

**CAR and DRIVER
ROAD RESEARCH REPORT**

AC Cobra

*The AC chassis gets a 4,261-cc dose of
just exactly what it's always needed*

CONTINUED

AC COBRA CONTINUED

Very simply stated, the AC Cobra attained higher performance figures than any other production automobile we have tested. And it did it with the "street" engine.

When Carroll Shelby builds a hot-rod, he doesn't settle for any old chassis. In this case he has chosen one that has figured largely in hybrid projects for some time, and with great success. Coupling the stout AC chassis and lightweight AC body with a souped-up Ford engine, Shelby has come up with an extremely track-worthy sports car of very high performance indeed.

AC introduced the Tojeiro design as the AC Ace in 1954, powered by the ancient long-stroke six-cylinder overhead-valve two-liter. In 1956 AC made a deal with Bristol to use the famous BMW-derived Bristol power plant, and the AC-Bristol became a respected competitor in sports-car racing. The next engine option was the 2.6-liter Ford Zephyr engine, introduced in 1961, and now we have the Cobra.

As a fourth-generation hybrid, the car must be considered in light of its true purpose—SCCA class warfare. For such usage, it is accurately aimed, and viewed in that light the secondary considerations such as street use must necessarily come off second best.

Traffic, for instance, presents some uncomfortable problems. With the Cobra's very powerful engine developing maximum torque at 4,800 rpm, its high gearing, and its fierce clutch, every stop and start presents an interesting challenge in turning noise into motion. Its poor steering lock makes parking and maneuvering highly complicated. And finally, the battery does not get enough input current to cope with low-rpm running under normal conditions, let alone when using the heater, headlights, wipers, and the inadequate electrical fan mounted in front of the tilted radiator.

Tasca Ford of Providence, Rhode Island, which supplied the test car, suggested a smaller generator pulley to cure the constant discharge problem. A better solution might be the alternator, since it is already optional for the 260-cubic-inch Ford V-8 that is used in both Fairlanes and Galaxies.

If the car presents problems in traffic, one would assume that they would be dissolved by the open road—the opener and the more like a race course the better. In fact, the effortless sort of cruising that the car's performance would seem to

promise is considerably handicapped by the encroachment on passenger space that the big V-8 makes. The engine is set back in the chassis enough so that the driver's accelerator foot gets cramped after a while in the only possible position (with the right leg bent inwards, toward the other, at the knee). Some relief is afforded by the long pedal travel of the throttle control, but it only comes with variations in speed.

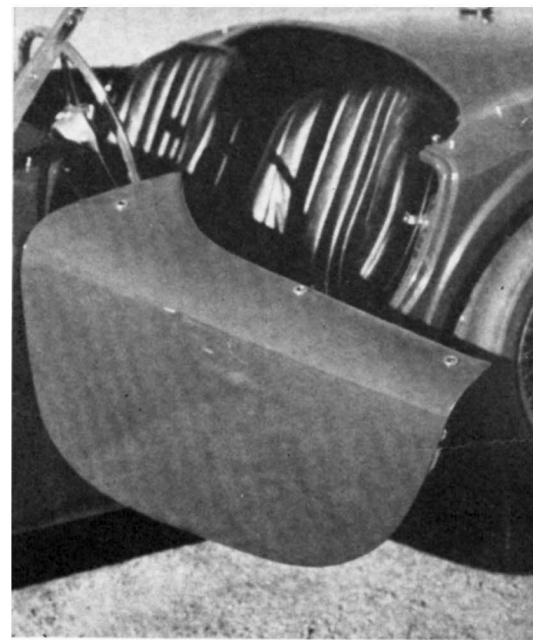
On the credit side, in regard to the driver's creature comforts, is an interesting refinement in the clutch and brake pedals. These are hinged below floor level, and also at the pedal faces. As a result, the pedal faces maintain a constant total contact with the sole of the driver's shoe regardless of the depression angle. The pedals are set closely enough together to allow room for the left foot beside the clutch.

Classic simplicity is the term that first comes to mind for describing the AC chassis (designed by John Tojeiro for his own sports-racing car in 1952 and subsequently taken over by AC). The frame consists of two large-diameter steel tubes with heavy cross-members front, center, and rear. Narrow-diameter tubes are used to support the all-aluminum body. All wheels are independently suspended by means of lower wishbones and upper transverse leaf springs. The result is a chassis that has given away nothing, as far as handling goes, in production-class racing since its introduction.

