

Two firms that grew up together in the competitive world of motor racing . . .

## ARCH MOTORS and SPECIALISED MOULDINGS

By JUSTIN HALER

**T**HERE can be little doubt that Britain owes part of its eminent position in world motor sport to the flourishing and enterprising band of racing car manufacturers which has sprung up over the past ten years. Since the early days of Formula 3, the leading training ground for potential F1 men, British *marques* such as Lotus, Brabham and Cooper have led the field, aided in more recent seasons by the new generation manufacturers such as Titan, Meryn and Chevron. The introduction of Formula Ford is enlarging their rôle and has also made them of great interest to the Chancellor of the Exchequer, for whom these firms now bring in plenty of foreign currency.

Naturally enough, individual drivers, teams and *marques* take the credit for winning races, but what is often overlooked are those firms who stay in the background and yet without whom half of the cars would never appear. AUTOSPORT'S recent series of articles on various racing constructors has shared one particular common link. With few exceptions, the names of Arch Motors and Specialised Mouldings invariably arise when we go to see a manufacturer. So vital a part do these firms—chassis and body makers respectively—play, that no such series would be complete without a close look at the background and techniques of these firms, without whom, it would be fair to say, there would hardly be the current boom in racing car construction.

### Arch Motors

**A**RCH Motors, like many of their customer constructors, are a product of the late 1950s/early 1960s racing boom, which has developed into what is now a thriving industry with half a dozen or so manufacturers now looking between them to four figure outputs. Specialised Mouldings also began at around the same time. Significantly both firms received their first encouragement from Eric Broadley, who was just starting Lola Cars then, and with such integrated purposes they have grown up alongside each other and always co-operated with one another, to the point today where the majority of Britain's tubular chassis and fibreglass bodies come from two factories next door to each other on a modern trading estate in Huntingdon. This town, incidentally, now looks like becoming rather like the Byfleet area, with the Charles Lucas Titan and engine-building concern having just moved there, and several others considering it.

The very beginnings of Arch Motors are rooted in Tottenham railway arches—"hence the name, which we never bothered to change"—where in 1958 Bob Robinson and Ted Young had a small business mainly geared to the production of motorcycle sidecars. However, there wasn't really much money in producing them and so these two former motorbike racers wrote around to various racing car constructors asking for specialist chassis building work. Their first reply came from Eric Broadley, who was just lining up his very successful Mk 1 sports-racing car for serious production.

The success of the light tubular chassised Mk 1—they built over 30 frames—led to not only more work for Lola, but also a reputation which prompted Colin Chapman to sub-contract some work to them on the F1 Lotus 24 tubular chassis. With these jobs behind them, Arch Motors had really arrived. Ted Young's brother Alan joined next and gradually their orders gathered momentum. Besides Lola's F3 cars and the Mk 4 F1 machines, they built an immensely successful batch of Lotus 23 sports-racers, and "by 1962 we had moved into a second arch and things were looking up."

Arthur Mallock found demand for U2s increasing and he started to sub-contract work, and then Motor Racing Developments entered the scene with the Brabham, which in turn largely sparked off the new breed of FF/F3 constructors. Although Eric Broad-

ley had ceased to use the space-frame design at this time, their connection with him brought them quite a bit of work on the original Ford GTs of 1964, including the construction of the sub-assemblies. Bruce McLaren gave them the chassis building work on the first M1A G7 cars and Lotus turned over Type 31 F3 chassis production to the expanding Tottenham firm. By 1966 "we were bursting at the seams," recalls Robinson; "it had to be seen to be believed."

