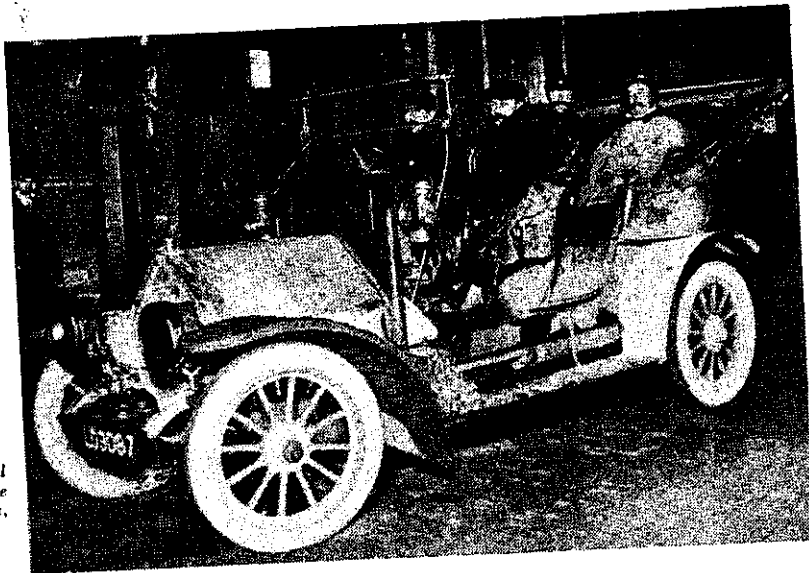


# THE IRIS CAR

By S. A. GIBBONS



THE 2,000 MILE TRIAL IRIS.—At the wheel of this 25-h.p. model is A. Saunders, while the occupant of the near-side back seat is Mr. Duncan, a well-known R.A.C. observer

MR. C. R. DOYLE, in "The World's Automobiles," gives the date of the birth of the Iris as 1905. How the name Iris came to be adopted for the cars built by the firm of Legros and Knowles Ltd. I do not know, but the first two cars built were certainly anything but Iris-like.

Perhaps before going further a few words concerning the founders of the firm may not come amiss.

Guy G. F. Knowles, who I gather provided a considerable portion of the financial backing, came of a wealthy and artistic family, both his father and mother being well-known in artistic circles during the latter part of the 19th century. He had studied sculpture and drawing under Alphonse Legros, who was also well-known in the world of art in Paris and London, and presumably it was at this time that his association with Mr. L. A. Legros began, which culminated in their forming a partnership to build the cars which Legros designed.

L. A. Legros was an engineer and designer of some standing, and I think some years older than Knowles, who was then only 26, and had, prior to his partnership with Knowles, been engaged in tramway engineering; this was I gather his first incursion into motor-car design. These first cars (only two were built) certainly gave the impression they were heavy ungainly chain-driven machines with slow-revving four-cylinder engines and l.t. magneto ignition, and not unlike the Durkopp in appearance, and were not a success.

While at school at Harrow some ten years before, Guy Knowles was friendly with Ivon M. De Havilland elder brother of Geoffrey (later to become Sir Geoffrey) De Havilland of aircraft fame to whom I am indebted for this information. Meeting Ivon again, Knowles invited him to join the firm as designer, which invitation he accepted.

In 1905 some marine sets were built, incorporating the original Legros-designed engines, somewhat modified, probably by De Havilland, one of which was fitted in the motor-boat "Iris" which acquitted itself quite well in the trials held by the Motor Yacht Club at Southampton that year.

A description of the "New Iris Chassis" appeared in *The Motor Car Journal* on November 4th, 1905. This new chassis designed by De Havilland was a complete break away from the original, and of a more enlightened and unconventional design, to which, during 1906, quite a few modifications and improvements were made. Unfortunately, Ivon De Havilland did not live to carry on his good work; he died at an early age, I think, towards the end of 1906.

The Iris factory was quite small, consisting of, on the ground floor: lower machine shop, engine room containing the gas engine (which drove all the machinery), erecting shop, with space sufficient to allow for erecting four chassis at a time, blacksmith's shop, and general store. On the floor above: light machine shop, fitting shop, parts store, and pattern maker's shop. There was no foundry. Downstairs and across the yard in a separate building were the office, drawing office, and engine test-shop, with, I think, three test beds, and a Heenan and Froud electric dynamometer. Also in the yard were located the petrol and oil store, etc.

