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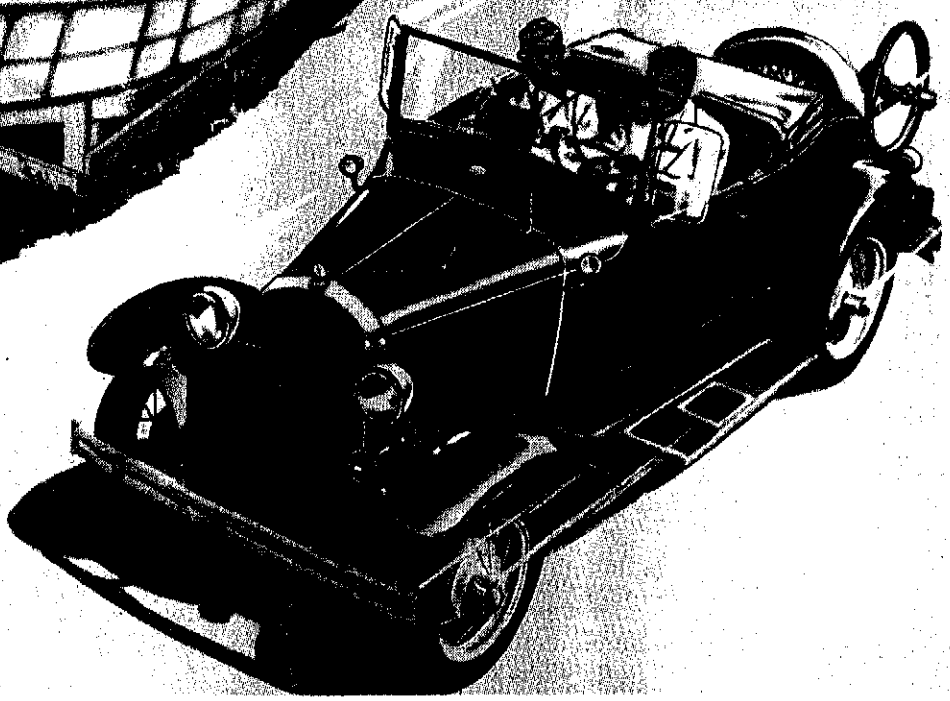
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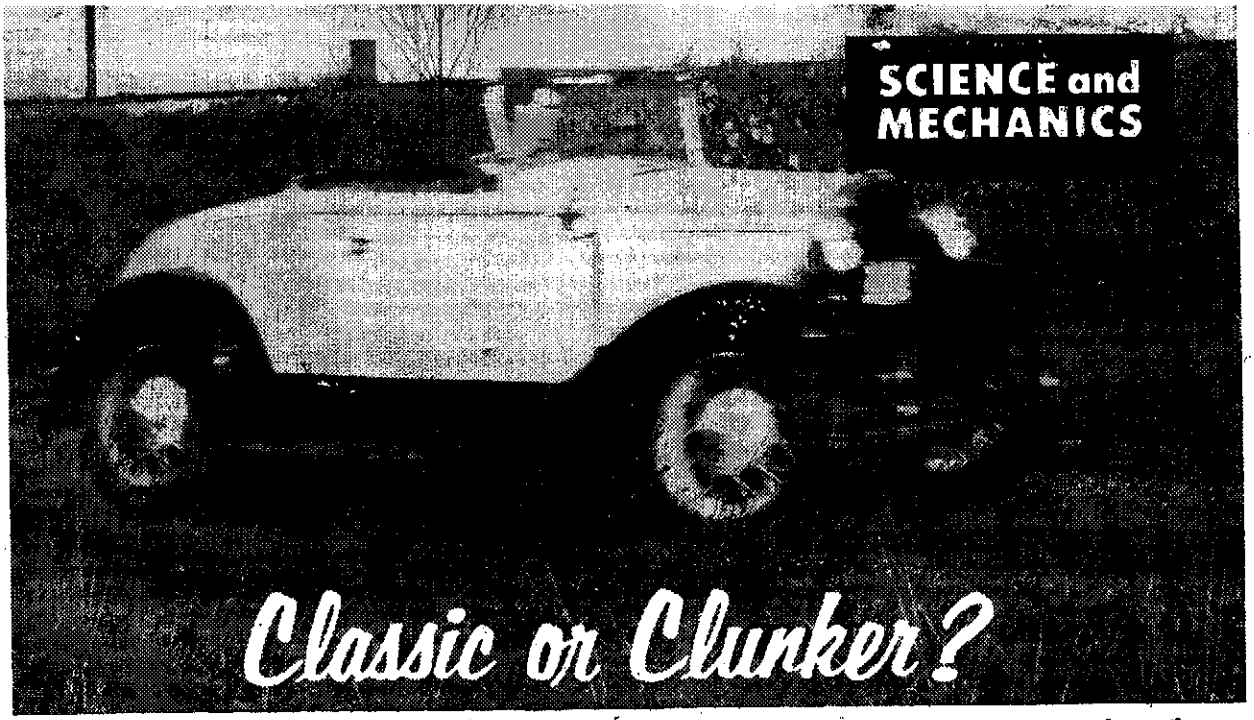
Cockpit Report on the World's Newest Amphibian