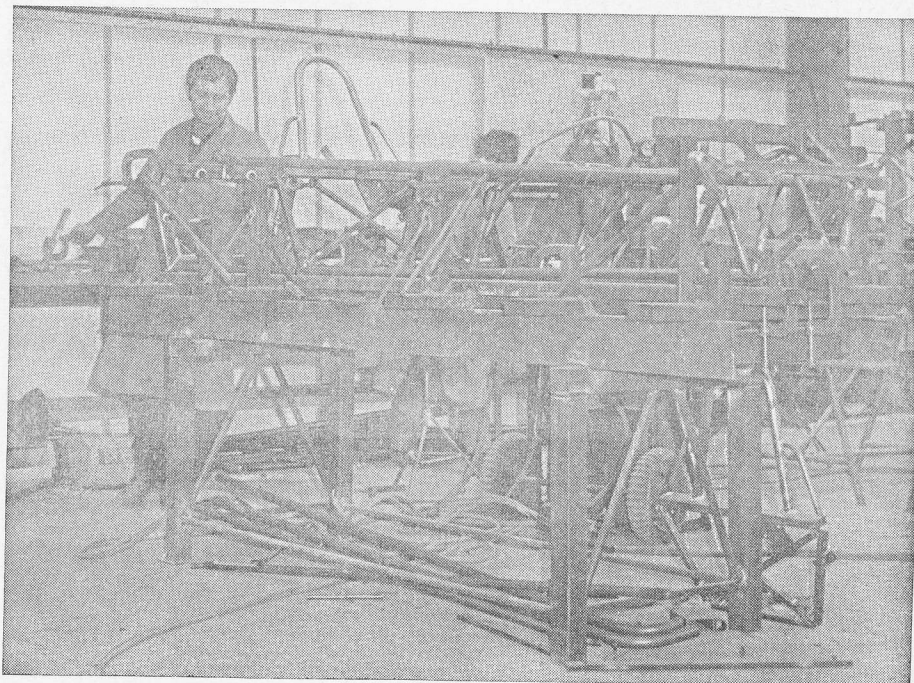
Together with Specialised Mouldings, they decided to move to Huntingdon in January 1967, where a modern 5000 sq ft factory solved their space problems, although now they are growing still more to cope with progressively increasing demand—"it's Formula Ford that's done it," thinks Robinson. The move also spelt the end of the times when they suffered serious seasonal lapses—"We

once did a big job for Courtaulds; it was mainly arc-welding for a rayon plant that they sold to Russia."

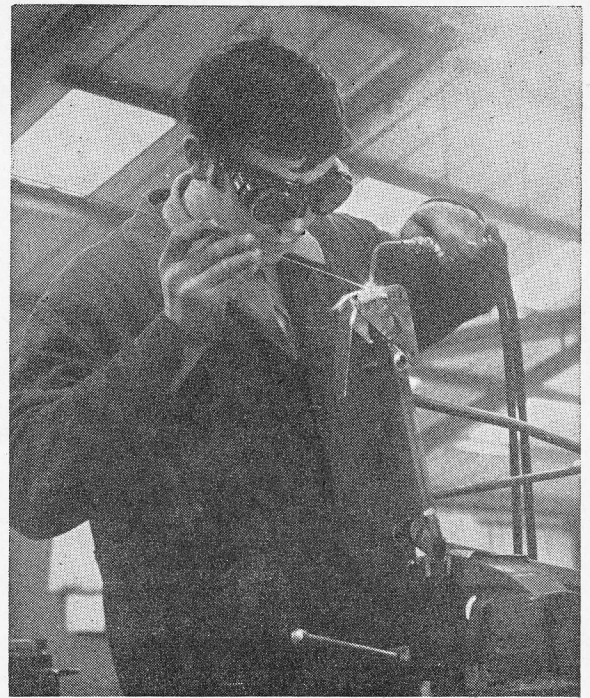
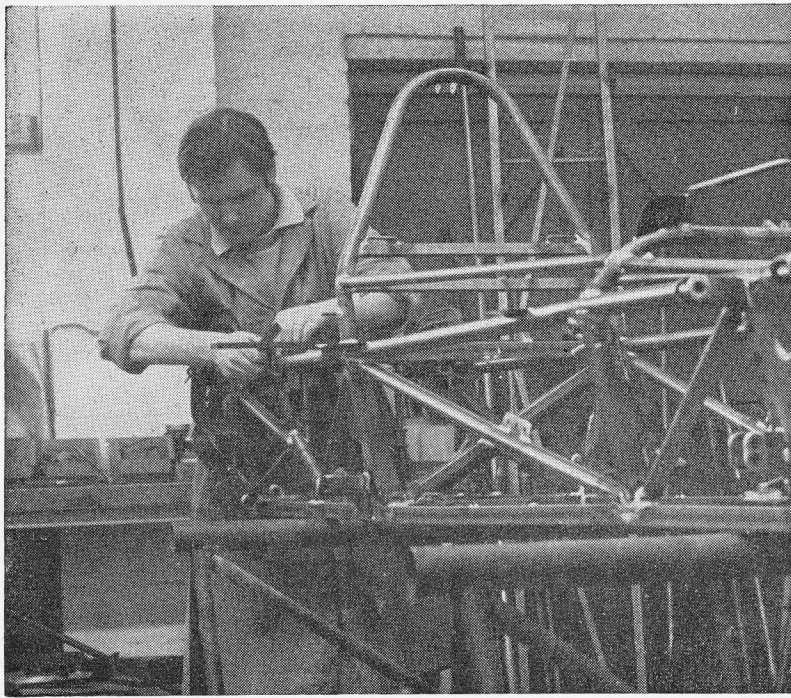
Such is the demand for the tubular chassis—"we've never done a monocoque simply because we haven't been asked to, but we will . . ."—that the Huntingdon factory has recently had a large extension, and now their major problem is the recruitment of skilled labour—"with both staff and space," says Robinson, "we can put our ideas on general efficiency into operation, and we can expand a bit all the time to keep pace with demand." However, their future plans not only include more racing cars, but wider horizons, once they can keep ahead of the demand for chassis. "We're prepared to turn to anything in the world of fabrication." Besides their early rayon plant work, Arch have built 80 crop-spraying trailers, as well as doing various fabrication jobs such as making up suspension components for the McLaren F1 team and the Honda F1 car.

