

The Repco racing programme 1940-1970: innovation and enterprise in the private sector

In 1966 Jack Brabham (1926-2014) became the first, and still the only, person to win a Formula One world championship driving one of his own cars. The BT19 was designed by Ron Tauranac and powered by a Repco Brabham engine (RB620) designed by Phil Irving and engineered by Repco under the supervision of Frank Hallam in Melbourne. While built in England, the BT19 was an all-Australian affair.

Brabham's story is well known; an online search will bring up dozens of sites dedicated to him and his three Formula One world championships. The contribution of those who worked with him is less well known to the general public, if not to those interested in the history of Australian motorsport.¹ With this in mind, the intention of the present paper was to account for the surprisingly widespread Australian involvement in international post war racing, focussing on Brabham, Tauranac and Irving with some consideration of Repco. Once in the Repco archive, however, my attention turned to the company itself and the development of its racing program. This research showed that Repco's commitment to racing was almost as old as the company, and was not a response to Brabham's 1963 request for a replacement for the Coventry Climax engine, as much of the literature suggests. It also showed that Repco's decentralised company structure, that encouraged personal initiative within its groups, may have been instrumental in providing the conditions under which a racing culture could thrive, a culture that was not necessarily nurtured for financial gain.

Robert Geoffrey Russell (1892-1946) and the Repco organisation

In November 1922, 30-year old Robert 'Geoff' Russell registered Auto Grinding Company, an engine-reconditioning business he had established in a galvanised iron shed at the corner of Gipps and Rokeby Streets in Collingwood.² Catering to the growing automotive industry, the venture was successful, and in 1924 Russell moved to larger premises at 278 Queensberry Street on the corner of Berkeley Street, Carlton, near the centre of Melbourne's motor trade, which clustered around the top end of Elizabeth Street near the former Haymarket. In 1926 he and a friend Bill Ryan formed Replacement Parts Pty Ltd and a year later Russell Manufacturing Company was established in North Melbourne for piston-grinding and finishing. The office for Replacement Parts moved to a more central location at 618 Elizabeth Street in 1930, which fronted the Berkley street building. Carrying the largest stock of its kind in Australia, they invested in good point of sale design and customer relations and famously comprehensive catalogues; stock was always ready to hand, it was kept up to date and the staff were well trained, factors that explain 'the remarkable speed with which the right part comes to light when asked for'.³ In the four years from 1932 to 1936 staff numbers increased from 50 to 150, premises grew and Repco extended its activities into the accessory and equipment fields.⁴ The Elizabeth street premises were rebuilt. Replacement Parts (known as Repco from 1930 and incorporated as Repco Limited in 1937) expanded into regional Victoria (Sale and Hamilton) in 1932 and interstate to Tasmania in 1933 when it purchased 50% of Edmondson's Auto Spares in Launceston, soon buying out the remaining 50% to create Replacement Parts (Tas). In 1941 Repco also acquired engineering firm A T Richardson and Sons.

In 1930 Russell had bought 89-95 Burnley Street, Richmond and created a new company, Russell Manufacturing Co. Pty Ltd where they established a foundry to manufacture their own piston castings and piston rings, operating out of open sided buildings on the extensive Richmond site. Growth of the business and its foundry footprint continued during the war when it ramped up production to meet wartime demand.⁵ A new building on the corner of Burnley and Doonside streets was erected in 1942 that, along with the Auto Grinding and Elizabeth Street buildings, still exists.⁶ So, from the earliest years Russell created a particular business culture - of manufacture as well as merchandising, of acquisition, decentralisation (which was a new idea at the time),⁷ experimentation and training that not only gave him considerable market advantage over his competitors but was to characterise Repco for years to come. Auto Grinding, Replacements Parts and Russell Manufacturing were the core around which Repco built its organisation.

John Storey (1896-1955) and industrial management

Russell retired in 1945 due to ill health, and died the following year. In 1945 John Storey became Chairman of Directors and during his ten years at the helm Repco enjoyed a period of extraordinary growth. Storey was a supremely accomplished industrialist and businessman. In 1934 he had become director of manufacturing at GM-H, based in Melbourne, and joined the board. He supervised the erection of GM-H factories at Fishermans Bend (completed 1936), and Pagewood (1940) and the refurbishment of plants in Brisbane and Perth. Denis Nettle argues that Storey used his position as Director of Manufacturing at GM-H to try to persuade GM's US management to allow Australia to manufacture its own car, both through advocacy and "through the way he adapted Sloan system management approaches to Australian conditions". For example:

In the US GM had outplayed Ford through its ability to coordinate mass production of components from several plants to manufacture multiple models. Storey used these techniques to show how the coordination of small lot production of components across plants could also be used to efficiently produce cars in small volumes.⁸

Storey was appointed a director on the board of Commonwealth Aircraft Corporation and during the war when the decision was made to undertake complete local manufacture of the Beaufort aircraft, Storey, having resigned from GM-H, was put in charge. Building the Beaufort bomber was one of Australian industry's more spectacular achievements.⁹ In this role

Storey sub-contracted to some six hundred firms across Australia the production of components which were fed into seven sub-assembly workshops and, finally, the main assembly factories at Fishermans Bend and at Mascot, Sydney.¹⁰

Thus, by the time Storey came to Repco he was highly qualified to transform the company 'from a distributor and manufacturer of engine parts, rings and pistons into the largest integrated manufacturer and distributor of car components in Australia'.¹¹ Importantly, in terms of the organisation's future, in 1949 he reconstituted Repco as a holding company with subsidiary and associated firms becoming self-contained units or companies within its overall structure.

