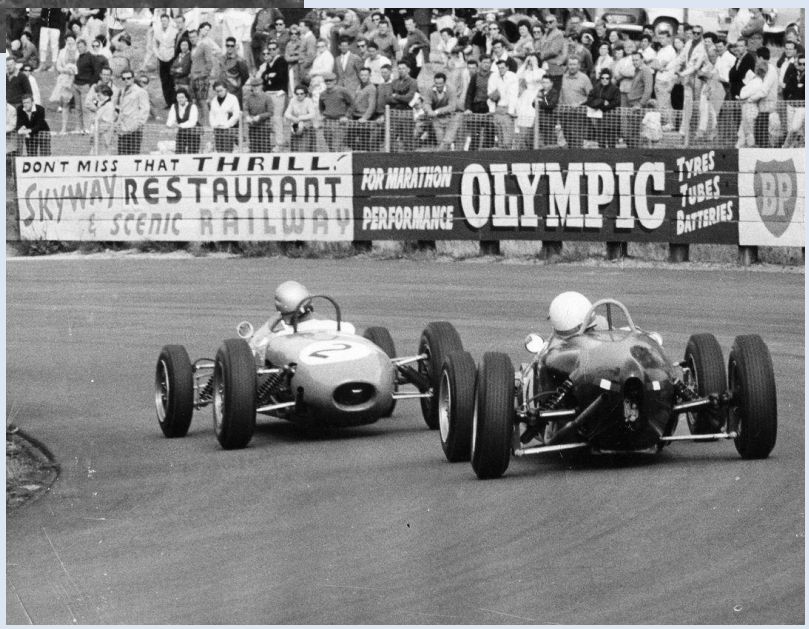
Source: LHS pic: www.motorsportretro.com and RHS pic: www.CreativeSpirits.info

At the time of our event the circuit was still very usable, and surrounded by attractive, shady bushland that has no doubt reclaimed much of the area. What I do recall was how thrilling it was to drive the track at race speed, and how confidence rose during the day so that people were eventually sliding and dicing within grasp of those sobering walls. When the meeting finished for the day the fog would roll in again, leaving little alternative but to pack up and leave while navigation still seemed possible. I do have a memory of an exit road climbing one of the steepest hills I've ever drive, with a mandatory stop at the top at a T-junction. If nothing else, the Nissan had a first gear that could pull stumps, and this was a time when I was thankful for it! A mate towing with a Datsun 1600 had to back down the road and find a different way out, such was the climb.



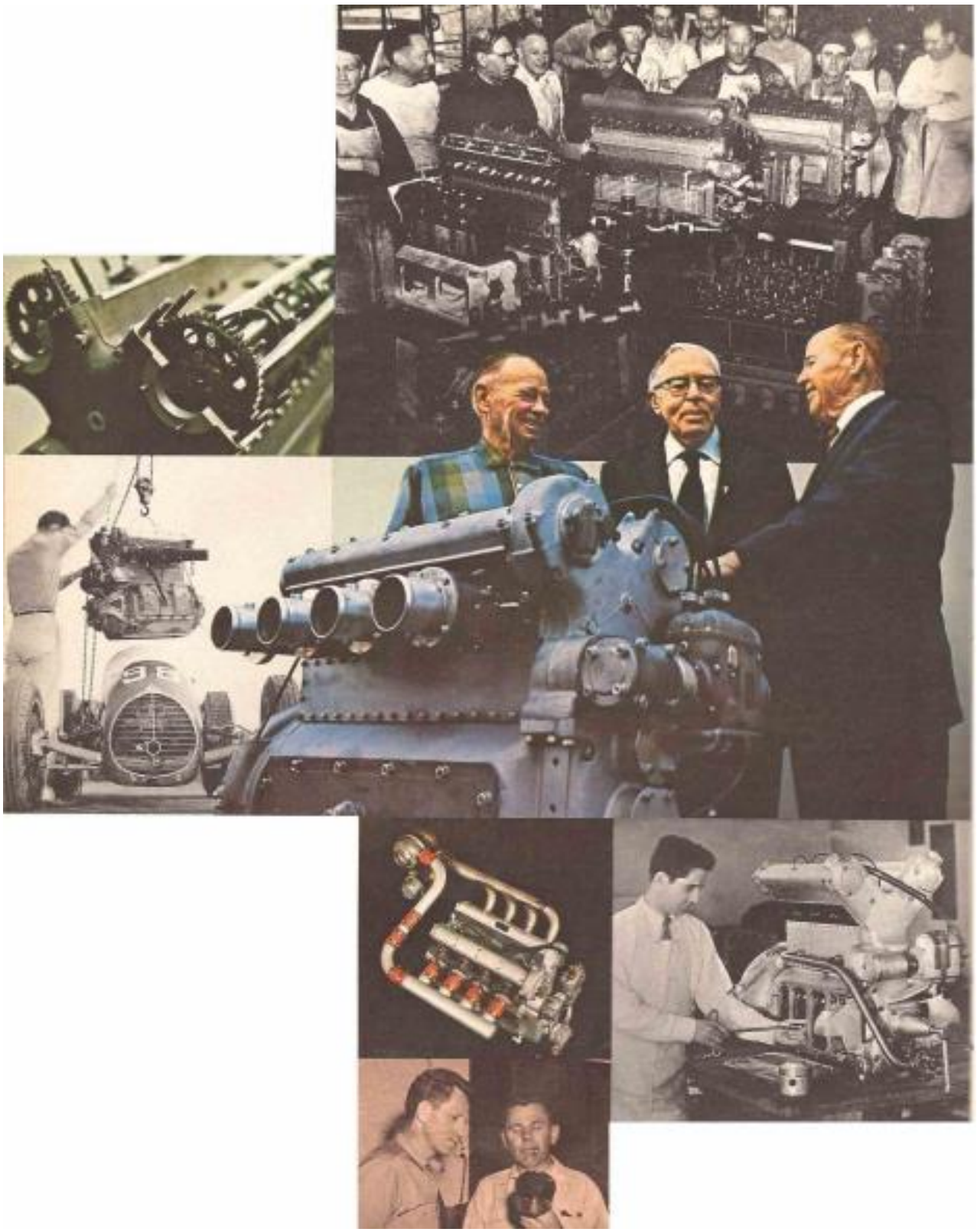
Opening in 1961, the track's heyday was the 1960s-early 70s: the last race was held in January 1970 and by the 1980s it had an uncertain future and lack of investment financially, as well as maintenance-wise. The opening of Amaroo Park and Oran Park raceways were the final blows for Catalina Park, as these circuits were much closer to Sydney and attracted the crowds. What has happened to Catalina Park? The track was finally closed in the mid-1990s. Much of it apparently still remains but is now used mostly as a walking track. The accompanying photos show a still-recognisable circuit in parts, but only the echoes and memories of motorsport remain for those lucky enough to have seen one of Australia's great circuits in action.





(Trivia: Also known as 'The Gully,' Catalina Park was so named after the failed tourist park that preceded the race circuit: the developers built a large dam and sat a Catalina PBY-5 Flying Boat upon it as a tourist novelty.)

Ed: In keeping with our recent articles on great motors and engineering, here is the story behind the Offenhauser dynasty. This comes from a magazine called Motor Trend, from May of 1970. I can't recall who sent it through to me, but thank you!
I had to cut & paste this as many small pieces to retain a readable quality – if you struggle with any part, you can read an electronic copy on the GCC web page.



4 CYLINDER, TWIN CAM, 16 VALVE AMERICAN DREAM

Offenhauser: Never again will one engine hold in its iron grip the destiny of racing for two generations.

By Griff Borgeson

On Memorial Day, 1965, after almost 20 years of near-total domination in American Championship racing, the Offys were soundly trounced at Indianapolis, and the racing world chalked up the end of an era without equal in racing history. The Ford victory had been won at immense cost, and few doubted that with all of Dearborn's colossal resources, plus 17 Ford engines among the 33 starters, that the hoary Offy stood any chance at all. With few exceptions, the American racing fraternity awaited the formal burial of the indomitable four-banger.

But exceptions there were. They included a good number of highly knowledgeable race-car owners and builders, mechanics and drivers, plus Offy manufacturer Dale Drake and his engineer, Leo Goossen. After the dismal tout of '65 these two men lost no time in swallowing the fact that their old iron horse had reached the end of its tether. The Offy was exploding its guts to pull 425 bhp at 7000 rpm, while the youthful racing Ford was turning 480 at 8500 and probably had years of development potential in reserve.

For the 1966 season Drake and Goossen retaliated by chopping displacement to USAC's supercharged limit of 168 cubic inches and adding a Rootes blower. This relatively tiny engine would wind out to 8500 and was good for a beautiful and honest 525 bhp on the dyno. But the Indy winner was Dearborn-powered once more, the luckiest Offy coming in fifth. True, there were bugs still to be worked out of the rejuvenated four-banger but, as one old hand reasonably observed:

"An Offy still could have won if Rodger Ward hadn't decided to quit in the middle of the race, or if Parnelli Jones' mechanics hadn't forgotten to grease a wheel spindle."

In the 1967 Indy 500 history reverted to normal, with Offys winning and carrying off 9 of the top 11 places. This of course drove Ford back to the drawing board and to further massive investment. But the Rootes-blown Offys had continued to give trouble and Drake and Goossen began digging for new and better answers. They tried an AiResearch turbocharger and were gradually rewarded with dyno readings ranging from 600 to 625 bhp. But this took time, and the '68 500 was Ford's again, with Offys doing no better than seventh and eighth place.

For 1969 USAC reduced the supercharged limit to 161.7 cubes maximum. With this even smaller displacement, but with further refinements and with manifold pressure jacked to 80 inches of mercury absolute, the turbocharged Offy began belting out up to 670 horses, along with a high and tremendously flat torque curve. This incarnation of the Offy was spanking new and therefore in acute need of development, but at Indy it finished a very honorable third and fourth to Ford's first and second. It was back in the most solid contention and, given a little time for rounding off the burrs, there was no sound reason for denying that it could rule the Brickyard again. Ford could destroy all competition in international Grand Prix racing, but finishing off the Offy could be a much more difficult and trying task.

Of course the Miller-Offy has been "finished" for decades. Foreign-iron freaks always have detested it because, for them, it seemed to lack any exotic appeal. Home-iron freaks detested it because it robbed their sport of variety. The guys most in the know believed in the late fifties that the Offy was over the hill and that anyone running one was running on the ragged edge of absolute disaster. One of the greatest racing mechanics of all time was my cherished friend, Clay Smith, who was crushed against a pit wall by a runaway race car in 1954. Clay once told me:

"I won't say that the Offy 270 engine has gone beyond itself because its dependability proves that it can go farther. Still, any mechanic who prepares a 270 learns to have no confidence in the engine; no matter how good he is, he's in beyond his depth and anything can happen. The strains inside the engine are so great that any part may let go at any time. There is no 'most common source of failure.' You might drop a gear tooth, a block stud, or a main-bearing nut and never know it until the engine tore itself apart. The only way we get reliability is by being more extravagantly careful than we've ever been before. By testing, tearing down, inspecting every piece, then doing it all over again. By never trying to squeeze by with questionable parts. By pushing patience beyond all reasonable limits."

But this discipline also produced a breed of racing mechanics without equal in racing history. To cut it in the Offy league you had to learn to sense and feel every quirk and mood of that basic power unit. It created a vast body of widely shared knowledge about that highly unique type of engine. And it created a breed of fearless, gung-ho, stand-on-it-and-turn-left drivers who could keep bearing down on the throttle

continued

The Group (opposite page, l to r), Dale Drake, Leo Goossen and Fred Offenhauser. All-time Indianapolis giants, they completely dominated the Speedway and the rest of the country for nearly two generations.

through terrifying, kidney-crushing vibration periods and still say, *"Wind,* wind, you son of a . . . !"

In the beginning there was the Miller-Offy. From it derived men and chassis, tires and materials capable of living in the same world with it. It totally eliminated the gentleman driver from the American Championship racing scene. The Europeans who witnessed the Offys at Monza in the mid-fifties are still shaken by the experience. They called those "Monzanapolis" events The Races of Two Worlds, and the Europeans saw another world for the first time, as awesomely violent and powerful as the diplomacy of General Curt LeMay, also an Offy freak. What they saw, mechanically, was their own racing tradition carried to its near-ultimate degree of development.