Classic or Clunker?
Testing the Model A Ford



How to Make a FIBER-GLASS BOAT without a Mold



Dusting down a country lane, the 1930 Model A showed itself to be full of bounce and jounce, but plenty willing.

What a Test on the 1930 Model A Ford Reveals

Foreword: This is the hired help talking. I'm the guy who tests cars for the editors of SCIENCE AND MECHANICS. And I'd like to report the conversation we had about this one:

Editor: *"It's time we tested another classic. How about the Model A Ford? I used to own one, and what a sweetheart she was . . ."*

Test Driver: *"Where do you get that 'classic' stuff? Most of those I've seen ended up as clunkers, even if they didn't start out that way."*

Editor *(dreamily):* *". . . There isn't a car on the road today that could compare with my old Model A . . ."*

Test Driver *(muttering to himself):* *"Backward, turn backward, oh time in thy flight. This editor is a child again, and not just tonight."*

Editor *(still dreaming):* *"Why I remember the time . . ."*

Test Driver: *"Never mind, Boss. Where's that Model A you want me to test?"*

AND so the argument goes. Is the Model A Ford a true classic, a car head-and-shoulders above others of its day, a car that can still be driven with pride in its soundly-engineered performance, and in the classic honesty of its lines?

Or is the car, as some would have it, just a renovated clunker, a sort of overgrown toy for rugged individualists to spend their hobby money on, in between Fourth-of-July Parades?

To find the answers to the questions, we borrowed a 1930 Model A Roadster from Jerry Beman of Northfield, Illinois, and tested it. Now this particular Model A is not a souped-up job. It was not rebuilt from stem to stern with special speed equipment, to make it perform far differently from the way a Model A was originally designed to perform. Instead, it was just such a car as you or I might buy—full of aches and age and the effects of 26 years of use and abuse. The speedometer registered 80,000 miles, but which time around that was, we wouldn't know.

Jerry bought the car last April, stripped off the old paint, then reprimed and painted it a canary yellow. Bumpers, windshield frame, spare tire cover, and other odds and ends were chrome-plated, seats were re-upholstered, and a new top was ordered (it's still on the way).

The engine ran, albeit not too happily. We did not grind the valves since compression was even from cylinder to cylinder. But we did install new sparkplugs and points, and timed the ignition for optimum acceleration. In this process, by the way, we noticed with pleasure how easy a tune-up job on this car would be. The gas tank is directly behind the firewall (about where they park the radios on today's cars), and this location allows

the gas line to the carburetor to be short and free from vapor lock. Also, because the tank is higher than the carburetor, no potentially-troublesome fuel pump is needed.

You notice other things about the engine, too, when you begin to get chummy with it. Such as how easy it would be to remove the head to grind the valves, or to service the generator or water pump.



Ford T-bird poses beside the Model A, which was also quite a sporister in its day. Note Boyce Moto-Meter, a thermometer locked in radiator cap which indicates water temperature for those with good eyesight.