John Tojeiro also designed the body, a sleek shape reminiscent of the Ferrari 166 Mille Miglia.

Design work on Ford's Challenger V-8 engine began in 1958 under the leadership of Robert F. Stirrat. Weight reduction became a main objective during this period, and Ford aimed at producing a cast-iron engine that could compare in weight with an aluminum power unit of similar displacement. The decision to use cast iron was based on such advantages as the graphite content in its matrix, which serves as a lubricant in itself and also attracts and holds minute particles of engine lubricant, thus further reducing engine wear. Cast iron also has excellent sound-damping qualities, and tends to damp vibrations. Thermal expansion characteristics are nearly ideal, assuring proper clearances at all operating temperatures.

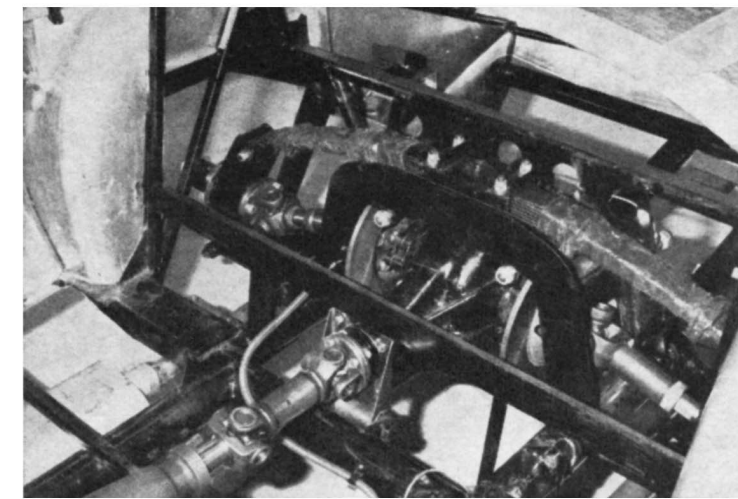
Aided by Ford Foundry's latest techniques in thin-wall casting, with extensive use of resin-bonded cores, Stirrat came up with an engine that (text continued on page 70; specification and performance data overleaf)



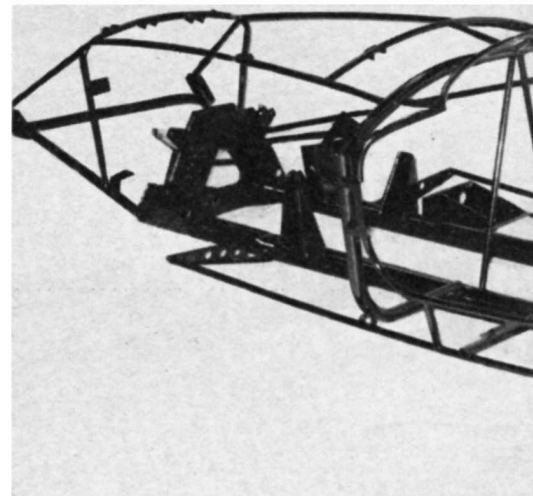
Good-sized doors swing open wide enough to give surprisingly easy entry and exit.



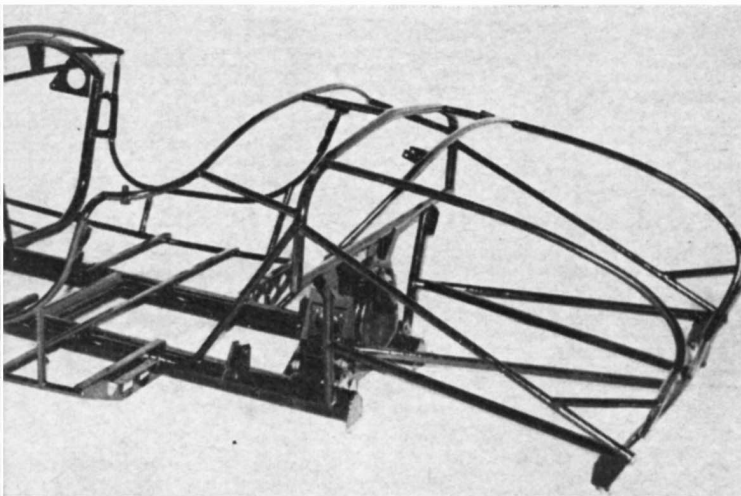
Soft top allows plenty of headroom but somewhat spoils the beautifully clean lines of the car in its open roadster form.