The present Drake engine, the original Offy, embodies the greatest concentration of experience and refinement in all of motor-racing history. In the history of the Grand Prix Peugeots it is revealed how the *"Charlatan"* school of race-car design crystallized in France just before War I, with profound and permanent repercussions throughout the racing world. It was Peugeot's odd policy to sell its competition cars after each race and, when the war broke out in 1914, its remaining machines were shipped to the States and sold.

One of these wound up in the hands of ace racer and Land Speed Record holder "King of Speed" Bob Burman. He scattered its engine a few months before the opening of the 1916 season with the big-time 300-mile Corona Road Race in California in April. He cabled Peugeot for help, was told that each engine was hand-made and that there were no interchangeable parts. He would have to ship his shrapnel to Paris, where it could be rebuilt in about 6 months.

In desperation, and with just 4 months to spare, Burman turned to the one and only local hope, the Master Carburetor Company of Los Angeles, inventor Harry Miller being the owner. This firm made the world's best racing carburetors at that period and had an excellent machine shop which was *the* gathering place on the West Coast for most of the American racing fraternity. Enter the name Offenhauser.

Fred Offenhauser was born, of German immigrant parents, in the then-tiny village of Los Angeles in 1888. His ambition from childhood was to be a good machinist. Around the turn of the century the best machine shop in southern California was that of the now gravely lamented Pacific Electric Railway and its long-gone fast and efficient system of public transportation by means of its legendary Red Cars. The shop, which employed over 100 men, was under the direction of a famous old New England technician named Strang. The two or three apprentices per year who had the luck to be accepted by him had their status assured as true masters in their field. Fred Offenhauser had that luck. When Strang came down the line, dabbing at each machine with his ever-present white handkerchief, Fred's was always immaculate and polished to a satin sheen. A master craftsman also was a sanitary one.

By 1913 Offenhauser had risen to the rank of precision toolmaker in the Pacific Electric shops, when he heard that the Master Carburetor Company had a good opening for a man with his qualifications.

"I went down and talked with the owner, Harry Miller," he recalls. "I told him flatly that I wasn't interested in making a change if I had to be somebody's relative to get ahead, and that I wanted a job where I could advance according to my own ability. Miller seemed to like that, and he hired me then and there."

Offenhauser was a small man with huge, blunt-fingered hands which testified to his years spent with the tools. He balded early and there was always a lot of humor in his bright, blue-gray eyes and in his rasping, nasal drawl. He was liked universally by the 30-odd men in the small Miller factory, his mechanical knowledge was encyclopedic, and his accurate and willing counsel to clients with carburetion problems made him a valued favorite with them. Within 2 years his boss asked him to take over as plant superintendent.

"I'll take the job on one condition," Offenhauser said with his usual directness. "That there be just one boss over the men. Not you. Not anybody else. Just me."

Miller chuckled, accepted, and was good to his word. He never interfered in who Offenhauser hired or fired, nor did he ever ask why. One of Fred's first acts was to promote the part-time janitor to full-time status and to give his men an hour a week for cleaning their machines on the company's time. He also applied Strang's standards of craftsmanship and very soon the Miller plant had the reputation of being one of the finest in the west. That tradition has been guarded jealously by Offenhauser's successors and I know of no engine manufacturing facility in the world today whose products match current Offy standards.

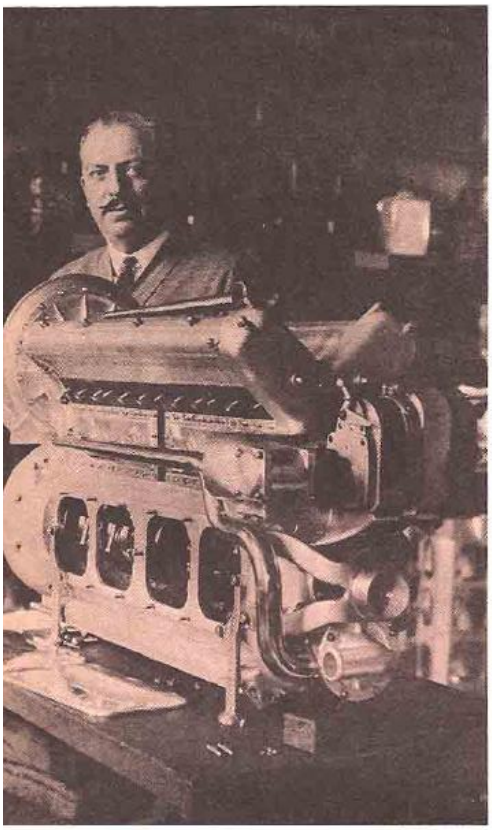
It was to the old Miller plant on Washington Blvd. between Los Angeles and Maple Streets that Burman brought his shattered engine. He was frantic, and Miller called in his shop boss to contemplate the mess.

"Can we do it?" he asked the man who would have to do it.

"Well," said Offenhauser, "first the dimensions have to be translated from metric to English, and I can see that few of them are going to work out to neat English fractions. Then we can make drawings, then castings, then get on with the machine work. If I take our two best machinists, the three of us should be able to get it done in 4 months, in time for Corona. At that, it will take at least 16 hours a day, and no days off."

It was done, and Burman crashed at Corona and he and his mechanic were killed. But the car had run wonderfully well. The rebuilders of its engine had increased its valve area, improved its valve timing, and had applied their

Harry Miller probably never fully realized the true significance of his engine innovations



special expertise to equipping it with dual carburetion. The result was potent with obvious improvement in output over that of the original Peugeot. No one was as sensitive to the difference as were Burman's competitors, and Miller was recognized overnight as a racing engine expert. Clients flocked to his shop with all of the best racing machinery in the world, all of which he and Offenhauser were able to study. Soon Miller became an engine designer in his own right, building Barney Oldfield's historic *Golden Submarine* in its entirety. Its sohc four-cylinder was troublesome, but it did propel the car to new speed records of major importance.

The final human combination which was to lift the names of Miller and Offenhauser to racing immortality solidified on the heels of this, in 1919, when a young ex-Buick draftsman, Leo Goossen, joined the Miller organization. Early the following year top drivers Tommy Milton and Ira Vail commissioned Miller to create and build for them an in-line eight engine to beat the then-dominant Duesenbergs. Miller, Offenhauser, and Goossen pooled their resources on this project, which resulted in the historic and brilliant Miller 183.

In its general architecture the 183 was an eight-cylinder version of the four-cylinder GP Peugeot which Harry and Fred knew so intimately well. There were the barrel crankcase with its 360-degree support for the main bearings; the dual overhead camshafts driven by a train of spur gears at the front; four valves per cylinder in pent-roof combustion chambers; and other classic *Charlatan* features.

It was Offenhauser who was largely responsible for a "Miller touch" which was to become a hallmark of the line and eventually would be adopted for nearly every dohc engine ever made in the world. This was the highly positive and simple cup- or piston-type cam follower. It had been devised by Ernest Henry for the French-built Indy Ballots. Ballot team chief Ralph de Palma was the one member of his *équipe* who insisted upon the installation of Miller carburetors when the cars reached the States. He and Offenhauser were old friends but there was no love lost between M. Ballot and his top driver. So, when they expressed an interest in just having a peek at the Ballot's valve gear, a cam cover was lifted briefly. Fred snapped up the beauty of the principle and carried it back to his boss. And the next great design leap for Miller – precious in some high-performance engines and less so in others – was the original adoption of the two-valve, perfectly hemispherical combustion chamber in 1923 for his engines for the new 122-cubic-inch formula. The essential, absolute, classic correctness of its basic design is testified to by its ability still to hang in one piece while pouring out as many as 275 powerful horses per liter, and still to hold its competitive own tenaciously after well over 40 years of insatiably demanding development.

The Miller-marine saga actually began in 1927, when American boat-racing champion Dick Loynes came to Miller for an engine with which to compete in the then-current 151-cubic-inch formula. Loynes had raced most successfully with Miller 91 straight eights and knew them well. He did not want another eight, he told Miller, but instead a good, thumping four-banger, to give him added torque in coming out of one-buoy hairpin turns. He also specified that he didn't want a super-refined thoroughbred, stressed to the limit like the 91, but, instead, something brutally rugged and beefy which he could go on developing for years to come. Miller went along with these orders and had Goossen draw up one half of the 310-cube marine eight which the firm had introduced the year before. It was as solid as a brick privy, had all the acceleration and durability that Loynes had hoped for, was a roaring success in competition and was built and sold in quantity and, eventually, in versions up to 183 cubes. The 151 was good for 102 bhp at 4000 rpm; centrifugally blown, it pulled 160.

Miller sold his business for $150,000 in 1929, leaving his staff with the new owner. It was during this racing season that a crazy idea occurred to Bill White, one of the biggest race promoters and race-car owners of the day. Watching the performance of the four-bangers in boat racing, White had put two and two together and decided that what worked on water might just hack it on dirt and pavement. Big-time car racing in the U.S. was committed 100 percent to the straight-eight engine, but White, after much consultation, acquired a 183-cubic-inch marine to be converted to track use from the new owners of the Miller plant. Miller at this time was making arrangements for a new shop temporarily located at West 16th Street. Soon White had his four-banger installed in a Miller one-man car, in which he turned driver Shorty Cantlon loose at old Legion Ascot Speedway. Cantlon turned a few blazing laps and came into the pits shaking.

"My God, Bill, she runs like a wild horse," was all that he could say.

"We ran the car at Ascot every Sunday, working out the bugs," White told me. "We had trouble keeping valves, pistons, and wrist pins from failing, but Offenhauser put in long hours with us at the track itself. We figured out what had to be done, and Fred and Leo saw to it that we got the improved parts that were needed. When we were sure that the little mill would stand up under the toughest racing conditions we went up to Muroc Dry Lake for a flat-out speed run. We clocked a record 144.895 mph. We knew then that we had stumbled onto something big and that we were ready for Indianapolis."

White took his converted boat engine to the Speedway in 1930. He was greeted by guffaws for trying to compete against sixes, eights, with a mere, miserable four. But Cantlon racked up the third fastest time among the 38 qualifiers and had no trouble holding second place throughout the 500 miles. He drove the marine four for the rest of the season and wound up second in the

