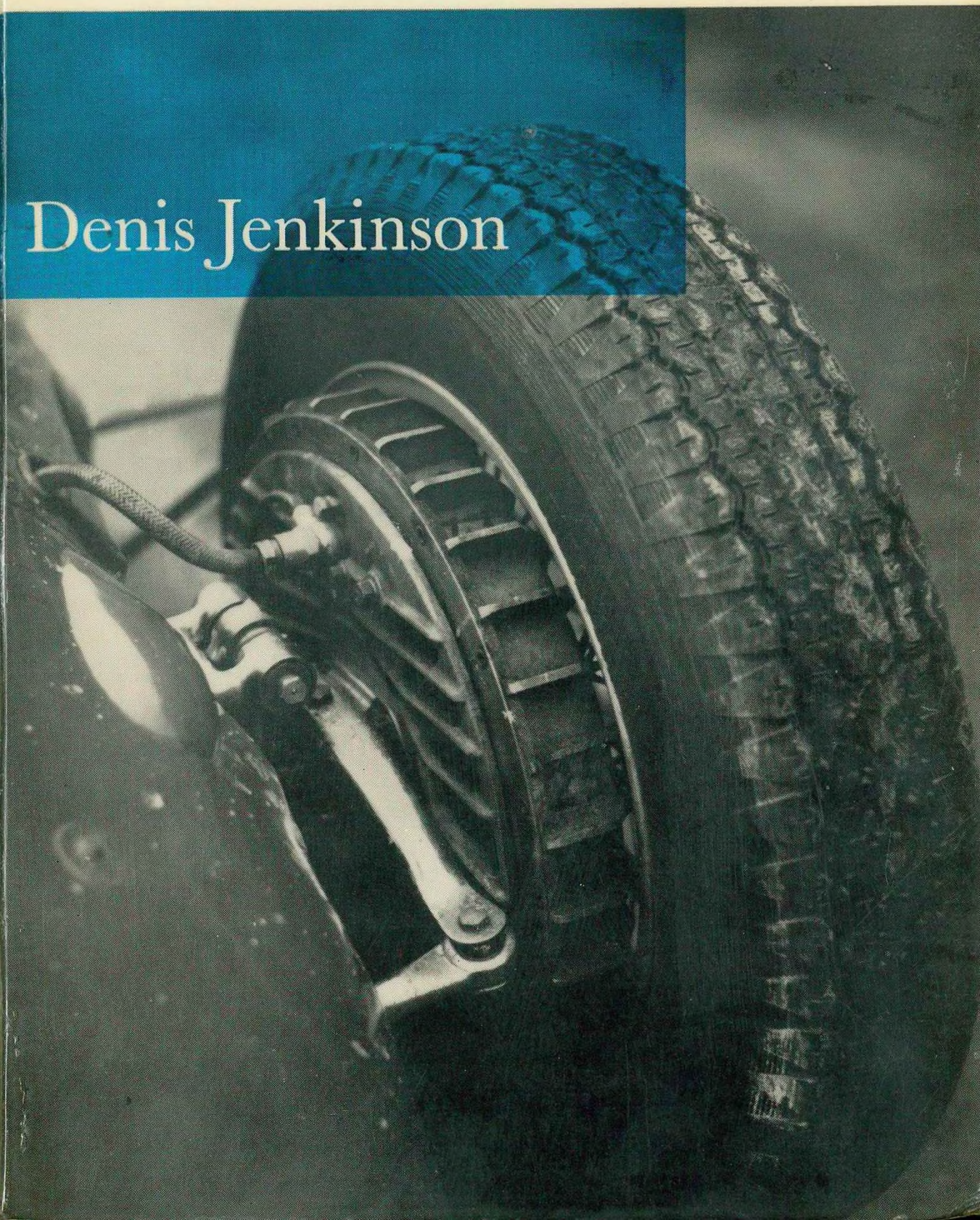
A story of **Formula 1**

Denis Jenkinson



A story of FORMULA 1

The Spirit of Grand Prix driving – Fangio in a Maserati

A story of FORMULA 1

1954 - 60

DENIS JENKINSON

GRENVILLE: LONDON

First Published 1960

Made and printed in Great Britain

by Tee & Whiten and J. Mead Ltd., 21, City Road, London, E.C.1

for Grenville Publishing Company Ltd., 15, City Road, London, E.C.1

Dedicated to

GRAND PRIX RACING

ACKNOWLEDGMENTS

The author would like to acknowledge the assistance received from William Boddy, the editor, and the publishers of *Motor Sport* for permission to reproduce articles and photographs. Also Fred Taylor, Peter Coltrin, David Thirlby, and Daimler-Benz A.G. for the use of their photographs.

Odiham 1960 D.J.

CONTENTS

		page
ACKNOWLEDGMENTS		6
LIST OF ILLUSTRATIONS		8
CHAPTER 1	Historical	11
CHAPTER 2	The Circuits	17
CHAPTER 3	The Champion Cars	28
CHAPTER 4	The Champion Drivers	41
CHAPTER 5	The Valiant Ones	53
CHAPTER 6	Streamlining	63
CHAPTER 7	Technical	76
CHAPTER 8	Transport	88
CHAPTER 9	Supremacy of Britain	100
CHAPTER 10	Sights and Sounds	129
CHAPTER 11	In Memoriam	142
RESULTS		148
DRIVERS		157
FATAL ACCIDENTS		159

LIST OF ILLUSTRATIONS

The Spirit of Grand Prix driving	*Frontispiece*
1954 Grand Prix Maserati	*Between pages* 16 and 17
1960 Grand Prix Lotus-Climax	
Street Racing, Naples	
Street Racing, Pau	
1954 Mercedes-Benz W196	*Between pages* 32 and 33
1955 Mercedes-Benz W196	
1956 Lancia/Ferrari V8	
1957 Maserati 250F	
1958 Vanwall	
1958 Dino 246 Ferrari	
1959 Cooper-Climax	
1960 Cooper-Climax	
Juan Manuel Fangio	*Between pages* 48 and 49
James Michael Hawthorn	
Jack Brabham	
Fangio in Action	
Hawthorn in Action	
Brabham in Action	
Bugatti Type 251	
Maserati V12	
Aston Martin	
Scarab	
Streamlined Mercedes-Benz W196	*Between pages* 64 and 65
Streamlined Connaught B-Series	
Streamlined Maserati 250F	
Streamlined Lancia/Ferrari	
Streamlined Vanwall	
Gordini Eight-cylinder	
Rear-engined B.R.M.	
1959 Dino 246 Ferrari	
Used Tyre	*Between pages* 80 and 81
New Tyre	
Goodyear Disc Brake	
Mercedes-Benz Drum Brake	
Pit Stop	
Ferrari Drum Brake	

Ferrari Disc Brake — *Between pages* 80 and 81
Weber Carburetters
Bosch Fuel Injection
Mercedes-Benz Inboard Brakes
Cooper-Climax Independent Rear Suspension
Vanwall i.f.s.
Lotus-Climax i.f.s.
Transport by Leyland — *Between pages* 96 and 97
Transport by A.E.C.
Transport by Mercedes-Benz
Transport by Bartoletti
Unloading a Ferrari
Unloading a Maserati
Ferrari Mechanics
Italian mountain road
Vanwall Mechanics
Syracuse Grand Prix 1955 — *Between pages* 112 and 113
Syracuse Connaught
Vanwall at Reims 1956
Vanwalls at Aintree 1957
Vanwalls at Monza 1957
Vanwall Personalities
Jean Behra Winning at Caen
Joachim Bonnier Winning at Zandvoort
Cooper-Climax at Monaco 1957 — *Between pages* 128 and 129
Lotus-Climax at Reims 1958
Coventry-Climax $2\frac{1}{2}$-litre Engine
Mr. G. A. Vandervell and Fangio
John Cooper
Colin Chapman
Zandvoort Start 1954
Zandvoort Start 1960
Driver Confidence
Ferrari driving up shopping street
Wheelspin — *Between pages* 144 and 145
Maserati V12 Engine
Ascari, Hawthorn and Moss
Luigi Musso
Peter Collins

1

Historical

IN 1951 THE governing body of International motor racing, the Federation Internationale Automobile, announced that a new Formula for Grand Prix racing would come into being on January 1st, 1954, and that it would be for unsupercharged cars of 2,500 c.c. capacity, without superchargers, or 750 c.c. capacity with a supercharger. At the time there had been some pretty fierce racing going on in Grand Prix events between Ferrari and Alfa Romeo, with cars built to the Formula in existence then, which was for unsupercharged cars of 4,500 c.c. capacity and supercharged ones of 1,500 c.c. capacity, and after a long struggle the 4,500-c.c. Ferrari had at last got the supercharged Alfa Romeos well and truly on the run. Anyone who saw the British Grand Prix in 1951 at Silverstone will remember even now the fantastic driving of Gonzalez and Fangio, on Ferrari and Alfa-Romeo, respectively, for that season was a peak one in the history of Grand Prix racing.

It is an F.I.A. rule that the Formula, or list of regulations, for Grand Prix racing shall be changed every so often, and the supercharged and unsupercharged Formula was long overdue to be changed, having been going since 1947. When the new rules were announced there was a great deal of complaining from the followers of Grand Prix racing, for they said, " How dull it will be, with engines only half the size." The following year Alfa-Romeo withdrew from racing, and with only the 4½-litre Ferraris taking part in Grand Prix events, various organisers quickly cancelled their proposed Formula 1 races and substituted events for the current Formula 2 of that time, which was for unsupercharged cars of 2,000 c.c., and the general feeling was that if we were going to have dull and slow racing in 1954, we might as well prepare for it in 1952 and 1953 by forgetting the Formula 1, especially as any race run to the old rules would have been a Ferrari procession. As things turned out the years 1952 and 1953 saw a great deal of competition between a great number of makes and though average speeds were not as high as before, the closeness of the racing satisfied even the most embittered enthusiast. By the end of 1953 the competition between Maserati and Ferrari, with their 2-litre Formula 2 cars was so hot that most of the English teams who were taking part were certain the Italians were using 2½-litre prototype engines, ready for the 1954 season. Obviously this was not true, but there was no doubt that the Italian cars were quick enough to be exciting, and the Italian Grand

Prix at Monza in 1953, or the French Grand Prix of that year, at Reims, are two races that have gone down in history as wheel-to-wheel epics.

When January 1st, 1954 came along everyone was looking forward to Grand Prix racing with keen anticipation, for the 2,000-c.c. engined cars had been fast enough, and now they were able to use 2,500 c.c. engines. All thoughts of regrets over the passing of the old Formula had disappeared, apart from a lingering for the sound of a supercharged engine, for it was very clear that the F.I.A. had made a bungle in limiting supercharged engines to 750 c.c., as even the most optimistic power output from such an engine could not hope to compare with that from an unsupercharged 2,500 c.c. engine. In 1951 it had seemed probable, or even possible, but the advance made in unsupercharged engines during 1952 and 1953 had been remarkable and the knowledge on power extraction without the aid of a supercharger had become very good, while supercharging and all its problems had been developed almost to its limit by 1951. The new Formula was a great success, and by the end of the first season there were four cars from different manufacturers, having nothing in common, except perhaps the front suspension, which could lap any given circuit almost at equal speeds. These were the straight-8-cylinder Mercedes-Benz W196, the Squalo Ferrari four-cylinder, the 250F Maserati six-cylinder and the V8-cylinder Lancia D50, and at the Spanish Grand Prix of 1954 the front row of the start consisted of one of each of these makes. While it was exciting to see such a variety of design ideas all on equal terms, it did rather indicate that none of the manufacturers had really found the answer to Grand Prix racing under this new Formula. As the years of the Formula progressed, it having been laid down for a period of four years, the design of Grand Prix cars changed, some manufacturers dropped out of racing and new ones joined in, and this book gives the story of the fortunes of some of the makes of Grand Prix cars and ideas during those years. Although the Formula should have been changed for 1958, it being reckoned that four years under the same rules was sufficient, Grand Prix racing was in such a healthy state at the time that it was decided to continue with the rules for another three years, as far as the cars were concerned, but to make a few minor changes. As things turned out, and the following chapters discuss, these minor changes affected the whole pattern of Grand Prix racing, and things took a completely new turn during 1958 so that by 1960 there was remarkable uniformity of design among Grand Prix car constructors, and the season ended with about as little variety of design as there had been complexity of design at the end of 1954.

For the first four years of the Formula, that is 1954-57 inclusive, the designers were given a free hand as far as fuel was concerned, and any sort of alcohol mixture could be used, or even oxygen-bearing fuels such as nitro-methane. Both Maserati and Vanwall resorted to the use of nitro-methane, in their searches for more and more horsepower, and in passing it is interesting that a Vanwall engine on the

test-bed, using a very high percentage of nitro-methane once gave as much as 310 b.h.p., but in racing only about 280 b.h.p. was extracted. The races organised for these Formula 1 cars could either be of three hours' duration, or over a distance of 500 kilometres (approximately 300 miles), so that cars had to be pretty solid in construction, and be capable of carrying a large fuel load, if pit stops were to be avoided, while tyres had to be large-section in order to deal with the horse-power, and weight, and to last out 500 kilometres. Apart from these rules and the capacity ones, there was a free hand for the designers. Due to a great deal of interest in Grand Prix racing by various manufacturers, this type of racing became more and more popular everywhere and business people began to take more interest, especially the petrol and oil companies, for they were flourishing industries now that world economics were booming, especially as far as Great Britain was concerned. By 1956 the petrol concerns were putting a lot of money into motor racing, for they had to get rid of excess profits somewhere, and it was nice that they were supporting Grand Prix teams and racing circuits, but they were beginning to mutter that they would like something back, and what they wanted was to be able to advertise successes gained by cars using their fuels. With the special alcohol fuels being used by everyone, admittedly mixed by Shell or B.P. or Esso, they could not use race winning as a direct advertisement, for they did not sell alcohol fuels to the public. Consequently various moves were made to encourage the F.I.A. to ban the use of alcohol fuel and limit the manufacturers to using commercial petrol for their engines, and in that way the fuel companies could advertise the fact that " The British Grand Prix was won on petrol the same as you can buy." With so many people living on petrol companies' money, either directly or indirectly, there was not a great deal of opposition to the idea, except from people like Mr. Vandervell who had sufficient millions of his own not to have to ask petrol companies to support his team of Grand Prix Vanwalls.

When the Formula was given a new lease of life, for the years 1958, 1959 and 1960, it was decreed that straight petrol should be used in the engines, with no additives, and that it should be " pump petrol ". This caused Mr. Vandervell to storm into the F.I.A. sanctuary and ask, very pointedly, " which pump, a British one or a Moroccan one " for between various countries the petrol sold to the public varied enormously. After a great deal of arguing and an inability by a lot of people to see that a variation in the quality of pump petrol was going to be an impossible problem for engine designers, it was agreed to scrub the rule and substitute the use of Aviation petrol, for this was the only commercial fuel that was blended to an International standard. The result was that International Avgas was the fuel decided upon and this was rated at 130 octane, against the best pump-petrol which was 100 octane. It also meant that the fuel companies had to provide supplies of this Aviation spirit at all Grand Prix meetings, so they had

just as much work to do as before and also, of course, they had defeated their own object, for nobody in the motoring public can buy Aviation spirit, so there was no advertising benefits. All this change did was to add the final straw to Maseratis back which made them close down their racing department, and cause the engine designers at Vanwall and B.R.M. a lot of headaches and a lot of work in order to redesign their engines to run on the new fuel. Ferrari was in the happy position of having to design a new engine anyway, so he could do this from scratch and plan for Avgas from the start. Coventry-Climax were only just getting under way with their enlarged four-cylinder engines, so that it caused them no problem and the basic designs of the twin-camshaft unit has been laid down for 100 octane petrol anyway, as they had no ideas of anything larger than a 1,500-c.c. engine when they started work.

As well as changing the fuel regulations the F.I.A. also decided that for the World Championship races where drivers scored points for the Championship it should no longer be possible for two drivers to share a car and share the points gained, as had been allowed. This removed a very exciting aspect of Grand Prix racing, for no longer could one see the fastest driver in the team making up time after taking over the slowest car, when his own broke down, as Moss had done when winning that most famous race, the British Grand Prix of 1957, the first Grande Epreuve to be won by a British car. They also reduced the duration of Grand Prix events, for the World Championship, from three hours to two hours, or in distance from 500 kilometres to 300 kilometres (approximately 186 miles). This meant that much lighter and smaller cars could be designed, for whereas an alcohol burning engine might do 6 m.p.g., one burning Avgas could be made to do 10 or 11 m.p.g., so the quantities of fuel to be carried could be drastically reduced, and the reduction of distance meant even less fuel to carry. This in turn meant that all parts of the chassis could be reduced in size and weight, and the Cooper Car Company, had already started on this path before the 1958 regulations came into force. Naturally they were delighted with the rules for 1958, as were Lotus, another small manufacturer just starting in Formula 1 racing, using the Coventry-Climax engine, as were Cooper. Between them these two manufacturers brought about a revolution in Grand Prix car design, Cooper with the engine behind the driver and Lotus with the engine in front, but as the modified Formula progressed it became more and more obvious that Cooper had the right layout for these small, light cars. There was no longer any point in having a big Grand Prix car, such as the Mercedes-Benz had been, or the Lancia/Ferrari or the 250F Maserati, or the Vanwall for that matter, and by 1959 the era of the small-car was well under way, while it was becoming more obvious that with such lightweight cars it was necessary to have as much weight as possible near the rear wheels in order to get good traction. At the end of 1959 B.R.M. went over to a rear-engine and a few months later Lotus did

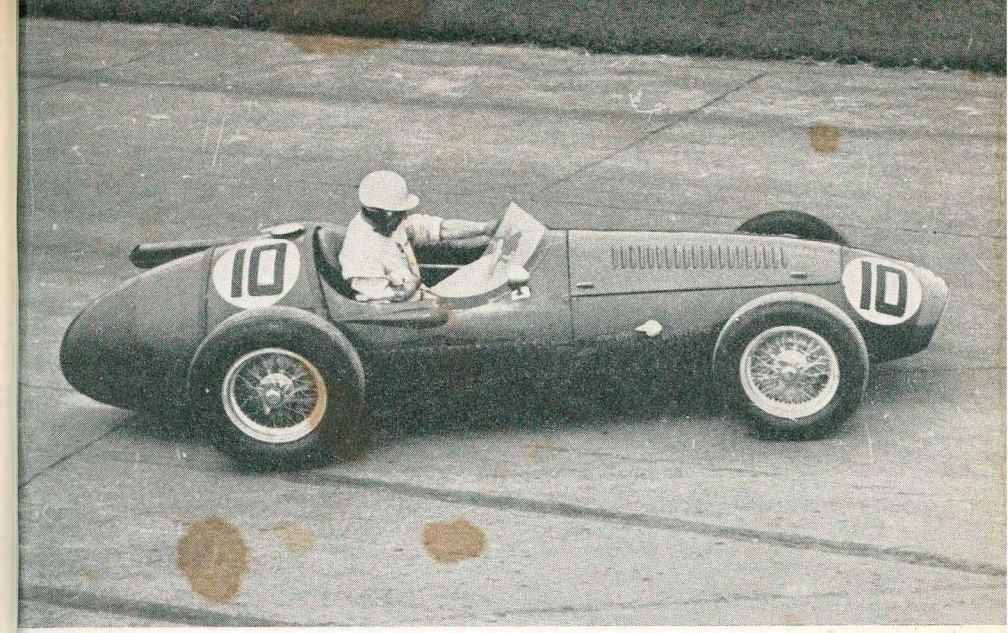
likewise, while in 1960 even Ferrari succumbed and followed the Cooper layout, and just too late to be successful the Vanwall team built a rear-engine car, so that by the end of 1960 the layout for a Grand Prix car had become almost standardised, with independent suspension to all four wheels, and rear engine, preferably of four-cylinders in order to produce good low-speed torque and to keep the power unit compact.

The rear position of the engine for a Grand Prix car was not new, for Dr. Rumpler had tried it in the early nineteen-twenties, and Dr. Porsche had continued the idea with the Auto-Unions in the nineteen-thirties, but being large powerful cars the idea was not a success, and also knowledge of steering and road-holding was very sparse so that the cars were tricky monsters to drive. By the time Coopers got a footing in Grand Prix racing there was sufficient knowledge available on chassis and suspension design to be able to overcome the disadvantage of having most of the weight at the back of the car, and in addition the small four-cylinder engines were comparatively light so that the weight distribution was not drastically unequal, if at all in some designs.

So there we have the brief development story of the life of the 2½-litre unsupercharged and ¾-litre supercharged Formula, which was claimed would bring dull racing when it was first announced, and yet produced some of the fastest and closest racing ever seen, with a greater variety of makes competing than anyone ever dreamed possible, and from a multitude of ideas as to the best layout for a Grand Prix car we have come to an almost universal layout, and size. The following chapters deal with various aspects of the Grand Prix racing during those years, and as I was able to spectate at more than two-thirds of the races run to the Formula 1, while writing reports of them for *Motor Sport*, as their Correspondent in Europe, many of the observations are personal ones, while information was invariably gleaned on the spot. At frequent intervals I digress from the purpose in view, for digressing is one of my favourite pastimes, and anyway when you are living with the Grand Prix " circus " and motoring as many as 30,000 miles in eight months each year, personal digressions are very frequent and many of them I have recounted in the hope that they will give a good picture of what was going on in the realms of Grand Prix racing under Formula 1 during the years 1954-60.

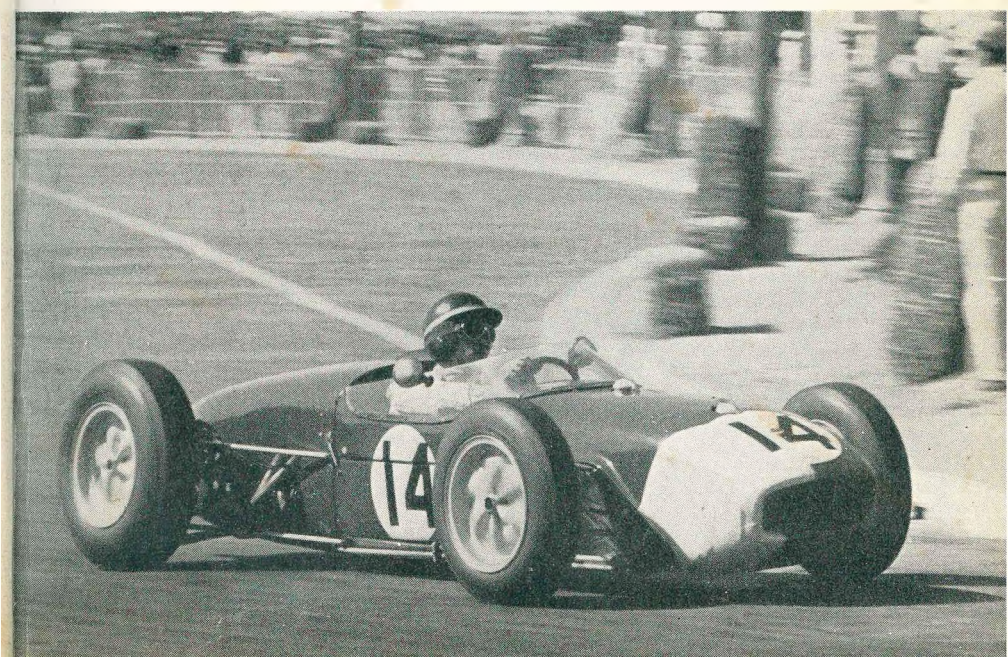
At the end of 1958 a new list of regulations were announced by the F.I.A. for Formula 1 Grand Prix racing, to take effect from January 1st 1961, and as in 1951 this caused a storm of protest from short-sighted people who thought that everything was alright in the world and there was no need to change. If you asked anyone interested in Grand Prix racing in 1960 what they thought of the Grand Prix cars of 1951, they would invariably say that they were big gormless cars, and monsters to drive, compared with the splendid machines of today. That was only nine years ago, and I'll wager that you will get the same

reply in 1970, about 1960 Grand Prix cars, if not before. With the exception of one abortive attempt there were no supercharged cars built for the Formula of 1954-60, so that this era of Grand Prix racing can almost be looked upon as " the 2½-litre Formula ". As this book is being published this Formula has drawn to a close, having been a memorable one, and the new Grand Prix racing begins on January 1st 1961, and it could well be another memorable one, so I feel justified in saying " Formula 1 is dead, long live Formula 1 ".



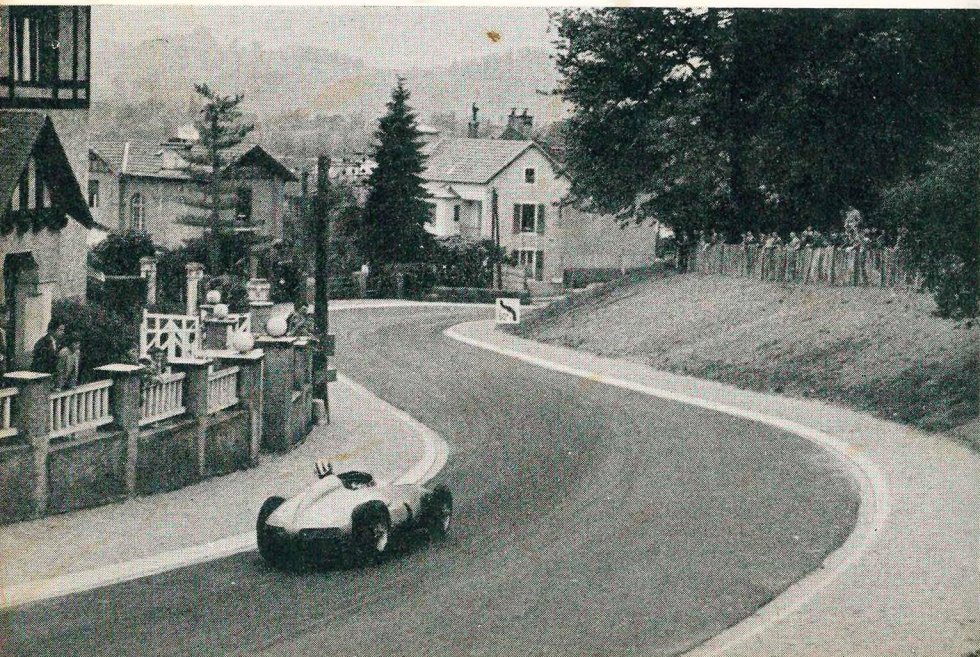
1954 *Grand Prix car*, Roy Salvadori in Syd Greene's 250F Maserati at Goodwood. This car was a very familiar sight on British tracks in the early years of the Formula.

1960 *Grand Prix car*, Jimmy Clark in a rear-engine works Lotus-Climax at Portugal. The white patch on the nose is masking-tape holding together the split fibreglass body, after a practice crash.



Street racing in Italy. The start of the 1955 Naples Grand Prix round the Posillippo suburbs, and a large part of the town can be seen in the background.

Street racing in France. An 8-cylinder Gordini on a downhill section of the Pau circuit, passing through a residential area, permitting a free view for the residents.



2

The Circuits

FORMULA 1 RACES can be run in any country, providing that the National Automobile Club concerned is affiliated to the Federation Internationale Automobile, whose headquarters are in Paris. The F.I.A., as it is known, is the ruling body of organised International motor racing, and consists of members from all the countries concerned in motoring sport, which means virtually the whole world. Any of the member clubs can apply for a permit to hold a Formula 1 Grand Prix, but of course many of them are not in a position to organise such a race, though they may run sports-car races or rallies. When you invite the top teams of Grand Prix racing to an event they bring in their wake a vast *coterie* of outside assistance, such as petrol and oil people, tyre people, and representatives from all sides of motor racing, who have an interest in Grand Prix racing, either from the aspect of helping, reporting or merely watching, so that once the Grand Prix " circus " starts heading for a given circuit the organisers have to have strong resources to cope with it all. For this reason motoring clubs do not rush to the F.I.A. for permission to run Formula 1 races, and even if they did the F.I.A. does not grant permits freely. A circuit or organising club usually has to get some experience with running smaller events before a Formula 1 Grand Prix permit is granted, because while it is easy to run an event for a few of the local lads, it is a very different thing to run a full-length Grand Prix for Brabham, Moss, and the boys. Then again some countries are not interested in organising a Formula 1 event because this type of racing, although rated as the highest form of the sport in Europe, does not have the interest in their part of the world. In Australia for example the races are run essentially for the Australian and New Zealand drivers and few of these have modern Formula 1 Grand Prix cars, so that a Grand Prix run to the Formula 1 rules would not permit the home drivers to compete. In consequence that continent prefers to run events under Formule Libre, which is to say, a free Formula in which any sort of car can compete. The Argentine also run similar events, as the supply of modern Formula 1 cars is very limited out there, though they do hold one Formula 1 race each year, and occasionally two, but they also have a Formule Libre event in which the European Formula 1 cars can compete. With motor racing having been born in Europe it is not surprising that it still remains the centre of Formula 1 racing, where the majority of races are held and most of the cars are con-

structed, but there is no reason for it to remain that way, the centre of Formula 1 racing can obviously vary according to where the interest lies. On the International calendar each country is permitted to nominate one race as its most important, and this is then referred to as the Grand Prix of that particular country, such as the British Grand Prix, or the German Grand Prix, and these are grouped under the heading of Grandes Epreuves, or the major races of the year, and most of them have been going for a very long time, the French Grand Prix for example having its 41st in the series in 1954 when the new Formula 1 began, and now having reached its 46th. Any country can apply for its premier event to be put in the list as a Grande Epreuve, but whether it is accepted by the F.I.A. depends on a number of things, such as the quality of the circuit, the experience of the organisation, the proposed character of the race to be run and so on. The Grande Epreuve races are then listed as the ones that count points towards the Drivers' World Championship each year, and as an article of faith there is a rule that says that if a World Championship race is cancelled for more than two consecutive years then it shall no longer remain in the official list, but must run as a normal Grand Prix again, before being re-accepted. This is to safeguard against an irresponsible country reserving a date in the very crowded calendar and not making use of it, while another more worthy circuit may have been refused a permit. Also it is considered that if a club does not run a big event for two years in succession then there is every possibility of its organisation having deteriorated, so that it is wise to insist on it running a smaller event first, before taking on the task of a Grande Epreuve.

During the past seven years there have been some infringements of some of these rules, as is inevitable, but they have usually been justified and have shown that the F.I.A. can be flexible where it is considered justified. One glaring example was in 1959 when the United States club asked for permission to run a Formula 1 race at Sebring and it was granted a permit to count as a Grand Epreuve, yet it was the first Formula 1 race ever to be held in America. The reason permission was given was because the organisers had run events already for sports cars of World Championship status, so the F.I.A. considered them capable of handling the complexities of a Grande Epreuve. In direct opposition the Automobile Club of Morocco booked a Formula 1 date in 1957 for a race on their circuit just outside Casablanca and they were made to run a normal Grand Prix for that year, under F.I.A. observation, and were only granted a World Championship permit the following year. The Spaniards held only one World Championship race for the Formula under review, that being in 1954, so that if they are ever in a position to run another Grand Prix race, they should, by the rules, run it as a non-championship event before being allowed back in the Grande Epreuve category, and, similarly, the same rule should apply to Switzerland who held their

last Grand Prix in 1954, at Berne.

Another rule that was bent slightly was the one that insists that each country shall organise only one event to count for the World Championship. In 1957 this rule was waived for the benefit of Italy, who were allowed to run two Championship events; their traditional Italian Grand Prix at the Monza track, and the Grand Prix of Pescara, way down the Adriatic coast. The Pescara Grand Prix is one of long standing, though not at all times has it been an event for Formula 1 cars, some years it being for sports cars, depending on the finances of the organising club. In 1954 it was a normal Formula 1 Grand Prix, then it reverted to sports cars and returned to Grand Prix cars in 1957. That year the list of Championship events was depleted by the cancellation, due to financial troubles, of the Dutch Grand Prix and the Belgian Grand Prix, so in order to swell the lists the Pescara race was upgraded to Championship status. This caused a certain amount of ill-feeling in France, for that year the French Grand Prix left its traditional circuit at Reims and was held on the wonderful road circuit at Rouen. The Reims organisers held a normal Formula 1 Grand Prix on their circuit, and it received virtually the same support as the Grande Epreuve, but it did not count as a Championship event, and when later in the season the Italians were granted an extra Grande Epreuve permit there was understandably a little grumbling.

Each year one of the Championship events is given the title of the Grand Prix of Europe, but this means very little and is a throwback from days of long ago before any Championships and when there were fewer races, for then the Grand Prix of Europe was considered the most important event of the season and all the manufacturers made big efforts to win it. Nowadays, with a series of important events being run the manufacturers try to win all of them so that the title of Grand Prix of Europe carries no particular advantage, except that organisers can use the title in their advertising blurbs as an added attraction for the paying public, the title going in rotation to the various European countries.

It can be seen that there are no impossibly hard-and-fast rules about where Formula 1 races can be held and who can organise them, and it so happens that most of them are in Western Europe, with the the continents of Africa, and the Americas joining in. Obviously, when the Australasians have suitable cars they will apply for some of their races to be run under Formula 1, and also for a Championship event to be held in their part of the Southern Hemisphere.

An organising club may be prepared to run a Grand Prix race, and the F.I.A. may grant them a permit but it is of no avail if the government of the country concerned does not give permission, and one Grand Prix that disappeared from the lists due to this was the Swiss Grand Prix. This event had been running for many years and used a magnificent circuit on the outskirts of the capital city of Berne. It

was 4½ miles in length and ran through the forest of Bremgarten, having the unique distinction of containing no lengths of straight road, but every possible type of corner and steep descents and gradual climbs as well. The lap speed was well over 100 m.p.h. and it called for the greatest amount of concentration of almost any circuit I know, for at no point in its length could the driver relax for more than a second or two. Many of the bends were taken at speeds approaching 130 m.p.h. and they were such that the car had to be placed accurately, to within inches, long before the corner was reached for visibility was limited by trees and hedges, so that the driver really had to know where he was aiming his sliding racing car if he was going to put in a fast lap. This circuit was used for motorcycle racing and car racing, and anyone who raced on it will agree, I am sure, that it was one of the most exacting circuits in Europe, as well as the most satisfying. I raced on this circuit over a period of four years when I was riding as sidecar passenger in motorcycle Grand Prix racing, and always found it extremely satisfying as an achievement, while it was without question the hardest circuit physically, for all the corners were high-speed ones, and whereas I could do a race at Nurburgring and not feel tired, or 40 or 50 laps of the tricky little Pau circuit and feel no strain at all, I found that 16 laps of the Bremgarten circuit used to make me completely worn out both physically and mentally. The Swiss club's series of Grand Prix races ran regularly since long before the 1939-45 war and in 1954 they held the Swiss Grand Prix to the new Formula 1, it being an excellent race, with competition from Ferrari, Maserati, Gordini and Mercedes-Benz, victory going to Fangio with a Mercedes-Benz. Then in 1955 there was a big accident in a sports-car race in France and the whole of Europe suddenly became very righteous, and somewhat pompous as well, and there was a great deal of " stable door shutting " once the horse had gone, over the question of the safety factor in motor racing. The Swiss government had never been very friendly towards motor racing, especially as it was all organised on normal everyday roads, which meant disrupting society every time the roads were closed for racing. As this business of closing roads for competition purposes was accepted in all European countries except England, Scotland and Wales, the Swiss permitted it in their country. Back in the early thirties the tourist trade in Switzerland was at a low ebb and to try and attract people to the country various activities were arranged and amongst them was a motor race at Berne, the Swiss Automobile Club persuading the local townspeople in power to let them have the roads in the Bremgarten Forest for the purpose. Someone in the organising club was very astute, for this permission was made legally in writing and allowed the Bremgarten to be used once a year for the purposes of racing, which was why the cars and motorcycles had to use it on the same weekend. When the tourist trade looked up again the Burgomasters of Berne said they did not want any more racing near their lovely city, for the noise and traffic

disruption, to say nothing of the unruly people that were attracted by Grand Prix racing, was beginning to upset the gentle tourists. However, the club had a master card in the legal paper they had drawn up when helping the town in hard times, so the Swiss Grand Prix was organised each year despite opposition from the townsfolk. When governments got all excited in 1955, after the big accident, the Italians said, with their tongue in their cheek, " no more racing on the roads —anyway, not for Formula 1 cars or big sports cars " and then realising what they had said they added, " at least, not until the circuit has been passed as safe and satisfactory," though they did not mention what they meant by that. France, in whose country the rumpus had started simply said " All racing will cease until we have looked into the matter " which they did very promptly and soon got things under way again. The Belgians and the Dutch did not say too much, not having a great deal of racing activity on public roads, while the British were not interested in getting in a flap as all their racing was run on comparatively safe permanent circuits anyway. The Germans had a big internal uproar and completely lost sight of the point at issue, which was the safety measures for the public on circuits that used normal roads, and they argued amongst themselves on motor racing in general, there being a big anti-motor racing element in that country. The Swiss government felt it had to keep face with all the other European governments so they said " No more racing in Switzerland " and having said that they stuck to it, for enthusiasm for racing in that country was very small, though where it did exist it was very ardent. With the Berne authorities agreeing smugly with the Swiss government there was nothing that the Swiss Automobile Club could do and the Bremgarten circuit was never used again, nor was another Swiss Grand Prix ever held for Formula 1 cars, though a few hill-climbs were gradually squeezed back into the International calendar.

With the passing of the Bremgarten circuit I always felt that one aspect of true Grand Prix racing had gone, for it was one of the few remaining unspoilt road circuits, and Grand Prix racing was born on the normal public roads, and spent all its life on them, until recent years when various interests deflected activities towards artificial tracks. This change of attitude by the various governments and also by National Automobile clubs, following the Le Mans accident, caused the disappearance from the calendar of a number of the smaller Grand Prix races. As a sop to government opposition the French racing authorities agreed to send a commission of responsible people to their various circuits to pronounce them safe for further racing, thereby relieving the French government of further responsibility to the French public, for some anti-motor-racing newspapers were saying that " public opinion " was demanding stricter safety measures at motor races. This was complete nonsense, of course, as " public opinion " always is, for invariably what is put out as headlines supposedly voicing public opinion is merely what various newspaper proprietors

think themselves and want the public to think. The resultant scream about public opinion and motor racing obviously came from the opposition to the government in power at the time and in order to curry favour the political parties came down heavily on racing and the circuits used. Very often " public opinion " as forced on the public by politically biased newspapers has an effect that results in a political benefit to one party or to some vested interests, and in this case it made a great change to motor racing, for many small clubs who used normal public roads to hold races on had to give up all idea of organising further events for they could not afford to carry out safety recommendations as suggested by the French commission. The circuit in the city of Pau, at the foot of the Pyrenee Mountains, came under criticism, this being a short round-the-houses type of circuit. At first they had no option but to abandon their race for 1956, but then the townfolk banded together and raised sufficient money to re-build the pits area and grandstands, and resurface the roads to the required standards and racing took place there once more. A little farther north, in the great port of Bordeaux the situation was not so happy, and this tricky little street-circuit, with its cobblestones and tramlines was abandoned for good, the local club not being in a position to finance any major alterations or able to find any alternative circuit that did not need a lot of money spent on it. Bordeaux held but two Grand Prix races under Formula 1, in 1954 and 1955, and a chapter in French motor racing history was closed. A similar fate befell the small race meeting held at Cadours, in southern France, though they did manage to keep going by organising races for less powerful cars, the Federation permitting sports-car races and small racing-car events to be held, but the true Grand Prix of Formula 1 never returned to Cadours after 1954. Also in this part of France the Grand Prix of Albi suffered a similar fate, for that organising club was not very rich and they had to accept demotion, so that after 1955 the town no longer rang to the sounds of Formula 1 cars in action.

In Italy the Valentino Park circuit in Turin was abandoned and Bari accepted demotion to sports-car status as a circuit, while the Naples club agreed to cut out a particularly tricky part of their circuit in order to stay on the Grand Prix calendar. A similar national scrutineering committee being formed to that in France, in order to appease a rather agitated government. In both cases an amusing occurrence took place with regard to these committees, for the French one called at Monte Carlo to scrutineer the circuit used for the Monaco Grand Prix, and they were told to go away, and Monaco pointed out politely that they were a Principality and did not come under French jurisdiction, and had their own Automobile Federation that would decide about the safety of the circuit. Needless to say the Monaco Grand Prix continued unchanged, for if anyone started to consider the safety factor of that fantastic circuit, they would soon get a big headache. It always had twisted and turned through the narrow

streets of Monte Carlo, round the hairpins by the station and through the black tunnel on the harbour front and along the promenade and it would have been an impossible task to make alterations, so it was left alone. As most of the public who watch the race stand on balconies, or high banks, there could be no claim that the organisers were not honouring their responsibilities to the public as regards safety, but it always has been and always will be a " hairy " little circuit for those taking part. The Italian commission set off for Sicily, to start altering things on that rugged little island, but they got about as far as the French did when they went to Monaco, for the Sicilians made it very clear that they were not Italians, and were not very interested in legislation that was going to mess up their motor racing. In consequence the Grand Prix at Syracuse continued unchanged, though like the Pau Grand Prix it ultimately dropped from the Formula 1 calendar due to organising a different category of racing, but that was for another reason altogether.

Over the seven years of the Formula many of the circuits underwent changes that were a result of the organiser's own ideas for improvement, and so on. This applied particularly to permanent tracks on private ground, for as races showed a profit, so some of the money could be spent on improvements. In England a good example of this was the way the character of the Silverstone circuit changed. In 1954 when the British Grand Prix was held the inside of many of the corners was defined rather vaguely by a line of old five-gallon oil drums, and these corners were not very popular with the drivers for the definition was poor and made it difficult to place a Grand Prix car accurately when taking the corner in a full-blooded Grand Prix slide. That particular Grand Prix, in 1954, was memorable for the way the streamlined Mercedes-Benz cars kept striking these oil drums, to the detriment of the drum and car's bodywork. As the drums were placed at intervals there was no continuous line at which to aim the car, and the protruding streamlined bodywork of the German cars caused Fangio and Kling a great deal of anguish. However, the following year these drums were replaced by low permanent walls round the corners, which did much to improve the circuit for the drivers, and for the spectators made it look a bit less like a disused airfield.

In 1954 the Aintree circuit came into being, built within the precincts of the horse-racing stadium, and this underwent a major change in its first year. The first meeting, not for Formula 1 cars, though having many Grand Prix cars competing was a Formule Libre event, run in an anti-clockwise direction, this being the original layout when the circuit was planned. After sounding the opinions of drivers the direction was changed to a clockwise one for the second meeting in 1954, which was its first Formula 1 race, and it has stayed that way ever since. In 1955, 1957 and 1959 the British Grand Prix was held at this circuit, while 1954, 1956, 1958 and 1960 saw the British Grand Prix held at Silverstone, and at both circuits amenities for the com-

petitors improved with time, the paddock at Aintree, for example, being moved from a cinder car park on the outside, to an improved one on the inside of the circuit, while Silverstone improved its pits and permanent buildings over the years. Another circuit which changed its character during the life of the Formula was the little Brands Hatch track near South London, for in 1960 it was lengthened considerably, a long and interesting loop being added to the original kidney-shaped track, making it a good one for Grand Prix cars.

On the Continent two circuits which kept changing imperceptibly were Reims and Spa, the former circuit in France being roughly of triangular shape, while the Belgian one was more complex and ran through the pine-forests of south-east Belgium. Both circuits were extremely fast and on each the lap times were reduced and the average speeds of the races went up and up, there being keen rivalry between the two organisers to see who had the fastest circuit. Although no major changes were made to the circuits, corners would be eased, or cambers altered and surfaces improved, so that as the speeds of the Grand Prix cars increased, the circuits became faster as well. In 1955 both these circuits missed out on their Grand Prix races, following the Le Mans accident and its repercussions, for they were due to take place almost immediately afterwards, but they returned to activity the following year. In 1957 and 1959 the Belgian race did not take place, due to financial difficulties, first within the club and then between the club and the Grand Prix teams, but in spite of this a vast sum of money was spent on buying land and building very permanent pits and paddock, even though the roads of the circuit itself are public, open to normal traffic when there is no racing taking place. The French word " ambiance " is used to describe a combination of surroundings, amenities, atmosphere and situation, and without a doubt the finest circuit in Europe from the point of view of " ambiance " is the Spa circuit in Belgium. It also holds the distinction of being the fastest road circuit in use in Grand Prix racing today, with a race average in 1960 of 215.049 k.p.h. (approx. 133½ m.p.h.).

In 1955 the Monza track in Italy underwent a very radical change, when a concrete banked track was incorporated with the road circuit. The track is in the old Royal Park in the town of Monza, just north of Milan, and the road circuit is roughly L-shaped, one end changing direction by means of two sharp right-hand bends at the district known as Lesmo, and the other end having two more sharp right-hand bends near Vedano, these latter bends also being referred to as Curva Porfido, this being the name for the small stone sets with which the bends were surfaced. In 1955 the banked oval track was built in such a way that one of the parallel straights of the old circuit was also part of the banked circuit as well, while the back leg of the road circuit ran down the centre of the area covered by the oval circuit. Strictly speaking the banked circuit was not oval, but comprised two 180-degree banked turns joined by two parallel straights. By clever bridging the two

circuits were made to cross and blend so that it was possible to use a combination of the banked track and the flat road-type circuit. The southern banking was arranged to join the wide pits straight on the outside, where the Porfido corners used to end, so these were taken up and a new 180-degree flat turn for the L-shaped road circuit was built inside the banked turn so that it joined the pits straight on the inside of its great width. This shortened the road circuit from 6.3 kilometres to 5.75 kilometres, but allowed a combined circuit length of 10 kilometres. As a matter of historical interest the small pink stone sets from the Porfido corners were used to surface the paddock, this having previously been a loose gravel surface. This new combined road and track circuit was used for the first time in 1955, and again in 1956, but then the Italian Grand Prix reverted to the road circuit, for the banked part was not popular with drivers or constructors, for it was not only frighteningly fast but was also very bumpy. When it was used again in 1960 it caused a terriffic uproar amongst the British Grand Prix teams with the result that none of them entered for the Italian Grand Prix that year.

The popularity of a circuit depends on a great number of things, for drivers and spectators alike, but I find that part of the fascination of following the Grand Prix " circus " around Europe is the variety of places at which races are held, for there are hardly two that are the same, and one circuit will be pleasant for one reason, and another for an entirely different reason. The Nurburgring, which is situated in the Eifel mountains south of Cologne, has a particular fascination in that it is almost completely self-contained and during a race there everyone connected with racing lives together, giving a vast circus-like family feeling. The paddock is enormous and has lock-up garages round its edges, so that all the teams make their bases there, and you can see Ferrari next to Maserati, or Cooper next to Lotus, while as part of the enormous grandstand overlooking the pits and starting area there is a fine restaurant and hotel. Those people who do not stay at the Sport Hotel in the grandstand usually descend into the village of Adenau, which is at the other end of the long 14-mile circuit, so that at no time is there a feeling of being away from the Grand Prix. As practice for this race usually takes place for two or three days prior to the event, it will be appreciated that the Nurburgring has terrific atmosphere, and whether you are there doing a job of work or merely as a spectator you get a feeling of really being part of the Grand Prix.

Another circuit that generates the same sort of atmosphere is that at Reims, just outside the French cathedral town, on the road to Soisson. Here the pits and paddock areas have restaurants and bars laid on permanently, and everyone stays in the town which has numerous pleasant hotels, and one of the main streets, which is practically full of hotels, becomes the centre of the Grand Prix during the three days prior to the race. There you can sit at any of the pavement cafés or

restaurants and you can be sure of seeing most of the leading drivers, team-managers, or well-known followers of Grand Prix racing pass by, while the road itself is invariably packed solid with exciting motor cars. Monte Carlo is another town that appears to be virtually taken over by the " circus " at Grand Prix time, and with the circuit itself running through the centre of the hotel area, you just cannot be in Monte Carlo without being conscious of being caught up in the motor racing atmosphere, particularly when practice is held at six o'clock in the morning ! In direct contrast to these circuits is the Silverstone circuit that is a self-contained hive of motor racing, while the racing is in progress, but once the chequered flag falls it becomes a desolate waste and all those concerned disperse widely. This is mainly because there is no definite centre around which the circuit has grown, so that the teams go in all directions, the public invariably live pretty close, by European standards, and there are too few attractions to keep people at the circuit once the business of racing has been dealt with.

At some of the smaller Grand Prix events, which are held either in a town itself or close by, the race-atmosphere is very strong, for the organisers rely on this to attract people to pay entrance money to watch the " racers " in action. At somewhere like Pau, Naples or Caen the drivers are encouraged to drive their racing cars through the streets of the town, in order to arouse interest in the race meeting, as organised publicity is usually limited by financial conditions.

From my personal point of view as a reporter on Grand Prix races, the services available for the Press count a great deal towards my enjoyment of a race, and if the Press Stand is placed in a position where you cannot see the starting grid, or the pits, it makes life very miserable, unless one can find another " unofficial " vantage point from which to observe. The Press Tribune at Reims is a splendid one, for you can get a fine panoramic view of the pits, the paddock, the starting area and the circuit itself for about two-thirds of its length. With a powerful pair of field glasses it is possible to keep in touch with numerous aspects of a race all at the same time, while in addition the Stand has its own private restaurant which makes a long stay much more comfortable. The Monza track has a similarly well-placed Press Tribune, at the top of the main grandstand, but in contrast Monaco have yet to find a suitable place in which to put the " gentlemen of the Press." So far all the arrangements have been so awful that I have never availed myself of them, preferring to make myself scarce on the edge of the track itself. At Lisbon the Press are well placed immediately on top of the pits, the only drawback being that the sun drops lower as the race progresses and shines directly onto your face and by the end of the race it is like sitting in an oven. Of course, one can slip down the stairs at the back and disappear into a cool bar, but personally once a race has started I can never drag myself away from watching, so in the hot Press Stands I just have to sit and suffer while trying to concentrate on a lap-chart and the race.

At many of the Grand Prix circuits I find it much more convenient and interesting to follow a race from the pits, always providing there is room available, and during the 1958 season I watched most of the big Grand Prix events from the Vanwall pits, acting as their lap-chart recorder as well as watching the movement of the race as a whole for my purpose of writing a report afterwards. If one is not to make enemies while doing this it is necessary to be very tactful, for being on the " inside " of a Grand Prix team organisation allows you to see and hear many things that are not for publication, either from the point of view of etiquette or giving away information to rival teams, and I am happy to say that I managed to look after the Vanwall lap-charts for most of that season without causing any ill-feeling.

With all the circuits used for Formula 1 Grand Prix racing being spread out over the whole of Western Europe, as well as infiltrating into Africa, the journeys to and from the various places are part of the fascination of Grand Prix racing, but that involves stories not strictly connected with Formula 1.

3

The Champion Cars

EACH YEAR during the Formula there was a Championship for the drivers taking part, and also a Championship for the constructors of the cars, the first car of each make counting for points, so that if one make finished 1-2-3-4, as did Mercedes-Benz and Maserati on an occasion, they could only count points for being 1st. The champion car of the year was only counted on the results of the Grandes Epreuves, which counted for the Drivers' Championship, and in 1954 Mercedes-Benz won four events, these being the French G.P., the German G.P., the Swiss G.P., and the Italian G.P. Maserati won the Argentine G.P., and the Belgian G.P., while Ferrari won the British G.P. and the Spanish G.P., so the season ended with Mercedes-Benz with four wins, and Maserati and Ferrari with two wins each in the major races of the season. Taking Formula 1 throughout the season of 1954 we get a different result, for Mercedes-Benz won five races, Maserati won eight races, Ferrari won twelve races, and Gordini won one race. In 1954 Mercedes-Benz used two types of car to achieve their victories, starting with the revolutionary fully-streamlined car that appeared at Reims, with its eight-cylinder engine lying at 20 degrees from the horizontal, fed by a Bosch fuel-injection system, and using special alcohol fuel mixed by the Daimler-Benz engineers, and running on Continental tyres. This model was known as the W196 and had independent suspension to all four wheels and an unusual system of having the drum brakes mounted on the chassis frame, the front ones joined to the wheels by short universally-jointed shafts, and at the rear they were mounted on each side of the gearbox/differential unit, with jointed halfshafts running out to each wheel. The rear wheels were sprung on a swing-axle principle, with the two axle beams pivoted on a central point below the gearbox. All four wheels were sprung on torsion bars and great attention was paid to shock-absorbing, so that this racing car was one of the most softly sprung known and drivers were given a very comfortable ride. As explained elsewhere the fully-streamlined bodywork was not practical for all circuits, and their wins in the German G.P. at Nurburgring and at Berne in the Swiss G.P. were made with the same type of chassis but fitted with new bodywork on which all four wheels were completely exposed. For the fast Monza circuit, where the Italian G.P. was held, they reverted to the fully-streamlined bodywork once more.

The following year saw Mercedez-Benz become even more powerful

as a team, and they began to develop a number of versions of the W196 to suit the various circuits. In this season, 1955, they won at Buenos Aires in the Argentine G.P., at Spa in the Belgian G.P., at Zandvoort in the Dutch G.P., at Aintree in the British G.P. and at Monza once more, in the Italian G.P., so the score in the Championship races was Mercedes-Benz five wins, Ferrari one, with no one else getting a look in. For this virtual clean-sweep, the German firm used a variety of cars having different lengths of wheelbase, from an ultra-short one for the twisty Monaco circuit, to the 1954 long-wheelbase one for Monza, and a medium length one for Zandvoort and Spa. These shorter wheelbase models required a great deal of redesigning about the front end, for there was no longer any room for the massive drum brakes to be mounted inboard at the front, so a lighter and slimmer drum brake was designed to be mounted on the wheel hubs at the front, though the rear ones remained unchanged. These drum brakes were very effective, and no ordinary design, for they had no fulcrum point for the shoes, both ends being expanded outwards at the same time. They also had fully automatic adjustment so that clearance between the shoes and drum remained constant as wear took place, and they used special linings made of two types of material, about one-third of each shoe being one type and the remaining two-thirds another type. I personally have a great deal of respect for the brakes on the W196, for the same components were used on the 300SLR sports Mercedes-Benz, as raced by them in 1955, and in one of these I rode with Stirling Moss when he won the Mille Miglia. We had done brake lining tests during training and it was thought that 7 millimetres of lining would be sufficient, but after the 1,000-mile race the front brakes had no linings on them at all and a large proportion of the alloy brake shoe was worn away. Thanks to the automatic adjustment the shoes had gone on moving out towards the drum long after all the lining had been used up, and it was a point of good design that there was a big safety factor in the thread length of the adjusters. We had noticed a change in the brakes some 300 miles before the end of the race, for the pedal pressure had increased considerably, and I recall Moss making the Italian hand sign for " hard " or " heavy," signalling to me that something was happening to the brakes, but we never dreamt that we were beginning to use metal to metal brakes, for they were still working well. Later on we found one of the front ones tending to grab, and this spun us off into a ditch on one occasion, luckily without damage and we were able to continue the race. Had we known that all the linings were gone from the front I doubt whether we should have come over the Futa and Raticosa mountain passes as quickly as we did. Without the automatic adjustment we would have been in trouble, for the pedal travel would have got progressively more until it would have touched the floor.