Currently there are 40 employees on the books of Arch Motors, divided on welding and fitting, and they are averaging an output of about 20 chassis per week, and hoping to increase that figure in the coming months. Robinson is Managing Director of the firm, with Ted Young largely responsible for setting up the production lines, and his brother acting as Works Manager.

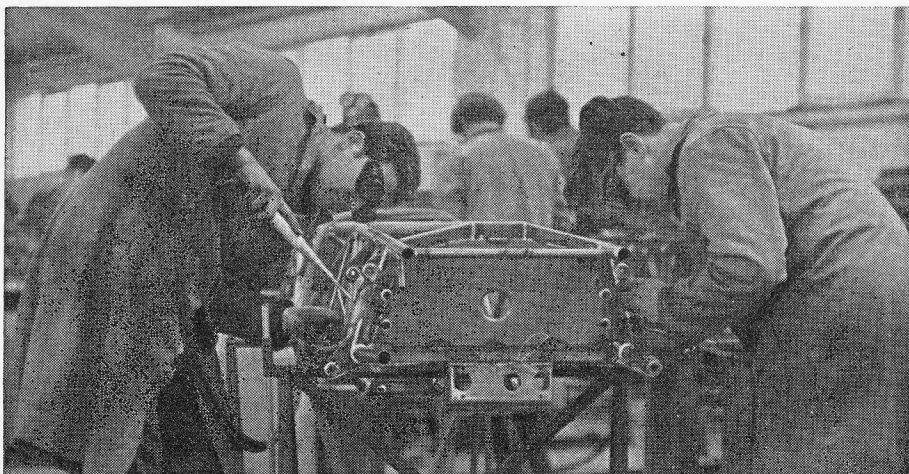
Few people know of the specialist techniques involved in making a space-frame chassis. The process begins with the manufacturer, who supplies accurate drawings of what he wants. A "basic" chassis is then made in metal by AM, and "when the bugs



