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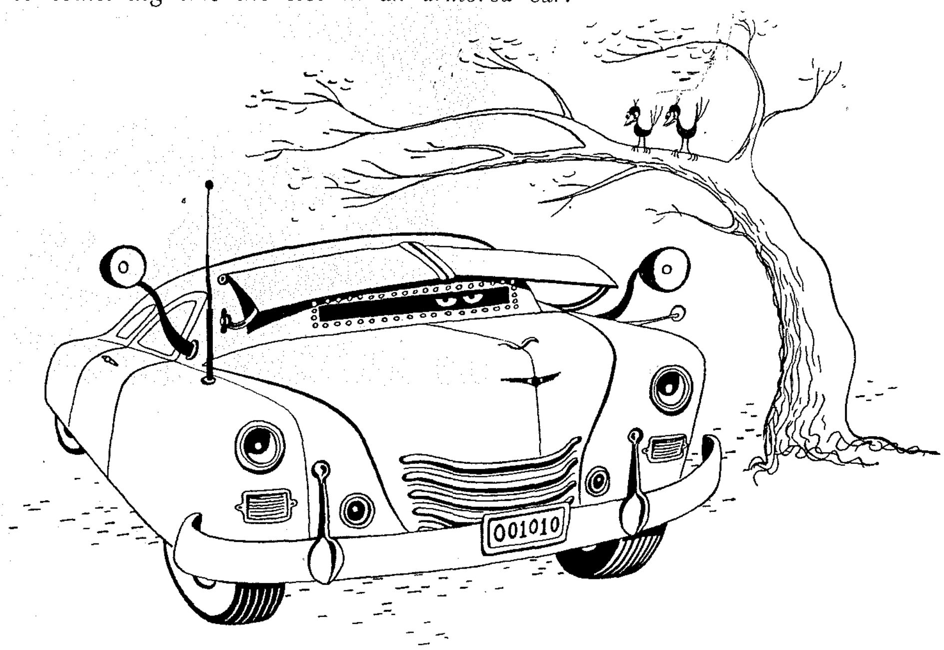


What's new about the new cars

by Peter Kyropoulos

THE 1949 AUTOMOBILES, with a few exceptions, are the first newly designed models since the war. Because most cars are bought for their looks anyway, it might be well to begin by considering the 1949 bodies-more-or-less-beautiful.

It is pretty well agreed now that the front has to seat three, and that is what the average body is designed around. The bumper-to-bumper length has not changed materially on any of the cars, nor has the tread. The body width has increased in many cases, and has reached the upper practicable limit—unless we raise a new generation of garages and parking lots. One manufacturer has a compromise solution: the seats can be made up into a bed so that the driver can stay in the car for the night if he gets into the garage but finds it too narrow to get the car doors open.

There is a tendency to style front and rear in a similar fashion. It all started a year or two ago with Studebaker—of which they used to say that you did not know whether it was coming or going. (There followed some reflections on Paul G. Hoffman's way of running the ERP, but I am assured that Paul G. did not style the car, and any similarity is purely coincidental).

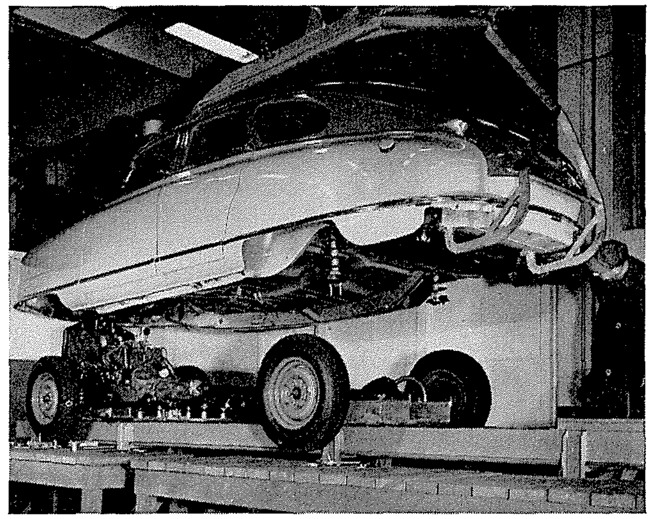
More window area is provided all around and visibility has been improved, except in one direction—straight ahead of the driver. (But then, nobody seems to care where he is going, anyway; being content just to keep in touch with the bumper ahead). Buick, for instance, obtained an increase in window area of roughly 25 per cent, chiefly by enlarging the rear window. Total window area in the Buick is now 25 square feet.

Eyelids (outside visors over the windshield) are not standard equipment, but everybody seems to be sold some sooner or later. The sportier models reduce the drivers' vision between the hood and the visor to something like the slot through which one peers out of an armored car.

Kaiser-Frazer and a few others are reviving the non-convertible convertible. Called the hard top convertible, it has a metal roof with baby blue satin or the like pasted over it. How long do I think that idea will last? When I asked this at a gathering of automobile people, they wanted to know who was that heckler and why didn't he go home? I did, which is why I don't know the answer.

Since running boards disappeared, we have been fall-

THE NASH: *Unitized body is lowered to running gear on Nash assembly line. The Nash has no separate chassis; the frame is welded into the body.*



ing out of cars and crawling in. Now there is one where you fall both ways—the only car you step down into, the Hudson.