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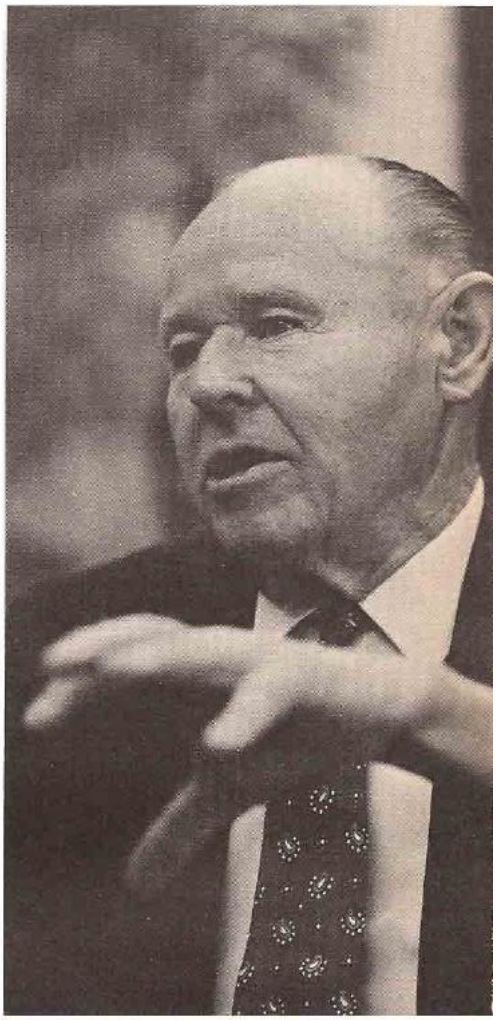
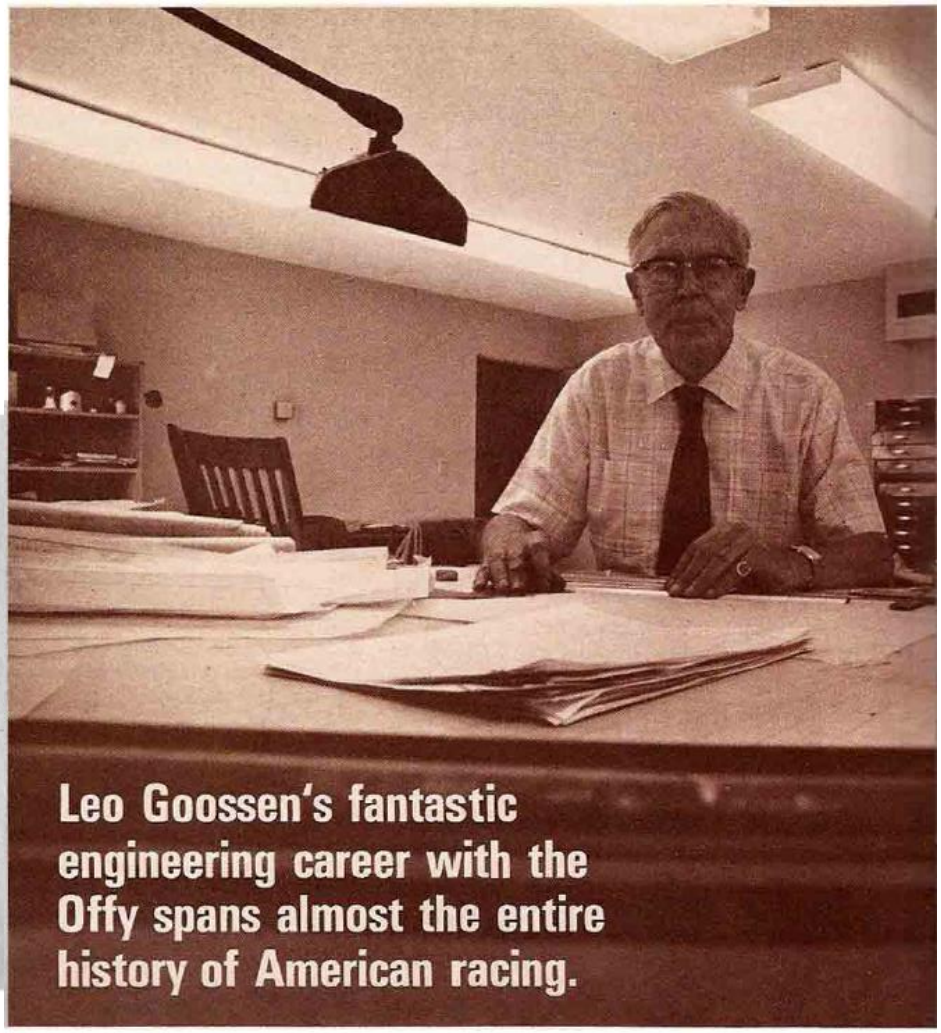
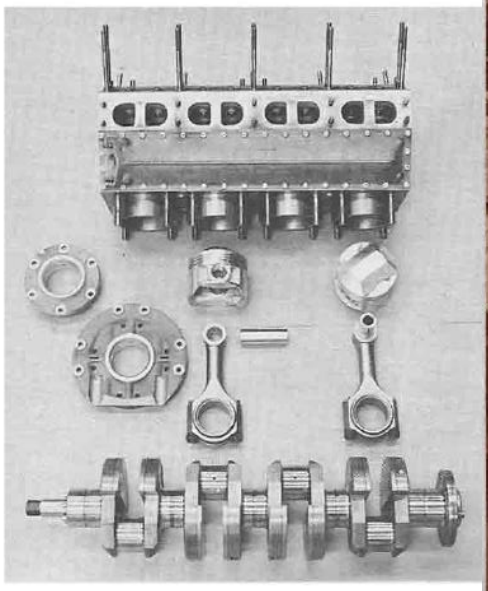
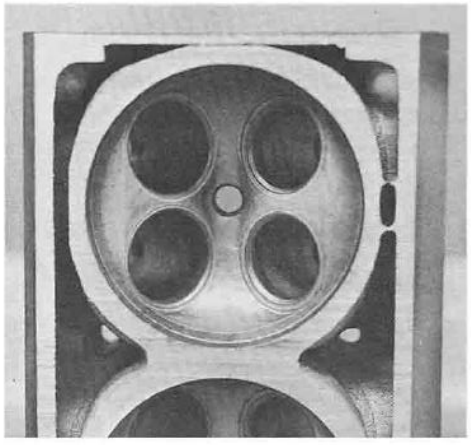


The cup cam follower . . "wasn't my idea, it wasn't Miller's idea, it wasn't Goossen's idea, it was taken off the Ballot. They've all been that way ever since." —Fred Offenhauser

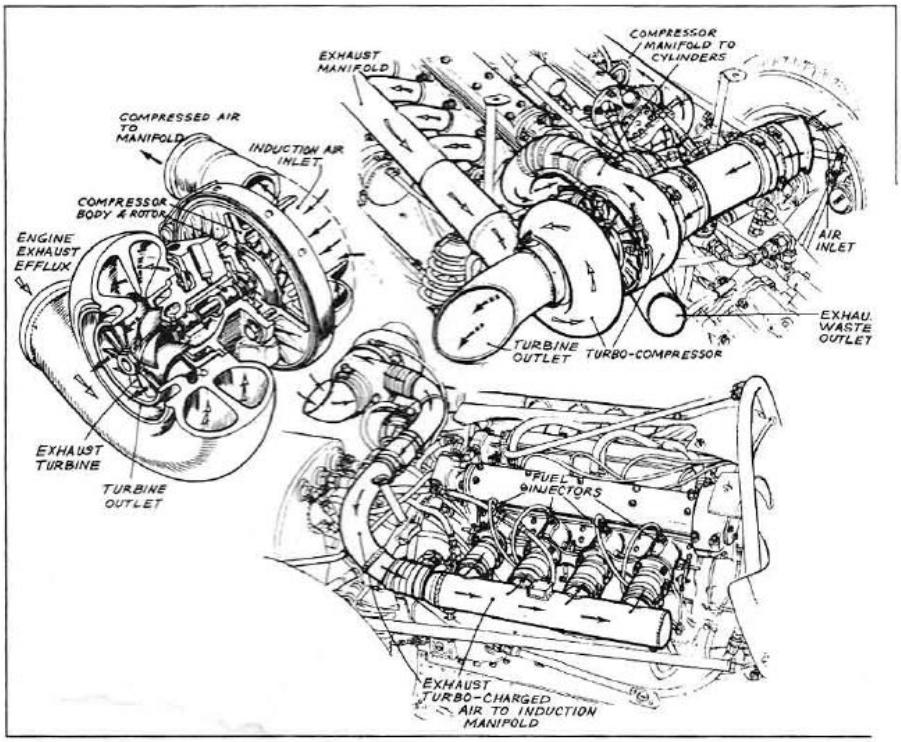


Leo Goossen's fantastic engineering career with the Offy spans almost the entire history of American racing.

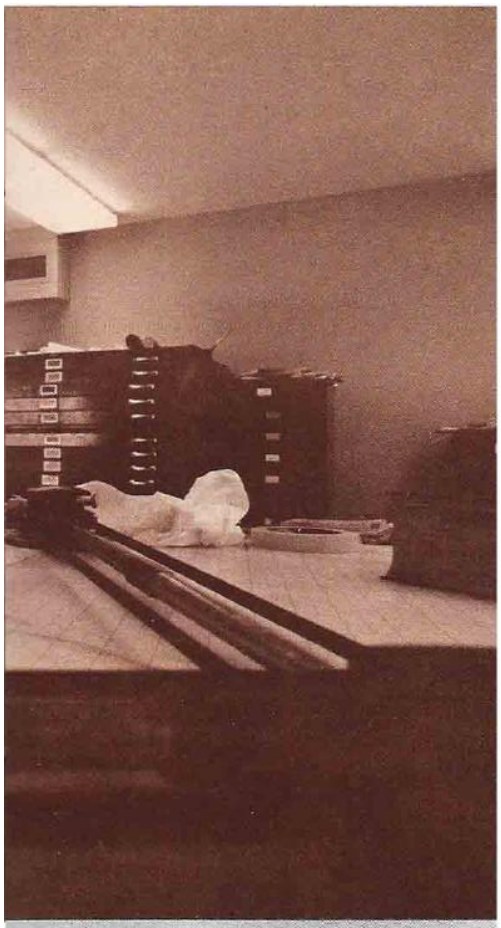


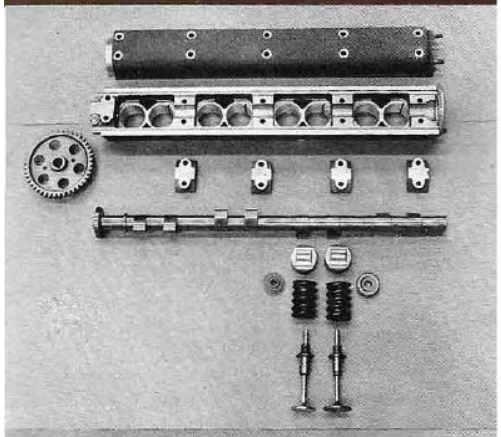


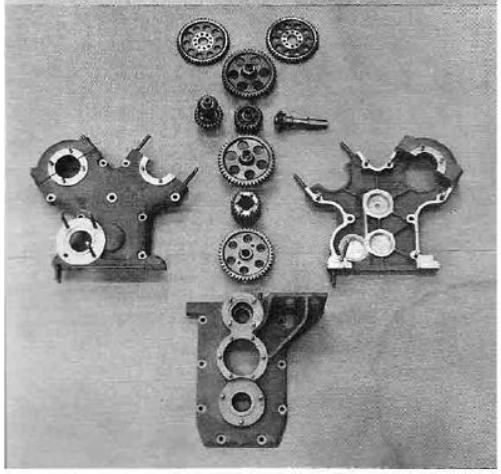
Big enough to stuff your fist through is what an Offy has always been about. Four-valves-per-cylinder-head (above), capitalizes on super intake and exhaust-port size. Block and connecting-rod assembly (top), is strong to a fault — of being too heavy. Note stout rods.



No matter what you do to an Offy, or Drake as it is known now, it has probaby been done b fore. Turbocharger is the new trick (above). DOHC gear drive (right), is absolutely foolpro Camshaft tower (right above) fits atop head, positions Ballot-type cup and holds ca







OFFENHAUSER continued

AAA National racing Championship.

Miller moved his shop to Grammercy Place and most of his old team, including Goossen, rejoined him. Although Miller regarded four-cylinder engines as retrograde junk, he did listen to Offenhauser's counsel on technical matters. The Great Depression was not going to disappear overnight, Fred pointed out, and a four-barrel Miller could be produced for almost half the cost of an eight, and this fact could be decisive in the years immediately ahead. Miller conceded that this made a kind of sense and OK'd the laying out of a four to be designed from scratch for purely automotive use. That engine which took shape on Goossen's drawing board fully deserved the name Miller and Offy since it incorporated all the technical know-how learned over the years. But the market for racing engines, even at bargain prices, remained close to nil.

Over the long years Offenhauser and Miller had been the closest of friends and frugal Fred felt from time to time that he owed it to The Old Man to offer financial advice in an effort to hold his business troubles at bay. But Miller would take this from no one and when bankruptcy caught up with him in 1933 he owed his plant boss a good $30,000 in cash loans and unpaid wages. Never unappreciative, and seeing the end approaching, Miller gave Offenhauser a document granting him title to many of the plant's machine tools. But this was ruled by the court to be an illegal transaction and all the firm's property, worth a tidy fortune, was appraised at $4000 and put up for grabs at auction.

Dick Loynes provided a home for all of the Miller drawings, patterns, and engines and parts on hand. Offenhauser owned his modest home outright and had about $1000 in the bank. Screwing up all the courage he had, he put all but $200 of this into machine tools.