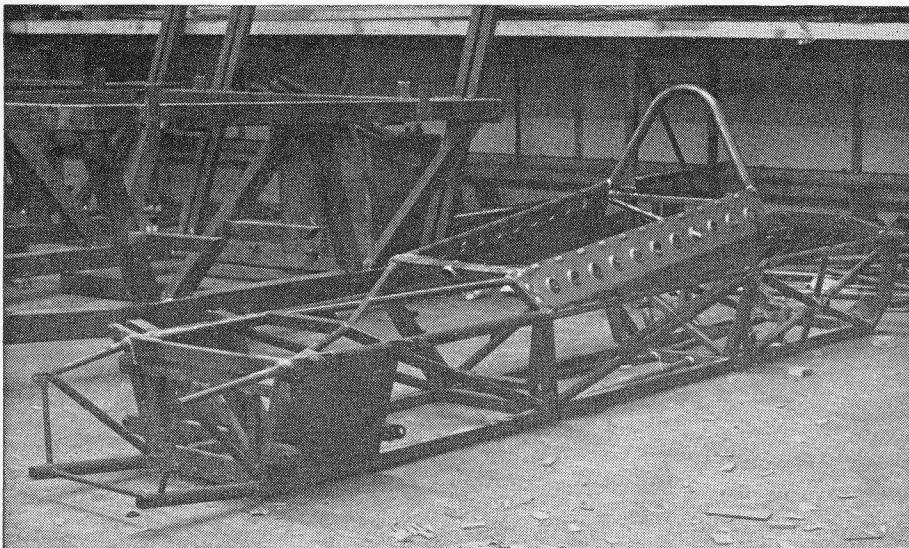
New Zealand F3 driver Bill Stone has spent the winter months working on chassis; here he is preparing to put the finishing touches to a chassis on the main jig.



*Prefabricated chassis members are mated to the frame on the main jig; here parts are just being clamped to the chassis ready for welding. Prefabrication in the making (right): a bracket is welded up ready to fit onto the main jig.*



*The finishing touches are made to a tubular frame, which spends as little time as possible on the main jig.*



*The end product: a new Palliser Formula B chassis, which has left the jig and now awaits only the stove-enamel finish.*

are all ironed out, we jig it fully." The building of the jig—"this is one of our problems, we can't get enough skilled men"—is a relatively large operation, which on average will cost £260. A steel framework is made up from the manufacturer's drawing with all the major parts of the chassis sized on the jig, a good example being the suspension pick-up points. As many jig parts as possible are made detachable so that when a crashed chassis does come back for realignment there is more likelihood of being able to get it back on the jig. The drawings are always followed strictly—"we never make any design changes, but we sometimes suggest some to make production easier. We've never designed a complete car, but we probably could do from what we've learnt."

Four cutting machines are used to size tube to length and there is another machine to shape tube ends to fit together. As many parts of the chassis as possible are prefabricated—"we like a chassis to spend as little time as possible on the main jig from a time point of view"—and then the chassis takes shape with pre-cut tube lengths going on to the jig and being welded up, growing as prefabricated sections are added. The chassis is then ready to be taken for stove enamelling in the paint shop. The frame is put into AM's oven and the paint is baked at 250 deg F, and after an hour, it has a dark grey, durable finish.

One of Arch's big concerns at the moment is to keep up a smooth production flow. At Huntingdon their working space is split up into a small office, a divided main assembly area with stores department at one end, and the paint shop. "By prefabricating we don't have a whole cluster of people around the main jig, which is much more efficient." Thus while one man prepares Lotus 7 main side sections, for example, another can be forming the chassis on the jig. Then the prefabricated sections are added and the chassis gets baked, and so the process goes on.