I think the total number of men employed, including office and drawing office staff, never exceeded about 60.

By the time that I was taken on as a premium apprentice early in 1907 the Legros-designed cars were but a memory; they were referred to by the men who had helped build them as "The Old Buggerinas."

Design was now in the hands of F. T. Burgess assisted by Acers. Burgess, of course, later designed the 1914 T.T. Humbers, and was afterwards closely associated with W. O. Bentley, in designing the 3-litre Bentley.

Quite a lot of modifications had been made to the chassis during the previous year. The vertical gilled tube radiator had been dropped in favour of the honeycomb type, the open propeller shaft with flexible steel universal joints had given way to a torque tube and single universal joint of more normal design, and the foot-brake now operated on a drum behind the gearbox instead of on the rear wheels. An h.t. magneto took the place of battery ignition with single trembler coil and h.t. distributor, and a most unusual fitting for those days, "a dynamo to keep the battery charged, and supply current for lighting the lamps" which had apparently been specified for the earlier models, had gone.

The two four-cylinder models were identical except for the cylinder dimensions. The frame was of channel-section pressed steel, rather light and flexible, with parallel side-members, the front axle was a straight steel tube about 2½ in. in diameter lined with wood (onto which were pressed and pinned the forged steel ends which held the swivel pins carrying the stub axles and the front springs were semi-elliptic).

At this time the firm were turning out three models, a 25-h.p. four-cylinder 108 × 133 mm., a 35-h.p. 127 × 133 mm., and a 40-h.p. 108 × 133 mm. I think that at first only the two four-cylinder models were made, the six following about a year later.

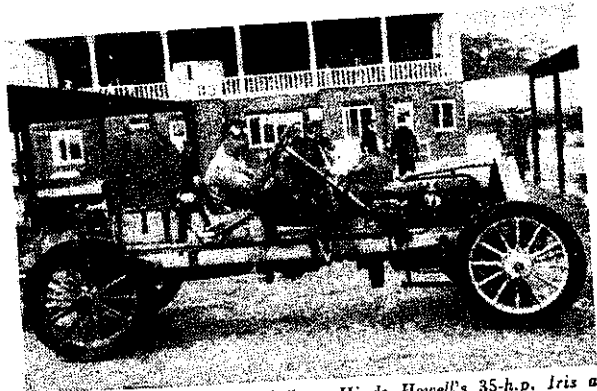
The rear axle was quite a nice piece of work, consisting of an aluminium diff.-housing into which steel tubes about 2½ in. in diameter were pressed and riveted. The outer ends were forgings carrying the wheel bearings, back plates, etc., again pressed and riveted onto the axle tubes. The diff.-housing had a cover plate at the rear, on removal of which with the two yokes which held the diff.-assembly in place, and withdrawing the two axle shafts, which were full floating and splined at both ends, the whole crown wheel and diff.-assembly could be lifted out. The driving pinion was held on its shaft by an outside set-screw and spring-washer. I never remember this method giving any trouble; in fact, the whole axle was remarkably trouble free and silent.

The drive from the engine to the separate gearbox was taken through a multiple-plate clutch (steel and brass plates running in oil) which was quite all right as long as it wasn't used except for changing gear! It didn't take kindly to being slipped in traffic, and with a bottom gear of about 8 to 1 this wasn't always easy to avoid.

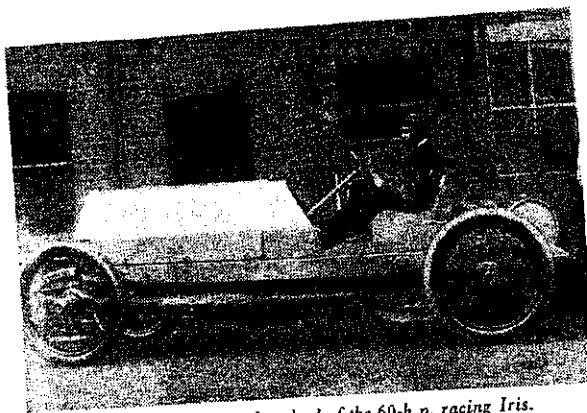
The separate three-speed gearbox was of cast aluminium, suspended at three adjustable points from the chassis cross-members, with right hand gate change. The pinion teeth were of large size and stood up well to wear and were remarkably silent. The selector mechanism was external; this had an unexpected advantage in that

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Arthur Earp at the wheel of Capt. Hinds Howell's 35-h.p. Iris at Brooklands.