"It was the most desperate thing I ever did," Fred says, "but I owed everything I had to the racing fraternity. And if I didn't look after their needs for parts who else would?"

For the first 6 months Offenhauser worked alone, filling rare orders for parts and doing occasional job work for a local trucking firm. Then, as Indianapolis time rolled round, enough parts orders trickled in that he was able to hire back some of the old staff, including Goossen, on a part-time basis.

"It was just a matter of trading nickels and dimes, and hoping that once in a while a quarter would turn up," he remembers. "If you could eat, you were lucky, and that was all that we worried about."

Ed Winfield is one of the great practical engineers of American racing history. Offenhauser gave him his first job in the old Miller carburetor plant and the camshafts in the 1970 Offy are Winfield's own grinds. He once told me:

"Fred kept the old organization together, and he had the advantage of having those men who had worked on the same equipment most of their lives. He didn't make much money until the war came along, but he managed to keep the doors open and pay everybody's wages, which was more than Miller had been able to do. Harry always had too much overhead for the amount of business he was able to conduct, so he always lost money. Fred, by cutting all the corners and not having any of the things that you should have in a business, was able to make a success of it."

When Offenhauser got an order for an engine he rented the patterns from Dick Loynes. But for a long, lean time there were hardly any orders. The best four-banger at Indy in 1931 finished only eighth. In '32 a four finished second again, but the next best four was fourteenth. Then in '33 Wilbur Shaw and Lou Moore tried their luck with fours at the Brickyard and came in second and third. The old engines were wearing out and business began picking up for the newly named Offenhauser Engineering Company.

In 1934, 13 Offy four-bangers started at Indianapolis. They finished first, second, third, fourth, ninth, and eleventh.

Came World War II and the suspension of racing. The Offy plant carried on with indifferent job work until one day in 1940 when a small project came in from Lockheed Aircraft. It was executed with Offenhauser's routine perfection and from that moment until the end of the war the plant worked 24 hours a day, every day, swamped with precision work for the aircraft industry.

With the wartime emergency finally behind him, Fred, 67 years old and having had barely a day's repose in his life, found that he was beginning to feel tired and that his heart was pounding out a pretty spooky beat. He decided that if he didn't go fishing he'd drop dead.

There was a lot of money looking for places to invest itself and Offenhauser Engineering attracted its share. Fred sized up the offers and judged them all to be from mere "washer manufacturers" who had no conception of, or interest in, the mystique for which they were bidding. Any of them would go broke in a year, and what they took down the drain with them never could be replaced. Still, the time finally came when Fred found himself faced with fast-failing health on one hand and, on the other, three offers which were fantastically high and difficult to refuse. He had an idea:

"Louis Meyer and I were very close," he said, "and for many more reasons than what part I may have had in his three Indy victories. His old crew chief, valve manufacturer Dale Drake, was a close buddy too, and our three families got together a lot. Though still fairly young, Louie and Dale both were semi-retired. I trapped them together at Louie's house one night.

"After a few hours of good companionship I got up to leave and said, as a parting shot, 'By the way, I'm selling the plant tomorrow.'

"They laughed in my face and Louie said, 'Come on, Fred, don't kid your friends. *We* know that a million dollars wouldn't pry you away from that place.'

"'Don't you kid yourselves,' I said. 'There are three different outfits bidding

continued on page 111

OFFENHAUSER *continued*

for it and one is coming over in the morning with the cash to close the deal.' On that note I left.

"Louie called me at sunup. 'I haven't slept,' he said. 'Dale and I sat up for hours talking after you left and I've spent the rest of the night thinking. Listen, Fred, how about giving us a crack at the place?' "

Offenhauser told Meyer that he would be at the plant at 8 a.m. and Louie and Dale were there waiting for him.

"I want you boys to have it," Offenhauser said. "You know how to run a business and you also know engines and racing. I know that you two can carry it on. We have $40,000 on deposit against orders right now, so it won't cost you a penny to start."

Money was not the issue with Meyer and Drake either, but the possibility of carrying on the Miller-Offy tradition was a privilege and a challenge which neither man could resist. The deal was closed on the spot, that morning. Fred Offenhauser, patriarch of that tight tribal society which called itself the American racing fraternity for lack of a better term, could go to pasture in the knowledge that he had in no way shirked his tribal responsibilities.

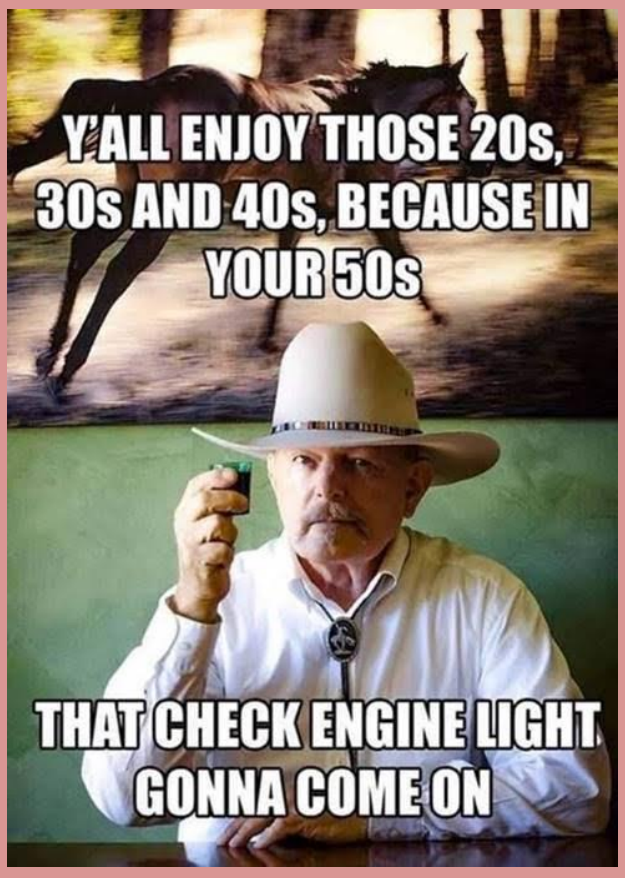
The Meyer & Drake partnership lasted until 1965, when their firm, ironically enough, became the sales agent for the Ford V8 competition engine. It was at this point that these men parted at last, Drake holding onto the Offy and Meyer going over to Ford. The Offy has taken on new life under the Drake regime, during which over 50 Indy engines have been built, for between $15,000-$20,000 the copy.

Remarkably enough, today's Offy comes very close to returning to the characteristics of the original 220 of 1932. When USAC reduced the formula from 270 to 255 cubes in 1957, Meyer & Drake dropped the traditional 255 and began building an engine of that displacement with the gear tower, con rods, valve train, pumps, and most other organs of the original 220. For the 168 of 1965, in addition to the Rootes blower, the crankshaft bearing supports were beefed up, a new gear tower with fewer gears was adopted, plus, at last, a light alloy cylinder block. In 1967 Stu Hilborn and Herb Porter, along with Robert Debisschip of AiResearch, did the major work on discovering new levels of Offy output through turbocharging which, because of the great additional heat generated, caused the block to be redesigned to provide water passages between the exhaust valves.

If you are at Indy this Memorial Day or in one of the raft of theaters carrying the race, the Offys, or more properly, Drakes, you see out there on the Brickyard will be of two types: the familiar long-stroke 3⅛ x 4 (plus .030)-inch stroke/bore jobs favored for the last three years or, the new 2¾ x $4^{9}/_{32}$-inch configuration. The short-stroke deal was kind of the brainchild of Stu Hilborn and Dick Jones of Champion Spark Plug who have worked closely with Drake's Leo Goossen in the engine's revitalization. Faced with a turbo-Ford power figure of around 800 for qualifying the four's output had to be raised and the best way to do this seemed shortening up the stroke and improving the engines induction system.

In 1969, a ballpark figure for the average turbo-Offy was 740 qualifying horsepower and 625 for the year. For '70 it will be 800 and 720 respectively. There was a real question while the bore/stroke realignment was going on about the former induction system's efficiency, especially with greater quantities of air being pushed through at higher velocity. Hilborn experimented with several configurations, finalizing on a plenum collection chamber at the outer ends of the injector tubes.

This is the challenger with which the Fords have to live today. If the Ford engine itself incorporated any drastically newer ideas than the Offy does, the contest might seem very unequal. But what we are dealing with is the classic internal combustion racing engine, in which all the money in the world cannot easily take the place of overwhelming experience. The Offy is a thundering monument to such experience. /MT



Do not let them take your temperature going into the store! It's a scam! They're erasing your memory. I went for bread and eggs and came home with Ice Cream and Snickers.

Ed: the Club has been contacted by the owner of an historic race car he is rebuilding, and was hoping someone might have information about it. Here are his e-mail and photos:

My name is Garry and I am re-building an old hill climbing car from the 50's with a Vincent engine.
Apparently, the car originally belonged to a John Shine.
I do not suppose you have any records of this car.

Thank you, Garry 0408 035-917.

CLUB MEMBER PROFILE: YVETTE STOLK

- Your name: Yvette Stolk
- Years of membership of GCC: On & off for a fair few years now
- Cars of interest owned: The SYGA open-wheeler.
- Your first car was: Toyota Corolla
- The best car you ever owned was: Has to be the SYGA!
- The worst car you ever owned was: Impossible to answer, all have served their purpose.
- Your biggest car-related disaster: It involved 10L of acrylic house paint, a hatchback, a lid that wasn't done up properly, a steep downhill and a sharp left. I can laugh about it now.
- Your greatest moment in motoring was: The first time I rear wheel steered the R1.
- Your most-admired driver is (and why?): It has to be the GCC's fast guys - the fact they drive impressively fast but also that they build their own cars, now that's skill!
- Your favourite driving circuit/track/road/area, & why: Hard to say just one, but the top two would be our track & Broadford. I like that they are technical but it is also the atmosphere of the people when I'm there.
- A phrase you say regularly: You only live once…
- Finish the sentence: I will die satisfied if..... (this is one of the items on my bucket list) I own a Corvette, then I'll be 'Vette in the 'vette!
- Any other insights you'd care to share? Have a Merry Christmas, thankfully 2020 is almost over and I'm sure we'll never have a year like it.

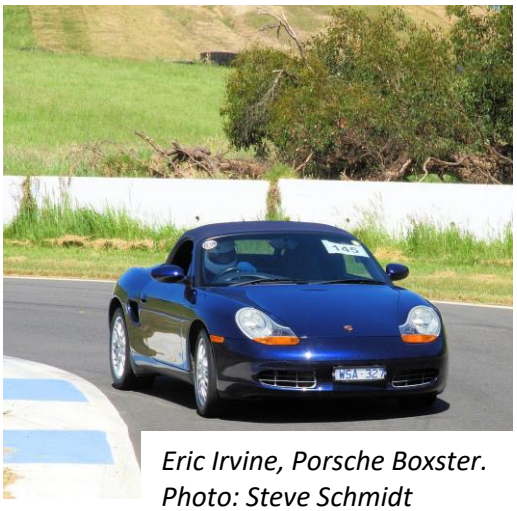
  Also, make sure the lids are hammered down (even on new tins) if you put paint in the car!

Competition report– A HILL CLIMB WITH A DIFFERENCE

– John Bryant was there!

On Sunday, November 3, we held our first hill climb at the track since February – no action whatsoever during that time due to the COVID virus and the Government lock down! Due to the Government restrictions at the time, we were only able to conduct a regional event, as Melbourne residents were being held within their "ring of steel". We were pleasantly surprised to receive 42 entries for the event, with a number of other wanting to run but they were on the wrong side of the steel barrier.

The event ran according to the Motorsport Australia Return to Motorsport rules – no spectators, gates locked, no canteen, no paperwork (all entries done electronically), no scrutineering (all self-scrutineered), no trophy presentation, limited drivers briefing, everyone wearing masks when not driving, and everyone observing social distancing – everyone did all of these things, and we were able to offer eight runs each on the Clockwise Figure 8 track, and still finished early. Everyone appeared to have a great time, except for Mark Revitt-Mills who had a slight off resulting in some minor damage to the car but not to Mark. The event actually appeared more like one of our track hires, with very few open wheeler cars and the majority of entrants in the tin top classes.