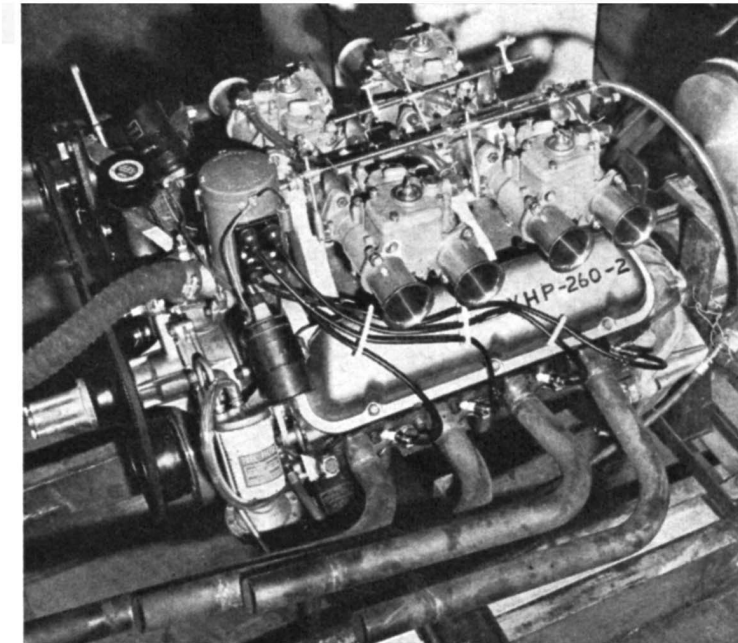
Inboard disc brakes were used on the prototype, but when the production models were coming off the line they were outboard.



The basic ladder-type frame provides a rigid structure for the engine and the



drive train, and the light framework is more than adequate for the unstressed-skin aluminum body manufactured by AC.



With four Weber carburetors (optional) and full race tuning the Ford Challenger 260-cubic-inch V-8 will develop 335 bhp.



Its Goodyear tires protruding beyond the bodywork, the AC Cobra has an air of ex-



treme purposefulness, no doubt calculated to intimidate the opposition on the track.



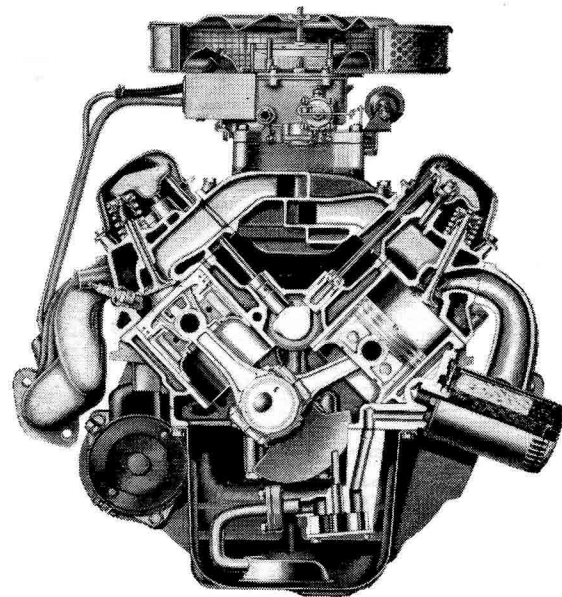
Strictly a two-seater, the Cobra has both a large fuel tank for covering long distances in the day and a trunk capacity of adequate size for weekend trips.

Road Research Report

AC Cobra

Importer: Shelby American, Inc.
1042 Princeton Drive
Venice, California

Number of U.S. dealers: 16
Planned annual production: 1,000
Value of spare parts in U.S.: Not available due to origin of components.