To revert to the 1955 Mercedes-Benz Grand Prix cars once more, they had fully-streamlined bodywork for the medium length chassis,

and for the long chassis, as well as open-wheeled bodywork, while the short chassis cars had only open-wheeled bodywork. In testing before the Italian G.P. at Monza, they experimented with an airbrake on one of the streamlined Grand Prix cars, this taking the form of an aluminium flap mounted across the tail, that could be hinged upwards into a vertical position by means of hydraulic rams, operated from a pump on the gearbox. This was never used in a Grand Prix race though it was used on their racing/sports cars, at Le Mans and elsewhere. By this time they were getting 295 b.h.p. from their advanced engines, with desmodromic valve gear and fuel-injection, and having a surplus of power over their rivals, they were able to fit the W196 with all sorts of minor luxuries that made the car heavier. For example, in front of the radiator opening there was a wire mesh grille hinged at the top, and the driver could raise this by means of a control in the cockpit, so that the grille swung forwards and upwards. The reason for this fitting was that in 1954 at the Spanish G.P. on the outskirts of Barcelona, there had been a lot of paper and leaves blowing about on the circuit and with its protruding radiator cowling the W196 collected a lot of this debris and it blocked off a considerable area of the radiator and caused the engine to run hot. The device fitted to the 1955 cars permitted the driver to clear any debris from the front of the car, the wind blowing it off the hinged grille when it was raised, and over the driver's head—or into his face, as someone once remarked rather cattily. To this Daimler-Benz replied that they thought their drivers sufficiently intelligent to be able to remove paper and leaves from their faces so there was no need to design another form of grille in the shape of a hinged face-mask! Another luxury these cars carried was an adjustment for the rear shockers that could be operated by the driver while the car was in motion, it consisting of a control shaped like the letter T, mounted vertically beside the driving seat. When turned through 180 degrees it reset the rear shock-absorbers for a lighter load, and this was to counteract the vast weight of fuel they carried in the tank mounted in the tail of the car. Races were still over 300 miles in those days so that it was necessary to carry 58 gallons of alcohol fuel, which is a considerable weight to have in the tail of the car. As the fuel was used and the tail of the car became lighter there was no need for the shock-absorbers to have such stiff settings, so by a series of experiments they decided at what point in the race the setting could be softened and at the prescribed time the driver merely had to turn the handle through 180 degrees and the mechanism did the rest. This was why one saw the team manager, Alfred Neubauer, hold out a signal to the Mercedes-Benz drivers, about half-way through a race, that looked like a London Transport Underground sign. It was a pictorial view of the top of the T-handle, as the driver would see it on looking down into the cockpit, and on receiving the sign he knew which control to operate. On the fuel-injection system the feed to the Bosch injection metering pump was

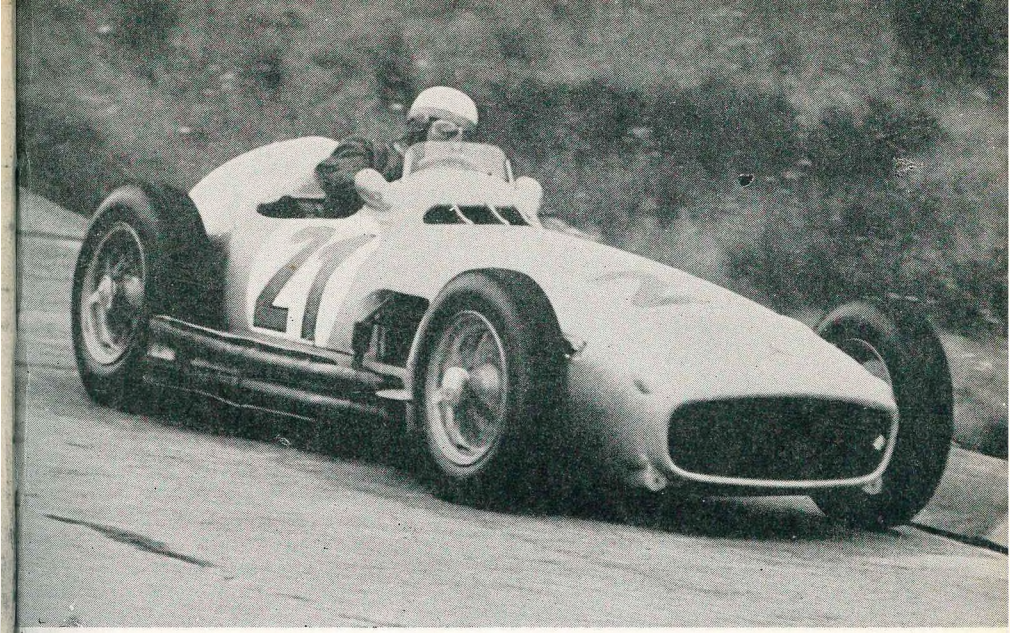
taken from a continuous flow of fuel circulated through the system by mechanical pumps, the injection pump taking whatever it wanted for the occasion, the rest circulating back to the tank. However, when the engine was stationary there was no fuel circulating and vapour-locks were liable to occur in the system near the injection pump, especially as it was mounted on the side of the crankcase. To obviate this happening the 1954 cars had a separate pump operated by a wooden handle in the cockpit, and this circulated fresh fuel around the injection pump feeds, so that the drill for starting the engine when it was hot was to pump to and fro on this wooden handle, so that the injection pump could pick up cold fuel, for vapour in the injectors did no good at all. Karl Kling, who watched and helped with the development of the original car was very appreciative of this requirement and during practice, when starting off from the pits after a brief stop, he never hesitated to pump the handle like fury. Hans Herrmann never really understood why he had to pump, or exactly when and how much, but the German mechanics were able to drum into him the necessity of doing so, though often they would be pushing his car to start the engine, and " Sonny Boy " would forget to pump or not pump hard enough and you would hear a wild cry in German that could be translated into " For Christ's sake, the pump," and then all would be well. With the team leader, Juan Fangio, it was even more difficult for he spoke negligible German, and Neubauer's Spanish was not all that good, so that explaining the need of the hand pump, and when to use it, was rather difficult. In the early races with these cars there would often be a pantomime in starting a car during practice, especially the streamlined ones, for a mechanic would run alongside the car and try and reach over the side and work the pump. By 1955 this problem was sorted out and an electric pump was fitted which circulated the cold fuel round the injection unit, and a small battery was carried on the car to operate this pump. It was of the rotary immersion type, as used in aircraft fuel tanks, and often when a Mercedes-Benz engine was switched off you would hear a buzzing noise coming from the car, which indicated that the re-circulating pump was still switched on, it being operated separately to the ignition. If a car had been standing for a few minutes, when the engine was very hot, it was necessary to switch on the fuel pump for a few seconds before trying to start the engine. Once the engine fired, of course, the mechanical pumps took over, and it made no odds if the electric pump was left on, though there was a little hooded red lamp on the instrument panel to show when it was working. Other refinements were small lever controls on each side of the bulkhead to operate flaps on the scuttle to let air into the cockpit, instead of having to reach over the windscreen in order to open them or like some Grand Prix cars where the driver had to stop at the pits and get a mechanic to open the cold air flaps if the cockpit was getting too hot. Then there was another control, this time in the form of a knurled knob that you turned to open a

fresh air vent in front of the windscreen that let the cool air blow on your face, while the windscreen was nearly three-eighths of an inch thick, for they had had trouble in the past with broken screens and wanted to avoid this if possible, though in the Italian Grand Prix in 1955 Moss was delayed by a broken windscreen, the blast of air at 170 m.p.h. being more than the human face could stand, even wearing goggles.

If all the Grand Prix contenders had developed the same b.h.p. then Mercedes-Benz could not have indulged in all these weight-making luxuries, but they were sufficiently advanced over their rivals to be able to do this.

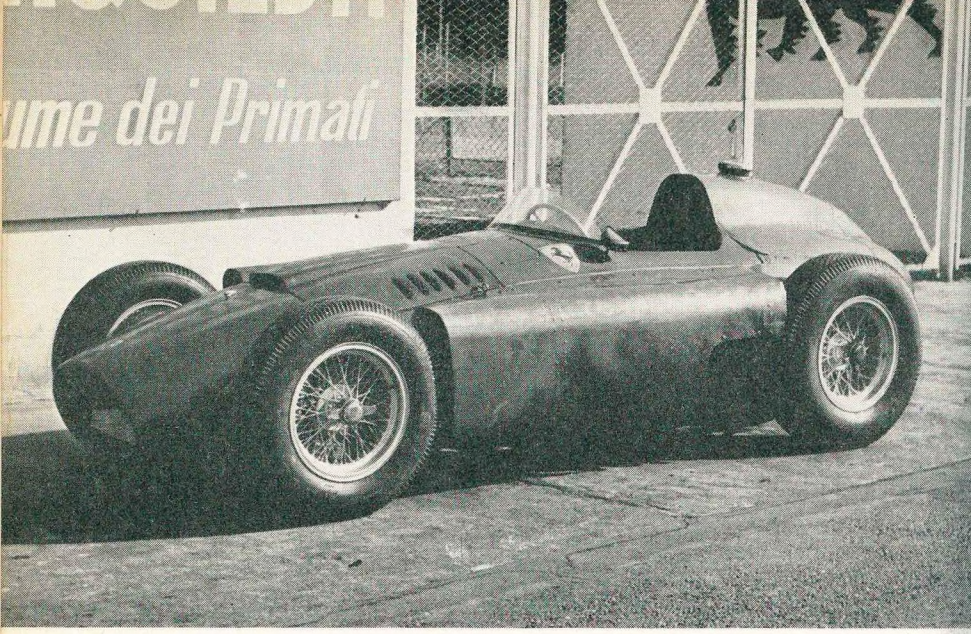
In the overall picture of Formula 1 in 1955 the score was once more different, for Mercedes-Benz competed only in Championship events with their factory cars, so they scored a total of five wins, there being no private owners to assist them in small events, as there were with Maserati and Ferrari. In all, Maserati collected nine wins, Ferrari collected only one, and that a lucky one, for it was when all the Mercedes-Benz cars broke down, in the Monaco G.P. and was the only occasion when not a single German car finished the race. The nine wins by Maserati were all in small races, but nonetheless they were meritorious as many of them were by private owners. The Lancia works team won two races, these being early in the season before the firm went bankrupt and the racing department closed down, while Connaught appeared on the winning scene with two wins, one of them the never-to-be-forgotten Syracuse G.P. at the end of 1955, and a new name appeared for the first time, this being Vanwall, for Harry Schell won two small National British races with this up-and-coming British Grand Prix car.

In 1956 Mercedes-Benz did not race, so race winning returned to the Italians and Ferrari was champion manufacturer using a car derived from the Lancia D50. The Lancia firm having been taken over by Fiat and that company agreeing to help Ferrari financially, saw the Lancia Grand Prix cars absorbed into the Scuderia Ferrari. This caused a certain amount of umbrage at Maserati, for they thought that Fiat should help them as well, especially as they reckoned they were doing more to uphold Italian prestige in Grand Prix racing than the Scuderia Ferrari. This was a matter of opinion, depending on which side of the via Emilia you were standing in Modena, but there was no doubt that in 1955 the works Maseratis had been the only ones able to put up any sort of challenge to the Mercedes-Benz as far as speed was concerned. However, the Maserati engineers did not want the Lancia cars, being convinced that their own car was better, whereas Ferrari was desperate for a new design, so he grabbed the Lancia material without question. After experimenting with a number of variations he settled on a car that was mostly Lancia, but had Ferrari-influenced rear suspension, weight distribution and bodywork, and was justifiably referred to by everyone as a Lancia/Ferrari, much to



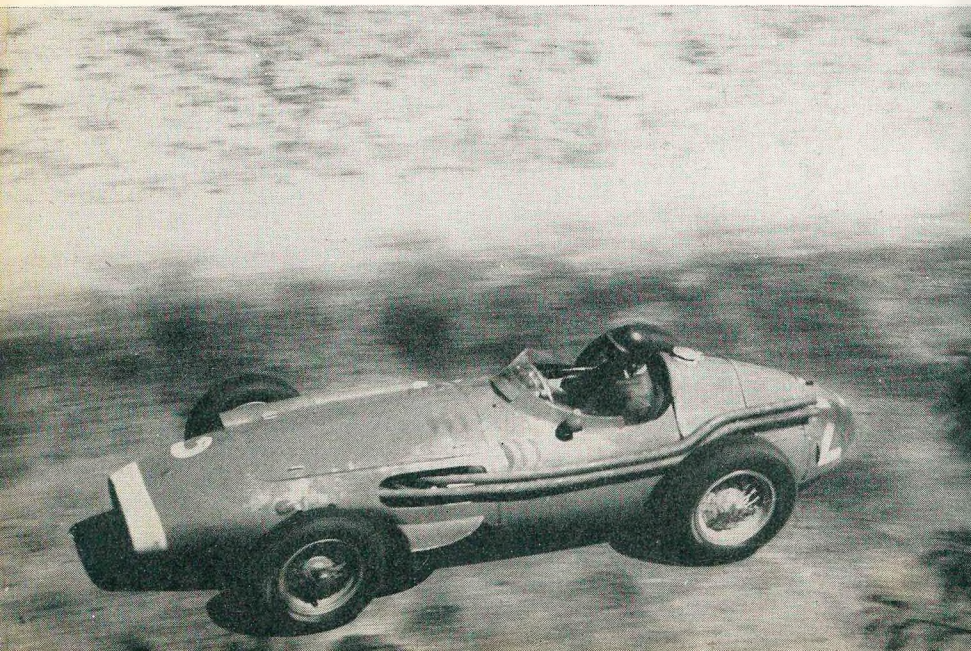
1954 *Champion car.* A W196 Mercedes-Benz on the Nurburgring with Hermann Lang at the wheel during the German G.P. This was the first appearance of these cars without the fully-streamlined bodywork.

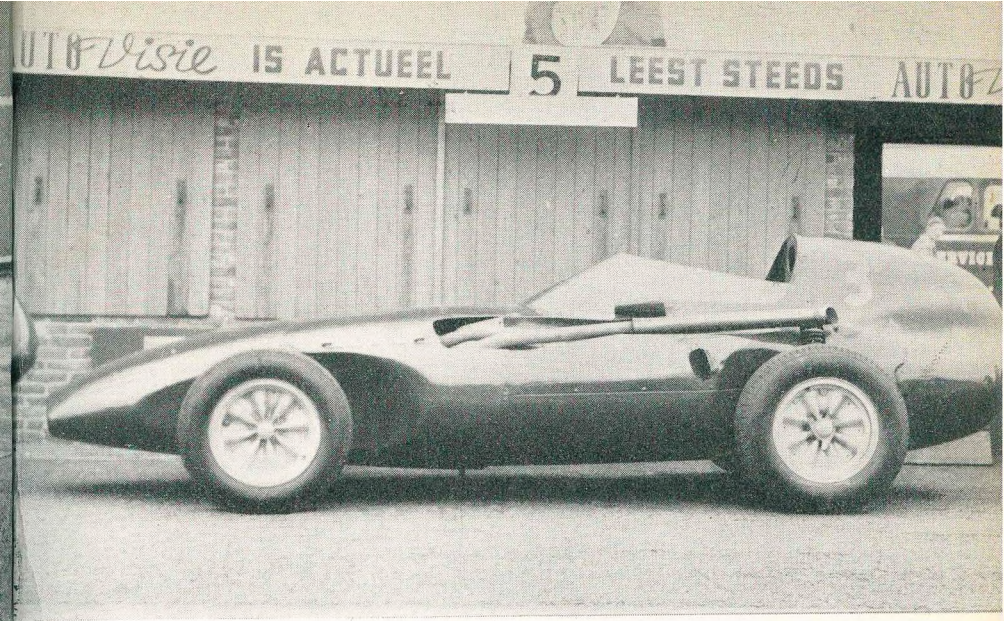
1955 *Champion car.* One of the variations of the W196 Mercedes-Benz, at Monaco driven by Stirling Moss. This was the ultra-short chassis with outboard front brakes, tidier exhaust system, bonnet top air intake and no grille in front of the windscreen.



1956 *Champion Car*. The Scuderia Ferrari version of the V8 Lancia, retaining the pontoon bodysides, but leaving them empty except for exhaust pipes.

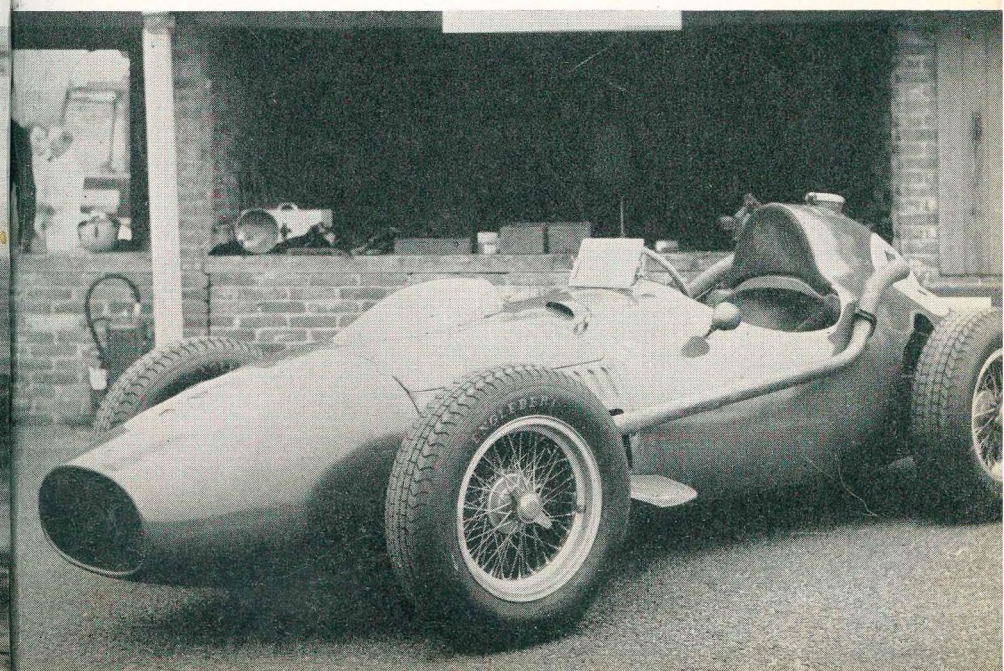
1957 *Champion Car*. The final version of the 250F Maserati, as raced by the Scuderia, showing the long nose, side air intake, high cockpit sides and slight headrest in the tail.

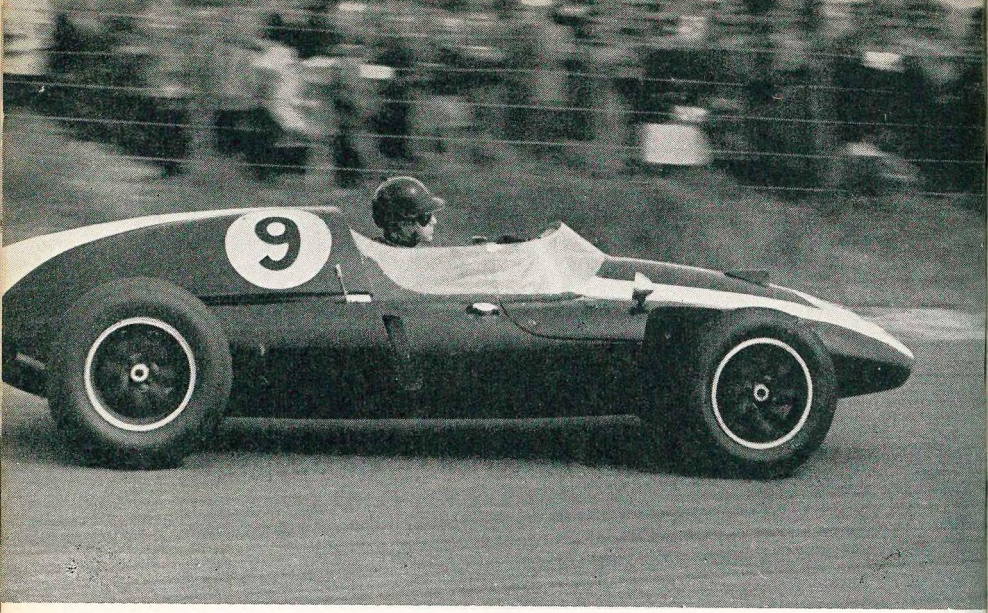




1958 *Champion Car.* The Vanwall, seen at Zandvoort, with alloy wheels front and rear, shorter exhaust system with extractor sleeve, and efficient windscreen. This view shows the excellent lines of the car.

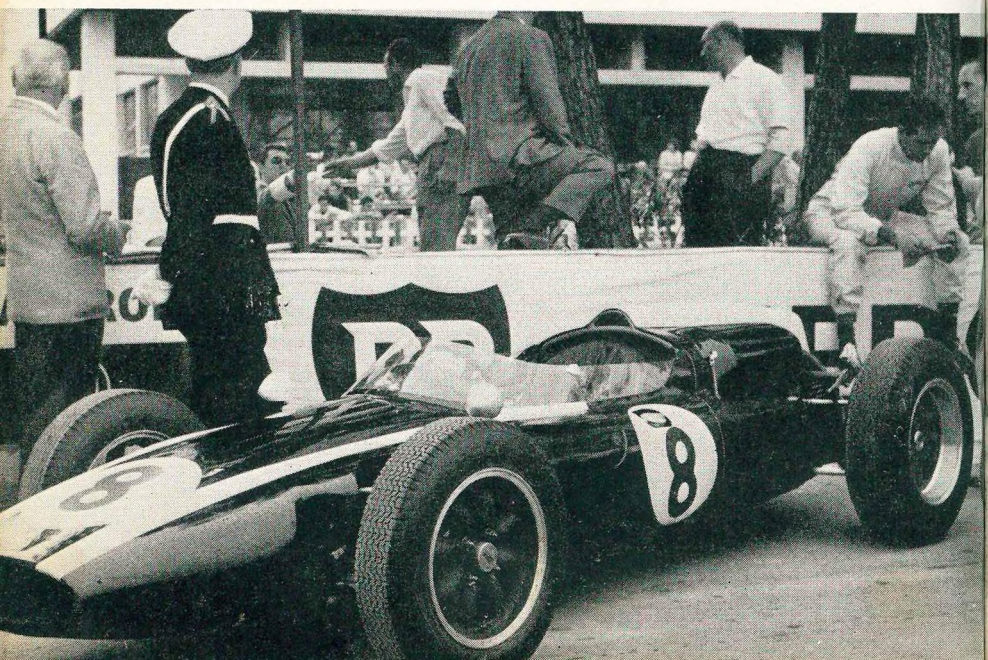
1958 *Champion Driver's car.* Though not winning the manufacturer's championship the Dino 245 Ferrari V6 carried Mike Hawthorn to victory in 1958. The flat aero-screen was a personal fad of the driver, the cars normally having wrap-round Perspex screens.





1959 *Champion Car*. The Cooper-Climax works car, seen here driven by Masten Gregory. The compactness of the car is very striking, as is the slight fin on the tail, which was used by the works team.

1960 *Champion car*. The Cooper-Climax that won Championship honours for John Cooper and Jack Brabham in 1960. Compared with earlier Coopers it can be seen how much lower was this ultimate 2½-litre from Surbiton.



the annoyance of the Commendatore, who insisted that they were pure Ferrari cars. On the original Lancia design the V8 cylinder engine, with its four overhead camshafts and four double-choke Solex carburetters, was used to tie together the front of the chassis carrying the front suspension, and the bulkhead, there being only two very light tubular members running under the engine from the front of the chassis to the bulkhead to ensure that the whole thing did not fall apart when the engine was taken out. The compact V8 engine made a very solid structure on which to bolt the front cross-members and the bulkhead at the rear, and made for light weight, but Ferrari altered all this and increased the size of the lower frame tubes and added some more above the engine, so that though the cylinder block still formed the major portion of the chassis, it had a number of supporting struts. The fuel tanks were removed from the pontoons slung between the front and rear wheels, on outriggers of very light construction, and most of the fuel was carried in a normal tank, which formed the tail of the car, supplemented by small ones on each side of the cockpit, strapped on to the chassis frame. The rear suspension was completely altered, having a high-mounted transverse leaf-spring controlling the de Dion layout, whereas Lancia had used a low-mounted one, while the chassis frame was extended out beyond the rear axle assembly and carried vane-type Houdaille shock-absorbers, as well as the end of the fuel tank and an oil tank. On the Lancia design the oil had been in one of the pontoons, and telescopic shock-absorbers had been used which had been linked together on a balance bar so that they had no effect on the roll-stiffness of the rear suspension. Finally the bodywork was altered so that the main part of the body flowed outwards and blended in with the pontoons which were retained, even though they served no purpose, except that the exhaust systems from each side of the engine ran along them and ended in four separate megaphones on each side of the car and these stuck out at right-angles to the car just in front of the rear wheels. Lancia had used very long single tail pipes that ran under the rear suspension and stuck out at the back of the car. The result of all Ferrari's labours was to make a car that was much heavier than the original Lancia D50, but was much easier to drive close to and over the limit of adhesion, whereas the Lancia had been a tricky car when driven very fast.

Although it was progress in design over the 1955 Lancia, it was not in the direction in which the Lancia had been going, but nonetheless, with only Maserati to beat, the Lancia/Ferrari was the successful car of 1956, winning five of the Championship races to Maserati's two, no one else being able to challenge them in the big races. Overall the position was Lancia/Ferrari seven wins and Maserati six wins, so on results alone the Maranello firm was still on top, and justified the help given them by Fiat. Vanwall and Connaught both had a lone win each, as did Gordini, the French car being incredibly lucky at Naples when all the opposition blew up.

At last it was Maserati's turn to be Champion constructor and this they did in 1957, but mostly by reason of having Juan Manuel Fangio as their number one driver for the first time since he left them in 1954. The Maserati directors always maintained that they would have been Champions in 1954 if Fangio had not deserted them in favour of Mercedes-Benz half-way through the season, and in that they are probably right, for he won the first two Grandes Epreuves of that season for them. However, he made up for things in 1957 and Maserati were Champions with a score of four wins, against Ferrari's poor showing of no wins at all, but there was a new force making itself felt and this was Vanwall, for they scored three Championship wins. Maserati were still using the six-cylinder 250F model that started life at the beginning of 1954 by winning the very first race for which it was entered, and from that day they carried out a steady line of development without making any major changes to the design, with the result that by 1957 the factory 250F models were very good indeed. The development of the 250F was not unlike that of the renowned Spitfire aircraft during the war of 1939-45, for to a casual glance there was little difference between the Spitfire Mk. 1 and the Spitfire Mk. 21, and similarly the difference between a 1954 Maserati and a 1957 model was outwardly very small. The basic layout of the six-cylinder engine remained unchanged, the two overhead camshafts being gear-driven from the front of the crankshaft, three double-choke Weber carburetters being used and two six-cylinder magnetos to fire the 12 plugs. The maximum r.p.m. of the engine was not increased very much, but by attention to port sizes, valve timings, compression ratios and fuel mixtures the power output was continually increased until 270 b.h.p. was being obtained, but this meant using a percentage of nitro-methane in the alcohol fuel. The brake drum diameter and width increased continually, and the design of the cooling fins was for ever being changed, but the suspension was hardly altered at all over the years, nor was the general shape of the body, apart from small details, such as a headfairing incorporated in the tail which was an alloy fuel tank, and different shaped radiator nose cowlings and air intakes to carburetters. The layout of the chassis frame was kept the same, though for 1957 much lighter ones were used, in which the diameter and thickness of the tubing was reduced considerably. The gearbox/rear axle unit changed only in as much as it was made larger to accommodate five foward speeds instead of four, but it still kept the drive going in via a pair of changeable bevel gears and the shafts of the gearbox lying in a transverse plane, with the final drive to the differential crownwheel being by straight-cut spur gears. During the years between 1954 and 1957 the Maserati designers experimented with a number of ideas, such as fuel-injection, disc-brakes, streamlining and a model with offset engine and transmission giving a very low seating position, but all the while they continued to develop the basic 250F model and 1957 saw them reap the benefit, but before the

season was over it was very obvious that Vanwall was becoming a serious challenger. In consequence it was no real surprise when the Vanwall became the Champion car for 1958. However, the overall scores in 1957 were Maserati eight wins, Lancia/Ferrari and Vanwall three each, B.R.M. two and Connaught one, so that yet another new name joined the lists, that of B.R.M., and it was significant that it was another British car.

In 1958 the conditions for the constructors changed drastically for alcohol fuel was banned, only straight petrol of 130 octane rating being allowed, and race distances were reduced to 186 miles and/or two hours, instead of the previous limits of 300 miles and three hours Maserati did not compete in Grand Prix racing this year, and it was left to Ferrari to challenge the growing might of Great Britain and though he built an entirely new car for the petrol-only regulations he could not challenge the Vanwalls. The four-cylinder fuel-injected Vanwall was Champion of 1958 with six wins, while Ferrari only scored two, and the remaining two were won by Cooper-Climax, yet another British name to be reckoned with, especially as races were shorter, thereby permitting cars to be made smaller and lighter, having less strain to withstand and less fuel and tyres to worry about. The Coventry-Climax engine did not develop as much power as its rivals, but by keeping the Cooper small and compact the performance was adequate on short, twisty ciruits.

With six major victories to their credit the Vanwall team were undisputed Champions of 1958 and these beautifully made cars, built in the lavish workshops of Mr. Vandervell's industrial plant, were a fine example of British engineering. Talking to two mechanics from the Italian OSCA factory one day while they were looking at a Vanwall they said, almost with tears in their eyes, how wonderful it would be to work on such a beautifully built car. OSCA engineering is to pretty high standards, but these two craftsmen could appreciate the way the Vanwall was made and their fingers were itching to be allowed to handle such beautifully fashioned pieces of metal, a sign of master mechanics to whom perfection is only just good enough. Another man who paid greater tribute to Vanwall than he ever imagined was Mike Oliver, the engine development man of Connaughts, who after that firm closed down paid a visit to the Vanwall racing department. He was used to working to very high standards himself, but he was more than impressed by the workmanship in the Vanwall, both as regards the engine and the chassis, and he said he honestly thought their standards were as high, if not higher than Mercedes-Benz.

The Vanwall had a four-cylinder engine with two overhead camshafts, and the design, particularly of the valves, timing, ports and combustion chamber were all developed from the racing Norton motorcycle, Mr. Vandervell having once been a director of Norton Motors, until he sold out to concentrate on his bearing factory, so in consequence he knew more than a little about where the power came

from in the 500-c.c. Norton racing engine, and he had the co-operation of the Norton designers when developing the Vanwall engine. It used a Bosch fuel-injection system and here again Mr. Vandervell received help, for both Bosch G.M.B.H. and Daimler-Benz helped him to sort out the problems involved with fuel-injection. Like Mercedes-Benz the Vanwall was prone to vapour-locking in the injection unit, but managed to get away without a circulatory fuel system. In hot weather you would often see the Vanwall mechanics during practice swathing the injection units in rags soaked in cold water. Quite often before a race, while the cars were actually on the starting grid, wet rags would still have to be applied to the injection units after warming the engines, to ensure that they would restart again on the one-minute signal, and while all the other cars were buttoned up and ready to go you would see the three Vanwalls with their bonnets slid back about six inches and a pile of wet rags lying on the injection pump which was mounted on the front of the engine, with a mechanic standing by. On the signal to start the engine, he would remove the rags and put the bonnet in place, while the other mechanics started to push-start the car. This was a very precise routine and the mechanics had to be pretty slick about their drill in order to get the three cars started as quickly as possible. In the colder countries, such as England and Holland this was never necessary, but it was very important at Monza or in Casablanca.

The Vanwall used a very beautifully constructed space-frame designed by Colin Chapman, made from small diameter tubing, with double wishbone and coil spring front suspension, and de Dion rear suspension also from the same designer. The gearbox and rear axle assembly were in one unit, but not of the best layout for it took far too long to remove from the chassis and alter the gear ratios, but as the basic design of the Vanwall was developed from the original Vanwall Special which appeared in 1954, to alter this layout would have been a job that would not have justified the time. The body was one of the sleekest and most efficient looking ever created for a Grand Prix car and set a new standard of efficiency, doing away with all louvres, bumps and bulges and unnecessary openings, and was designed by Frank Costin, who had been working with the de Havilland Aircraft Company. From its very inception Vanwall used disc brakes of their own manufacture, but made under licence from the Goodyear Company of America, and while Dunlop, Lockheed and Girling were having numerous teething troubles with disc brakes, the Vanwall brakes seldom gave trouble and were particularly efficient, but having got this advantage Mr. Vandervell was not interested in telling other people how it was done. Although the Vanwall was not the first car fitted with disc brakes to win a Grand Prix, the Connaught claiming this distinction in 1955 at Syracuse, it was the first to win the Constructors' Championship as the result of a number of victories, using disc brakes and they were subsequently to become universal in

Formula 1. The Vanwall engine was a very efficient unit, developing 280 b.h.p., which it needed, for the car itself was quite large by comparison with Ferrari or Cooper, and it was notable for its very quiet exhaust note, relative to its rivals. One day at Monza, in 1957, while Ferrari was still struggling to keep up with the opposition with his Lancia/Ferraris, it was very noticeable how the Vanwall would go by with a smooth tight-sounding hum coming from its exhaust, whereas the V8 Lancia engine would be making the most shattering noise, accentuated by having four exhaust pipes on each side and megaphone ends as well. Jokingly, Mr. Vandervell went up to the Commendatore Ferrari and said " They'll never go, all the power is coming out of there," pointing at the megaphones, and kicking the rear tyre, he added " That's where you want the power, where it doesn't make any noise." The Commendatore did not understand a word of what was said, Vandervell having spoken in English, but he did not look amused. Meanwhile, Mr. Vandervell walked back to his cars, which were easily the fastest that day, muttering to himself, " They'll never go, they make too much blasted noise."

Of course, it was not all as simple as that, but what he was getting at was right enough, for with efficient gas-burning in the cylinder of an internal combustion engine you can employ less extreme valve timing and the sounds from the exhausting gases will be greatly reduced. Good burning is affected by port design, combustion space design piston design and the efficiency of fuel/air mixing, in the case of the Vanwall by Bosch injection. The Vanwall team only competed in the Championship races, as Mercedes-Benz had done, aiming only for the highest prize, and this they achieved. Consequently, in the overall total of wins they still had six, whereas Ferrari had five and Cooper-Climax had four.

Apart from one appearance at Aintree for the 1959 British Grand Prix, the Vanwall team retired after winning the Championship, so that Ferrari had greater hopes of being Champion constructor, but he reckoned without Coventry-Climax. The possibilities of the Cooper car had been seen in 1958, their only limitation being b.h.p. due to having engines of only 2.2 litres. For the 1959 season the Coventry-Climax firm developed some 2.5-litre four-cylinder engines, selling them to Cooper and to Lotus, another newcomer to Grand Prix racing and the Cooper-Climax went from strength to strength, winning five Grandes Epreuves and becoming Champion constructor, the laurels being shared between the Cooper Car Company and the Coventry-Climax engine firm, for one without the other would have got nowhere at all. Ferrari was still battling, and won two events in the Championship, both being on very fast circuits, one at Avus in Berlin, and the other at Reims, in France, and B.R.M. managed one Championship win, but apart from these it was Cooper all the way. However, it was not the factory Coopers that did all the winning, for a privately owned car, built and prepared in the workshops of Mr. R.

R. C. Walker won two of the Championship victories, the factory cars taking the other three. The cars from these two teams were basically the same except for the gearbox, that on the Walker cars being a specially built 5-speed unit, for the exclusive use of his cars, the Cooper factory having to be content with their own 4-speed gearbox, which was not completely reliable, but then neither was the Walker gearbox, but between the two of them they managed to win sufficient races to bring the Championship to Britain once more. It must be recorded that the gearbox on the Walker cars was designed and built in Italy, the design coming from Valerio Colotti who had been with Maserati and Ferrari before setting up as an independent designer.

The Cooper car is another of those long term developments that started in a small way and gradually grew and grew, like Topsy. If Coopers' designer, Owen Maddox, had been asked to design a 1959 Grand Prix car with no previous knowledge it is doubtful whether the successful Cooper-Climax would have been thought up, but by a continual development through racing the 1959 Champion car was evolved. The beginnings can be traced back to 1946 when John Cooper built a 500-c.c. car using a J.A.P. motorcycle engine and motorcycle gearbox in the rear of a chassis built from two front halves of Topolino Fiats welded back to back. This started him on the two fundamental principles of Cooper cars, rear-mounted engines and all-independent suspension. From that day onwards John Cooper was convinced of the advantages of these two things, and apart from a few sorties into the realms of front-engined cars, all Coopers have had their engines at the rear, and certainly all successful Coopers have been built to that layout. The 1959 Formula 1 car was developed from an 1,100-c.c. sports car that was successful in racing in 1957, using a single-camshaft Coventry-Climax mounted behind the driver. In mid-summer of that year a new class of racing was announced for racing cars with engines limited to 1,500 c.c., and it took Cooper no time at all to take the basic chassis of his sports car and fit a 1,500-c.c. Climax engine into the back, and a narrow single seater body. This car still had independent suspension to all four wheels on the Fiat 500 front suspension principle of a high-mounted transverse leaf-spring anchored in the middle and a lower wishbone to each wheel, this system being used on all four wheels on the Cooper. The Formula 2 car was a great success and it was not long before a Cooper-Climax single seater with 1.9-litre engine was appearing in Grand Prix racing, this later being enlarged to 2.2 litres. For 1958 the front suspension was changed to double wishbones and coil-springs, and it was this layout that was used on the Champion Cooper-Climax cars of 1959; the four-cylinder Coventry-Climax engine was a fairly simple and straightforward unit, using two overhead camshafts driven by a train of gears from the front of the crankshaft, while under the crankshaft were mounted three oil pumps, two to look after scavenging and one for pressure. Single sparking plugs were used in each cylinder and carburation was by two double-

choke Weber carburetters, Italian instruments used almost universally by Grand Prix winning cars, apart from those who used fuel-injection. In all the Coopers that were involved in winning the Championship in 1959 the Coventry-Climax engines were more or less the same, as the engine firm did all the building and preparation. On overall placings, irrespective of the Championship, Cooper-Climax were even more outstanding, having eight wins to three by Ferrari and two by B.R.M.

The final season of the Formula was more or less a repeat of 1959, except that Cooper-Climax were more convincing than ever, though they had some opposition from Lotus, who had built a new rear-engined car using the same Climax engine. Poor Ferrari was right out of the picture having only one Championship win, in the Italian Grand Prix where none of the British teams took part, whereas Cooper-Climax scored six Championship wins, while Lotus-Climax scored two. Cooper were particularly outstanding during 1960, winning five Championship races in succession, all by a factory team car driven by the World Champion Jack Brabham. For 1960 the factory cars underwent a complete redesign, the two basic principles of all-round independent suspension and rear engine being retained, but everything being improved. The chassis was made lighter and lower, with a great many straight tubes in place of curved ones used previously, the rear suspension was changed to double-wishbones and coil springs, and an anti-roll bar was fitted, while the engine was lowered in the chassis and a new 5-speed gearbox was built. Girling disc brakes were still used successfully and Dunlop tyres, while the Climax power output had been improved to nearly 240 b.h.p. with a very good torque curve in the lower r.p.m. range. These works Coopers were much lower and squatter than earlier models, and though they needed a couple of races to get the handling sorted out, once right they were almost unbeatable. Between Cooper and Lotus fifteen out of the sixteen Formula 1 races held in 1960 were won using Coventry-Climax engines, so that there was no question about the supremacy of British cars in Grand Prix racing in 1960, the totals being Cooper-Climax nine wins, Lotus-Climax six wins, and Ferrari one, no other make being featured in the winner's circle.

It is noticeable that only one make of car has competed continuously throughout the life of the Formula 1 under review, and that is Ferrari. Though he was not the most successful constructor, being Champion only once, and then using a car that was basically Lancia, he has certainly been the most consistent constructor and for that reason alone deserves every praise, for whereas Maserati eventually gave up, and Lancia came and went in a very short space of time, Ferrari has gone on continuously, doing his best to uphold Italian prestige in Grand Prix racing. It would seem the decision made by Fiat was the right one, for Ferrari has certainly done more than any other Italian constructor towards keeping the Italian colours in the forefront; but as I said, it depends on which side of the via Emilia you happen to be

standing.

From being a complete non-entity in Grand Prix racing in 1954 British cars have risen to a position of complete supremacy, and when the pendulum swings again, as swing it must, and some other nation begins to dominate Grand Prix racing in some future Formula 1, then I hope that amongst our Grand Prix constructors who are so successful at present, we shall have an Enzo Ferrari who will go on battling against overwhelming odds to try and keep the British green out in front.

It will have been noticed that in the illustrations to this Chapter the 1958 Ferrari Dino 246 car has been included. In this season arose the unusual situation of the Championship for the Drivers being won by the narrow margin of one point so that the car he used did not become the Championship car. Vanwall won six races, shared between two drivers and Ferrari won only two, but the World Champion was Mike Hawthorn who drove his Ferrari consistently into good places, but not enough to beat the combined efforts of the Vanwall team. The Dino is depicted as it was a new effort by the Scuderia Ferrari to regain their lost supremacy and this small and compact V6-cylinder car carried the Maranello fortunes until the end of the Formula.

4

The Champion Drivers

IN ADDITION TO the Grand Prix races that have been taking place during the past seven years there has been running a World Championship for Drivers, based on points gained according to finishing positions in the major races of each year. Naturally one would expect to see a list of seven names for the years under review, but in fact there have only been three names on the list of World Champions. This is explained by the fact that that remarkable man from the Argentine, Juan Manuel Fangio, won the World Championship four times running, in the years 1954-55-56-57. The remaining three Championship years were divided by Mike Hawthorn, who won it in 1958 and Jack Brabham who was World Champion for 1959 and 1960.

There is no doubt that the competition for the title of World Champion has done much to increase the popularity of Grand Prix racing, especially in Great Britain, and the greatest year of all from our point of view was 1958, the first year that there was a chance of a British driver becoming World Champion. The many admirers of Fangio will say that this was only possible because the great man had virtually retired from Grand Prix racing that year, but be that as it may, there is no getting away from the fact that the 1958 season ended on an extremely high note as far as personal competition was concerned. Two drivers were in the running for the championship, these being Mike Hawthorn and Stirling Moss, the tall blond chap from Farnham having amassed points not so much by winning races, but by always being placed at the finish and driving hard all the time, scoring frequent fastest laps and putting up a very consistent series of drives. The short stocky Londoner was driving his brilliant best at all times, winning races when Hawthorn would be second or third, but over the whole season making a mistake or two that either cost him a race or a fastest lap, and the result was that the last race of the year, the Moroccan Grand Prix, was to decide the Championship between these two. Held on a very fast circuit just outside Casablanca in late October, while the weather was still glorious in North Africa, this race attracted the eyes of the motor racing world, for not only was the Championship to be decided on the outcome of this one race between Hawthorn and Moss, but for the first time since the inception of the Championship by the F.I.A. in 1950, a British driver was going to win it. Before the race it was clear cut what each driver had to do in order to become Champion; Moss had to win the race and make

fastest lap and providing his rival finished lower than 2nd place, then Moss would be Champion. Hawthorn did not have to worry about winning the race, but merely had to concentrate on finishing 2nd, in order to be Champion. Moss was driving the very fast Vanwall, with two team-mates to support him, and Hawthorn was driving for Ferrari and had the fast American driver Phil Hill to give him team support. It was a truly splendid race, with Moss showing his superb skill and ability to perfection, for he did all that was possible, winning the race and making fastest lap, but the Championship was not for him, as Hawthorn finished 2nd, after a fine piece of team work between him and Phil Hill. The American drove like one possessed, in what was only his third Grand Prix race, and forced the pace and worried Moss, trying to cause the Vanwall to break or Moss to make an error of judgment, while Hawthorn kept just behind, waiting to take 2nd place, or even 1st, should anything happen. Moss was not worried, however, and it was Hill who made the mistake and went up the escape road, so towards the end of the race Hill eased off the pressure and waited for Hawthorn to catch him up to take the pre-arranged 2nd place.

There was a very amusing little scene at the pits when this happened, for although Phil Hill was slowing down and waiting for Hawthorn, the Ferrari team-manager, Romolo Tavoni, was giving him pit signals to slow down and on his stop-watch it did not look as though Hill was slowing sufficiently. As each lap went by and the end of the race came nearer Tavoni was getting more and more worried, for if Hill did not let Hawthorn go past into 2nd place then the Championship was lost and the more he got worried the more furious became the slow down signals, until poor Tavoni was nearly in tears and was down on his knees pleading with Phil Hill to slow down and let Hawthorn catch up. The excitable Italian team manager need not have worried for Hill knew exactly what he was doing, and Hawthorn went by into 2nd place just before the end and became the first British driver to take the World Championship.

Although there was much rejoicing for Hawthorn as he was an extremely popular figure, and no better character could be wished for as a successor to Fangio, the Moss supporters were very upset and quite rightly so for Moss had driven an impeccable race, and as he had proved so many times during the season, he was the rightful successor to the great Fangio as far as the art of Grand Prix driving was concerned, but there is more to racing than just driving and Hawthorn had shown that hard fighting, consistency and a spirit of never-give-up even if you have not got the best car, could pay off.

We have got a little ahead in our story of the Champions, so let us return to the beginning of the Formula 1 story, to 1954 when Fangio won the Championship. Although he started the season with two convincing wins, at Buenos Aires in the Argentine Grand Prix and at Spa in the Belgian Grand Prix, these were partly due to being ready with a new car before most of his more serious rivals. Maserati had

produced the entirely new 250F six-cylinder model and Fangio was quick to make good use of this advantage. For the third race of the season he switched to the new W196 Mercedes-Benz and had an easy win in the French Grand Prix, and it looked as though he was going to be unbeatable for the rest of the year, especially as the only man capable of beating him in open combat was Alberto Ascari and he was still waiting for the new Lancia D50 to be completed. Lancia loaned Ascari to the Maserati team after Fangio left them, but they were never really organised and his efforts were wasted on unreliable cars. However, defeat came to Fangio and the apparently unassailable Mercedes-Benz at the hands of his compatriot, the burly Froilan Gonzalez who was driving for Ferrari. This was at a memorable British Grand Prix held at Silverstone, and Fangio was having trouble with visibility from the all-enveloping body of the Mercedes-Benz and later with the gearbox, but he refused to give up even though he was beaten and it was this characteristic that to me justified his World Championship rather than the races he won with ease, such as the German and Swiss events which followed his Silverstone defeat. By this time the Mercedes-Benz had been fitted with a normal type of Grand Prix body where the wheels are exposed and Fangio wasted no time in showing the superiority of the combination of his driving and a good car. In the Italian Grand Prix at Monza he won again, but not with ease, having to fight off a serious row of challengers in the form of Ascari with a new Ferrari, and Moss and Villoresi with very fast Maseratis. The season of 1954 closed with the Spanish Grand Prix and here, as at Silverstone, Fangio demonstrated to me at any rate, the characteristics of a true World Champion, a great driver, a master tactician and above all a fighter. This time he had Ascari against him in the brand new Lancia V8, which led until it broke, and also Harry Schell worrying him with a Maserati, Hawthorn with a Ferrari and to add to his opposition his Mercedes-Benz developed an oil leak and began to spray his left arm and side with burning hot oil. He finished that race in 3rd place with a car that was very sick and he himself must have been suffering terribly for the oil of a racing engine runs at something like 80°C. and the whole of his left-side was glistening with the hot shiny oil. It was so typical of Fangio to keep going and nurse the car to the finish, where many other drivers would have given up or not been gentle enough and have broken the engine.

His Championship win that year, using Maserati and Mercedes-Benz cars was indeed a popular one, but he was not unbeatable as Gonzalez and Hawthorn had proved, and many people, myself included, felt that had Ascari been racing from the beginning of the season with good cars we might have seen a different result. Anyway, no one could possibly object to Juan Manuel Fangio being the World Champion for 1954 for even at that time he was one of the finest drivers in Grand Prix racing, and he was later to prove that he was *the* finest.

The following year, in 1955, Fangio again drove for Mercedes-Benz

and with Stirling Moss to back him up as second driver in the team he swept through the season of Grand Prix events with win after win, and was once more undisputable World Champion. He began the season with a wonderful display of stamina in the Argentine Grand Prix when the weather was unbelievably hot and most of the drivers were suffering from sun-stroke through merely sitting in the open cockpits, without the additional heat from the engine and gearbox. This particular race was probably one of the most arduous and complicated ever run, for as the heat attacked a driver he came into the pits and another member of the team took over the car until he could stand it no more and then the car would be passed to someone else. In most cases as many as three different drivers were needed to get a car to the finishing line, while drivers were lying prostrate in the pits and some just could not go on any longer. Through all this Fangio drove with one refuelling stop, on his own, completing the gruelling 233-mile race in just over three hours. This remarkable ability of his to withstand the heat and to overcome physical suffering was to be seen many times in the ensuing years, just as he had demonstrated it previously and added to this was his fantastic ability to concentrate really hard for three hours on end at racing speeds. In passing it is worth mentioning that one other driver competed in that race without relief, and that was Roberto Mieres, the young Argentinian who drove for Maserati at that time, and though he was only 5th in the race, some five laps behind the great Fangio, he nevertheless drove right through unaided, though he did have a long pit stop while a fuel pump was changed.

While on the subject of Fangio and his remarkable ability to keep going through difficult conditions, and his stamina for driving for long periods, I shall always remember meeting him in the lobby of the Hotel Brescia in the town of that name, while we were practising for the 1955 Mille Miglia, when I rode as passenger with Stirling Moss in one of the Mercedes-Benz team cars. Fangio had set off that morning in the practice 300SLR Mercedes-Benz and the general rule was that when doing a practice lap of the 1,000-mile circuit of the Mille Miglia one went on until dusk and then stopped at a convenient hotel. When I met him looking very tired and dirty it was about 9 p.m. and darkness had fallen some three hours before so I was amazed to see him back in Brescia. After he had bathed and joined us at supper he explained that he had made excellent time round the circuit, down to Pescara, across the Abruzzi mountains to Rome and northwards over the mountains to Florence and Bologna and was approaching Modena as darkness began to fall. Knowing the route from Modena to Brescia very well he decided to press on after dark and complete the whole lap in one day, but as he battled his way up the via Emilia amid the lorries, scooters and inevitable Fiats he found that the Mercedes-Benz had only one headlamp working and he had completely underestimated the traffic. His description of the nightmare drive in a

racing Mercedes-Benz on one headlamp amid the evening traffic of Italy did not leave anything to the imagination and explained why he arrived in the hotel looking very haggard and worn. When asked why he did not stop somewhere along the route he said that it did not seem worth while having got so far, and anyway it was rather nice to have made a complete lap of the Mille Miglia course non-stop in one day, on the normal public roads open to everyday traffic. As he had been entirely on his own the whole time we never found out exactly what sort of average speed he had put up, but I know from experience that Moss and I never succeeded in doing more than 750 miles in one go on that route in a normal practice day, and on one such run our average from Brescia to Ravenna had been 95 m.p.h. and close on 90 m.p.h. for the run to Pescara, which is less than halfway. This had meant cruising on the fast Italian roads at 145-150 m.p.h. and I'm not line-shooting, so what the " old man " must have been averaging in places I can't imagine.

The following year I met him once again in a hotel lobby in the middle of the evening, this time in Modena at the Albergo Reale, and he had just done a non-stop lap of the Mille Miglia course in a 3.5-litre Ferrari. He was a strange man for he hated stopping at wayside hotels, preferring to drive hard and fast for long hours in order to get back to base, even though the strain was such that most people would have given up.

However, back to Formula 1 Grand Prix racing, and away with the digressions for a while. The 1955 season was rather a walkover for Fangio as World Champion and sad to relate the only man who might have challenged him was killed in a sports car accident, that man being of course, Alberto Ascari. The Lancia had begun to show promise at the beginning of the 1955 season and at Monte Carlo Ascari set up equal fastest practice lap with Fangio, but in the race the World Champion settled any arguments by leading away from the start and staying out in front until his engine broke, a very rare occurrence for the W196 Mercedes-Benz, but at this particular meeting the whole team were plagued by mechanical trouble. After Ascari's very sad death there was no one to challenge Fangio and the Mercedes-Benz and he and Moss swept from one 1st and 2nd place demonstration to another, the young Englishman naturally relegated to second position behind the master at all times except the British Grand Prix, where Fangio forewent his usual position as number one of the team, and gracefully let Moss win. As a leader and instructor Moss could not have wished for anyone better during that season, for at no time did Fangio allow a feeling of complacency to settle, even though they would be way out in the front of the race, secure of a 1st and 2nd. Many times that year we saw Moss sitting just behind Fangio, the two silver Mercedes-Benz seemingly tied together and looking to be cruising quietly round when suddenly a gap would appear between them and Moss would have to make a big effort to catch up. When

questioned about what was happening he explained that Fangio would suddenly put on a spurt and take three-quarters of a lap at a much faster pace than they had been going, just to keep Moss on his toes and alert and to indicate to him that following the master was not an easy tour all the time. At other times he would suddenly make this increase as they were about to lap some slower cars and Moss said that the way Fangio went through fast-moving traffic was incredible and that he had to work really hard to keep station with him. To the casual onlooker it seemed that the two silver cars were touring round taking it easy, but Moss assured me that it was far from easy, for a moment's relaxing of concentration and Fangio would be gone into the middle distance, and he would not hang about and wait for the pupil to catch up. At Aintree, where the British Grand Prix was held in 1955, and Fangio allowed Moss to win as a sort of gracious offering to the British racing public, he made the British driver concentrate all the way, racing him to the finishing line from the last corner in what appeared to be a dead heat, so that Moss could not tour round and win his first British Grand Prix at an easy gait. Many people still believe that Moss beat Fangio fair and square in that Aintree race, even if he did win by a matter of inches, but one must remember that the previous year, in September 1954, Fangio was beaten by a similar small amount at the Avus G.P. in Berlin by the German driver Karl Kling. The fact that the only two occasions on which Fangio was beaten by such small margins were at races that had a great significance for the other driver is too much of a coincidence to be ignored. The Berlin race was in the nature of a Mercedes-Benz publicity run as there was no serious opposition and it was to encourage the people of West Berlin that West Germany was rising up and becoming a power in the industrial world once more, and the Mercdes-Benz victories of 1954 and 1955 certainly did this. That Karl Kling, the best German driver at that time should win this demonstration run was only right and proper, and similarly Mercdes-Benz were all set for a 1-2-3-4 victory in the British Grand Prix at Aintree so what better gesture than to let the British member of the team have his victory in his own National Grande Epreuve. In passing it is worth recalling that in sports-car racing during 1955 Moss showed very conclusively that he was the better driver and soundly beat Fangio in the Mille Miglia, in Sweden, in the T.T. and in the Targa Florio, but in Grand Prix racing Fangio always had the edge on him.

1955 saw Fangio win his second successive World Championship and a most convincing one, for the combination of his driving ability, stamina and judgement, together with the technical superiority of the Daimler-Benz concern, both as regards the car and the organisation, were more than anyone could hope to beat. When the Daimler-Benz firm withdrew from racing at the end of the 1955 season it left the future very much more open and for 1956 Fangio drove for the Scuderia Ferrari, who were by this time running the Lancia V8 cars

under their banner and modified somewhat by their engineers.

Although Fangio was World Champion once more in 1956, making it the third one in a row, it was not such an overwhelming victory and he had to work hard for his crown and needed the assistance of his team-mates in the Scuderia to ensure victory. This season saw Moss join the Maserati team and all the race-craft and skill he had absorbed while following Fangio in the Mercedes-Benz team he now put to good use in his endeavours to beat the World Champion, which he did at Monaco and at the end of the season at Monza, but they were not enough to win him the Championship for Fangio never gave up and finished the year Champion once again, on points if not on absolute merit. In the first race of the season, in the Argentine, Fangio took over from Musso in order to win the race and gain points, and at Monaco he again had trouble with his own car and took over from Collins, while in the final race for the Championship he was once more out with mechanical trouble and after Musso had refused to give his car to the team leader it was Collins who once more graciously stepped down and let Fangio take his car on to the finish, thus gaining the vital points necessary to bring him his third successive World Championship, for the rules allowed that if two drivers shared a car in a race they divided the points equally. 1956 was a distinctly harassing year for Fangio for although he was World Champion it was more by luck than anything else and in addition the Lancia/Ferrari handling never really looked to be suiting his personal driving technique. Fangio's technique on a high speed corner was to flick his car into a slide before the corner and control it through the corner by means of the amount of power applied by the accelerator pedal. A car which oversteered at high cornering powers was ideal for this technique and both the 250F Maserati and the W196 Mercedes-Benz did this and responded splendidly to his technique, but the Lancia/Ferrari was much more reluctant to arrive at this state of rear wheel break-away and when it did it was rather sudden and vicious, which is why you would often see a Lancia/Ferrari on a corner doing a wild tail slide on one lap and on the next lap it would be in a state of extreme understeer, yet to the casual eye it appeared to be going at the same speed. In actual fact it needed only a slight increase or decrease of speed when near the cornering limit, for the cars to change their characteristics completely. This made them fairly easy to drive providing you did not reach the limit of cornering power and for drivers such as Collins or Musso it was all right, but when Fangio started trying he wanted to be able to drive right on the limit of adhesion, and then he found himself getting into difficulties, and spun off the road more than once during the 1956 season, which was not his normal habit at all. Therefore it came as no surprise when he left Ferrari and rejoined Maserati for the 1957 season, and this year was his greatest for he showed superb mastery of high speed driving throughout the season. The Maserati team were still using the 6-cylinder 250F

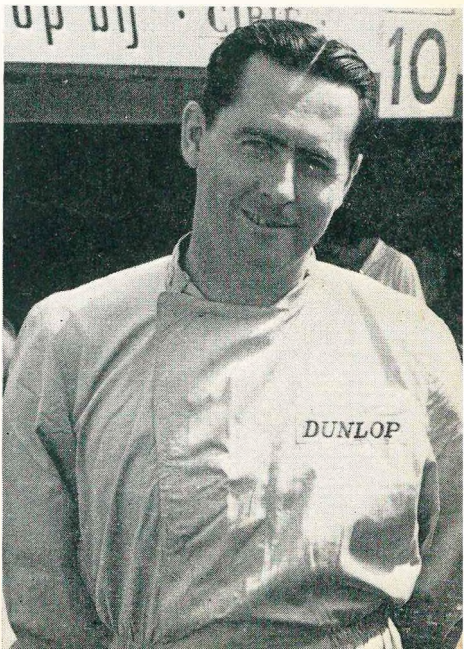
model, greatly improved as far as brakes and power output were concerned and still having excellent handling characteristics, such that Fangio was able to take the most unbelievable liberties with the car and still remain in control. I think 1957 will always be remembered as a truly vintage year in Grand Prix racing as far as Fangio's driving was concerned for he was magnificent at all times and thoroughly deserved the Championship yet again, his fourth in succession. His driving of the 250F Maserati so impressed the British that the Guild of Motoring Writers presented him with their trophy for "The driver of the Year." This was a remarkable thing for it is normally presented to someone who is not necessarily the greatest, but to someone who has done an outstanding piece of driving in any form of competition, from a Grand Prix to a Rally. At the end of the 1957 season there was hardly any need for a ballot as practically everyone in the motor racing world was agreed upon the fact that Fangio had proved himself the absolute master of the art of high speed driving. His exploits that year are really all too recent to enlarge upon, but anyone who was lucky enough to see "the old man" going down through the swerves on the Rouen circuit with his Maserati in full-lock slides at 130 m.p.h. will know what I mean when I say that it was "out of this world." At the time he was so far out in the lead that he had no need to hurry but he was thoroughly enjoying himself and throwing the Maserati about just for the sheer exhilaration of doing something that no one else could do. At the Nurburgring that year he virtually slaughtered the Ferrari and the Vanwall team single-handed and drove the race of his life, showing superb judgement in tactics, untold stamina and a reserve of speed and skill that would hardly seem possible. This was the race where he started with his fuel tank only half full, built up a big lead in the first half of the race, stopped for fuel and tyres, by which time his opponents overtook him, and then drove the race of his life to catch them and win the race, lowering the lap record continuously throughout. If anyone ever reached the ultimate limit round the treacherous Nurburgring then Fangio certainly did in that German G.P. of 1957 and some while afterwards he admitted that he would never do it again for on those closing laps he had taken chances that he realised later were foolhardy and bordering on the dangerous while setting the lap record at 9 min. 17.4 sec. as against his 1956 record of 9 min. 41.6 sec. When Fangio himself thinks that, it is time to stand well back!