Eric Irvine, Porsche Boxster.
Photo: Steve Schmidt

Jim McNiven, BMW
Photo: Steve Schmidt

Fastest time of day was taken out by Keven Stoopman in the Lancer Evo – his first ever run at the track and an almost record time of 58.98 seconds – Mark Samson tried to break 60 seconds but the best he could do in the Mygale Formula Ford was 60.01 seconds to take out second fastest. Daniel Rikken followed in third place, and it was noticeable that he was featuring a newly clipped wing on the SS Nissan Gazelle. Les Dole had his first competition run at the track in his newly restored and immaculately presented Watson Clubman and came in fourth outright. He was followed in fifth by Terry Selwyn, with Rob Duncan and James Dyer both recording times of 65.23 in positions 6 and 7. They were followed closely in positions 8, 9 and 10 by Steve Banks, Tyson Cull and Mick Green.

Six of the classes only had one entrant each, but the rest were well contested. The Improved Production up to 2000 had five entrants, and that was won by the proverbial country mile by James Dyer in the indecently fast (and cheap) Suzuki Ignis. IP 2001 and over was taken out by Terry Selwyn who fell in from Rob Duncan by 0.02 of a second! Tyson Cull, John Mahy and Jim McNiven followed closely, all within one second of Terry. Seven entrants in the Sports Cars up to 2000, with Steve Banks taking out the class from Ian Speight in his "new" Mazda MX5 only 0.84 of a second behind. Mick Goossens and son Brody were so starved of motorsport that they joined the Club, and drove down from Ballarat to compete in the Toyota MR2. Peter Evans convincingly

Ian Maud, FIAT X1/9
Photo: Steve Schmidt

won the SC 2001 and over class. The Sports Sedans 4WD class featured five entrants, and was convincingly won by Keven Stoopman in the extremely fast Lancer Evo that normally appears at the pointy end of races on circuits. Ken Neilson decided to take two of his three sons racing for the day in their circuit Excel – Ken beat both of the boys, but they were all shaded by Matthew Binks – these cars have come a long way since the time a few years ago when you could pick them up off the side of the road and turn them into a racing car!!

The results for the day appear elsewhere in this edition of Valve Bounce. As notified in the last edition, we are not conducting the various Club Championships this year, so obviously there are no points scores for the day.

Competition report– Nugget Nationals at Bryant Park

– 28th November, 2020. -Rhys Yoemans

While I was unable to escape the ring of steel for our last club hill climb, with the wall falling and an easing in restrictions, I was able to make my way to Bryant Park for the Nugget Nationals hill climb. Nugget Nationals is a series based on cheap (sub $3000) and low-powered (1.5L or smaller-engined) vehicles, which is a great introduction for many to motorsport or another option for those whose race cars have become too expensive to run regularly.

It has been great to see the series grow over the past 5 plus years, from a handful of Nuggets with the rest of the field non-Nuggets, to their first Nugget-only event at Bryant Park. COVID has had a position impact on the Nugget population, as there were at least 15 new cars and faces that I hadn't seen before, so there is a silver lining amongst all the doom and gloom of 2020.

As much with all events, there are a variety of lap times based on level of car preparation and driver skill, the pointy end of the Nugget field being very competitive, with a handful of drivers swapping fastest laps through the day on both the 'figure 8 plus additional loop' and then 'figure 8' layouts.

The last three runs saw Gippsland Car Club's James Dyer in his Suzuki Ignis Sport and Iain McCowan in his ED Honda Civic almost matching each other in lap times, both supporting each other in their efforts to go faster along the way. In a showing of great sportsmanship, Iain assisted James between each run in removing as much weight as possible from his car, to the point that half the exhaust and interior were sitting in the pits as James lined up for his last run of the day!

In the end, James was able to run a fastest lap of 64.64, while Iain was not far behind at 64.98, two lap times that are very impressive considering the lack of power, 200tw tyres and that both cars drove to and from the track!

James Dyer driving his Ignis Sport much faster than the designers at Suzuki thought it would ever be!
Photo – Gran Photography.

https://www.facebook.com/GranPhotog/

Competition report– A DOUBLE DELIGHT

-John Bryant

(WHICH TURNED OUT TO BE LESS THAN A DELIGHT DUE TO THE WEATHER!!)

John Bryant was at the December 5 twilight event, and has the following observations to make.

This was another event with a difference, being a Club-only event, and for the first time in about three years, was to use two tracks on the day. On this occasion, the theory was to have four runs on the Clockwise Track, and four runs on the Clockwise Short Track, which has not been used for some time. Times were to be determined by adding the competitor's fastest time on the Clockwise Track and the fastest time on the Clockwise Short Track – it was lucky that due to the COVID restrictions at the time, we did not have a trophy presentation, so the mathematical calculations were not required after the meeting!

We received a good entry size for this event, with 66 members recording a time throughout the day. Most of them completed the four runs on the Clockwise Track, most completed the first run on the Clockwise Short Track, many opted not to run the second run on the Clockwise Short, whilst only three people attempted the third Clockwise Short and none for the last run on this configuration. **RAIN KILLED THE DAY OFF!!**

My quick calculations suggest the first ten outright as follows (please do not ring to complain if you disagree with my maths – the real results will be revealed in the fullness of time):

First	Bruce Minahan	Hayward	88.62 seconds
Second	Pete Minahan	Hayward	88.79 seconds
Third	Wim Janssen	Wimp 002	88.98 seconds
Fourth	Ewen Moile	Ramblebee	91.93 seconds
Fifth	Mark Samson	Spectrum	95.17 seconds
Sixth	Rhys Yeomans	Honda Civic	98.40 seconds
Seventh	Terry Selwyn	Datsun 1600	100.60 seconds
Eighth	Max Bonney	NG Elfin	100.67 seconds
Ninth	Steve Buffinton	Westfield	100.76 seconds
Tenth	Larry Kogge	Torana XU1	101.13 seconds

The day was almost incident-free, which was good because the track became progressively greasier as light rain continued to fall from about the second run onwards. The only casualty was Joel Martin, who gave the concrete barrier after the finish line a fair smack, but I am not sure what damage he did as he was able to keep going back into the pits. The results for this event are included in this edition, as well as on the website. Runs numbered one to four are for times recorded on the Clockwise Track, whilst runs 5 to 7 are for the Clockwise Short Track. We are extremely lucky that we have abandoned the Club Championship this year, as it would have been a nightmare working out the points to the satisfaction of all.

The season has finished – we managed only three hill climbs, only one of which was a multiclub event in February: the other two club only – certainly a season with a difference. I look forward to 2021 and hope that things might get back to normal. Our next event is the Victorian Hill Climb Championship twilight event on Saturday, February 13, 2021 – this will also be Round 1 of our 2021Club Championship.

Report-Working Bee at Bryant Park

– 29th November -Rhys Yoemans

I will admit that I only suggested we schedule this working bee as I wanted to drive my car before the hill climb on the 5th, and I didn't even end up doing that! Waking up on Sunday morning to a torrential downpour was a little disappointing compared to the great weather from the day before, so I went up to the track without my tyres and helmet looking to tidy the place up and get home at a reasonable hour. I did have a couple of messages from people asking if the working bee was still on, which I told them that I wouldn't travel too far as the weather didn't look to be improving.
Despite the weather, we had a small group of people arrive for the working bee. Most were focused on whipper snipping, while Billy was on the ride on mower. The Newton boys of Mark and Mitchell had the honour of cleaning the pit garages. A few months with very little human contact meant that several red back spiders had moved in! Phil Tullett - if you read this, a reminder to book the pest control guy!

We worked until 11:30am before putting cars on the track, with the standard Bryant Park weather on display. Rain, sun, wind or all at the same time was encountered for the length of practice with all cars doing plenty of laps before heading home mid-afternoon with very few mechanical issues to resolve before the following week's hill climb.

I unfortunately did not take any photos, though would like to thank all those who attended to assist at this working bee, along with any others we will hold into the future. It doesn't take much to keep Bryant Park looking its best!

FOR SALE: AE82 Corolla Club Car – Give yourself a Christmas present!

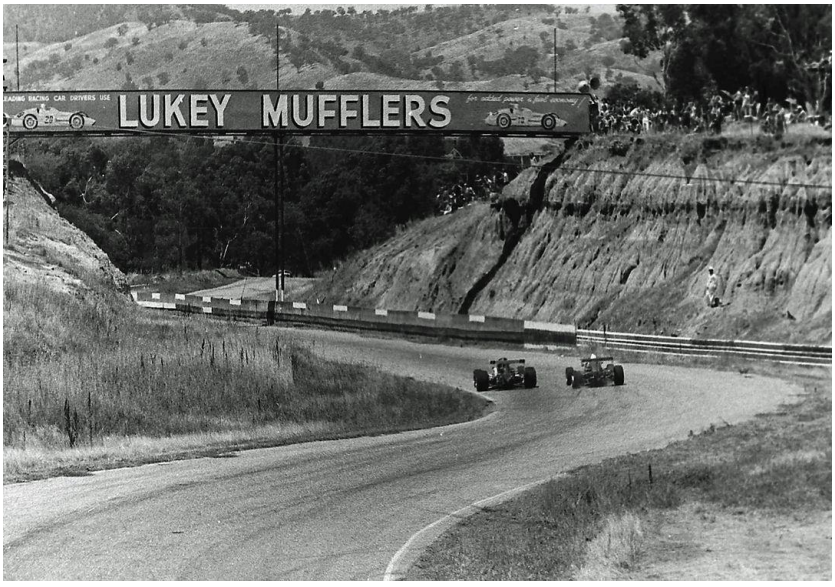
Ever thought about getting into motorsport? Perhaps with a son/daughter? Here's the exact vehicle you need! It's cheap to run, super-reliable and has a proven race history in GCC events and several 6-hr relays. The car is very well presented, log-booked, has a CAMS-approved roll bar, excellent race seat, and harness. The suspension has been lowered, and fitted with stiffer gas struts all round. It needs a new battery but apart from that, it's turnkey motorsport: take it to the next event and go!

The 'package' also includes a spare set of wheels and race tyres, a third set of race tyres, a Corolla Seca with a twin-cam engine, and another Corolla Seca for spares. You couldn't build it for the asking price of **$2,500**. Call Ian on 0414 580921.

…and a parting shot:

Here's another great photo of the mighty Pete Geoghegan in his Mustang, this time at Catalina Park – so it seemed to tie in with the earlier article. Pete's Mustang was known for its odd front wheel angles, but as has been explained, the front end was set up so the outside wheel (taking most of the cornering force) would stand vertical to the track, maximising its grip – as can be seen working perfectly here. The inside wheel…well, did whatever it did until it was leant on.
So here's Pete, with a slight bit of opposite lock, barrelling around the track at 10/10ths within cooee of those famous timber sleeper walls (top, LH corner) – a brave bloke!

Last month Bill Revill wrote about one of our 'lost' circuits – Hume Weir. Here's another photo of this track in its heyday, as two open-wheelers charge through the cutting. That wall in front of them separated the cars entering Energol loop from those leaving it and heading down the main straight – so you had cars at race speed separated by only the width of a concrete or Armco wall. Drivers – should they feel the impulse to do so – could just about have 'high-fived' each other at race speed!