During the 1940s and early 50s Storey undertook an aggressive acquisition campaign bringing in successful manufacturing enterprises that complemented the core business of servicing the automotive sector. These included Patons Brake Replacements (1947), Warren and Brown, which included gasket manufacturer Brenco (1949), Precision Metal

Stampings (1949) Specialised Engineering Co (1950), P J Bearings (1952), Hardy Spicer (Aust) specialists in universal joints (1954), and piston manufacturer Brico (1955). At the same time Repco created new companies that sat alongside the acquisitions, including Repco Electrics (Replex 1946), Repco Cycles (1947), Repco Bearing Co. (1948) and others.¹² It was a pattern that continued for many years and resulted in 'a strong Australian owned components sector, which meant that as large US component suppliers began to enter the Australian market in the 1950's they were required to negotiate with Repco'.¹³

In 1970 when interviewed about Repco's success, then Managing Director Peter Rosenblum referred to these owned and affiliated companies as 'profit centres', terminology that had been coined by Austrian-born American management theorist Peter Drucker in about 1945.¹⁴ In 1943 Drucker had conducted research on the GM organisation and in his findings, *Concept of the Corporation*, published in 1946, he used the term 'federal decentralization' to describe the way GM was organised around a number of autonomous businesses each under its own manager. A factor in its dominance over Ford by the late 1920s was the way in which Alfred Sloan, unlike Ford, had embraced the idea of management and welded his 'undisciplined barons' into an effective management team.¹⁵ Similarly, under Storey's leadership, Repco's structure could be likened to that of 'federal decentralisation', in that when a new company was acquired, it continued to operate as before and its manager became part of the larger management team. Storey also adhered closely to the "line and staff" management principles he had encountered at GM-H.¹⁶ Not surprisingly given this background, Storey established a close relationship with Holden, in the supply of parts, such that, according to Murray and White, "Repco rode on the Holden's back to spectacular growth".¹⁷

Charles McGrath (1910-1984) and Repco Racing

The acquisition strategy adopted by Repco had to do with enhancing core business and lessening dependencies on outside resources. But from the 1930s there emerged another field of enterprise that was not core business but did bring Repco local recognition and eventually, international fame. This was racing.

In 1934 Repco sent Charles 'Dave' McGrath, who had begun as a messenger boy at the company in 1927, to re-organise the Launceston business along Melbourne lines, which he did with great success. McGrath, a motorcycle enthusiast, assembled a riding team from his engineers who eventually included Frank Hallam, Gordon Dangerfield and George Wade and the business attracted other keen motorcyclists for parts and advice.¹⁸ During the war McGrath used his own initiative to expand the Launceston workshop to manufacture engine

bearings and other components essential to the war effort. The bearings business eventually became a separate company in the established Repco manner.¹⁹ Repco management was impressed with McGrath and in 1946 he relocated to Melbourne to assist the joint managing director O R Wadds.²⁰ This position gave him access to Storey, and with Storey's backing his rise through the organisation thereafter was fairly seamless. In 1947 he was appointed general manager of Replacement Parts, director of Repco Ltd in 1948, director of sales in 1952 and managing director under the chairmanship of Storey in 1953.²¹ Storey died in 1955, and following the death of his successor W T Richardson in 1957, McGrath was elected Chairman of Directors.²²

The significance of McGrath to this story is I believe, paramount. He was a racing enthusiast, and fellow enthusiasts Wade and Hallam joined him in Melbourne and Hallam was to have a central role in the development of racing engines as chief engineer of Russell Manufacturing (1955) and chief engineer of Repco in the engine parts group (1959).²³ When McGrath stepped down as managing director in 1967, the *Financial Review* noted:

Just as triple world champion Jack Brabham has steered the Repco-Brabham to numerous racing circuit victories, so Mr. McGrath has led Repco through a period of dramatic growth.²⁴

The identification of Repco with racing was complete: but how had it come about?

Horace Charles (Charlie) Dean (1914 - 1985) and Repco Research

As McGrath, Hallam and Wade were settling in, a memo of November 1946 Storey informed staff that 'a new department of the business was created to manufacture specialised automotive electrical equipment' to be under the management of Charles Dean.²⁵ Replacement Parts had established a workshop at 50 Sydney Road, Brunswick, during the war 'to manufacture some electrical test equipment'.²⁶ They also sold 'Ajax' battery chargers that were manufactured by a small operation set up by Dean soon after the war in rented space in Elizabeth street, opposite Repco.²⁷ Importantly for this story, Dean was a racing enthusiast who had built his first special at the age of 17. He also developed an interest in electric vehicles, an enthusiasm he shared with Russell who advised him on setting up in electric charger production; it was Storey who made the offer in 1946 to incorporate the business into Repco. Dean was appointed manager, with products using the trade name 'Replex'.²⁸

This acquisition, however, was unusual - Repco usually acquired businesses with track record, assets and some standing as successful enterprises. Dean's business was relatively new and had not yet established any market prominence although Dean was said to design and manufacture 'the first "fast" battery chargers in Australia'.²⁹ What is significant is the fact that throughout his 27-year career at Repco, Dean's line manager was nearly always McGrath and a number of important decisions about the Repco engines discussed here seem to have been Dean's that had McGrath sanction.