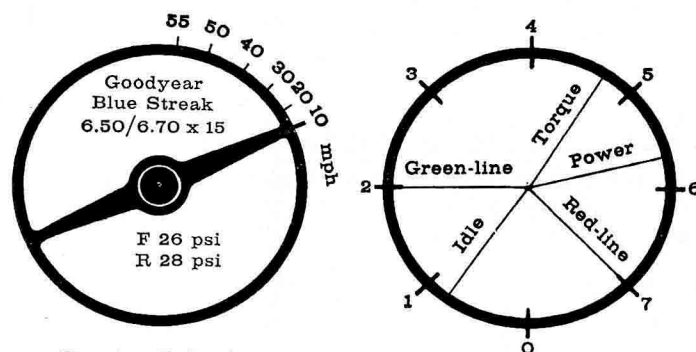
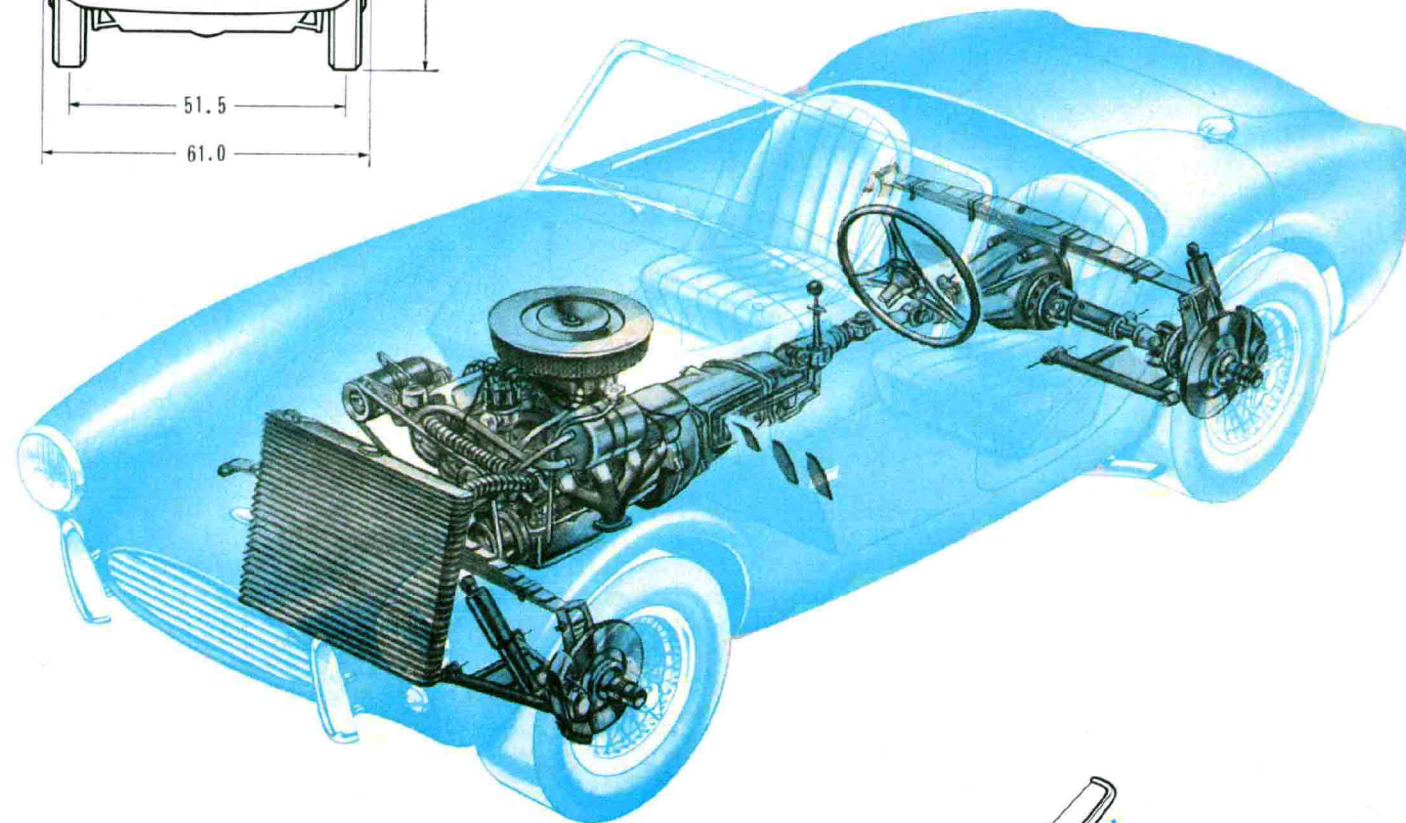
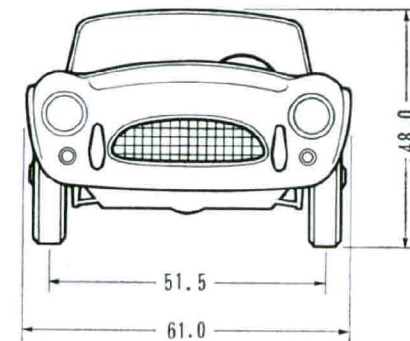
PRICES:
Price as tested.....\$5,995

