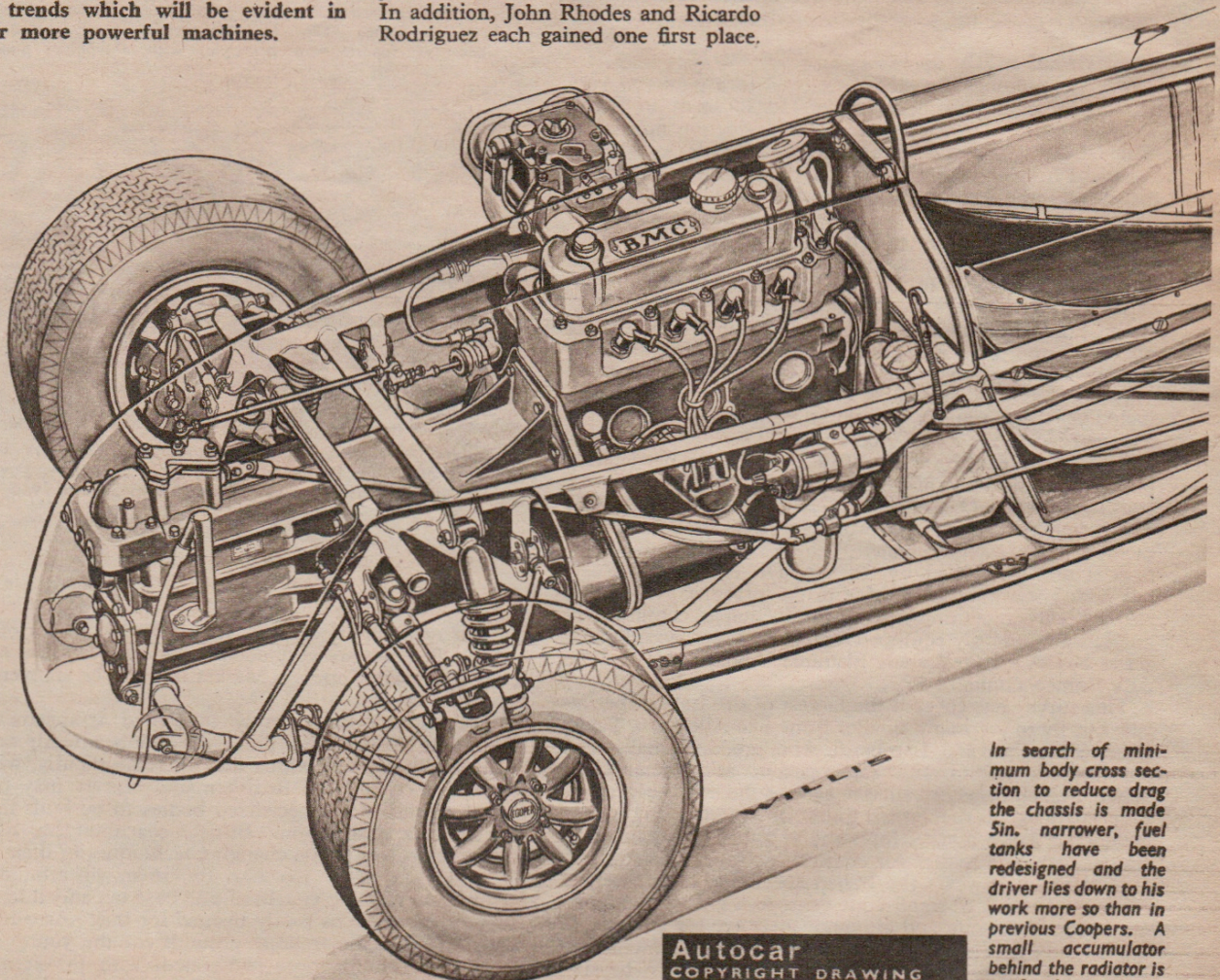


Quickly detachable glass fibre mouldings are employed for the shapely body; the driver is well protected by his Perspex screen and side fairings

Formula Junior Cooper-Austin

ALTHOUGH Cooper have not released details so far of their formula 1 car for this season, past experience indicates that their redesigned formula Junior model, seen at the Racing Car Show, should stress the trends which will be evident in their more powerful machines.

Last season Cooper cars had a successful year in formula Junior racing, particularly on the Continent, and those raced as a team by Ken Tyrell and driven by Tony Maggs and John Love secured a total of 11 wins. In addition, John Rhodes and Ricardo Rodriguez each gained one first place.