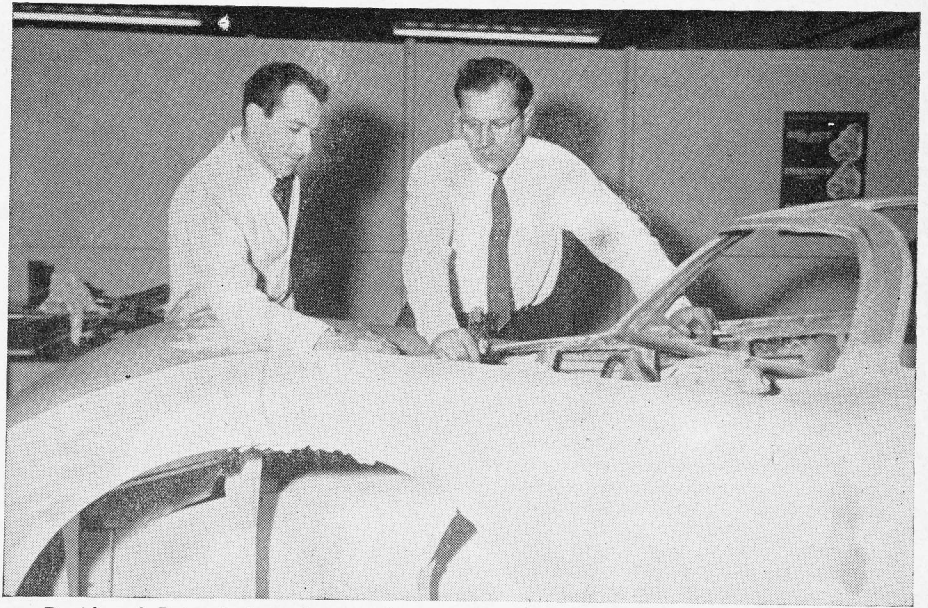
It's worth bearing in mind at a circuit that Arch Motors, little known outside the trade, make the chassis for Lotus 7s, FF 61s, F5000 Lola T142s, F2/3 Brabhams, F3/FF Merlyn's, GT/F3 Chevrons, F3/FF Titans, U2s, F3/FF Alexis, FF Royale and Unipower GT cars, which should entitle them to a little of the limelight after all!

### Specialised mouldings

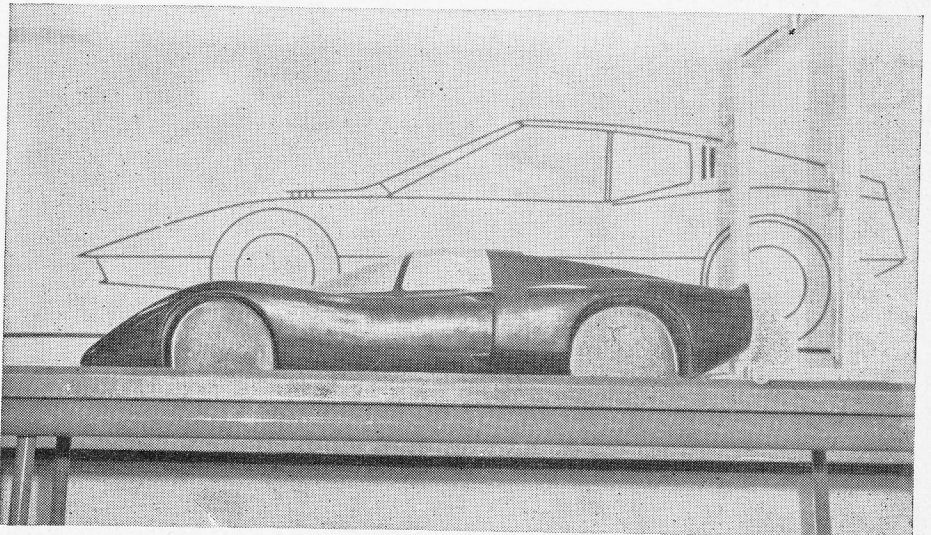
**L**IKE their long standing associates, Specialised Mouldings originally had no motor racing background. Peter Jackson, who founded the firm and runs it today, was an upholsterer for nine years. He was approached in the late 1950s to trim some glassfibre Adventurer motorcycle sidecars. This was his first real encounter with glassfibre—Fibreglass is a trade name—but soon the sidecar venture was abandoned when his partner pulled out. Peter's next partner was a man who had just left BEA—"he had about £2000 to invest and was looking for a suitable business." Peter got together with him and they decided to set up a firm making miniature plastic Vanwalls for children. However, this venture was shortlived: "after eight weeks—we had built the first pedal car and displayed it at a big plastics exhibition—he pulled out." That left Jackson on his own, but he was another person who had the fortune to meet up with Eric Broadley. "I showed him the Vanwall; he was impressed and asked if we could do anything on his sports-racer." That day in 1959 really marked the start of Specialised Mouldings and the start of racing car manufacture in Britain as it is today, with bodies and chassis sub-contracted to these two firms.