He was not supreme in race-winning that year for Moss beat him fairly and squarely at Pescara, for the Vanwall had by this time proved itself more than a match for any Maserati or Ferrari, and it was, of course, far superior to the B.R.M. By the time the Italian G.P. took place at Monza towards the end of the season the Vanwall team, consisting of Moss, Brooks and Lewis-Evans, were in a very powerful position and they completely dominated the race, that is but for the now legendary Fangio. Although the whole Vanwall team were the

Juan Manuel Fangio. The 1954, '55, '56 and '57 World Champion seen in the middle of a happy group of Mercedes-Benz personnel. Fangio never liked posing for publicity pictures, such as this, and invariably showed his dislike. Standing, left to right, are Lang, Neubauer, Kling and Herrmann.

Mike Hawthorn, the 1958 World Champion and first British driver to achieve this honour.

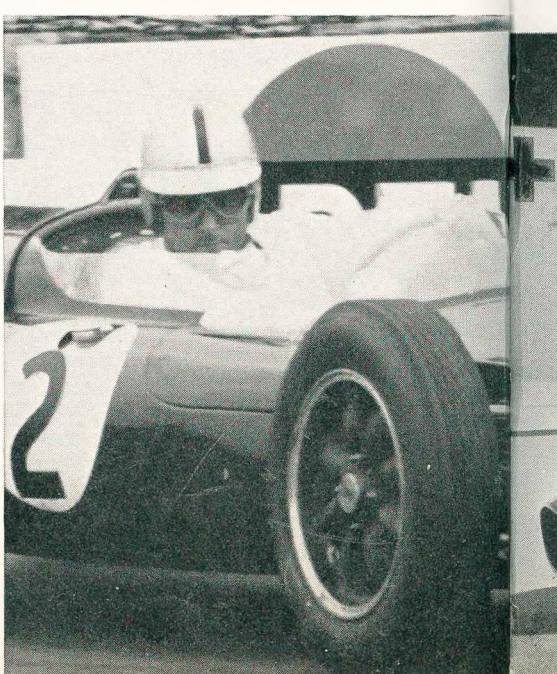
Jack Brabham, the quiet Australian driver who was World Champion in 1959 and 1960.



World Champion in Action. Juan Manuel Fangio showing the concentration that was such a characteristic of his driving, while cornering in a 1955 Mercedes-Benz on his way to his second successive Championship.

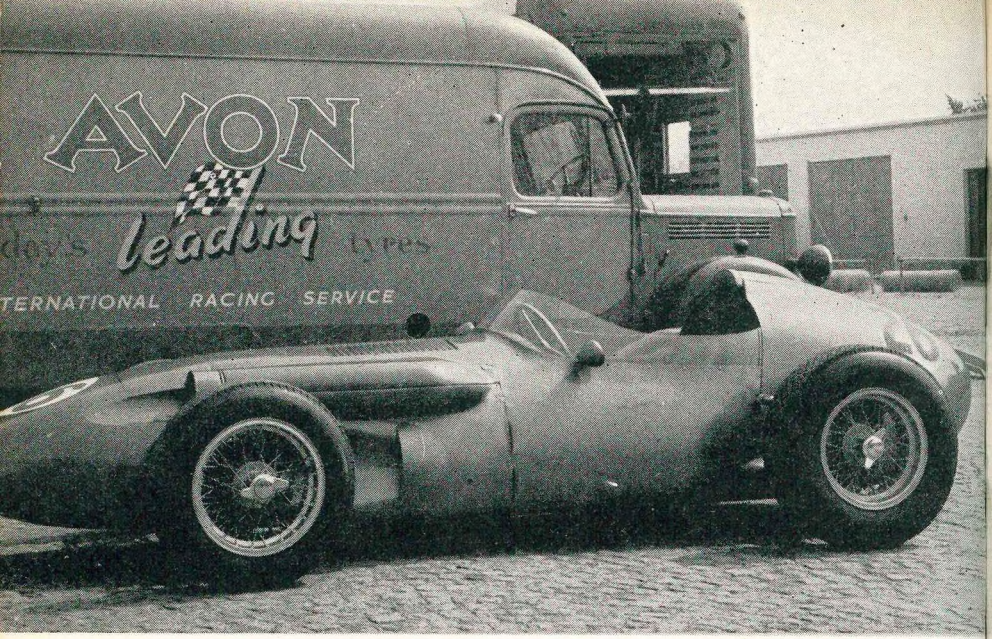
World Champion in Action. Mike Hawthorn in a typical crossed-arms attitude at the wheel of a Ferrari. Note how he " pushes " a wheel spoke with his right thumb, hence his desire at all times for a four-spoke wheel.

World Champion in Action. Jack Brabham looking intently, over the side of a Cooper-Climax. Unlike many drivers who adopt a " lying-back " driving position, Brabham has a tendency to crouch.



The 1956 *Bugatti* Type 251, which proved a costly experiment that only raced once. Two cars were built, this being the second one. The compact appearance is achieved by a transverse, rear mounting of the 8-cylinder engine.

The 1957 *Maserati* V12 was a long and drawn-out experiment and is depicted at Rouen for the French Grand Prix. This exciting engine was fitted to a modified 250F chassis and had a set of exhaust pipes and megaphones each side.



The 1959 *Aston Martin* was a half-hearted attempt at Grand Prix racing, using a development of the successful sports-car engine, but it arrived too late, after Grand Prix cars had become much smaller.

The 1960 *Scarab* was a praiseworthy entry into Grand Prix racing that arrived too late, the trends of design having already changed. Chuck Daigh is seen at the wheel at Monaco, looking for the sponsor of the project, American Lance Reventlow, due to arrive in the second car.

fastest in practice Fangio never gave up hope and the lap times he extracted from the Maserati made even the Italians shake their heads in amazement and bewilderment, to think that their car could stand up to such driving. The start allowed four cars on the front row and there were the three successful Vanwalls, a sight that I personally shall never forget, and the fourth car was Fangio's Maserati. In the early stages of that race there took place one of the finest pieces of Grand Prix racing that I have ever seen, for the way Fangio stayed with the Vanwalls for lap after lap, chopping and changing positions with them was fantastic. He had support from his team-mate Jean Behra who was driving a very fast, but unproven V12-cylinder Maserati, but it was Fangio who really led the Maserati attack on the Vanwall team and it was a wonderful demonstration of true fighting spirit. The cutting and thrusting that went on for those first 20 laps was memorable, with Fangio making up on the corners what he was losing on the straights. The fight that he put up against the three Vanwalls was incredible, for Moss, Brooks and Lewis-Evans were working as a team and determined to trounce the Italian cars on their home ground and at times they would completely surround Fangio, all at a race average of around 120 m.p.h., but time and again he would outwit them and break up their formation. Although he did not win the race he left everyone regarding him once more with the greatest respect. That memorable race ended the Championship season but there was one more event, to which everyone went, and that was at Casablanca for the Grand Prix of Morocco and naturally Fangio was warmly welcomed as the reigning World Champion. Before the race a number of drivers caught severe attacks of Asian 'flu, and while some withdrew from the race and went home, Fangio showed that indomitable courage that was part of his nature, by driving in the race in spite of having a high temperature and being fever-ridden. That he was obviously unwell was shown by the fact that he made a misjudgement on one corner and spun his Maserati off into the sand, but restarted and completed the race in 4th position.

When Maserati withdrew from racing at the end of 1957 Fangio decided it was time to retire, as he was 46 years old and he thought he had been going long enough. He made no definite announcements about retiring and appeared in the 1958 Argentine Grand Prix, using one of the 1957 Maseratis on loan from the factory. On this occasion he was soundly beaten by Moss in the little Cooper-Climax and I think that that is what really decided him to give up, coupled with the fact that there were no new Maseratis being built. Had he won his own country's Grande Epreuve, as he had done in 1954, 1955, 1956 and 1957 and had Maserati got their 12-cylinder car ready for racing then I feel he would have gone on for another season, and added to this the F.I.A. reduced the duration of a Championship race from 3 hours to 2 hours, so that one of Fangio's master cards had been taken away, his ability to keep up the pressure and concentration for

three hours or more. There were many drivers who could keep with him for the first hour and a few that would still be there at the end of the second hour, but hardly any that could hope to be with him at the end of the third hour. He had obviously been so happy and contented with the Maserati team in 1957 that it was difficult to imagine him in a similar state with another team and with various changes that were taking place in Grand Prix racing it was not surprising that he did not appear in Europe until the middle of the summer of 1958 and then only to honour a contract to drive at Reims in the French G.P. The Maserati firm had built a smaller and lighter version of the 250F and it was this that Fangio drove, but it was no match for the new V6 Ferraris and the Vanwalls and it was rather a sad race that he ran, which was to be his last, for after that he hung up his crash hat, never to race again. His final season was not really worthy of his ability but nevertheless I feel sure that everyone will remember Juan Manuel Fangio for his World Championship of 1957, for as I said earlier, that was surely a Vintage year.

When Fangio retired almost everyone was agreed that now all the other drivers could move up a rung on the ladder, and as already described, the season of 1958 was a very exciting one that culminated in the Championship for popular Mike Hawthorn, and he was indeed a worthy successor to Fangio for he had that same courage and fighting spirit, and I always remember Mike telling me about the way Fangio had caught him at the Nurburgring in 1957. He could see the Maserati in his rear-view mirrors as they started the 21st lap, with only two more to go, and Mike was pressing the Lancia/Ferrari as hard as he could to keep in front of the Maserati. After a short straight they arrived at a left-hand corner, followed by the twisting descent down to Adenau and right on the apex of the corner Fangio dived through on the inside, forcing Mike to go wide and run up the bank, which was a perfectly legitimate manoeuvre with two such experienced drivers involved. Hawthorn thought to himself as he bounced along the grass bank, " the cheeky old ——, he's not going to get away with that " and this incident brought all the real " tiger " out in Mike and he stayed on Fangio's tail for the rest of that lap and was a mere 3 seconds behind him as they started the final lap. This Fangio accomplished in 9 min. 24 sec. and Mike stayed with him all the way, whereas previously he had been losing as much as 11 seconds a lap. As he put it " the old man lost me going down the hills, but I got it back going uphill and though I knew I hadn't a hope of getting the lead again, I wasn't going to let him get away," and he didn't, for he finished the last lap only 4 seconds behind Fangio, showing the true Hawthorn fighting spirit. I can really do nothing better than to quote a brief passage from the report that I wrote for *Motor Sport* at the time of that classic German G.P. of 1957: ". . . this was the Hawthorn everyone likes to watch, the never-say-die Hawthorn who will fight against overwhelming odds to the bitter end." Having achieved his

ambition, to be World Champion, Hawthorn decided to give up racing and it was a bitter blow to the sport, for a more likeable and friendly fellow you could not wish to find, and he had a terrific following among the public because he represented to them all that was finest in British sporting manhood. He was a big man, born in Yorkshire, had a forthright and blunt way of dealing with troublesome people, looked every inch the typical sporting Englishman and might well have been an International Rugby player, a Varsity oarsman or a county cricketer. Only a few weeks after announcing his retirement he died a tragic death in a road accident on the Guildford by-pass and some measure of his popularity as a public figure apart from being a great racing driver can be seen from the way a great many members of the public passed by the spot where he was killed and genuinely paid homage to a fine man, and they laid numerous floral tributes on the bank where his Jaguar eventually came to rest a crumpled and broken wreck, with poor Mike, already dead, inside.

Quite apart from any personal feelings his death was a sad blow to motor racing, for though he had said he would race no more he had every intention of staying in the sport and helping at any job he could do. There is no doubt that had he been able to do this the sight of the 1958 World Champion in the paddock or helping around the start at even a small national meeting, as he had done in the past, would have had a wonderful effect on the spirit of racing. In the big Grand Prix events of 1959 he was badly missed, just as was Fangio, and though few of us who were at these meetings could have laid a finger directly on what was wrong with the 1959 season of motor racing everyone was agreed that it was not one of the better years of Grand Prix racing. Now, only a year later, it is possible to reflect on what was wrong with 1959 and I feel sure that it was due to a number of things and among them was the absence of those two great fighters Fangio and Hawthorn. They both had remarkable personalities, Fangio quiet and retiring, Hawthorn happy and boisterous, and both drove with that grim determination that challenges anyone to try and beat them. Although Fangio had virtually retired in 1958 his presence was still felt for even though he did not enter for races there was always the rumour that he was going to and everyone, especially Maserati, always hoped he would turn up at the last moment; but in 1959 he had retired for good and undoubtedly it was this certainty that neither Fangio nor Hawthorn would ever be seen on the racing circuits again that left the 1959 season in a bit of a doldrum. It was rather assumed that Stirling Moss would be the natural successor to Fangio and Hawthorn, for he had been runner-up in the World Championship to both those drivers, but this was not to be for a new star was rising and this was the Australian Jack Brabham, who with the Cooper-Climax factory cars was beginning to make his mark. On only one occasion during 1959 in the World Championship races did Brabham beat Moss fairly and squarely, and that was at Aintree

in the British Grand Prix when he led from start to finish, but on other occasions it was due to Moss retiring with mechanical troubles that allowed Brabham to gain sufficient points to lead the Championship. Although Brabham only won two Grandes Epreuves that season he nevertheless was never far behind the leaders and deserves every credit for a season of steady and reliable driving even if it was not very inspiring, and I personally felt that the points system adopted for awarding the Championhip had given it to the wrong man. However, in 1960 Brabham went from strength to strength, and more than made up for any doubts about the 1959 season, winning five Grandes Epreuves in succession, the Dutch, Belgian, French, British and Portuguese, thus gaining the World Championship for the second year in succession and thoroughly deserving it. Brabham does not have that natural fighting spirit that was so typical of Fangio and Hawthorn, and for this reason his successes have not been heralded with as much glamour as the other two, but for a combination of skill, track-craft, intelligence and foresight it would be hard to improve on the quiet Australian. I would not rate him as a genius of motor racing, as I would Fangio, and he is not an artist of Grand Prix driving, but then neither was Hawthorn, but he is undoubtedly a conscientious worker at the business of Grand Prix racing, and a very successful one. If ever there was an example of the fruits of hard labour then Brabham's 1960 World Championship is it. Fangio was a World Champion by reason of sheer superiority over all his adversaries, Hawthorn was a World Champion by reason of being a fighter and Brabham by plain honest hard work.

5

The Valiant Ones

WHEN A NEW SET of rules are produced for a particular activity there are two ways of joining in, either by making something entirely new to suit the rules, or adapting something available so that it complies. With the introduction of the new rules for Formula 1 racing in 1954 those manufacturers interested in racing could be divided into these two groups and to which group they adhered depended a great deal on the finance and material available. Not every builder of racing cars can hope to be successful, and there are degrees of success, but during the life of the 1954 Formula 1 there were many attempts at building a car to the rules that were either complete failures due to the basic design being wrong from the outset, or the ability of the designer and his facilities did not permit him to develop the car to its fullest extent. Motor racing, and Grand Prix racing in particular, is a very costly business and a great deal of money was spent at various times on projects that either failed or did not produce very good results. Those costly projects that worked out alright are known by the race-results and records, but those that never achieved fame, and yet took just as much effort and money, will gradually fade into obscurity and for this reason I feel it would be nice to spend some time mulling over some of the Formula 1 projects of 1954-60 that failed to reach the designer's goal, and thus we might manage to keep on record some valiant attempts to bring new life into the racing scene, for if there was no one willing to experiment or build unusual cars then motor racing would be rather a dull business.

One of the earliest projects to fail was the H.W.M., for this was an adaptation of a 1953 car to 1954 racing. The H.W.M. team, with their four-cylinder Alta engines had made quite a name for themselves during 1950-52, but by 1953 they were being left behind and even though John Heath, the creator of these cars, designed a new cylinder head for the Alta engines the cars were definitely back markers in the final days of 2-litre racing. With the 1954 Formula 1 starting John Heath could not afford to build new cars, yet wanted to stay in Grand Prix racing so he enlarged the volume of one of his 1953 engines up to 2½ litres and fitted an S.U. fuel injection system. The car was run in two English meetings early in 1954, driven by Lance Macklin, but it was no match for new cars built to the Formula 1 such as the 250F Maserati. It's only appearance in a major Grand Prix race was in the 1954 French Grand Prix on the very fast Reims circuit, where, of

course, it was completely left behind. After this John Heath abandoned all thoughts of Formula 1 racing and went in for sports car racing, and it was in a sports car race in 1955 that he crashed and was killed. Had John Heath lived to see the rise of the Coventry-Climax engine in Grand Prix racing I am sure we should have seen the name of H.W.M. back in racing, for like Chapman of Lotus and John Cooper, John Heath was an expert at chassis building from available components, to take a proprietary engine, and he could not have resisted the attraction of the Coventry-Climax Grand Prix engine.

Some cars that were built served a useful purpose, for although they were not completely successful they directed the designer's thoughts to better things, which did eventually succeed, and one such car was the rear-engined Cooper-Bristol that Jack Brabham and John Cooper concocted for the 1955 British Grand Prix at Aintree. At this time the Cooper Car Company were building racing/sports cars in which the driver sat in the middle of the cockpit and the engine was placed behind him, coupled directly to the gearbox and rear axle unit. A sturdy tubular chassis was used and an all-enveloping body was fitted and using an 1,100-c.c. sports engine these cars were most successful in their own sphere. Brabham's idea was to lengthen the chassis frame by two inches and fit a six-cylinder Bristol engine of 2-litres capacity into the space where the little Coventry-Climax engine had been. It was a tight fit but was found to be possible and minus all the road equipment such as lights, horn, starter, etc., he and John Cooper had a car with which they could compete in Formula 1 races, even though it was not taking full advantage of the 2½-litre capacity limit. This little hybrid competed at Aintree in 1955 but, of course, was very much overshadowed by the pure Grand Prix cars from the various factories, but at least it allowed Brabham to take part, and John Cooper to take an interest in Formula 1 racing, which until then had seemed to be the province of big factories or millionaires. Although this rear-engined Cooper-Bristol was not a success in Grand Prix racing, it did perform well in small races and encouraged Cooper and Brabham to think further on the subject of a rear-engined Formula 1 car. At the end of the 1955 season, when reviewing this car I wrote: " While there is no intention by Coopers to build any more of these rear-engined Bristol Formula 1 cars, it being a ' one-off ' especially for Brabham, one should never be surprised if another type of Formula 1 car appears from Surbiton." We know now only too well that another type did appear, for Brabham won the Drivers' World Championship in 1959 and 1960 with Formula 1 Cooper-Climax cars, and the car itself won the Manufacturer's Championship in those two years, and it started the vogue for Grand Prix cars with the engine behind the driver, and Vanwall, Lotus, B.R.M., and Ferrari all followed the Cooper lead. As the Cooper Car Company do not build engines, or even develop them, it is not a very costly thing for them to concoct a new type of car. Having started with the Cooper-Bristol, thanks to

the Bristol Company developing their six-cylinder sports car engine into a possible racing unit, Coopers were lucky to have Coventry-Climax get sufficiently interested in racing to develop a line of engines from the sports 1,100 c.c. unit up to the full 2,500-c.c. Grand Prix engine and Coopers worked along with them on chassis development. It is impossible to say exactly how much money Coventry-Climax Ltd. spent on engine research and development before their four-cylinder engine was capable of winning races but it certainly runs into tens of thousands of pounds and while Coopers were lucky to find someone prepared to do that, Coventry-Climax were equally lucky to have such an enthusiastic team as John Cooper and Jack Brabham, to look after the actual matter of Grand Prix racing and reach a position of almost unchallenged superiority. The old saying " From small beginnings " etc., still holds very true.

Right at the other end of the scale there was the Type 251 Bugatti Grand Prix car that took many years to build, was raced once and then put away and forgotten. This was a case of starting from scratch with a clean sheet of paper to design a car to the new Formula of 2,500 c.c. unsupercharged. The Bugatti firm had little enough money to spend on racing, without designing a complex car and instead of doing like Gordini and keeping to simple and known principles they went to the other extreme and designed a car with an eight-cylinder engine mounted transversely across the chassis behind the driver, driving by a train of gears from the centre of its crankshaft to a five-speed gearbox and differential unit. The suspension was unusual in that it was non-independent both front and back, using the de Dion principle whereby the majority of the weight is sprung weight. Although the project was started with a view to racing in 1954 it was not until 1956 that the first prototype went out on test and it was July 1956 before the second car that was built made a public appearance. This was at the French G.P. at Reims, where Maurice Trintignant drove it, but it was hopelessly slow and retired less than a third of the way through the race when the carburetter throttles became jammed with dust, due to an unusual air collector box being used. This car and the prototype model, which ran in practice, were then returned to the factory at Molsheim and nothing more was ever heard of them, so that this was a most expensive experiment that bore no fruit whatsoever.

Another costly experiment that did not produce the desired result, but at least provided experience and gained a great deal of knowledge for the people concerned was the young American Lance Reventlow's Scarab team. These cars were built as pure Formula 1 racing cars, nicely designed and nicely executed, but the project took a year too long so that when they did appear in racing they were already out-dated. Not only did Reventlow and his workers build the chassis but they also designed and built an advanced four-cylinder engine with desmodromic valve gear, and it was this that took longer to develop

than they expected, as also did their special gearbox, with the result that they finally had to use a Chevrolet-Corvette gearbox in order to get started in racing at all. It was intended to be ready for the 1959 season but delays set them back and it was not until Monaco 1960 that two cars appeared, driven by Reventlow himself and a compatriot of his, Chuck Daigh. By this time Grand Prix racing had become very fierce and specialised into a uniform groove and the Scarabs could not even qualify to start in the race. They failed to qualify again at the Dutch Grand Prix and finally they competed briefly in the Belgian Grand Prix, only to be left behind once more at the French Grand Prix, so Reventlow then cut his losses and returned to America, a sadder but much wiser man. Although the whole project had been a costly one, and had failed for a similar reason as Bugatti, which was the time taken to develop the car into a race-worthy project, it was not a completely wasted effort for Reventlow continued to be interested in Grand Prix racing and built new cars, with a much better appreciation of the task, thanks to the brief experience that his first cars afforded him.

This question of the time taken to develop a racing car project is very important, and has caused the failure of numerous promising designs, and one that comes to mind as having failed for this reason is the Aston Martin Grand Prix car. When the Formula began in 1954 David Brown had a very successful racing/sports car that could have been developed into a Grand Prix single-seater, and a rather half-hearted attempt was made when a car was sent out to Australia to race in the winter of 1955-56. The sports-car design went from strength to strength, finally winning the Manufacturers' Sports-Car Championship, but the Grand Prix project lagged and when it eventually made its appearance in 1959 was hopelessly outclassed. Two single-seater Grand Prix Aston Martins were raced in some of the World Championship events of 1959 but they were very slow and merely made up the numbers on the starting grid. A slightly improved version was built for 1960 but it was still way behind its rivals, for development was advancing very rapidly and too much time had been lost for the Aston Martin ever to catch up. As it was going to cost too much to start all over again, and the 2½-litre class of racing was finishing at the end of 1960, David Brown wisely decided to abandon the whole project and dispose of the cars. Had the Aston Martins appeared in 1956, or even 1957, as they could easily have done, had the firm been able to spend more time and money on racing, they may well have proved to be successful Grand Prix cars, contemporary with the 250F Maserati and the Lancia/Ferrari cars.

Developing a racing engine is by far the most costly part of motor racing and many firms would never have been seen in Grand Prix racing had they been forced to design and build their own engines. It is extremely doubtful whether the names of H.W.M., Connaught, Cooper or Lotus would ever have been known in connection with

Grand Prix racing if it was not for the " fairy-godmothers " who either supplied the basic engine from which to start development work as Geoffrey Taylor did with his four-cylinder Alta engine, or as Coventry-Climax have done with Cooper and Lotus, supplying complete Grand Prix power units ready to put in the chassis. If you build a racing-car chassis and it is not right then it is possible to modify it until it is, but if you build a racing engine and it is wrong, then the chances are that it will break into a thousand pieces and you must start all over again. With chassis building you can fabricate parts as you go along, and when it is right you make jigs for reproducing it, but with an engine you must make jigs and fixtures, in the form of patterns and forgings, before you can even start to build it. For this reason alone engine designing and building is a very costly business, so that a successful new engine involves a terrific amount of work and expense before it can even compete in a race, let alone win it. One new engine that appeared during the years 1954-60 and which cost a great deal of money and time and never produced results was the 12-cylinder Maserati engine. This started life on the drawing board in the design office of the Maserati factory in 1955 and was laid down as a horizontally-opposed 12-cylinder with two banks of 6 cylinders each and the capacity was naturally 2,500 c.c. While in the Maserati drawing office early in 1956 in connection with a sports-car project I was shown the completed drawings of this exciting, new, flat-12-cylinder engine, but during that season it was decided to alter the design and make it a narrow-angle vee unit. The main reason being that it was decided not to spend more time on designing a new chassis but to fit the new engine to the existing 250F chassis. It was found that there was not room to fit a horizontally-opposed engine to this chassis so the design was altered to one with a 60°-vee between the two banks of cylinders, itself no mean task. This then produced another problem, for there was no room for the 12 carburetters in the vee of the engine, so to overcome this problem the porting of the cylinder heads was altered and the inlet tracts ran down beside the sparking plugs in the centre of each head, between the pairs of overhead camshafts. This arrangement had been used by Mercedes-Benz on their 196 engine and also by other firms on touring car engines, and the result was a very compact but very complex power unit, made all the more complex as coil ignition was used for the 24 sparking plugs, and each plug had its own small coil. This incredible racing engine ran at over 10,000 r.p.m. and produced the most wonderful noises, described elsewhere in this book, as are some of the details of testing on this unit. The Maserati team had great hopes for this new power unit but though it produced as much as 310 b.h.p. on the test-bed it proved most unsuitable for racing as unless the r.p.m. were kept very high the power dropped off rapidly. This made it a very difficult engine to handle and though it kept appearing in a modified 250F chassis for practice it seldom ran in a race. Finally it started its first race in July 1957,

driven by Carlos Menditeguy as third member of the works team, so it was obvious that nothing very spectacular was expected of it, and they were right for it burnt a piston before half distance and retired. The next time it was raced was at the end of the season in the Italian Grand Prix at Monza and this time, in much modified form, it began to show promise and for 28 laps of the race Jean Behra kept it in the thick of the fighting for the lead, but it was consuming more fuel and tyres than was reasonable and he had to stop at the pits for replenishment. Although he rejoined the race he could not make up the lost ground and eventually the engine began to overheat and finally it broke and was withdrawn shortly after half distance. This was near the end of 1957 and though it was used again for practice it was not raced and at the end of the year the Maserati firm withdrew from racing as a works team and a great deal of the energies of the design department were directed to production-car matters so the 12-cylinder engine was put to one side, and though it was not forgotten completely it was never used again. The amount of money and time spent on this engine was untold and many examples were built, including a 3½-litre sports-car version running on ordinary petrol, whereas the racing unit had been using alcohol racing fuel, but as a project it can only be considered a failure, for it never produced the desired results. Even though it was put to one side, as a design project, and forgotten as far as development and use were concerned, it could never be forgotten completely as anyone who was lucky enough to hear it in action in 1957 will know.

While on the subject of Formula 1 engines it is interesting to recall that though the rules for the Formula permitted supercharged engines of 750-c.c. capacity to compete with the unsupercharged engines of 2,500-c.c. capacity, only on one occasion in the whole life of the Formula did a supercharged 750-c.c. engine compete in a race. This was at the Pau G.P. in south-west France on Easter Monday, 1955. René Bonnet, the French small-car builder produced two single-seater D.B. Panhard cars that were more in the nature of an experiment using existing components than a serious attempt to design a Grand Prix car, and both were quite hopeless, this being the only race in which they appeared, so we can add them to our list of valiant attempts, though these were not too valiant. Bonnet had been developing small racing cars and sports cars, using as a basis the horizontally-opposed air-cooled twin-cylinder Panhard engine, gearbox and front-wheel-drive assembly and what he did was to build two cars from the knowledge gained with these. His D.B. Panhard sports cars were normally 850 c.c. but by fitting smaller diameter pistons and cylinders he reduced the swept volume to 750 c.c. and fitted a small supercharger, driving it by a train of gears from the camshaft drive. On his basic D.B. layout the engine stuck out in front of the front wheels and he retained this arrangement for his two supercharged cars and they were driven by two French drivers well versed in the handling

and driving characteristics of the D.B. By competing on the twisty and slow circuit of Pau, Bonnet thought his tiny lightweight supercharged 750-c.c. cars might put up a good performance, but he did not reckon with the hills on that circuit and both cars got hopelessly left behind. They were quick enough round the corners and on the downhill bits but when it came to accelerating uphill from corners there was a noticeable lack of power compared with the heavier 2½-litre unsupercharged cars that were competing. This was Bonnet's only attempt to join in Formula 1 racing and it was so awful that he wisely went back to sports-car racing. Of course, the obvious thought is why didn't someone develop a proper supercharged 750-c.c. engine for Formula 1 racing, but that is something that is discussed elsewhere.

French participation in Formula 1 racing was very mediocre and the only serious contender was Gordini, his six-cylinder cars being in effect left over from the pre-1954 period. However, in 1955 he designed a completely new car, having a 2½-litre eight-cylinder engine and independent suspension to all four wheels, but this car never showed any very great promise. Whereas the old Gordinis had been very small and light cars, by 1954 standards anyway, the new car was much larger and heavier and the engine did not produce anything like the power that had been hoped for. It ran in two races at the end of the 1955 season but was singularly unimpressive and could be discounted as a challenger from the very outset. For the 1956 season a second car was built and these two competed regularly throughout the season in all the major Grand Prix races and also in many small ones, and though they proved to be reliable they were completely outclassed and never finished very high up in the list. However, right at the end of the 1956 season there was a Formule Libre race at Montlhéry and da Silva Ramos drove one of the eight-cylinder cars to victory against sports-car opposition, but as it was not a Formula 1 race it was not very significant. The following year, 1957, saw the eight-cylinder Gordini run its last race, for this season Amedee Gordini withdrew from racing having run out of money and also having a job of work to do for the Renault factory. One eight-cylinder competed in the Pau Grand Prix at Easter and was as usual left way behind the leaders, and on that note Gordini racing faded quietly away, the eight-cylinder cars never racing again. Although the car did in fact win one race, it could be viewed only as a failure in Formula 1 racing and was a good example of a designer going round in circles, designing a brand new car from scratch and finishing up with a car that was no better than his old and out-dated cars. Had Gordini been able to extract 280 b.h.p. from his eight-cylinder engine, as did Mercedes-Benz with their eight-cylinder engine, the Gordini might have got somewhere but as it gave barely 230 b.h.p. and was larger and heavier that the old six-cylinder Gordinis the end result was virtually no improvement, apart from better handling and suspension.

One problem a designer of racing cars must face if he is not his own

master is that of the owner of the firm losing interest in a project before it is finished and one firm that suffered from this was Connaught. Rodney Clarke and Michael Oliver were the design and development team behind Connaught racing, but it was Kenneth MacAlpine who was financing the team, and when he decided to give up racing in 1957 there was a new Connaught racing car nearing completion. The " Syracuse " model had proved itself quite a sound racing car during 1956 and before the 1957 season began a new model was planned, to be known as the C-type and while it followed the basic layout of the B-series it had many new features, among them a light tubular space frame, as against the large diameter tubular ladder-frame of the earlier cars, and a new line in de Dion rear suspension that was later to be developed into independent rear suspension by other designers and to become widely used. This was the principle of using the drive shafts, from the chassis-mounted differential unit to the rear wheels, as suspension members. For a long while it had been considered inadvisable to use Hooke-type universal joints for anything but rotational loads and in consequence drive shafts always had sliding-spline joints in them. The C-type Connaught did away with the sliding joint so that each shaft located its wheel laterally and became a suspension member as well as a driving member. By 1960 many more designers were using the principle in order to save weight, especially unsprung weight. Connaught racing closing down in the middle of 1957 before the C-type was finished was a bitter blow for its designers and though the car was completed by the time the racing department and its contents were sold the car was never raced while it was still in the forefront of Grand Prix racing. At the end of 1959 it was taken to America where it was driven at Sebring in the American Grand Prix by Bob Said, but it performed hopelessly, for, apart from doing no testing before setting off to America, the whole conception of Grand Prix cars had changed completely by this time so that what had been built as an advanced Grand Prix car in the winter of 1956/57 was by 1959 very old fashioned. The C-type Connaught never ran in Formula 1 again and along with the many other expensive failures it passed into obscurity.

A similar problem to that of the C-type Connaught arose with a Maserati project, for the chassis designer of that firm, Valerio Colotti, had ideas for a smaller and lighter 250F Maserati that was under way when the racing department closed down in 1957. In 1958 he left the Maserati firm and continued the design for this lighter 250F which was to have independent suspension for the rear wheels in place of the well-tried but obsolete de Dion layout, but it was still using the six-cylinder Maserati engine and the Maserati gearbox. A private owner commissioned him to go ahead with this car ready for the 1959 season, but before it was completed this driver changed his plans so the project was abandoned for a time, finally being bought by another racing enthusiast and completed by the end of the year. By this time, of

course, Maserati had finished building the 250F engine, so there were only secondhand parts with which to complete the mechanical side of the car. When the car was finished it was called a Tec-Mec, the name of Colotti's design studio, even though the car was no longer of any direct interest to him. Finally, it went to Sebring for the American Grand Prix, driven by the Brazilian driver d'Orey but its performance was such that it can only be listed in this chapter of failures.

Other projects which failed to reach fulfilment were those that were experiments schemed up around various components that were already proven and one such was the fitting of a B.R.M. engine into a Cooper chassis. This was begun before the 1959 season and was a joint effort by Stirling Moss, Rob Walker and Alf Francis, and was prompted by the obvious possibilities of the Cooper chassis which Moss had raced with success using a small Coventry-Climax engine giving less than 180 b.h.p. The B.R.M. car had shown that it had a good engine and was as fast as most of its rivals, so the scheme was to fit a B.R.M. engine into the Cooper chassis, for then Moss would have 250 b.h.p. available in a very small and compact car. Walker was having a special five-speed gearbox made to fit into other Cooper cars that he owned so one of these was grafted onto the B.R.M. engine and the unit was squeezed into the rear of a Cooper chassis in place of the Coventry-Climax engine. This entailed a great deal of work, including practically rebuilding the chassis frame, altering all the pedal layout and controls and modifying the magneto drives on the B.R.M. engine. The car was finally ready early in 1959 and Moss drove it at Aintree, looking all set to win the " 200 " when a badly assembled gearbox let him down. After that the car was hurriedly prepared for the Monaco Grand Prix, where because of some trouble with the gear-lever mechanism it was not used more than for one practice, and then Stirling Moss thought up another racing project so the Cooper-B.R.M. was abandoned and a whole winter's work was wasted before it had been given a proper try-out. A similar project was completed just before the end of the 1960 season when the Vanwall team fitted one of their powerful four-cylinder fuel-injection engines into a rear-engined Lotus chassis in place of the Coventry-Climax engine. It appeared for a practice session at Snetterton and that was all, the season was ended and with it the 1954-60 Formula so the Lotus-Vanwall was too late. Marrying engines and chassis of different parentage has always been a popular pastime and in 1956 the Scuderia Ferrari took a remarkable selection of hybrid vehicles to the Argentine Grand Prix in Buenos Aires. At the end of 1955 Ferrari took over all the Lancia V8 racing cars and still had all his own four-cylinder Ferraris, so during the winter he concocted some " specials " combining parts of both types of car and used the Argentine race as a test ground to decide which was the best arrangement. He fitted a Lancia V8 engine into one of his 1955 Super Squalo chassis, but this proved a complete failure, having too much power for the ability of the chassis. Another car was a

Lancia V8 with rear suspension based on the Super Squalo and a more Ferrari-like weight distribution, and another Lancia V8 was altered only in respect of the weight distribution, being fitted with a large fuel tank in the tail. A standard Lancia V8 and a standard Super Squalo were also raced to make direct comparisons with the modified cars and from this variety the 1956 Lancia/Ferrari that gave Fangio the World Championship that year, was evolved. Although the whole collection only competed in that one Grand Prix it was an intelligent piece of experimenting that bore fruit in the end, by proving quickly which ideas were right and which were wrong, and the V8 Lancia engine in the Ferrari chassis was definitely wrong and this was hurriedly broken up.

6

Streamlining

FROM THE VERY beginning of motor cars designers have studied the question of cheating the wind, having always been conscious of the fact that when travelling along in a motor vehicle, no matter what the speed, the air through which it is passing is the greatest enemy to forward progress. Even as early as 1899 Camille Jenatzy set up a speed record of over 60 m.p.h. in a vehicle on which the flow of air along the body had caused considerable thought, while in 1902 a Mr. Baker was acutely aware of air-flow and his electric record-breaking car was shaped in such a way as to carve its way through the air causing the least possible disturbance. With the introduction of the aeroplane, where the air is the only barrier to forward motion, designers soon became even more acutely aware of the necessity to make their machines capable of cheating the wind. Naturally, as with any mechanical problem, there was no simple straightforward answer and various people had different ideas on the best way of streamlining an aeroplane, and by a process of research and development the study of aerodynamics soon became a very exact science. Without the application of aerodynamics your aeroplane was almost certainly doomed to failure, so that the construction of flying machines and the application of various scientific theories on air-flow developed hand in hand, of necessity, but with the development of the motor vehicle it was not the same. The motor car was found to get along quite well without the application of any knowledge of air-flow, and as everyone who built cars in the early days concentrated on mechanical problems and ignored the aerodynamic ones, the motor car developed mechanically, leaving air-flow to the aeroplane.

However, in racing and record breaking there was more incentive to study this air-flow problem and throughout the history of motor racing there have been designers who endeavoured to combine mechanical considerations with aerodynamic considerations, just as the aircraft designer has done. Knowledge of the mechanics of building engines and making cars go fast is pretty widespread, with the result that over the years varying designs of racing car have produced nearly equal results, no particular design of engine or layout of car being vastly superior to any other combination, but every now and then a designer would attack the aerodynamic problem with an eye to getting some extra speed and thus outwit his rival. As I have pointed out earlier, the application of aerodynamics to motor vehicles has not been essential to their development, so in consequence there has been

very little research done on the subject, so that any racing car designer who wanted to outwit his rival has had virtually no theoretical knowledge upon which he could draw, while there have been no hard and fast theories postulated, or proven, as in the aircraft world. As a result of this, attempts at streamlining racing cars, other than straight-line record-breaking cars, have been very amateurish, with little sound theory behind them and more on the hit-and-miss lines of development, rather than calculation. This has resulted in very little obvious gain over an unstreamlined car and designers have either become depressed at the results, or have come up against a snag that was not at first apparent and the project has been dropped before any reasonable development work was carried out.

Attempts at smoothing out the flow of the air as a racing car passes through it can be traced from as far back as the Wolseley Beetle of 1903, with other similar examples almost every year in motor racing, such as the " tank " Bugattis of 1923, the special Avus bodies on the Mercedes-Benz and Auto-Unions of 1937, or Maserati at Tripoli in 1939, these being extreme applications of attempts to cheat the wind, while minor ones can be found at all times in such things as fairings over hand-brakes and front axles on early racing cars, to later attempts to fit cowlings over radiators and suspensions, or to make smooth-shaped headrests for the drivers, which supposedly stopped turbulence behind the driver's head, and long tapering tails on racing cars. There being no research and development centre for the study of air-flow on racing cars, all these things depended on the ideas of the designers and there was no way to prove them right or wrong as regards Grand Prix racing, though they did take on some significance when straight-line record breaking was involved, and the attempts at serious smoothing out of the air on such record-breaking cars as M.G., Austin, Mercedes-Benz and Auto-Union during the nineteen-thirties began to show some valuable results, for many of the speeds achieved were in the range which applied to Grand Prix racing on a very fast circuit such as Reims or Spa. In record breaking in the ultimate sphere, where speeds were approaching 400 m.p.h. air-flow was obviously very vital, but the results were not so applicable to Grand Prix cars.

During the seven years of the Formula which is under review in this book, the application of air-flow principles to the construction of Grand Prix cars was very active, and almost every constructor of racing cars tried, at some time or another, to build a fully aerodynamic racing car, but for various reasons which we shall discuss, none were wholly successful. Had one particular manufacturer produced a fully streamlined, as we shall call it, Grand Prix car that was successful under all circumstances, then I feel sure that everyone would have followed suit and by 1960 the Grand Prix car would have been as smooth and efficient as a Comet 4b, but as it has turned out there were so many factors involved that were insuperable, or the gain did not justify the expense and complication, that there was no concerted

Streamlining by Mercedes-Benz. The W196 car at Monza in 1954, the chromium star and trim from the radiator opening has long since been dispensed with, while the scoops in front of the rear tyres must have caused a lot of drag.

Streamlining by Connaught. The 1955 B-series car showing the N.A.C.A. duct to the carburetters and the functional radiator and brake cooling intakes. The exhaust is well tucked in at the side and openings are few.

Streamlining by Maserati. The 250F with partially enclosed bodywork, showing the exhaust pipe coming out of the body just in front of the rear wheel.

Streamlining by Ferrari. An experimental V8 Lancia/Ferrari at Reims in 1956 showing how the front and rear fairings were blended into the standard full width body.

Streamlining by Vanwall. The very sleek frontal aspect of the 1957 Vanwall that made an abortive appearance at Reims. Note how the enveloping of the front wheels has been blended into the normal cockpit, and that of the rear wheels into the standard tail.

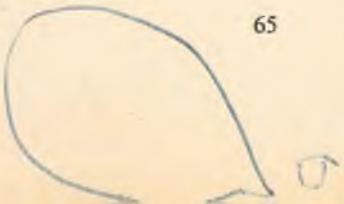
Streamlining by Gordini. The 8-cylinder car with wide body and cowling in front of the wheels, which was an attempt to get the best of both worlds. It is seen on the Monza banking in 1955.

Lessons of Streamlining. The 1960 rear-engined B.R.M. avoided experiments with streamlining but concentrated on compactness, using a wrap-round windscreen and low seat. Graham Hill is seen trying not to break the Perspex as he gets in.

Further lessons by Ferrari. The 1959 Dino Ferrari V6 was a sleek car showing results of the study of smoothing out the path of the air. Note how the wrap-round screen merges into the high tail.

effort to conquer the air-flow problem. What did happen though, was that during these various experiments designers became agreed on a number of small items that became adopted almost universally and the conception of the Grand Prix car changed materially during the seven years. One typical example of this was the adoption of the Perspex wrap-round windscreen, as against the flat glass aero-screen. This was started in the new Formula by Maserati with the 250F which appeared at the very beginning of the new Formula in January 1954, while most other constructors had not gone further than making their aero-screens of Perspex, with just a slight curvature. This was such an obvious improvement to the air-flow around the open cockpit sides that it was soon copied by nearly everyone, reaching its ultimate pitch in the 1959 Lotus-Climax where the curved Perspex was moulded into the aluminium of the scuttle and ran along both sides of the cockpit until it blended into the headrest, and the opening through which the driver had to insert himself was so narrow that he had to stand on the seat facing sideways and lower himself down into the car before turning round to face forwards. With a big driver such as Graham Hill, who was in the Lotus team that year, it always seemed an impossibility that he would ever get through the small gap, or once inside, that he would ever get out again. Fortunately, as this enclosing of the cockpit sides developed over the years, the cars themselves became lower and smaller, so that the problem of getting in and out became less acute, but on the 1957 Vanwall, which was a very high car by the ultimate standards of Grand Prix car, there was a definite drill for getting into the cockpit, which involved using a rear wheel as a step. Luckily Perspex is a fairly flexible material and these wrap-round screens stood quite a lot of ill treatment as drivers clambered in and out. With a wide cockpit such as is used on Maserati or Ferrari the difficulty was not so acute as on the smaller cars such as Cooper and Lotus.

To return to the question of air-flow, or streamlining, as applied to the racing car completely, the first year of the Formula saw two firms tackle the problem from the original concept of the design of their Grand Prix car, deciding that if you were going to get any benefit at all from aerodynamics the racing car should be designed as an aerodynamic projectile first and foremost. In 1954 the Type W196 Mercedes-Benz made its appearance designed and constructed as a fully streamlined, all-enveloping Grand Prix car, and it won its very first race, the French Grand Prix at Reims in July of that year. In August the B-Series Connaught was completed, also with a fully streamlined body designed as part of the basic conception, although this car did not race until early the following year. The designers of these two cars, Rudolph Uhlenhaut of Daimler-Benz and Rodney Clarke of Connaught, were both thinking along the same lines and decided that the major cause of air disturbance on a racing car was the road wheels, so that their designs for bodywork covered all four wheels completely. They weighed up the advantages of being able to make the



whole car an aerodynamic shape, with improved air-flow characteristics over its whole length, against the disadvantage of additional frontal area and additional weight. Of the two the Connaught was undoubtedly the most advanced and the most functional from the aerodynamic point of view, making no concessions to conventional and accepted aesthetics, and adhering strictly to known aircraft principles of air-flow, utilising much knowledge gleaned from the files of the aircraft industry. The Mercedes-Benz was not so strictly functional in its lines, pandering in many small ways to the styling department, the publicity department and to practical knowledge as regards racing cars. Whereas the front of the Connaught would have done justice to a figher plane, the Mercedes-Benz was styled to have a similar appearance to their production sports car. The Connaught made no concessions to the requirements of the tyres, demanding that the tyre manufacturers should be capable of producing a tyre that would stand up to the heat of racing without having the benefit of the outside air to cool the rubber. Mercedes-Benz, on the other hand, were prepared to upset the air-flow along the bodywork and cut large holes in front of the rear tyres to allow some cooling air to enter the body. In a similar way they had air scoops for taking cold air into the cockpit, and other holes for letting hot air out of the engine compartment and for the exhaust pipes to protrude from.

In their first race with the streamlined car Mercedes-Benz were most successful, for the circuit was fast and simple, with long straights and few corners, but the next race they competed in was a very different story. This was at Silverstone, where they suffered defeat from the more conventional racing cars with exposed wheels, for one of the troubles with the fully streamlined car was that the driver could not see his front wheels and placing the car accurately on a corner was more a matter of guesswork than visual judgment. The Silverstone race resulted in some very battered Mercedes-Benz bodywork as the drivers misjudged on their guesswork and clouted marker drums on the insides of corners. After this the Daimler-Benz designers quickly abandoned the fully streamlined bodywork, except for favourable circuits where corners were few, and the W196 was developed during the remainder of 1954 and 1955 as an exposed-wheel racing car, not quite in the conventional slim single-seater pattern, as the whole conception of the car had been based on being totally enclosed, with the result that the chassis frame was nearly as wide as the wheel-track, so that when the cars were fitted with non-streamlined bodywork for the German Grand Prix in 1954 they looked extremely ungainly. However, their technical superiority as regards power and road-holding still gave them an advantage over their rivals, in spite of losing the extra bit of speed gained by cheating the wind.

The streamlined Connaught made its first appearance at Silverstone early in 1955 and the driver did not suffer from reduced visibility as had the Mercedes-Benz driver, for the layout of the mechanical

components of the B-Series Connaught was such that he sat very much in the middle of the wheelbase and quite high, in direct opposition to the Mercedes-Benz, where the driver was seated right back near the rear axle, and sat very low. The Connaught driving position was such because of a short four-cylinder engine, mounted upright; so the driver sat above the propeller shaft, and the weight distribution was endeavouring to keep the polar moment of inertia low, so the seat was well forward of the rear axle. The Mercedes-Benz was built with a high polar moment in view and a low centre of gravity, encouraged by the long eight-cylinder engine being mounted on its side with the propeller shaft running alongside the driving seat. Apart from the differences in the approach to a fully streamlined body it can also be realised that the basic chassis design of the two cars was as equally divided, there being considerable freedom and originality of thought as to what was desired to produce the best results in Grand Prix racing. Mechanically, as regards engine power, the Connaught had no advantage over its rivals, and, in fact, was behind some of them, but it was hoped the gain from wind-cheating would make up for this. Certainly the car performed well at its first Silverstone outing, and there were no obvious disadvantages to be found in racing a fully streamlined Grand Prix car. As the season progressed various difficulties were revealed, among them the vulnerability of the all-enveloping body, and the expense and time to mend one should damage be done due to a driver crashing the car. Before the 1955 season came to a close Connaught, like Mercedes-Benz, had virtually abandoned the fully streamlined car, but for different reasons; and in both instances the reasons were not ones that had been obvious when drawing up the original designs. The Mercedes-Benz suffered from poor driver visibility, while the Connaught suffered from vulnerability when not racing. The Connaught team found that one of the biggest worries was the handling of the car in the paddock, or at the pits, or when loading it into the transporter. It was much too easy to cause damage to the bodywork before racing began, and it was not an easy shape to smooth out again once a dent had been made. The result of a crash while racing was brought home to them at Aintree when one of their drivers spun off and hit a concrete post, for the chassis and mechanical components were undamaged, but the streamlined body was badly wrecked and would have taken so much time and money to rebuild that the project had to be abandoned from that point onwards, and like Mercedes-Benz they reverted to a conventional bodywork with the wheels exposed. Unlike the German car the chassis layout was not unconventional so that their non-streamlined car was still a nice-looking vehicle by the standards of those days.

It is interesting to ponder on what would have happened had the two cars been reversed as regards the manufacturer, for Mercedes-Benz had vast resources of time, labour and finances and the problems that caused Connaught to abandon their project would have presented

no difficulties to the German firm. One might well have seen the continued development of the fully streamlined Grand Prix car, which would have assuredly caused other manufacturers to follow suit, and the whole conception of Grand Prix car might have gone in a completely different direction to that in which it actually did go. As so often happens, people who have good ideas do not have the right facilities, as regards materials and money, and many a sound line of development in design is still-born, and I feel that one such line of thought was the all-enveloping Connaught.

The fact that these two firms abandoned all-enveloping bodywork did not mean the complete cessation of activity in this field, for after the 1954 win by the streamlined Mercedes-Benz at Reims, everyone was convinced that that circuit was the one where aerodynamics really counted, and every year someone inevitably produced a " Reims Special " with all-enveloping bodywork. As this was the only race each year at which such projects were tried none of them received any serious development work so that they were all abandoned almost as soon as they were started. To follow the history of totally enclosed bodywork as applied to the Grand Prix car a study of the races at Reims each year is all that is needed, although there were occasional forays into these realms for the Italian Grand Prix at Monza, which is also a fast circuit. The Maserati firm made an attempt, which was used both at Reims and Monza, which consisted of a normal 250F Grand Prix car with a streamlined body fitted to it. Not being too convinced about concealing the tyres altogether, Maserati left openings in the bodywork around all four wheels, so that the driver could see the tops of the tyres and they were also out in the cooling air. It was quite a pretty looking car, but apart from presenting more frontal area than the normal Grand Prix car it is doubtful whether it showed any serious gain. It made its first appearance on the combined road and track circuit at Monza in 1955, and in typical Maserati fashion it was hurriedly completed before the race and Jean Behra, who drove it, was handicapped by not being able to open the carburetter throttles fully, as the linkage was fouling part of the body. The car was put away after this until the middle of 1956 when it was tried out in practice at Reims, but once again it was not given sufficient attention mechanically and this time badly prepared brakes caused it to be abandoned before any conclusive results about the bodywork could be ascertained. Being basically a normal Grand Prix car with a covering, one problem was the question of what to do with the exhaust pipe, and the result was never very satisfactory. The manifolding and first part of the tail pipe were all under the body panels, the end of the pipe appearing through a hole in the bodywork just aft of the cockpit. This meant that the heat from the manifold was very restricted in its dissipation, being in effect, in a box, so that under bonnet temperatures ran very high. If the engine was run for any length of time with the car stationary the heat under the cowling became so great that the paintwork would blister, and more

than once the paint actually burst into flames while the car was being warmed-up at the pits. The simplest way to overcome this problem was for Maserati to commission a mechanic to stand by with a water can and as soon as he saw the paint beginning to blister he would pour water on the car, so that running the engine in the paddock was usually accompanied by clouds of steam. Oddly enough this car was completely destroyed in a fire at the Maserati factory in Modena, though not due to its self-igniting trick.

Naturally, with Maserati experimenting with an all-enveloping bodywork, Ferrari soon followed suit, and in 1956 they too produced a " streamlined special " for the Reims race. They experimented first of all at Monza with a cowling covering the front of the car completely, but leaving the tops of the front wheels exposed, as Maserati had done, and then for the French race they covered the rear wheels as well, leaving holes in the leading edges of the fairings to allow air to flow onto the rear tyres. By this time Ferrari was using the Lancia D50 cars for his Scuderia, and had modified the normal road racing bodies so that the pannier tanks of the original Lancia design were no longer on outriggers, but were faired into the bonnet and body sides so that the centre section of the car extended out to the full width of the tyres. In consequence it was a simple matter to make the front cowling so that it bolted onto the existing body, and similarly with the fairings over the rear wheels. The resultant car looked very much like the Maserati streamliner, but whereas Maserati were committed to the all-enveloping bodywork, it being mounted on a sub-frame welded to the main chassis frame, Ferrari could remove their "streamlining " at a moment's notice. After some half-hearted practice during which the drivers thought the car was being badly affected by side winds, which is more than likely as no wind tunnel testing was done on the car, the streamlining was removed and the project abandoned almost before it was begun.

In 1957 the Vanwall team had a go at total enclosure for the Reims race, and a normal Grand Prix Vanwall chassis was fitted with a special body in which the front wheels were completely covered and the body width at the cockpit taken out almost to the full width of the tyres. This front was one of the most shapely looking attempts at streamlining, and looked very much like a sports car, except for the central driving position. At the rear the normal high Vanwall head fairing was retained, but the tail flowed sideways into fairings over the tops of the rear wheels, leaving the majority of the tyre exposed to the air-flow along the side of the body. Like so many of these Reims projects it was completed at the last moment and with little opportunity to try it out before practice for the race began, it arrived at Reims hopelessly overgeared, so that it showed no gain over the normal Vanwall. The drivers did not take kindly to the vast expanse of bodywork in their vision, rather than a slim nose and the two front wheels, so that there was no real enthusiasm for the car, and

even though the axle ratio was changed to one more suitable the car was never given a fair chance, and yet another Reims project was virtually stillborn. Practice for the Reims race was the one and only appearance of this car, and like so many things in motor racing, it was abandoned and written off as an unfortunate experiment. One of the most hampering things to any such project as far as Great Britain is concerned is the complete impossibility of doing any serious test work with such a car. The main object behind total enclosure of a Grand Prix car is to gain an advantage on maximum speed, which means in the region of 180 m.p.h. yet nowhere in this country is it possible to reach such speeds, for even on our fastest circuit it is only possible to attain around 140-150 m.p.h. for a matter of a second or two. Had we got a banked track such as Montlhéry or Monza, or even a high-speed track without bankings, then some serious work could have gone into projects such as the Connaught and the Vanwall. This is one disadvantage that a manufacturer of Grand Prix cars must suffer, for the Society of Motor Manufacturers and Traders have built a high-speed banked testing track near Nuneaton, but they refuse to allow racing cars to be tested there. For some strange and old-fashioned reason they will allow sports-racing cars to use the Lindley test circuit, so that firms such as Jaguar were able to test the beautifully streamlined D-type Jaguar sports car prior to Le Mans races, but the Vanwall was forbidden to use the test-track because it was a Grand Prix car, so it had to go to Reims completely untried. It could have used Silverstone, or Snetterton, but neither circuit is fast enough for the objects of the exercise. It is indeed strange that a Motor Manufacturers' Association refuse to help motor racing on a Grand Prix level when the Government will assist by loaning wind tunnels for testing bodywork, as they did for Vanwall at times.