In search of minimum body cross section to reduce drag the chassis is made 5in. narrower, fuel tanks have been redesigned and the driver lies down to his work more so than in previous Coopers. A small accumulator behind the radiator is for the starter

Autocar
COPYRIGHT DRAWING
© Iliffe Transport Publications Ltd. 1962

Their latest model, although basically similar to last season's, is built to the 1,100 c.c. weight limit of 400kg (882lb), and the engine, supplied by the B.M.C. Competitions Department ready to race, is the modified "A" series unit. The capacity is increased from 948 c.c. to 1,095 c.c. by enlarging the cylinder bores to 67.6mm; power output at the present stage of development by Morris Engines is 95 b.h.p. net at 7,500 r.p.m. More power may yet be extracted as development proceeds.

The compression ratio has been raised to 12-to-1 and the cylinder head extensively modified, larger valves

being fitted. The camshaft, of course, is entirely new, giving extended valve opening periods and more overlap; a stiffer crankshaft has been fitted although bearing sizes remain unchanged. A dry-sump lubrication system is employed, a spur-gear scavenge pump being driven by skew gears from the camshaft. The pump is fitted in place of the original mechanical fuel pump.

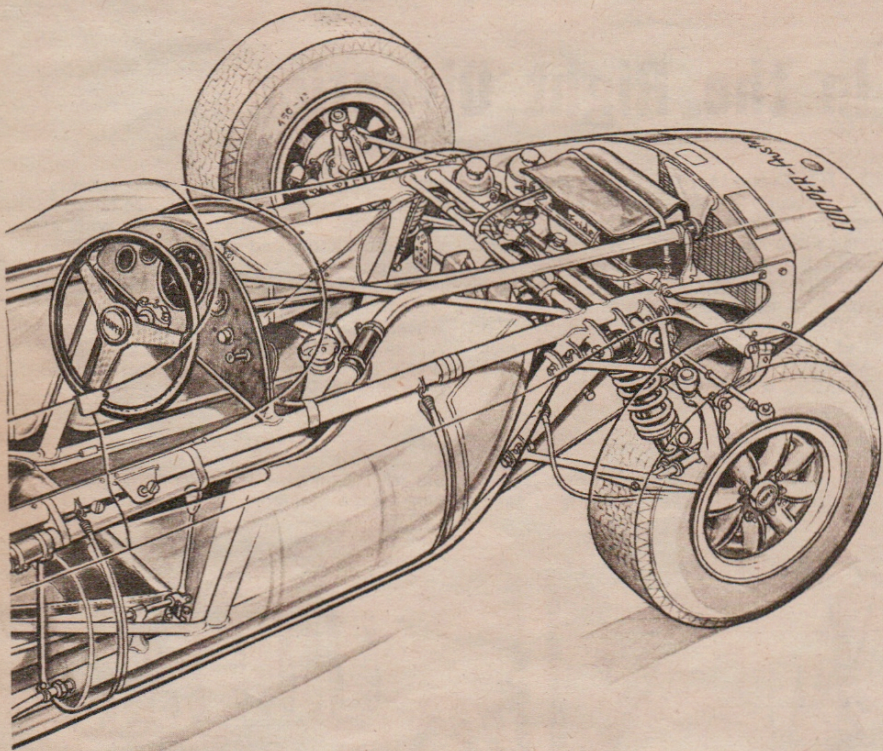
As before, the engine is mounted vertically, ahead of the rear wheels, which it drives through a Borg and Beck diaphragm-spring clutch with sintered linings. A pair of spur transfer gears (to reverse direction of drive

and to lower the engine mounting position) and a five-speed gearbox and spiral bevel final drive complete the assembly. As on the previous cars, this comprises a Citroen gearcase and Cooper constant-mesh gears with dog engagement. On the latest car, first gear has been modified so that it may be used during racing as well as for starting.

Since weight is controlled by regulations and cannot be reduced, the methods by which race speeds of formula Junior cars can be raised are by increasing power output, reducing frontal area and improving roadholding. Frontal area of this latest Cooper-Austin has been reduced substantially in two ways. First, the four longitudinal members of the multi-tube chassis frame have been brought closer together so that, as the fuel tanks beside the driver have also been reshaped, the body has been narrowed by 5in. Secondly, a semi-reclining driving position has been adopted, enabling the upper frame tubes and the body contour to be lowered by 1.5in.; the top of the driver's helmet is now only about 31in. above the ground.