OPERATING SCHEDULE:
Fuel recommended Premium
Mileage 12-18 mpg
Range on 19-gallon tank 230-340 miles
Oil recommended SAE 10W-30 HD
Crankcase capacity 5 quarts
Change at intervals of 5,000 miles
Number of grease fittings 8
Lubrication interval 1,000 miles
Most frequent maintenance Grease steering-swivel pins every 200 miles for the first 2,000 miles.

ENGINE:
Displacement 260 cu in, 4,261 cc
Dimensions 8 cyl, 3.80-in bore, 2.875-in stroke
Valve gear Pushrod-operated overhead valves
Compression ratio 10.0 to one
Power (SAE) 260 bhp @ 5,800 rpm
Torque 269 lb-ft @ 4,800 rpm
Usable range of engine speeds 2,000-7,000 rpm
Carburetion Single four-barrel Holley carburetor

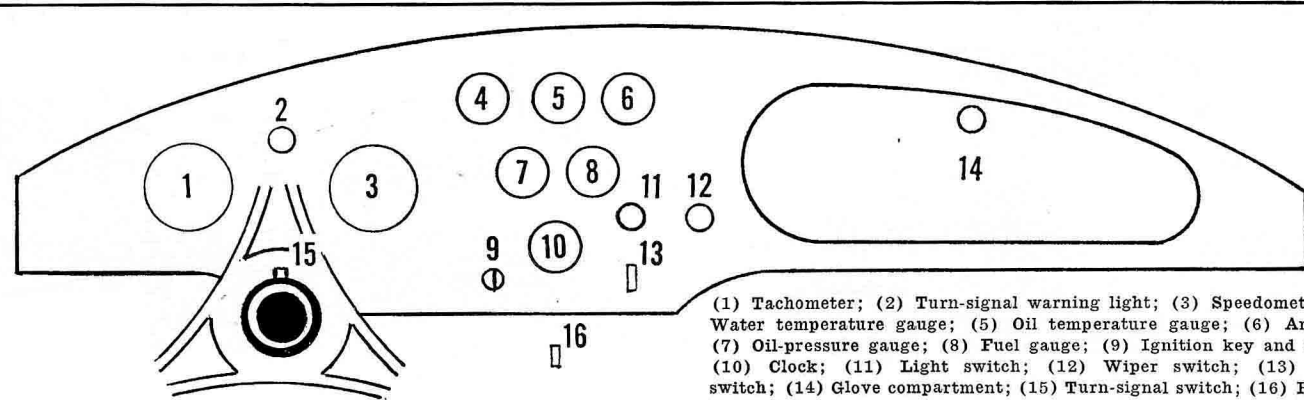
CHASSIS:
Wheelbase 90 in
Tread F 51 in, R 52 in
Length 154 in
Ground clearance 7.0 in
Suspension: F: Ind., lower wishbones and transverse leaf spring, anti-roll bar. R: Ind., lower wishbones and upper transverse leaf spring.
Steering Worm and sector
Turns, lock to lock 1 1/2
Turning circle diameter between curbs 40 1/2 ft
Tire size 6.50/6.70 x 15
Pressures recommended Normal F 26, R 28 psi
Brakes Girling 12-in discs front, 11-in rear, 512 sq in swept area
Curb Weight (full tank) 2,120 lbs
Percentage on the driving wheels 51.5

DRIVE TRAIN:
Clutch Single dry plate
Gear Synchro Ratio Step Over-all 1,000 rpm Mph per Rev
1st Yes 2.42 — 8.54 —9.65
2nd Yes 1.78 33% 8.36 9.9
3rd Yes 1.41 26% 6.30 13.1
4th Yes 1.00 41% 4.99 16.6
Final drive ratio 3.54 to one