Specialised Mouldings' first premises were in a basement room under a secondhand shop in Thornton Heath with a small adjoining yard. "I explained that I had no money, so Eric and my bank manager lent me £50 each. We took moulds off Maurice Gomm's aluminium panels for the Lola." At this stage Peter's brother David left the army and joined: "although he didn't know anything about glassfibre at that time, his pattern-making experience was invaluable." Two more men were taken on in the backyard set-up and then Specialised contacted Cooper. Jackson says: "I think it was they who really put us on our feet; it was the time that glassfibre was really starting to be used." That work prompted their move to a more spacious builders' yard at Crystal Palace in 1960. A limited company was formed and they now had seven men working there. "We built up the broken down sheds there ourselves as we had no capital; they were the real blood and sweat days."

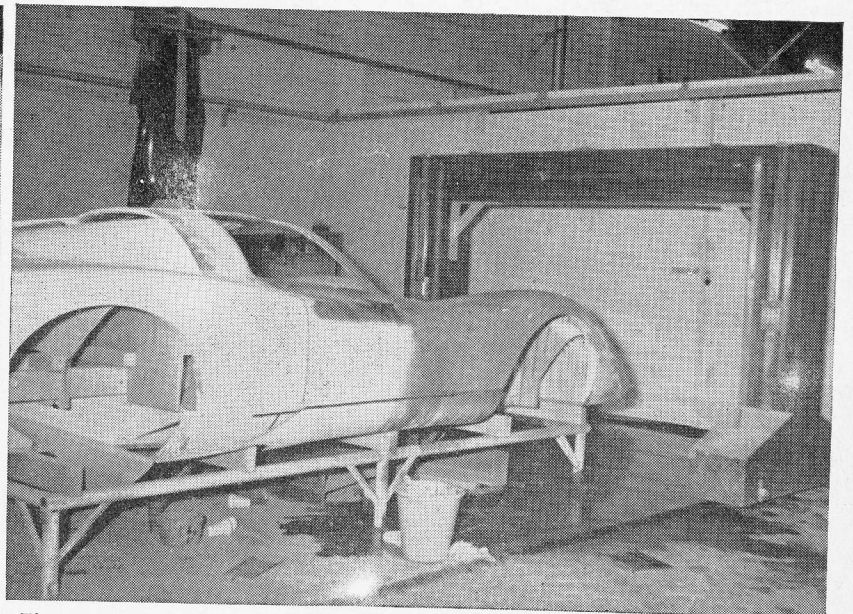
Besides car body building, Specialised were also delving in industrial work such as murals and film set equipment, notably for "Cleopatra." Ron Tauranac of Brabhams handed them the bodywork for the first MRD car in mid-1961. Merlyn later joined the fold,



David and Peter Jackson inspect the prototype McLaren M6GT body.



In the model/drawing section is the quarter-scale model of Chevron's new B16 G6 car with a miniature "Datum" bridge over it for taking accurate measurements.