The two fuel tanks, of smaller cross-section, extend well forward towards the driver's feet and their front sections bulge archwise over his legs. Because of the different driving attitude there is less space in the nose, and the light-alloy oil tank is now mounted between the engine and the driver's backrest. A new combined radiator and oil cooler is shaped to conform with the body outline, and this has enabled the nose section of the body to be made slimmer.

Front and rear tracks are 1in. wider, and this, together with the reduced frame width, has made longer suspension wishbones necessary. The inner pivots of the top wishbones have been lowered, which has the effect of raising the roll centre of front and rear suspensions from 3in. to 4.66in. and 4.72in. respectively. One effect these changes have made on the handling



SPECIFICATION

ENGINE (AUSTIN)

No. of cylinders	... 4 in line
Bore and stroke	... 67.6 x 76.2mm (2.66 x 3.0in.)
Displacement	... 1,095 c.c. (67.39 cu. in.)
Valve position	... Overhead, pushrods and rockers
Compression ratio	... 12-to-1
Max. b.h.p. (net)	... 95 at 7,500 r.p.m.
Carburettor	... Dual-choke Weber 45 DCO E
Fuel pump	... S.U. electric
Tank capacity	... Left: 6 Imp. gall. (27.3 litres) Right: 4.5 Imp. gall. (20.4 litres)
Oil tank capacity	... 2 gallons (9.1 litres)
Oil filter	... Full flow
Cooling system	... Pump circulation, pressurized
Battery	... 12 volt

TRANSMISSION

Clutch	... Borg and Beck, diaphragm spring type, 7in. dia.
Gearbox	... 5 forward speeds, dog engagement. Right-hand change
Overall ratios	... Top 4-01, 4th 4-67, 3rd 5-48, 2nd 6-45, 1st 8-41 to 1 (alternative overall ratios by transfer gear combinations)
Final drive	... Spiral bevel, 3.44 to 1

CHASSIS

Brakes	... Lockheed discs, front and rear. Independent hydraulic systems
Disc dia.	... Front, 9.25in. Rear, 9in.
Swept area	... Front, 131 sq. in. Rear, 127 sq. in.
Suspension: front	... Wishbones and coil spring-damper units, anti-roll bar
rear	... Independent, double wishbones, coil spring-damper units
Dampers: front	... Armstrong adjustable telescopic type AT9
rear	... Armstrong telescopic type GT7
Wheels	... Cast magnesium alloy, bolt on, 5in. wide rim
Tyre size	... F. 4.50-13in.; R. 5.50-13in.
Steering	... Rack and pinion
Steering wheel	... 13in. dia, three spoke
Turns, lock to lock	... 2

DIMENSIONS (Manufacturer's figures)

Wheelbase	... 7ft 5in. (226cm)
Track: front	... 4ft 2.5in. (128.3cm)
rear	... 4ft. 1.75in. (126.4cm)
Overall length	... 11ft 6in. (350.5cm)
Overall width	... 4ft 7in. (139.7cm)
Overall height (to top of roll bar)	... 2ft 7in. (78.7cm)
Ground clearance	... 4.5in. (11.4cm)
Weight (with water and oil)	... 882lb—7.86cwt (400kg)
Weight distribution (with driver and 4 gallons of fuel)	... F, 44 per cent R, 56 per cent

Formula Junior Cooper-Austin . . .**CONCLUDED FROM PAGE 181**

characteristics is that the driver is made more aware, and has better warning, of the cornering forces at the tyres as these build up. During comparative tests at Silverstone on the Grand Prix circuit, lap times were consistently improved by 1.5sec over those with last year's car.

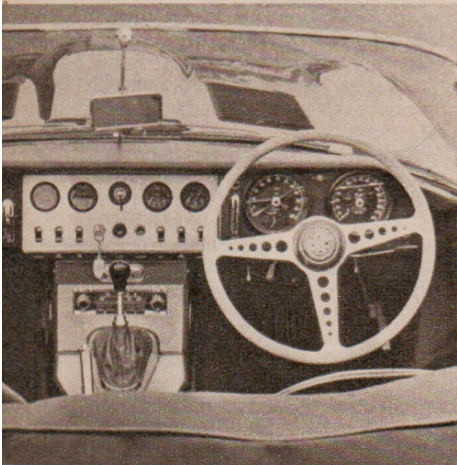
The coil spring-damper units are set at a steeper angle and it has been necessary to redesign the springs, although the suspension rate at the wheel remains about the same as

before. The rear dampers are now Armstrong GT7 with inverted mounting, the damper cylinder being pivoted to the chassis to reduce unsprung weight. At the front, the adjustable Armstrong units are retained, so that settings can be varied as required. An anti-roll bar has been found necessary only at the front.