The same driver at the wheel of the 60-h.p. racing Iris.

on one occasion when we broke the gear-lever of the "sixty" off short one day at Brooklands, we were able, by removing the floor boards and using a long spanner, to drive back to the works without trouble. While Thorn, who was driving, manipulated throttle and clutch, I swapped the cogs with the spanner inserted in the forks of the selector rods; by the time we reached the works we were doing quite snappy changes!

Immediately behind the gearbox was the foot-brake, a small diameter steel drum with two external contracting shoes with cast iron linings. It was a poor affair, the drum scored easily and the brake was inclined to chatter. The hand-brake, which consisted of contracting bands operating on small drums on the rear wheel hubs, was not much better. In fact the brakes and universal joint were not the chassis' best points.

The universal joint was a bad bit of work, not being a true universal at all, as the centre line through the lugs of the driving fork did not intersect the line through centres of the driven fork-lugs, and provision for lubrication was pretty poor.

The propeller shaft ran in a torque tube and the drive was taken through rather flimsy radius rods from the rear axle, which was mounted on full-elliptic springs, to brackets on the frame side-members.

The engines of the two four-cylinder models were almost identical except for the cylinder blocks, and were supported on tubular cross-members suspended from the chassis side-members on steel brackets.

The cylinder blocks were cast in pairs, with L heads, all valves being on the near side. Massive and deeply-recessed bronze valve caps with wide flanges covered the valves and carried the sparking plugs; these caps screwed into the cylinders. They had hexagon tops and with the good ring spanner provided (which also fitted the road-wheel hub caps) could be pulled up dead tight and easily removed. I mention this point as so many cars of this period had valve-cap trouble.

The crankshaft ran in three bronze bearings and in the later models with pressure lubrication was drilled for oil passage. The H-section steel connecting-rods had four-bolt bearing caps and bronze big-end bearings, the gudgeon-pins were fastened in the piston bosses by tapered set-screws, pistons in the normal models were cast with flat tops, but as mentioned later one or two special models had steel pistons with high domes. The crankcase was of aluminium and had two large inspection doors on the off-side.

The Iris carburettor was a very simple affair, having a barrel-throttle and a single jet which was located to the side of the main air flow. Later models were fitted with an "economiser" which closed down onto the jet as in some of the early Mercedes cars, only in the case of the Iris it was interconnected with the throttle. The carburettor was located on the off-side and on the Type 4 (35-h.p.) was mounted on a very short aluminium inlet pipe, the mixture passing to the inlet valves *via* passages cast in the blocks. On the Type 3 (25-h.p.) the inlet pipe was slightly longer. The petrol tank was of copper and usually located under the front seat.

Water circulation was by a gear-type pump housed in a rectangular recess in the lower part of the radiator, to which it was bolted and driven by a dog-coupling from one of the timing wheels. This arrangement was not altogether satisfactory and was dropped when the new models were introduced about 1909: as may be imagined, the bronze gear wheels wore pretty rapidly, as did also the lignum-vitae bushes.

Ignition was by h.t. Bosch magneto, with battery and coil an optional extra. The magneto was mounted transversely on the off-side front of the engine and driven by skew gears from the camshaft; it was very accessible and very reliable.

The camshaft arrangement is worthy of special mention. The cam-case containing the camshaft and tappet assembly was not part of the crankcase but a separate unit bolted to it. By removing six nuts the whole assembly (camshaft, tappets and timing wheel) could be removed in one piece.

Lubrication of the early engines was by splash with oil tank and visible drip-feed mounted on the dash; later models had pressure feed to mains, big-ends and gudgeon-pins, pressure maintained by a submerged gear pump in the sump delivering oil at about 6 lb./sq. in. The flywheel of the four-cylinder cars was a massive, solid (not spoked) affair.

The main characteristic of these cars was largely due to this flywheel, i.e., poor acceleration, good slow-speed top-gear running, and easy-starting. With the long rigid starting handle provided and the fine momentum of the big flywheel these engines were easy to swing. Although never very muscularly strong I had little difficulty in swinging the 35s (5 in. bore and no half-compression), even in frosty weather.