In 1959 the Cooper works team made a Reims attempt and practised with a totally enclosed Formula 1 Cooper-Climax, but having made the body by guesswork rather than calculation they found they had slipped up in the shape and at speeds approaching 180 m.p.h. the front of the car was beginning to lift, with resultant loss of steering on the front wheels, so the car was quickly put to one side and yet another attempt at total enclosure was abandoned before it really got under way. The way the car lifted at the front was rather disturbing, for as you stood on the edge of the track and watched it approach, you realised that you could see the lower wishbones of the front suspension, and they were pointing downwards towards the outside of the car. When the car was stationary you could not see the lower wishbones, for they sat parallel with the ground and were concealed by the undertray. Brabham, who drove the car, was very conscious of something peculiar happening for the steering became lighter as the speed rose, which is not surprising considering the suspension was approaching towards full downwards travel so that the front of the car must have been sitting on a cushion of compressed air rather than on its tyres.

As it was pretty obvious that attempts at total enclosure were being done in a rather haphazard and " backyard " type of manner, the F.I.A. began to look askance at such things, and for the 1959 German Grand Prix which was held on the fantastically fast Avus track in Berlin the regulations contained a clause that banned any enclosure of the wheels, or similar attempts at streamlining. Over the seven years of Grand Prix racing from 1954–60 we have seen full streamlining for racing cars descend from serious aerodynamic studies to " slap-happy tin-bashing " until regulations ruled out any further possibilities. The development of total enclosure for Grand Prix cars went in exactly the opposite way to that which one would expect, so that now there is no possibility at all of racing cars becoming efficient aerodynamic projectiles.

However, the trials and tribulations of streamlined attempts did not go completely unheeded, for it turned designers thoughts to air-flow in general and over the years there has been a continual reduction in body drag and a lot of attention has been given to detail work and a general cleaning up of the lines of the Grand Prix car. Although no material gain could be claimed for any one detail improvement there have been indirect gains, and various interesting ideas have been tried. The exposed wheels of a racing car have always been a problem to designers who wish to study air-flow and there have been three schools of thought on the subject. As already explained Mercedes-Benz and Connaught covered everything with the bodywork, making total enclosure, but for various reasons this was not the answer, and in direct contrast Gordini adhered to a very slim bodywork, ignoring the turbulence of the exposed wheels and concentrating on low frontal area. This was on his early cars, which continued to be raced in the early part of the 1954–60 period, but later gave way to the third school of thought on air-flow, which will be discussed later. After failing with their fully enclosed car Connaught started on a new angle by ignoring the wheels and designing the body of the car as an aerodynamic problem on its own. This resulted in a car that tapered from the front to its widest section both vertically and across the car, at about three quarters along its length, near the cockpit, based on a known aerodynamic principle of air-flow. This was in 1957 and once again the designers were frustrated before they could draw any definite conclusions, for the financial backer of the Connaught team withdrew his support early in the 1957 season and the team went into liquidation. This particular model of Connaught was built on the same chassis as that used for the fully streamlined model, and, in fact, it was one of the streamlined cars that was used for this experiment. Viewed in side elevation this car tapered in a straight line from the nose cowling right up to the tip of the tail, which was the highest point of the car, and in plan it tapered from the nose to a point just in front of the rear axle and then ran back to a vertical knife edge from the top of the tail. Needless to say it was soon dubbed the " toothpaste tube " Connaught,

for in side view that is what it resembled, but whether it would have been successful we shall never know, as no one else showed any interest in following the lead that Connaught encouraged in applying aerodynamic principles to racing car design.

In other design offices this problem of air-flow was continually being studied from all angles and the space between the wheels alongside the body was one that worried a lot of people. The wheels of a racing car are one of those fixed things that nothing can be done to alleviate, so thoughts of air-flow centred around improving things around these fixtures. The Italian designer Vittorio Jano, when laying out the D50 Lancia in readiness for the 1954 season decided to fill in the space between the front and rear wheels with an aluminium spacer the width of the tyres and virtually the same height, leaving a few inches necessary ground clearance. In these panniers he fitted oil and petrol tanks, and they were mounted on thin aerofoil section struts from the chassis frame, so that there was a considerable gap between the body of the car and the panniers, the theory being that the air would flow uniformly along this gap and there would be no turbulence behind the front wheels or in front of the rear wheels. This layout also fitted in nicely with his basic design which called for the location of the weight masses within the wheelbase, in direct contrast to Maserati, Ferrari and Mercedes-Benz who had some of their weight masses behind the rear axle. This air-flow principle of filling in the space between the front and rear wheels was not new, having been used by Sir Henry Segrave on his Golden Arrow record car and also by other record breaking straight-line machines, but it was certainly a new and novel feature for a Grand Prix car. The D50 Lancia was another project which did not reach full fruit, the firm getting into financial difficulties during 1955 and closing down on their racing activities, so that yet another novel idea became history! However, the Scuderia Ferrari took over all the Lancia cars and one of the first things the Ferrari designers did was to fill in the gap between the panniers and the body of the car, thus losing the whole point of the layout, for they stopped the air flowing through the space and presented additional frontal area to the wind. Ultimately, in 1957 this wide body layout was abandoned altogether and the cars became narrow single-seaters of rather conventional aspect.

Other ideas on filling in the space between the front and rear wheels came from Ferrari himself, in 1954 when he produced the Type 553 model, or " Squalo " as it was called. This had a very bulbous body that swelled out to nearly the full width of the tyres in its centre section, rather like an orthodox single-seater with its cheeks blown out. This was developed the following year into the Type 555 or " Super Squalo ", and on this model the overall height was lowered considerably, though the bulges on the side of the body were retained. This bulging bodywork was not done purely and simply for air-flow purposes, for on this Ferrari model the designer Aurelio Lampredi

was aiming at a weight distribution within the wheelbase, rather like Jano with the D50 Lancia, so it was necessary to carry the fuel tanks on each side of the cockpit, and this was a contributory factor to making the bulbous bodywork. In 1955 Amedee Gordini built a new Grand Prix car, with all -independent suspension and an eight-cylinder engine and this was designed from the start to try and cheat the wind. The radiator grille and nose cowling extended sideways to form fairings which covered the front suspension completely and partially covered the front wheels when viewed from in front of the car, rather like Ferrari and Maserati had done with their Reims specials. The body of the Gordini was oval in section, the major axis being horizontal and the full width of the wheel track, so that like the Squalo Ferrari the bulbous sides partially filled in the space between the front and rear wheels. For reasons completely unconnected with the basic design of the car the Gordini team had to give up racing, as did Connaught, and still another idea on air-flow disappeared from the scene.

However, as with nearly all design features, as soon as one disappears a new one arrives on the scene and in 1956 the revised Vanwall brought new and enthusiastic ideas into the field of aerodynamics and racing cars. This was the brain-child of Frank Costin, who worked with Tony Vandervell on designing an efficient body around the 1956 Vanwall chassis layout. Costin went in basically for a body that would extend nearly the full width of the wheel track, thus presenting a large frontal area, on the assumption that suspension and drive shafts, etc. filled in the gap between the wheels and the chassis, when viewed from the front, so no disadvantage would be apparent from also filling this gap with bodywork. He paid great attention to detailed airflow, concentrating on avoiding unnecessary bumps, depressions or holes throughout the entire body, so that the Costin designed Vanwall of 1956 was one of the smoothest and sleekest Grand Prix cars ever seen. The nose cowling was long and tapered with a very small aperture, which in actual fact could have been even smaller, and the only openings in the body skin were an N.A.C.A. intake duct, to let air into the engine, and aircraft scoops to allow air into the cockpit to cool the driver, while near the rear wheels were two tiny scoops to take air to the inboard rear brakes. Great attention was paid to the flow of air after it had passed through the radiator, and also to the under bonnet air, so that there was no necessity for the accepted bonnet covered in louvres that never seem quite sure whether to let the air in or out. A wrap-round Perspex screen was used that blended into the tail, which itself was wide and high, working on similar theories to those used by Connaught on their " toothpaste tube " car. To get the best appreciation of the smoothness of the Vanwall one had to see it in the paddock when up on jacks and minus all its wheels, for then it looked more like an aircraft than a racing car. Although a large car in overall dimensions the Vanwall was extremely fast and in 1957

and 1958 its basic shape remained unchanged and it went from strength to strength, finally winning the Manufacturers' Championship in 1958 and being the first truly successful British Grand Prix car that completely trounced the Italian opposition on numerous occasions. Having achieved the ultimate in success Tony Vandervell withdrew from racing, for a much-needed rest, and by the time he returned the whole conception of a Grand Prix car had changed, due to different requirements, as regards the actual races, and the 1958 Vanwall, which surely represented the peak in racing car design and construction in the "large car" era of the 1954–60 Formula 1, was completely out-dated.

The years 1959–60 saw a revolution in racing car design, whereby cars became smaller and more compact, of necessity as far as Lotus and Cooper were concerned, for their Coventry-Climax engines did not produce sufficient b.h.p. to indulge in extravagant design fancies that resulted in weight and bulk. As designers strove to keep the cars small so, naturally, the frontal area was inevitably low, though Colin Chapman made an error in designing his 1958–59 Lotus, for though it was small in bulk and almost a copy of the successful Vanwall in shape, it presented a large frontal area to the wind. Having the same horsepower available as Cooper, who had a much lower frontal area, but a less aerodynamic shape, the outcome was virtually the same. Any gain from reduced drag on the Lotus was lost by the increase in frontal area. The 1960 Lotus was designed around the minimum frontal area, which meant the size of the radiator, as far as the body was concerned, and no attempts at controlling the air-flow along the body was made, apart from simple things like wrap-round screens and absence of bulges or holes. The result was a frontal area of 6 square feet, compared with 9 square feet for the 1958 car, and the result was a much faster car. It is interesting that body design has gone round in a full circle, for in 1954 Gordini was racing his old cars which he had developed from his 1952–53 Formula 2 cars, when he had less power than his rivals and concentrated on keeping his frontal area low, in order to cheat the wind and make up for his deficiency in horsepower. There is a basic aerodynamic principle which says that "the horsepower required to move a body through the air goes up as the cube of the speed." In other words, if you need 1 b.h.p. to push an object through the air at 1 m.p.h. then you will need 8 b.h.p. to push the same object through the air at 2 m.p.h.; or to put it into more reasonable figures, 100 b.h.p. might give your car a speed of 100 m.p.h., but for 200 m.p.h. you will not need 200 b.h.p. but 800 b.h.p. Of course, if you can keep your frontal area the same and improve the drag of the vehicle then a definite gain will be found, but as all the experiments over the past seven years have shown, this is difficult to achieve, especially with other things to consider besides aerodynamics. As the 1954–60 Formula 1 finishes there seems to be general agreement among designers that streamlining does not pay the necessary

dividends and the original concept of low frontal area is more important. Nevertheless, the various attempts to overcome this problem produced some interesting projects over the years, and without them racing would be very dull, progress would be slow and we should never learn anything from racing.

Before leaving this subject it is worth noting that the various attempts to cheat the wind caused nearly everyone to become more conscious of the wind and in this respect radiators and cooling systems benefited enormously. Whereas at one time air was led into a radiator and then had to find its own way out, past the engine, and either upwards through louvres, or sideways, this continual study of air-flow has caused everyone to pay attention to radiator ducting, both into and away from the cooling element. With the advance of rear-engined cars this became even more important, for you could not let the hot air flow into the cockpit, so ducting for the outlet of hot air became very important. This improvement in flow showed a marked improvement in the efficiency of the cooling element and in consequence radiators and radiator cowlings could be drastically reduced in size and weight. In a similar way the study of air-flow round the cockpit produced the fully wrap-round screen and though this gave the driver a more comfortable ride as regards buffeting from the wind, it did bring other problems such as reduced visibility on hairpin corners and suffocation in hot climates, so that quite often the wrap-round screens would be replaced by the old-fashioned aero-screen and open-cockpit for certain circuits. One of the greatest opponents to enclosed cockpit sides was Mike Hawthorn, and invariably his Ferraris were fitted with flat glass aero-screens while his team-mates had wrap-round Perspex screens. Stirling Moss on the other hand was a keen advocate for streamlining and at Monza in 1958 he experimented with a totally-enclosed cockpit on a Vanwall, the wrap-round screen having a Perspex top which clamped on after the driver was inside. Unfortunately the noise level inside was greater than even Moss could endure so it was not used for the race.

The great advantage of gaining speed by wind cheating is that once you have achieved any increase it cannot be lost by going " off-tune " or breaking, as can an engine, but substantial increases are very difficult to come by as we have seen by the great number of varied experiments carried out during the years under review.

7

Technical

Tyres

THERE IS NO doubt that one of the most important accessories of a racing car is its tyres; without the pneumatic rubber tyre motor racing would be in a sorry plight, for over and above all else the limiting factor of a racing car's ability to go round a corner is the adhesion factor of the tyres with the road. All the mechanical things such as springs, suspension, shock-absorbers and weight distribution are all being ultimately aimed at keeping the tyres in contact with the road surface, for it is only the four small areas of contact between road and tyres that decides whether one car can corner faster than its rival. Now means of keeping the tyres in contact with the road is a problem for the car designer, but what happens to that contact area under acceleration, braking and cornering is the concern of the tyre manufacturer and if there are a number of tyre manufacturers interested in racing then competition will be keen, and it is obviously important for the car designer and the tyre designer to work in close co-operation.

Since John Boyd Dunlop introduced the pneumatic tyre to competitions, in a bicycle race, and later produced pneumatic tyres for motor vehicles, racing has been an excellent testing and experimental ground for tyre manufacturers and throughout the history of motor racing most of the big tyre concerns have at some time or other supported racing. When the 1954 season began the Italian Pirelli firm had a very good hold on Grand Prix racing, for they supplied tyres for Maserati and Ferrari and these two makes were very powerful at the time. The Belgian Englebert firm were making tyres for Gordini and in Germany the Continental tyre company were working in close co-operation with Daimler-Benz on the new Mercedes-Benz racing car. In England the Dunlop tyre firm were supporting B.R.M., though Vanwall and Connaught preferred to buy Italian Pirelli tyres, deeming these more beneficial to the cornering ability of their cars than Dunlop tyres. As Dunlops were doing their tyre development work with the new B.R.M. as their yardstick it was not surprising that other manufacturers were not so happy for a tyre design that might suit one car, or even one driver, need not necessarily be ideal for another. During 1954 and 1955 the Continental firm designed a series of tyres for the Mercedes-Benz, for varying circuits and conditions and these were made exclusively for the German cars so that while there was no opportunity to see how they performed on, say a Maserati, there was no

guarantee that they would have been as suitable as the Pirelli. One problem the tyre designers had to face was whether they should use the data from one make of car, or from a variety of makes, for no two makes would have the same handling characteristics or need the same requirements, both weight and horsepower having a direct bearing on the design of a suitable tyre. In 1955 the Scuderia Ferrari changed over to Englebert tyre, mostly for financial reasons for Pirelli were known for the rather hard bargain they struck with racing firms. You had to buy your tyres from them at quite a high price and if you won races then they paid up considerable sums of bonus money which paid for your tyres many times over. If you did not win then you got nothing, which really was rather fair, whereas certain other tyre firms would not only give you tyres free but also paid large retaining fees to ensure you raced on their tyres all the season, hoping of course that you would win races and that they could advertise the fact. Pirelli racing tyres at the time were, if not the best, certainly one of the best racing tyres from all points of view and they had a very good racing service. The Maserati team always raced on Pirelli and there was a man from the tyre factory who was resident in Modena and spent all his time at the Maserati works. It can be appreciated that if you have a team of four cars, that is sixteen wheels and if you only have one spare set of wheels for each car that is another sixteen, and as there were always two or three private Maseratis being prepared at the factory it is easy to see that there were enough Maserati wheels about the place to keep a man busy on a full time job of tyre changing and inspection, especially with races every weekend, for all the sports Maseratis ran on Pirelli tyres as well as the Grand Prix cars. The Pirelli firm were not very interested in cars that could not win races and there was that classic occasion in 1954 when Mr. Vandervell was at Monza with his prototype Vanwall and wanted to buy some Pirelli tyres and they rather gave him the impression that they were not interested in selling tyres to cars that were not likely to win the Italian G.P., which was true of the Vanwall at that time. Ferrari and Maserati were using Pirelli tyres and when Mr. Vandervell heard Pirelli's reply he was immediately onto the two Italian racing teams as they both used Vandervell shell bearings and he made no bones about the fact that he wanted a set of Pirelli tyres right smartly and if he didn't get them there was going to be an acute shortage of bearings in a certain part of Italy. He got his new tyres within a few minutes. Clearly, one of the reasons Ferrari changed to Englebert tyres in preference to Pirelli was because it was pretty obvious before the 1955 season began that Ferrari cars were not going to do much race winning while the Mercedes-Benz were about and also the Lancia team had shown their possibilities in the last race of 1954. The Englebert firm were prepared to offer a large retaining fee and take a chance on there being some wins, whereas Pirelli were sticking to their system of payment only on results. For firms like Maserati and Lancia who still had good possibilities of

winning, Pirelli was a sound proposition, for when they did win the bonus money was very worth while. Vanwall and Connaught were both prepared to buy Pirelli tyres, whether they had any chances of winning or not because their object at this time was to keep up with the opposition and they both did tests which proved conclusively that their cars were faster round a circuit on Pirelli tyres than on other makes. At the end of 1955 I assisted at some tests that Connaughts carried out at Silverstone, and Stirling Moss drove a "Syracuse" Connaught first on Pirelli tyres, then stopped and had a set of wheels put on the car fitted with another make of tyre and his lap times were consistently 3 seconds slower. Putting the Pirellis back on again regained the lost 3 seconds.

As already mentioned the German Continental firm were working exclusively for Mercedes-Benz, but later they did sell racing tyres on a similar basis to Pirelli, whereby they paid very large sums of money on results; no wins and you got no money. The years 1954 and 1955 were most interesting from the tyre angle for there was a truly International battle going on within the Grand Prix field, with Italian, German, Belgian and British tyre firms all trying to outdo one another. The Dunlop firm were not in a very happy state, as the activities of their racing and experimental department were rather limited and because of this their tyres were definitely inferior to their rivals, so naturally they had little hope of attracting top teams or drivers, so they could not learn much from racing, but fortunately things improved later, as we shall see.

At the end of 1955 Ferrari ran into some trouble over tyres when the Italian G.P. was held on the road-cum-track circuit at Monza. By this time he had taken over the very fast Lancia D50 cars, which had been racing successfully on Pirelli tyres, but when Ferrari ran them they had to be changed to Englebert, in view of the contract the Belgium firm had with the Scuderia Ferrari. While practicing for the Italian G.P. and running on the high speed banking the Lancias kept throwing treads from their Englebert tyres, while cars fitted with Dunlop, Continental or Pirelli were having no trouble at all. Ferraris own cars were much slower than the Lancias so the Englebert tyres were not giving any trouble on them and for the race the Scuderia had to abandon the fast D50 models and use their slower four-cylinder cars. After this season the Mercedes-Benz team withdrew from Grand Prix racing and so the Continental tyre firm were not so active and the scene became a direct battle between Pirelli and Englebert, with Dunlop still hoping that the B.R.M. would produce results. In 1956 Vanwall began to show signs of becoming race winners, while Connaught had already won a major event in 1955, so Pirellis were now friendly to both these teams, but Maserati were still their most important customer. At Monza the Italian G.P. was once more held on the road-cum-track circuit and once again Englebert tyres let down the Ferrari team for the Lancia/Ferrari cars had more trouble with treads coming off and had

to make more pit stops than they intended. At the time I wrote the race report for *Motor Sport* and headed my article : " Pirelli win Italian Grand Prix," for Moss won the race for Maserati using Pirelli tyres which had given no trouble at all. The following season saw Pirelli in an even stronger position, for the Vanwall team now began to win races, using their tyres and it seemed that the Italian tyre firm was going to dominate racing for the Lancia/Ferrari were no longer winning races. The Dunlop concern were still making racing tyres, but their competition activities were still restricted by the management, though the technical department continued to make progress. At the end of 1957 Maserati racing closed down as a Scuderia, and 1958 saw only occasional appearances of official works cars while at the same time Pirelli announced their withdrawal from racing and closed down their competition department. What little racing that Maserati did during 1958 they were able to do on the stocks of tyres they had, but the Vanwall team were put in a difficult situation and had to buy up all the Pirelli tyres they could and use them sparingly during 1958. At about this time the Dunlop firm saw an opportunity to improve their situation and the technical and competition department were given the signal to go ahead without restriction. This saw tremendous advances made in the Dunlop racing tyres and before the season was over the Vanwall team were using Dunlop, while the B.R.M. were still using them and so were the racing Cooper and Lotus teams, while the unfortunate Englebert firm were losing ground and Ferrari was looking elsewhere for tyres and money. In 1959 the Dunlop firm had a virtual monopoly in racing, for things snowballed once they got under way and this happened almost as soon as Pirelli withdrew from racing. Once Dunlop had a race-winning team using their tyres, such as Vanwall, they were able to make tremendous strides in racing tyre design and prove them by winning races, and they have gone from strength to strength, and they finally got Ferrari away from Englebert and so had all the winners on Dunlops. For a short period the Avon tyre company joined in, supporting the Aston Martin G.P. car, but they were more concerned with motorcycle racing tyres and soon dropped out of motor car G.P. racing, so that 1960 saw Dunlop with complete control of the racing scene as far as tyres are concerned, but for a brief but nonetheless interesting intrusion by the American Goodyear tyre company. This firm made some racing tyres for the American Scarab racing team which made a few appearances in Europe during 1960, and while the tyres were no match for Dunlop tyres, they were quite good as a first attempt at getting into European road racing. During various practices Reventlow tried one of his cars on Goodyear and the other on Dunlop racing tyres and there was no doubt that the Dunlop shod car was faster round the corners, but we must remember that in 1954 Dunlop were in exactly the same position with Pirelli. The International battle of tyres in Grand Prix racing is always interesting and adds enormously to the atmosphere of a Grand Prix race and the

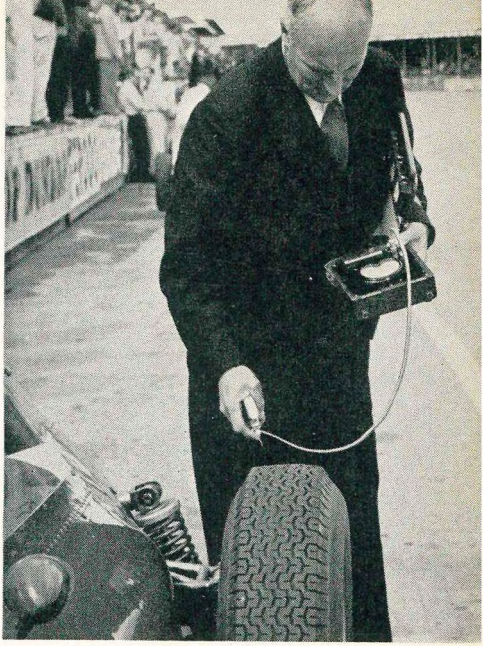
period 1954-60 saw many changes both in tyre design and construction, supremacy of various makes and national prestige.

Brakes

In 1954 British cars were notably absent from the lists of Grand Prix contestants, though there were projects from B.R.M., Connaught and Vanwall in the offing, the last named actually racing at selected meetings during the season. All three were experimenting with the disc-type brake, where a metal disc rotates with the wheel and two or more pads are made to press on the disc from opposite sides, these pads being made of brake lining material. At this time all the Continental cars were making their own drum brakes, from large diameter thin ones by Ferrari, to small-diameter immensely wide ones on the Lancia. There was no agreement on the design of drum brakes, each firm having its own ideas on the subject, and Daimler-Benz used very special ones on their Mercedes-Benz car, which had all four ends in each pair of shoes moving outwards at the same time, and they used enormous turbo-finned drums of alloy. Lancia on the other hand used finely finned, light but very rigid drums made of cast-iron. The disc brake was almost a British monopoly, with the exception of the French Messier firm, who built some disc brakes for Gordini at the end of 1954. In Britain, Dunlop, Lockheed and Girling were all experimenting with disc brakes and vying with each other to get B.R.M., or Connaught to use them. The Vanwall was in a very advanced situation, having its own design of disc brake, made in collaboration with the Goodyear company. These brakes had been developed on the Thinwall Ferrari that Mr. Vandervell had been racing up to the introduction of his new Formula 1 car, so that most of the snags had been sorted out. The three British brake manufacturers all had their share of troubles in these early days, while experimenting on Grand Prix cars, even though Dunlop had been successful with disc brakes on sports Jaguars. One big problem was the weight, which was much more important on a light Grand Prix car than on a heavy sports car.

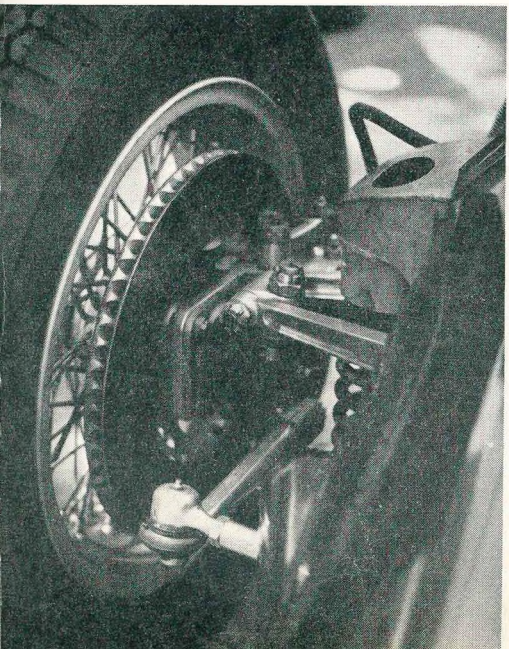
On the Continent there was very little interest shown in the disc brake, apart from Gordini and Messier, and Daimler-Benz were content with their drum brakes, as were Maserati, Lancia and Ferrari. The Germans were naturally interested in the progress of disc brakes, but were not prepared to spend time on carrying out experiments while their drum brakes were proving adequate. At one point they sent Dunlop the drawings of their W196 Grand Prix car in order that an experimental set of disc brakes could be built, but Jaguars soon saw to it that this project did not develop, for in long distance sports-car racing they had a definite advantage over the Mercedes-Benz, until the Germans developed their air-brake. Even when Connaught won the Syracuse Grand Prix at the end of 1955, using Dunlop disc brakes, the first Grand Prix victory for this new type of brake, there was no great excitement abroad, and both the Italian teams were content to

Used Tyre. The result of an Englebert tyre bursting on the Monza banking at high speed.

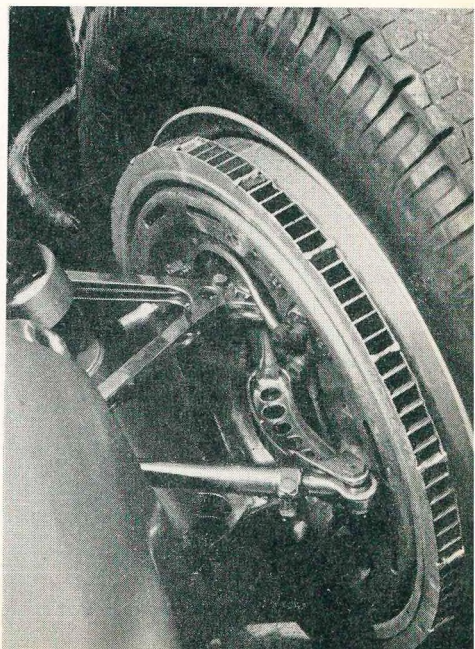


New Tyre. A Dunlop tyre expert checking the tread temperature on a modern racing tyre after some practice laps.

Goodyear Disc Brake. Front brake on a Vanwall, showing the heavily drilled disc and high finish of the suspension parts.

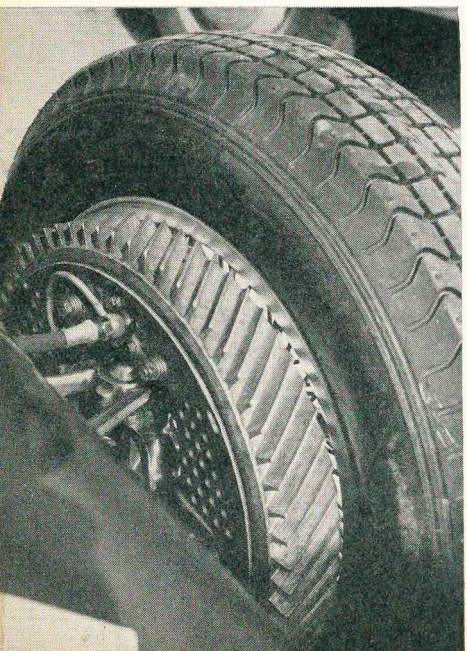


Mercedes-Benz Drum Brake. An outboard front brake on the 1955 short chassis W196 showing the turbo-finning for cooling air.

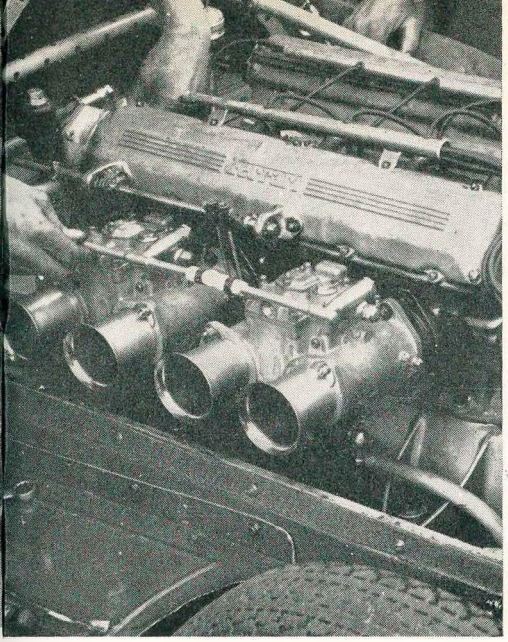


Pit Stop. The excitement of a tyre change at Monza in 1958 on a Ferrari. Note the crowd of onlookers preventing the paying public from seeing anything. They include officials, police, photographers, rival tyre-experts and 'hangers-on'.

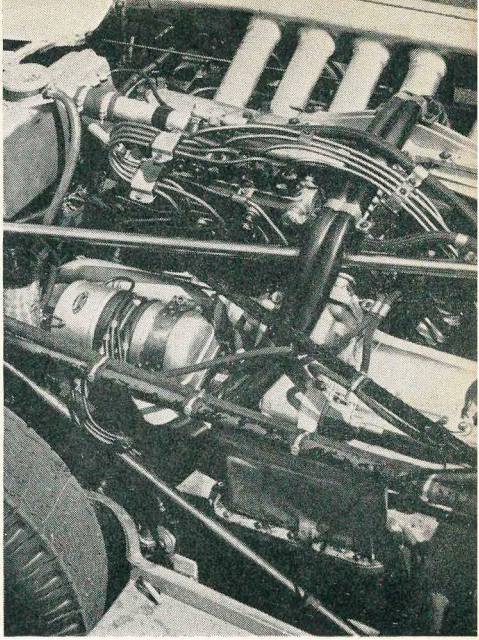
Ferrari Drum Brake. An experimental cross-flow alloy drum with steel liner used in 1958 before the Scuderia Ferrari succumbed to the superiority of the British disc brake.



Ferrari Disc Brake. A Dunlop disc brake fitted on a 1958 Ferrari, showing the obvious simplicity of this type of brake. It makes interesting comparison with the Goodyear disc brake on the previous page.

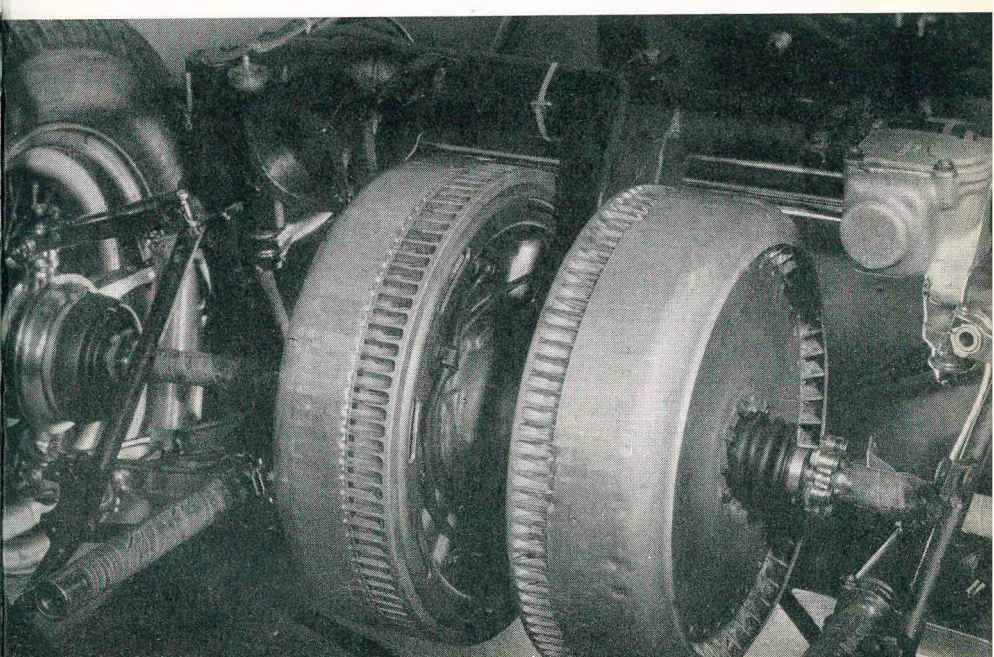


Carburation. If a Grand Prix car must use carburetters then they are invariably Weber double-choke instruments, as seen here on a 4-cylinder Ferrari engine.



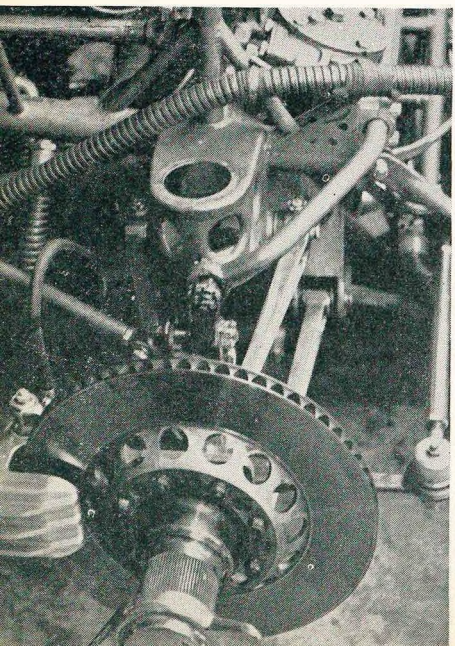
Fuel-Injection. The Bosch system of the W196 Mercedes-Benz, showing the bunch of small diameter pipes running from the pump to the cylinders.

Inboard Brakes. The mounting of the front brakes on a W196 Mercedes-Benz, showing the shafts coupling them to the front wheels. This view is taken with the radiator removed.

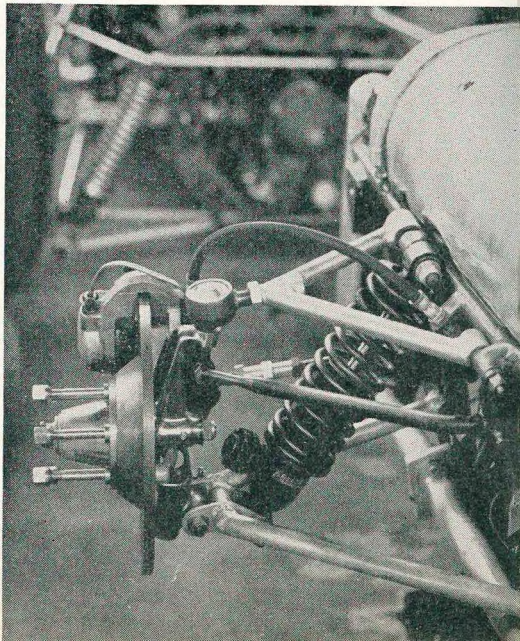


Independent rear suspension. The rear of the 1960 Cooper-Climax showing the double-wishbones to each wheel, and coil spring and damper units. The rear frame cross-tube carries an anti-roll bar. This also shows the Cooper 5-speed gearbox.

Classic i.f.s. The Vanwall front suspension, brake and hub, showing the beautifully machined wishbones, drilled disc and eared hubnut.



Modern i.f.s. The Lotus-Climax front suspension showing the welded construction of the wishbones, Girling disc brake, and bolt-on attachment for the wheel.



go on developing drum brakes.

In 1956 drum brakes were still being used on all the winning cars, though Gordini and the British were still improving their disc brakes, but they were not winning races. However, during that season Maserati fitted an experimental set of Dunlop disc brakes to their streamlined car, which was a failure, so that the brakes never had a chance to prove themselves. This experiment was prompted by Stirling Moss, who arranged for Dunlops to supply a set of disc brakes to the Maserati factory, for he was their number one driver at the time. His own Maserati 250F had been using Dunlop disc brakes for some time and he and all the other people who raced the car were very satisfied with them, while B.R.M. had fitted a set to their Maserati 250F, which they raced in 1954 and 1955, while getting their own Grand Prix car ready. Nobody at the Maserati factory was really interested in Moss' project so that the car was not prepared properly and the Dunlop man who went to Modena to supervise the fitting received no co-operation at all and the whole idea fizzled out. The Continental firms had been worried about the rise of the Vanwall, for they could see a dangerous potential not only in the car but in the organisation behind it. They were not worried about B.R.M., for nothing that the Bourne people did inspired any great confidence, while Connaught were known to be limited in their possibilities. With the Vanwall it was the speed of the car that had the Continentals worried, not the braking, but in actual fact the Goodyear-inspired disc brakes were a very great part of the success of the car. In 1957 when British cars began to win races consistently, it became very obvious that the disc brake had come to stay, and Dunlop and Girling were making useful advances with their brakes. As British supremacy in Grand Prix racing gained ground, as told elsewhere in this book, the disc brake went along as well, for previously no-one in Britain had ever designed a really good drum brake that was the equal of the Continentals, so now that the various specialists were onto an obviously good thing, in the disc brake, all thoughts of drum brakes were forgotten and every effort put into the disc type. Coopers were soon using them, as did Lotus as soon as they joined in Formula 1 and ultimately only Ferrari was left using the drum brake, after Maserati withdrew from racing.

During the 1958 season Peter Collins had a set of Dunlop disc brakes fitted to his roadster Ferrari, and after his untimely death in the middle of the 1958 season, this road-going Ferrari went back to the Maranello factory. The Vanwalls by this time were almost unbeatable and Ferrari was getting desperate to win the Italian Grand Prix, so as an experiment he fitted one of his Grand Prix cars with the Dunlop disc brakes from Peter Collin's road car. There was a great outcry from a certain rather pompous section of the British racing world, and some of the press, for they maintained that it was most unpatriotic to allow the Italians to use the British disc brake, which

was such a big advantage for our Grand Prix cars. These poor misguided people could only see as far as the ends of their silly patriotic noses, for they completely overlooked the fact that B.R.M., and Cooper were using Italian Weber carburetters, and Vanwall was using German Bosch fuel-injection. At the time of this misguided patriotism one of the Vanwall mechanics was heard to say that if all the non-British parts were removed from their cars they would not do much racing. This fuss died down, for Vanwalls won the Manufacturers' Championship, and big business carried on with racing, for both Dunlop and Girling tried to get a contract with Ferrari for disc brakes. Finally it was Dunlop who won, and as Ferrari was at this time changing from Englebert tyres to Dunlop tyres one cannot help feeling that some persuasion was used over the question of which disc brakes to use.

By 1959 the British disc brake, either Dunlop or Girling, was being used universally in Grand Prix racing, for Messier had retired with Gordini, and when Vanwall withdrew from racing he took his very successful Goodyear brakes with him. The disc brake struggled up to supremacy along with the British cars, but whereas the British cars might not stay in power in future Formula racing, it is unlikely that the British disc brake will be ousted from its monopoly for some time to come, unless someone thinks up a new idea for braking.

Carburetters

On the subject of mixing petrol and air and delivering it to the engine of a Grand Prix car there has been almost universal agreement as far as the best type of carburetter. Since the early nineteen-twenties many Italian Grand Prix cars have used Weber carburetters, designed and built by Edoardo Weber in close collaboration with the various firms, such as Alfa-Romeo, Maserati, and Ferrari. During the Formula under discussion most of the British and French racing-car manufacturers have used various versions of the Weber carburetter, except for those who used fuel-injection. The Weber carburetter has no particular magic about it, apart from being particularly good at ensuring good mixing of the petrol and air, but mainly they have been used because they are the only firm who make a serious attempt to provide a pure racing carburetter. With so many years of success behind them, even Edoardo Weber's death during the war did not stop them from continuing with racing carburetters and supplying special ones for the Italian racing teams. The only exception to the universal use of the Weber carburetter was when Lancia produced their D50 Grand Prix car in 1954, for this had Solex carburetters, and when Ferrari took over the Lancia cars in 1955 he continued to use Solex carburetters, but occasionally experimented with Weber carburetters. When he gave up the Lancia based cars and produced his own series of Dino Ferraris he reverted to Weber carburetters. Gordini and Bugatti both used Weber carburetters, while in England all except

Vanwall used them in one form or another, but mostly in the standard type of racing instrument which is really two carburetters in one block. This is known as the double-choke carburetter, and on a four-cylinder engine, such as the Coventry-Climax two such double-choke carburetters are used, thereby giving one choke and set of jets to each cylinder. Needless to say all Cooper and Lotus victories with Climax engines have been gained using the Weber carburetter. The Maserati tried to break away from this carburetter monopoly in 1956 when they experimented with fuel-injection, first of all with a Marelli system and later a Bosch system, but neither was successful and they did the majority of their race winning on Weber carburetters, especially in the big races.

From its very beginning in 1954 the Vanwall used a system of fuel-injection utilising a German Bosch injection pump and injection nozzles, and similarly the Mercedes-Benz engine was designed as a fuel-injection unit, also using Bosch equipment. Whereas Vanwall squirted the fuel/air mixture into the inlet ports, just behind the valve head, Daimler-Benz squirted their mixture direct into the cylinder, through the cylinder wall and the nozzle was masked by the piston when the piston was at top dead centre. These two were the only manufacturers to really conquer fuel-injection, though other people experimented with it. Connaughts spent a great deal of time and effort on trying to make the S.U. low-pressure fuel-injection system work on their Alta engine, but eventually gave up and used Weber carburetters, while B.R.M. also did some test-bed work on a fuel-injection system, but did all their racing on Weber carburetters. In 1960 Aston Martin attempted to use S.U. fuel-injection on the low-pressure system, but it was not a success. Whereas the S.U. system works on a pump pressure of 100 lbs./sq. in., the Bosch system uses 450 lb./sq. in., and results would indicate that high-pressure injection is the real answer.

Not everyone is convinced that a carburetter is better than a fuel-injection system, or vice-versa, but in 1959 and 1960 every Formula 1 race was won by a car using Weber carburetters, so it would seem that designers are convinced of which carburetter to use if they do not use fuel-injection. While the Weber factory of Bologna have this monopoly it is not due to nobody else trying to produce a racing carburetter, for both Solex and S.U. have built racing double-choke carburetters of similar pattern to the Weber, but neither succeeded in breaking the Italian firm's stranglehold on competitions as far as Formula 1 is concerned.

Suspension

When the Formula began in 1954 there was almost universal agreement among constructors that the rear suspension of a Grand Prix car should be of the de Dion layout, and this was to a great extent a continuation of development in the old Formula 2 that dominated

racing in 1952 and 1953. The system of rear suspension known as de Dion derived from an invention used by the Comte de Dion at the turn of the century and what it amounted to was a conventional one-piece rear axle layout without the disadvantages of the orthodox axle. If a single piece rear axle is used it has a wheel and brake at each end and the crown wheel and pionion and differential gear in the centre, and the whole heavy assembly is then joined to the chassis frame by means of a suspension medium, usually leaf springs in the early days. The main drawback of this layout, still unfortunately used far to frequently on modern passenger cars, is that the whole assembly is unsprung, being in continual contact with the ground; though over bumps it was usually the reverse, for once a bump has set a complete axle assembly moving in an upward direction it tends to go on rising long after the bump has finished, due to its inertia. What the Comte de Dion endeavoured to do was to keep the road wheel fixed relative to one another and to spring the centre mass. This was done by mounting the final drive unit on the chassis frame and joining the wheels together by a fixed tube that was pivoted on the chassis frame. The drive from the differential gear to the wheels was effected by a shaft on each side fitted with universal joints, to allow for the movement of the wheels in an up and down direction, relative to the final drive, the tube joining the wheels together, or to be more precise, the brake back plates, was located by various means so that it was limited in its movements. No sideways movement was permitted, nor any fore-and-aft movement, but it was free to rise or fall completely, or to rock, if only one wheel was deflected by a bump. In 1937 the Daimler-Benz company resurrected this principle on their Grand Prix Mercedes-Benz of that period, and many firms followed their lead. The cross tube which kept the rear wheel upright and parallel was known as the de Dion tube, after the name of first user of this layout, and many were the ideas for locating this tube, for the controllability of its movements was vital in the success or otherwise of any de Dion axle layout.

Until Daimler-Benz produced their W196 Mercedes-Benz Grand Prix car in July 1954 it was almost universally agreed that a de Dion layout was a *sine qua non* of a successful Grand Prix car, though the detail design left much scope for the various constructors. Maserati, Ferrari, Lancia, B.R.M., Connaught, H.W.M. and Vanwall all were fitted with de Dion layout rear axles. However, the new Mercedes-Benz was a break from this school of thought as it had fully independent suspension to the rear wheels, as well as the front ones. Independent front wheel suspension was agreed upon, and most firms had settled on the arrangement of double-wishbones and coil springs, or a transverse leaf spring, though torsion bars were also in use. Many misguided people tend to look upon the de Dion rear axle as an independent suspension, but this is completely erroneous, for independent means that when one rear wheel is deflected either up or down

by a road irregularity, then the other rear wheel is not affected. In the de Dion layout, when one rear wheel moves up or down the opposite wheel is moved, because they are joined together rigidly by the de Dion tube. The Mercedes-Benz had fully independent suspension on the swing axle system, whereby each wheel, and hub, is mounted on the end of a transverse arm pivoted near the centre of the chassis, and in the case of the Mercedes-Benz, under the differential assembly, which also incorporated the gearbox. This meant that each wheel could swing about an arc equal to the length of the transverse arm. The differential unit was mounted on the chassis frame and the drive taken to each wheel by universally-jointed shafts as on a de Dion layout. A link system coupled each swinging arm to a torsion bar spring, or it could as easily have been coupled to a coil spring or the end of a leaf spring, the actual springing medium having no bearing on the independent layout. This system of suspension was not new, but was a further development of swing-axle design and had the advantage of a de Dion layout in that the major weight of the rear axle assembly, namely the final drive and differential unit, was sprung, but the added advantage of having the wheels moving independent of each other. Further moving of unsprung weight to the sprung weight part of the car was affected by fitting the rear brakes on the inside ends of the drive shafts, adjacent to the differential housing; this idea also being possible on a de Dion layout.

There was a lot of opposition to independent rear suspension by various designers, the majority of them sticking to the proven de Dion layout, but Gordini used independent rear suspension on his eight-cylinder car in 1955, and in 1956 the Ferrari designers tried out an experimental swing-axle independent rear suspension, but soon abandoned it and returned to the now orthodox, for Grand Prix cars at any rate, de Dion layout. In small cars, such as Formula 3 cars, of 500-c.c. capacity, and small sports cars there was a lot of experimenting going on with independent suspension and many layouts were very successful but apart from Mercedes-Benz and Gordini there was a reluctance to use any such system on a Grand Prix car. When Cooper joined in Grand Prix racing in 1957 he inevitably brought with him his independent rear suspension layout originated with a 500-c.c. car and improved and perfected over the years in various small racing cars. This mounted the final drive unit on the chassis and drove each wheel by a jointed half-shaft, while the wheels were located by a wishbone pivoted at its base on the chassis and at its apex on the wheel hub carrier, while a transverse leaf spring, also pivoted to the hub carrier at its ends, provided a parallelogram movement for each wheel when it rose or fell.

As racing cars became lighter and smaller, especially after the changes to the Formula in 1958, it became more and more important to reduce the unsprung weight on the rear axle, for a vital factor in road-holding is the ratio of the sprung weight of a car to its unsprung

weight, and as the overall weight is reduced it is important to reduce the unsprung portion in order that the ratio between the two stays within certain limits. This encouraged designers to look for alternative layouts to the de Dion system, in which the unsprung parts of the rear axle layout could be reduced in weight, and the inevitable moves were towards mounting the brakes "inboard," and doing away with the de Dion tube and going in for fully-independent layouts. Gradually, as cars became smaller and lighter, the de Dion layout lost favour, and by 1959 it was almost defunct, only Aston Martins retaining it, and they too went to fully-independent rear suspension in 1960, so that by the end of the Formula 1 the de Dion layout of rear suspension was finally dead and buried.

It is interesting that an idea originating at the very beginning of motor car design, should be resurrected in 1937 and then last until 1960, in the design of Grand Prix cars. When first invented it was only in the form of a way round the main problem, which was individual wheel suspension, and in 1937 was only a stop-gap because the knowledge at Daimler-Benz, or anywhere else, in those days was very limited as far as racing-car suspension was concerned. Many people appreciated that independent springing of the rear wheels was just as important as independent springing of the front wheels, but there were various snags, connected with steering problems, that could not be overcome due to a lack of knowledge. In the post-war era a great deal of new knowledge was gained, as well as much trial-and-error experiment, so that by 1954 it was possible to overcome the snags of 1937, but conservative thought kept designers to the de Dion system which was at best nothing more than a system to cover up the inability to deal with the known ideal, which was independent rear suspension. Once Cooper, and very soon afterwards, Colin Chapman with his Lotus cars, had shown the way the de Dion layout died very rapidly, and one can see no possible likelihood of it reappearing in future designs for Grand Prix cars, no matter to what Formula rules they are built. Just as in racing-car engines the side-valve layout or the push-rod operated overhead valve is no longer contemplated, where power production is all important, so the de Dion rear axle layout has been abandoned for all time. It is historically of interest that we have seen the last racing car to compete in Grand Prix racing with a de Dion rear axle layout, during the 1954-60 Formula, and equally, this Formula has probably seen the last of the drum brake, in favour of the disc brake, though this is not quite so certain as is the death of the de Dion axle.

Assistance

Elsewhere I have mentioned how the petrol and oil companies support Grand Prix racing by giving large sums of money to various successful teams or drivers, but their support goes further than that, and, together with numerous other accessory manufacturers in the

motor industry, they supply a much-needed service at Grand Prix races. Naturally petrol and oil are among the chief commodities required by a Grand Prix car, and while a drum of oil might well be carried in the transporter, it is a different matter if all the fuel for a Grand Prix race had to be transported across Europe by the various teams. The major petrol companies are all interested in Grand Prix racing, that is to say, B.V. Aral, AGIP, Azur, Shell, Esso and B.P., and in each European country where Grand Prix racing takes place these firms have representatives who look after the competition interests of their firm, while an overall competitions manager controls things from the head office, in London, or wherever the parent firm is based. Each of these European representatives arranges assistance for competitors at the big Grand Prix events, and the parent companies vye with each other to sign up the more successful teams or drivers, and having done that it is up to the country in which a race is being held to decide on the lavishness of its race meeting assistance. This varies from the competitions manager carrying supplies of oil in the boot of his own car, to vast fully-equipped travelling workshops. In Germany the petrol and oil companies provide one of the most incredible racing services, each concern having a large lorry in the form of a motor coach, the interior of which is a fully-equipped workshop, with lathes, milling machines, welding plant, drills, benches and vices, and all manner of hand tools, while the driving cab is usually fitted out with a refrigerator and gas stove, and drinks and snacks are freely available for anyone having a lot of work to do in the paddock during practice. At most German race meetings there is a separate paddock for the " industry," where these vast Mercedes-Benz, Magirus-Deutsch or Hanomag lorries are parked, together with each company's fuel and oil tanker, dispensing supplies to the competitors. In addition, the tyre manufacturers, such as Dunlop or Continental, have a similar service, and all other branches are represented, such as plugs, brake linings, brakes, electrical equipment and so on, while many of the British firms, such as Ferodo, Mintex, Lockheed, Girling, K.L.G., Lodge, and Champion all have their representatives at these races with their service vans, having travelled out from England along with the racing teams.

Earlier I mentioned that if a motor club applies for a permit to run a Formula 1 Grand Prix race, and eventually have ideas of running a Grande Epreuve, they must have the organisation behind them to deal not only with the race itself, but also all that goes with it, and these " industry camps " are just one of the many important parts of Grand Prix racing that have to be looked after and space provided for.

8

Transport

IT IS ALL very well to build or buy a team of Grand Prix cars, but an equally important part of racing is to make sure you can get them to the racing circuit. Many years ago racing cars could, and often were, driven to the circuits, even over quite long distances across Europe, but as the racing developed into the more specialised Grand Prix machine they became less practical to drive on the public roads, and also conditions changed which made it inadvisable, apart from wearing out the machinery. Of course, there are still many occasions when Grand Prix cars do get driven on the public roads, but they are not normal, and the most important part of equipment in a Grand Prix team is its transporter. Each team seems to have its own ideas on the best arrangement, B.R.M. for example starting off with individual small Austin trucks for each Grand Prix car, but in 1960 they changed to a single vast three-car transporter van built on a Leyland Royal Tiger chassis. The Vanwall team favoured Leyland for their transport, though they spent some time with a Bedford that was rather overloaded and under-braked. They had a three-car van body built on a Royal Tiger chassis, which was very advanced as far as commercial vehicles were concerned, having a diesel engine lying on its side in the middle of the wheelbase, driving through a preselector gearbox operated by compressed air and hydraulics, so that gear-changing was simplicity itself. This gearbox was a five-speed unit and I had a demonstration run in this huge truck one day and there was no more effort needed to drive than was required by the average large family saloon car, while the visibility was superb, the driving cab being the most forward part of the body, with no bonnet out in front. The B.R.M. transporter was very similar, except that it was made with left-hand drive as most of its life would be spent travelling about Europe from one Grand Prix to the next. These really big modern trucks have very powerful brakes that are vacuum-servo assisted, so that a very light pedal pressure is required, and in an emergency they can really stop in a hurry. On one occasion the Vanwall Leyland was motoring pretty smartly along, unladen, and it had a following wind, when a little man in a 4 c.v. Renault motored smartly out of a side-turning right in the path of the Leyland. The Vanwall driver trod heavily on the brake pedal and this big lorry practically locked all its wheels and stopped in a very short distance, generating a veritable fog of rubber and brake lining smoke, and this coloured cloud was wafted forward

by the following breeze and completely enveloped the unhappy 4 c.v. and its owner who thought he was going to run over in a big way.

The Italians use equally big Fiat or Alfa Romeo lorries, and in recent years the Italian commercial coach-building firm of Bartoletti have built some magnificent transporters, on Fiat chassis, especially for racing transport. These can carry three cars apiece, two on the top deck and one on the lower, and the forward part of the lower deck is closed in to form a box car in which all the spare tyres, tools, spare engines, gearbox and so on can be stored. Power winches driven from the main diesel engine drive cable-operated lifting mechanism which lowers the cars from the top deck down to the lower deck, from whence they can be run down ramps onto the ground. The Scuderia Ferrari have two of these magnificent transporters, their only drawback seeming to be the fact that the racing cars are out in the open, or under dust-sheets, so that in bad weather the racing cars often arrive at a race meeting looking pretty travel-stained. When the Ferrari team are overworked, with Grand Prix races and sports car races in quick succession, the transporters often have to be supplemented by an ordinary open lorry to take extra cars, and quite often, if you arrive bright and early for practice, you will see the Ferrari mechanics indulging in a precarious manoeuvre, getting cars off the ordinary open truck. At one meeting they arrived with a lorry fitted with a tubular structure on its back to carry two Grand Prix cars, one above the other, and to get the top one down from its great height they back this lorry up to one of the Bartoletti transporters. Then they placed planks from the top deck of the transporter across to the improvised carrier, wheeled the car backwards onto the transporter and then winched it down to the transporters lower deck, and after moving the lorries apart they ran the Grand Prix car down ramps to the ground. It was all pretty straightforward, except that the planks to carry the car from one top deck to the other were a bit thin and they sagged under the weight of the Ferrari, so that there were some heart-stopping moments until the valuable racing car was safely across the gap. After the race they had to go all through this business again when loading up the improvised carrier.

The driving cabs on these Italian transporters have to be seen to be believed, for they are the last word in comfort and space and can hold six or eight people, and usually have a couple of bunks at the rear. With races being as much as a 1,000 miles from their factories the Continental lorry drivers are hardened to travelling non-stop for days on end, taking turns at the wheel while the others sleep. Unfortunately the British Ministry of Transport has strict rules about the dimensions of commercial vehicles, so that by the time a transporter has been built to take three cars and all the spares there is little room left over for the driving cab without going over the legal limit of overall length. The Italians are not hampered by such legislation, so in consequence can have more lavish driving quarters. Before they withdrew from

Grand Prix racing at the end of 1957 the Scuderia Maserati used a Bartoletti transporter, identical to that of the Ferrari team, apart from the colour being blue and yellow, against Ferraris red. In 1960 the Scarab team had a similar transporter built for their Grand Prix cars, and theirs was painted a light blue, but before they could make real use of it Lance Reventlow returned to America to replan his racing programme.