Lockheed disc brakes are fitted on all wheels, the caliper assemblies being the same as those used on the Austin Mini-Coopers. The discs, however, are

larger than on that car, being 9.25in. at the front and 9in. at the rear. Magnesium alloy cast wheels are retained, having the wide 5in. rims; Dunlop D9 or D12 racing tyres of 4.50in. section at the front and 5.50in. at the rear are fitted.

Formula Junior racing should be livelier and harder fought than ever with these machines on the circuits—not that further stimulus is needed! Already 30 have been ordered; their price is £1,600 unassembled.



In the Right Direction

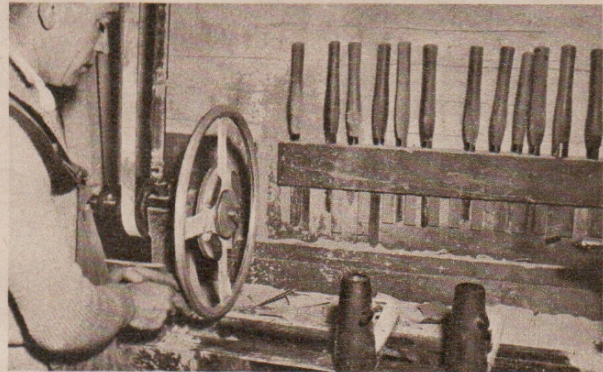
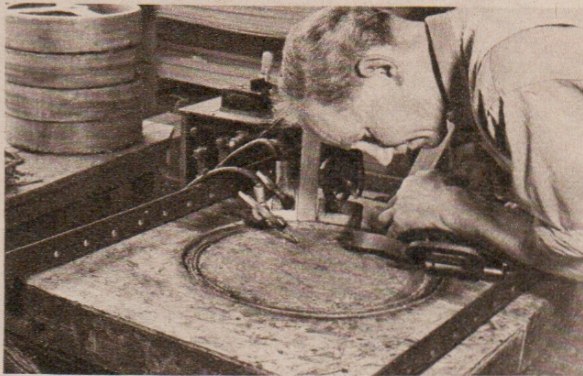
WOOD-RIMMED steering wheels are usually considered the mark of the sporting driver, but on the faster cars they are a safety factor. A case in point is the E-type Jaguar, where the slim wood rim gives precise control at the very high speeds of which the car is capable.

The Coventry Timber Bending Co. Ltd. have been making wood-rimmed wheels for Jaguars since the days of the Le Mans winning D-types. The wheels

are made from eight 3mm beech veneers 5½ft long and 4in. wide. These are bonded together in a specially made jig with a resin glue, and cured under low-frequency heating.

The "drum" of wood is then sliced into four pieces—each representing one wheel. Each wheel is then slit again and recessed to take the metal spider. The whole lot is then bonded together with a resin glue to form a very strong unit.

◀ Left: The finished article in an E-type Jaguar. Below left: setting the wheel rim in the glueing jig. Below right: hand-finishing the rim on a lathe ▶



DANGER IN THE AIR

A GENERAL MOTORS laboratory report issued recently in the United States shows that motor vehicles are responsible for only 2 to 10 per cent of the 3.4 benzpyrene in city and town atmosphere. Benzpyrene is a carcinogen—a cause of cancer—and has been shown that under laboratory conditions it can cause cancer in mice.

The remaining percentage apparently

comes from the burning of other carbon containing materials such as coal, fuel oil, natural gas and rubbish. However, benzpyrene is only found in trace quantities in urban air.

The sources of benzpyrene from a motor vehicle are the exhaust and crankcase blow-by. In all, seven of the 24 aromatic hydrocarbon products were found to be carcinogenic, but to a lesser

degree than benzpyrene. The crankcase blow-by percentage of the substance was only 4 per cent of the total.

At present scientists are puzzling over the quantities of 3.4 benzpyrene in relation to vehicle density. Concentrations have varied from 1.9 micrograms per 1,000 cu. m. to 29.9 micrograms per 1,000 cu. m. Los Angeles, which has one of the highest traffic densities in the United States, has a very low concentration, despite adverse weather and natural ventilation problems.