Road wheels were artillery, fitted with beaded-edge tyres (usually 880 x 120) and several cars were fitted with detachable rims, mostly Shrewsbury and Challiner.

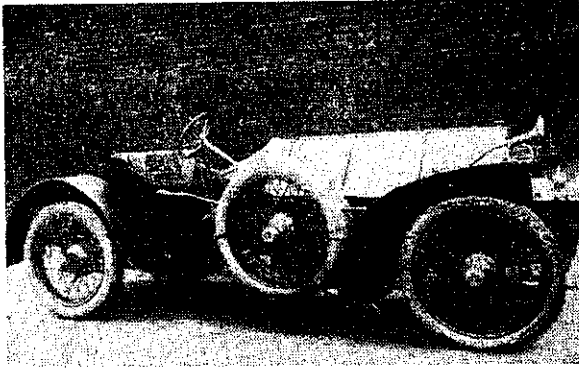
The six was of more advanced design than the four. The frame was heavier and more inswapt at the front, the front axle was of I-section, and the road spring semi-elliptic all round, the petrol tank was at the rear, pressure fed by a bypass from the exhaust, supplemented by a hand pump.

The engine employed three pairs of the 108 mm. cylinders as used on the 25-h.p. model, mounted on a rather unique aluminium crankcase incorporating an integrally cast undertray fitting closely round the fan-spoked flywheel, as used by Mercedes and other Continental firms, thus obviating the use of the more usual fan behind the radiator (and acting as a fine dust raiser!) The water pump was not located in the bottom of the radiator as in the four-cylinder models but in a more normal position on the near-side of the engine. Timing wheels were, I am pretty sure, totally enclosed. A half-compression lever was located below the radiator, handy to the starting handle and operating on the camshaft. Again, no accelerator pedal was fitted, only a hand-controlled throttle lever mounted on the steering wheel, but more complicated than on the four-cylinder models as it turned with the steering wheel.

A rather unusual feature of the four-cylinder engine was that the front and rear main bearings were outside the sump and had bottom caps fitted with short drainpipes back to the sump, and on more than one occasion when a rear main had "caught hold" (those bronze bearings needed very careful running-in) I have slacked off the bearing cap and got home.

In 1907, with the opening of Brooklands Track in the offing, the thoughts of the Directors turned towards racing. Two of them decided to enter their own cars, Capt. (later Col.) Hinds Howell his 35-h.p. four-cylinder, and Mr. F. R. S. Bircham his 40-h.p. six-cylinder, in the first Marcel Renault Memorial Plate race.

The touring bodies were removed and a single seat fitted flat on the floor boards. As the rake of the steering column was not altered this gave a most uncomfortable driving position, but was quite



In later days "the sixty" was fitted with this touring body and used by Mr. Knowles.

common in the early days of Brooklands. Bircham drove his own car, but Capt. Howell's was driven by the head-tester Arthur Earp, brother of Clifford Earp of Napier fame. Both cars were fitted with oxygen cylinders to supply more oxygen to the engines, and controlled by the drivers.

The two Iris cars finished first and second in their heat, the four-cylinder slightly in the lead, but failed to score in the final. I think the four-cylinder came in fourth.

Capt. Howell entered for several more meetings with moderate success, occasionally driving himself. In 1908 E. S. R. Thorn, who had succeeded Arthur Earp as head-tester, drove the car, and a few modifications were made with a view to improving its performance. A higher axle ratio was fitted, and steel pistons (machined from the solid). In its most highly-developed state the engine developed 63-h.p. on the brake.

In the meantime, Mr. G. Knowles, another of the Directors, had a special short chassis built and fitted with a special engine, i.e., the normal six-cylinder crankcase with three pairs of the 35-h.p. (5 in. bore) cylinders, and steel pistons, and a very high axle ratio. It carried the same single seat that had been fitted to the first six-cylinder, but the steering column was properly raked and the driving position good. This car was always known as "the sixty."

Knowles entered it at the October 1907 Brooklands Meeting in the "second 60-h.p. race" with Arthur Clifford Earp as driver, and it finished in fourth place. As far as I know this was the only time the car was raced, but I am not sure about this, as I have distinct recollections of going to Brooklands with Thorn (presumably to practise) when the incident of the broken gearlever referred to earlier occurred, but I can't recall an actual race; this would have been in 1908.