These big Italian transporters are certainly comfortable to ride in, and on one occasion while staying in Modena a group of us decided we would go to the Opera at Verona, some 60 miles away, so rather than take a selection of private cars, we all went together in one of the Maserati transporters. It cruised happily at 55-60 m.p.h. and being empty of racing cars it accelerated very well, so that we had a most enjoyable ride. We even parked it in a car park just outside the Verona Arena, and there was a bit of a fuss because the man wanted us to pay for the space rather than the vehicle, grumbling that he could have parked about a dozen Fiat 600 cars in the space we had taken. When he saw how many people got down from the cab he was even more upset !

The big Leylands of B.R.M. and Vanwall can also crack along when crossing Europe and I followed the Vanwall team back from Pescara in 1957 at a steady 55 m.p.h., and in 1960 I came up behind the B.R.M. van at close on 60 m.p.h. Having a transporter that can cover the ground at that speed can be a boon to a racing team, for it is impossible to anticipate every likely delay, and if bad weather crossing the Channel, or detours on the roads, or even the Tour de France bicycle race cause a hold up, then it is nice to be able to regain some of the lost time during a three- or four-hundred mile trip across France. The Mercedes-Benz team were very mindful of the need for having fast transporters that could be really motored in the case of an emergency arising, and I recall one day in 1955 when I was with Moss in an SLR sports Mercedes-Benz and the engine blew up some 300 miles from Brescia. We were told on the phone to sit and wait and help would arrive, and 5½ hours later one of the engineers arrived with Stirling's 220S saloon Mercedes-Benz, so that we might carry on with our practice lap of the Mille Miglia course. In a little less than a half an hour more one of the Mercedes-Benz diesel lorries drew up to collect the stricken SLR, having averaged just over 50 m.p.h. from Brescia, with four solid-looking German mechanics sitting on the bench-type front seat. We were pretty impressed, knowing how long it was since we had telephoned to Brescia, and set off in the 220S hoping we could improve on their average.

In 1955 the Mercedes-Benz racing designer, Rudolph Ulenhaut designed the last word in transporters. It was built to carry one car, and was made from 300SL components, this model Mercedes-Benz being the 150-m.p.h. sports coupé with the " gull-wing " doors, and fuel-injection six-cylinder 3-litre engine. Ulenhaut took one of these

power units, and gearbox, a front suspension, brakes and rear suspension from the production line and built them onto a back-bone chassis with a forward-control driving cab, where the driver and his mate sat on each side of the inclined 300SL engine. It had a very futuristic looking cab, and a frontal aspect like the latest Mercedes-Benz lorries, and was good for 110-m.p.h. unladen, or 100 m.p.h. with a racing car on its back. The first time I saw this all-independently sprung, fuel-injection lorry, was during some tests at Hockenheim, when one of the Mercedes-Benz mechanics said " Have you seen Ulenhaut's High-Speed transporter? " I told him I did not know about it and he chuckled and said it would be arriving pretty soon. When it came it appeared in the distance on the fast Hockenheim track and came towards us at about 85 m.p.h. carrying a W196 Grand Prix car on its back, and it sounded just like a rorty 300SL coupé arriving. It was a truly wonderful machine and had cost a fortune to build, but Ulenhaut was very pleased with it, and during the season it was often used for rushing a new car to a race meeting, or taking the last car if preparation took longer than anticipated. After the German firm withdrew from Grand Prix racing, in 1955, it was used for various publicity tours, carrying a racing car on its back, and was also used to take the 1937 Grand Prix car to Oulton Park, on the occasion of Vintage Sports Car Club's demonstration of pre-war Mercedes-Benz Grand Prix cars.

It is not everyone that can afford to build such expensive transporters themselves, or even have special ones built, so that some of the less wealthy team have to make-do with secondhand vans and lorries, while private-owners are often hard put to running a truck and prefer to tow a trailer behind a saloon car. Whatever the answer to the transport problem, it usually depends on the financial situation of the owner-driver or the team, but in all cases it is false economy to skimp the expenditure on transport for your racing car.

While transporters are a straightforward enough job, there is the added problem of finding someone to drive them. With most teams this usually falls to one of more of the mechanics, though some employ drivers who do nothing else except maintain the team's transport. The Vanwall team did this, having two lorries so that he had plenty to do to keep them serviced while at race meetings, especially if they had done a 1,000 miles or more to get there from base, and had another 800 miles to do to the next race meeting, as often happens. Mostly it is the mechanics who drive the transporters and they have to find time to maintain them in between looking after the racing cars and travelling about. As can well be imagined the boys in the lorries have plenty of stories to tell about their travels which take them all over Europe and many are the epics that have been enacted in order to get to a race in time, about which the drivers and team manager often know nothing. No matter which team of mechanics you get talking to, Cooper, Ferrari, B.R.M. or

Maserati, they can all tell you the most incredible stories about things that happened to them on their travels, such as the time when I met the Maserati lorry all smashed in at the front, and enquiring as to what happened discovered that Amedio, the driver, had been following the Ferrari lorry a bit too close and run into the back of it; or the time when Derek, who drove the Vanwall lorry had to get a platoon of Italian military to stand in the back in order to compress the springs sufficiently for the truck to pass under the tunnel at Monza. To whomever you talk you will be impressed by one thing, and that is that no matter what has happened to them they all take it as part of the job, there are never any grumbles about Union rules, or any gripes about overtime, while to go on strike is something that would never enter the head of any self-respecting mechanic. They all have a sense of devotion to the team for whom they are working, and their greatest satisfaction is to see their car win. Unless a man has a willingness to work for his driver or his team, he will never become a racing mechanic and will find that he is not very acceptable to the other mechanics. Between them they have a remarkable code of ethics, all unwritten, of course, and time and energy must be unlimited, while above all else must be a devotion to duty, and that duty is to make sure the racing car is on the starting line in the best possible condition for racing.

Of all the stories I could write about things that happened to various mechanics, I think the one that I shall always remember is the epic of Tony Robinson in 1957. This was a wonderful example of devotion to duty, imagination, and initiative and I only quote this one because I happened to have been connected with it. Tony was working for Bruce Halford in those days, maintaining his 250F Maserati and transporting it about the Continent in a converted Royal Blue A.E.C. coach and at the time of this particular incident he was in Modena at the Maserati factory, preparing the car for the Caen G.P. Bruce was in England, and as I was going to Caen, which is in Northern France, from Aintree, I arranged to pick him up on my way and we would travel to Caen together. We arrived there on Thursday evening as practice was due to start first thing on Friday morning and the first sign of trouble was that there was no sign of Tony, the Royal Blue or the Maserati at the garage where we had arranged to meet. The garage man told us that Mr. Robinson had telephoned to say he would be late and was going to ring again later. Having no idea what could have gone wrong we could only go to bed and hope that Tony would arrive in the night. Next morning there was a gloom for there was still no sign of the Maserati, and as practice was before breakfast Bruce had to content himself with watching the others. We did more to-ing and fro-ing between hotels, the Automobile Club and the garage than I care to remember, and after breakfast there came another 'phone call from Tony. He was at Briancon some 500 miles away and the Royal Blue had broken down, but he now had another lorry organised and should be with us by Saturday morning, in time for

practice on Saturday afternoon. Tony had been on his way from Modena and was coming over the Mont Genevre, between Susa and Briancon, and had just got to the top of the pass when a big-end broke up on the A.E.C. engine. Not really knowing what the trouble was he decided to coast down into Briancon before he investigated the trouble, knowing a garage there in which he could work, for this was one of the normal routes chosen by the racing transport lads when going to and from Italy, as it was a less severe pass than the Mont Cenis, which is a little further north, and it is open much longer than most others. Setting off down the pass in neutral Tony suddenly realised that he would only have the mechanical hand-brake for the footbrake worked off a vacuum servo system from the engine, so that his descent was something of a nightmare as he did not want to run the engine for fear of it breaking up completely. Perspiring heavily he eventually arrived in Briancon and went to the garage and started work on removing the sump of the A.E.C., all on his own for he had no helping mechanic with him. By the time he had ascertained the trouble and come to the conclusion that it could not be fixed there and then, Thursday was drawing to a close. Now he could have sat down and said, " Well, that's that, I can't get to Caen in time so Bruce has had that race." He could have said that, but he didn't, for he knew that Bruce was dependent on racing at Caen to pay for the Maserati overhaul, and the outcome of the Caen race was going to decide whether he got an entry for the German Grand Prix the weekend following. So there he was, in the middle of the French Alps with a derelict ransporter and 500 miles still to do. Now Briancon is not a very big town and there was no hope of getting the A.E.C. engine repaired there, and he worked it out that if he hired a car and took the damaged parts to Grenoble and then came back and fitted them he would not have sufficient time, and anyway there was no guarantee that he could find anyone to do the job immediately in Grenoble, if at all.

There was only one thing to do and that was to hire a lorry so Friday morning he started searching Briancon bright and early, to find a lorry big enough to take the Maserati and some spares, such as wheels, jacks and tools, and this itself was no easy task, and having done that he had to find an owner that was prepared to do a hire job of 1,000 miles. He found plenty of people prepared to do a transport job of 50 miles, but not 500 miles, while there was nothing in the lorry line between something too small and something much too big, and he finally had to settle for an enormous Berliet diesel that would have taken two Maseratis, but time was now getting very short. It was owned by a one-man business that was engaged on carting rubble about, and the owner agreed to drive Tony and the Maserati to Caen and named his price, which was pretty high, as can be imagined. This was where Tony was put in a bit of a spot, wondering whether he was justified in spending so much of Halford's money, not that he had that much money with him anyway, but he worked out that the start-

ing money at Caen would just about cover what he owed Maserati, and pay for the hire of the lorry, so that providing the Maserati did not blow up in the Grand Prix they would break even when it was all over. He was in no position to argue with the lorry owner, for having agreed on the price he then had to explain that he could not pay him until after the race on Sunday night, and that they must hurry or they would be too late to race anyway. It says a great deal for Tony's powers of persuasion that he talked the burly Frenchman into this rather dubious one-sided deal, but the important fact was that he did. Then came the problem of getting the Maserati onto the Berliet, for it was nearly five foot from the bottom of the tailboard to the ground. Wheeling the racing car out of the back of the coach was easy enough, as he had special ramps, but they were nowhere near long enough to reach up to the Berliet, and anyway it would have been too steep to push the Maserati up. Once again the Robinson never-give-in spirit took charge and he dashed off all over Briancon in a borrowed car until he found a garage with an hydraulic greasing lift, and there was only one, but that was enough, so back to the garage and they towed the Maserati behind the Berliet, put it on the hydraulic lift and raised it up to the height of the lorry so that they could then wheel it across the tailboard and into the back. Time was ticking rapidly by all the time, and when his 'phone call to Caen eventually came through he was more or less ready to leave and it was mid-morning on Friday. They set off with the owner of the lorry at the wheel and he took along with him a young apprentice labourer, to help with the driving for he was not insured for Tony to drive and they were going to have to go right through the night. Once they had started Tony was able to urge them on by impressing on them that unless Bruce started in the Grand Prix on Sunday there would be no money for anyone, especially them, and the farther they got from Briancon the more conscious they became of this. But this was not all, for they had not gone far before Tony realised that the burly owner was getting too enthusiastic about the trip and was driving like a lunatic, and he felt sure that if they didn't crash and all get killed then at least the Maserati would bounce off the back of the lorry and be smashed to pieces, for there had been no way of fastening it down. Poor Tony did not know whether to be more concerned about his own life or possible damage to the valuable racing car in the back. Finally he could stand it no longer and suggested that the young lad should have a drive, saying that the owner should conserve his energies for the night driving. This was agreed upon but then more trouble arose, for the owner proudly explained that the young lad was just learning to drive, and in fact he was teaching him, and they crawled along at a snail's pace, being ever so cautious everywhere. After some hours of this Tony came as close to giving up as he has ever been, having had very little sleep over the past few days, most irregular meals, all the worry of making decisions that were a great responsibility for he was dealing with someone else's money and

property, and the general strain of organising the whole trip nearly brought him to tears. He really did not know whether to let the owner drive and risk a crash and fail to get to Caen, or let the apprentice drive and go so slowly that he knew they would arrive too late, and they refused to let *him* drive. Rather than making another decision he felt like getting out and just lying down beside the road and weeping, and no one would have blamed him for that. However, he realised that that would do nobody any good so he steeled his nerves and got the owner to drive again, for that way they at least had a sporting chance of getting to their destination on time. That journey was one of Tony's biggest nightmares, the brakeless descent of the Montgenevre being nothing in comparison, and they would thunder on until his nerves needed a rest and then the apprentice would take over. They would crawl along until the tension of losing time became too great and then the nerve-racking dice would start all over again, and so they went on right through the night.

Practice on Saturday was due to take place in the afternoon and Bruce and I were up bright and early and round to the garage to see if there was any sign of Tony, or any further 'phone calls, but all was quiet so we could only sit and hope. We worked out average speeds, we pored over maps, we peered up the road, and shortly before lunch the big blue Berliet lorry came into sight and stopped outside the garage. A very tired, hungry and harrassed looking Tony climbed down from the cab, for they had come non-stop, without eating or anything. It was a truly remarkable sight to see this huge French lorry, and they really are huge, dusty and dirty and in the middle of it the tiny Maserati. The next problem was to get it down onto the ground, for time was getting short and already other teams were getting their cars ready to go out to the circuit. We had to find another garage with an hydraulic ramp, and that itself was not easy, even in Caen, for it had to be in such a position that the lorry could back right up to it. There were plenty inside service stations, but at last we found one out in the open and away they went to reappear shortly with the Maserati on tow. We all mucked in to help Tony get fuel in the racing car, check the tyres, water, oil, plugs and so on, all in a matter of minutes and away we went just in time for practice.

The car went splendidly in spite of its rough journey, and though Bruce could not hope to equal the times of the works B.R.M. cars, his was the fastest Maserati and equalled the previous years' lap record, and that alone more than justified all the effort in Tony's eyes, so that he quickly forgot the previous two days and prepared for race day. The lorry driver and his mate had to be found accommodation, no easy matter when there is a race on, and extra pit tickets had to be scrounged for them as they were being useful around the place and wanted to see the race anyway as they were obliged to stay until it was over before they could get paid. The race itself went off splendidly for Bruce and he finished in 3rd place, on the same lap as Jean

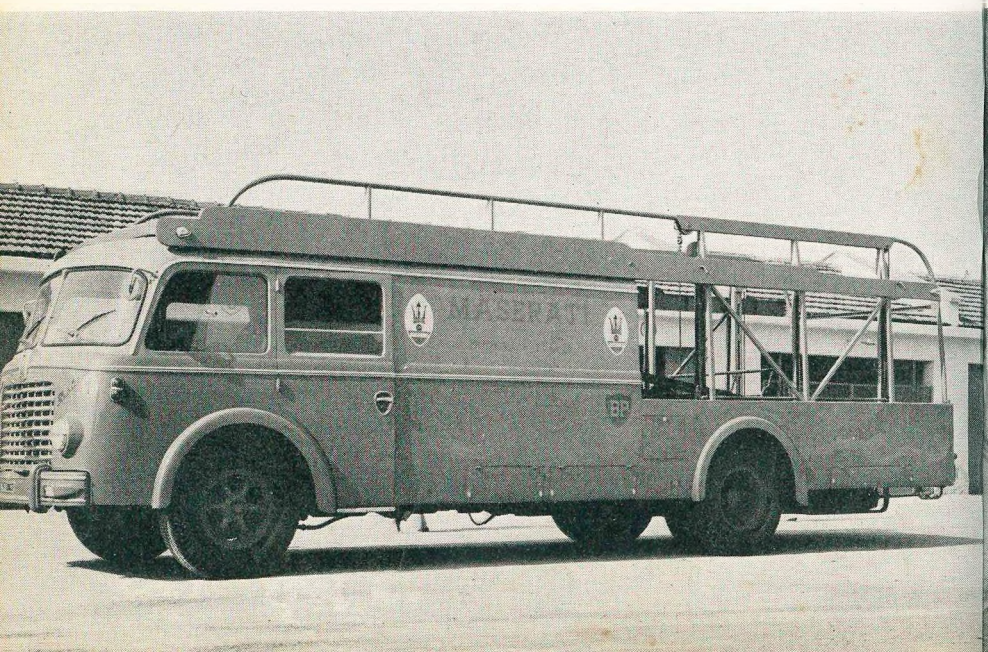
Behra who brought the B.R.M. to its first victory on that day. Everyone was overjoyed by Bruce's effort, most of all Tony for he had gambled with a large amount of money and it had paid off, for not only would they break even with the starting money, but there was prize money for 3rd place so they would now show a small profit. After the race Tony went for some hard-earned sleep while Bruce and I went to the prize giving, and during the evening we started in motion some telegrams between Caen and Germany to find out whether the organisers of the German Grand Prix would accept Bruce's entry on the strength of his 3rd place at Caen. Next morning we all gathered at the garage once more and the lorry driver and his mate were beginning to make " going-home " noises, but before they were paid in full a reply came to say that the Nurburgring entry had been accepted, so in double-quick time we had a conference to decide how best to get the Maserati there. It took quite a lot of hard French talking, a certain amount of bribery and a great deal of persuasion to get the owner of the Berliet to agree to making a 300-mile detour on his way home to take the Maserati to Germany. He studied the map for a long time while we showed him where the Maserati had to go, and he finally squashed the whole project by telling us he had no passport or papers for his lorry to go out of France, and he added as an afterthought that his permit only allowed him 50 miles away from Briancon anyway! After waving bunches of French 1,000-franc notes in front of him he eventually agreed to take the Maserati as far as the German frontier and what we did there we had no idea, but Tony told us not to worry, he'd sort it out when he got there. Luckily the Frenchman did not realise that Caen to Germany was one side of a triangle of which he had covered the long leg, the 500 miles from Briancon to Caen, and that Germany to Briancon was another 350 miles, so that he had got 650 miles to do before he got home. Anyway, he had been paid well over the odds for the journey to Caen and it had been worth it so we all kept quiet, and while Tony set about loading the Maserati onto the Berliet once more, Bruce and I went about various bits of business we had to deal with and arranged to meet Tony at a certain German frontier post that we both knew. There was now plenty of time available, so Tony's ride across Northern France was fairly peaceful and Bruce and I had a good run in the Porsche, and got to the German border at the time arranged. At the French frontier post, which was the farthest point to which the Berliet could go, there was no sign of Tony so we presumed that we were ahead of him, until one of the Customs men told us that the Maserati had gone through into Germany. The German barrier was quite a way up the road, and we motored on and there beside the road sat the red Maserati, loaded with tools and odds and ends, and Tony was sitting on the grass bank smoking a cigarette. He had pushed it from France into Germany, and cleared the paperwork which was still required in those days, and had set in motion the next step from the frontier to

Transport by Leyland. The Royal Tiger of the B.R.M. team which carries three cars and spares, built in 1960 and seen on its first outing at Spa for the Belgian G.P.

Transport by A.E.C. The three ex-coaches used by Connaught to carry their three cars to Grand Prix races in 1956. They are seen in the paddock at Monza.

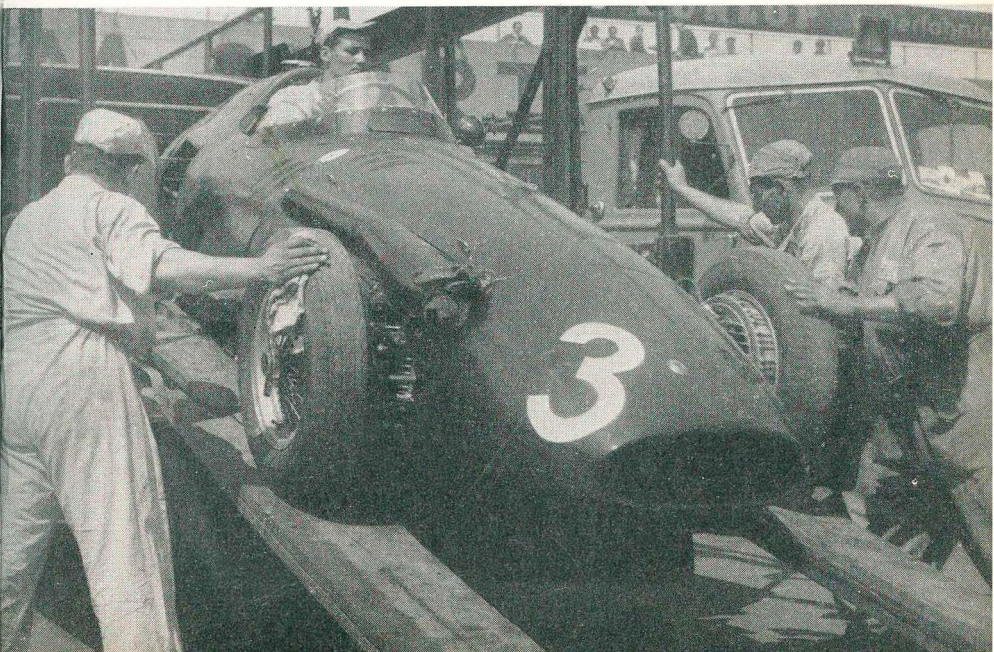
Transport by Mercedes-Benz. The high-speed transporter built by the racing department of Daimler-Benz, using components from the production 300SL sports car, to carry a Grand Prix car at 100 m.p.h.

Transport by Bartoletti. The special transporter built on a Fiat chassis for the Scuderia Maserati. It carries two cars on the upper deck and one on the lower, with a closed compartment behind the cab for spares.



Unloading a Ferrari. A precarious manoeuvre by the Ferrari mechanics in getting a G.P. car from an improvised transporter onto their Bartoletti truck in order to lower it to the ground.

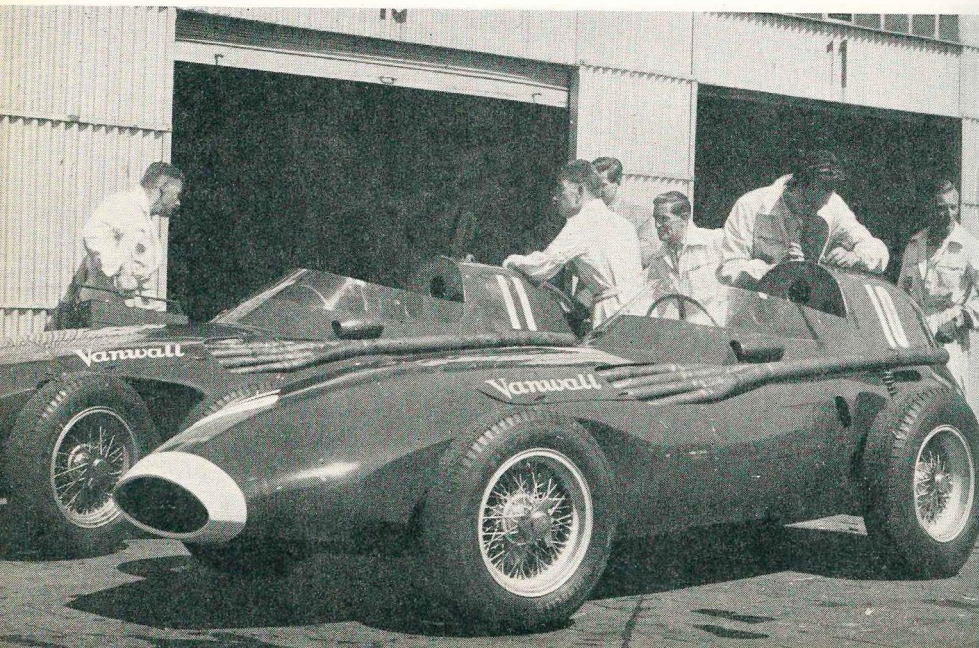
Unloading a Maserati. Mechanics cautiously lowering a 1957 Grand Prix Maserati down planks from their transporter, at the Nurburgring.



The Gay Life. Ferrari mechanics listening to Phil Hill explaining why the car is no better after all the work they have done, in modifying it to make improvements.

The Adventurous Life. An Italian mountain road seen from one of the British transporters. Driving through mountainous country like this is all part of the job of being a mechanic.

The Serious Life. Vanwall mechanics checking their cars for fuel and oil prior to going out to practice for the 1957 German Grand Prix at Nurburgring.



Adenau, a further 80 miles. We had thought the sight of Tony arriving in Caen with the Maserati on the huge French lorry was remarkable, but it was nothing compared to the sight of him at the German frontier with a Grand Prix car and nothing else in sight. There was still a lot to be done regarding the entry for the German Grand Prix, and Bruce wanted to get in some practice laps in the Porsche before official practice began, so Tony told us to go on and he'd fix everything. By this time even the greatest doubter must have begun to have faith in his ability, and we certainly had, so giving him a fistful of German money we bade him goodbye and set off. He had explained that he had already got friendly with the frontier guard and that he had got him to telephone a friend in the next village who would take the car to the Nurburgring on his lorry. As we motored along we saw a large muddy Mercedes-Benz lorry approaching and we just knew that it was the Customs man's friend on his way to pick up Tony and the Maserati. Indeed it was, and they had to go through the little pantomime again of finding a garage with an hydraulic ramp, and you would be surprised how difficult that is. Later that day the lorry arrived at Nurburgring and once more the unloading problem presented itself, only this time there were no garages, for the paddock area at Nurburgring is out in the country away from towns and villages. The ever resourceful Tony soon solved this one by disappearing off into some woods with the lorry driver, where they found a steep bank against which the lorry could reverse and then with the aid of planks we manhandled the Maserati onto the grass bank and by making a circuit of a field Tony found a way out onto the road and we towed it into the paddock and went and had supper, all very relieved and somewhat haggard after the last few days. While eating we had a quiet chuckle about the driver of the Berliet, for he had no maps and had no idea where he was in France, but had disappeared at high speed assuring Tony that he could find his way back to Briancon alright.

The German Grand Prix was another good race for Halford, and he finished in 11th position, and only one lap behind the winner, who was Fangio, and when it is remembered that this was the classic German Grand Prix when Fangio drove one of the greatest races of his career, to finish at all for a private-owner was satisfactory.

That little epic, of getting to two races in that particular season, will always stand out in my mind as an excellent example of the character of a true racing mechanic, who loved racing and racing cars and all that went with the " Continental Circus " style of racing, where you literally lived from one race to the next. The story of Tony Robinson's efforts on behalf of his driver is not unusual, and I could fill the whole of this book with similar stories of other mechanics and their trials and tribulations while driving about Europe, but they all take it as part of the life and though it may have seemed like hell at the time, if you get them talking about such incidents afterwards they will all

treat them lightly and not consider them heroic at all, but personally I think some of them are the greatest heroes I've ever had the pleasure to meet and yet how often does anyone ever give a thought to what went on before a race to ensure that the cars are ready on the starting line when the flag is raised? Not often enough I'm afraid.

Looking through my *Motor Sport* notebook for 1957 in which race notes were made at the time I found an entry under the Caen Grand Prix which simply said " First practice, Halford (Maserati) no practice, lorry broken down at Briancon." This gave no idea at all of what had been going on, but my private diary told a very different story, as it so often does. If some of the workers in industry had the same devotion to duty as Tony Robinson had, and still has, for he is now a Director of the British Racing Partnership, having been chief mechanic for the Yeoman Credit Team for a year, then a lot of the world's labour troubles would be over, and most of the racing mechanics work for a lot less than the average factory worker takes home each week, while they would consider a 40-hour week to be a holiday. The life of a racing mechanic is not an easy one, but with the right outlook on life it can certainly be a pleasant one, but above all else it is devotion to duty that counts.

Although this chapter was intended to be mainly about the transport as it concerns Grand Prix racing, it seems to have been more about the men who drive the transport. Of course, this is only right as transporters without men won't get very far, whereas we have seen that men without transporters can get along reasonably well, providing the men have initiative and an enthusiasm for racing that knows no bounds. As I have said, one could fill a book about the adventures of the racing transports, about breakdowns, landslides, frontier strikes, paperwork difficulties and a thousand other things that are liable to make an easy passage difficult, to say nothing of a shortage of time that usually harasses the racing teams. I often wonder whether the drivers of Grand Prix cars ever give a thought to the difficulties that might cause a transporter to arrive a bit late, or if it is on time I wonder if they ever realise that it meant the mechanics driving as much as seventeen hours a day for days on end.

This was the sort of effort that Connaughts had to put in to get to Syracuse for that great race of 1955. Mike Oliver was acting as team manager as well as chief engineer on that occasion, and he preceded the A.E.C. buses carrying the cars, driving his hot Zephyr. They had unfortunately taken the mountain route to Sicily, not knowing any better, and at times Mike was having difficulty putting 22 miles into an hour's motoring, and he was naturally feeling pretty worried about the transporters which were following the same route. In actual fact, what he did not know was that one of the buses was having its brakes re-lined in the middle of the high street of a mountain town, for they had been used up completely going through the mountains. As Mike said afterwards, " those A.E.C.s were definitely long-dogs, not made

for corners or hills." That trip saw the mechanics eventually driving non-stop, there was no question of how many hours a day, it was just continual day and night. One team of mechanics summed up a trip to Sicily, the mountain route, by saying drily, "We took turns in driving—doing 12-hour shifts!"

The life of a mechanic on the transporters is not an easy one, but if the car wins then it has all been well worth while, if it doesn't win, well, there is always next time.

9

Supremacy of Britain

IF YOU CARE to study the tables of results of Formula 1 races that are appended at the end of this book you will notice many things but the most outstanding will be the comparison of the 1954 list with the 1960 list. In the first year of the Formula there is only one British car gaining a first place, and that was only because it was a National meeting with no continental cars competing. In 1960 only one race was won by a non-British car, and that was one in which none of the British teams were taking part. This complete reversal of the situation in the results list was not a fluke, nor did it happen overnight, but it was the result of years of endeavour by a small group of people who were determined that British cars should make their mark in Grand Prix racing, and among those people one man stands out above all others. That man was Mr. Guy Anthony Vandervell, the owner of the great VP Products industrial plant on Western Avenue, Acton, in West London. That man was more determined than anyone else that a British Grand Prix car should be able to beat all the foreign opposition and he spent untold thousands of pounds, and ceaseless energy that nearly ruined his health, in his efforts to bring about his ambition. His team of green Vanwall cars eventually reached the highest peaks in Grand Prix racing, and while they were not the first British car to achieve a Grand Prix Victory for Great Britain in the Formula 1 of 1954-60, they were the first to gain a series of victories and win the Manufacturers Championship for Britain. The Formula finished in 1960 with British cars dominating the scene completely, Cooper and Lotus, both using Coventry-Climax engines, sharing the spoils, but it is to the Vanwall team that a great deal of credit should go for they fought the bitter fights in the years 1956 and 1957 that were to set the seal on the downfall of the continental Grand Prix cars and start the British ones on their way to almost complete domination of Formula 1.

This rise to supremacy was not an easy one, nor was it a quick one and all the while I was lucky enough to be on the inside of it all watching progress, sometimes with a happy heart, sometimes with a sad one. Grand Prix racing to me is more than a job or an interest, it is a passion, and consequently I had very definite feelings about the progress of British cars in Grand Prix racing, and over the years I wrote a number of articles in *Motor Sport*, for whom I was working as race-reporter, about Britain and Grand Prix racing. I make no excuses for reprinting these articles in full, here and now, and adding one or two other

quotations from writings made over the years under review, for they tell the full story of the rise of British cars in Grand Prix racing from almost complete obscurity to a virtual monopoly, and they give some idea of the hard struggle that took place. Their story shows some of the pitfalls, mistakes, and heart-burnings that went on before any progress was made. In 1959 and 1960 there was no need to write any further articles on the subject, for the results lists of those seasons spoke for themselves. I have always been very limited in my praise, and quick to condemn, and have often been taken to task for this, but it is my nature and I do not wish to change it, but I will say that my condemnation in the earlier articles was done from the heart, for I wanted more than anything else to see a British Grand Prix car out in front, and though I was criticised strongly at the time for being too harsh, I am now more than ever convinced that it did no harm and may have done some good in urging along the successes that I wanted so much to see.

In January 1956 I wrote the following, under the title of Britain and Grand Prix racing :

" For many years now I have stood on the edges of most of the circuits of Europe watching Grand Prix racing and have had to spend a considerable time groaning inwardly, and often outwardly, at pathetic attempts being made by British cars and drivers in an endeavour to become part of the Grand Prix circle. This accepted all-time high in motor racing has been the happy hunting ground of foreign cars and drivers for a very long time, and British efforts in this field have been such that each individual occasion can be well remembered. During the passing years there have been numerous occasions when a faint glimmer of hope appeared on the horizon and it looked as though we might see a British racing car getting somewhere, but invariably it did not last or was too late in the day. There were many happy times in the early 1950s when the H.W.M. team netted good second or third places, and occasionally a first, such as at Chimay and the International Trophy, but this was in the days of Formula 1 and Formula 2 and the H.W.M. team could do no more than make a name in the 'boys' class.' Indeed it was creditable, but one had to keep a sense of proportion and bear in mind that the absolute top of motor racing at that time was being dominated by the 158 Alfa-Romeo team. Then there were good performances put up by early Connaughts and Cooper-Bristols, but always with some sort of qualification having to be added, such as the fact that there was no serious opposition, or that it was only a second-class event, or was not a full-length Grand Prix. Also there were numerous flashes of inspiration that lasted only a lap or two and then the green car had to stop at the pits and be repaired, while the red or blue cars went on to victory.

There was the memorable meeting at Albi when Fangio drove a supercharged B.R.M. and made the works 4½-litre Ferrari blow-up, but again there was the qualification that the race was meaningless

because by that time most races were being run for unsupercharged cars and the old Formula 1 was on its way out. I well remember that on that particular day the performance of Trintignant with an unblown 2½-litre Gordini was of far more significance, for it was the first appearance of a car to qualify for the new Formula 1 that had just been announced. On other occasions there were equally impressive motor-racing efforts being made by British drivers with other out-of-date cars, and many of them came under that delightful British heading, ' a jolly good show,' especially bearing in mind that stout-hearted things were being done on one pound sterling against the Continental's 100 pounds, but all the while they could never be taken seriously, nor did they give anyone a feeling that Great Britain was ever going to get anywhere in Grand Prix racing.

In sports-car racing and Formula 3 things were very different, and a British entry in either type of racing was something to watch and to expect to win. Even Jaguar's magnificent victories at Le Mans and Aston Martin's efforts in the Mille Miglia had to be qualified with the thought that it was only sports-car racing and the top target of all racing teams was still the Grand Prix events, where there were virtually no holds barred. Even though a small patriotic cheer was raised in appreciation of some of these results, it was still in the realms of the elite that I was looking for British cars to make their mark. No matter how fast and furious sports-car or Formula 3 racing may be, most of the competitors cherish the hope that one day they will be able to get in on pure racing-car events, using sports cars for basic schooling. Being something of a purist, I naturally have tended to agree with this idea that Grand Prix racing is the be-all and end-all of a successful racing career, and when Hawthorn was taken into the works Ferrari team, and later Moss joined Maserati and Mercedes-Benz, I made a note that here were two Britishers able to hold their own with the best; it was the beginning of a British foothold in Grand Prix racing. Then Hawthorn trounced Fangio at Reims in 1953 and later trounced everyone at Barcelona, thereby putting a British name in the lists of the highest and mightiest, making his mark in the absolute top of motor racing with no qualifications needed at all; no ifs, no buts—a real triumph. In 1955 the Mercedes-Benz sweeping victories with Moss playing a close second fiddle to World Champion Fangio, added extra weight to Hawthorn's brilliant opening, but the efforts of both these chaps were made in Continental racing cars and it was still to see a green car at the front that I was waiting for.

Now, at the end of the 1955 season, I am delighted to say that on four separate occasions during the Grand Prix season I was able to cheer loudly with an open heart at the efforts of a British car in pure Grand Prix racing. It was not because they were winning, but because I could really see that the particular effort was praiseworthy by any standards and needed no qualifications. At last, after many years of hopeful waiting, I was being convinced that what I was seeing was

genuine and 100 per cent. as good as anyone could wish for. Ifs and buts were not needed; it was unnecessary to think of it as ' a jolly good show ' or ' a sound sporting effort,' Here were four occasions when I stood up and cheered and urged a green car on to greater things, for it was at grips with the reigning stars of Grand Prix racing, and it was an occasion of which to be proud.

The first of these four occasions was preceded by a quiet moment of satisfaction and was at Aintree, for the British Grand Prix. On the third row of the starting grid was a green Vanwall car, with more red cars behind it than in front of it. Admittedly a whole team of silver cars was in front of it, but Ferraris and Maseratis were good enough opposition for anyone, and the leading Vanwall was only beaten by two Maseratis during practice. That the driver, Harry Schell, was not British and also stalled his engine on the starting line, so that he was last away, was relatively unimportant, for the way that Vanwall went until the throttle pedal broke off was a wonderful sight. To see it sail past the entire Ferrari team and some of the Maseratis in an attempt to make up lost ground, brought forth cheers and waves of encouragement. Even though that particular car did not finish the race, Schell proved that the Vanwall could really go by taking over Wharton's car, now many laps behind, and continuing to lap at undiminished speed.

It was the same combination of car and driver that brought forth the second cheer, this time at Monza during the Italian Grand Prix. Here, in the heart of Continental motor racing where everyone was having an end-of-season blind, there was a bunch of six cars fighting bitterly. They were not battling for the lead, but that did not matter; there were three red cars and two blue ones, all factory entries, and they were being led by a green factory car. It was not tailing along at the back, feebly keeping up with this mid-field group; it was out in front of them, setting the pace and making the others puff. It did not last long for the de Dion tube broke, but that was another matter; the important thing was that it had been really fighting when it went out. Not long after this event, another rousing cheer was given from the heart for the sight of Peter Collins driving the new B.R.M. at Oulton Park. Against the two best from Maserati and the two best from Lancia/Ferrari the new B.R.M. put up a short but meteoric fight and, like the Vanwall at Monza, it had gone out with all its fangs and claws really extended in a valiant attempt to tear the opposition to pieces. It was not lukewarm opposition in a minor event or under an out-of-date formula, it was in the racing of the minute, today's Formula 1 racing, and for that matter the formula of tomorrow and the day after.

As a climax to this most encouraging season of Grand Prix racing came the loudest cheer of all on a day that was pure history, a day that I sincerely hope is going to become the one by which we remember the beginning of an epoch. I refer, of course, to October 23rd, 1955,

when young C. A. S. Brooks, driving the Grand Prix Connaught entered by the factory, wiped the eye of the entire Maserati team, with no ifs or buts, or qualifications. There were barely more than a dozen people from Great Britain present to see this great happening, but I am sure they will all remember that day with satisfaction.

However, I hope it is not going to be a question of remembering the day Britain won a Grand Prix; it has got to be ' the day Britain began to win Grand Prix races.' It is unlikely that Italian people can remember the first occasion when a red car won a Grand Prix race, and at one time the French could not remember when a blue car was first victorious. Now the Italians remember the occasions when they were beaten and the French remember with nostalgia the last Grand Prix they won, while the Germans are probably looking forward to the first Grand Prix a Mercedes-Benz gas-turbine racing car will win. We, in Great Britain, can remember the classic win by Napier in the dark ages, the win by Sunbeam in the middle ages, and now the win by Connaught in the present, and this third occasion must become the opening phase in an era that will become known as ' when green cars were the backbone of Grand Prix racing.'

With the season finished I was able to spend a memorable day at Silverstone when one of our top drivers had three different Formula 1 Grand Prix cars at his disposal to test and see if he would like to drive one of them in the 1956 World Championship series. All three were green, designed and built in Great Britain, and they were all capable of lapping Silverstone in a time that would have got them on the front row of any starting grid. There have been British Grand Prix cars in the past, some of them having reasonable possibilities, but never before has there been three different makes all worthy of the best drivers in the world. Worthy that is from the point of view of potentiality, whether capable of being race-winners is another matter; one of practical application depending largely on the quality of workmanship. But, undeniably, all three, B.R.M., Connaught and Vanwall, are practical up-to-the-minute designs ready to take on all-comers, and if they never win another race between them we can be certain that they will all be in the running.

The 1956 season could very easily prove to be the real beginning for British Grand Prix cars, for the past season has shown the possibilities. Both B.R.M. and Vanwall have strong resources behind them and are capable of fielding three cars apiece, while Connaught could do the same if someone would put up the money for they have the brains, the know-how and the car. If there were nine British cars in the World Championship events of 1956 the law of averages alone would give us a victory, and once the cars had proved themselves then every top driver in the game would fall over himself trying to get one to drive. At the moment only the Connaught has proved that it is a race-winner, the Vanwall has shown itself to be a serious contender, and the B.R.M. has started off on the right foot, but all that is not

sufficient for the top drivers like Fangio, Moss, Hawthorn, Castellotti, Farina, Musso and Behra to be prepared to sign on the dotted line and drive these green cars. To these professional drivers the aim is to win races and the hope is to become World Champion, and what car they use is not so important, but deep down they all have national pride and the day our drivers can be certain of winning with a green car they will be ready to do so. It is a fine thing that we have some drivers who can battle for positions in the top six, and if during 1956 our three teams can prove their cars to be race-winners then 1957 will see not only British drivers winning with British cars but Continentals as well.

What of the immediate future? Moss put a great deal of time and effort into trying to convince himself that one of Britain's Grand Prix cars was ready to help him become World Champion. In one day alone at Silverstone he drove nearly a full Grand Prix distance, jumping out of the Vanwall into the Connaught, out of the Connaught into the B.R.M., and then back into the Vanwall again. He drove on a dry track and on a wet track, he tried with full tanks and with empty tanks, he went to Oulton Park and risked his neck on wet leaves, and he went back to Silverstone in pouring rain. He really wanted to convince himself that he should drive a green car in 1956, but in the end he signed on for Maserati for one year. It was not that the British cars were no good, for we know the Connaught has beaten Maserati, we have seen the B.R.M. pass Lancia and Maserati, and the Vanwall has finished races and shown excellent engine reliability, but still none of them are certainties for World Championship honours. What is certain is that all three are capable of being driven round a given circuit as fast as the opposition, but for how long is another matter, and that is an important factor to a driver whose ambition is to become the first World Champion from Great Britain. The B.R.M. engine is delivering more than enough horsepower, it has excellent torque characteristics and the power is usable, but the handling is far from right, and in a crowded opening lap at Berne or Spa, when everyone is nudging everyone else, even the master Fangio would not be happy. The Vanwall handling appears to be more than satisfactory and is such that the driver could go on throwing it about whether the day be wet or fine, at the beginning of a race or at the end, as Schell demonstrated at Aintree, but little bits and pieces are still falling off. The Connaught has amply demonstrated its capabilities, but the bottom of the barrel has already been scraped and professional Grand Prix drivers have got to live.

That we are on the threshold of 1956 with three makes of Grand Prix car wearing the green is a fine effort, but it is not enough and every move must be made to show the world that all three can keep going and justify that the top six drivers have got to use them for the 1957 season. Never before has there been an opportunity like the coming season, for Mercedes-Benz are not playing, the Gordini team

is no longer to be feared, the Bugatti is new and untried, the Scuderia Ferrari are still a bit out of breath from their last two seasons of defeat, and only Maserati are in 100 per cent. condition, but they are far from perfection. The 1956 season is the crucial one for Great Britain, for if our cars do not get right into the thick of Grand Prix racing this year it will be too late. By 1957 the Bugatti may turn out to be a winner, the Gordini may have a revival, Ferrari will have certainly found his feet again, and Maserati will be another full year ahead of everyone. In Grand Prix motor racing there is always a note of urgency, as with any racing, and in the past we have missed the boat. But this time it must not happen for we shall never again see quite such a golden opportunity as this. We have already got our foot on the bottom rung and the next few steps are clear, and the way in to full-scale battle is open to us. When we have become a force in Grand Prix racing it will not mean that the world will buy B.R.M., Connaught or Vanwall cars, it will mean that British engineering will be respected once more. If British-built racing cars win Grand Prix races as well as sports-car races then a degree of confidence will be borne in all British cars, and eventually it will go farther than that and any British engineering product will be respected. Naturally, the manufacturing industry will have to back up the racing efforts by making sure their products are good anyway, but there is no doubt that if Britain was to sweep the floor in *all* branches of motor racing and British-built goods had inherent quality then trade would boom. Already we sell some of the best over-the-counter sports cars and our efforts in this type of racing are far from mediocre, but it is not enough. We must go on to bigger and better things, and now that we have the potential and our foot on the Grand Prix ladder every effort must be made to get in and stay in.

With Moss, and Behra driving for Maserati, and Fangio, Collins, Castellotti, Musso, and possibly Hawthorn, for Ferrari, some people may feel that our teams have no hope, but we must not forget Brooks, Scott-Brown, Titterington and similar drivers, and while they may not be as good as Fangio they can all go well enough for the Fangios of the racing world to think ' Hmm, if " X " can make that green car go like that, then I could really go to town with it.' As I have said already, October 23rd, 1955, must be considered the opening day of the new epoch, and the day one of the top six drivers thinks the above remark while driving in a Grand Prix race, then I shall consider that the second day in this coming epoch has arrived, and I hope that day will be very soon.

It has been suggested that Mr. Owen and Mr. Vandervell, the respective owners of the B.R.M. and Vanwall teams, should amalgamate and buy Connaughts, and the combined operation could then wipe up the Italians. It is an intriguing suggestion, but one that I am sure would fail, for during 1955 the only thing that kept Ferrari and Maserati plugging away at the might of Daimler-Benz was their own

personal battle to become the best Italian team. Had they combined in an effort to beat the Germans then I am sure they would have succumbed by joining in a mutual and lonely despair. In France, Gordini has suffered from loneliness and the advent of Bugatti may be the shot in the arm that he has been waiting for. During the combined B.R.M., Connaught and Vanwall test day at Silverstone it was heartening to see the friendly rivalry as each group tried to convince Moss that their car was the best. Had they been a single unit there would have been no competitive spirit and complacency would have settled. Competition and continual struggle is the essence of motor racing, and if our three teams go all out to beat each other and prove themselves to be the best British car then they cannot but help getting involved with the Continental opposition and they could easily find that not only have they beaten the other green cars but some red and blue ones as well." (Quoted from *Motor Sport*, January 1956).

This was followed in November 1956 by this one, again under the title of Britain and Grand Prix racing and I was a bit upset :

" At the beginning of the year I wrote about the possibilities of Britain getting a foothold in Grand Prix racing, pointing out that the combined forces of Connaught, B.R.M. and Vanwall should be capable of producing a win in a major Grand Prix, through weight of numbers if nothing else. More important still was the fact that we did not have to worry if none of the top drivers were in our cars, so long as the cars put up a good performance and finished the races, for then the ace drivers would begin to wonder whether perhaps they were in the wrong cars. Now, after a full season of Grand Prix racing the record shows a truly miserable result, with Connaught achieving third at Monza by reason of not going fast enough to blow up, a fourth at Silverstone by consistent steady driving, and Vanwall achieved fourth at Spa. Admittedly Vanwall finished first at Silverstone in the International Trophy, but that was not a full-length Grand Prix race and cannot be brought into the present discussion, the events under consideration being the Grandes Epreuves.

If we look back over this season's races we do not see a very impressive demonstration of British ability in the Grand Prix field, especially when we remember that in November, 1955, as I pointed out at the beginning of the year, we had three Grand Prix designs capable of lapping any given circuit as fast as the opposition. In the Argentine none of our teams were ready to compete. At Monaco Vanwall and B.R.M. entered, the Vandervell cars being impressive enough in practice but both being eliminated in the race due to unforeseen crashes which could not be blamed on the cars. B.R.M. practised in a rather mediocre manner and did not start in the race due to faulty material in the engines, while Connaught did not even enter. At Spa, for the Belgian Grand Prix, Vanwall showed a marked improvement and Schell finished fourth, having shown more than one driver in other teams that the Vanwall was much faster down the straights.

However, they did not worry for the car was virtually uncontrollable on the corners and the extra speed proved useless. The second Vanwall retired with a loss of power. Once again B.R.M. did not start, the trouble at Monaco taking them an unbelievable long time to overcome. Connaught entered one car, to be driven by a private owner, but it did not last, suffering from a structural failure in the brake-pedal mounting and loss of oil pressure in the gearbox.

The next big meeting was Reims, for the French Grand Prix, and here the Vanwall really showed enormous promise and while it was going no one could complain, but then all Schell's efforts became fruitless because part of the throttle linkage came adrift, a trouble experienced on the car on more than one previous occasion and really inexcusable. Before taking this car over Schell had retired with his own car due to a number of troubles started by having second gear break up in the gearbox. Connaught did not enter for this meeting and once more B.R.M. were not ready.

At Silverstone the British teams saw their big opportunity, for not only were they on their home ground but all three teams were ready and fielded three cars apiece. Here if anywhere a green car should have won, or at least been well placed, but the result was that one Connaught finished out of nine British factory cars that started. One Connaught broke a rear hub, another broke a connecting-rod, one Vanwall broke a half-shaft and the other two had the inside coating of the fuel tank disintegrate and choke up the fuel system, while one B.R.M. broke its engine and the other two suffered failures in the transmission. Of the nine cars eight retired due to some structural or material failure and the only saving grace was the fact that two B.R.M's led the entire field in the opening laps, but it really did not make up for the abysmal display by our cars on their home ground. So depressing was this display at Silverstone that not a single British car entered for the next Grand Prix, at Nurburgring, and it was not until nearly two months later that green cars appeared once more on the starting line. This was at Monza, and though Vanwall showed terrific promise it was Connaught who achieved results by plodding along. Vanwall proved beyond all doubt once again that it is the fastest car racing today, but its chassis leaves so much to be desired so far as handling at high speed is concerned that cars with less horsepower were able to beat it. As if this was not enough the leading Vanwall then retired with a failure in the transmission. Of the other two one went out with an oil leak in the rear axle and the other suffered a structural failure of the front suspension. Of the Connaughts, apart from the third place achieved by Flockhart, another finished 5th but with a completely collapsed suspension, and the third one suffered a failure of the splines in a rear torsion-bar. Once more B.R.M. did not enter. If excuses are needed for the breakages that occurred at Monza one can put forward the excuse that most of the foreign opposition also suffered structural failure, but personally I

think the time is past for making excuses for the failure of British cars, for we have been doing that long enough.

I honestly believed last winter that we were going to see British Grand Prix cars get somewhere in first-line racing, for I could see that we had the potential to produce teams of good cars. Admittedly Connaught and Vanwall did not have drivers from the élite top flight but B.R.M. had Hawthorn and they could not wish for better, yet 1956 proved to be a fruitless and wasted year for him. Vanwall had a car that at least proved itself worthy of standing up against all the opposition even when driven by lesser drivers than Fangio or Moss, but they achieved nothing in the way of results due in the main to little pettifogging troubles that should have been ironed out two years ago. Connaught were no better off for their car was just not quick enough, having made little progress over the 12 months, and apart from being slow was also unreliable.

At the beginning of this season the main opposition in Grand Prix racing, Maserati and Ferrari, were both in an undetermined state and it was a golden opportunity for a new British team to get on top and stay on top, but now it is too late. Ferrari took only a matter of weeks to get himself organised with his new Lancia/Ferrari cars and Maserati, although making some awful bloomers during the season, at least won two of the big races in a convincing manner and finished second in two more in an equally convincing way. The British teams did absolutely nothing in comparison and if we add up the efforts into figures they read like this: Vanwall started 12 cars, finished two; Connaught started seven cars, finished three; B.R.M. started three cars, finished none; these figures referring to the first-line Grand Prix events, not small national meetings or short races. It will be seen that Vanwall made the biggest attempt to get somewhere, but suffered the greatest percentage of failures. During the season Vanwall twice showed that their cars were capable of leading against all-comers and B.R.M. did so once, so that on the credit side we still have a ray of hope, but on the debit side we have nothing but a series of failures due to material failure or bad preparation and design of details, or in the case of B.R.M. failure before the starting line was even reached.

The whole season has been one of disappointment so far as British Grand Prix cars have been concerned; disappointment that is, relative to the obvious possibilities. As with last year, both Vanwall and B.R.M. evoked excited cheers from me when they really ' mixed-it ' with the foreign opposition but the cheers had to turn to groans as both makes fell by the wayside. While it is all very well to moan and groan like this and complain of the pathetic exhibition that our cars have made over the season of racing, one should really try and offer constructive criticism and assistance to the teams concerned, in an attempt to make next year a far better one. Without being on the inside of any of the three teams it is difficult to know exactly the reasons for the failures and troubles involved. B.R.M. would appear

to have difficulties in producing parts and obtaining the right materials, Connaught still suffer from lack of money sufficient to enable them to build a new engine, for they have little hope of improving much over 250 b.h.p. with their existing one, while Vanwall have all the money and facilities necessary for running a Grand Prix team and have more power from their engine than anyone else, yet their cars fail through detail faults or material faults. Surely there must be a reason somewhere for the continual inability of any of our three teams to get any success in real Grand Prix racing.

All I have done in the foregoing is to chronicle the events that have happened, and no doubt many of them have good reasons for happening, but I am not convinced that any of them need have happened. I would like to suggest that Mr. Vandervell or his technical men let us know just why their cars failed to win a Grand Prix race this year; and for Rodney Clarke to say why the Connaughts fell to bits; and Peter Berthon to explain why the B.R.M. has been such a failure after the initial excellent showing at Oulton Park last year, and why it has taken so much time to get them race-worthy, so long, in fact, that the season was finished before they reappeared from Bourne. I know many of the reasons given for failures, but what of the reasons for bad workmanship, or the reasons for the supply of bad material, or, even more pertinent, the reasons for delay in supply of parts or materials. All three teams can offer explanations of delays and errors but they are never very convincing when the efforts of our sports-cars teams are compared. Jaguars, Aston Martins, Coopers and Lotus have all made efforts this past year that have been far more worthy of British engineering than have the efforts of our Grand Prix teams.

Can it be that the people behind our three Grand Prix cars are the wrong ones, or can it be that Grand Prix technicalities and brainwork is more exacting than in sports-car racing? I doubt it very much. Just what is wrong with British Grand Prix efforts is hard to say, but something is definitely wrong, for now, in November, 1956, we are in no better position in Grand Prix racing than we were in November, 1955. In 12 months we have made no visible progress, whereas Ferrari and Maserati have shared the spoils in all the big races of the year. Any suggestion that either of those firms has bigger or better facilities than the Vanwall team is nonsense, and equally it is nonsense to imagine that Ferrari or Maserati mechanics are better than British mechanics, for I am convinced they are not. As far as organisation goes neither Italian team has much ability and I have personally experienced some of the chaos that goes on in both factories, and every time it makes me wonder just how they ever manage to win a race. I think many times that a well-organised and efficient British team could wipe the floor with them, they are in such chaos, yet every time they win. Is it that Grand Prix racing is just too much for our technical ability, or is it that our standards of workmanship are just not high enough? Whatever it is something is still seriously wrong

and much money is still being wasted. To spend a vast sum of money and get something back in return, namely first places in the important events, is worthwhile, but to spend all the time and effort in producing a result such as we have had this season really does seem a waste of time. The past season has been miserable, the only gratification was that at least there were some green cars on the starting grid, but I sincerely hope that 1957 will produce something a bit better."

In January 1957 I was getting very hot under the collar, for I could see our hopes slipping and made no bones about saying so, once more under the heading Britain and Grand Prix Racing:

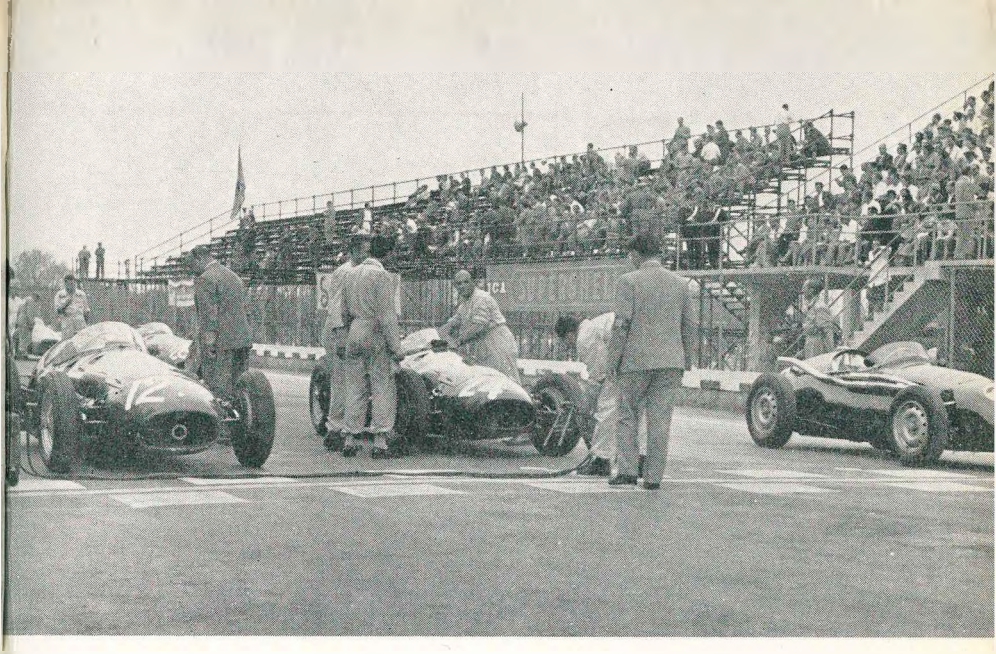
" Since the article of the above title appeared in the November issue of *Motor Sport*, there has been a considerable amount of interest taken. Many agreed fully with all that was said, while others thought certain teams had been dealt with too harshly. Perhaps the most gratifying result of the article was the interesting correspondence that was received from Connaught Engineering, supplied by their Press representative John Webb. While agreeing fully that Connaught efforts taken over the whole Grand Prix season (and I would stress that only the full-length 300 mile or three-hour races were being considered), has not been outstanding. Rodney Clarke and his fellow workers were exceedingly frank about the reasons for breakdowns or retirements, and where the blame was theirs they accepted it without argument. However, they quite rightly pointed out that in races of less than Grand Prix distance Connaught cars had done well during 1956, and that due to financial shortage they were necessarily confined to short sprint-type events in preference to long Grand Prix races. Bearing in mind the cost of repairing a Grand Prix car, they pointed out that a Brands Hatch race was less damaging on a car than 300 miles at Monza and naturally had to take this into account when planning their programme.