Replex was not financially successful until it began to produce electric wheel balancers, which while important for the day to day automotive industry were also critical in racing. Dean was responsible for this development and in 1951 Replex moved from Sydney Road to larger premises in Weston Street, Brunswick where an assortment of existing buildings, including dwellings, was pressed into service. In 1960 they were all demolished and a new factory built.³⁰ The Sydney road premises were therefore vacant and it was here that Dean had the space to develop and test cars.

In 1946, the year he joined Repco, Dean had begun construction of what has become one of Australia's most successful early open-wheeler racing cars, the Maybach. It was not the first locally-designed open-wheeler. In 1929 Alan Chamberlain and his friend Eric Price built a special, now known as the Chamberlain 8, powered by a Daytona Indian motorcycle engine. Continuously modified thereafter it raced throughout the 1930s and briefly after the war.³¹ But the Maybach was more sophisticated and more successful.

Dean had bought a 1940 Maybach engine that had been used to power a German Army scout car captured from the Afrika Korps in the Western Desert and then shipped to Australia.³² With Wade, Hallam and Jack Joyce from Repco, Dean designed and constructed a two-seater, sports racing chassis to house it.³³ It debuted at the Rob Roy hill climb in November 1947 and over the next few years, during which time it acquired a body, and competed in hill climbs, speed trials and road races, including the 1948, 1949 and 1950 Australian Grand Prix, and Bathurst in 1951. At the Rob Roy hill climb championship in November 1951 the Maybach set a new race record for its class, while newcomer Jack Brabham won the overall championship in a speed car of his own construction.³⁴

However, prior to this in June, Dean had sold the Maybach to driver Stan Jones but came to an arrangement with McGrath to house it at the Sydney Road premises now vacated by Replex, where he could continue to work on it - the benefit to Repco being publicity and a test bed for its products. The building also housed a Holden 48-215 used for testing Repco

components as well as young employee Paul England's Ausca special, then under construction.³⁵ When Dean was sent overseas in 1951 to look at licensing agreements with firms in the USA he took time to visit the Maybach factory in Stuttgart and was surprised to learn they had heard of his Melbourne venture.³⁶ Jones drove the Maybach with great success through 1952 and 1953, and in 1954 took out the New Zealand Grand Prix against significant Italian and British cars including Brabham in a Cooper Bristol.

By this time, if not before, Repco had claimed the Maybach as its own. Indeed, in their literature they designated it the Repco-Maybach, presumably because of the quantity of Repco parts Dean used to modify the original engine.³⁷ Two articles published by Russell Manufacturing in August 1954, proprietarily illustrated the rings, bearing, piston pins and pistons used in the car. Paton Brakes also helped out. The Maybach became at this time Repco's 'unofficial mascot'.³⁸ After the New Zealand win Dean rebuilt the car as the single-seat Maybach II in which Jones had initial success before he crashed and destroyed it in the November 1954 Grand Prix at Southport, Queensland.

Phil Irving (1903-1992) and the racing engines

Dean had been appointed chief automotive experimental engineer at Repco reporting to McGrath in 1954.³⁹ A little later Phil Irving appears on the salary books. He had approached Dean, whom he had met years before at the racetrack, when he heard of plans to build the Maybach III on completely new, radical lines.⁴⁰ He had been working with Chamberlain Bros (with whom Repco had close business connections through their Rolloy piston rings), on an engine for their famous Chamberlain tractor but now he was ready to leave.⁴¹ He was taken on in Dean's experimental division, but to do what is not clear. If it was to work only on the Maybach, which was essentially Dean's private project, Repco was being quite extravagant hiring him. But then again, Irving was easily the most credentialled racing engine designer in the country, so employing him was shoring up specialised resources in that field.

Irving was over fifty and came with an established international reputation as an engine designer and author. He was a maverick, something of a loner, and over the years acquired an almost legendary status for engine design in the automotive world. After studying mechanical and electrical engineering at the Melbourne Technical College (RMIT University), and thwarted in his ambition for further study at Melbourne University, in 1922 Irving obtained his first job with the eminent and brilliant Australian engineer Anthony Michell at the firm of Crankless Engines in Fitzroy.⁴² In 1930 he left Australia as a pillion passenger on a Vincent HRD and eventually fetched up in England. He spent the following nineteen years working for Velocette motorcycles where he patented a number of designs and with

Philip Vincent with whom he designed the legendary Black Shadow Vincent motorcycle, while during the war he designed a submersible lifeboat engine for the RAF. In the 1930s and 1940s, Irving wrote a technical column in *Motor Cycling* and he published several books of which *Tuning For Speed* was the most celebrated.⁴³