(Photo: Mark Bishop, from www.facebook.com)

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Hillclimb, 8th November:

Results - Class

GCC CLUB HILLCLIMB (REGIONAL)

CLOCKWISE FIGURE 8 TRACK

Event Ranking

Rank	Number	Name	Vehicle	Class	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Time	Gap
Formula Ford														
1	50	**SAMSON Mark**	Spectrum 011b	Formula Ford		60.83	60.70	60.70	60.01	93.99	61.12	60.67	**60.01**	
Historic Other														
1	162	**CHARMAN Keith**	Elleton BMC Special	Historic Other	71.92	71.22	71.03	73.98		70.96	72.01		**70.96**	
Improved Production up to 2000														
1	45	**DYER James**	Suzuki Ignis Sport	Improved Production up to 2000		66.02	65.59	65.29	65.23	65.30			**65.23**	
2	23	**MCLAREN Stuart**	Ford Escort	Improved Production up to 2000		74.89	72.31	73.80	71.51	70.70	89.05	85.89	**70.70**	5.47
3	303	**MORGAN William**	Hyundai Excel	Improved Production up to 2000	73.08	72.49		72.44					**72.44**	7.21
4	121	**REYNOLDS Lloyd**	VW Golf	Improved Production up to 2000		74.25	73.73	74.19	73.79	73.74	74.37	74.55	**73.73**	8.50
5	136	**BENBOW Hugh**	Holden Barina RS	Improved Production up to 2000		83.44	80.92	80.45	78.58	76.74	76.98	75.82	**75.82**	10.59
Improved Production 2001 and over														
1	302	**SELWYN Terrence**	Datsun 1600	Improved Production 2001 and over			66.08	65.21	65.41	65.26	65.89	65.47	**65.21**	
2	2	**DUNCAN Robert**	Holden Commodore	Improved Production 2001 and over	65.71	65.58	65.37	65.70	65.33	65.23	66.07	66.28	**65.23**	0.02
3	180	**CULL Tyson**	Ford Falcon EA	Improved Production 2001 and over	72.33	66.21	65.89	65.52	66.65	71.48			**65.52**	0.31
4	231	**MAHY John**	Holden Commodore	Improved Production 2001 and over	66.21	67.02	65.91	66.42	66.33	67.68	66.22	67.48	**65.91**	0.70
5	6	**MCNIVEN Jim**	BMW E36 M3	Improved Production 2001 and over	67.09	66.85	66.94	67.59	66.05	66.79	67.67		**66.05**	0.84
6	68	**PENNYCUICK Damien**	Nissan Skyline	Improved Production 2001 and over		66.85	66.41	66.85	66.73	66.91	66.92	66.89	**66.41**	1.20
7	80	**CULL David**	Ford Falcon	Improved Production 2001 and over		68.29	67.45	66.93	67.35	66.75			**66.75**	1.54
8	291	**REVITT-MILLS Mark**	Holden Commodore	Improved Production 2001 and over	68.44	69.31							**68.44**	3.23
9	147	**COOLING Geoff**	Ford Falcon	Improved Production 2001 and over	71.17	70.21	70.11	70.10	70.32				**70.10**	4.89
10	100	**GOODWIN Dylan**	Mitsubishi Magna	Improved Production 2001 and over	76.80	74.23	73.22	72.94	72.78	72.02	71.89	71.69	**71.69**	6.48
11	29	**REVITT-MILLS Paul**	Holden Commodore	Improved Production 2001 and over		72.41	72.37						**72.37**	7.16
12	112	**JOHNSON Laurie**	Ford Probe	Improved Production 2001 and over		78.92	81.80	77.44	77.87	79.03	76.53	76.67	**76.53**	11.32
Clubman Sports Cars up to 1600														
1	65	**DOLE Les**	Clubman Watson	Clubman Sports Cars up to 1600		67.10	67.81	68.20	67.80	66.29	64.99	64.88	**64.88**	
Sports Cars up to 2000														
1	222	**BANKS Steve**	Mazda MX5	Sports Cars up to 2000	66.04	65.79	65.43	72.64	65.59	67.41	65.79		**65.43**	
2	83	**SPEIGHT Ian**	Maxda MX5	Sports Cars up to 2000		66.81	66.27	66.84	68.78	68.08	66.97		**66.27**	0.84
3	11	**MAUD Ian**	Fiat X1/9	Sports Cars up to 2000	69.50	70.39	71.15	69.44	104.40	69.73	69.00		**69.00**	3.57
4	55	**GOOSSENS Michael**	Toyota MRS	Sports Cars up to 2000		70.68	72.20	69.86	70.08	69.00	70.12	70.71	**69.00**	3.57
5	43	**VELLA Sei**	Maxda MX5	Sports Cars up to 2000		73.87	72.92	72.93	73.50	74.31			**72.92**	7.49
6	74	**MAYZE Ian**	MGB Roadster	Sports Cars up to 2000		75.74	76.00	75.17	75.27	75.00	73.77		**73.77**	8.34
7	243	**VELLA Raymond**	Mazda MX5	Sports Cars up to 2000	83.77	81.94	83.45	84.58	81.27	80.70			**80.70**	15.27
Sports Cars 2001 and over														
1	366	**EVANS Peter**	Nissan 370z	Sports Cars 2001 and over	67.20	66.95	67.02	66.57	66.42	66.93	66.07	67.16	**66.07**	
2	145	**IRVINE Eric**	Porsche Boxster 986	Sports Cars 2001 and over	71.02	69.95							**69.95**	3.88
3	71	**THORBECKE Lex**	Toyota RA60 Celica	Sports Cars 2001 and over		78.05		77.68	77.79	75.90	76.95		**75.90**	9.83
Sports Sedans up to 2000														
1	223	**GREEN Michael**	Hyundai Excel	Sports Sedans up to 2000	66.71	67.21	66.83	66.47	66.08	66.51	66.70	65.71	**65.71**	
Sports Sedans 2001 and over														
1	63	**RIKKEN Daniel**	Nissan Gazelle	Sports Sedans 2001 and over		65.72	65.37	65.33	64.52	64.72	63.99	63.85	**63.85**	
Sports Sedans 4WD														
1	12	**STOOPMAN Keven**	Mitsubishi Evo 7	Sports Sedans 4WD	60.22	60.48	59.61	59.67	58.98	59.17			**58.98**	
2	87	**MARTIN Joel**	Subaru WRX	Sports Sedans 4WD		68.47	67.61	68.17	68.42	68.49	67.46	68.15	**67.46**	8.48
3	9	**REYNOLDS Shane**	Subaru Liberty	Sports Sedans 4WD	72.84	71.14	69.51	71.30	73.24	70.86	71.21		**69.51**	10.53
4	144	**PORTHOUSE Gavin**	Subaru Impreza	Sports Sedans 4WD			71.36	70.82	70.28	69.72	69.84		**69.72**	10.74
5	32	**SEDDON Scott**	VW Golf	Sports Sedans 4WD		74.13	72.88	73.07	73.55	72.78	75.03		**72.78**	13.80

Junior

1	555	**GOOSSENS Brody**	Toyota MR2	Junior	84.54	78.67	83.02	75.52	76.99	75.33	76.01	76.28	**75.33**	

Circuit Excel

1	38	**BINK Matthew**	Hyundai Excel	Circuit Excel		68.58	67.68	67.28	68.65	67.46	79.14		**67.28**	
2	118	**NEILSON Ken**	Hyundai Excel	Circuit Excel		68.45	68.52	68.69	69.33	68.19	68.99	68.46	**68.19**	0.91
3	18	**NEILSON Josh**	Hyundai Excel	Circuit Excel		71.66	71.12	70.41	69.90	68.87	68.43	68.51	**68.43**	1.15
4	181	**NEILSON Judd**	Hyundai Excel	Circuit Excel	74.00	85.23	72.14	73.64	72.46	73.01	72.57	70.57	**70.57**	3.29

Hillclimb, 8th November:

Results - Outright

GCC CLUB HILLCLIMB (REGIONAL)

CLOCKWISE FIGURE 8 TRACK

Event Ranking

Rank	Number	Name	Vehicle	Class	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Time	Gap
1	12	**STOOPMAN Keven**	Mitsubishi Evo 7	Sports Sedans 4WD	60.22	60.48	59.61	59.67	58.98	59.17			**58.98**	
2	50	**SAMSON Mark**	Spectrum 011b	Formula Ford		60.83	60.70	60.70	60.01	93.99	61.12	60.67	**60.01**	1.03
3	63	**RIKKEN Daniel**	Nissan Gazelle	Sports Sedans 2001 and over		65.72	65.37	65.33	64.52	64.72	63.99	63.85	**63.85**	4.87
4	65	**DOLE Les**	Clubman Watson	Clubman Sports Cars up to 1600		67.10	87.81	68.20	67.80	66.29	64.99	64.88	**64.88**	5.90
5	302	**SELWYN Terrence**	Datsun 1600	Improved Production 2001 and over			66.08	65.21	65.41	65.26	65.89	65.47	**65.21**	6.23
6	2	**DUNCAN Robert**	Holden Commodore	Improved Production 2001 and over	65.71	65.58	65.37	65.70	65.33	65.23	66.07	66.28	**65.23**	6.25
7	45	**DYER James**	Suzuki Ignis Sport	Improved Production up to 2000		66.02	65.59	65.29	65.23	65.30			**65.23**	6.25
8	222	**BANKS Steve**	Mazda MX5	Sports Cars up to 2000	66.04	65.79	65.43	72.64	65.59	67.41	65.79		**65.43**	6.45
9	180	**CULL Tyson**	Ford Falcon EA	Improved Production 2001 and over	72.33	66.21	65.89	65.52	66.65	71.48			**65.52**	6.54
10	223	**GREEN Michael**	Hyundai Excel	Sports Sedans up to 2000	66.71	67.21	66.83	66.47	66.08	66.51	66.70	65.71	**65.71**	6.73
11	231	**MAHY John**	Holden Commodore	Improved Production 2001 and over	66.21	67.02	65.91	66.42	66.33	67.68	66.22	67.48	**65.91**	6.93
12	6	**MCNIVEN Jim**	BMW E36 M3	Improved Production 2001 and over	67.09	66.85	66.94	67.59	66.05	66.79	67.67		**66.05**	7.07
13	366	**EVANS Peter**	Nissan 370z	Sports Cars 2001 and over	67.20	66.95	67.02	66.57	66.42	66.93	66.07	67.16	**66.07**	7.09
14	83	**SPEIGHT Ian**	Maxda MX5	Sports Cars up to 2000		66.81	66.27	66.84	68.78	68.08	66.97		**66.27**	7.29
15	68	**PENNYCUICK Damien**	Nissan Skyline	Improved Production 2001 and over		66.85	66.41	66.85	66.73	66.91	66.92	66.89	**66.41**	7.43
16	80	**CULL David**	Ford Falcon	Improved Production 2001 and over		68.29	67.45	66.93	67.35	66.75			**66.75**	7.77
17	38	**BINK Matthew**	Hyundai Excel	Circuit Excel		68.58	67.68	67.28	68.65	67.46	79.14		**67.28**	8.30
18	87	**MARTIN Joel**	Subaru WRX	Sports Sedans 4WD		68.47	67.61	68.17	68.42	68.49	67.46	68.15	**67.46**	8.48
19	118	**NEILSON Ken**	Hyundai Excel	Circuit Excel		68.45	68.52	68.69	69.33	68.19	68.99	68.46	**68.19**	9.21
20	18	**NEILSON Josh**	Hyundai Excel	Circuit Excel		71.66	71.12	70.41	69.90	68.87	68.43	68.51	**68.43**	9.45
21	291	**REVITT-MILLS Mark**	Holden Commodore	Improved Production 2001 and over	68.44	69.31							**68.44**	9.46
22	11	**MAUD Ian**	Fiat X1/9	Sports Cars up to 2000	69.50	70.39	71.15	69.44	104.40	69.73	69.00		**69.00**	10.02
23	55	**GOOSSENS Michael**	Toyota MR5	Sports Cars up to 2000		70.68	72.20	69.86	70.08	69.00	70.12	70.71	**69.00**	10.02
24	9	**REYNOLDS Shane**	Subaru Liberty	Sports Sedans 4WD	72.84	71.14	69.51	71.30	73.24	70.86	71.21		**69.51**	10.53
25	144	**PORTHOUSE Gavin**	Subaru Impreza	Sports Sedans 4WD			71.36	70.82	70.28	69.72	69.84		**69.72**	10.74
26	145	**IRVINE Eric**	Porsche Boxster 986	Sports Cars 2001 and over	71.02	69.95							**69.95**	10.97
27	147	**COOLING Geoff**	Ford Falcon	Improved Production 2001 and over	71.17	70.21	70.11	70.10	70.32				**70.10**	11.12
28	181	**NEILSON Judd**	Hyundai Excel	Circuit Excel	74.00	85.23	72.14	73.64	72.46	73.01	72.57	70.57	**70.57**	11.59
29	23	**MCLAREN Stuart**	Ford Escort	Improved Production up to 2000		74.89	72.31	73.80	71.51	70.70	89.05	85.89	**70.70**	11.72
30	162	**CHARMAN Keith**	Elleton BMC Special	Historic Other	71.92	71.22	71.03	73.98		70.96	72.01		**70.96**	11.98
31	100	**GOODWIN Dylan**	Mitsubishi Magna	Improved Production 2001 and over	76.80	74.23	73.22	72.94	72.78	72.02	71.89	71.69	**71.69**	12.71
32	29	**REVITT-MILLS Paul**	Holden Commodore	Improved Production 2001 and over		72.41	72.37						**72.37**	13.39
33	303	**MORGAN William**	Hyundai Excel	Improved Production up to 2000	73.08	72.49		72.44					**72.44**	13.46
34	32	**SEDDON Scott**	VW Golf	Sports Sedans 4WD		74.13	72.88	73.07	73.55	72.78	75.03		**72.78**	13.80
35	43	**VELLA Sei**	Maxda MX5	Sports Cars up to 2000		73.87	72.92	72.93	73.50	74.31			**72.92**	13.94
36	121	**REYNOLDS Lloyd**	VW Golf	Improved Production up to 2000		74.25	73.73	74.19	73.79	73.74	74.37	74.55	**73.73**	14.75
37	74	**MAYZE Ian**	MGB Roadster	Sports Cars up to 2000		75.74	76.00	75.17	75.27	75.00	73.77		**73.77**	14.79
38	555	**GOOSSENS Brody**	Toyota MR2	Junior	84.54	78.67	83.02	75.52	76.99	75.33	76.01	76.28	**75.33**	16.35
39	136	**BENBOW Hugh**	Holden Barina RS	Improved Production up to 2000		83.44	80.92	80.45	78.58	76.74	76.98	75.82	**75.82**	16.84
40	71	**THORBECKE Lex**	Toyota RA60 Celica	Sports Cars 2001 and over		78.05		77.68	77.79	75.90	76.95		**75.90**	16.92
41	112	**JOHNSON Laurie**	Ford Probe	Improved Production 2001 and over		78.92	81.80	77.44	77.87	79.03	76.53	76.67	**76.53**	17.55
42	243	**VELLA Raymond**	Mazda MX5	Sports Cars up to 2000	83.77	81.94	83.45	84.58	81.27	80.70			**80.70**	21.72