Tied in with that engine are the manual spark and throttle controls on the steering wheel, and the hand choke combined with a carburetor adjustment. When you wanted to relax your feet on long drives, you stretched them out comfortably and controlled speed with the manual throttle lever. Also, there was nothing like that spark retard to shorten warm-up time on cold days, though we must admit warm-up time needed shortening then. And in case you don't remember, you could "lean" the carburetor by turning the choke lever clockwise.

How does the performance of this antique compare with that of a modern Ford? Since our tests on the 1957 Ford have not yet been made, let's use the figures on the 1956 Custom Ford we tested, for comparison. Here's what they show on fuel mileage:

	Miles Per Gallon				
	at 20 MPH	at 50 MPH	In Traffic	City-Country	Overall
1956 Custom V-8	21.4	18.7	12.3	16.9	12.7
1930 Model A	26.0	16.3	15.8	18.9	16.9

Only at 50 *mph*, on steady, level road driving, did the 1956 Ford prove more miserly than its older brother. And this is the kind of fluke result you'll occasionally get with an old, tired engine; that 16.3 figure for the Model A is definitely on the low side. With an engine in prime condition, we estimate you would obtain 19 *mpg* at a steady 50 *mph*.

The Model A excelled in gasoline economy primarily because of its low weight (2275 lbs. versus 3550 lbs. for the 1956 Ford) and, as a minor point, its manual shift transmission. If you compare the two cars on a ton-mile-per-gallon basis, you get the following figures:

	Ton Miles Per Gallon			
	at 20 MPH	In Traffic	City-Country	Overall
1956 Custom	46.4	26.5	36.4	27.4
1930 Model A	35.0	21.2	25.3	22.4

On this basis, the 1956 Ford clearly is more efficient than the old Model A, even though your pocketbook may not agree, since you pay on a miles-per-gallon basis. The reason the more efficient engines on today's cars can't deliver better mileage is simply that they have been saddled with more than enough extra weight to offset their improved efficiency. You get more speed out of the new cars, too, even though you do pay for it. Thus:

	HP and RPM	Compression Ratio	Weight	Top Speed	Rear Wheel HP
1956 Custom	173 hp at 4400 rpm	8	3550	95-100 mph	114 at 97 mph
1930 Model A	40 hp at 2200 rpm	4.22	2275	60-65 mph	28 at 48 mph

Along the same lines, a few reasons why ulcers and traffic deaths are increasing can be appreciated by noting the following:

	0-50 MPH (minimum)	Top Speed	Feet to Stop from Top Speed	Feet to Stop from 30 MPH
1956 Custom	9.75 sec	95-100 mph	450	45
1930 Model A	27.6 sec	60-65 mph	180	45

Although brakes have been improved, the wheels must still be locked for minimum stopping distances, and the coefficient of friction between locked tires and road has not changed appreciably with the years. Thus, at the same speeds, new cars have roughly the same stopping

Driver's Observations

ROADABILITY: Not too bad for 26-plus years of age. With shock absorbers ride is light but with its low top speed, never dangerous. Without shocks, ride is rough as a cob, and bumps tend to amplify. Takes corners well but lack of body support adds to feeling of sway. Doesn't bottom easily nor do front or rear bumpers drag on inclines. Steering no heavier than modern cars, with fast ratio but little front weight.