Dean and Irving started a new project, with the blessing of McGrath, to make rallying more lively. The new Holden had proved a boon to road racing and rallying which had been popular from the early 20th century. Then the preserve of the few, the Holden made rallying accessible to many more Australians: 'engine tuners began to exploit the latent possibilities of the FJ Holden engine with such effect that they 'converted a fairly humdrum tourer into a respectable is not actually formidable device for sedan car racing'.⁴⁴ However, as tuning required skills that not everyone had, Irving designed a high-power cylinder replacement head that produced enough power to make a 'racing Holden sedan capable of over 115 mph'.⁴⁵ In 1953, Repco assisted the country's best racing drivers, Stan Jones, Lex Davison and Tony Gaze in the set-up of the Holden 48-215 they drove to 64th place in the Monte Carlo Rally. By 1956 Russell Manufacturing was running its own trials for its staff.⁴⁶

In the first issue of *Repco Record*, an in-house magazine McGrath established in September 1956 to replace Storey's *Repco Topics*, there was a separate motorsport section, a feature that would continue well into the 1970s. Under the title 'stories of initiative' the issue reported on Irving's cylinder head, Paul England's Ausca, another private venture carried out on Repco premises with Repco staff, and Repco's support of PIARC in the establishment of which Irving was heavily involved.⁴⁷ In fact in the early years of Phillip Island circuit development, Repco support was rewarded with the naming rights to the 'U' bend opposite Grandstand Hill which became known as 'Repco Corner' while in 1955 Repco guaranteed PIARC a bank loan of £10,000 thus helping to ensure the circuit's development was completed.⁴⁸ In 1957 McGrath led a Repco staff team of 19 to assist at the racetrack during the races where Dean and Irving were 'directors of the meeting'. Both were on the PIARC committee, and Irving was vice-president.⁴⁹ Irving's extensive involvement in motorsport, including his Mobilgas rallies in 1956 and 1957, was closely followed by *Repco Record* and his fame as the designer of the Vincent engine was a constant source of company pride.⁵⁰ By this time, sanctioned by McGrath, ably fronted by Dean, helped by the charismatic Irving, and operationalised by Hallam and his expert team, a diverse and vibrant racing culture was embedded in Repco.

In 1957 McGrath had announced the formation of a 'central research establishment' with Dean in charge. Research had been important for Storey⁵¹ but it was under McGrath's watch

that Repco's potential for engineering research and product design (as yet unacknowledged in Australian design history), came to be realised. Dean's managerial duties included research in a broad sense, but his position also gave him the power to implement his own projects tucked away at the Brunswick site. He now embarked on the design and manufacture of a modest version of a *gran turismo* sports car. Like the Maybach it was originally a private project that was brought into the Repco fold with McGrath's permission.⁵² Perhaps it was the presence of former GM-H employee Tom Molnar on staff, whose extensive knowledge of car manufacture provided sufficient in-house skill to pull it off. It was of unitary construction like a big production car and its Hi-power cylinder head was tuned for racing. It was an expensive project and it's hard to see where the financial return would come from although it was assembled with a great deal of Repco product, a fact that was exploited for publicity. Fortuitously the 'Repco Record' car appeared in the race scene, shot at Phillip Island, in the 1959 film *On the Beach* and Repco made the most of the exposure.⁵³ It was also sent to New Zealand on a promotional tour in 1960.⁵⁴ This project even more than the Maybach is indicative of a culture at Repco that encouraged innovative in motorsport.

In 1959 Dean was appointed director of Repco Research, again reporting to McGrath, an independent entity within Repco to which all the other companies would contribute as required.⁵⁵ It would seem that his independent projects and initiative suited the company. In 1960 he joined the Board of Directors and in 1961 he became a divisional general manager.⁵⁶ A purpose-designed research facility in Dandenong opened in 1960.⁵⁷ In 1964, in an effort to encourage cooperation and 'freer exchange of ideas', between its various branches and groups, Dean was appointed Director of both Research and Engineering.⁵⁸ By this time the RB620 engine was well under way.

Repco and Formula 1: Brabham, the RB620 and its aftermath

Up to this point Repco's engagement with racing at both sports/racing car and production car levels, was primarily local with some overseas exposure in New Zealand. It became truly international through the agency of Jack Brabham in the late 1950s. Repco had established a presence at the 1957 Earls Court Motor Show, had set up a London headquarters at St James's Street in the West End at the same time, and, leased a warehouse in Surbiton two years later. From this base they expanded throughout Europe, USA, South America, India, South Africa and elsewhere.⁵⁹ The story goes that in 1958 Brabham approached the Repco stand at Earls Court and spoke to the Hardy Spicer representative about trouble he was having with the universal joints in his Cooper - at the time he was a works driver for Charles and John Cooper. In Melbourne, Repco made special forgings for him and sent out ten kits

in time for the opening of the 1959 season in which Brabham won his first world championship. Repco therefore could claim some of the glory of his success.⁶⁰

In 1960, the year of his second world championship, Brabham decided to set up his own works to build sports and racing cars. He initially worked from a space rented from Repco and asked Ron Tauranac, a fellow racer from Sydney and brilliant racing car designer, to join him in England. His cars carried the Repco Brabham brand, irrespective of the engine used, as a result of a sponsorship deal between Brabham and Repco.⁶¹