Hillclimb, 5th December:

Results - Class

GCC CLUB HILLCLIMB

CLOCKWISE TRACK, CLOCKWISE SHORT TRACK

Event Ranking

Rank	Number	Name	Vehicle	Class	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Time	Gap
Formula Vee														
1	86	**BONNEY Maxwell**	Elfin Ng	Formula Vee	58.90	58.17	58.91	59.70	42.50	44.34			**42.50**	
2	71	**ROBERTS Harold**	Elfin Formula Vee	Formula Vee	70.94	62.00	59.79	64.46	49.20	46.98			**46.98**	4.48
3	861	**DEAN John**	Elfin Ng	Formula Vee	64.93	65.60	65.33	66.54	47.29	54.32			**47.29**	4.79
Formula Ford														
1	501	**SAMSON Mark**	Spectrum 011b	Formula Ford	56.71	55.64	61.29	58.07	39.53				**39.53**	
Formula Libre up to 1300														
1	150	**MINAHAN Peter**	Hayward 07	Formula Libre up to 1300	52.45	52.28	53.73	51.13	37.66	48.97			**37.66**	
2	707	**MOILE Ewen**	Ramblebee Mk8	Formula Libre up to 1300	53.68		54.38	55.70	38.25				**38.25**	0.59
3	50	**MINAHAN Bruce**	Hayward 07	Formula Libre up to 1300	52.87	50.59	49.98	51.54	38.64	39.07			**38.64**	0.98
4	151	**CASEY David**	Casey CR600T	Formula Libre up to 1300	55.51	55.38	56.86						**55.38**	17.72
Formula Libre 1301 to 2000														
1	250	**FOLEY Alan**	R Foley Formula Libre	Formula Libre 1301 to 2000	59.01	51.29							**51.29**	
Formula Libre 2001 and over														
1	777	**JANSSEN Wim**	Wimp 002	Formula Libre 2001 and over	51.91	51.22		53.64	37.66				**37.66**	
Historic Group N 2001 and over														
1	721	**KOGGE Larry**	Holden Torana	Historic Group N 2001 and over	59.56	59.61	60.29	60.09	41.51				**41.51**	
Historic Other														
1	162	**CHARMAN Keith**	Elleton BMC Special	Historic Other	65.58	63.82							**63.82**	
Improved Production up to 2000														
1	45	**DYER James**	Suzuki Ignis Sport	Improved Production up to 2000	61.07	60.44	60.32	62.29	44.71				**44.71**	
2	12	**REYNOLDS Lloyd**	Volkswagen Golf	Improved Production up to 2000	67.85	67.11	66.39	68.67	50.24	49.65			**49.65**	4.94
3	31	**MURPHY Paul**	Datsun 1200	Improved Production up to 2000	67.42	68.45	67.77	75.97	52.13	51.98	60.33		**51.98**	7.27
4	173	**HORTER Peter**	Ford Escort RS2000	Improved Production up to 2000	68.76	69.01	68.28						**68.28**	23.57
5	23	**MCLAREN Stuart**	Ford Escort	Improved Production up to 2000	73.34	68.33							**68.33**	23.62
6	36	**FINN Oscar**	BMW 318i	Improved Production up to 2000	85.10	70.97	69.81						**69.81**	25.10
7	82	**FINN Paul**	Mini Clubman	Improved Production up to 2000	75.36	73.18	73.26						**73.18**	28.47
8	238	**BINK Matthew**	Hyundai Excel	Improved Production up to 2000	88.83								**88.83**	44.12
Improved Production 2001 and over														
1	302	**SELWYN Terry**	Datsun 1600	Improved Production 2001 and over	60.35	59.04	64.09	60.03	41.56	51.91			**41.56**	
2	2	**DUNCAN Robert**	Holden Commodore	Improved Production 2001 and over	61.61	60.83	60.14	63.30	43.47	42.70			**42.70**	1.14
3	170	**CULL David**	Ford Falcon EA	Improved Production 2001 and over		63.38	62.57	63.14	43.35	46.98			**43.35**	1.79
4	70	**CULL Tyson**	Ford Falcon EA	Improved Production 2001 and over		60.35	59.02	62.68	43.78	44.08			**43.78**	2.22
5	231	**MAHY John**	Holden Commodore	Improved Production 2001 and over	62.35	61.23	63.63	61.50	43.95	49.09			**43.95**	2.39
6	34	**WESCOMBE David**	Nissan Skyline	Improved Production 2001 and over	62.28	62.43	61.59	63.21	44.38				**44.38**	2.82
7	6	**MCNIVEN Jim**	BMW M3	Improved Production 2001 and over	61.77	69.63	62.63	65.19	46.76	44.95			**44.95**	3.39
8	95	**DORE Raymond**	Chevrolet Camaro Z28	Improved Production 2001 and over	62.08	62.63	64.04	65.66	46.25				**46.25**	4.69
9	68	**PENNYCUICK Damien**	Nissan Skyline R33	Improved Production 2001 and over	61.67	60.77	61.46	61.17	47.87				**47.87**	6.31
10	30	**SELWYN Travis**	Holden HR	Improved Production 2001 and over	69.13	68.08	67.11	70.04	49.57	48.46			**48.46**	6.90
11	112	**JOHNSON Laurie**	Ford Probe	Improved Production 2001 and over	70.18	71.91	70.06	69.70	48.96	49.92			**48.96**	7.40
12	7	**SVASDIKUL NA AYUTTHAYA Svasdivong**	BMW 335i	Improved Production 2001 and over		68.44	68.36	109.01					**68.36**	26.80
13	136	**BENBOW Hugh**	Holden Barina RS	Improved Production 2001 and over	70.11	68.51	69.46						**68.51**	26.95
Clubman Sports Cars up to 1600														
1	181	**BUFFINTON Steven**	Westfield Clubman	Clubman Sports Cars up to 1600	57.76	57.65	60.65	65.09	43.00	50.13			**43.00**	
2	52	**HOCKING Dale**	Dalrick Clubman	Clubman Sports Cars up to 1600	58.05	57.43	57.74						**57.43**	14.43
3	75	**DOLE Les**	Clubman Watson	Clubman Sports Cars up to 1600	59.71	60.34	59.28						**59.28**	16.28

Rank	Number	Name	Vehicle	Class	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Time	Gap
Sports Cars up to 2000														
1	222	**BANKS Stephen**	Mazda MX5	Sports Cars up to 2000	60.60	61.08	62.88	65.05	44.10				**44.10**	
2	43	**VELLA Sei**	Mazda MX5	Sports Cars up to 2000	63.42	62.45	62.62	63.67	46.22	46.14			**46.14**	2.04
3	701	**BOWER Geoffrey**	MG Midget	Sports Cars up to 2000	67.62	63.53	67.55	68.88	46.14				**46.14**	2.04
4	83	**SPEIGHT Ian**	Mazda MX5	Sports Cars up to 2000	63.99	62.96	63.54	72.13	48.10				**48.10**	4.00
5	33	**PARR David**	Honda Integra	Sports Cars up to 2000	76.66	73.52	73.94	75.24	51.63	51.51			**51.51**	7.41
6	243	**VELLA Raymond**	Mazda MX5	Sports Cars up to 2000	71.03	76.83	76.72	74.53	52.04				**52.04**	7.94
7	74	**MAYZE Ian**	MGB Roadster	Sports Cars up to 2000	69.26	71.81	67.57	69.67	56.97	54.02	52.43		**52.43**	8.33
Sports Cars 2001 and over														
1	366	**EVANS Peter**	Nissan 370z	Sports Cars 2001 and over	62.74	61.83	64.04	62.30	42.73	43.01			**42.73**	
2	171	**THORBECKE Lex**	Toyota RA60 Celica	Sports Cars 2001 and over	70.41	70.48	75.78	76.27	52.67				**52.67**	9.94
Sports Sedans up to 2000														
1	8	**YEOMANS Rhys**	Honda Civic	Sports Sedans up to 2000	56.27	56.11	56.27	57.06	42.29	42.69			**42.29**	
2	223	**GREEN Michael**	Hyundai Excel	Sports Sedans up to 2000	60.59	60.45	62.41	61.97	43.11	46.66			**43.11**	0.82
3	61	**SIMONETTO Angelo**	Renault R8	Sports Sedans up to 2000	76.34	76.77	75.87	81.94	58.62	60.14			**58.62**	16.33
4	27	**HICKEY Paul**	Toyota Corolla	Sports Sedans up to 2000	69.99	70.60	72.48						**69.99**	27.70
5	727	**HICKEY Jill**	Toyota Corolla	Sports Sedans up to 2000	81.90	77.65	77.73						**77.65**	35.36
6	80	**WEBSTER Malcolm**	Toyota Corolla	Sports Sedans up to 2000	84.89	85.38	85.04	84.46					**84.46**	42.17
7	180	**WEBSTER Robert**	Toyota Corolla	Sports Sedans up to 2000	86.42	87.03	89.87	92.14					**86.42**	44.13
Sports Sedans 2001 and over														
1	81	**RUBINIC Steven**	Nissan ER34	Sports Sedans 2001 and over	62.98	61.43	60.82	62.86	44.69	49.07			**44.69**	
2	261	**LAMONT Bruce**	Nissan Skyline	Sports Sedans 2001 and over	66.87	68.17	73.53	72.87	46.59	51.57			**46.59**	1.90
3	621	**BAIRD Steven**	Ford Falcon	Sports Sedans 2001 and over	59.09	60.00							**59.09**	14.40
4	54	**LANGMUIR Gavin**	Nissan Pulsar	Sports Sedans 2001 and over	65.94	63.62							**63.62**	18.93
5	110	**DEAKINS Leigh**	Ford Falcon XR6	Sports Sedans 2001 and over	65.56	63.92	66.24						**63.92**	19.23
6	3	**FOSTER Mitchell**	Holden Commodore	Sports Sedans 2001 and over	68.64	64.73							**64.73**	20.04
Sports Sedans 4WD														
1	17	**BAKKER Steve**	Subaru WRX	Sports Sedans 4WD	60.62	60.14	60.36	59.87	43.47	45.32			**43.47**	
2	444	**PORTHOUSE Gavin**	Subaru Impreza	Sports Sedans 4WD	63.97	63.39	63.98	64.14	44.33				**44.33**	0.86
3	446	**LUCIANI Jad**	Volkswagen Bora	Sports Sedans 4WD	67.72	66.05	66.93	66.40	46.39				**46.39**	2.92
4	87	**MARTIN Joel**	Subaru WRX	Sports Sedans 4WD	64.11	62.21	62.16						**62.16**	18.69
5	9	**REYNOLDS Shane**	Subaru Liberty	Sports Sedans 4WD	64.13	63.84	64.71						**63.84**	20.37
Circuit Excel														
1	38	**BINK Matthew**	Hyundai Excel	Circuit Excel	62.99	62.07	60.87	62.67					**60.87**	
2	118	**NEILSON Kenneth**	Hyundai Excel	Circuit Excel	65.90	64.38	63.63	65.16					**63.63**	2.76