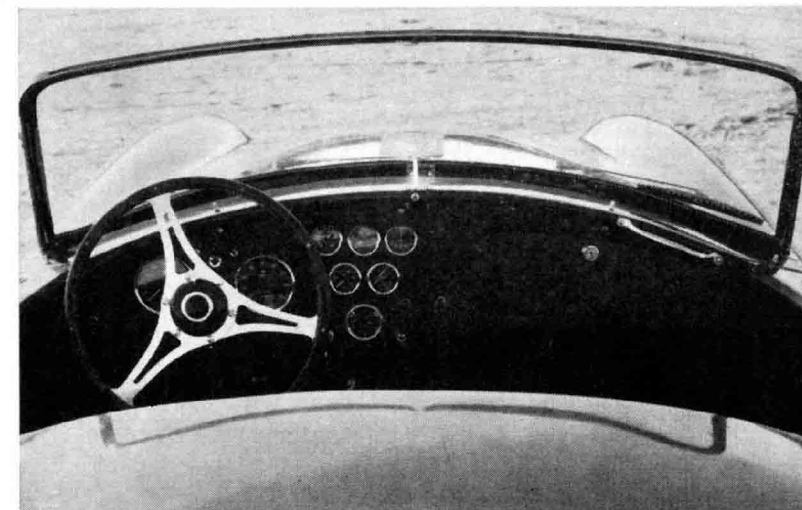
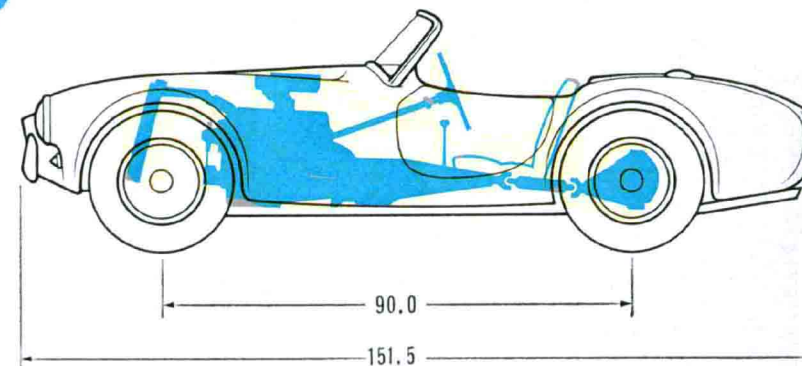
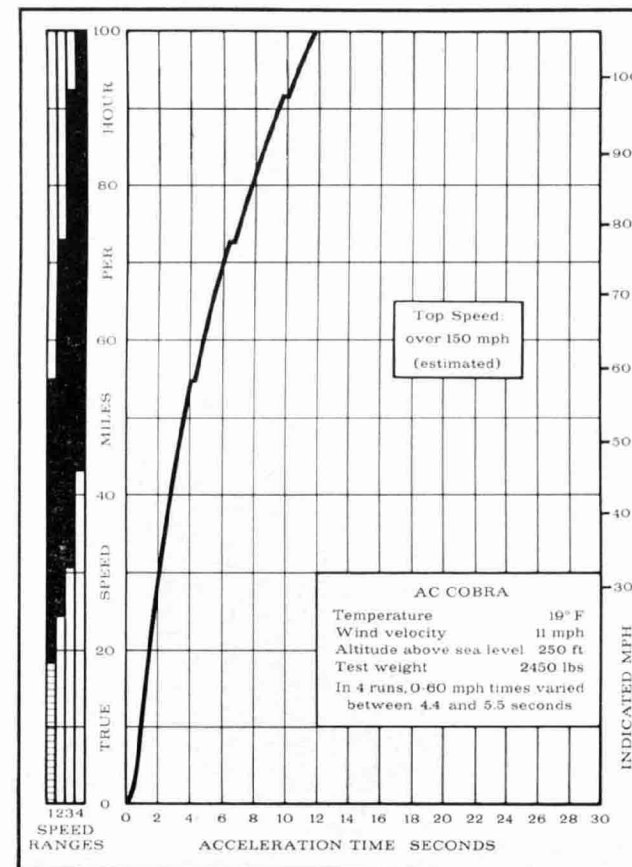


Steering Behavior
Wheel position to maintain 400-foot circle at speeds indicated.