In the meantime the Tasman Cup had been introduced in 1964 and at the time the 2.5-litre four-cylinder Coventry Climax engine was the most popular and successful engine in contention. Brabham, who regularly drove in the Tasman, along with other British racers like Stirling Moss and Roy Salvadori,

Enlisted the aid of Repco's resources to service and brake-test his Climax engines as well as supplying pistons, liners, bearings and so on as required, and this service was extended to other drivers. Eventually, the short-stroke 2.5 litre engine . . . was evolved [and] the job of supplying components to keep the numerous 2.5-litre units in Australia in race-worthy condition was landed entirely on Repco.⁶²

As Graham Howard points out, Brabham's Australian Grand Prix wins in 1963 and 1964 'were strongly Repco-based'⁶³ or as Repco put it 'whoever wins a big race anywhere in Australia - or a small one for that matter - Repco is very likely to have had a share in it'.⁶⁴

However, the Climax engine was coming to the end of its life and according to Mike Lawrence, Brabham worked on Hallam to induce Repco to build a V8 replacement but how the decision was made and who made it is a moot point.⁶⁵ If indeed Hallam were persuaded by Brabham, he would not have taken the decision alone and R A "Bob" Brown, head of the division in which Hallam worked, was an important player in the decision-making process. It might not have taken much to persuade Dean and McGrath and other board members to commit to the project. It belonged in Hallam's engine parts group, still headquartered in Richmond and in the normal way of things he would have chosen the team to design as well as test and build it. However, in late 1963, Irving was assigned the top-secret design job. Irving would not have been Hallam's choice, and the likelihood is that Dean chose him, although Hallam agreed to it.⁶⁶ Dean was senior to Hallam and close to McGrath and his appointment to oversee both Research and Engineering might have been to keep an eye on the Repco-Brabham V8 engine project. Of course Irving had a track record. Howard's

detailed account of the V8 engine programme glosses over this issue, simply stating that Irving was in the 'parts' group with Hallam. But he was not there in the early stages of the V8 development.⁶⁷ In 1961 Dean had appointed him to the Research Centre in Dandenong, given him his own desk and what appears to have been a remarkably open remit that allowed him to travel to England to visit the Isle of Man TT (Tourist Trophy) Race and continue his writing.

In January 1964 Irving was in London to work on the engine, for secrecy and also probably to keep out of Hallam's way. He spent the next 10 months there, liaising with Tauranac and Brabham and accessing specialist manufacturers. The engine was ready for its first test in Melbourne less than a year after the project began, and in September 1965 it was unveiled in *Repco Record*. There it was announced it would be built in two versions, a 2.5-litre Tasman Formula engine, and a 4.3-litre for sports-car racing.⁶⁸

As it turned out the engine was unsuccessful in the Tasman Cup, but the long game was to enlarge it to 3-litres so it could run in the Formula One World Championship in 1966 under the new rules.⁶⁹ In April 1966 as the RB620, in its 3-litre form, was powering its way to Brabham's third world championship, Repco formed a new company Repco Brabham Engines Pty Ltd at 87 Mitchell Street, Maidstone. Situated in the Engine Parts group under Bob Brown, a director of subsidiary Warren and Brown, it was formed 'to manufacture and market Repco Brabham racing and sports car engines' and to 'develop other high performance equipment for motor vehicles'.⁷⁰ Hallam, then divisional chief engineer of the Engine Parts group, became the general manager of Repco Brabham Engines.⁷¹ A new engine, the RB740, was already under development; Irving had begun work on it but fell out with Hallam and left Repco early in 1966.⁷² In 1967 the RB740 saw success in the world championship with Denny Hulme first and Brabham a close second, Brabham again winning the constructor's championship.⁷³ Repco made much of these wins:

As we have said before, car racing is not our business; but central to our business is the technology required to design automotive parts and to produce them to the highest standards of precision and reliability. We believe it will long be a source of reassurance to our customers, our employees and our shareholders that in 1967/68 engines completely designed and manufactured by Repco limited outperformed the world's best, in race after race.⁷⁴

Noticeably absent here was the reassurance of the profitability of Repco Brabham, and indeed Lawrence suggests that by this stage it was 'bleeding money'. Lawrence also

discusses the complications of the engine projects, the poor sales, the falling out between Hallam and Irving, the company's unrealised plans to build more engines and enter the international market in a major way, the lacklustre attitude to Repco promotion by both Brabham and Tauranac, and much else. Given the devolved nature of Repco's companies, Hallam was responsible for the financial success of Repco Brabham Engine Co and it was in trouble.⁷⁵

For the 1968 season Repco Brabham developed a new engine to meet the competition from the newly developed Ford Cosworth DFV V8 but it was not a success. It picked up some points in the Indianapolis 500 but, rather than develop it further, the company abandoned the project. But by this stage the Repco board was having serious doubts about the huge expense entailed in trying to keep ahead of an increasingly sophisticated opposition and decided to withdraw from Grand Prix racing.⁷⁶ On 12 December 1968, Repco Brabham Engines was transferred to Manufacturing Division III with Hallam as general manager reporting to Dean.⁷⁷ A few months later, in April 1969 Hallam was transferred out of the engine section and moved to Repco Research to enable him to concentrate fully 'on new product development with the new title of Chief Automotive Research Engineer'.⁷⁸ Importantly for this story he was to be 'undisturbed by current engine projects'.