"Turns out it was a marble in the ashtray"

Hillclimb, 5th December:

Results - Outright

GCC CLUB HILLCLIMB

CLOCKWISE TRACK, CLOCKWISE SHORT TRACK

Event Ranking

Rank	Number	Name	Vehicle	Class	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Time	Gap
1	777	**JANSSEN Wim**	Wimp 002	Formula Libre 2001 and over	51.91	51.22		53.64	37.66				**37.66**	
2	150	**MINAHAN Peter**	Hayward 07	Formula Libre up to 1300	52.45	52.28	53.73	51.13	37.66	48.97			**37.66**	
3	707	**MOILE Ewen**	Ramblebee Mk8	Formula Libre up to 1300	53.68		54.38	55.70	38.25				**38.25**	0.59
4	50	**MINAHAN Bruce**	Hayward 07	Formula Libre up to 1300	52.87	50.59	49.98	51.54	38.64	39.07			**38.64**	0.98
5	501	**SAMSON Mark**	Spectrum 011b	Formula Ford	56.71	55.64	61.29	58.07	39.53				**39.53**	1.87
6	721	**KOGGE Larry**	Holden Torana	Historic Group N 2001 and over	59.56	59.61	60.29	60.09	41.51				**41.51**	3.85
7	302	**SELWYN Terry**	Datsun 1600	Improved Production 2001 and over	60.35	59.04	64.09	60.03	41.56	51.91			**41.56**	3.90
8	8	**YEOMANS Rhys**	Honda Civic	Sports Sedans up to 2000	56.27	56.11	56.27	57.06	42.29	42.69			**42.29**	4.63
9	86	**BONNEY Maxwell**	Elfin Ng	Formula Vee	58.90	58.17	58.91	59.70	42.50	44.34			**42.50**	4.84
10	2	**DUNCAN Robert**	Holden Commodore	Improved Production 2001 and over	61.61	60.83	60.14	63.30	43.47	42.70			**42.70**	5.04
11	366	**EVANS Peter**	Nissan 370z	Sports Cars 2001 and over	62.74	61.83	64.04	62.30	42.73	43.01			**42.73**	5.07
12	181	**BUFFINTON Steven**	Westfield Clubman	Clubman Sports Cars up to 1600	57.76	57.65	60.65	65.09	43.00	50.13			**43.00**	5.34
13	223	**GREEN Michael**	Hyundai Excel	Sports Sedans up to 2000	60.59	60.45	62.41	61.97	43.11	46.66			**43.11**	5.45
14	170	**CULL David**	Ford Falcon EA	Improved Production 2001 and over		63.38	62.57	63.14	43.35	46.98			**43.35**	5.69
15	17	**BAKKER Steve**	Subaru WRX	Sports Sedans 4WD	60.62	60.14	60.36	59.87	43.47	45.32			**43.47**	5.81
16	70	**CULL Tyson**	Ford Falcon EA	Improved Production 2001 and over		60.35	59.02	62.68	43.78	44.08			**43.78**	6.12
17	231	**MAHY John**	Holden Commodore	Improved Production 2001 and over	62.35	61.23	63.63	61.50	43.95	49.09			**43.95**	6.29
18	222	**BANKS Stephen**	Mazda MX5	Sports Cars up to 2000	60.60	61.08	62.88	65.05	44.10				**44.10**	6.44
19	444	**PORTHOUSE Gavin**	Subaru Impreza	Sports Sedans 4WD	63.97	63.39	63.98	64.14	44.33				**44.33**	6.67
20	34	**WESCOMBE David**	Nissan Skyline	Improved Production 2001 and over	62.28	62.43	61.59	63.21	44.38				**44.38**	6.72
21	81	**RUBINIC Steven**	Nissan ER34	Sports Sedans 2001 and over	62.98	61.43	60.82	62.86	44.69	49.07			**44.69**	7.03
22	45	**DYER James**	Suzuki Ignis Sport	Improved Production up to 2000	61.07	60.44	60.32	62.29	44.71				**44.71**	7.05
23	6	**MCNIVEN Jim**	BMW M3	Improved Production 2001 and over	61.77	69.63	62.63	65.19	46.76	44.95			**44.95**	7.29
24	43	**VELLA Sei**	Mazda MX5	Sports Cars up to 2000	63.42	62.45	62.62	63.67	46.22	46.14			**46.14**	8.48
25	701	**BOWER Geoffrey**	MG Midget	Sports Cars up to 2000	67.62	63.53	67.55	68.88	46.14				**46.14**	8.48
26	95	**DORE Raymond**	Chevrolet Camaro Z28	Improved Production 2001 and over	62.08	62.63	64.04	65.66	46.25				**46.25**	8.59
27	446	**LUCIANI Jad**	Volkswagen Bora	Sports Sedans 4WD	67.72	66.05	66.93	66.40	46.39				**46.39**	8.73
28	261	**LAMONT Bruce**	Nissan Skyline	Sports Sedans 2001 and over	66.87	68.17	73.53	72.87	46.59	51.57			**46.59**	8.93
29	71	**ROBERTS Harold**	Elfin Formula Vee	Formula Vee	70.94	62.00	59.79	64.46	49.20	46.98			**46.98**	9.32
30	861	**DEAN John**	Elfin Ng	Formula Vee	64.93	65.60	65.33	66.54	47.29	54.32			**47.29**	9.63
31	68	**PENNYCUICK Damien**	Nissan Skyline R33	Improved Production 2001 and over	61.67	60.77	61.46	61.17	47.87				**47.87**	10.21
32	83	**SPEIGHT Ian**	Mazda MX5	Sports Cars up to 2000	63.99	62.96	63.54	72.13	48.10				**48.10**	10.44
33	30	**SELWYN Travis**	Holden HR	Improved Production 2001 and over	69.13	68.08	67.11	70.04	49.57	48.46			**48.46**	10.80
34	112	**JOHNSON Laurie**	Ford Probe	Improved Production 2001 and over	70.18	71.91	70.06	69.70	48.96	49.92			**48.96**	11.30
35	12	**REYNOLDS Lloyd**	Volkswagen Golf	Improved Production up to 2000	67.85	67.11	66.39	68.67	50.24	49.65			**49.65**	11.99
36	250	**FOLEY Alan**	R Foley Formula Libre	Formula Libre 1301 to 2000	59.01	51.29							**51.29**	13.63
37	33	**PARR David**	Honda Integra	Sports Cars up to 2000	76.66	73.52	73.94	75.24	51.63	51.51			**51.51**	13.85
38	31	**MURPHY Paul**	Datsun 1200	Improved Production up to 2000	67.42	68.45	67.77	75.97	52.13	51.98	60.33		**51.98**	14.32
39	243	**VELLA Raymond**	Mazda MX5	Sports Cars up to 2000	71.03	76.83	76.72	74.53	52.04				**52.04**	14.38
40	74	**MAYZE Ian**	MGB Roadster	Sports Cars up to 2000	69.26	71.81	67.57	69.67	56.97	54.02	52.43		**52.43**	14.77
41	171	**THORBECKE Lex**	Toyota RA60 Celica	Sports Cars 2001 and over	70.41	70.48	75.78	76.27	52.67				**52.67**	15.01
42	151	**CASEY David**	Casey CR600T	Formula Libre up to 1300	55.51	55.38	56.86						**55.38**	17.72
43	52	**HOCKING Dale**	Dalrick Clubman	Clubman Sports Cars up to 1600	58.05	57.43	57.74						**57.43**	19.77
44	61	**SIMONETTO Angelo**	Renault R8	Sports Sedans up to 2000	76.34	76.77	75.87	81.94	58.62	60.14			**58.62**	20.96
45	621	**BAIRD Steven**	Ford Falcon	Sports Sedans 2001 and over	59.09	60.00							**59.09**	21.43
46	75	**DOLE Les**	Clubman Watson	Clubman Sports Cars up to 1600	59.71	60.34	59.28						**59.28**	21.62
47	38	**BINK Matthew**	Hyundai Excel	Circuit Excel	62.99	62.07	60.87	62.67					**60.87**	23.21
48	87	**MARTIN Joel**	Subaru WRX	Sports Sedans 4WD	64.11	62.21	62.16						**62.16**	24.50
49	54	**LANGMUIR Gavin**	Nissan Pulsar	Sports Sedans 2001 and over	65.94	63.62							**63.62**	25.96
50	118	**NEILSON Kenneth**	Hyundai Excel	Circuit Excel	65.90	64.38	63.63	65.16					**63.63**	25.97
51	162	**CHARMAN Keith**	Elleton BMC Special	Historic Other	65.58	63.82							**63.82**	26.16
52	9	**REYNOLDS Shane**	Subaru Liberty	Sports Sedans 4WD	64.13	63.84	64.71						**63.84**	26.18
53	110	**DEAKINS Leigh**	Ford Falcon XR6	Sports Sedans 2001 and over	65.56	63.92	66.24						**63.92**	26.26
54	3	**FOSTER Mitchell**	Holden Commodore	Sports Sedans 2001 and over	68.64	64.73							**64.73**	27.07
55	173	**HORTER Peter**	Ford Escort RS2000	Improved Production up to 2000	68.76	69.01	68.28						**68.28**	30.62
56	23	**MCLAREN Stuart**	Ford Escort	Improved Production up to 2000	73.34	68.33							**68.33**	30.67
57	7	**SVASDIKUL NA AYUTTHAYA Svasdivong**	BMW 335i	Improved Production 2001 and over		68.44	68.36	109.01					**68.36**	30.70
58	136	**BENBOW Hugh**	Holden Barina RS	Improved Production 2001 and over	70.11	68.51	69.46						**68.51**	30.85
59	36	**FINN Oscar**	BMW 318i	Improved Production up to 2000	85.10	70.97	69.81						**69.81**	32.15
60	27	**HICKEY Paul**	Toyota Corolla	Sports Sedans up to 2000	69.99	70.60	72.48						**69.99**	32.33
61	82	**FINN Paul**	Mini Clubman	Improved Production up to 2000	75.36	73.18	73.26						**73.18**	35.52
62	727	**HICKEY Jill**	Toyota Corolla	Sports Sedans up to 2000	81.90	77.65	77.73						**77.65**	39.99
63	80	**WEBSTER Malcolm**	Toyota Corolla	Sports Sedans up to 2000	84.89	85.38	85.04	84.46					**84.46**	46.80
64	180	**WEBSTER Robert**	Toyota Corolla	Sports Sedans up to 2000	86.42	87.03	89.87	92.14					**86.42**	48.76
65	238	**BINK Matthew**	Hyundai Excel	Improved Production up to 2000	88.83								**88.83**	51.17

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