Engine Flexibility
RPM in thousands



(1) Tachometer; (2) Turn-signal warning light; (3) Speedometer; (4) Water temperature gauge; (5) Oil temperature gauge; (6) Ammeter; (7) Oil-pressure gauge; (8) Fuel gauge; (9) Ignition key and starter; (10) Clock; (11) Light switch; (12) Wiper switch; (13) Heater switch; (14) Glove compartment; (15) Turn-signal switch; (16) Radiator fan switch



AC COBRA CONTINUED

weighed only 450 pounds complete.

Its dimensions are very compact—8.93 inches high, 16.36 inches wide, and 20.84 inches long. A study of the short and stiff five-bearing crankshaft indicated that about 70% of the total unbalanced couple could be balanced by means of normal crankshaft counterweights. Two external counterweights provide the other 30%, one mounted in front of the timing sprocket and the other as an element of the flywheel. No vibration damper was needed. Crankshaft stiffness is such that the fourth harmonic occurs beyond the normal engine operating range.

Shelby modifications include higher compression, a hotter camshaft and a four-barrel carburetor (Ford or Holley). As a power option, four Weber carburetors will be available, and in racing tune the engine puts out 355 bhp.

The cars are shipped complete, except for engine and transmission, from AC, and engines and transmissions are shipped from Ford to its dealers whom Shelby has authorized to carry out the installation. Our test car had the lesser state of tune (and had *not* been test-driven by Carroll Shelby). Even with the mild engine, the torque characteristics were incompatible with most street driving, with a flat spot below 2,000 rpm and a really devastating noise at maximum torque. We suspect that the valve clearances were off on the test car, not only because of the terrific clatter but also because the engine seemed to peak out before the 7,000-7,200 rpm that Shelby claims to get with ease.

During our acceleration tests, upshifts were made below 6,000 rpm, as no improvement could be seen by staying longer in the lower gears. The gearbox was not fully run in on the test car, and its movements were inclined to be stiff. The short lever and its precise gate should be just perfect, though, after another 5,000 miles or so.

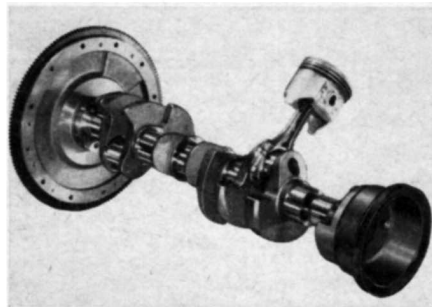
As has every other American high-performance car of recent times, Ford uses a Warner all-synchromesh transmission. The gear ratios are very well chosen, and close enough for racing, but it is a question whether a five-speed unit would not give better results. With the 3.5-to-one final drive, a starting gear is needed, and with a higher ratio, the car would be undergeared for many circuits. Perhaps next year will see further experiments in this direction.

Placed in a chassis with less of a racing tradition, the power of the

V-8 Ford would have been an embarrassment rather than an advantage. The center of gravity is located slightly towards the rear, and the rear wheels have a negative camber of about 3° in their neutral position, with just a trace of toe-in. This set-up is obviously made to reduce or annihilate oversteer—but it is still the tail that begins to swing wide when the limit is approached. Correction of such slippage is easy enough, with judicious use of power.

The existence of an actual limit of adhesion on a dry smooth surface seems to be a purely hypothetical question with the wide-section flat-profile Goodyear Blue Streak tires. Michelin X tires have always been an inherent part of the AC Ace design and if the Blue Streaks fitted to the Cobra are superior on a dry track, they certainly are not in the wet, on ice and snow, or on a rough or irregular surface.

Among the many advantages of independent rear suspension, the one that stands out on the Cobra is the



Precision-cast alloy iron crankshaft of V-8 engine is counterbalanced at ends.

unloading of the rear drive shafts and the resultant lack of wheelspin, in spite of the lack of a limited-slip differential.

As for comfort, the independent rear suspension makes absolutely no contribution, since the springing is so stiff and wheel travel so restricted. The whole car feels like so much unsprung weight at low speeds, and it does not begin to soften up until about 50 mph. At racing speeds it is highly satisfactory, each wheel staying on the ground and no more than one deflection per bump being permitted by the hard springs and the efficient shock absorbers.