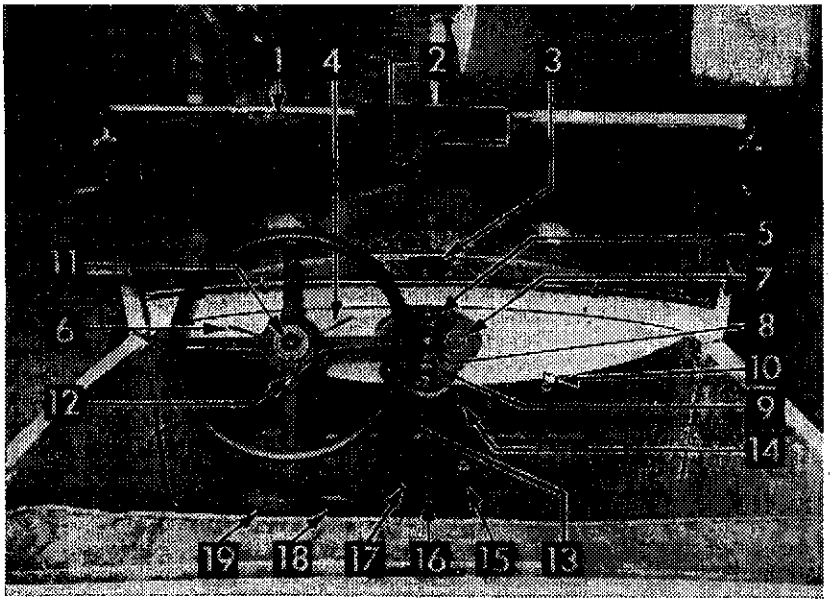
Front end seems light compared to modern cars, and spring suspension seems stiff. Little nosedown on braking. Acceleration poor but no urge to race or even to go fast—30 *mph* is best cruising speed for this gem.

RIDING AND DRIVING COMFORT: Not bad for 5-ft. 8-in. driver, although back cushion and seat seem to have had no particular design in mind. Steering wheel high and can block vision of short driver. Body extremely light and frame weave on rough roads encourages doors to open (even the new cars in 1930 did this). Folding windshield a safety hazard since wind pressure "blows it down" at high speed (and 40 *mph* is high speed).

Starter button placed high to avoid accidental use. Brakes, clutch, and shifting excellent from design standpoint.

INSTRUMENTS AND CONTROLS: The lighting switch on the steering wheel is a good location. You can't confuse it with half a dozen other controls, as you can on modern cars. Grouped instruments are off-centered. Parking brake and choke on right side don't take much reaching, since front seat is narrow by today's standards. Gas tank in front not a bad idea. Some say this is a fire hazard but it's also out of the way of collisions.

SERVICING: Here is where the Model A shines. Easy to do all minor servicing and somewhat of a pleasure because of the uncluttered simplicity.



Lots of uncluttered chrome-free beauty here. For the very young, or those with weak memories, the parts labeled are: (1) windshield wiper motor; (2) water temperature; (3) gas tank filler; (4) hand throttle; (5) fuel gage; (6) manual spark advance; (7) ammeter; (8) dash light; (9) speedometer; (10) carburetor adjustment and choke lever; (11) horn; (12) head light switch; (13) gear shift lever; (14) fuel line shut off valve; (15) emergency brake; (16) foot rest; (17) throttle; (18) brake pedal; (19) clutch pedal.

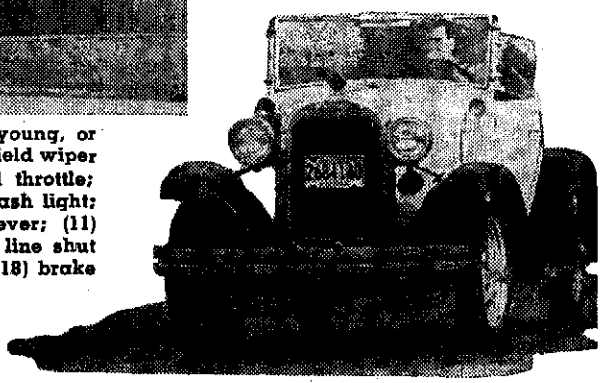
distances as the older models. The danger is, however, that we will try to set a crashing good record by using the higher speeds built into the new cars. Not the 95 to 100 *mph* speeds, perhaps, because relatively few people try to shatter speed laws by this margin. But plenty will drive in the 65 to 80 range when the road is right and no police cars are visible.

One reason they do is that the newer and heavier cars seem to purr so nicely and handle so beautifully at the higher speeds, while they seem sluggish and tend to "foul up" at the same low speeds where the Model A cruised comfortably.