All told Connaught Engineering made a very serious attempt to put right some of the wrong impressions that might have been gained after a review of the 1956 results, and also made an excellent reply as to ' why British Grand Prix cars had made such a miserable showing in Grand Prix races in 1956.' While no official representation was received from the Vanwall team, nor any details given by Mr. Vandervell as to why his cars failed to win a Grand Prix race in 1956, certain members of the team who obviously have the Vanwall Grand Prix car at heart, did approach me unofficially and offer explanations of failures, or reasons why the Vanwall cars did not win. At no time did these people try and make excuses for the poor showing, they very reasonably provided explanations and like Connaughts admitted to certain failures which were their own fault.

From the B.R.M. people at Bourne, not a single word was received, not even a curt telegram telling me to mind my own business. Complete and utter silence appears to reign at Bourne. It must be admitted that during the season certain of the technical staff have explained to

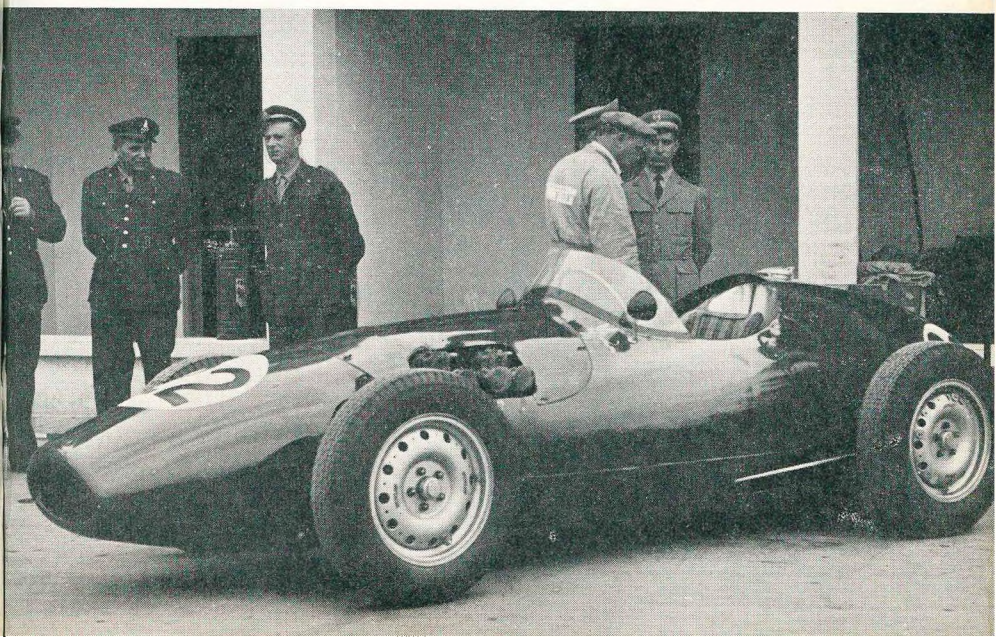
me various factors which add up to some of the difficulties experienced with the B.R.M., but since the end of the season information has been very short. But for the keen interest in motor racing from a purely neutral and enthusiastic standpoint of one of the well-known trade representatives, I would still be very much in the dark over B.R.M. matters, and while I am sure that a personal visit to Bourne would elicit all the information I could desire, it does seem strange that of all the Grand Prix teams B.R.M. are the most reluctant to put right any false ideas that may have got around. They are not alone in their lack of supplying information, for Bugatti might just as well not exist as far as the Press are concerned. However, be that as it may, I most certainly do not consider that either *Motor Sport* or myself are of any importance in the designing and running of a Grand Prix team, and therefore I do not expect anyone to come to me and tell me things, which is why I am always prepared to find things out for myself, but when Connaught and Vanwall do approach me personally it makes me very appreciative of their effort.

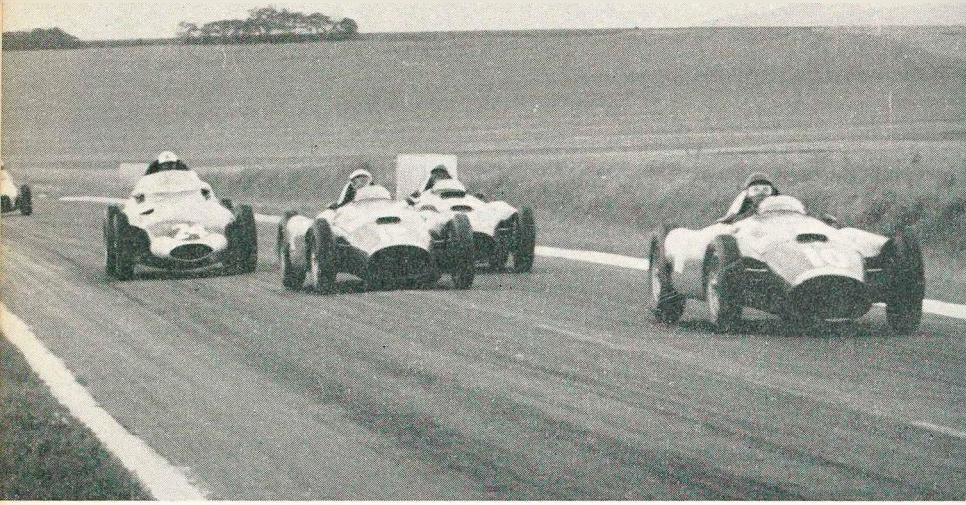
So much for the reaction to my recent article, the whole of which I still stand by, but what of the future, the immediate future that is? At the time of writing the only British cars that might appear in the Argentine Grand Prix are B.R.M., and while it is fully appreciated that South America is a long way off and the trip would upset workshop progress for about eight to ten weeks, I can only say that if Ferrari and Maserati looked on the Argentine in the same light there would be no Argentine Grand Prix. Let us allow that our teams are not strong enough financially or from the organisation side, to tackle the South American season, then the aim is to be the Monte Carlo Grand Prix in May. I say here and now, and without wanting to appear facetious, that I expect to see a British Grand Prix car win. The only opposition worth anything is going to come from Ferrari and Maserati, and if you have seen those teams in action, as I have done, you would wonder why they ever win Grand Prix races. Their only real advantage is that they have been in the habit of winning races for a long time, and habits are hard to break. No one is going to tell me that either team have a more powerful engine than the Vanwall, nor is anyone going to convince me that either Italian firm know any more about suspension and road-holding than do Colin Chapman or Rodney Clarke. If anyone tries to tell me that the Italians have better metals than we do in this country then I shall just scream. They have one thing better than us, and that is Fangio, but we have Moss on the Vanwall and Hawthorn on the B.R.M. and the World Champion is not that much better than our drivers. Add to the Vanwall team young Brooks and that great fighter, Harry Schell, and to the B.R.M. team fast and steady Flockhart, and leaving out Connaught for the moment, how can we possibly fail to win every Grand Prix in 1957? If Archie Scott-Brown and Lewis-Evans with the Connaughts are there, then all the middle-Italians, such as Maglioli,



First Blow. The beginning of the end of Continental supremacy in Grand Prix racing started at Syracuse in 1955. The winning Connaught is seen on the right before the start, the absence of fuss compared with the two works Maseratis being interesting.

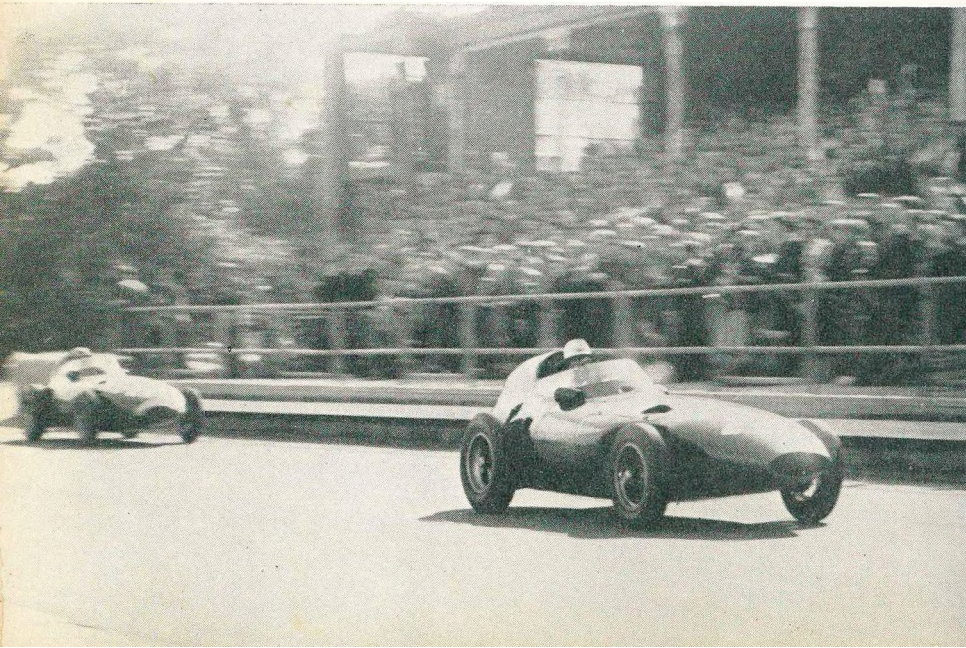
Historic Car. The B-Series Connaught seen at Syracuse before it won the first Grand Prix for Britain in the Formula 1. This model was subsequently named after the Sicilian circuit.

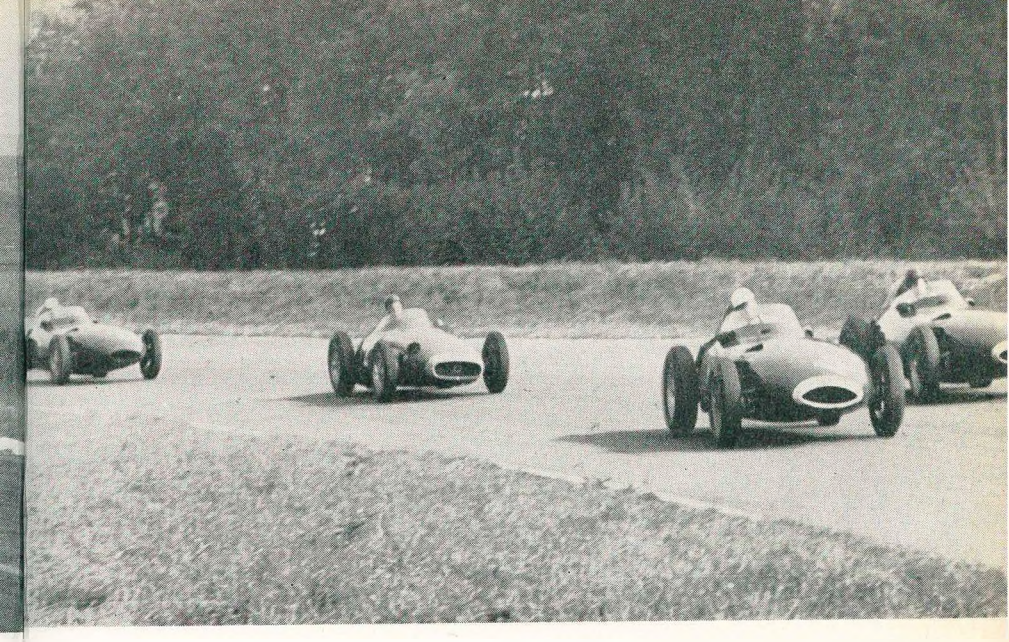




Vanwall Forcing. Harry Schell at Reims in 1956 trying to force his way past the three Lancia/Ferraris that were dominating the race. This race made the Scuderia Ferrari sit up and take notice.

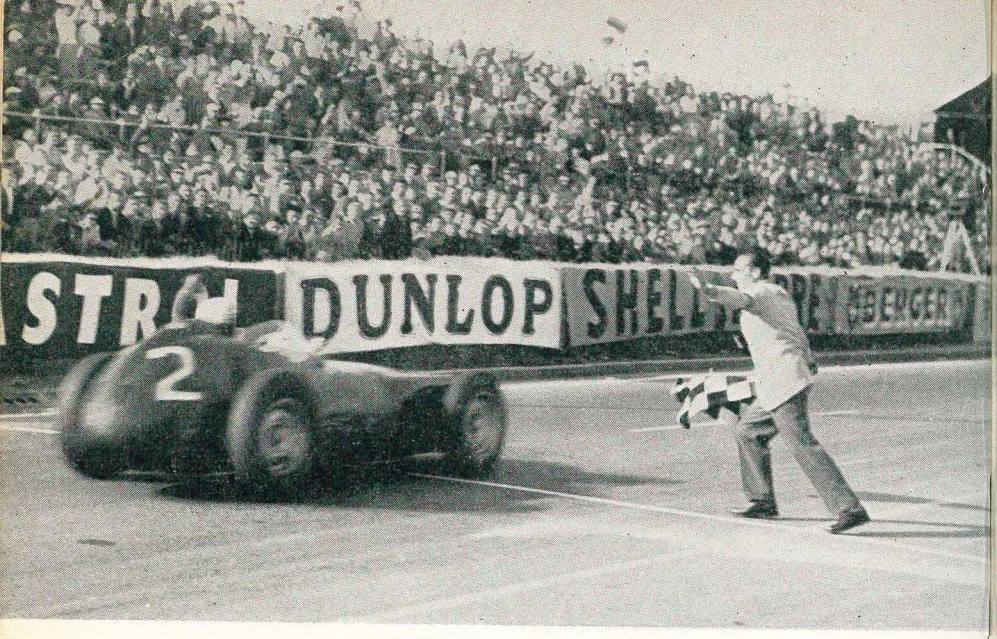
Vanwall Victorious. Moss and Lewis-Evans passing the pits at Aintree when they were lying 1st and 2nd in the 1957 British Grand Prix. Moss went on to final victory and British cars had arrived.





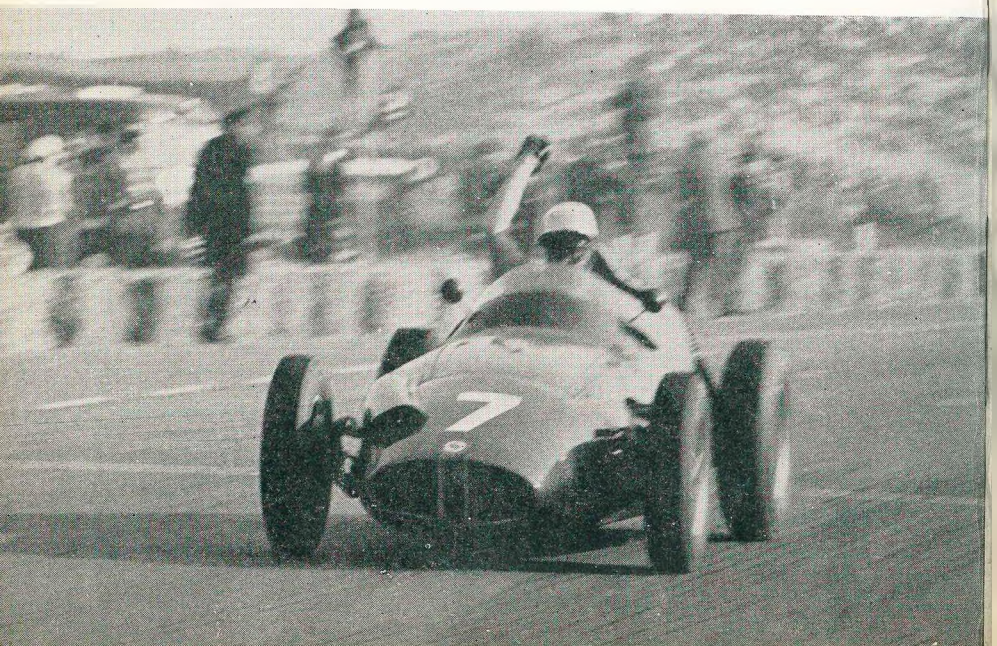
Vanwall Domination. The Italian Grand Prix of 1957, showing Fangio doing his best to keep his Maserati in amongst the Vanwall team, who set the pace from start to finish of the meeting.

Vanwall Personnel. Mr. Vandervell, with hands on hips, watching a signal being given to Brooks who is leading the 1958 Italian Grand Prix. With him keeping an eye on stop-watches are David Yorke, the team manager and Stirling Moss who had retired. The inevitable interfering Italian policeman is approaching.



First Victory. Jean Behra seen receiving the chequered flag at Caen when he scored the first victory for the four-cylinder B.R.M., adding yet another blow to the defeat of the Continental cars by British machines.

Grande Epreuve Victory. A jubilant Joachim Bonnier crosses the finishing line victor of the 1959 Dutch Grand Prix, giving B.R.M. their first big race win.



Taruffi, Perdisa and so on are going to be pushed to one side, so how can we fail to dominate the Grand Prix field?

There are many ways we can fail, and I shall not be surprised if we do, for we failed in 1956 and unless someone makes an effort we shall fail for the same reasons in 1957. Connaught freely told me that of 11 failures during 1956 racing, 10—I repeat *ten*—were due to failure of components or material supplied by firms doing contract work for Connaughts. They were mostly specialist firms, whose maxims are that it is better to consult an expert than to try and do it yourself. Connaughts are not so sure, and but for the difficulty of finding people willing to work hard, they would try to do a lot more of their manufacture themselves. The one failure that was the fault of Connaught Engineering was due to a mechanic who made a mistake, and the firm accepted the responsibility for that, but of the other failures they quite rightly refused to accept responsibility. What they did admit freely was the fact that owing to shortage of money they could not employ a first-class inspection department, and even if they could they doubt very much whether there are sufficient people interested in Grand Prix racing to staff such a department. This in itself is a staggering statement, but I fear that it is true, for how many people would seriously take a technical job with an industry that is as shaky as our Grand Prix industry? Here is just one way that Connaught could improve their chances in Grand Prix racing; if they had a first-class inspection department faulty workmanship from outside the firm would be rejected immediately, not after it had let them down in a race. I know, for a fact, that this problem is one that delays progress with B.R.M. and there are so few firms willing to make an effort that delays in supplying parts take longer than Grand Prix racing can tolerate, without the extra delays caused by poor workmanship. The Vanwall team are in the most happy state, for they are almost self-contained, and the great Vandervell industrial plant can do anything for the team, but even so 1956 saw the Vanwall cars let down due to bad design, lack of thought or bad workmanship, all of which emanated from Mr. Vandervell's own factory.

I do not expect readers to believe for one moment that Maserati, Ferrari or Gordini are perfect, they are far from that, and do not believe for one moment that those firms never make mistakes, for they do and many of them are unforgivable. But that is entirely beside the point, if everyone connected with B.R.M., Connaught and Vanwall, or any other motor-racing project in Britain, bear in mind the saying that ' the best will not be good enough for motor racing ' then we may see an improvement in our showing. If everyone, from the chief designer down to the boy who polishes the bodywork, resolves to be sure that what he has done is perfection and then convince himself that even that was not good enough, then I am sure that much of our trouble will disappear. Just watch a mechanic from Ferrari measure the quantity of fuel in a tank and then watch some of our chaps; one

takes it as a serious job of work, the other as fun and games. There are serious-minded mechanics among our Grand Prix teams, and it is easy to pick them out, for they are the ones that stay with the team, and in just the same way the designers can be weighed up, for a good designer will be kept and a bad one will move on somewhere else. But do not forget the man on the lathe or milling machine, or the chap in the forge or foundry, they are just as important, in fact almost more so, and their jobs must be done just as conscientiously, and then the man in inspection, even if he is not working directly for one of our Grand Prix teams, he too must be conscientious. When the whole matter of working is boiled down it would appear that the sloppy, disinterested, lackadaisical type of working, both in manufacture and design, which has ruined our passenger car industry is also ruining our Grand Prix industry. It can be assumed that workers in the passenger car industry are not really interested in passenger cars, they are merely doing a job of work, but for heaven's sake, we cannot and must not say the same of the people in the Grand Prix industry.

I say here and now, that if there is anyone working for any of our Grand Prix teams who is not interested in Grand Prix racing to an extent that it is an all-absorbing passion, then get out, and get out quickly, for you are not only wasting your own efforts but also those of the chaps who are prepared to give up their complete lives to Grand Prix racing. If we should find that we haven't enough people with sufficient passion for Grand Prix racing to support our three teams, then let us pack up right now and stop wasting effort. Personally, I think there are sufficient people in Britain to run three teams, and I think there is more than enough ability in this country to wipe the floor with all opposition, but a handful cannot do it on their own, they have got to have the backing of everyone no matter how remotely they are connected with the ultimate car.

We need not worry about drivers, for we have enough, and they are as good as they come, and even if Fangio and Maserati and Ferrari share 1957 races amongst them, I want to see British cars up there fighting, just as Schell fought with the Vanwall at Reims. If it finishes only second or third, then that will be something, but it must do so by only a car's length; if it blows up, then I want to see it way out in front when it does, like the B.R.M. at Silverstone. What I do not want to see is British cars trailing along at the back, being nursed along in case something breaks, or worse still no British cars at all, as at Nurburgring in 1956. Italian cars have troubles, but they get over them in time and are always on the starting line, the British cars have trouble and miss a couple of races while it is put right; I hope we have seen the last of such nonsense.

What I do sincerely hope is that I have now written the last of such harangues as the above, for nothing will give me greater joy than to write an article full of praise for a sweeping success by a British car in a major Grand Prix race, and if 1957 is a British season then rest

assured that *Motor Sport* will be the first to cheer loudly."

However, things looked up during that year and after the British Grand Prix, so ably won by Brooks and Moss with a Vanwall I wrote " Once the chequered flag had fallen enthusiasm for this hard-fought victory knew no bounds, and the crowds flooded on the track to acclaim the greatest British victory of all time, one which was achieved against the strongest possible opposition in a race that had put the greatest stress on mechanical endurance as well as on driver skill. The three Lancia/Ferraris of Musso, Hawthorn and Trintignant filled the next three places and Salvadori, Gerard, Lewis-Evans and Bueb brought up the rear.

Not since the Italian Grand Prix of last year had a race been run in which mechanical misfortune, sheer bad luck and the unknown quantity played such a big part. But through it all, having had their own fair share of the drama, Moss driving Brooks' Vanwall had triumphed, and everyone paid tribute to Mr. Tony Vandervell for getting together the team of drivers, mechanics and technicians that made it possible for a thoroughbred British Grand Prix car to win the British Grand Prix."

In September, after the 1957 Italian Grand Prix, I wrote in my report the following extract :

" It was a truly wonderful sight to see the three green Vanwalls on the front row, with only the six-cylinder Maserati of Fangio keeping them company. For many years now we have had to watch starts with one or two green cars scattered about amongst the rows of the grid, but here was a complete triumph; the first three cars on the grid were green and behind them came row upon row of red cars. If all three Vanwalls had blown sky high at the fall of the flag no one could have complained, for they had proved themselves in practice. As it was, when the flag fell it was Moss who leapt away into the lead, with Lewis-Evans and Brooks right on his tail, while Musso made a shattering start from the third row, where he had been in company with von Trips, Hawthorn and Gregory, and was right behind the three Vanwalls as they roared away towards the Curve Grande."

And at the end of the report of that race :

" Amid much rejoicing by the many British people present and an air of bewilderment from the Italians, Moss crossed the line to win the third Grande Epreuve for Vanwall this year, and the first British win at Monza, having beaten the full force of Italy on its home ground in one of the straightest and most open fights we have seen for a long time." The heading to that report read : "A Truly Wonderful Vanwall Victory " and I really meant that, and still think so.

In my Continental Notes in *Motor Sport* for October 1957 I wrote the following :

" This continual winning by British Formula 1 cars is something we have all been waiting for, and, personally, I have been waiting 25 years for this to happen. No matter whether it is Vanwall beating

all-comers at Monza, or B.R.M. beating a lot of also-rans at Silverstone, they are Formula 1 victories by British cars, and that to me is a state of affairs on which we cannot improve. There are people who pooh-pooh Grand Prix racing, and trump up the hoary old adage about 'What does it prove?' claiming sports-car racing to be *the* thing. To them I can only say: 'All right, but I like Grand Prix cars,' and I know there are many more besides who look upon Grand Prix racing as the pinnacle of motor-racing.

This season has been a truly great one for those of us who believe in Grand Prix racing, and for the few who have been able to witness all these victories—Aintree, Caen, Pescara, Monza, Silverstone, and not forgetting the recent past of Syracuse and 1956 Silverstone—it has been immensely satisfying. One thing that amazed me, especially after the two Vanwall victories in Italy, was the number of Italians who came up and offered me their really heart-felt congratulations, using such adjectives as '*tremendo*, *fantastico*, *mervelloso*.' When I replied that they should congratulate Mr Vandervell, not me, they always insisted that it did not matter. 'You are British,' they would say, 'and Britain has produced fine cars and fine drivers, congratulations.' It is not often that I have patriotic feelings, especially about the British Motor Industry, but sentiments such as these, and from many people closely connected with the Italian racing teams, I found very moving, and gave a cheer for Vanwall, Connaught and B.R.M. To hear 'God Save the Queen' after the races, paying tribute to British machines and British drivers, especially at Monza, was truly wonderful, for the Italians really try at Grand Prix racing. For years we have beaten them at sports-car racing, in particular Le Mans, for they have never made what I consider serious attempts at such racing, while our complete monopoly in 500-c.c. racing is mainly due to no one else having a serious try, but Grand Prix racing is a branch of the Sport in which the Italians have specialised for years. The rot really began back in 1955 when Connaught trounced the Italians at Syracuse, and now, two years later, Vanwall have brought that beginning to a wonderful climax with three World Championship victories during 1957.

From now on, of course, Mr. Vandervell and his team have a really difficult task, for it is one thing to battle your way from nothing to the top of the tree, and a very different thing to live up to it and stay at the top. Rejoice we must at the present situation, and celebrate if you feel it does any good, but on no account must we become complacent. Maserati and Ferrari are not going to take the Monza beating lightly and on October 27th, at Casablanca, we should see a fierce battle being waged between the British and Italian Grand Prix teams.

* * *

While we are rejoicing over the successes of Vanwall and B.R.M. we should pause to shed a silent tear over the demise of Connaught, for after Kenneth MacAlpine decided he could not afford to support

the Connaught racing team any more, and no one was prepared to take his place, the team was disbanded. In the middle of September the Connaught racing team came to a complete and final end when all their assets, including seven Grand Prix cars, came under the auctioneer's hammer. It was an unhappy day down at Connaught Engineering on the Portsmouth Road when all the cars and the stock of parts, together with all the experimental equipment, was put up for auction to the world in general. Simply because Rodney Clarke and Kenneth MacAlpine could not raise financial support from a big industrialist, or even a thought from the British Motor Industry, all their efforts over the past eight years have had to be thrown to the winds and the scavengers.

Looking round the line of ready-to-race Grand Prix cars, the spare engines, gearboxes, chassis parts, experimental bits and pieces, test equipment and so on, made me feel rather bitter about the motoring world. All this material, together with the people who built it, represented a vast potential provided it was kept together, but now that it is spread far and wide, an engine here, a car there, a gearbox somewhere else, it represents nothing in the sphere of International Grand Prix racing. Doubtless the new owners of the cars will have a lot of fun with their acquisitions, bought for a tenth of the price needed to conceive the cars, but why, oh why, could not the British Motor Industry have taken a keener interest? Connaught were the first to prove that the Italians were not the masters at Grand Prix racing, their victory at Syracuse will always remain memorable and Mr. Vandervell has shown that an industrial concern controlled by an industrial potentate can do even better, while Mr. Owen's faith in B.R.M. has at last reached fruition. If the 'Big Six' in the British Motor Industry had spent a little of their advertising and entertaining costs on Grand Prix racing we could now have had three Grand Prix teams at the top.

The sale at Send really was the end of the Connaught racing team, though Connaught Engineering still carries on as a general garage and motor agent, while some of the racing staff have been retained to run a small workshop specialising in tuning and quality maintenance, but the actual Racing Department is no more. To me, who has motor racing at heart, like many thousands of others, and does not view it as an easy-money pastime, glamour parade or publicity lever, the sight of the words 'Racing Department' on a closed door has always brought a feeling of reverence and awe, and to see that sign painted out at Connaught Engineering, and all the efforts that went on behind that door being laid bare to be picked at by passers-by, gave me a nasty lump in the throat."

* * *

I finished up that splendid year with another article on Britain and Grand Prix racing, in the November 1957 issue of *Motor Sport*, and this was the final one for I felt that British Grand Prix cars had arrived.

" Quoting passages from one's own articles of the past is something I do not like doing, and it can bounce back and strike one down in an embarrassing manner, but over the question of Britain and Grand Prix racing, which to me is the only true motor racing, I feel I must look back to previous articles. In the Motor Show issue of last year I wrote a long harangue about the miserable efforts made by British Grand Prix cars during the 1956 season of World Championship races, and slated all three of our Grand Prix teams, B.R.M., Conaught, and Vanwall for the mediocre performances they made and for the troubles they had allowed to happen to their cars and teams. I concluded with the words: ' . . . the only gratification was that at least there were some green cars on the starting grid, but I sincerely hope that 1957 will produce something a bit better.' In the January issue of this year, after having found out some of the reasons for the poor state of affairs of the 1956 season, I wrote again, trying to analyse why our efforts in Grand Prix racing were so hopeless, when our sports-car teams did so well, and I finished that article with the following paragraph:

' What I do sincerely hope is that I have now written the last of such harangues, for nothing will give me greater joy than to write an article full of praise for a sweeping success by a British car in a major Grand Prix race, and if 1957 is a British season then rest assured that *Motor Sport* will be the first to cheer loudly.' That was in January 1957. By July 1957 we were cheering loudly, in August we cheered again, and in September we cheered loudest of all. Nineteen fifty-seven has been the season we have all been waiting for; all my moans and groans of the past can be forgotten, for this year has seen Britain get right to the top of the tree. Not quite perfection, for the 1957 World Champion driver used a Maserati, but Italian racing-car supremacy was swept aside and the green Vanwalls forced their way to the head.

As a comparison with last year, let us review the activities of British Grand Prix cars in the World Championship events. No green cars went to the Argentine, the time and expense not being considered justified, but they were all ready for Monte Carlo, the first Grande Epreuve in Europe. In January I said I wanted to see a British car win at Monte Carlo; well, we very nearly did, and but for Stirling Moss making one of his very rare errors of judgment we might have seen a Vanwall victory. What we did see was the Vanwall team right up alongside the opposition during practice, Moss being on the front row with third best practice time, and Brooks being just behind with fourth best. When Moss crashed he was in the lead, and for me that is good enough, had he crashed when running in the middle of the field it would have been boring and intolerable. The other car, in which Brooks was having his first World Championship drive for Vanwall, ran perfectly, and this new driver finished a worthy second to World Champion Fangio, not a miserable second place many laps behind, but on the same lap only 25 sec. in arrears after more than three

hours' racing. This was obviously the right sort of beginning. Of the other teams Connaught started two cars, one finished a rather slow fourth and the other retired, while B.R.M. entered two cars, but only one managed to qualify, and that retired with engine trouble. These two teams were showing no improvement over 1956, but the efforts of the two Vanwalls was so good that it could carry the other green cars along, in the way that the six-cylinder Maserati was covering up for the failings of the new 12-cylinder Maserati. As if three complete British Grand Prix teams was not enough, that hard-trier John Cooper joined in the fun by enlarging the Coventry-Climax engines of his Formula 2 cars to nearly 2 litres and putting yet more green cars on the starting grid. With Australian Jack Brabham ' ear-'oling ' round the tight little Monaco circuit a Cooper had worked its way into third place until a few minutes before the end of the race. Then a broken fuel-pump mounting delayed it and dropped it back to the end of the field, but until this happened if was doing a great job of work, adding more fuel to the fire of green that was menacing the red fire of Italy. Already the green cars had taken the places on the starting grid from France, for the Gordinis were now so much of a back number that they gave up Grand Prix racing.

The Belgian and Dutch Grand Prix events were not held this year, so that it was not until July that the next round took place, but in the meantime disaster had befallen all three British Grand Prix teams in various ways. During the lull between the middle of May and the beginning of July the time had been filled in by sports-car races and other events, and first Vanwall temporarily lost the services of Brooks. Driving for Aston Martin at Le Mans he had an accident that put him out of action for a long time, his injuries taking longer to heal than expected. The number one Vanwall driver, Moss, also suffered a health setback due to carelessness for, eschewing a track race at Monza, he went water-ski-ing instead and as a result of too much salt-water submersion he contracted violent sinus trouble and had to miss two weeks of racing. This meant that the Vanwall team arrived at Rouen without their regular drivers, and this was a circuit that had every prospect of favouring the Vanwalls.

While Mr. Vandervell was having these troubles, Rodney Clarke had suffered the most serious set-back of all, for his financial backer, Kenneth MacAlpine, decided after Monte Carlo that he could no longer go on supporting the Connaught Racing Team. Finding no other monetary source to carry on the racing activities, Rodney Clarke had to make the bitter decision to withdraw from racing, and Connaught's as a racing team folded up. This unfortunate happening was a sad blow for Connaught Engineering, but it turned out to be a good one for Vanwall. With no more Connaught racing their drivers had to look elsewhere, and young Lewis-Evans, who had been showing a remarkable natural ability with Grand Prix cars, became involved with the Scuderia Ferrari. However, by the time the French

Grand Prix arrived there was no sign of even being allowed to try a Grand Prix Lancia/Ferrari, and seeing Vanwalls with an acute driver shortage he offered his services and got a drive at Rouen. The other Vanwall car was driven by Salvadori, he having despaired of ever getting confidence in the B.R.M. having signed up with the Bourne team at the beginning of the season. With the Vanwalls being driven by two drivers new to the cars the showing at Rouen was mediocre and to add to this both cars gave trouble and had to retire from the race. After the Monte Carlo efforts this was depressing, but lacking their two first-line drivers it was slightly excusable. The B.R.M. cars had been showing improvement on test, some major changes being made to the chassis design with obvious benefit, and at Rouen they began to show a little promise. With Salvadori leaving the team, the ever-faithful Flockhart was left to carry the burden of driving until the American driver Mackay-Fraser was given a try-out and found to be suited to the car. In the race Flockhart crashed due to spinning on some oil dropped by another car (one should whisper this—it was a Vanwall), and suffered severe personal injuries, while Mackay-Fraser ran quite well for his first Grand Prix but retired with suspected drive-shaft trouble. After this promising beginning it was unfortunate that this American should be killed the following week in a sports-car race. Having got the cars greatly improved, B.R.M. now found themselves at a complete loss for drivers.

All the hopes for a successful British Grand Prix season now seemed to be dwindling away, and for none of the reasons that occurred in 1956. Driver shortage, financial shortage and sheer misfortune were now plaguing our teams, and it looked as though Britain was not meant to succeed in Grand Prix racing.

The next Championship event was the British Grand Prix, held this year on the flat and twisty Aintree circuit, and prospects brightened when Moss was announced fit once more and Brooks fit enough to start, but carrying no guarantee that he could last out the whole race. Another ray of hope was Lewis-Evans, for since Rouen he had driven in a non-Championship race and was now getting the hang of the Vanwall and going very fast; so Aintree saw three cars from Acton on the starting grid. With the two leading Vanwall drivers back in the fray these cars now got back into their stride and carried on from where they had left off at Monte Carlo. Moss made fastest lap and Brooks was third fastest during practice, so that the starting line saw a lone red car sandwiched between two green ones on the front row, and this really was the beginning of the end. The next step was to get all three Vanwall cars on the front row and then stay in the lead until the finish. The Aintree race was what everyone had been waiting for. Moss rushed away into the lead and was completely uncatchable until his engine blew up; but, as I said last year, I am not going to complain about

that. If it had blown up when lying fifth or sixth I should have groaned loudly, but the first Vanwall had gone out fighting, and if you must retire then there is no better way. At this point Lewis-Evans was lying a firm fifth and Brooks in sixth place, though slowing as he was not yet 100 per cent. fit, so he was called in and Moss took over the car. Right back on the top of his form, Moss took the green Vanwall through the field in an unforgettable manner, and just as he took third place the two leading red cars ran into trouble, so that Vanwall went into the lead again, with the other one now second. For a brief and glorious moment Vanwall cars were first and second in the British Grand Prix, but then Lewis-Evans had mechanical trouble, inexcusable but possible to tolerate in view of the race positions. Moss swept on without a falter and gave Britain her first victory in a Grande Epreuve in modern motor-racing, not forgetting the efforts of Brooks who had kept the car on the boil in the early stages. Lewis-Evans managed to effect a repair and finally finished seventh. This had been a real team effort, all the other teams had had their share of troubles, just as Vanwall had, but the green cars had come out on top; not a clear decisive victory, but one mixed with misfortune and luck. But does it matter how you win in Grand Prix racing, as long as you win ? This was victory over the Italians, the reigning kings of Grand Prix racing, and that was all that mattered.

The B.R.M. team had entered with Leston and Fairman as drivers, but never showed any real promise throughout the meeting, both cars finally retiring with engine troubles. Bringing up the rear, and doing it very well in view of the material being used, were the little Coopers, not full-blooded Grand Prix cars, but green cars filling the results lists, one of them finishing fifth. In 1956 one British factory car out of nine starters finished in the British Grand Prix; in 1957 four finished out of eight starters, and one of them was undisputed winner. Not perfection, but no grumbles; to win is the thing.

The next race was the German Grand Prix on the Nurburgring and only Vanwall entered, the B.R.M. team being in mechanical disorder and not happy about the driver situation. This was the Vanwall team's first attempt on the Nurburgring and it is not a circuit to be taken lightly; in fact, it is true to say that competitors in the German Grand Prix race against the overwhelming odds of the circuit rather than against each other. After the victory at Aintree the Nurburgring was a complete and utter flop for the British, for the Vanwall suspensions were all wrong for the mountainous circuit and the drivers just could not stand the physical battering and mental strain of driving unmanageable cars. The Italians swept the board from start to finish, the best Vanwalls could do being fifth and ninth, the third car of the team retiring after a crash. While this was rather depressing there was no cause for despair, for it was quite obvious that the team had been caught out

by unknown local conditions, though they were to blame for not investigating the situation more fully—the difficulties of the Nurburgring are not new. However, they quickly learnt their lessons and by the time the next big race was held, at Pescara, alterations had been made and they were more or less right for the Italian mountain circuit. The three cars were once more driven by Moss, Brooks and Lewis-Evans, and here they achieved a resounding win, Moss leading for most of the race and only being challenged by Ferrari. The red challenge was brief but fierce, and Vanwall had already vanquished the Maranello car before it blew up. Maserati were just not in the picture and this victory now proved that we could win by ability as well as luck. B.R.M. missed out on this one for the same reason as Nurburgring; they did not consider the available drivers were good enough, and Flockhart was still convalescent.

The final round of the Championship was the traditional Monza race, an end-of-season flat-out blind, with no holds barred, if ever there was one. This race was the climax of the season and it proved to be the climax of all Mr. Vandervell's and the Vanwall team's efforts. The happenings are so recent that they must still be fresh in the memory of all Grand Prix followers, so there is no point in dealing with detail, but suffice to say that Vanwall swept the board from start to finish of the meeting. Never at any time during practice nor in the race did the Italian cars show any signs of getting the better of the three green cars. They fought tooth and nail, but the Vanwalls fought back and gave better than they got, so that Moss recorded the greatest British victory of all time, and the whole team put up the finest performance that any British team has ever done since Grand Prix racing began. With three Vanwalls entered and taking first, second and third fastest practice times, the Italians were fighting for survival. With a race result of first place, seventh place and the fastest lap of the race, the Vanwalls concluded the 1957 World Championship series and Moss (Vanwall) ranked second in the Drivers' Championship.

This is just the beginning, the beginning we have all waited for and for which so many people have worked so hard and suffered so many bitter disappointments. Now we must go on to greater things, to the sort of complete mastery that Mercedes-Benz achieved in 1955, where we can see three Vanwalls enter a race and know for sure that they will finish first, second and third. We must strive to achieve the position where the Italian teams openly admit that they are only racing to try and be the first Italian car to finish. Only by striving to achieve this aim can we be sure of meeting the challenge that might come from Stuttgart next year, the year after, who knows when, but come it surely will, and we must be in a position to fight them hard and beat them, for they are not infallible. Britain must get to the top. We have been laughed at and derided for too long. British engineering has lost its pride of position; 'Made

in Britain ' no longer has any significance, but it is not too late, the efforts of the Vanwalls team in 1957 can save the day. Already the smiles have gone from our competitors' faces; they are wondering if perhaps Britain is on the up and up—maybe she is going to put the 'Great' back in front of her name. We can and must, and Mr. Vandervell has forged a truly wonderful way back to recovery for us. Let us all now give him our support, not by collections, for he does not need money, not by material for his resources are sufficient, but by making sure that everything else that is British achieves the results that the Vanwall team have begun to achieve.

The year 1957 has been a memorable one in Grand Prix racing, but it is only the first, there must be many more. The B.R.M. cars have begun to show ability, admittedly only in minor races, but let us hope that next year they will be in all the Grandes Epreuves battling it out with the Vanwalls, so that the Italian cars and any other competitors that appear have an even more difficult task to get near the front of the racing.

I cannot say how truly happy I am to be able to write an article of praise on Britain and Grand Prix racing. It was not a pleasant task to write the harangues of the past years, but I always felt it was necessary, for I believe in Grand Prix racing above all else, and unless voices like mine cry out in the wilderness no interest is aroused in unhappy situations. When there is success everyone can see it, but when there is merely hope the world in general overlooks it. I have seen rays of hope for Britain becoming a force in Grand Prix racing for a number of years now, not by any clever insight, but by the good fortune of being able to be present and on the inside. It always caused me great anguish, and still does, when I see opportunities lost or bungled, but, believe me, nothing like the anguish experienced by those people behind the Grand Prix projects. They are always too busy trying to improve things to cry out in pain, but I have felt for them and in giving vent to my feelings on the matter I have inwardly hoped that it would do some good, even if only to make an individual conscious of his shortcomings, or to make up for those who have worked hard and conscientiously. By continually battering away, invariably on a critical and harping note, I have hoped to maintain interest in a difficult and complex business, for if nothing is ever said things might slide into obscurity. The 1957 season has seen British Grand Prix cars really achieving results. There have been failures and there have been bungles, and those that committed them know full well who was to blame, but no longer do I feel it necessary to criticise these happenings, for our results this year have been good enough to carry the responsibility of the failures.

To end on a happy note let us recall the British victories: Vanwall finished first at Aintree, Pescara and Monza; second at Monte Carlo; third at Syracuse and Reims; fifth at Reims, Nurburgring and Pescara; seventh at Aintree and Monza; and ninth at Nurburgring.

Connaught finished first and second at Goodwood; third at Pau; fourth at Monte Carlo; and fifth at Pau and Syracuse. B.R.M. finished first, second and third at Silverstone, first at Caen and third at Goodwood. Cooper finished second at Caen; fifth at Aintree; sixth at Syracuse and Monte Carlo; seventh at Syracuse, Rouen and Pescara ; and 12th at Reims.

British cars are indeed making their mark in Grand Prix racing."

Just how right I was can be seen from the 1958 Grand Prix results and I concluded with a tribute to Vanwall in the December issue of 1958 which read :

" In spite of much comment, Mr. G. A. Vandervell refused to bring his 1958 team to the starting line until the first of the events for the World Championship series was held in Europe, which was the Monaco Grand Prix. During the winter months the cars had undergone much detailed lightening, new wheels were designed, new exhaust systems, and new tails for some of the bodies. The biggest problem had been changing the four-cylinder engines to run on 130 octane Avgas in place of the alcohol fuel used previously, this new regulation fuel being demanded by the F.I.A. Without the cooling properties of the alcohol the Vanwall engines were running much hotter, temperatures around the valve seats being up by as much as 200 deg. C., and this called for a great deal of work to be done on valves and pistons, while head joints were also suffering. Another problem which caused much thought was the fact that the engine required a weaker mixture on full throttle than it did at three-quarter throttle, so that the accelerator linkage to the Bosch injection pump had to have a system of levers that allowed the metering slide to go to full rich and then return back a little bit as the air throttles went on up to full open. There was plenty of work to do on the engines alone, while the chassis were undergoing many detail changes, the front hubs, for example, being redesigned to carry an alloy wheel which contained roller races, there being no actual hub, while alloy rear wheels were designed to have a splined hub pressed in. In addition a change was being made to Dunlop tyres, as the Pirelli firm had stopped making racing tyres, and this necessitated much track testing to find the best combination of tyre design to suit the car. One thing Vanwalls did not have to worry about was driver choice, the three from 1957 remaining with them, being Moss, Brooks and Lewis-Evans.

On Sunday, May 18th, three cars started in the Monaco race, all of them having the new alloy disc wheels, short radiator cowlings, steel tube bumpers across the radiator and cut-down Perspex screens. The cars were the equal of any of the opposition, but the race was a complete fiasco for Vanwall, for Moss retired when leading, a valve-cap jumping out due to over-revving, while Brooks had a sparking plug unscrew and come out; he stopped to investigate the trouble but having done so on an uphill section of the course, could not

restart and had to retire. Lewis-Evans had a cylinder-head joint leak and this pressurised the water system, which caused overheating, and the header tank, mounted in the scuttle, to expand and bind on the steering column. In a way this acted as a safety valve to stop the engine blowing up completely due to the head joint going, for Lewis-Evans stopped as he felt the steering getting heavy. On top of all this, a spare engine which was being flown out to Monaco was destroyed when the 'plane that was carrying it crashed.

At Zandvoort on May 26th, at the Dutch G.P., things improved for all three cars were on the front row of the start, after having been in complete command of practice. The alloy disc front wheels were discarded on the car Moss drove, though he retained the rear ones. The major reason for this was that the front brake discs were distorting due to the solid wheel interrupting air flow and causing a wide temperature difference on the two sides of the discs. The result was grabbing brakes. In addition, one driver thought they altered the steering characteristics, while another thought they made no difference. The cars had reverted to their long streamlined nose cowlings and full wrap-round windscreens after the Monaco town race. Moss drove an impeccable race and won with ease, though the other two retired, Lewis-Evans with a broken valve-spring holder, and Brooks due to being unhappy with the handling of his car. Of six cars started up to this point only one had finished a race, which was not at all encouraging from the reliability point of view, the only consolation being that the one finisher had finished in first place.

At Spa on June 15th, for the Belgian G.P., the team suffered a severe challenge from Ferrari during practice, only Moss managing to get on the front row of the start. On the opening lap, while in the lead, Moss missed a gear-change and the resultant revs. allowed the pistons to hit the valves, which bent them all, and he was forced to retire. However, Brooks stepped into the breach and drove a very immaculate and fast race to notch up Vanwall's second victory, while Lewis-Evans finished third. Although two cars finished they were not without their troubles, for Brooks' car was losing oil, and as the gearbox is lubricated by oil from the engine system, on a low-pressure line, it meant that the gearbox was getting starved of oil, and he was lucky to finish the race before the gearbox started to seize. Lewis-Evans broke a wishbone as he completed his last lap, and this was probably due to fatigue, the wishbones having been lightened. In consequence, after this race these wishbones were all replaced by a heavier and stronger pattern.

From Spa they went to Reims, for the French Grand Prix, where the cars were running on full throttle for longer than they had ever done before, and throughout practice there was a lot of trouble with cylinder heads warping due to the high temperatures brought on by the use of Avgas petrol. Oil temperatures were running high all this time, and at Reims the cars were fitted with new oil tanks, mounted

directly behind the radiators instead of being down in front of the engine. These new tanks had fillers that were accessible through hinged flaps on the nose cowling. In the search for ever improved road-holding Moss had bracing struts fitted to his car, running from the top of the king-pin diagonally back to the chassis frame, while Brooks tried his car fitted with new rear hubs that gave vertical wheel position instead of the normal 2 deg. of lean-in, or negative camber. Both drivers were satisfied with their own experiments, but not convinced about each others ! The start of the race looked very black for the team, as they did not have a single car on the front row, the best being Brooks in row two. However, Moss managed to get second place in the race, though the other two retired, Brooks due to another gearbox seizure, and he then took over Lewis-Evans' car, but that retired with a broken inlet valve. All the time valves were a problem, due to the regulation fuel not being able to keep the temperatures down, and many experiments were being tried with different materials, methods of construction and design, but it all took time and quite often a heavy toll of cylinder heads.

At the British Grand Prix at Silverstone on July 19th the team suffered another fiasco, for Moss went out with a wrecked engine, after the valves had touched the pistons once too often; Brooks was right off form and just did not drive fast, being seventh; and Lewis-Evans could only manage fourth place. At least two cars finished, which improved the score, but confidence in the superiority of the cars was beginning to wane. Experiments with engines on the test-bed had proved rather disastrous, so that when the German Grand Prix came along on August 3rd, at Nurburgring, only two cars were entered. In accordance with Mr. Vandervell's rules, there was a complete spare car available but it was not raced; when three cars were raced, four were taken to the meeting, and so on. In the chassis department experiments were still going on, Moss now being converted to upright rear wheels in place of the negative camber, this allowing the tail of the car to slide more smoothly, even if at a slightly lower speed than before. The driver now had more feel to the back end and the car was more sensitive to being steered by the application of power. Thinner roll-bars were fitted at the front on both cars and Moss tried a telescopic steering damper on his car. While well in the lead, Moss was forced to retire with a dead magneto, a small part of the contact breaker mechanism flaking off and making a dead short. This was a chance in a million, and a completely unforeseeable happening. Brooks came into his own at this meeting, driving superbly and more than making up for his team-leader's misfortune, and he won the race in a most convincing manner, putting the score to seventeen starts, seven finishers, and three wins.

For the Portuguese Grand Prix on August 24th all the cars were converted to upright rear wheels, fitted with steering dampers, and king-pin bracing struts. In the engine department an attempt was

made to reduce the engine temperature by having a separate oil radiator, whereas previously part of the main radiator block was used for oil cooling. The new oil radiators were mounted on top of the nose with a cowling over them and a direct air flow through and along the top of the bonnet. This allowed the whole surface of the main radiator to cool the engine water. Following Brooks' magnificent win at the Nurburgring, Moss had an even more convincing first place at Porto, while Lewis-Evans finished third. The cars were now greatly improved from the reliability point of view and Brooks was running perfectly when he spun and stalled his engine, being unable to restart, outside assistance being forbidden of course.

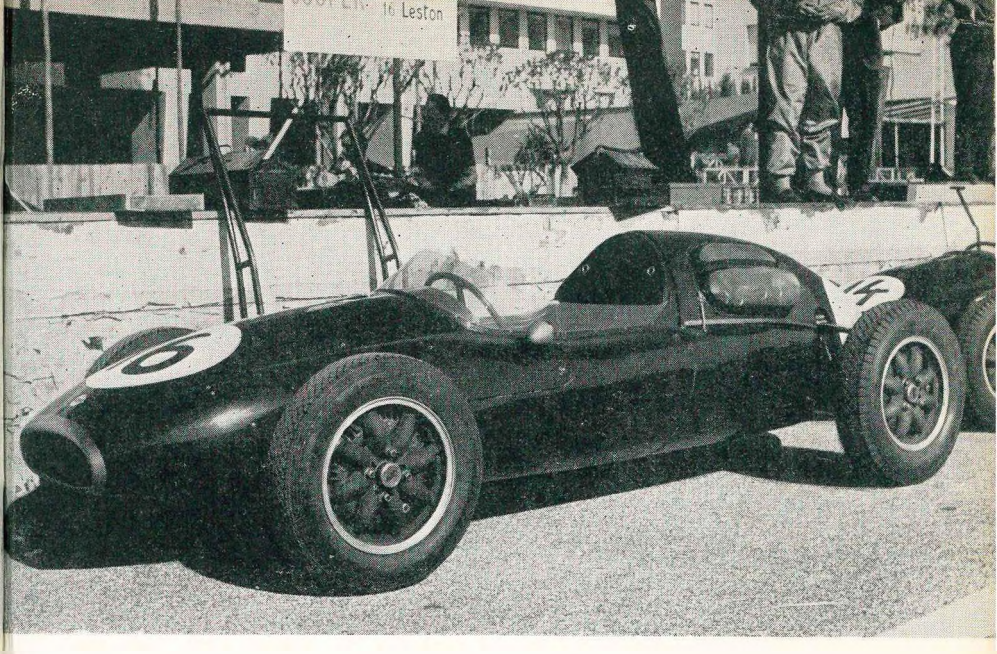
From Portugal the team went by road direct to Monza for the Italian Grand Prix on September 7th, and in practice Moss tried an aerodynamic experiment in the form of a completely enclosed cockpit, the normal wrap-round Perspex screen having a top clamped on of the same material. All three cars were going perfectly and were in the front row of the start, and Moss was battling for the lead when his gearbox showed signs of seizing one of its bushes, due to the old trouble of lubrication. Many experiments had been tried during the season to cure this trouble: different materials for the bushes, different clearances, increases of oil pressure and so on, but no complete cure was found. While the cars were being raced so frequently it was exceedingly difficult to make design and manufacturing alterations, let alone do adequate testing on a circuit, and much of the experimenting to overcome known troubles had to be done in the next race. Once more Brooks stepped into the breach left by the retirement of the team leader, and he went through and won the race, admittedly only because the opposition was also in trouble, but nevertheless he scored the fifth victory of the season for the Vanwall team. Lewis-Evans was in trouble with a leaking head joint which caused overheating, and he retired before the engine was wrecked.

For the final race of the season, for the Grand Prix of Morocco at Casablanca on October 19th, the cars were changed yet again as regards the oil coolers, these now being back as part of the main radiator, the nose cowlings once more being smooth and unbroken. The engines were developing adequate power, but still the internal temperatures were too high for comfort, and valve heads were showing signs of warping and breaking, Moss having one break in practice, and Brooks having one go in the race. A new type of front wheel was tried out in this race, on Brooks' car, these being wire-spoked but having the hub and roller-races integral with the wheel, the single nut holding the hub on to the stub-axle also holding the whole assembly in place. This did away with the heavy splined hub and female splined wheel centre, reducing unsprung weight considerably, and the Dunlop tyres proving 100 per cent. reliable there was never any need for a quick wheel change. Moss drove one of the best races of his season on this occasion and won the race

handsomely, making the total number of victories for the Vanwall team up to six, but the number of finishes was not increased greatly as Brooks retired with a wrecked engine and Lewis-Evans had a fatal crash, the first time that the team had suffered such a loss in all their years of racing.