"The sixty" was now fitted with a rather nice two-seater body somewhat spoilt by too voluminous wings and used by Mr. Knowles as his private transport. Later, after he had disposed of the car, it was fitted with a "Roi des Belge" four-seater body which, owing to excessive overhang, quite spoilt its appearance. It was a pleasant car to drive except for an extremely strong clutch spring, fitted in an endeavour to overcome clutch slip which had been its bugbear on the Track.

Towards the end of 1908 I took delivery of a somewhat modified 35-h.p. chassis (Type 4), fitted with h.c. steel pistons, higher axle ratio, modified exhaust system and pressure-feed petrol supply from a rear-mounted tank. This I had fitted with a small four-seater body, the rear seats being detachable.

This was one of the last of the Type 4 chassis to be turned out before the introduction of the new 25- and 35-h.p. chassis. The chassis number of my car was 220, and the first Iris to leave the factory had the chassis No. 101, which gives some idea of the production rate.

I entered for the 1909 May Senior Handicap at Brooklands and came in second from about half-way down the field of twenty. I ran in one or two minor events later without success but finding the expense too much for my pocket did not compete again. This car had a lap record of 80 m.p.h. when fully wound up, the engine developed 57-h.p. at 1,700 r.p.m. on the brake, and the car weighed 25 cwt. stripped for the track.

Although I did not compete in any more races I was a frequent user of the Track and committed quite a lot of light-hearted high-

speed "lappery" and competed regularly in the then popular "Bogey Competition" till my handicap was cut down to such an extent that I got fed up and pulled out. Had I known then what I learned by experience later, that the Type 3 and 4 cars, i.e., the ones with the tubular front axles, had inherently weak stub-axles (later two broke with me and two more that I know of after I sold the car), I don't think I and the friends who rode with me would have felt quite so light-hearted about it!

It was decided to have a go at the unofficial London-Monte Carlo record and one of the six-cylinder cars was prepared, but I don't think the run ever came off or else something went amiss, and it was then decided to send the same car to Madrid for the Spanish Show, and on the way to establish (or improve?) the London-Madrid record. The car certainly went to Madrid but as far as I know nothing was ever heard of any record.

I am a little uncertain about dates but I think it was in 1908 or early 1909 that Iris Cars Ltd. came into existence, with showrooms in Marshall Street, off Oxford Street, near Selfridge's, I think they then took over all the output from Legros and Knowles, and all the marketing was done by them. Later Legros and Knowles went out of existence and Iris Cars Ltd. started a Service Department at Aylesbury. But at the time of which I am writing H. F. Hodges was Works Manager at the Willesden factory and H. W. Chambers Sales Manager at Marshall Street, and I think there was the usual friction between the two departments.

In 1910 the two organisations got together and submitted one of the new type 25-h.p. chassis to a 2,000-mile non-engine-stop road-test under official observation of the R.A.C. The route selected was between London and Harrogate (205 miles), drivers were changed at each end and a half-way depot was established at the George Inn, Colsterworth.

The run went off without incident, the most noteworthy part about it being the weather; as might be expected at this time of year. October, we had foul weather throughout, but fortunately not much fog.

I said that the run went off without incident, but what is not generally known is that this was the second attempt; on the first run, within about 100 miles of the start, a large piece of mutton cloth worked down between the ill-fitting floor boards of the temporary body and wound itself well and truly round the clutch shaft and the engine had to be stopped for it to be cut away. After discussing the matter with the official observers on board it was decided to return to London and make a fresh start next day.

During 1909 Burgess considerably modified the two four-cylinder models. The engines remained the same but a new and heavier frame was used, the full-elliptical rear springs gave way to long semi-elliptics, the water pump was moved from the bottom of the radiator to a more normal position under the bonnet, the petrol tank was underslung at the rear of the chassis and pressure-fed, in fact the whole chassis was more on the lines of the six-cylinder model, which was now discontinued.

In 1910 another new model was introduced, the 15-h.p., a pleasant little car with a four-cylinder 15.9-h.p. 80 mm. x 114 mm. monoblock engine with fixed head and all valves on the near side and I think a roller or ball-bearing crankshaft.

One of these cars was entered for the 1911 R.A.C. Standard Car Race at Brooklands. Chassis No. 299 was driven by Arthur Woodfield, who was then head-tester (Thorn having left the company and joined Bentalls of Maldon, Essex). I rode with him as mechanic. We had a trouble-free run, with one short stop to refuel. Our time for the 277 miles was 5½ hours. I think we finished about 14th.