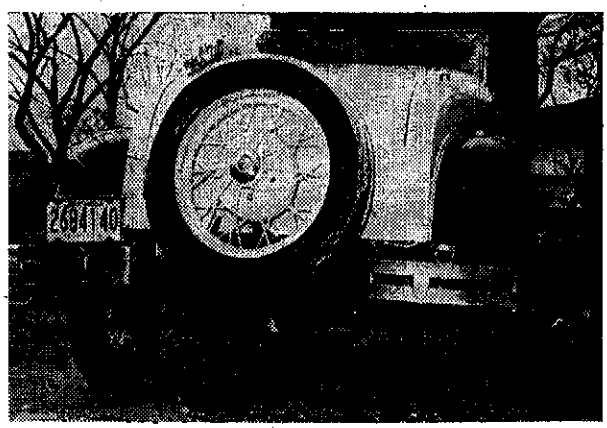
(To be honest about it, though, we seem to remember as high school kids, putting overhead valves on Model A's, and hitting speeds of 90 plus on roads that should have been reserved for horses.)

Cornering. At 40 *mph* around our test circle, the old Model A leaned only 2.8°, compared to the 4° sway angle recorded for the 1956 Ford we tested. Some other angles recorded in our tests also make interesting comparisons: 1937 Cord, 3½°; 1956 Volkswagen, 2°; 1956 Chrysler 300B, 2¾°; average of nine 1956 domestic cars, 4.4°. So the Model A acquits itself well as a cornerer, even though it seems to sway a lot more than it actually does. The reason, of course, is that its big wheels and high seat perch the driver up where his body swings through a greater arc for each degree of body tilt. The fact that its actual sway angle is low is due to the Model A's relatively stiff transverse springs (one across the front, and one across the rear, like an old-fashioned buggy).

Maybe our rump is not as springy as it was in the days of our youth, but the ride in this Model A seemed much rougher than we had remembered it. We also felt that shock absorbers, no matter how puny the 1930 versions of them may have been, fall into the necessity rather than the luxury class for Model A owners. Without them, the car pitches fore and aft like a cork on the ocean. Such pitching is, of course, emphasized by the short wheelbase (103½ versus 115½ for the 1956 Ford), and by the hard tires (35 *psi* pressure). On the other hand, parking the Model A is no problem, since it is 43 inches shorter than the '56 Ford. And the 34-ft. turning circle for the Model A (versus 41 ft. for the '56) allows neat U-turns.



Cornering at 40 *mph* on 285 ft. test circle, Model A registered a slight lean of 2.8°.



Nine inch ground clearance, plus a Continental tire mount, plus steps up to air-conditioned rumble seat. What more could one want?

Nomination for Classic. To get back to that question of whether the Model A should be considered a classic or a clunker, we would be inclined to call it a real working man's classic. And we'd venture to predict it will be recognized as such, when it becomes a little rarer. (Well over 5 million Model A's were built and, as both a car and a memory, this rugged rascal dies hard.)

One of the surest signs of the Model A's progress towards its enshrinement as a classic is the fact that they are becoming more costly to buy (no matter what condition they're in) with each passing year. It must be nice to own a car that

Science at the Wheel

Ford Model A (1930) 4-Cylinder

MODEL: Ford Model A (1930) 4 cylinder; Roadster
TEST DATES: Oct. 14 through Oct. 23, 1956
GENERAL ROAD AND WEATHER CONDITIONS: Portland concrete, smooth and generally level; Indian Summer, 60-80° F, 29.5-29.8 in. Hg
MILEAGE AT START: 81,575
MILES COVERED: 160
GAS: Regular; **OIL:** Penn. SAE 40
CURB WEIGHT (with 10 gal gas): 2275 lbs. 49.5% on front wheels; 51.5% on rear wheels
TIRE PRESSURE: 35 psi front; 35 psi rear
SPARK SETTING: For best acceleration
REAR AXLE GEAR RATIO: 3.77 to 1
TRANSMISSION: Stick shift, 1.86 in 2nd, 3.12 in 1st

TEST DATA

GASOLINE MILEAGE (checked with fuel volume flow meter and 5th wheel. Temperature 65° F; relative humidity 70%; barometer 29.5 in. Hg)

LEVEL ROAD FUEL CONSUMPTION (carried weight 410 lb. Average of two or more runs made in opposite directions over same road):

True MPH	True MPG	Odometer MPG	True Ton MPG
20	26.0	25.5	35.0
30	25.4	25.0	34.2
40	21.4	21.0	28.8
50	16.3*	16.0	21.9

* Estimate 19 mpg with new engine.