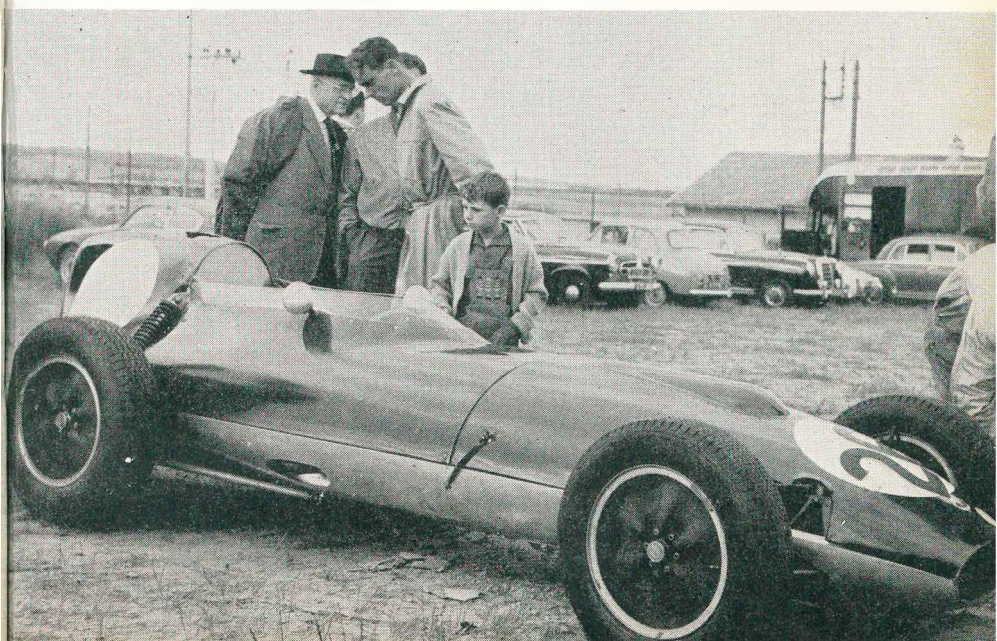
The score for the whole season, in which the Vanwall team competed in nine races, was six wins, one second place, two third places, one fourth place and one seventh place. Of twenty-six starts only eleven finished, which is a very high rate of breakages and retirements, but these were more than compensated for by the six wins out of nine races; a record which everyone connected with the Vanwall Racing Team can be justifiably proud, for it brought to them the Manufacturers' Championship title. In this brief review of the Vanwall 1958 season, tribute is paid to Mr. G. A. Vandervell for creating these most successful cars, the first Grand Prix Champion from Great Britain, and the most successful Grand Prix car from this country since the early 1920s. All readers will, I am sure, enhance the thanks that we give to the Vanwall team, to the owner and creator, the drivers, the team-manager David Yorke, the chief mechanics, Cyril Atkins, Norman Birkenshaw and Stan Elsworth, the many mechanics who work with them both at the races and at home in the workshops and test-houses, and the design and manufacturing staff connected with the Vanwall car, which must number scores of people. In addition, the accessory manufacturers who give unstinted support to this successful team, such as Dunlop, K.L.G., Bosch, B.P. and many others. To all who have had any hand at all in bringing success to the Vanwall team, endless thanks are due, for 1958 has been a year to remember for Vanwalls have put the ' Great ' back before Britain."

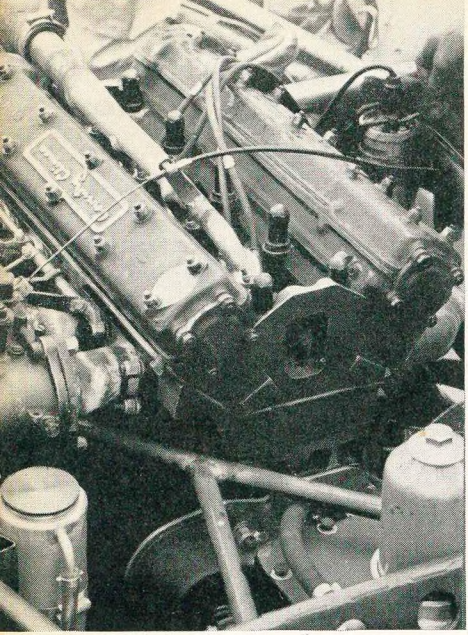
As I have said the 1959 and 1960 seasons needed no criticism or praise, for the results spoke for themselves, British cars winning ten out of thirteen races held in 1959 and fifteen out of sixteen held in 1960. The Formula 1 of 1954-60 may not be remembered so happily in other countries, but in Great Britain it will go down in history and I am very pleased to have been able to see all this happen.



Early Days. The works Cooper-Climax cars at Monaco in 1957, when no-one took them very seriously, due to not having the full 2½ litres capacity of their rivals. The following years told a different story.

Unsuccessful Try. The low and sleek Lotus-Climax on its first appearance at Reims in 1958. It was modelled on the Vanwall lines, but was never able seriously to challenge the Coopers.



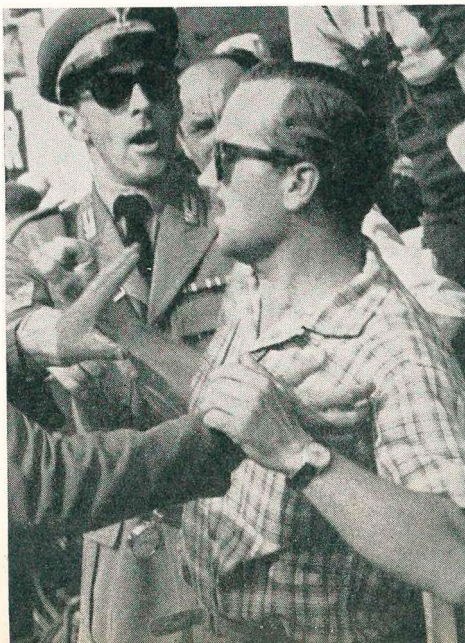


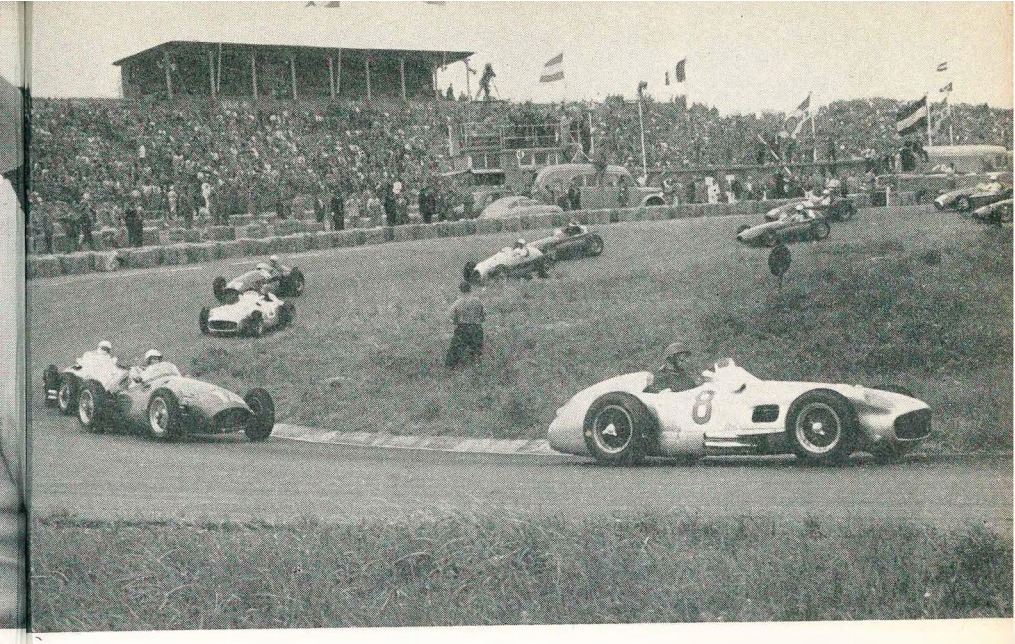
British Engine. The 2½-litre Coventry-Climax four-cylinder engine which was used to power Cooper and Lotus cars, and which almost completely dominated Grand Prix racing in 1960.

British Patron. Mr. G. A. Vandervell looking fairly pleased with life as one of his Vanwalls is discussed. Behind him Fangio is not sure he understands, nor whether he believes. He was convinced in 1957.

Quiet Cooper. Giving Brabham the " thumbs up," John Cooper looks relaxed and serious for a change.

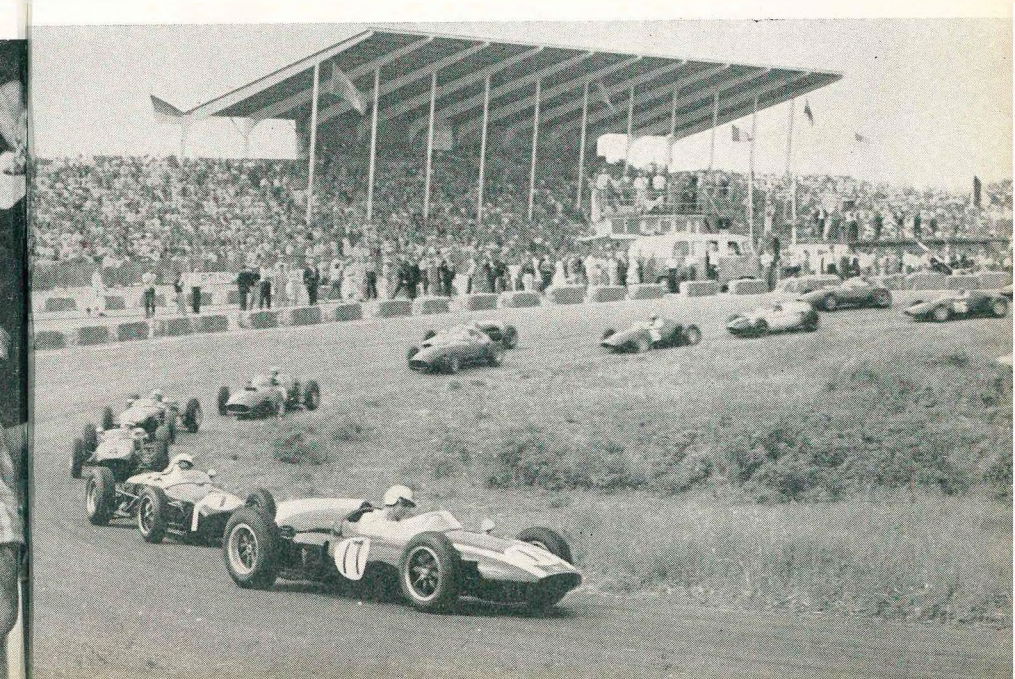
Noisy Chapman. Arguing with Italian police in front of the pits at Monza, Colin Chapman strikes a somewhat belligerent attitude.

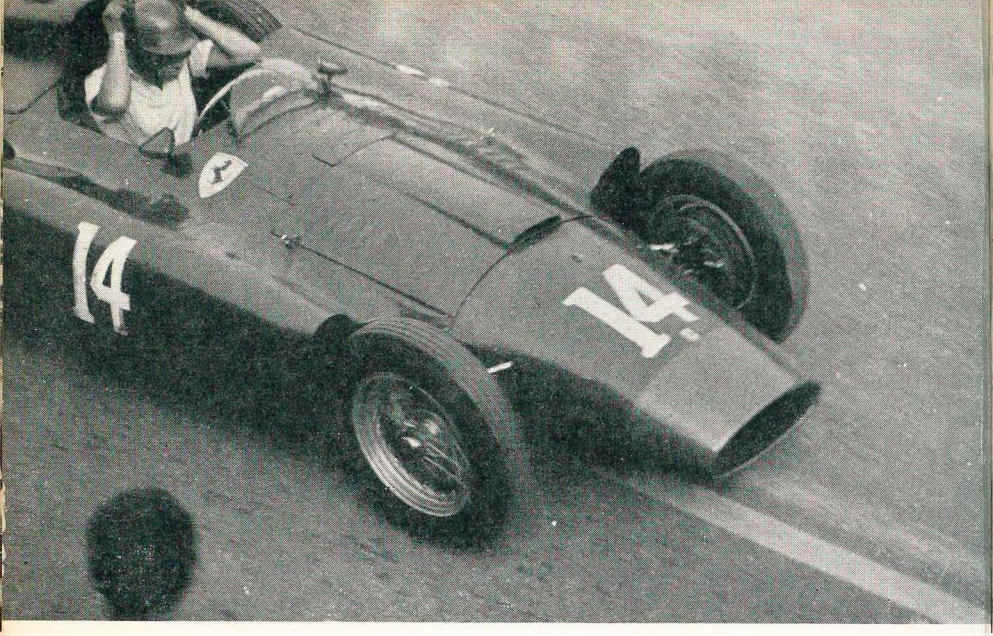




Zandvoort, 1954. Not a British car in sight at the start of the Dutch Grand Prix, though the writing is on the wall as the 3rd and 7th cars have British drivers.

Zandvoort, 1960. British cars in the first 5 places at the start of the Dutch Grand Prix, four with British drivers. In 6th place and 10th place are Italian cars, the rest are British.





Confidence. As the Lancia/Ferrari surges away under full power the driver nonchalantly adjusts the strap of his goggles, a sight that always satisfies the author.

Casualness. A mechanic drives a Ferrari up a shopping street in Stavelot before the Belgian Grand Prix, oblivious of the stares of passers-by. Another satisfying sight.

10

Sights and Sounds

TO THE KEEN FOLLOWER of Grand Prix racing the main point of any event is the winning, and the interest lies in how victory is achieved and by whom, but there is far more to racing than that, and while one can never experience the thrill of visiting one's first Grand Prix race on any subsequent occasion, there are lots of small things about Grand Prix racing and all that goes with it, that still give me a great thrill whenever I see or hear them. I always get a feeling of excited satisfaction as I approach the scene of a Grand Prix meeting, whether it is the arrival in Spa, or crossing on the Ferry to Messina, or just seeing the advertising posters as I am driving into Pau, or any other town large or small. Seeing as many races as I do in the course of my travels, it would be excusable to get a blasé feeling about Grand Prix racing, and I must admit that over some aspects of it I do get that feeling at times, but, on the other hand, there are lots of little incidents and happenings that are a regular feature of any Grand Prix race that never fail to give me a thrill, even though I have seen them many times before or know exactly what it is all about. One such happening is seeing a Grand Prix on the public roads in with the everyday traffic, for though this does not happen in Great Britain, it is a normal thing to see on the Continent when a Grand Prix race is in the offing. Only this year, at Monaco I was driving round the town and was held up by a policeman while the Lotus Team were waved over a crossroads, on their way to the circuit for practice. As Ireland, Stacey and Surtees went by in the immaculate green Lotus-Climax works cars, driving nose to tail, under the benevolent eye of a Monagasque policeman, I could not help chuckling to myself in satisfaction and rubbing my hands in glee, for that is the sort of sight I love to see. And yet I have seen similar situations consistently every year since I first saw it happen in 1948, only on that occasion it was Ascari and Villoresi in 4CLT Maserati works cars.

Sometimes driving a racing car on the open road can provide a good laugh, and in 1959 this happened at Reims before the French Grand Prix and involved the race organiser, Mr. Raymond Roche. Now Mr. Roche is a little fat man with a very explosive temperament, and he said there would be no practising on the Reims circuit on Saturday as he wanted the road surface left free of oil and rubber ready for the French Grand Prix on Sunday. As the circuit is comprised of normal public roads he could not stop people driving

round it, but he could discourage them from going fast, and this he was doing. As at most Continental race meetings the public loves to drive round the circuits imagining themselves to be Grand Prix aces, but in their 2-c.v. Citroén or Peugeots this is harmless enough, and Mr. Roche was strutting about the pit area while the public went about their sight-seeing tours. Now and again a sporty-boy would appear going rather fast in his M.G. or his Simca Sport and Roche would at once leap into the road and wave his arms and yell and shout until a more touring pace was followed. It was a glorious sunny afternoon and the traffic was flowing steadily and I happened to be passing the garage in Reims where the Scuderia Ferrari were preparing their cars and I met a friend who said, " Come on, they are going to try out Gendebien's car on the circuit after making some alterations." We knew nothing about Mr. Roche keeping his vigil in the pits area, but just seeing a Grand Prix car in amongst the ordinary traffic is always fun so we followed the Ferrari out to Thillois hairpin which is at the beginning of the undulating straight leading to the pits, where the unsuspecting Raymond Roche was still marching up and down, waving furiously at anyone doing much more than 40 m.p.h. The Ferrari team-manager, engineers and mechanics did not know of the ban on speed on the circuit, being too busy getting their cars ready for the race. Now the car they wanted to try out was Gendebien's car, number 30, but Gendebien was not to be found so they asked Phil Hill to try it, as he happened to be in the garage with Dan Gurney. Not prepared for doing any testing Hill did not have his crash hat with him, but Gurney had his so lent it to his team mate and away went the Ferrari and we all stood on the grass island at Thillois and looked for his arrival over the horizon at the top of the long hill down from Soissons. I must say it was a fine sight when it appeared in view on the wrong side of the road doing 130 m.p.h. or more and overtaking a long stream of public who were coming down the hill at around 50-60 m.p.h.

Hill pulled up by the grass island where we were all waiting and Tavoni and Chiti expected to hear how the car was going, instead of which Hill said, " That idiot Roche, is he trying to get killed, he stood right in the middle of the road." After a few adjustments, he went off on another lap and this time came back to report that Roche had tried to hit him on the head with a flag. Then a bystander said, " Oh, didn't you know," and told us about the ban on unofficial practice, but the Ferrari people were not really interested being more intent on tuning their car, though Hill was a bit sceptical about going on. He did another lap and this time when he stopped he was visibly shaken and reported that Roche had been about three feet off the ground and a sort of purple colour, and Hill began to wonder if there might not be recriminations until he realised that he was wearing Gurney's black and characteristic space-helmet and the car was carrying Gendebien's racing number. One more lap was all Ferrari wanted to complete their

tests, so away went Hill and this time he did not stop to report what had happened up at the pits but drove straight back to town and into the garage.

When Mr. Roche came down again it was all over and no one was very interested in what he was shouting about, while Gendebien said in all honesty, " Why no Mr. Roche, I've been in the swimming pool all afternoon," and Gurney smiled and said, " No, I haven't sat in a Ferrari since yesterday." All was forgiven when Brooks led from start to finish, and won yet another French G.P. for Ferrari, and proved that though the Dino 246 was not the best all-round car of 1959 it was undoubtedly the fastest on maximum speed, and the Ferrari claims of 280 b.h.p. from their V6 engine were not so outrageous as many people thought. As confirmation of this Phil Hill finished 2nd, and in passing it is worth noting that this was Gurney's first Formula 1 event and he was lying 7th until a stone through his radiator put him out of the race.

This business of driving racing cars on the public roads amongst the traffic is one of the nice things about Continental motor racing and part of the freedom that one misses in England. The same thing applies to motorcycle racing, and I still recall how I rode my Manx Norton, in racing trim, from Ostende to Mettet in Southern Belgium, right through the centre of Bruxelles and no-one said a word. Even had anyone protested I don't suppose I'd have heard them above the noise of my open exhaust. That was in 1948, and I remember how, with amazement, I overtook a tram in Bruxelles, the driver of which was standing on the side of the platform relieving himself into the road while the tram careered downhill under its own guidance. The Continent was certainly free in those days, and still is, even though it has become a little more respectable in many ways. One English friend of mine who spent the whole summer racing motorcycles in Europe always rode his racing Moto-Guzzi from his garage to the circuit, it being the normal thing to do. At the end of the season he brought two Belgian riders with him to England to race at Ansty Aerodrome near Coventry, and they stayed in that town. On the morning of the meeting they donned their leathers, got the motorcycles from the garage and rode out to the aerodrome, some miles out of town. It was not until they arrived in the paddock that my friend realised what they had done and he then went very pale, while the Belgians just did not understand what was wrong and were all for riding home again after the meeting. However, the arm of the law was not stretched as someone lent them a van.

While the law in England strictly forbids driving a racing vehicle on the roads unless it complies with the Roads Traffic Acts, and no Grand Prix car can do that, this does not mean that F.1 cars are never seen on English highways. While it would be tactless to say what has been seen there is a splendid piece of double-track roads outside the Vanwall factory, and down Surbiton way the police are very forgiving, while

the new Lotus factory being on the Industrial Estate at Cheshunt is a great help to Grand Prix racing. Quite recently I saw a very fine length of colour film of a potent single-seater racing car on test along a leafy country lane, but all this sort of thing is not encouraged by English law, which not only makes things difficult for anyone operating a racing car, but detracts a great deal from the pleasure of the public who enjoy motor racing, and nowadays that public is quite a large proportion of the population.

A few years ago Enzo Ferrari was busy making his annual announcement about withdrawing all his cars from racing and going to live in a monastery as there was nothing left in life for him, and on this particular occasion he was being taken pretty seriously by the daily newspapers. Speculation was rife as to whether it was the end of the Scuderia Ferrari and the Press room at Monza after the Italian Grand Prix was humming with stories from people who really knew the answer, and who had had personal interviews and so on. While the world was reading about the end of Ferrari racing on Monday morning I was motoring along the road between Modena and Maranello, and on the long straight which leads into Maranello village there were little groups of locals standing well back on the grass verge. I pulled into the side of the road and very soon there was a shattering roar and the head mechanic of the Scuderia Ferrari went by at about 130 m.p.h. in a Super Squalo Grand Prix Ferrari. Shortly he was back again, and by the way he was belting up and down this long straight he was not doing it just to have the wind blowing through his hair. There was no need to call at the factory to see if they had withdrawn from racing, or to go on reading the papers; I merely went on my way towards the next race on the calendar satisfied in the knowledge that the Scuderia Ferrari would be there.

You will often see a Ferrari with the letters MO 31 painted on the tail as this is the Scuderia Trade Plate number, and indicates that the car has been out on test on the open road, while more than one English racing car has been driven on the public highway with a Trade Plate tied on the tail. There was one classic occasion when I drove a works single-seater on the road with a Trade Plate on the front to appease the law, our line of defence being that the laws of Trade Plates state clearly that the driver should be a member of the firm, " unless the vehicle is constructed for the carriage of only one person." Of course, the law writers had in mind invalid carriages or tractors, but looking at the slim single-seater in question there was no doubt that it could only carry one person. Similarly, the lack of mudguards was covered by the clause " not to throw mud on other users of the highway." As the roads were quite dry and there was no mud to throw, we reckoned we could argue our way out of that one; but if the open exhaust was queried then we'd had it. Luck was on our side and the arm of the law was never encountered. Anywhere else in Europe there is no need for this sort of chicanery, you just get in your Grand Prix

car and drive away, and invariably you will find that the police give the racing cars preference where traffic is concerned. It is no unusual thing to be in a stream of traffic returning from a practice session and to have some of the racing cars go by, waved through by the police, who urge them to use the wrong side of the road. Of course, there are snags to this sort of freedom, especially when a member of the motoring public gets in the way and there is a slight rending of metal, for insurance companies often refuse to pay up. Due to this lack of cover by insurance companies you will never see the works Coopers on the open road at a Continental race meeting, but any of the others may overtake you on your way to and from the circuit.

Another aspect of this freedom on the Continent, as far as racing is concerned, is that of noise, for if you run a racing engine in England you stand a good chance of having someone complaining to the police, so that you have to be very careful where you site your test-beds. In Italy, for example, the situation is completely different, and during 1957 when the Maserati factory were trying to sort out their V12-cylindered Grand Prix engine Modena used to ring to the high-pitched scream of the open exhausts as an engine was given endurance tests at all times of the night and day. I can well remember being woken up at 5 a.m., while sleeping at the Albergo Reale, by the noise of the V12 on test, and it is getting on for one mile between the hotel and the factory. That particular season I spent quite a lot of time at the Maserati factory, and the sound of that V12 engine on test was wonderful, for it would run to over 10,000 r.p.m. and you would frequently hear it being held at that speed for minutes at a time, until you were certain it must fly into a thousand pieces. Then, with a suddeness that almost hurt the ear drums, the noise would stop as the twelve throttles were snapped shut and before you were accustomed to the silence the engine would be snapped back on full throttle again. The Maserati engineers did all they could to try and break that engine, but it seldom gave trouble, and developed well over 300 b.h.p., but unfortunately they were so obsessed with maximum r.p.m. and maximum b.h.p. that they lost sight of the importance of torque and flexibility, two factors which Coventry-Climax were working on at the time. The result was that when the V12 Maserati engine was put into a modified 250F chassis it was a most difficult car to drive. At Monaco that year Fangio drove it in practice and mastered it on the hairpin by taking the corner with the clutch pedal depressed and the engine running at 7-8,000 r.p.m. and having rounded the hairpin he then let the clutch in with a bang and shot off up the road. It was most spectacular to watch but not as fast as the six-cylinder Maserati, which could be driven round the hairpin on power. The other team drivers tried the car but could not master the Fangio technique, with the result that they left the hairpin with the clutch fully home and the r.p.m. down to 2,500-3,000 r.p.m., at which the engine was flatter than the proverbial pancake. The car would stagger away from the corner going " splat,

splat, burp, burp " until it gained a few thousand more r.p.m., and then all hell broke loose as it screamed up from 7,000-11,000 r.p.m. with a wild shriek. To make matters worse the engine development department of Maserati fitted the car with short exhaust pipes ending in megaphones which made this sudden step in the power curve even more pronounced. That V12 Maserati, although a mechanical joy to see and hear was never a success, though it went very well at Monza at the end of the season when Jean Behra drove it, keeping up with the leaders until it began to overheat.

The season of 1957 was a very exciting one for the inhabitants of Modena, for if the V12 was not on test the V8 sports-car engine could be heard, and as this was a 4½-litre racing engine which developed nearly 400 b.h.p. the noise that came from the test house could be well imagined. The times I have been in the test-house when that monster was turning over at 7,000 r.p.m. are memorable, for the whole building was vibrating and you could feel the concrete floor trembling. The chief engine tester, who is now working at Weber carburetters since Maserati withdrew from Grand Prix racing, was grey haired and trembled slightly, which I never thought very surprising after watching him working one week on the V12 Grand Prix engine running at 10,500 r.p.m. with an ear-splitting scream and the next week on the 4½-litre V8 sports-car engine bellowing out its noise at a healthy 7,000 r.p.m. Now and then he would test a 5-litre version of the V8 which was destined for an Italian speed-boat, which made a Grand Prix car look like a child's toy, but that was a form of mechanical sport that I never got very familiar with.

One of the sights in practice for a Grand Prix that always gives me a thrill is to watch one of the top drivers setting off from the pits in a Grand Prix car, and as he accelerates violently away in 2nd gear he will nonchalantly let go of the steering wheel and adjust the strap of his goggles, or pull them down off his helmet. A factory Formula 1 car accelerates smartly in the lower gears, and you or I, if we drove away from the pits, would be tending to hold onto the steering wheel, but the ace Grand Prix driver is so used to violent acceleration that he takes it all in his stride and has such good feel of the car through his feet and seat, as well as his vision, that he can happily aim the car away up the track and then let the car steer itself while he gets comfortable. Of course, this sort of thing doesn't happen in a race, and you will see the driver all set and ready to go racing at 10 seconds before the flag falls.

Another sight that I always enjoy is to see a Grand Prix car spinning its driving wheels, either getting away from the pits or at the start of a race. With a Grand Prix car the driver needs to spin the wheels a little when he starts off as a racing engine needs to be revving pretty high before it functions properly, and as there is a mechanical limit to the lowness of bottom gear, he can make up for this by letting the wheels spin and controlling the amount of spin by careful use of the

accelerator pedal. Sometimes a driver will overdo the amount of spin at the start of a race and then the car will sit there helplessly, hardly moving forward at all, until he eases his right foot and then when the tyres bite it will really shoot forward, but this is not the best method, though occasionally a really clever driver will get the wheels spinning furiously while the flag is still raised and then as it falls he will reduce the spin and shriek away. If he doesn't do this perfectly it will result in the car creeping forward too soon, or stopping completely when he lifts his foot, due to the tyres biting too much, and thus he risks stalling the engine. There have been many perfect starts in Grand Prix racing and the ideal is to provoke sufficient spin to leave a black mark but not enough to cause blue rubber smoke to appear. I shall never forget experiencing acceleration from a standing start that was probably as great as anyone has known as a passenger, and that was in a 4½-litre V8 Maserati sports car with Stirling Moss. We were doing some tests prior to the 1957 Mille Miglia, early one morning on the *via Emilia*, and we did a start from rest and accelerated up to 160 m.p.h. As we got away I looked over the tail and watched fascinated, as at first grey lines appeared on the dry road from the rear tyres and then, as we gathered speed, they changed their colour from light grey to black in a gradual darkening that got more intense as the V8 engine approached 7,000 r.p.m. in 1st gear, and then this phenomenon was repeated over again in 2nd, 3rd, 4th and 5th gears, and the rubber marks left by the tyres disappeared into the distance behind us. Oddly enough I did not get such a sensation of acceleration on that occasion as I did when I was looking through the windscreen, for I was so intent on watching the marks from the spinning tyres appear on the road. A little while later we tried the car out again on an *Autostrada*, going westwards from Brescia, and on turning round we had a clear run all the way back and accelerated from rest right up to peak revs in all five gears and then snicked into our special overdrive two-speed gear that gave us 170 m.p.h. maximum. That was the most superb piece of pure straight-line acceleration I have ever experienced, and as Moss changed gear at 7,000 r.p.m. and we surged on, it seemed that the acceleration was almost constant from 0-170 m.p.h. We held maximum for a mile or two and then braked heavily to a stop at the end of the *Autostrada*, where the Maserati mechanics were waiting for us. When the car reached peak revs in the overdrive 5th gear we both grinned at each other and as we came to rest we shook hands in glee, for until you have experienced acceleration like that you just don't know about motoring. It's quite beside the point, but after stopping at the *Autostrada* terminus the car was put away ready for the Mille Miglia, and until we started in the race the brakes were not used again. On the second application of the brakes from high speed, a few miles after the start, the brake pedal snapped clean off ! I still have a quizzical look on my face when I think about that, for had we been on the *Autostrada* earlier than we were I am sure we should have made another run out-

and-back just for the sheer thrill of accelerating like that, and if we had we should have gone through the buildings at the end of the *Autostrada* at about 150 m.p.h. and I would not have been able to write this book.

However, I was discussing spinning wheels, and particularly those occasions when Grand Prix cars have spun their wheels and provided a fine sight and sound. I have already mentioned the V12-cylinder Maserati and the glorious noise it made, and on the only occasion that it really went well in a race Jean Behra was driving it. This was at Monza in the Italian Grand Prix and after a time he had to stop for fuel and new rear tyres, for odd though it may seem the only way to control that car on corners was to set it up in a slide with the rear wheels spinning, and control its direction with the throttle. Only by keeping the revs up around the 8-9,000 mark could the engine be kept running properly and this amount of power meant that the wheels spun all too easily, so the only thing to do was to spin them deliberately, but the price to pay was rapid tyre wear. Behra was doing his utmost to keep up with the leaders and to prove to himself and the Maserati engineers that the V12 was a promising car, and after having new rear tyres fitted at his pit stop he took off from the pits in a most spectacular fashion. The object was to spin the wheels sufficiently to scrub the surface rubber of the tyres on the rough track near the pits, so that the " shine " could be removed before he reached the first corner. This is a trick that most top drivers do when setting off again into a race with new tyres, if they are in a real hurry, though it has to be done with a certain amount of caution for a car with spinning rear wheels can very easily get completely out of control. Behra took off in the V12 in one of the most wonderful blazes of sight and sound that you could wish to see, the rear wheels pouring out rubber smoke and the Maserati exhausts screaming to the heavens. Unfortunately, he overdid the loud pedal a bit and got the combination of wheelspin and throttle opening to such a state that it was a long time before he got things under control properly, but it was a wonderful sight.

During practice one year at Monza the Ferrari team were worried about clutch centres tearing out so the drivers were given instructions to leave the pits on practice laps in the same manner as if they were starting the race. In that way any weaknesses in the clutches would show up while there was still time to do something about it. Most drivers set off from the pits fairly cautiously during practice, looking over their shoulder, or into their mirrors, to see if all is clear before pulling out onto the circuit. On this occasion you would see a Ferrari driver take a good look down the track to make sure no one was coming, and then " Yeeee-ow " away they would rocket, causing quite a few people in the pit area to leap smartly in the air, especially any " troublesome " officials or policemen, and the black marks on the road were splendid to behold. At one point, forgetting about this " testing " I was conscious of a Ferrari passing me a bit close, with the driver making a rude sign at me, and looking down I saw a wheelspin

mark about four inches from my heel ! I think wheelspin is great fun, especially when done for a purpose and skilfully at that.

Of all the aspects of a Grand Prix motor race the one which never fails to excite me is the start, especially during the last five or ten seconds before the flag falls, for then the tension is at its highest. All the cars have their engines running, the drivers are concentrating on the starter's raised flag, engine revs are raised, clutches start gripping, and the air is full of exhaust smoke and hot engine fumes, while invariably there are race officials on the edge of the track who think someone is starting to move too soon and there is a lot of waving and gesticulating. As the flag falls the starting area becomes chaotic as all hell is let loose, for with perhaps as many as 20 Grand Prix cars on the grid, with twenty drivers eager to be first away, the moment of flag fall is usually pretty stupendous. Exhaust notes scream, wheels spin, there is smoke from engines and tyres, and everyone stands well back, for once the roaring pack has been released nothing on earth can stop them. In this uncontrolled initial rush of a Grand Prix start which is particularly enthralling, for there might be as much as 5,000 horsepower being let loose as 20 Grand Prix cars take off together, and any one vehicle with that much horsepower could not help but be exciting to watch getting under way. During the first few yards of a Grand Prix race the whole field of cars moves as one vehicle, so that it is easy to get the feeling of watching a machine with 5,000 horsepower being let loose. Even if there were some way of deciding whether there was such a thing as a false-start to a Grand Prix race it would be quite impossible to stop the massed Grand Prix " machine " once it is under way for at least 200 yards, so that the initial rush off the starting line makes me conscious of the uncontrolled force behind the cars, every time I see a Grand Prix start.

If all goes well and the whole field gets away together, quickly stringing out as acceleration and gear-changing come into play, there is always a sigh of relief from all those people around the start area, especially the organisers, and as the noise of the cars disappears into the distance you will hear the words " A splendid start " and know that everyone is relieved. However, quite often the start will develop into a shambles, and once this deterioration has started it is almost impossible to prevent it developing, and certainly impossible to obtain order once again. This can be started by one driver letting in his clutch too soon, and jumping the start, and in doing so encouraging other drivers to follow him. When you are sitting on the start line nervous and physical tension is very strained, completely deafened by the noise of the engines and exhaust, only able to tell if your own engine is running by the vibration and what the rev-counter is indicating, watching the water temperature, the starter's flag, the other drivers, and the road ahead all at the same time, as well as holding the clutch pedal down until your left leg is beginning to tremble, and at the same time mentally counting off the last five seconds. If in

the middle of all this the car to one side of you starts to creep forward, it requires untold will power to sit there and not creep up level with him. Similarly, if you have been shown a 10 seconds to go signal and have counted-down you begin to twitch if the flag doesn't fall immediately, and often with a local dignitary doing the actual flag dropping, he will lag a second or two behind the timekeeper's clock, so that the drivers will start lifting their clutch foot only to find the flag is still raised. When it finally falls the hardest part begins, for the driver must spin the wheels slightly, to avoid stalling the engine by a sudden load, he must have the engine revs high enough to absorb this loading, but not too high or uncontrollable wheelspin will start, and once the initial move has been made he must extract every ounce of acceleration from the car, for every driver has the urge to get to the first corner before everyone else.

Over the years of Grand Prix racing there have been some truly wonderful starts, especially at Monza, where the track is flat and wide with a long straight to the first bend, and from the big grandstand you can get an almost birds-eye view of the whole field straining to outdo each other on acceleration away up the straight, and the noise echoes between the vast cantilever concrete roof of the stand and the concrete pits, so that one can really feel a vast mechanised machine being let loose. Equally there have been some really chaotic starts, notable at Reims, where tubby Mr. Raymond Roche seems to make every effort to foul up the start of any Grand Prix. Here the road is narrow, and uphill slightly, so that drivers have to allow that little bit more for the initial load coming on the engine. The classic of all time was surely in 1957 when Mr. Roche was actually standing in the middle of the road when he inadvertently waved his starter's flag, and had he not run as fast as his little legs would carry him he would have been completely flattened by the whole screaming mob that he let loose. As it was Jean Behra had to lift off completely, to avoid running over the starter. There had been so much yelling and shouting and waving of arms prior to the start, clearing mechanics off the grid, and moving photographers back, that one of Roche's waving movements to a photographer was taken to be the starting signal, and as everyone was very tense, they all shot off together, before he really meant them to.

This is just one way a start can get chaotic, another way is when the reverse happens and the starter and timekeeper are not in step and the starter does not drop the flag when he should. This happened at Spa in 1958 and could well have affected the result of the race, for the signal was given that there were two minutes to go, and when team managers had counted off a further minute on their watches they signalled for the engines to be started. From the time the 2 minutes signal had been given there now remained barely 50 seconds, which is quite long enough to keep a hot racing engine blipping on the line. Just when the start should have been given the starter indicated that there was

another minute to go, because either he was not ready, or had made a mistake in saying 2 minutes to go. This 60 seconds ticked by and meanwhile one of the cars at the back of the grid was still being pushed up and down in an endeavour to start the engine. Once more all the drivers prepared to start, but seeing one of the cars still did not have its engine running the starter and timekeeper, who were standing on the start line, decided to wait for a further minute. By now the whole start area was in complete chaos, for engines were boiling, exhausts were smoking and drivers were getting frantic. Everyone was yelling and shouting and waving, and the poor Ferrari mechanics and team manager were nearly in tears for Peter Collins' car was so hot that the radiator was blowing out steam and the heat from the exhaust manifold was blistering the paint on the bonnet. This starting area is on a downhill slope, so that drivers were having to hold their cars back on the handbrakes, and they were all getting very jumpy and nervous and some were beginning to creep forward in sheer desperation. To delay a start a few seconds is permissible, but two whole minutes is just out of the question, for the nervous system just cannot stand that sort of tension for that long. With ten seconds of the last minute still to go the starter panicked and dropped the flag, much against the wishes of the timekeeper who was still studying his chronometer. After all this pandemonium it was not surprising that Hawthorn and Musso completely muffed their starts and nearly stalled their engines. The unheard of delay had caused Collins' engine to overheat badly, so that oil temperature and water temperature were both in the danger zone, and even when he got under way the oil was so hot that the pumps could not generate sufficient pressure and after only a few laps he had to retire before the engine broke. On the very last lap of the race, literally as he crossed the finishing line into 2nd place, Mike Hawthorn's Ferrari engine burst in a spectacular way, stopping in a cloud of steam and smoke, and almost certainly this damage was started by the overheating on the starting line. Not having self-starters, once the engine is started the driver must keep it running, for if any of them had switched off during the delay the chaos would have been even worse, and no-one, least of all the drivers, knew exactly when the flag would be dropped, so they all had to go on running the engines which were getting hotter and hotter.

In a Grand Prix race the starter is a very important figure and it really should not be allowed for this task to be performed by someone unqualified, as so often happens, for a popular thing to do is to get some well-known figure attending the race to perform the ceremony of starting the race. Unless he is well controlled by responsible officials this can lead to chaos, and a responsible official must know when to take the initiative and let the cars go, or hold them back, contrary to the timekeeper's instructions. If one of the cars has not been started he must decide very quickly whether he is justified in holding up the start a few seconds or not, and equally if " creeping " begins he must be

able to weigh up immediately whether it is serious, and let the cars go before their time, or whether he can wait a few seconds longer and dissipate the " creeping."

At Porto in 1960, for the Grand Prix of Portugal, one of the best bits of start " creeping " took place, luckily without serious results, for Graham Hill began to edge forward from the second row until he was between two of the cars on the front row, whereupon the three cars in the front row began to edge forward with him. Meanwhile the starter still had his flag raised, and many of the cars at the back of the grid were moving forward. Eventually there were four cars all level in the front row and all four were over a car length beyond the starting line, and still the starter was keeping his flag raised for the final seconds, and the four drivers in the front row were almost having to look over their shoulders to see him. Finally he dropped the flag and everyone rushed off, and no harm was done, but there was a case where a clued-up starter would have started the race 10 or even 15 seconds earlier than he should have done, as the " creeping " had got out of control, and you can't make the cars move back into place once they have crept forward! In order to restrain drivers from jumping the start of a race there is a rule which permits the organisers to penalise a driver one minute if he jumps the start, and though this has been done in minor events, it has never been enforced in a big Grand Prix race, for it would be a brave man who would penalise Moss or Brabham in a World Championship race. Anyway, when you get all the top Grand Prix drivers on a starting grid, if one jumps the start they all will, so it is impossible to pick on any one driver.

While chaotic starts usually only result in frayed nerves or loss of temper, they can sometimes become more serious, and in 1960 at Reims there was a frightful shambles as the flag fell, which luckily resulted only in bent motor cars. Once again Mr. Roche was in charge and he made it very clear before the start that after the 30 seconds to go signal had been given he was going to drop the flag at any time between then and zero seconds. He thought that by doing that he would discourage any driver from anticipating the start. However, as the drivers had to be ready to let in the clutch at any point in the count-down from 30 seconds, it meant putting the cars into gear before the 30-second signal. Usually 15 seconds is ample time at which to engage a gear, while some drivers will wait as low as 5 seconds, depending on the quality of the starter. In the flap of the Reims start, Graham Hill, once again, who was on the front row this time, was having trouble getting into gear, and when Roche dropped the flag at the 28-second mark, just 2 seconds after the last time indication, Hill was not ready to go, but everyone else was. The result was that Hill's B.R.M. was badly bent about the rear suspension and was out of the race, and Trintignant's Cooper was too badly bent to continue, while two other cars spun round and others were bumped.

Possibly the most frightening start of all the Grand Prix circuits

is that at Monaco, where only a few hundred yards from the starting line there is a 180-degree right-hand hairpin bend. The pushing and shoving that goes on at that hairpin immediately after the start is horrifying and caused Connaughts and Vanwall to fit special bumper bars to their radiators for the 1957 race, as well as fitting shortened nose cowlings, as did Ferrari, for previously too many cars had suffered from crumpled noses due to ramming other people's tails.

A very funny start was the 1957 French Grand Prix at Rouen, where the French organisers enforced a rule that all cars should be started on the grid by means of a portable electric starter, and no push-starting would be allowed. The road is not very wide at Rouen and the cars were lined up pretty close to one another, so that there was an awful mess of starter motors, battery trolleys and cables all over the place, with mechanics from rival teams getting in each other's way. With the cars of each team spread throughout the field the mechanics had to rush madly from one car to the next, carrying starters and batteries and, of course, they started their leading cars first, so that by the time the flag was due to fall they were still on their way to those cars at the back of the grid. When the start was due to be given the back of the grid was still a seething, struggling mass of mechanics and portable starter mechanisms, so the starter wisely held up the start for a few seconds. As time went by and the back of the grid cleared the cars at the front were beginning to move, for the drivers were totally unaware of the chaos behind them, and by sheer chance the starter lowered his flag just as the front row decided to jump the start together and roar off into the race. To be mixed up in one of these chaotic starts must be terrible, and the poor suffering mechanics and nervous drivers have my deepest sympathy, while I would hate to have the responsibility of the organisers, but to sit in the comfort and safety of the Press Tribune and watch all this with a distant and detached air is great fun, and most times extremely exciting. In fact, even when I may be looking my most bored at a Grand Prix race, I am really enjoying myself, because there is so much going on at all times that you can never tell when boredom is going to be rudely shattered by a sight or sound that can only come from Grand Prix racing and I could not bear to miss any of them, which is why I invariably stay to the bitter end where Grand Prix cars are concerned, long after many of the keener-types have gone away.

11

In Memoriam

UNFORTUNATELY SPACE and economics prevents me from putting all I would like into this book, but before bringing its pages to a close I feel I must put on record a few impressions of some of the drivers who took part in the 1954-60 period of Grand Prix racing, and who are no longer with us. Although a great many drivers who raced during those years were killed in racing, there were not a great number who were killed in Grand Prix racing, for statistically sports-car racing has claimed many more victims than Formula 1 racing. This is not necessarily because sports cars are more dangerous than racing cars, nor that they are more difficult to drive, but there are many more people racing with sports cars than with Grand Prix cars, and a driver seldom gets a seat in a Grand Prix car until he is very proficient in the art of motor racing, whereas sports-car racing is very much a nursery ground on which to train before going on to the High School of Grand Prix racing, so that naturally the average of skill among an entry of Grand Prix drivers is bound to be much higher than that among a similar entry of sports-car drivers.

Being so close to Grand Prix racing I unfortunately find myself too close to accidents and their effects and if a driver loses his life one has to accept the fact as part of the life of Grand Prix racing and keep a sensible outlook on the matter, especially if the driver happens to have been an exceptionally good friend, as has happened more than once. Of all the deaths that have occurred in Grand Prix racing the one that caused more visible suffering among us all in the pits than I thought possible, was when young Onofre Marimon was killed at Nurburgring while practising for the 1954 German Grand Prix. A most likeable and happy boy was Marimon, and a good idea of his character can be gained from the fact that he was nicknamed " Pinocchio," and when the news of his death got back to the pits no-one made any attempt to conceal their emotions, for it was not possible for anyone that had known him. Even now, after so many years, I feel very sad when I recall that black day at the Nurburgring, for his happy personality was so much part of the Grand Prix " circus."

Knowing all the great drivers of the Grand Prix world meant that I got to know them as individuals as well as great names and artists, and all of them have left an impression with me, so that though many of them are no longer with us at least I have the satisfaction of being able to recall pleasant memories from which to remember them, for

anyone who climbs up the Grand Prix ladder of success is no ordinary mortal and each one is a personality in his own right and an individualist, for if he was not it is unlikely that he would have ever got involved in the whirlpool of motor racing. Though they may leave that whirlpool with a suddenness that is almost unbearable for those who remain watching, everyone realises that that possibility is always with us.

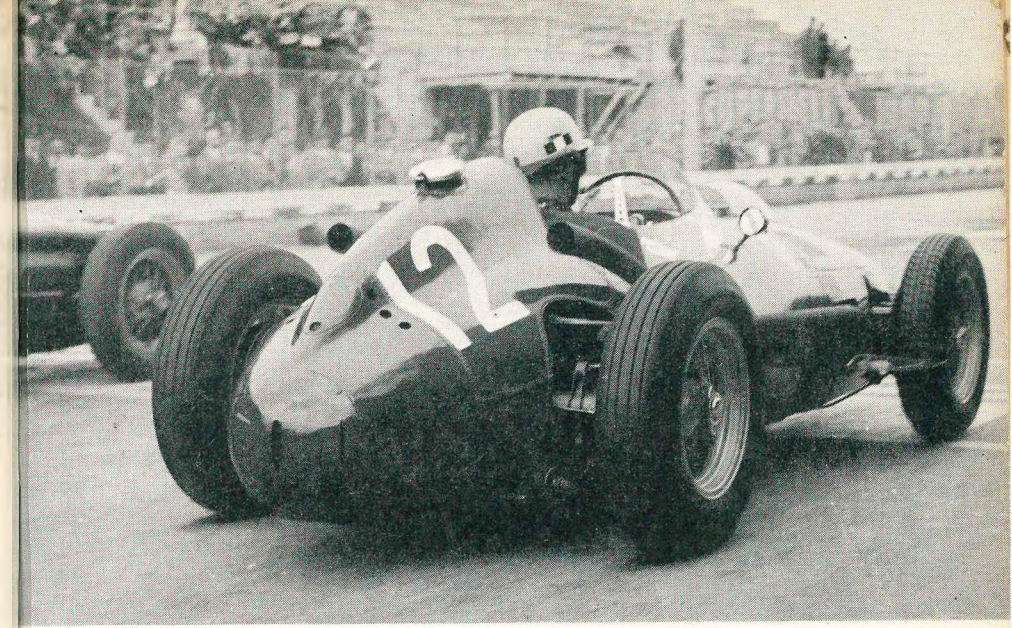
The one thing I always liked and admired Mike Hawthorn for was his genuine love for motor cars and mechanical things, not because they were part of his trade or profession, but purely and simply for the enjoyment he got from them. He often used to say, " Racing is all very well, and great fun, but it's getting too damned serious," and on a number of occasions at foreign racing circuits, at Morocco or in Sicily, or some such place, he would say, " I'll be glad to get back to Farnham, for I really do enjoy just messing about with cars, perhaps selling a Jaguar to someone or trying something out. I don't really like this foreign travelling." That he really meant these things I know only too well, for I lived just over the hill from his Farnham motor showrooms, and often during the winter months I would drop in as I was passing, not to talk journalistic " shop " or scandal, for Mike hated that, but just to talk cars with him.

One day I called in on a B.M.W. motorcycle and as soon as Mike saw it he said, " Can I have a go, I've never riddden a Bee-Emm?" and he soon went flying up the road on it. Later when I flooded its carburetters accidentally and it would not go on the kickstart, Mike said, " Come on, push it, you get on and I'll push," and he was obviously so happy just messing about with mechanical things just like any other motoring enthusiast, and these were in the days when he was a Scuderia Ferrari team driver. On another occasion, when he was already World Champion, I called in to see him in an old 1932 Alfa-Romeo sports car, which was in actual fact a sister team car to the one he had inherited from his father and which is now in the Beaulieu Museum. When he saw it he bubbled over with enthusiasm, comparing the details of the two cars and getting his out so that we could photograph them together. Then, as always, the inevitable, " Can I have a go in it?" and away he went driving the old Alfa as though he had driven it all his life; he came back overjoyed, for he was convinced that his particular Alfa-Romeo was faster but the one I had borrowed to show him had a much nicer gearbox. If I had taken the very latest Aston Martin or Maserati over to show him, I am sure he could not have been more enthusiastic or happy, and that was the great thing about Hawthorn, he was happy to be in good motor cars and enjoyed driving for its own sake. Anyone who was at Le Mans in 1958 will recall that on the Friday before the race a regularity run was staged for Le Mans cars of the past, and Mike was there, with his cap and his pipe, and drove a 3-litre Bentley. He was not doing it for personal gain, he just liked those sort of cars and enjoyed having fun.

The years of the past Formula 1 racing will always bring happy memories to me of the first Englishman to become World Champion, a truly fitting personality to take over such a position. Having followed his career at close quarters from his first drive with the Scuderia Ferrari to his last, when he was crowned World Champion I was never more happy than when he achieved the ultimate aim of every Grand Prix driver. That he died so soon after achieving this pinnacle is tragic indeed, but more tragic was that it was the death of a real motoring enthusiast who had enjoyed living.

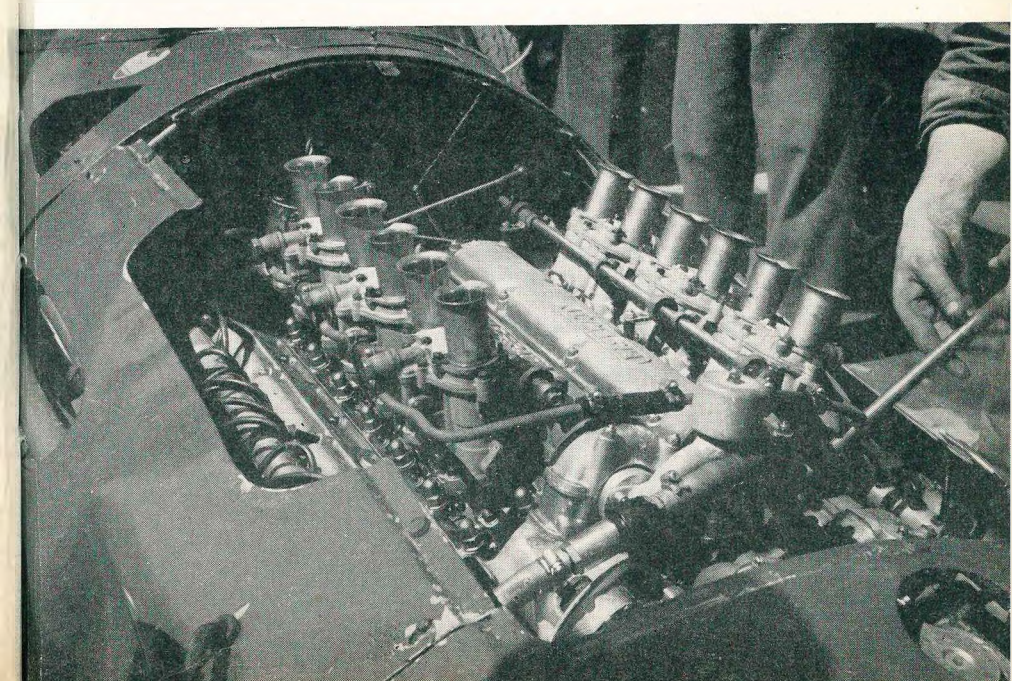
It was not only at the race tracks, or in the paddock that one met these happy and likeable characters, and often in my travels my path would cross one of theirs, such as when I was driving my Porsche up to Aintree for the 1957 British Grand Prix, and on a stretch of road north of Kidderminster I came up behind a big articulated lorry. The road was winding at this point so I could not get by, but at every opportunity I would nip out to have a look to see if there was any hope of getting by, and obviously the driver had seen the blue Porsche in his mirror. Eventually the road straightened out a bit and I flashed my headlights and began to accelerate past the trailer part of the lorry. An arm came out of the cab and waved me on, but not in the normal courteous way we are told lorry drivers wave-on fast cars, but in that well-known fashion employed by local van-drivers, which to people coming the other way looks like a V for victory sign. I was just thinking " rude lorry driver " and deciding to carve in close as I went by, when I drew level with the cab and looking up I saw Peter Collins at the wheel, roaring with laughter and continuing to wave derisively. We stopped a short distance further on and had a natter, and it seemed that his father wanted this new articulated truck delivered to Liverpool, and Peter was going to Aintree to race, so what better than to use it to go up to practise and then take it to its new owner. Later that day I saw Peter in his articulated lorry once again, this time at one of the Aintree gates trying to convince a commissionaire that he was a competitor and that his competitor's pass allowed him to take a lorry into the " Lawn " car park. He was another racing driver who enjoyed life, took it as it came and made the most of it, having fun and yet capable of being as serious as the next man when the occasion called for it.

In Siracusa one evening I went to a little harbour front restaurant with Luigi Musso and Carroll Shelby to have supper the way the natives do, on bare board tables with spaghetti and sea food washed down with rough red vino from bottles that had never seen a label or a storage cellar. While waiting for the spaghetti to be cooked Musso explained that one reason he did not enjoy visiting England was that restaurant habits were so different, and that in Italy things were placed on the table prior to the arrival of the meal for a definite purpose. There was a bowl of typical crusty Italian bread and a little glass full of tooth-picks in the centre of the table, together with the usual collec-



Wheelspin. Luigi Musso getting away in a perfect start with just enough wheelspin to keep the engine revving, yet not too much so that forward motion is lost.

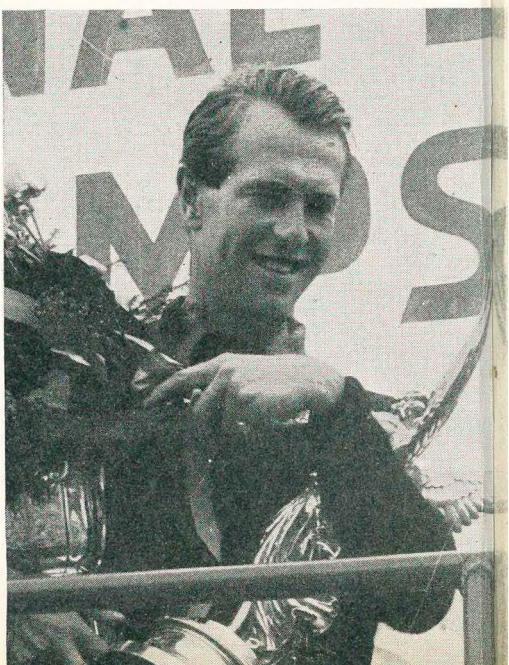
Noise Machine. The fantastic V12-cylindered Maserati engine that enlivened Grand Prix racing so much in 1957. The double-choke Weber carburetters are mounted between the camshafts of each bank of six cylinders.



Drivers at Play. Alberto Ascari telling a tale to Hawthorn and Moss at Monaco in 1955, prior to the race. Note the racing-dress styles of the three drivers.

Serious Italian. Luigi Musso having a discussion with the Scuderia Ferrari team manager, Romolo Tavoni, and chief engine man, Cav. Bazzi.

Happy Englishman. Peter Collins looking delighted with his arms full of cups and flowers, after winning the 1956 Belgian Grand Prix.



tion of salt and pepper and wine glasses. While remarking that in England we did not have nice crusty bread in restaurants, Musso was breaking up a piece of bread and nibbling at it, and went on to say that if you did not smoke at the meal table, like Americans, you had to do something while waiting and what was nicer than nibbling at bread crusts, in order to get your jaws loosened up and your digestive system working in readiness for the forthcoming meal. Then he went on to show Shelby and me how you could pass the time by using the toothpicks for almost anything except picking your teeth, and he demonstrated an enormous number of little games and tricks played with those flat and light toothpicks that will practically float on air and certainly can be made to glide most gracefully. These tricks varied from competitions, through guessing games to artistic construction and perfect balance, and by the time he had gone through his whole repertoire and we had attempted some of the tricks, the spaghetti had arrived, hot and steaming, well-cooked and soft and light, and Luigi then proceeded to demonstrate the many varied ways in which spaghetti can be eaten. " In Italy," he said, " we enjoy not only our food and our wine, but the whole question of mealtime, for it is a time for relaxing, but you in England you seem to make a hardship of eating and when I am there I must sit and twiddle my thumbs while I wait for the food to be prepared." At this point Shelby remarked drily, " Boy, you should come to the States, it don't take no time at all to open a can of beans."