At the same time, Dean was charged with creating a new entity from the residue of the V8 project at Maidstone; the Repco Engine Development Co.⁷⁹ Rather than desist from racing, Dean suggested that Repco return to production cars.⁸⁰ Dean once again called in Irving, now in his late sixties, to provide the design expertise to transform the recently developed Australian-designed Holden V8 engine into a racer for stock or production cars with a capacity limited to 5-litres.⁸¹ Working with a newly assembled team, Irving modified the block and head castings of the Holden engine and filled it with special components designed by Repco, bringing it up to the mark for the new Formula 5000 class. Frank Matich won the 1970 Australian Grand Prix in record time at Warwick Farm NSW driving a Repco-Holden powered McLaren M10B, the first of numerous successes for this engine.

Conclusion

Charlie Dean retired in 1973 and the engine-manufacturing program ended not long after. Although Repco continued to be involved in racing, for example, sponsoring the Repco reliability trial in 1979, its ambition to be a player on the world stage as a designer and manufacturer of racing engines was over.

Surveying the evidence thus far it appears that Repco's racing programme was coterminous

with Dean's employment and that as head of Research, under which umbrella much of the racing development was carried out, he, together with McGrath, played a substantial role in its development. The de-centralised company structure, which gave leeway to an individual manager's discretion, aided him. Furthermore, while Repco argued that the financial outlay for its racing programme was rewarded with global brand recognition, its effect on the profitability of the company has yet to be assessed. If, as legitimacy theory suggests, a corporation 'must act in congruence with society's values and norms'⁸² then Repco's racing programme might have been nurtured more for its perceived impact on a nation that places a high value on sporting achievement, particularly in the international arena, than for financial gain.

¹ Jack Brabham, *When the Flag Drops* (London: William Kimber & Co, 1971); Jack Brabham with Doug Nye, *The Jack Brabham Story* (Mindi Windsor NSW, 2004); Mike Lawrence, *Brabham, Ralt Honda, The Ron Tauranac Story* (Motor Racing Publications, Croydon, UK 1999); Phil Irving, *Phil Irving. An Autobiography* (Sydney: Turton & Armstrong, 1992); Simon G Pinder, *Mr Repco-Brabham. Frank Hallam* (Geelong: Victoria, 1995); Malcolm Preston, *Maybach to Holden. Repco, the Cars, People and Engines* (Mansfield QLD: Hughes Graphics & Design, 2010).

² For Russell see Robert Murray, 'Russell, Robert Geoffrey (1892–1946)', *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/russell-robert-geoffrey-11588/text20687>, published first in hardcopy 2002, accessed online 13 June 2016. The history of Repco up to 1960 is outlined in R A Murray and K B White's unpublished typescript "History of Repco" c. 1985, kindly made available to me by David McGrath.

³ 'A parts service built on Ford-like principles', *The Australian Automobile Trade Journal* (27 January 1930): 33, Repco company files, University of Melbourne Archives.

⁴ 'Repco's ten years of progress' in *Repco. Tenth Anniversary Celebrations*, Repco company files, University of Melbourne Archives.

⁵ R G Russell, 'A modern Australian foundry', *Foundry Trade Journal* (7 September 1933): 129-130, Repco company files, University of Melbourne Archives; 'Repco. In step with the nation's war effort', *GM-H Pointers magazine* 8 (4) (Nov 1941); I owe this reference to Norm Darwin.

⁶ Bryce Raworth, 'Former Repco Factory 81-95 Burnley Street, Richmond' Expert witness statement o panel amendment C149 to the Yarra Planning Scheme (March 2013): 4-6.

⁷ 'In these days [1930s] when the idea of decentralising industries was still new, replacement parts followed a definite policy of decentralisation in the building of its country branches', 'The story of replacement parts', typed notes p. 2, Repco company files, University of Melbourne Archives. Each

branch was a smaller replica of the Melbourne warehouse and workshop model. See also Murray and White, "History of Repco", chapter 4.

⁸ Denis Nettle, 'John Storey and the Nature of Australian Management Practice', sydney.edu.au/business/_data/assets/pdf, accessed 1 June 2016.

⁹ John Lack, 'Storey, Sir John Stanley (1896–1955)', Australian Dictionary of Biography, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/storey-sir-john-stanley-11783/text21077>, published first in hardcopy 2002, accessed online 8 May 2016. Murray and White, "History of Repco", chapter 5.

¹⁰ Nettle, 'John Storey and the Nature of Australian Management Practice'.

¹¹ Nettle, 'John Storey and the Nature of Australian Management Practice'; Murray and White, "History of Repco", chapter 4.

¹² 'Repco Limited. Chronological growth - subsidiaries', typed list, Repco company files, University of Melbourne Archives.

¹³ Nettle, 'John Storey and the Nature of Australian Management Practice'.

¹⁴ 'The profit centre concept - the Repco story', *Rydges Journal* (May 1971), Repco company files, University of Melbourne Archives.

¹⁵ Peter F Drucker, *People and Performance* (New York: Butterworth Heinemann, 2011 (1977)): 5.

¹⁶ Murray and White, "History of Repco", 51 and chapter 5.