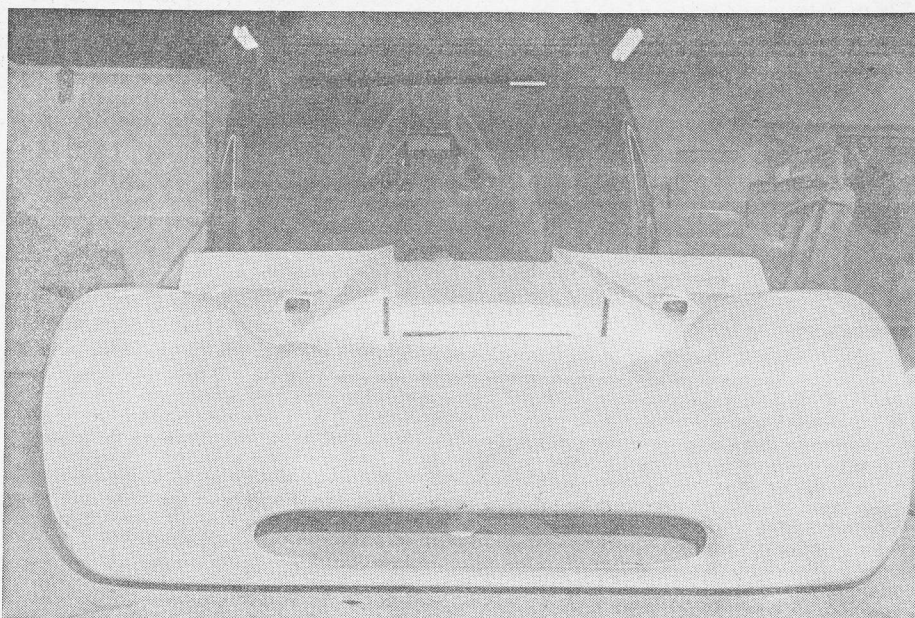
Carbon filaments are lined inside a Lola GT body (left). These recently-introduced filaments give added strength with less weight. In one of the prototype bays (right) work is taking place on the Chevron B16. The full-size "Datum" bridge slides to and fro on rails for measurements to be taken from all angles.

the Cooper contract was still going strong, and during 1963/64 they got plenty of work on the Broadley Lola and Ford GTs.

Jackson remembers the intricacies of the Ford GT episode well and praises Broadley highly. "Eric insisted on a fibreglass body and not an aluminium or steel one as they wanted. The master mould came over from Detroit in a big crate; I said the finish wasn't good enough and so they sent another. We split up into sections and did all the work on those first Le Mans cars." Lotus were next to come to Crystal Palace for their bodies and the Jackson Brothers supplied them with first F1 and then Indy bodyshells. Subsequently they co-operated on the F3 41 and Europa designs. Jackson for some time "had felt the need to make racing cars more attractive than they were in those days." Thus he employed his own stylist, Jim Clark, who worked in conjunction with Chapman on the styling of the 41, and freelance John Frayling, who did the same on the 46/47 series.

Methods have changed somewhat from the early days, when the procedure for a manufacturer was to give Specialised a quarter-scale model, from which they would make a master pattern and then take the moulds. "Nowadays on a lot of single-seaters especially, like the Titan, Chevron and Merlyn, the manufacturers give us a bare chassis and we model a body off them." The master pattern, which used to be of solid plaster, is now in a carvable plastic material—"racing cars are sculptured and then a mould is made and the master pattern destroyed." Once the glassfibre, which is impregnated with resin, has set in the mould, there is little afterwork to be done on a body section. The bodies are trimmed, ducting is put in and then they're polished ready for dispatch.

By 1966 the Crystal Palace premises were becoming a bit inadequate. "We put up another prefabricated building—it was a residential area and we couldn't get planning permission for a permanent place"—and so after discussing a move with Arch Motors, Specialised made the trip to Huntingdon and 10,000 sq ft of working space, taking with them 21 of their 22 staff. That was in January 1967 and now they have 43 workers. Peter Jackson is Managing Director, his brother David is technical director and works manager, and Jim Clark the stylist has his own department and is a director of their recently-formed subsidiary Specialised Design Associates, who mainly do industrial consultancy work. Roughly two-thirds of the staff are on production work, which at the moment comprises Brabham BT28s and 30s, Chevron B8s, 15s and 15Bs, Merlyns Mk 11As and Mk 14As, Lola T70 Mk 3Bs, T142s and T162s, McLaren M6GTs and M10As, and then Unipower



*The end product, in this case a Lola T70 Mk 3B body, is suitably impressive; the colour is gained when the body itself is moulded.*

GTs, the Palliser and Lotus 41C Formula B cars and various prototypes. The remainder of the staff are on prototype work, which at the moment mainly consists of the just homologated McLaren M6GT and the G6 Chevron B16. Another great Specialised claim to glory was their Ferrari body for the V8 with which Surtees won the 1964 World Championship, and besides doing the revised ducted nose for the F1 BRM P138 last year, Specialised's latest styling exercise in conjunction with a manufacturer is the new F1 Cosworth.