However, for me the most memorable recollection I have of Luigi Musso was when I saw him racing at Monza carrying the whole honour of the Italian racing world on his shoulders. It was not in a Grand Prix, but in the 1958 Monza 500-Mile race, when Ferrari built a special single-seater 4.1-litre car for this race round the banked track. Everyone knew that this car was more than the equal of the American Indianapolis machines and the way Musso drove that car was truly magnificent and if I never see another motor race I shall always be content that I saw the first 25 laps of the opening heat, for Musso drove that big Ferrari like a man possessed, fighting wheel to wheel with the best of the Indianapolis boys, and on one lap when he and his two rivals were lapping two slower cars, all five of them were simultaneously lapping three really slow cars, so that there were eight cars coming off the banking and roaring down the wide straight past the grandstands, at speeds ranging from 180 m.p.h. to 160 m.p.h. Sheer force of circumstances had put Musso on the inside position and without lifting his foot he took the Ferrari down the straight only a few feet from the pit counters, throwing up clouds of dust and as the whole melee reached the end of the straight he was past the lot of them and swooped back on to the South banking in the lead once more. It was a most wonderful exhibition of sheer guts and bravery, allied with an almost fanatical patriotism, for Musso was a true Italian who believed not only in Italian supremacy in racing but also in Italian pride

and honour, and though he was racing for his own pleasure, deep down he was doing his best for the honour of his country. Until he was overcome by fumes and had to hand over to his co-drivers, Musso really gave the Indianapolis track specialists something to think about with that big Ferrari, and it was the Americans who gave him the greatest credit when they said afterwards, " Man, that Musso, he's a racer." It was just one week later that poor Luigi lost his life at Reims, in the Grand Prix of France, still driving a Ferrari endeavouring to keep station with his team leader, the brilliant Mike Hawthorn, Musso lost control and went off the road on the very fast bend after the pits and died from his injuries.

Often I get the opportunity of enjoying a relaxing evening after a race with some of the drivers and getting to know them as something different from cool, calculating robots controlling a piece of intricate mechanism, and one such evening was a pleasant dinner party at Naples in 1955 after the Lancia team had been victorious, and the President called upon Ascari, as the winner, to make a little speech on behalf of the drivers. He got up, looked around and said, " It would be presumptuous of me to make a speech tonight when we have with us that Grand Maestro of motor racing, Luigi Villoresi. I feel he should make the speech." Grey-haired and elegant, Villoresi stood up removed his spectacles and quick as a flash said, " Oh, no, I couldn't think of doing that while we have the rising star of the Lancia team with us—I call on Eugenio Castellotti." The beautifully-groomed and handsome young Castellotti rose, looking rather embarrassed and said simply, " I did not compete today, but Luigi Musso did, and he too is a rising star, so I ask Luigi to make the speech." Musso reluctantly stood up and cast around in vain for someone to pass-the-buck to and it seemed a deadlock had been reached but then his eyes twinkled above his strong Roman nose and he said, " Gentlemen, we are not being polite, we have with us tonight a driver from a foreign country, who is our guest and it is only correct that we should ask him to speak on behalf of the drivers. I call on Jean Behra." Poor Behra had not been following all this very closely and when those on each side of him lifted his elbows and said, " Stand up, a speech," he unwillingly rose and made a speech in French that very few of the Italians understood, but he was cheered to the echo.

This impromptu speech-making caught on and almost everyone in the room got up and said a few words on the slightest pretext, the Lancia team called for a speech from Maserati; Maserati shouted in return, " Speech from Lancia." The ladies made speeches, the secretary of the club, the police, the fire brigade, the Mayor, in fact everyone looked for a reason why someone else should make a speech. Nobody listened, everyone clapped and cheered and the party became riotous. I was forced to make a speech for the Press, which I did in my best Italian. At any rate, I understood it even if no one else did.

It is sad to recall such happy days, for of the five drivers involved

in " passing-the-buck " at that Naples dinner party only five years ago, four are no longer with us and the fifth has retired, while both of the big Scuderias that took part in that race, Lancia and Maserati, have disappeared from Grand Prix racing as the Formula draws to a close at the end of 1960.

At the time of writing this book the new Formula for Grand Prix racing has yet to start, coming into force on January 1st, 1961, and if it goes on for seven years as the one about which I have written has done, then I feel sure I shall have seven years of enjoyment, and sadness, in front of me. I hope I shall be able to absorb these seven years to the fullest extent, for as one of the Grand Prix drivers said, when everyone was complaining about the new rules, " For me, the main thing is to race," and while there are people about with that sentiment then I want to be there to watch them.

FORMULA 1 RACE RESULTS 1954 - 1960

1954

Date	Event	Distance	First	Second	Third	Fourth	Speed (k.p.h.)	Fastest Lap
Jan. 17th	Argentine G.P.	3 hours	J. M. Fangio (*Maserati*)	G. Farina (*Ferrari*)	F. Gonzalez (*Ferrari*)	M. Trintignant (*Ferrari*)	111.876	J. M. Hawthorn (*Ferrari*) 1 min. 48.2 sec.
April 11th	Siracusa G.P.	440 kms.	G. Farina (*Ferrari*)	M. Trintignant (*Ferrari*)	L. Mantovani (*Maserati*)	R. Manzon (*Ferrari*)	153.350	O. Marimon (*Maserati*) 2 min. 03.8 sec.
April 20th	Pau G.P.	3 hours	J. Behra (*Gordini*)	M. Trintignant (*Ferrari*)	R. Mieres (*Maserati*)	E. Bayol (*Gordini*)	100.769	J. Behra (*Gordini*) 1 min. 35.2 sec.
April 20th	Lavant Cup—Goodwood	27 kms.	R. Parnell (*Ferrari*)	R. Salvadori (*Maserati*)	K. McAlpine (*Connaught*)	L. Macklin (*H.W.M.*)	142.830	R. Parnell (*Ferrari*) R. Salvadori (*Maserati*) 1 min. 36.2 sec.
May 9th	Bordeaux G.P.	302 kms.	F. Gonzalez (*Ferrari*)	R. Manzon (*Ferrari*)	M. Trintignant (*Ferrari*)	S. Moss (*Maserati*)	97.562	F. Gonzalez (*Ferrari*) 1 min. 22.7 sec.
May 15th	International Trophy—Silverstone	235 kms.	F. Gonzalez (*Ferrari*)	J. Behra (*Gordini*)	A. Simon (*Gordini*)	R. Mieres (*Maserati*)	149.283	F. Gonzalez (*Ferrari*) 1 min. 50.0 sec.
May 22nd	Bari G.P.	330 kms.	F. Gonzalez (*Ferrari*)	M. Trintignant (*Ferrari*)	J. Behra (*Gordini*)	O. Marimon (*Maserati*)	141.309	O. Marimon (*Maserati*) 2 min. 18.5 sec.
June 6th	Frontieres G.P.—Chimay	217 kms.	"B. Bira" (*Maserati*)	A. Pilette (*Gordini*)	D. Beauman (*Connaught*)	A. Legat (*Veritas*)	158.017	J. Pollet (*Gordini*) 3 min. 51.0 sec.
June 6th	Rome G.P.	395 kms.	O. Marimon (*Maserati*)	H. Schell (*Maserati*)	S. Mantovani (*Maserati*)	A. Simon J. Behra (*Gordini*)	170.907	O. Marimon (*Maserati*) 2 min. 15.7 sec.
June 7th	Goodwood Whitsun	19 kms.	R. Parnell (*Ferrari*)	R. Salvadori (*Maserati*)	J. Somervail (*Cooper-Bristol*)	J. Lawrence (*Cooper-Bristol*)	141.027	R. Salvadori (*Maserati*) 1 min. 35.0 sec.
June 20th	Belgian G.P.—Spa	508 kms.	J. M. Fangio (*Maserati*)	M. Trintignant (*Ferrari*)	S. Moss (*Maserati*)	J. M. Hawthorn F. Gonzalez (*Ferrari*)	185.172	J. M. Fangio (*Maserati*) 4 min. 25.5 sec.
July 4th	French G.P.—Reims	500 kms.	J. M. Fangio (*Mercedes-Benz*)	K. Kling (*Mercedes-Benz*)	R. Manzon (*Ferrari*)	"B. Bira" (*Maserati*)	186.638	H. Herrmann (*Mercedes-Benz*) 2 min. 32.9 sec.
July 11th	Rouen G.P.	485 kms.	M. Trintignant (*Ferrari*)	"B. Bira" (*Maserati*)	R. Salvadori (*Maserati*)	G. Berger (*Gordini*)	131.791	M. Trintignant (*Ferrari*) 2 min. 09.9 sec.
July 17th	British G.P.—Silverstone	435 kms.	F. Gonzalez (*Ferrari*)	J. M. Hawthorn (*Ferrari*)	O. Marimon (*Maserati*)	J. M. Fangio (*Mercedes-Benz*)	144.311	Various 1 min. 50.0 sec.

July 25th	**Caen G.P.**	211 kms.	M. Trintignant (*Ferrari*)	S. Moss (*Maserati*)	J. Behra (*Gordini*)	"B. Bira" (*Maserati*)	142.477	S. Moss (*Maserati*) 1 min. 25.7 sec.
Aug. 1st	**German G.P.—Nurburgring** (*G.P. of Europe*)	501 kms.	J. M. Fangio (Mercedes-Benz)	F. Gonzalez J. M. Hawthorn (*Ferrari*)	M. Trintignant (*Ferrari*)	K. Kling (Mercedes-Benz)	133.500	K. Kling (Mercedes-Benz) 9 min. 55.1 sec.
Aug. 1st	**Crystal Palace Trophy**	44 kms.	R. Parnell (*Ferrari*)	R. Salvadori (*Maserati*)	A. P. Rolt (*Connaught*)	H. Gould (*Cooper-Bristol*)	120.041	R. Parnell (*Ferrari*) 1 min. 06.0 sec.
Aug. 7th	**Oulton Park**	160 kms.	S. Moss (*Maserati*)	R. Parnell (*Ferrari*)	F. R. Gerard (*Cooper-Bristol*)	D. Beauman (*Connaught*)	134.349	S. Moss (*Maserati*) 1 min. 56.3 sec.
Aug. 14th	**Snetterton**	175 kms.	R. Parnell (*Ferrari*)	F. R. Gerard (*Cooper-Bristol*)	D. Beauman (*Connaught*)	H. Gould (*Cooper-Bristol*)	142.299	R. Parnell (*Ferrari*)
Aug. 15th	**Pescara G.P.**	409 kms.	L. Musso (*Maserati*)	"B. Bira" (*Maserati*)	H. Schell (*Maserati*)	J. Daponte (*Maserati*)	139.580	"B. Bira" (*Maserati*) 10 min. 46.7 sec.
Aug. 22nd	**Swiss G.P.—Berne**	480 kms.	J. M. Fangio (Mercedes-Benz)	F. Gonzalez (*Ferrari*)	H. Herrmann (Mercedes-Benz)	R. Mieres (*Maserati*)	159.650	J. M. Fangio (Mercedes-Benz) 2 min. 39.7 sec.
Aug. 28th	**Castle Coombe**	45 kms.	H. Gould (*Cooper-Bristol*)	W. Whitehouse (H.W.M.)	J. R. Pritchard (*Connaught*)		134.477	F. R. Gerard (*Cooper-Bristol*)
Sept. 5th	**Italian G.P.—Monza**	504 kms.	J. M. Fangio (Mercedes-Benz)	J. M. Hawthorn (*Ferrari*)	U. Maglioli F. Gonzalez (*Ferrari*)	H. Herrmann (Mercedes-Benz)	180.218	F. Gonzalez (*Ferrari*) 2 min. 00.8 sec.
Sept. 12th	**Cadours G.P.**	120 kms.	J. Behra (*Gordini*)	A. Pilette (*Gordini*)	L. Rosier (*Maserati*)	F. Wacker (*Gordini*)	122.876	A. Pilette (*Gordini*) 1 min. 56.0 sec.
Sept. 19th	**Avus G.P.**	498 kms.	K. Kling (Mercedes-Benz)	J. M. Fangio (Mercedes-Benz)	H. Herrmann (Mercedes-Benz)	A. Pilette (*Gordini*)	213.500	J. M. Fangio (Mercedes-Benz) 2 min. 13.4 sec.
Sept. 25th	**Goodwood Trophy**	81 kms.	S. Moss (*Maserati*)	P. Collins (*Vanwall*)	R. Salvadori (*Maserati*)	F. R. Gerard (*Cooper-Bristol*)	147.210	S. Moss (*Maserati*) 1 min. 33.0 sec.
Oct. 2nd	**Aintree Trophy**	82 kms.	S. Moss (*Maserati*)	J. M. Hawthorn (*Vanwall*)	H. Schell (*Maserati*)	S. Mantovani (*Maserati*)	137.487	S. Moss (*Maserati*) J. M. Hawthorn (*Vanwall*) 2 min. 04.8 sec.
Oct. 24th	**Spanish G.P.—Barcelona**	505 kms.	J. M. Hawthorn (*Ferrari*)	L. Musso (*Maserati*)	J. M. Fangio (Mercedes-Benz)	R. Mieres (*Maserati*)	157.734	A. Ascari (*Lancia*) 2 min. 20.4 sec.
1955								
Jan. 16th	**Argentine G.P.**	375 kms.	J. M. Fangio (Mercedes-Benz)	G. Farina F. Gonzalez M. Trintignant (*Ferrari*)	U. Maglioli G. Farina M. Trintignant (*Ferrari*)	K. Kling S. Moss H. Herrmann (Mercedes-Benz)	125.000	J. M. Fangio (Mercedes-Benz) 1 min. 48.3 sec.

1955—*continued*

Date	Event	Distance	First	Second	Third	Fourth	Speed (k.p.h.)	Fastest Lap
Mar. 27th	**Valentino G.P.—Turin**	378 kms.	A. Ascari (*Lancia*)	R. Mieres (*Maserati*)	L. Villoresi (*Lancia*)	E. Castellotti (*Lancia*)	141.437	J. Behra (*Maserati*) 1 min. 44.2 sec.
April 11th	**Glover Trophy—Goodwood**	81 kms.	R. Salvadori (*Maserati*)	F. R. Gerard (*Cooper-Bristol*)	D. Beauman (*Connaught*)	M. Keen (*Cooper-Alta*)	143.691	R. Salvadori (*Maserati*) 1 min. 33.8 sec.
April 11th	**Pau G.P.**	304 kms.	J. Behra (*Maserati*)	E. Castellotti (*Lancia*)	R. Mieres (*Maserati*)	L. Villoresi (*Lancia*)	100.326	A. Ascari (*Lancia*) 1 min. 35.3 sec.
April 24th	**Bordeaux G.P.**	302 kms.	J. Behra (*Maserati*)	L. Musso (*Maserati*)	R. Mieres (*Maserati*)	S. Moss (*Maserati*)	104.112	S. Moss (*Maserati*) 1 min. 20.9 sec.
May 7th	**International Trophy—Silverstone**	290 kms.	P. Collins (*Maserati*)	P. Salvadori (*Maserati*)	"B. Bira" (*Maserati*)	A. Simon (*Maserati*)	154.450	R. Salvadori (*Maserati*) 1 min. 47.0 sec.
May 8th	**Naples G.P.**	246 kms.	A. Ascari (*Lancia*)	L. Musso (*Maserati*)	L. Villoresi (*Lancia*)	J. Behra (*Maserati*)	110.927	J. Behra (*Maserati*) 2 min. 09.4 sec.
May 22nd	**Monaco G.P.** (*G.P. of Europe*)	314 kms.	M. Trintignant (*Ferrari*)	E. Castellotti (*Lancia*)	J. Behra C. Perdisa (*Maserati*)	G. Farina (*Ferrari*)	105.914	J. M. Fangio (*Mercedes-Benz*) 1 min. 42.4 sec.
May 29th	**Albi G.P.**	314 kms.	A. simon (*Maserati*)	L. Rosier (*Maserati*)	H. Gould (*Maserati*)	J. Pollet (*Gordini*)	131.432	A. Simon (*Maserati*) 1 min. 17.1 sec.
May 30th	**Davidstow Airfield**		L. Marr (*Connaught*)	C. Bolton (*Connaught*)	T. Kyffin (*Cooper-Bristol*)		137.664	L. Marr (*Connaught*)
June 5th	**Belgian G.P.—Spa**	509 kms.	J. M. Fangio (*Mercedes-Benz*)	S. Moss (*Mercedes-Benz*)	G. Farina (*Ferrari*)	P. Frere (*Ferrari*)	191.337	J. M. Fangio (*Mercedes-Benz*) 4 min. 20.6 sec.
June 19th	**Dutch G.P.—Zandvoort**	419 kms.	J. M. Fangio (*Mercedes-Benz*)	S. Moss (*Mercedes-Benz*)	L. Musso (*Maserati*)	R. Mieres (*Maserati*)	144.268	R. Mieres (*Maserati*) 1 min. 40.9 sec.
July 16th	**British G.P.—Aintree**	435 kms.	S. Moss (*Mercedes-Benz*)	J. M. Fangio (*Mercedes-Benz*)	K. Kling (*Mercedes-Benz*)	P. Taruffi (*Mercedes-Benz*)	139.190	S. Moss (*Mercedes-Benz*) 2 min. 08.4 sec.
July 30th	**Crystal Palace Trophy**	56 kms.	J. M. Hawthorn (*Maserati*)	H. Schell (*Vanwall*)	R. Salvadori (*Maserati*)	C. A. S. Brooks (*Connaught*)	124.500	J. M. Hawthorn (*Maserati*) 1 min. 03.4 sec.
Aug. 6th	**Charterhall Airfield**	112 kms.	F. R. Gerard (*Maserati*)	H. Gould (*Maserati*)	L. Rosier (*Maserati*)	J. Brabham (*Cooper-Bristol*)	134.014	L. Rosier (*Maserati*) F. R. Gerard (*Maserati*) 1 min. 23.8 sec.
Aug. 13th	**Snetterton Airfield**	109 kms.	H. Schell (*Vanwall*)	K. Wharton (*Vanwall*)	S. Moss (*Maserati*)	J. Brabham (*Cooper-Bristol*)	130.010	S. Moss (*Maserati*) 1 min. 56.0 sec.

Sept. 3rd	**"Telegraph" Trophy—Aintree**	82 kms.	R. Salvadori (*Maserati*)	F. R. Gerard (*Maserati*)	H. Gould (*Maserati*)	C. A. S. Brooks (*Connaught*)	134.735	R. Salvadori (*Maserati*) 2 min. 05.2 sec.
Sept. 11th	**Italian G.P.—Monza**	500 kms.	J. M. Fangio (*Mercedes-Benz*)	P. Taruffi (*Mercedes-Benz*)	E. Castellotti (*Ferrari*)	J. Behra (*Maserati*)	206.791	S. Moss (*Mercedes-Benz*) 2 min. 46.9 sec.
Sept. 24th	**Gold Cup—Oulton Park**	241 kms.	S. Moss (*Maserati*)	J. M. Hawthorn (*Lancia/Ferrari*)	J. D. Titterington (*Vanwall*)	R. Parnell (*Connaught*)	138.304	S. Moss (*Maserati*) 1 min. 53.2 sec.
Oct. 1st	**Avon Trophy—Castle Coombe**	163 kms.	H. Schell (*Vanwall*)	H. Gould (*Maserati*)	F. R. Gerard (*Cooper-Bristol*)	R. Salvadori (*Maserati*)	138.600	H. Schell (*Vanwall*) 1 min. 13.6 sec.
Oct. 23rd	**Siracusa G.P.**	385 kms.	C. A. S. Brooks (*Connaught*)	L. Musso (*Maserati*)	L. Villoresi (*Maserati*)	H. Gould (*Maserati*)	159.392	C. A. S. Brooks (*Connaught*) 2 min. 00.2 sec.
1956								
Jan. 22nd	**Argentine G.P.**	3 hours	J. M. Fangio L. Musso (*Lancia/Ferrari*)	J. Behra (*Maserati*)	J. M. Hawthorn (*Maserati*)	F. Landi G. Gerini (*Maserati*)	127.900	J. M. Fangio (*Lancia/Ferrari*) 1 min. 45.3 sec.
Feb. 5th	**Mendoza G.P.**	251 kms.	J. M. Fangio (*Lancia/Ferrari*)	S. Moss (*Maserati*)	J. Behra (*Maserati*)	C. Menditeguy (*Maserati*)	133.721	J. M. Fangio (*Lancia/Ferrari*) 1 min. 49.2 sec.
April 2nd	**Richmond Trophy—Goodwood**	124 kms.	S. Moss (*Maserati*)	R. Salvadori (*Maserati*)	L. Leston (*Connaught*)	F. R. Gerard (*Connaught*)	151.810	S. Moss (*Maserati*) 1 min. 30.2 sec.
April 15th	**Siracusa G.P.**	440 kms.	J. M. Fangio (*Lancia/Ferrari*)	L. Musso (*Lancia/Ferrari*)	P. Collins (*Lancia*)	L. Villoresi (*Maserati*)	156.217	J. M. Fangio (*Lancia/Ferrari*) 1 min. 59.9 sec.
April 21st	**Aintree "200"**	323 kms.	S. Moss (*Maserati*)	C. A. S. Brooks (*B.R.M.*)	J. Brabham (*Maserati*)	L. Rosier (*Maserati*)	132.520	C. A. S. Brooks (*B.R.M.*) 2 min. 04.6 sec.
May 5th	**International Trophy—Silverstone**	280 kms.	S. Moss (*Vanwall*)	A. Scott-Brown (*Connaught*)	J. D. Titterington (*Connaught*)	F. R. Gerard (*Cooper-Bristol*)	161.690	J. M. Hawthorn (*B.R.M.*) S. Moss (*Vanwall*) 1 min. 43.0 sec.
May 6th	**Naples G.P.**	246 kms.	R. Manzon (*Gordini*)	H. Gould (*Maserati*)	G. Gerini (*Maserati*)	G. Scarlatti (*Ferrari*)	104.801	L. Musso (*Lancia/Ferrari*) 2 min. 12.3 sec.
May 13th	**Monaco G.P.—Monte Carlo**	314 kms.	S. Moss (*Maserati*)	P. Collins J. M. Fangio (*Lancia/Ferrari*)	J. Behra (*Maserati*)	J. M. Fangio E. Castellotti (*Lancia/Ferrari*)	104.514	J. M. Fangio (*Lancia/Ferrari*) 1 min. 44.4 sec.
June 3rd	**Belgian G.P.—Spa**	508 kms.	P. Collins (*Lancia/Ferrari*)	P. Frere (*Lancia/Ferrari*)	C. Perdisa S. Moss (*Maserati*)	H. Schell (*Vanwall*)	190.614	S. Moss (*Maserati*) 4 min. 14.7 sec.
June 23rd	**Aintree "100"**	160 kms.	H. Gould (*Maserati*)	F. R. Gerard (*Cooper-Bristol*)	B. Halford (*Maserati*)	R. Salvadori (*Connaught*)	133.680	H. Gould (*Maserati*) 2 min. 06.0 sec.

1956—*continued*

Date	Event	Distance	First	Second	Third	Fourth	Speed (k.p.h.)	Fastest Lap
July 1st	**French G.P.—Reims**	506 kms.	P. Collins (*Lancia/Ferrari*)	E. Castellotti (*Lancia/Ferrari*)	J. Behra (*Maserati*)	J. M. Fangio (*Lancia/Ferrari*)	196.802	J. M. Fangio (*Lancia/Ferrari*) 2 min. 25.8 sec.
July 14th	**British G.P.—Silverstone**	475 kms.	J. M. Fangio (*Lancia/Ferrari*)	A. de Portago P. Collins (*Lancia/Ferrari*)	J. Behra (*Maserati*)	J. Fairman (*Connaught*)	158.760	S. Moss (*Maserati*) 1 min. 43.2 sec.
Aug. 5th	**German G.P.—Nurburgring**	501 kms.	J. M. Fangio (*Lancia/Ferrari*)	S. Moss (*Maserati*)	J. Bahra (*Maserati*)	F. Godia (*Maserati*)	137.800	J. M. Fangio (*Lancia/Ferrari*) 9 min. 41.6 sec.
Aug. 26th	**Caen G.P.**	246 kms.	H. Schell (*Maserati*)	A. Simon (*Maserati*)	R. Salvadori (*Maserati*)	G. Burgraff (*Gordini*)	129.317	R. Salvadori (*Maserati*) 1 min. 26.2 sec.
Sept. 2nd	**Italian G.P.—Monza** (*G.P. of Europe*)	500 kms.	S. Moss (*Maserati*)	P. Collins J. M. Fangio (*Lancia/Ferrari*)	R. Flockhart (*Connaught*)	F. Godia (*Maserati*)	208.787	S. Moss (*Maserati*) 2 min. 45.5 sec.
Oct. 14th	**Brands Hatch**	24 kms.	A. Scott-Brown (*Connaught*)	S. Lewis-Evans (*Connaught*)	R. Salvadori (*Maserati*)	L. Leston (*Connaught*)	118.753	A. Scott-Brown (*Connaught*) 59.0 sec.
1957								
Jan. 13th	**Argentine G.P.**	313 kms.	J. M. Fangio (*Maserati*)	J. Behra (*Maserati*)	C. Menditeguy (*Maserati*)	H. Schell (*Maserati*)	129.740	S. Moss (*Maserati*) 1 min. 44.7 sec.
Jan. 27th	**Buenos Aires G.P.**	282 kms.	J. M. Fangio (*Maserati*)	J. Behra (*Maserati*)	P. Collins L. Musso (*Lancia/Ferrari*)	J. M. Hawthorn (*Lancia/Ferrari*)	119.000	J. M. Fangio (*Lancia/Ferrari*) P. Collins (*Lancia/Ferrari*) 2 min. 19.6 sec.
April 7th	**Siracusa G.P.**	440 kms.	P. Collins (*Lancia/Ferrari*)	L. Musso (*Lancia/Ferrari*)	S. Moss (*Vanwall*)	P. Taruffi (*Maserati*)	164.797	S. Moss (*Vanwall*) 1 min. 54.3 sec.
April 22nd	**Pau G.P.**	304 kms.	J. Behra (*Maserati*)	H. Schell (*Maserati*)	I. Bueb (*Connaught*)	M. Gregory (*Maserati*)	101.071	J. Behra (*Maserati*) 1 min. 35.9 sec.
April 22nd	**Richmond Trophy—Goodwood**	124 kms.	S. Lewis-Evans (*Connaught*)	J. Fairman (*Connaught*)	R. Flockhart (*B.R.M.*)	J. Brabham (*Cooper-Climax F.2*)	145.900	C. A. S. Brooks (*Vanwall*) 1 min. 29.6 sec.
April 29th	**Naples G.P.**	246 kms.	P. Collins (*Lancia/Ferrari*)	J. M. Hawthorn (*Lancia/Ferrari*)	L. Musso (*Ferrari F.2*)	H. Gould (*Maserati*)	113.085	J. M. Hawthorn (*Lancia/Ferrari*) 2 min. 05.6 sec.
May 19th	**Monaco G.P.—Monte Carlo**	330 kms.	J. M. Fangio (*Maserati*)	C. A. S. Brooks (*Vanwall*)	M. Gregory (*Maserati*)	S. Lewis-Evans (*Connaught*)	104.160	J. M. Fangio (*Maserati*) 1 min. 45.6 sec.
July 7th	**French G.P.—Rouen**	503 kms.	J. M. Fangio (*Maserati*)	L. Musso (*Lancia/Ferrari*)	P. Collins (*Lancia/Ferrari*)	J. M. Hawthorn (*Lancia/Ferrari*)	160.960	L. Musso (*Lancia/Ferrari*) 2 min. 22.4 sec.

July 14th	**Reims G.P.**	506 kms.	L. Musso (*Lancia/Ferrari*)	J. Behra (*Maserati*)	S. Lewis-Evans (*Vanwall*)	H. Schell (*Maserati*)	198.537	J. Behra (*Maserati*) 2 min. 27.8 sec.
July 20th	**British G.P.—Aintree** (*G.P. of Europe*)	435 kms.	C. A. S. Brooks S. Moss (*Vanwall*)	L. Musso (*Lancia/Ferrari*)	J. M. Hawthorn (*Lancia/Ferrari*)	M. Trintignant (*Lancia/Ferrari*)	139.680	S. Moss (*Vanwall*) 1 min. 59.2 sec.
July 28th	**Caen G.P.**	301 kms.	J. Behra (*B.R.M.*)	R. Salvadori (*Cooper-Climax*)	B. Halford (*Maserati*)	J. Bonnier (*Maserati*)	149.385	J. Behra (*B.R.M.*) 1 min. 20.7 sec.
Aug. 4th	**German G.P.—Nurburgring**	501 kms.	J. M. Fangio (*Maserati*)	J. M. Hawthorn (*Lancia/Ferrari*)	P. Collins (*Lancia/Ferrari*)	L. Musso (*Lancia/Ferrari*)	142.900	J. M. Fangio (*Maserati*) 9 min. 17.4 sec.
Aug. 18th	**Pescara G.P.**	460 kms.	S. Moss (*Vanwall*)	J. M. Fangio (*Maserati*)	H. Schell (*Maserati*)	M. Gregory (*Maserati*)	153.730	S. Moss (*Vanwall*) 9 min. 44.6 sec.
Sept. 8th	**Italian G.P.—Monza**	500 kms.	S. Moss (*Vanwall*)	J. M. Fangio (*Maserati*)	W. von Trips (*Lancia/Ferrari*)	M. Gregory (*Maserati*)	193.563	C. A. S. Brooks (*Vanwall*) 1 min. 43.7 sec.
Sept. 14th	**International Trophy—Silverstone**	241 kms.	J. Behra (*B.R.M.*)	H. Schell (*B.R.M.*)	R. Flockhart (*B.R.M.*)	J. Bonnier (*Maserati*)	160.850	J. Behra (*B.R.M.*) 1 min. 42.0 sec.
Sept. 22nd	**Modena G.P.**	184 kms.	J. Behra (*Maserati*)	L. Musso (*Ferrari*)	H. Schell (*Maserati*)	P. Collins (*Ferrari*)	130.503	L. Musso (*Ferrari*) J. Behra (*Maserati*) 1 min. 02.2 sec.
Oct. 27th	**Moroccan G.P.—Casablanca**	419 kms.	J. Behra (*Maserati*)	S. Lewis-Evans (*Vanwall*)	M. Trintignant (*B.R.M.*)	J. M. Fangio (*Maserati*)	181.283	J. M. Fangio (*Maserati*) 2 min. 25.6 sec.
1958								
Jan. 19th	**Argentine G.P.**	313 kms.	S. Moss (*Cooper-Climax*)	L. Musso (*Ferrari*)	J. M. Hawthorn (*Ferrari*)	J. M. Fangio (*Maserati*)	134.559	J. M. Fangio (*Maserati*) 1 min. 41.8 sec.
April 7th	**Glover Trophy—Goodwood**	160 kms.	J. M. Hawthorn (*Ferrari*)	J. Brabham (*Cooper-Climax*)	R. Salvadori (*Cooper-Climax*)	C. Allison (*Lotus-Climax*)	152.824	J. M. Hawthorn (*Ferrari*) S. Moss (*Cooper-Climax*) 1 min. 28.8 sec.
April 13th	**Siracusa G.P.**	330 kms.	L. Musso (*Ferrari*)	J. Bonnier (*Maserati*)	F. Godia (*Maserati*)	H. Gould (*Maserati*)	161.314	L. Musso (*Ferrari*) 1 min. 59.1 sec.
April 19th	**Aintree "200"**	324 kms.	S. Moss (*Cooper-Climax*)	J. Brabham (*Cooper-Climax*)	C. A. S. Brooks (*Cooper-Climax*)	R. Salvadori (*Cooper-Climax*)	137.857	J. Brabham (*Cooper-Climax*) 2 min. 01.4 sec.

1958—*continued*

Date	Event	Distance	First	Second	Third	Fourth	Speed (k.p.h.)	Fastest Lap
May 3rd	**International Trophy—Silverstone**	241 kms.	P. Collins (*Ferrari*)	R. Salvadori (*Cooper-Climax*)	M. Gregory (*Maserati*)	J. Behra (*B.R.M.*)	163.860	J. Behra (*B.R.M.*) P. Collins (*Ferrari*) 1 min. 40.0 sec.
May 18th	**Monaco G.P.—Monte Carlo**	314 kms.	M. Trintignant (*Cooper-Climax*)	L. Musso (*Ferrari*)	P. Collins (*Ferrari*)	J. Brabham (*Cooper-Climax*)	109.413	J. M. Hawthorn (*Ferrari*) 1 min. 40.6 sec.
May 26th	**Dutch G.P.—Zandvoort**	314 kms.	S. Moss (*Vanwall*)	H. Schell (*B.R.M.*)	J. Behra (*B.R.M.*)	R. Salvadori (*Cooper-Climax*)	151.159	S. Moss (*Vanwall*) 1 min. 37.6 sec.
June 15th	**Belgian G.P.—Spa** (*G.P. of Europe*)	338 kms.	C. A. S. Brooks (*Vanwall*)	J. M. Hawthorn (*Ferrari*)	S. Lewis-Evans (*Vanwall*)	C. Allison (*Lotus-Climax*)	209.090	J. M. Hawthorn (*Ferrari*) 3 min. 58.3 sec.
July 7th	**French G.P.—Reims**	415 kms.	J. M. Hawthorn (*Ferrari*)	S. Moss (*Vanwall*)	W. von Trips (*Ferrari*)	J. M. Fangio (*Maserati*)	201.898	J. M. Hawthorn (*Ferrari*) 2 min. 24.9 sec.
July 19th	**British G.P.—Silverstone**	362 kms.	P. Collins (*Ferrari*)	J. M. Hawthorn (*Ferrari*)	R. Salvadori (*Cooper-Climax*)	S. Lewis-Evans (*Vanwall*)	164.230	J. M. Hawthorn (*Ferrari*) 1 min. 40.8 sec.
July 20th	**Caen G.P.**	302 kms.	S. Moss (*Cooper-Climax*)	J. Bonnier (*Maserati*)	B. Halford (*Maserati*)	M. Trintignant (*Cooper-Climax*)	151.156	J. Behra (*B.R.M.*) 1 min. 20.8 sec.
Aug. 3rd	**German G.P.—Nurburgring**	342 kms.	C. A. S. Brooks (*Vanwall*)	R. Salvadori (*Cooper-Climax*)	M. Trintignant (*Cooper-Climax*)	W. von Trips (*Ferrari*)	145.800	S. Moss (*Vanwall*) 9 min. 09.2 sec.
Aug. 24th	**Portuguese G.P.—Oporto**	370 kms.	S. Moss (*Vanwall*)	J. M. Hawthorn (*Ferrari*)	S. Lewis-Evans (*Vanwall*)	J. Behra (*B.R.M.*)	169.028	J. M. Hawthorn (*Ferrari*) 2 min. 32.37 sec.
Sept. 7th	**Italian G.P.—Monza**	402 kms.	C. A. S. Brooks (*Vanwall*)	J. M. Hawthorn (*Ferrari*)	P. Hill (*Ferrari*)	M. Gregory C. Shelby (*Maserati*)	195.077	P. Hill (*Ferrari*) 1 min. 42.9 sec.
Oct. 19th	**Moroccan G.P.—Casablanca**	403 kms.	S. Moss (*Vanwall*)	J. M. Hawthorn (*Ferrari*)	P. Hill (*Ferrari*)	J. Bonnier (*B.R.M.*)	187.033	S. Moss (*Vanwall*) 2 min. 22.5 sec.
1959								
Mar. 30th	**Glover Trophy—Goodwood**	160 kms.	S. Moss (*Cooper-Climax*)	J. Brabham (*Cooper-Climax*)	H. Schell (*B.R.M.*)	J. Bonnier (*B.R.M.*)	145.340	S. Moss (*Cooper-Climax*) 1 min. 31.8 sec.
April 18th	**Aintree "200"**	324 kms.	J. Behra (*Ferrari*)	C. A. S. Brooks (*Ferrari*)	B. McLaren (*Cooper-Climax*)	H. da Silva Ramos (*Maserati*)	142.846	S. Moss (*Cooper-B.R.M.*) 1 min. 58.8 sec.
May 2nd	**International Trophy—Silverstone**	241 kms.	J. Brabham (*Cooper-Climax*)	R. Salvadori (*Aston Martin*)	R. Flockhart (*B.R.M.*)	P. Hill (*Ferrari*)	165.324	R. Salvadori (*Aston Martin*) 1 min. 40.0 sec.

May 10th	**Monaco G.P.—Monte Carlo**	314 kms.	J. Brabham (*Cooper-Climax*)	C. A. S. Brooks (*Ferrari*)	M. Trintignant (*Cooper-Climax*)	P. Hill (*Ferrari*)	107.361	J. Brabham (*Cooper-Climax*) 1 min. 40.4 sec.
May 31st	**Dutch G.P.—Zandvoort**	314 kms.	J. Bonnier (*B.R.M.*)	J. Brabham (*Cooper-Climax*)	M. Gregory (*Cooper-Climax*)	I. Ireland (*Lotus-Climax*)	150.406	S. Moss (*Cooper-Climax*) 1 min. 36.7 sec.
July 5th	**French G.P.—Reims** (*G.P. of Europe*)	415 kms.	C. A. S. Brooks (*Ferrari*)	P. Hill (*Ferrari*)	J. Brabham (*Cooper-Climax*)	O. Gendebien (*Ferrari*)	205.079	S. Moss (*B.R.M.*) 2 min. 22.8 sec.
July 18th	**British G.P.—Aintree**	362 kms.	J. Brabham (*Cooper-Climax*)	S. Moss (*B.R.M.*)	B. McLaren (*Cooper-Climax*)	H. Schell (*B.R.M.*)	144.650	S. Moss (*B.R.M.*) B. McLaren (*Cooper-Climax*) 1 min. 57.0 sec.
Aug. 2nd	**German G.P.—Avus**	498 kms.	C. A. S. Brooks (*Ferrari*)	D. Gurney (*Ferrari*)	P. Hill (*Ferrari*)	M. Trintignant (*Cooper-Climax*)	230.700	C. A. S. Brooks (*Ferrari*) 2 min. 04.5 sec.
Aug. 23rd	**Portuguese G.P.—Lisbon**	337 kms.	S. Moss (*Cooper-Climax*)	M. Gregory (*Cooper-Climax*)	D. Gurney (*Ferrari*)	M. Trintignant (*Cooper-Climax*)	153.396	S. Moss (*Cooper-Climax*) 2 min. 05.07 sec.
Sept. 13th	**Italian G.P.—Monza**	414 kms.	S. Moss (*Cooper-Climax*)	P. Hill (*Ferrari*)	J. Brabham (*Cooper-Climax*)	D. Gurney (*Ferrari*)	200.177	P. Hill (*Ferrari*) 1 min. 40.4 sec.
Sept. 26th	**Gold Cup—Oulton Park**	241 kms.	S. Moss (*Cooper-Climax*)	J. Brabham (*Cooper-Climax*)	C. Bristow (*Cooper-Climax*)	R. Salvadori (*Cooper-Maserati*)	154.964	S. Moss (*Cooper-Climax*) 1 min. 41.8 sec.
Oct. 10th	**Snetterton Airfield**	109 kms.	R. Flockhart (*B.R.M.*)	J. Brabham (*Cooper-Climax*)	B. Halford (*B.R.M.*)	D. Piper (*Lotus-Climax*)	178.173	R. Flockhart (*B.R.M.*) 1 min. 33.6 sec.
Dec. 12th	**American G.P.—Sebring**	315 kms.	B. McLaren (*Cooper-Climax*)	M. Trintignant (*Cooper-Climax*)	C. A. S. Brooks (*Ferrari*)	J. Brabham (*Cooper-Climax*)	159.116	M. Trintignant (*Cooper-Climax*) 3 min. 05.0 sec.
1960								
Jan. 9th	**New Zealand G.P.**	241 kms.	J. Brabham (*Cooper-Climax*)	B. McLaren (*Cooper-Climax*)	B. Stigwell (*Cooper-Climax*)	S. Jones (*Cooper-Climax*)	139.364	S. Moss (*Cooper-Climax*) 1 min. 21.3 sec.
Feb. 7th	**Argentine G.P.**	312 kms.	B. McLaren (*Cooper-Climax*)	C. Allison (*Ferrari*)	M. Trintignant S. Moss (*Cooper-Climax*)	C. Menditeguy (*Cooper-Maserati*)	133.208	S. Moss (*Cooper-Climax*) 1 min. 38.9 sec.
Feb. 14th	**Buenos Aires G.P.—Cordoba**	240 kms.	M. Trintignant (*Cooper-Climax*)	D. Gurney (*B.R.M.*)	G. Munaron (*Maserati*)	E. Chimeri (*Maserati*)	122.500	B. McLaren (*Cooper-Climax*) 1 min. 27.2 sec.
April 18th	**Glover Trophy—Goodwood**	162 kms.	I. Ireland (*Lotus-Climax*)	S. Moss (*Cooper-Climax*)	C. Bristow (*Cooper-Climax*)	B. McLaren (*Cooper-Climax*)	161.558	S. Moss (*Cooper-Climax*) 1 min. 24.0 sec.

1960—*continued*

Date	Event	Distance	First	Second	Third	Fourth	Speed (k.p.h.)	Fastest Lap
May 14th	**International Trophy—Silverstone**	241 kms.	I. Ireland (*Lotus-Climax*)	J. Brabham (*Cooper-Climax*)	G. Hill (*B.R.M.*)	A. Stacey (*Lotus-Climax*)	175.124	I. Ireland (*Lotus-Climax*) 1 min. 34.2 sec.
May 29th	**Monaco G.P.—Monte Carlo**	314 kms.	S. Moss (*Lotus-Climax*)	B. McLaren (*Cooper-Climax*)	P. Hill (*Ferrari*)	C. A. S. Brooks (*Cooper-Climax*)	108.599	B. McLaren (*Cooper-Climax*) 1 min. 36.2 sec.
June 6th	**Dutch G.P.—Zandvoort**	314 kms.	J. Brabham (*Cooper-Climax*)	I. Ireland (*Lotus-Climax*)	G. Hill (*B.R.M.*)	S. Moss (*Lotus-Climax*)	154.929	S. Moss (*Lotus-Climax*) 1 min. 33.8 sec.
June 19th	**Belgian G.P.—Spa**	508 kms.	J. Brabham (*Cooper-Climax*)	O. Gendebien (*Cooper-Climax*)	P. Hill (*Ferrari*)	J. Clark (*Lotus-Climax*)	215.049	J. Brabham (*Cooper-Climax*) 3 min. 51.9 sec.
July 3rd	**French G.P.—Reims**	415 kms.	J. Brabham (*Cooper-Climax*)	O. Gendebien (*Cooper-Climax*)	B. McLaren (*Cooper-Climax*)	H. Taylor (*Cooper-Climax*)	212.113	J. Brabham (*Cooper-Climax*) 2 min. 17.5 sec.
July 16th	**British G.P.—Silverstone**	362 kms.	J. Brabham (*Cooper-Climax*)	J. Surtees (*Lotus-Climax*)	I. Ireland (*Lotus-Climax*)	B. McLaren (*Cooper-Climax*)	174.920	G. Hill (*B.R.M.*) 1 min. 34.4 sec.
Aug. 1st	**Brands Hatch**	213 kms.	J. Brabham (*Cooper-Climax*)	G. Hill (*B.R.M.*)	B. McLaren (*Cooper-Climax*)	P. Hill (*Ferrari*)	149.444	J. Brabham (*Cooper-Climax*) J. Clark (*Lotus-Climax*) 1 min. 40.6 sec.
Aug. 14th	**Portuguese G.P.—Oporto**	407 kms.	J. Brabham (*Cooper-Climax*)	B. McLaren (*Cooper-Climax*)	J. Clark (*Lotus-Climax*)	W. von Trips (*Ferrari*)	175.849	J. Surtees (*Lotus-Climax*) 2 min. 27.53 sec.
Sept. 4th	**Italian G.P.—Monza** (*G.P. of Europe*)	500 kms.	P. Hill (*Ferrari*)	R. Ginther (*Ferrari*)	W. Mairesse (*Ferrari*)	G. Cabianca (*Cooper-Ferrari*)	212.534	P. Hill (*Ferrari*) 2 min. 43.6 sec.
Sept. 17th	**Lombank Trophy—Snetterton**	162 kms.	I. Ireland (*Lotus-Climax*)	J. Clark (*Lotus-Climax*)	J. Bonnier (*B.R.M.*)	R. Salvadori (*Cooper-Climax*)	165.323	J. Clark (*Lotus-Climax*) 1 min. 32.6 sec.
Sept. 24th	**Gold Cup—Oulton Park**	264 kms.	S. Moss (*Lotus-Climax*)	J. Brabham (*Cooper-Climax*)	G. Hill (*B.R.M.*)	B. McLaren (*Cooper-Climax*)	151.037	J. Clark (*Lotus-Climax*) 1 min. 42.4 sec.
Nov. 20th	**American G.P.—Riverside**	395 kms.	S. Moss (*Lotus-Climax*)	I. Ireland (*Lotus-Climax*)	B. McLaren (*Cooper-Climax*)	J. Brabham (*Cooper-Climax*)	159.325	J. Brabham (*Cooper-Climax*) 1 min. 56.3 sec.

List of Drivers who have Competed in

Formula Races 1954 - 60

and Cars Driven

A

†**Alborghetti, Mario**—Arzani.
Allison, Clifford—Lotus-Climax, Maserati, Ferrari.
Armagnac, Paul—D.B. Panhard.
†**Ascari, Alberto**—Ferrari, Maserati, Lancia.

B

Barthe, Lucien—Maserati.
Bayol, Elie—Gordini.
Beaufort, Karel Godin de—Maserati.
†**Beauman, Donald**—Connaught.
†**Behra, Jean**—Gordini, Maserati, B.R.M., Ferrari.
Berger, George—Gordini.
" Bira, B."—Maserati.
Birger, Claude—Gordini.
Birrell, Alistair—Cooper-Bristol.
Bonnier, Joachim—Maserati, B.R.M.
Bonomi, Roberto—Cooper-Maserati.
Bourely, Rene—Maserati.
Boulton, Charles—Connaught.
Brabham, Jack—Cooper-Bristol, Maserati, Cooper-Climax.
Brandon, Eric—Cooper-Bristol.
†**Bristow, Christopher**—Cooper-Climax.
Brooks, Charles Anthony Standish—Connaught, B.R.M., Vanwall, Ferrari, Cooper-Climax.
Brown, Alan—Vanwall, Cooper-Alta.
Bucci, Clemar—Gordini, Maserati.
†**Bueb, Ivor**—Connaught, Maserati.
Burgess, Ian—Cooper-Maserati, Lotus-Maserati, Cooper-Climax.
Burgraff, George—Gordini.

C

Cabianca, Giulio—Ferrari, Maserati, Cooper-Ferrari.
Cabral, Mario Arauyo—Cooper-Maserati.
†**Campbell, Keith**—Maserati.
†**Castellotti, Eugenio**—Lancia, Ferrari, Lancia/Ferrari.
Chapman, Colin—Emeryson.
Chimeri, Ettore—Maserati.
Chiron, Louis—Lancia, Maserati.
†**Claes, John**—Ferrari.
Clark, James—Lotus-Climax.
†**Collins, Peter John**—Vanwall, Maserati, B.R.M., Lancia/Ferrari, Ferrari.
Creus, Antonio—Maserati.

D

Daigh, Chuck—Scarab, Cooper-Climax.
Daponte, Jorge—Maserati.
Davis, Colin—Maserati, Cooper-Maserati.
de Riu, Giovani—Maserati.
D'Orey, Fritz—Maserati, Tec-Mec.
Drake, Robert—Maserati.
Duncan, Dale—Maserati.

E

Emery, Paul—Emeryson Special.

F

Fairman, Jack—Connaught, B.R.M., Cooper-Climax, Cooper-Maserati.
Fangio, Juan Manuel—Maserati, Mercedes-Benz, Lancia/Ferrari.
Farina, Guiseppe—Ferrari.
Filippis, Maria-Therese de—Maserati.
Fitch, John—Maserati.
Flockhart, Ronald—B.R.M., Connaught, Cooper-Climax, Maserati.
Frere, Paul—Gordini, Ferrari, Lancia/Ferrari.

G

Gendebien, Olivier—Lancia/Ferrari, Cooper-Climax, Ferrari.
Gerard, Frederick Roberts—Cooper-Bristol, Maserati, Connaught.
Gerini, Gerino—Maserati.
Gibson, Richard—Cooper-Bristol, Connaught, Cooper-Climax.
Ginther, Paul Ritchie—Ferrari.
Girard, Lorenzo—Ferrari.
Godia-Sales, Francisco—Maserati.
Gonzalez, Jose Froilan—Ferrari, Vanwall, Maserati, Lancia/Ferrari.
Gould, Horace—Cooper-Bristol, Maserati.
Graffenreid, Baron Emanuel de—Maserati.
Greene, Keith—Cooper-Maserati.
Gregory, Masten—Maserati, Lancia/Ferrari, Cooper-Climax, Cooper-Maserati.
Guelfi, Andre—Gordini.
Gulle, Pablo—Maserati.
Gurney, Daniel—Ferrari, B.R.M.

H

Halford, Bruce—Cooper-Bristol, Maserati, B.R.M., Cooper-Climax.
Hall, Jim—Lotus-Climax.
Hall, Keith—Cooper-Bristol.
†**Hawthorn, James Michael**—Ferrari, Maserati, B.R.M., Vanwall, Lancia/Ferrari, Lancia.
Helfrich, Theo—Meteor.
Herrmann, Hans—Mercedes-Benz, Maserati, B.R.M.
Hill, Graham—Lotus-Climax, B.R.M.
Hill, Philip—Maserati, Ferrari.
Holt, Bill—Connaught.

I

Ireland, Innes—Lotus-Climax.
Iglesias, Jesus—Gordini.

K

Kavanagh, Kenneth—Maserati.
†**Keen, Michael**—Cooper-Alta.
Kling, Karl—Mercedes-Benz.

L

Landi, Francisco—Maserati.
Lang, Hermann—Mercedes-Benz.
Laurent, Roger—Ferrari.
Lawrence, John—Cooper-Bristol.
Legat, Alphonse—Veritas.
Leston, Leslie—Connaught, B.R.M.
†**Levegh, Pierre**—Ferrari.
†**Lewis-Evans, Stuart**—Connaught, Vanwall.
Lovely, Pete—Cooper-Ferrari.
Loyer, Roger—Gordini.
Lucas, Jean—Gordini, Maserati, Ferrari.

M

MacAlpine, Kenneth—Connaught.
†**Mackay-Fraser, Herbert**—B.R.M.
Macklin, Lance—H.W.M., Maserati.
Maglioli, Umberto—Ferrari, Maserati.
Mairesse, Willy—Ferrari.
Mann, Alan—H.W.M.
Mantovani, Sergio—Maserati.
Manzon, Robert—Gordini, Ferrari.
†**Marimon, Onofre**—Maserati.
Marr, Leslie—Connaught.
Martin, Eugene—Gordini.
McLaren, Bruce—Cooper-Climax.
Menditeguy, Carlos—Maserati, Cooper-Maserati.
Mieres, Roberto—Maserati.
Milhoux, Andre—Gordini.
Morice, William—Cooper-Bristol.
Moss, Stirling—Maserati, Mercedes-Benz, Vanwall, Cooper-B.R.M., Cooper-Climax, B.R.M., Lotus-Climax.
†**Musso, Luigi**—Maserati, Lancia/Ferrari, Ferrari.

N

Naylor, John Brian—J.B.W.-Maserati.
Nuckey, Rodney—Cooper-Bristol.

O

Oliver, Michael—Connaught.

P

Parnell, Reginald—Ferrari, Connaught.
Pedini, Aldo—Ferrari.
Perdisa, Cesare—Maserati, Lancia/Ferrari.
Pilette, Andre—Gordini, Lancia/Ferrari.
Piper, David—Lotus-Climax.
Piotti, Luigi—Maserati.
Pollet, Jacques—Gordini.
†**Portago, Marquis Alfonse de**—Ferrari, Lancia/Ferrari.
Pritchard, John Riseley—Connaught.

R

Reventlow, Lance—Scarab.
Richards, Horace—H.A.R.
Richardson, Geoffrey—R.R.A., Connaught.
Rolt, Anthony—Connaught.
†**Rosier, Louis**—Ferrari, Maserati.
Rosier, Marc—Ferrari.
Russell, James—Maserati.
Ruttmann, Troy—Maserati.

S

Said, Bob—Connaught.
Salvadori, Roy—Maserati, B.R.M., Vanwall, Aston Martin, Cooper-Maserati, Cooper-Climax.
Scarlatti, Giorgio—Maserati, Ferrari, Cooper-Climax, Cooper-Maserati.
†**Schell, Harry**—Maserati, Ferrari, Vanwall, B.R.M., Cooper-Climax.
†**Scott-Brown, Archie**—Connaught.
Scotti, Piero—Connaught.
Seidel, Wolfgang—Maserati.
Shelby, Carroll—Maserati, Aston Martin.
Silva Ramos, Hermanos da—Gordini, Maserati.
Simon, Andre—Gordini, Maserati, Ferrari, Mercedes-Benz.
Somervail, Jock—Cooper-Bristol.
Sparkan, Mike—Gordini.
†**Stacey, Alan**—Lotus-Climax.
†**Storez, Claude**—D.B. Panhard.
Surtees, John—Lotus-Climax.
Swaters, Jacques—Ferrari.

T

Taraschi, Berardo—Ferrari.
Taruffi, Piero—Maserati, Mercedes-Benz, Ferrari, Vanwall.
Taylor, Henry—Cooper-Climax.
Taylor, Michael—Lotus-Climax.
Testut, Andre—Maserati.
Thorne, Leslie—Connaught.
Titterington, John Desmond—Connaught, Vanwall.
Tomaso, Alessandro de—Ferrari, Maserati.
Trintignant, Maurice—Ferrari, Lancia/Ferrari, B.R.M., Aston Martin, Vanwall, Bugatti, Maserati, Cooper-Climax, Cooper-Maserati.
Trips, Wolfgang Berghe von—Ferrari, Lancia/Ferrari.

U

Uria, Antonio—Maserati.

V

Vidilles, Jean-Claude—D.B. Panhard, Ferrari.
Villoresi, Luigi—Maserati.
Volonterio, Ottorino—Maserati.

W

Wacker, Fred—Gordini.
Walker, Peter—Connaught, Maserati.
Ward, Roger—Offenhauser.
Webb, John—Turner.
†**Wharton, Kenneth**—Maserati, Vanwall, Ferrari.
Whiteaway, Edward—H.W.M.
Whitehead, Graham—Cooper-Bristol.
†**Whitehead, Peter**—Cooper-Alta.
†**Whitehouse, William**—Connaught.

Y

Young, John—Connaught.
Young, Michael—Connaught.

† *Deceased.*

FATAL ACCIDENTS
to
Drivers who have Competed in
Formula 1
1954 - 60

Driver and Car	Place or Race	Remarks
Iborghetti, Mario (*Arzani*)	Pau Grand Prix, 1955	In first G.P. race
scari, Alberto (*Ferrari*)	Monza, 1955	During sports-car practice
eauman, Donald (*Connaught*) ...	Leinster Trophy, 1955	During race
ehra, Jean (*Porsche*)	Avus, 1959	During sports-car race
ristow, Christopher (*Cooper-Climax*)	Belgian Grand Prix, 1960	During race at Burnenville bend, Spa circuit
ueb, Ivor (*Cooper-Climax*)	Clermont-Ferrand, 1959	From injuries in F.2 race
ampbell, Keith (*Motorcycle*)... ...	France, 1958	During motorcycle race
astellotti, Eugenio (*Lancia/Ferrari*) ...	Modena, 1957	During testing of F.1 car
laes, John	Bruxelles, 1956	Illness
ollins, Peter (*Ferrari*)...	German Grand Prix, 1958	During race on Nurburg-ring
awthorn, James Michael (*Jaguar*) ...	Guildford, 1959	Road accident
een, Michael (*Cooper-Bristol*) ...	Goodwood, 1955	During sports-car race
evegh, Pierre (*Mercedes-Benz*) ...	Le Mans, 1955	During sports-car race
ewis-Evans, Stuart (*Vanwall*) ...	Moroccan Grand Prix, 1958	From injuries in race
lackay-Fraser, Herbert (*Lotus-Climax*)	Reims, 1957	In F.2 race
larimon, Onofre (*Maserati*)	German Grand Prix, 1954	During practice on Nur-burgring
lusso, Luigi (*Ferrari*)	French Grand Prix, 1958	During race at Reims
ortago, Marquis Alfonse de (*Ferrari*)	Mille Miglia, 1957	During sports-car race
osier, Louis (*Ferrari*)	Montlhéry, 1956	During sports-car race
:hell, Harry (*Cooper-Climax*)	Silverstone, 1960	During practice for Inter-national Trophy
:ott-Brown, Archie (*Lister-Jaguar*) ...	Spa, 1958	During sports-car race
:acey, Alan (*Lotus-Climax*)	Belgian Grand Prix, 1960	During race at Malmedy corner
:orez, Claude (*Porsche*)	Reims, 1959	During rally tests
/harton, Kenneth (*Ferrari*)	New Zealand, 1957	During sports-car race
/hitehead, Peter (*Jaguar*)	Tour de France Rally, 1958	Road accident
/hitehouse, William (*Cooper-Climax*)	Reims, 1957	During F.2 race