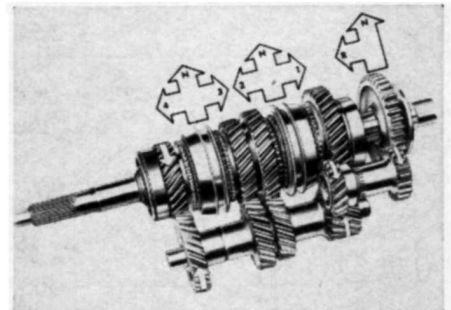
This ride gives the driver great confidence and helps improve his feel of the forces acting on the car, with the result that after a few hours at the wheel at high speeds he begins to feel like an integral part of the machine. Few modern sports cars can really give this impression—but then the AC Cobra is not so much a modern sports car as a traditional

sports car brought up to the minute.

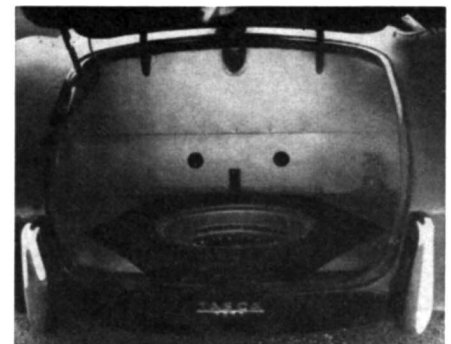
And this feeling is obtained more in spite of than because of the driving position. We were a little disappointed in the seats, which do not have enough backrest rake (and only fore-and-aft adjustment of the whole seat). The upright seating position is all right on a twisty circuit with plenty of arm- and footwork, but far from ideal on a fast course with sweeping top-gear bends. Since the steering is quite heavy at low speeds, turning the wheel is easier when it is located at less than arm's length. At speed, however, the steering becomes lighter, and as wheel movements are ultra-small, with 1½ turns lock to lock, most drivers would certainly prefer a more reclining position with almost straight arms.

Road shocks are felt in the wheel, but with such direct and ultra-sensitive steering, wheel movements are kept small and bumps could never alter the course of the car to any extent. Road feel is excellent, and corrections can be made almost before they become necessary.

Directional stability at speed is unusually good, regardless of crosswinds and road surfaces. The car can be controlled with a fingertip on a good road, and gentle curves call for no extra force. Under racing conditions, a reduction of steering-wheel work can be achieved by throttle steering, but even on a normal road it pays to look ahead, and with in-



Warner four-speed all-synchromesh gearbox has ratios close enough for racing.



Spare wheel is housed below trunk floor, thus providing good luggage storage space.

telligent driving, it is possible to reduce the physical effort considerably.

Caution when using the brakes on a slippery surface is imperative. The 12-inch discs have no power booster, but so little pedal effort is required that under extreme conditions most drivers are likely to apply too much force on the pedal rather than not enough. The ultimate stopping power on a dry surface is limited by locking of the rear wheels. The hand-brake is well placed and comfortable in use, but it is not of the fly-off type as on Ace-Bristols.

Without going the whole hog, HRG-fashion, the AC Cobra has a well-equipped instrument panel, with gauges to tell you the temperature of the oil as well as the water, large dials for MPH and RPM, and an oil pressure gauge—but why the clock? It is obscured by the driver's right fist most of the time, and when a clock is needed, it would hardly be considered reliable enough anyhow.

There is a roomy (relatively) glove box, but we were surprised to find there's no map-reading light.

English soft tops usually sacrifice a lot on the altar of lightness, and that of the AC Cobra is no exception. It is not flimsy, and the fastening is clever, but there is continual buffeting, rattles from the side windows, drafts and leaks everywhere. In addition to the side clips at the windshield edges, there is a slide at the center of the top of the windshield frame, with nailheads on the top securely fastened. The frame for the top is removable and may be stored separately in the trunk.

Every time we test a genuine 150-mph road car, the question crops up whether there is really adequate justification for their existence. In every case we have been convinced that there is. For people who enjoy traveling fast, the tremendous importance as a safety factor of a generous power reserve at all times cannot be overestimated. High-speed highway merges become routine and overtaking distances become amazingly short, so if not abused, the 150-mph sports car can be the safest yet simultaneously the fastest (it goes without saying) car on the road.

The AC Cobra is not as sophisticated or as well-integrated as the cars it is competing with both in price and in racing classification. It will be interesting to see if the phenomenal performance bias will "bring the car off" as a commercial success. Commercial or not, the hair-curling level of performance the Cobra provides will certainly give the ranks of big production-car racers pensive moments.

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