We had done a considerable amount of running on the Track prior to the race, and had been bothered all the time with a falling off of power after prolonged full throttle running and it was only by keeping just under full revs. that we had a no-trouble run. I don't think the reason for this falling off of power was ever really satisfactorily explained.

The car was entered in several races at the ordinary Brookland Meetings during 1911 with some degree of success. It won the Third Junior Long Handicap (8½ miles) at an average speed of 61½ m.p.h. in 1911.

In 1908 or 1909 Geoffrey De Havilland (now Sir Geoffrey) got the Iris Co. to build his first aero engine. It was a water-cooled horizontally-opposed four-cylinder with copper water jackets and an outside flywheel. The first flywheel fitted was built up with a steel rim bolted to a circular steel plate about ¼ in. thick and about two feet in diameter. At certain engine speeds this flywheel developed an alarming wobble and I believe had to be modified. Looking through an old diary I came across the following entry: "Iris chassis No. 275 took De Havilland's aero engine down to Olympia, March 10th, 1910"—presumably to the Aero Show.

After 1911 the company definitely went down hill. About the end of 1913 the works at Willesden were closed and a service department started at the factory of The Bifurcated & Tubular Rivet Co. at Aylesbury.

For the following information concerning the latter days of the Iris Company I am indebted to Mr. John Paterson who is well-known in Veteran and Vintage car circles and to the owner of a very finely restored 1903 20-h.p. Winton. John Paterson's father is Chairman and Managing Director of The Bifurcated and Tubular Rivet Co., Ltd. mentioned previously, and his late grandfather was at one time Chairman and Managing Director of The Iris Car Company, probably in 1913, and had with him as secretary Mr. Gwilt who was later Chairman and Managing Director of the Sturtivant Engineering Co. Ltd.

The following is quoted verbatim from John Paterson's letter to me.

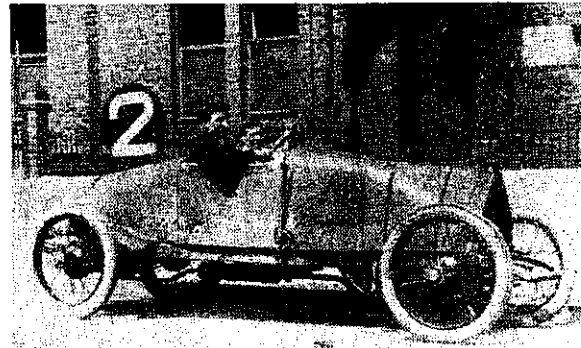
"As far as the connection between Iris Cars and this Company is concerned, a Service Department was opened in 1914 in what is now our machine shop—in fact the old hands still call it the Iris Car shop.

"A number of cars were brought down from Willesden, which were stored in a shed here for many years and a major tragedy occurred during the war, when I was in the army, and before I was connected with veteran cars in any way, when some eight or nine Iris cars of various types were sold for scrap, mainly for the light alloy parts which they contained. This sale also included some thousands of crank cases, cylinder blocks, pistons and other parts, which had been stacked through the years, and we could easily have started an Iris Car Club on our own. The cars included a hearse, a baker's delivery van, and open and closed cars of various types, and it grieves me to think of this sad loss. I have attempted to trace them through the scrap merchant who first bought them, but they have definitely been completely broken up.

"My father, who is now Chairman and Managing Director of this company, ran one of these cars until about 1925, and I well remember as a boy being taken for rides in the surrounding countryside in his open tourer. This car had an exhaust cut-out which was operated by pulling a ring in the floor-boards, and my sister and I were always asking my father to operate this, as it made such a tremendous noise!

"Another car, which was bright yellow, was used as the works car for this company right up until the early 1930s and became a well-known vehicle in the district. The Service Department was kept going until about 1923, when it was closed down and the employees transferred to our pay roll.

"I have attempted to find old catalogues of Iris cars which were also stored in our offices, but I think there has been a big clear out,



*The author with Arthur Woodfield in his 15-h.p. Iris in Brooklands' trim. No mudguards were needed on cars driven on the roads in those days*

again during the war, and I have had very little luck. What few catalogues remain, however, I have carefully stored away."

And that is the Iris story as far as I know it.