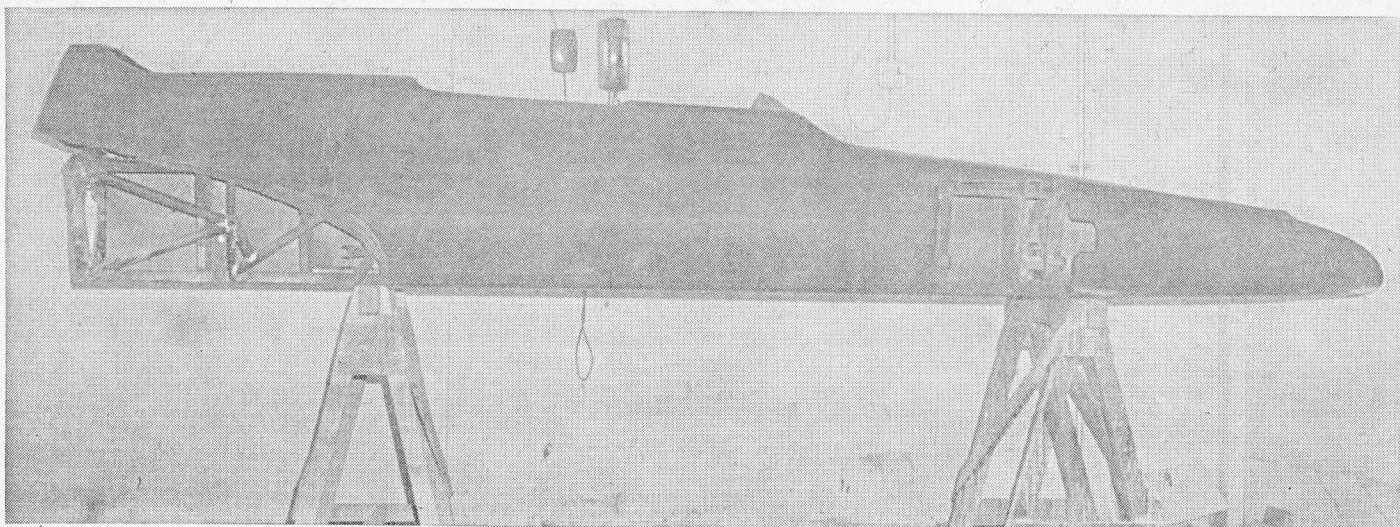
Sidelines apart from their work for industry and sculptors, including John Mills and John McCarthy, include the service which they currently offer to the big car manufacturers. "When they design a new car for, say, two years head, we can do a fibreglass body from a full-size clay mock-up much faster than they can do one in metal." Another new line started up in 1968 is the production of fibreglass hulls for the very rapid Class 3 speedboats.

At the moment the factory is split up into a fairly large production area, and four bays for prototype work, all with lockable sliding doors "so we can have one customer in to see his own car without seeing what the

opposition is up to." A quarter-scale model still forms the basis of any body, and when the customer is satisfied a master pattern will be made up, and from this the mould. A recent production innovation is the use of fine carbon filaments, which are lined inside the body. Developed at RAE Farnborough, these offer strength and mean that the body builder can make his panels 15% to 20% lighter without losing strength. They were first used in racing by the JW Ford GT40s at Le Mans, but recently the Penske Lola T70 Mk 3B with Specialised filamented-bodywork took the Daytona 24-hour race.

Specialised Mouldings, like their neighbours, have come a long way since their 12 ft by 12 ft backroom, and they too have more plans for expansion. They would in particular like to undertake a road car series. If their growth rate continues at its present rate there is no knowing what they will be doing.

It only takes a brief look inside these two firms to see just how vital a role they are playing and, unlikely as it is, if Huntingdon's motor racing specialists shut down their doors, the racing manufacturing fraternity would find itself hard put to make the cars which they are now selling so well.



*After taking a quarter-scale model, a master pattern is built up from which the main moulds are taken. The master pattern, which is built from a carvable plastic material, is then destroyed. This is the master pattern for the wedge-shaped Palliser Formula B car, which has no orthodox radiator intake, but an underbody slat beneath the nose to which cooling air is directed.*