¹⁷ Murray and White, "History of Repco", 88.

¹⁸ *Repco Record* 1972, p. 28 notes that Repco racing began in Tasmania with these motorcyclists. In 1950 McGrath had negotiated for Repco to sell imported DMW motorcycles from England, although this came to nothing. Frank Hallam arrived at Repco in April 1943 having been transferred from CAC. He came from a distinguished family, being a descendant through his father of English historian Henry Hallam and his poet son Arthur Hallam, and through his mother, of Tasmanian attorney general and Australian explorer J T Gellibrand; Pinder, *Mr Repco-Brabham* Chapter 1.

¹⁹ Murray and White, "History of Repco", chapter 7.

²⁰ Murray and White, "History of Repco", 56, 112.

²¹ O R Wadds, management memorandum no. 6, 17 September 1946 announced McGrath's appointment as assistant to managing director; O R Wadds, management memorandum no.18, 23 May 1947 notes McGrath's appointment to Replacement Parts; John Storey, management memorandum no. 30, 4 May 1948 for McGrath's appointment as Director; John Storey, management memorandum no. 67, 17 October 1952 for McGrath as Director of Sales; 'Our chairman's history with Repco', *Repco Record* (June 1967): 2, Repco company files, University of Melbourne Archives.

²² C G McGrath, management memorandum 152, 18 November 1957, Repco company files, University of Melbourne Archives.

²³ For Wade: <http://www.motormarques.com/editorial/item/196-george-wade-1913-1997>, accessed 15 May 2016. O R Wadds, management memorandum, 10 July 1947, Repco company files, University of Melbourne Archives. Hallam's appointment was announced in management memorandum no. 112, 11 August 1955; in a memo of 6 August 1959 he is referred to as chief engineer in the Engine Parts Group, Repco company files, University of Melbourne Archives.

²⁴ *Repco Record* (June 1967): 3.

²⁵ John Storey, management memorandum, 20 November 1946, Repco company files, University of Melbourne Archives.

²⁶ 'Replex', *Repco Record* (September 1962): 2.

²⁷ Murray and White, "History of Repco", 80.

²⁸ O R Wadds, management memorandum no 4, 21 August 1946, Repco company files, University of Melbourne Archives. Dean's various appointments were noted in Storey's office memoranda for 6 August, 24 August, 17 September, 8 October, 6 December and 17 December 1946; 11 November 1948; 31 January 1951, Repco company files, University of Melbourne Archives.

²⁹ *Repco Record* (December 1973): 8. According to Malcolm Preston, Dean also produced large industrial transformers and services and reconditioned automotive electrical components, Preston is incorrect however about the name of Dean's business and the address of its initial premises, *Maybach to Holden*, 26; Murray and White, "History of Repco", 80.

³⁰ 'Replex', *Repco Record* (September 1962): 4.

³¹ Harriet Edquist and David Hurlston, *Shifting gear. Design Innovation and the Australian Car*, (Melbourne: National Gallery of Victoria, 2015).

³² 'The technical history of Australia's fastest car - the Repco-Maybach', *Repco Technical News* (August 1954): 1 Repco company files, University of Melbourne Archives.

³³ *Repco Record*, special 50th anniversary issue (1972): 28.