TRAFFIC FUEL CONSUMPTION (carried weight 400 lbs): Simulated traffic pattern of city driving—stops, acceleration, braking:

True MPG	Odometer MPG	True Ton MPG	True Average MPH
15.8	15.5	21.2	21.4

CITY-COUNTRY FUEL CONSUMPTION (miles covered on 5 gal gas):

True Mileage	Odometer Mileage	True MPG	True Average MPH
94.7	93.1	18.9	32.5

OVERALL FUEL AND OIL consumed during test:

Total Mileage	Total Gal Fuel	Total Oil	True MPG	Odometer MPG	Oil MPQ
160	9.6	2 qt.	16.9	16.7	80*

* Oil leak rear main bearing.

OVERALL EFFICIENCY to move car's mass against road friction and air resistance, calculated from level road mpg, weight, and frontal area of car: 10.7% at 30 mph; 10.3% at 50 mph.

ACCELERATION—LEVEL ROAD (timed with 5th wheel; carried weight 390 lbs.; temperature 60° F; relative humidity 60%; barometer 29.5 in. Hg; spark optimum; average of two or more runs in opposite directions over same road):

True MPH	Gear Range	Average True Time (sec)
0-20	1st to 17 mph 2nd to speed	5.40
0-30	1st to 17 mph 2nd to speed	10.2
0-40	1st to 17 mph 2nd to 33 mph 3rd to speed	17.1
0-50	1st to 17 mph 2nd to 33 mph 3rd to speed	27.6

SPEED AT END OF ¼ MILE FROM STOP: 50 mph (true) in 27.6 sec.

MINIMUM ACCELERATION time for 0-50 mph (true) over level road with no wind, best spark setting, premium fuel and driver alone 24.6 seconds.

ACCELERATION FACTORS:

True MPH	Gear	MPH per sec	Ft/sec²
10	1st	3.75	5.5
20	2nd	2.6	3.8
30	2nd	1.9	2.8
40	3rd	1.2	1.8

HILL CLIMBING (calculated from acceleration data with allowances made for rotational inertia):

Approx MPH	Gear	Grade%	Pull in lb
15	1st	22	590
40	High	5.8	160

SPEEDOMETER-ODOMETER CORRECTIONS: Odometer distance 10.00 miles; true distance 10.17 miles; odometer error at 35 mph —.17 miles. Multiplication factor and % of error 1.017 and —1.7%:

Speedometer MPH	True MPH	% Error Speedometer	Engine RPM
20	20.5	—2.4	980
30	30.5	—1.6	1430
40	40.9	—1.8	1880
50	51.5	—2.9	2340
54 (top)	55.5	—2.7	2520

LATERAL SWAY TEST OF CORNERING ABILITY: At 40 mph on 285-ft. radius circle, side tilt angle recorded was 2.8°.

BRAKE FADE TESTS: Normally, these are repeated applications of brake from 60 mph to 30 mph at deceleration rate* of 7 ft/sec², to determine how many stops are needed to double the pedal effort. Because of the age of this car (26 years), these rugged tests were omitted—as being too dangerous to both test drivers and the car itself. Observed braking action on this Model A was fair.

HORSEPOWER AT REAR AXLE (values calculated from acceleration data with allowances made for efficiencies and rotational inertia):

MPH True	Engine RPM	Equiv Engine Torque (lb ft)	Axle Horsepower
48	2200	67	28
34	1600	71	21.5
21	1000	71	13.5

Per cent of advertised engine horsepower supplied to rear wheels: 70%.