And what of all those connected with the old firm? A great many will I know have "punched the clock" for the last time. Guy Knowles died last April in his 80th year. Douglas Hawkes, who needs no introduction, was an apprentice at the same time that I was, and I saw a lot of him after the war before I left England in 1922. Working a lathe near mine during part of my first year was the late Herbert Le Vack. Arthur Saunders, foreman of the lower machine shop, was later racing mechanic to Burgess at Humbers and afterwards with Bentleys. Several of the old Iris hands went to the Humber experimental shop and afterwards to Bentleys. Many other names occur to me, Tom Sparrow, in charge of the engine test-shop; J. L. Travers, a fellow apprentice, was later a Colonel in the R.F.C., and after the war went to Chile to train their pilots and advise the Government on flying matters, returned to England only to be killed in a flying accident while flying a machine of his own design. And many others, whose names I remember, but have never seen since.

The only Iris I know of in existence today is a 15-h.p. living, I believe, somewhere in the north of England. I should be interested to know if there are any others.

#### MINIATURES NEWS

It is interesting that those fascinating motor-car miniatures which are now available from the toy shops in such profusion that keen collectors find their models overflowing from the study and lounge into the children's bedrooms and the spare room, are mass-produced in England, Ireland and Wales.

It all commenced before the war when Meccano Ltd. introduced their Dinky Toy miniatures, which are made in Liverpool. Collectors still seek the now rare old Dinkys—a pre-war Dinky military vehicle was dug up in a garden recently and had survived so well it is being restored!—and the modern range is greatly enhanced, with sprung wheels and windows, etc., perhaps the most imposing being the beautifully modelled and finished Rolls-Royce Silver Wraith (No. 150).

In more recent times Playcraft launched the Corgi series of motor-car miniatures which are mass-produced in Wales. Now comes news that the long-established toy concern, Lines Bros., has introduced Triang Spot-On miniatures, which are made in a self-contained factory in Belfast. The Spot-On series comprises a complete model roadway incorporating roads, pavements, traffic signs, etc., and a range of buildings, produced by a subsidiary company, are sealed for use with this roadway. So far as the cars are concerned, these are all to 1/42nd scale, with windscreen, windows, seats, steering wheel, number plates, embossed cast chassis (depicting engine sump, prop-shaft, road springs and back axle), and red rear lamps, etc. The Spot-On range already includes Ford Zodiac, Armstrong Siddeley Sapphire, Bentley sports saloon, Rolls-Royce Silver Wraith, M.C. M.C.-A, Austin Healey 100-Six, Jaguar XKSS, Triumph TR3, Jensen 541, Aston Martin DB3, 3.4 Jaguar, B.M.W. Isotta, Austin A40 Farina, Meadows Frisky-sport, Coggomobil Super, Fiat Multipla, and Bristol 406. Commercial vehicles include Austin

Prime Mover, E.R.F. 68G, Ford Thames Trader, A.E.C. Mammoth Major 8, and Austin FX4 taxi, articulated and heavies being supplied in company livery or normal colour combinations.

Most of the Spot-On cars are in duo-tone finish, prices ranging from 2s. 11d. to 4s. 5d. inclusive of p.t., the commercial vehicles from 12s. 11d. to 13s. 6d. We have examined the Bristol 406 model (No. 115) and it is extremely realistic, even to spot-lamps, roof aerial, air intake on scuttle, extended steering column, etc. It is also very softly sprung, so that the wheels realistically follow "road" irregularities, and the finish is of high quality. Ask for Spot-On miniatures in your local toy shop, and for the sailing dinghy, Shell and B.P. petrol pump sets, police and telephone boxes, and other items in the range. The cars come in cartons, with a colour picture and data relating to the full-size car.—W. B.

Readers interested in building a simple 2.5-c.c. diesel engine will find a useful article in *The Model Engineer* for December 10th last year.

Trico-Folberth Ltd. have introduced Trico-Glo-Wash, a new car shampoo which is inexpensive but very effective. A six-shot bottle costs 3s. 6d.

Motorists going abroad this year can obtain from Shell some excellent maps of foreign lands—these cover France, Germany, Spain, Portugal, Sweden, Yugoslavia, Holland, Belgium, Luxembourg, Italy, Switzerland, Finland, Austria, Greece, Norway and Denmark. They have gay coloured covers and data in several languages, and there is an overall covering map. Inquire for them at your favourite Shell garage.