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- ³⁴ Preston, *Maybach to Holden*, 28-30.
- ³⁵ Preston, *Maybach to Holden*, 37.
- ³⁶ Preston, *Maybach to Holden*, 39.
- ³⁷ 'The technical history of Australia's fastest car - the Repco-Maybach', *Repco Technical News*, 1.
- ³⁸ *Repco Record* (1972): 28.
- ³⁹ C G McGrath, management memorandum no 88, 28 June 1954, Repco company files, University of Melbourne Archives.
- ⁴⁰ Irving, 'How we beat the world', 3; Irving, *An Autobiography*, 457.
- ⁴¹ Irving, *An Autobiography*, 457ff on Chamberlain.
- ⁴² Irving, like Frank Hallam, came from a distinguished family. In 1855 his grandfather, Martin Irving, son of famous Scots preacher and heretic Edward Irving, was appointed professor of Greek and Latin Classics at the University of Melbourne; he was later headmaster of Wesley College, which Phil Irving attended.
- G. C. Fendley, 'Irving, Martin Howy (1831–1912)', *Australian Dictionary of Biography*, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/irving-martin-howy-3840/text6099>, published first in hardcopy 1972, accessed online 13 June 2016.
- ⁴³ Irving, *An Autobiography*, 154-398.
- ⁴⁴ Phil Irving, 'Chapter 14: How we beat the world', typescript, Repco company files, University of Melbourne Archives.
- ⁴⁵ Irving, 'How we took on the world', 5.
- ⁴⁶ *Repco Record* (December 1956):
- ⁴⁷ 'Stories of initiative' *Repco Record* (September 1955): 6,13; 'Stories of progress', *Repco Record* (December 1957): 10, followed up on Dean and Irving and the Hi-power Head. See also Jim Scaysbrook, *Phillip Island. A History of Motorsport since 1928*, (Melbourne: Bookworks, 2005): 47,50.
- ⁴⁸ <http://www.islandmagic.net.au/about-piarc/history-piarc/>, accessed 13 June 2016 quoting PIARC Newsletter, 8.6.1954 and PIARC letter to Repco Ltd, 9.8.1955. Murray and White (84) note that the Repco Board agreed to pay "£4000 in sponsorship of the Phillip island Racing Club, believing that it would be an excellent advertising medium".
- ⁴⁹ 'At the Motor Races', *Repco Record* (March 1957): 10.
- ⁵⁰ 'Repco Man in Car Trial', *Repco Record* (September 1956): 5; *Repco Record* (September 1957): 5; see also *Repco Record* (September 1964): 15.
- ⁵¹ In 1949 Storey appointed L G Russell Technical Manager with a brief to establish and manage a modern development and research laboratory, located at Russell Manufacturing; management memorandum no 42, 5 July 1949. In 1951 he appointed Lionel Stern, an accomplished industrial designer who took out a number of patents. The May 1952 edition of *Repco Topics* featured an article on the Repco research division while the December 1950 issue featured an article on the Repco Dynamometer. Even in the 1930s Repco had encouraged innovation in its manufacturing enterprises, see Murray and White, "History of Repco", 36-37.
- ⁵² 'Repco, first in research!', *Repco Record* (June 1959): 2.
- ⁵³ C G McGrath, management memorandum no 164, 14 April 1959; 'We're in "On the Beach"', *Repco Record* (June 1959): 15, Repco company files, University of Melbourne Archives.
- ⁵⁴ *Repco Record* (June 1960): 8.
- ⁵⁵ C G McGrath, management memorandum no 164, 14 April 1959; Repco company files, University of Melbourne Archives.
- ⁵⁶ C G McGrath, management memorandum no 193, 8 December 1960, Repco company files, University of Melbourne Archives.
- ⁵⁷ 'New quarters for Repco Research', *Repco Record* (March 1960): 6. For Dean's later appointments, see McGrath's office memoranda for 14 April 1959; 8 December 1960; 18 August 1961, Repco company files, University of Melbourne Archives. The reviewer of this paper noted how Repco's commitment to R & D was in stark contrast to many other Australian organisations of that era.
- ⁵⁸ C G McGrath, management memorandum no 247, 20 December 1964, Repco company files, University of Melbourne Archives. Dean was stationed at the Dandenong research facility and Lionel Stern became its chief engineer in 1965.
- ⁵⁹ *Repco Record* (December 1957); Murray and White, "History of Repco", 150.
- ⁶⁰ *Repco Record* (March 1960): 15.
- ⁶¹ <https://en.wikipedia.org/wiki/Repco>, accessed 12 June, 2016.
- ⁶² *Repco Record* (March 1960):15; *Repco Record* (1972): 29.
- ⁶³ Graham Howard, 'Made in Australia. The Repco Brabham V8s', *Australian Motor Racing Year*, 1983/84, 34-41.

⁶⁴ *Repco Record* (March 1964): 341.

⁶⁵ According to Lawrence, Brabham worked on Hallam directly, see *Brabham, Ralt Honda, The Ron Tauranac Story*, 51; Preston claims Brabham approached McGrath directly, *Maybach to Holden*, 103; Pinder argues that Bob Brown, Hallam's boss, had a significant role, *Mr Repco-Brabham*, pp.23ff.

⁶⁶ In Pinder's account of Frank Hallam's life at Repco, largely taken from interviews with Hallam, the latter's dislike of Irving seeps through. He particularly disliked Irving's odd working hours, hostility to changes to his designs, and preference for working alone rather than in a team. He thus finds it impossible to discuss Irving's contribution to the design of the RB620 engine in an impartial way, see *Mr Repco-Brabham* chapters 4 to 6.

⁶⁷ Howard, 'Made in Australia', 35.

⁶⁸ *Repco Record* (September 1965): 3.

⁶⁹ Irving, 'How we beat the world', 8.

⁷⁰ C G McGrath, management memorandum no 276, 18 April 1966; *Repco Record* (June 1966): 12.

⁷¹ Management memorandum 276, 18 April 1966, Repco company files, University of Melbourne Archives.

⁷² Irving, *An Autobiography*, 552-554.

⁷³ *Repco Record* (June 1967):

⁷⁴ 'Report', Repco company files, University of Melbourne Archives.

⁷⁵ Lawrence, *Brabham, Ralt Honda, The Ron Tauranac Story*, 86-87; Pinder, *Mr Repco-Brabham*.

⁷⁶ Preston, *Maybach to Holden*, 130-131.

⁷⁷ D E Callinan, management memorandum no 338, 12 December 1968, Repco company files, University of Melbourne Archives.

⁷⁸ C H McGrath, management memorandum no 346, 28 April 1969, Repco company files, University of Melbourne Archives.

⁷⁹ D E Callinan, management memorandum no 363, 10 February 1970, notes that Malcolm Preston remains manager of the company reporting to Dean, Repco company files, University of Melbourne Archives.

⁸⁰ Preston states that the decision to build the F5000 engine was Dean's, *Maybach to Holden*, 133.

⁸¹ Irving, 'How we beat the world', 13-17.

⁸² Gary O'Donovan, *Legitimacy theory as an explanation for corporate environmental disclosures*, (PhD thesis, Victoria University of Technology, 2000).