SPECIFICATIONS

ENGINE: Valve in block, 4 cylinder. Bore 3⅜ in.; stroke 4¼ in. Advertised maximum brake horsepower 40 bhp at 2200 rpm. Taxable horsepower 24. Advertised maximum torque 128 lb ft and mean effective pressure of 96 psi at 1000 rpm. Compression ratio 4.22 to 1. Piston displacement 200.5 cu in. Fuel specified—regular.

TRANSMISSION: Conventional 3-speed manual shift. Rear axle ratio: 3.77 (other rear axle ratios: 4.111 for mountain use)

STEERING: Turning circle 34 ft, curb to curb. Overall ratio 11 to 1. Torque to turn 10 lb ft static; 3 turns lock to lock.

EXTERIOR: Wheelbase 103½ in. Overall length 155 in. Overall width 68 in. Overall height (top of windshield) unloaded 63½ in. Curb weight 2275 lb. (with 10 gal gas, oil and water). Minimum road clearance 9 in. at differential.

INTERIOR: Legroom: front seat 41¾ in. Kneeroom: rumble seat 32 in. Hiproom: front seat 44½ in. and rumble seat 42½ in. No seat adjustment.

VISIBILITY: Windshield area 565 sq in. From eye of 5 ft 8 in. driver and seat in best position, distance from driver's eye to road over left front headlight is 24 ft 4 in. (or 16 ft 8 in. blind distance to car); over hood center 35 ft 9 in. (or 28 ft 0 in. blind distance to car); over right front fender 29 ft 3 in. (or 21 ft 8 in. blind distance to car).

EQUIPMENT: Battery 6-volt, 13 plate, located under hood. Tires 4 ply 4.75-19; recommended pressure 35 psi front, 35 psi rear. Springing: front and rear transverse, semi-elliptical. Frame channel.

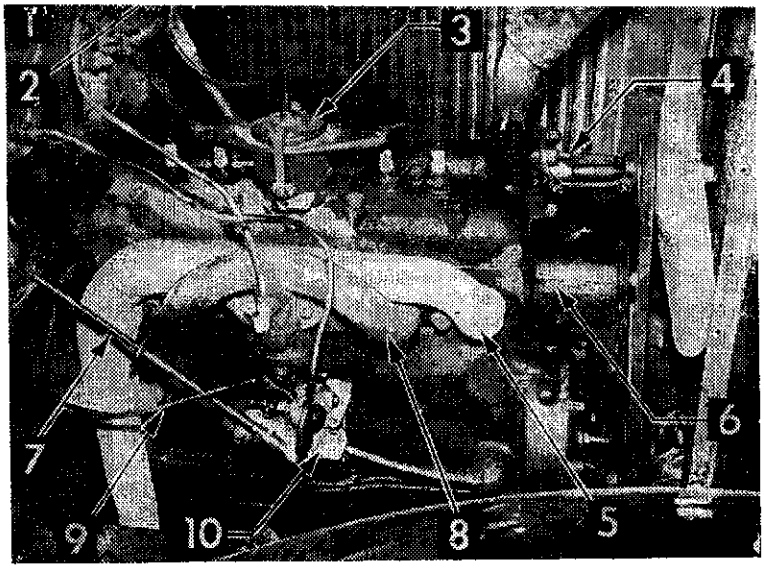
CAPACITIES: Fuel tank 11 gal. Crankcase 5 qt. Cooling system 12 qt with heater.

CERTIFICATION

I certify that the test results in this report are the actual findings obtained in tests on the automobile named and under the conditions specified.

Edw J Chet

Member, Society of Automotive Engineers, American Society of Mechanical Engineers, Director, Automotive Research Laboratories, Professional Engineering Consultants, 1204 Noyes Street, Evanston, Illinois.



Under the hood, this mechanic's delight is what greets you. Note (1) spark coil; (2) vacuum line; (3) distributor; (4) water pump; (5) exhaust manifold; (6) generator; (7) choke linkage; (8) intake manifold; (9) throttle linkage; (10) carburetor.

appreciates, rather than depreciates in value. A 1930 Model A town Sedan, by the way, originally sold for $640.

The fact that Model A's now can qualify as antiques may also mean that you save on insurance costs, in addition to the savings on gasoline. And if you have a do-it-yourself attitude toward servicing, you can enjoy yourself with this car, without being a contortionist or owning a set of wrenches specially designed by a drunken pretzel bender.

The styling is about as functionally honest as you can find. It had its gayer touches, too. Like the spare tire between the bumpers (the forerunner of today's Continental kit); the fold-down windshield and rear rumble seat (for lovers of the wind-blown look); and the little steps on the fender and rear bumper guiding the passenger up to the rumble seat (many a shapely leg was admired in this process).

Then there is that unique underneath styling which gives you a fat nine inches of road clearance under the car (the 1957 domestic models seem to be averaging about 6.5 inches' road clearance). It may be news to some Detroit designers, but there still are some country roads with high center ridges around the U.S. premises.

PERFORMANCE FACTORS
(Calculated)

48 mph (true) at maximum advertised horsepower and 21 mph at max adv torque.

Engine rpm at 60 mph (also revolutions per mile) 2800 rpm.

Average piston speed at 60 mph (also, ft/mile) 1980 ft/min. Cu ft per minute of mixture at 60 mph (also, cu ft/mile) 162. Maximum engine horsepower (adv) per ton of car (curb weight) 35.2

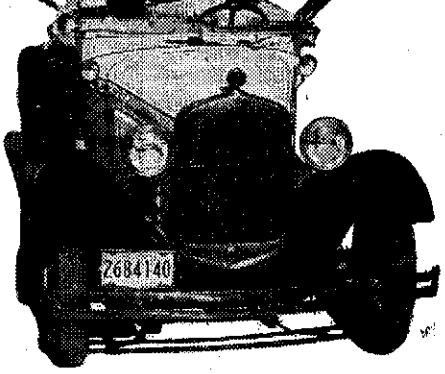
Reciprocating load factor at 60 mph (based on piston weight, bore, stroke, rpm; an indicator of wear and stress on the engine; low values desirable) 1295.

Maximum engine horsepower (adv) per cu in. displacement 0.20.

Power performance factor (a weighted average of CR, piston displacement, and curb weight): 107.

Does the Model A have the dignity a classic should have? That depends on where you sit. High up in the driver's seat of a Model A, looking down on the tops of the modern cars that go by (and traveling at a dignified pace), we would say it does have sufficient dignity.

The only trouble is that so many of those modern cars *do* go by you.



Proud owner Jerry Beman loads up his girls and a friendly Boxer for a spin in his Model A.

TECH TALK

THE comparison between a 1956 Ford and a 1930 Model A is best shown by the various specifications and performance factors. The Model A Ford had essentially the same bore as today (3⅞ in. versus 3.62 in.) but a long stroke (4¼ in. versus 3.30 in.) with displacement of 200 cu. in. (272 cu. in. for the 8 cylinder 1956 engine). Although its advertised horsepower of 40 bhp was only 23% of the 1956 model, its torque of 128 lb. ft. was 50% of the '56 figure (and it is torque which gives acceleration).

The various performance factors show

	Engine rpm (60 mph)	Average piston speed (60 mph)	CFM mixture (60 mph)	HP per ton	Power factor
Model A	2800 rpm	1980 ft/min	162	35.2	107
1956 Custom	2485 rpm	1370 ft/min	196	97.5	128

Since the Model A barely touched 60 *mph* (which was about the top speed for an undoctored model in its best days), the somewhat high piston speed is not objectionable. Note that the horsepower per ton of car has almost tripled through the years—mainly true because of the high engine speeds which we now use. The power factor is quite acceptable and attests to the fact that the Model A, when new or in good condition, will give a good account of itself in acceleration trials (although our reported data on acceleration are poor for this particular car). The reason for the predicted good acceleration can be laid to the low weight of the car versus new models.

Some of you will remember how the Model A was made speedworthy. The front and rear spring assemblies were underslung to lower the body and special overhead valve heads were available to pep up the performance. With these changes, memory says that acceleration to 60 *mph* was better than that reported for modern cars (again, because of minimum weight, more than mechanical excellence). Medium oldsters will also remember fondly the 1928 Model A which really could dig.