Interiors are about the same as before, except for Nash's combination instrument panel and steering wheel, which has been tried before ('39 Olds, I think, and '48 Cadillac, or thereabouts).

If you think the interiors are too elaborate, read what *Motor*, the British magazine, has to say: "The shining plastic dashboard of the Nash contrasts somewhat garishly with the quiet tones of the Austin A-40—dour and doughty, my dear fellow."

It's all in the point of view. *Motor* also says: "As a reliable and rugged design, the Willys jeep station wagon points the way to inexpensive but soundly constructed small U. S. vehicles." There is a strong feeling here that a dolled-up army "vehicle" does not point the way to anything.

Cadillac is very proud of its tail light-tank filler-neck combination. I think it gives the rear fender the looks of a battle axe, but I am not a stylist.

Television is not yet generally provided for in cars but it can be had. It offers many possibilities. The aircraft people consider the prone position beneficial for higher speeds and accelerations. One might conceive of an arrangement where the driver is in the prone position and views the road through television with intermittent flashbacks to the major league games. The prone position would allow cars to pile up at much higher speeds than heretofore possible.

The Nash "Airflyte" is the first American car to close the front fender as well as the rear, with only a small cut-out to facilitate removal of the wheel. The bumper jack lifts the body and allows the springs to extend so that the wheel clears the fender. (Note: this is more or less literally quoted from some sales propaganda. I should like to try it sometime, preferably on a side road with plenty of camber, in the rain, at midnight, and in evening clothes.)

Swing low, sweet chariot

Bigger and better bodies hide, in general, the same chassis as before, except for a general trend toward shorter wheel bases. Ford has at long last given up the transverse springs and has independent front wheel suspensions and longitudinal rear springs.

The only departure from conventional chassis design is made by Hudson. The two main longitudinal members of the frame pass outside the rear wheels with only subsidiary members passing inboard over the axle beam. This permits an almost flat floor. Rear wheel removal is made possible by the use of a bumper jack which drops the axle low enough to remove the wheel, together with a small removable panel in the lower edge of the rear fender. Although termed "a brave mechanical innovation" by *Motor*, this general type of frame construction has been used on Citroen's front wheel models since the early 30's.

The Nash, as before, does not have a separate chassis. The frame is welded right into the body which, in itself, takes the place of the structural member. Rear axle location is provided by a rigid torque tube, diagonals and a stabilizer bar. The rear is sprung by coil springs (minimum weight, no friction, no squeaks). Damping is provided by shock absorbers.

Front wheel drive and a rear engine have been talked about, but there seems to be no desire on anybody's part to try them. The arguments pro and con are not very forceful. Several companies have experimental models of either kind in their bone yards. None seem to have taken. Independent rear wheel suspension, popular in Europe, likewise does not seem to arouse any enthusiasm here. It is true that a definite need for either of these designs has yet to be demonstrated.

After some thirteen years of development, General Motors has come out with what is ultimately to be a high compression ratio engine (also called the Kettering engine). After preliminary single cylinder tests, a prototype was designed as a counterpart to the Oldsmobile 6, with a compression ratio of 12.5 to 1. Some of the important characteristics of this engine are compared with the conventional engine in the table on p. 9.

The comparison shows a material gain in fuel economy due to increased compression ratio. That in itself is no news. Special engines have been operated at such high compression ratios before and improved economy has been observed. The interesting thing is that this engine finally led to the new Cadillac and Oldsmobile V-8 engines, both of which are production engines.

Also note that overhead valves are necessary with high compression ratios since the combustion chamber is very small, and there is not sufficient room for valve opening in the L head.

Engine data are as follows:

	CADILLAC	OLDS 8-98
Type	V-8, 90 degrees	Valve in head
Bore (in.) '49	3 13/16	3 3/4
Bore (in.) '48	3 1/2	3 1/4
Stroke (in.) '49	3 5/8	3 7/16
Stroke (in.) '48	4 1/2	3 7/8
Displacement (cu. in.) '49	331	303
" '48	346	257.1
Compression ratio '49	7.5:1	7.25:1
" " '48	7.25:1	7.0:1
Rated brake horsepower '49	160@3800 rpm	135@3600 rpm
" " " '48	150@3400 rpm	115@3600 rpm

The crankshaft of the new V-8 has five main bearings instead of the conventional three. This increases engine rigidity and prevents what is known as "roughness" in the engine game. This is a nice feature now, but a

	12.5 COMPRESSION RATIO ENGINE	1946 STOCK ENGINE
Number of cylinders	6	6
Valves	Overhead	L-head
Bore and stroke	3 3/8 x 3 3/8	3 1/2 x 4 1/8
Displacement (cu. in.)	181	238
Compression ratio	12.5:1	6.4:1
Compression pressure, 2000 rpm (lbs per sq. in. gage)	420	165
Peak pressure, 2000 rpm (lbs per sq. in. gage)	1150	525
Friction hp, 2000 rpm	10.5	14
Maximum brake hp	95 at 3000 rpm	85 at 3400
Min. brake specific fuel consumption (lbs. of fuel per bhp hr.)	.40 at 2000 rpm	.54 at 2000 rpm
Miles per gallon, 40 mph Oldsmobile Sedan	26.5	18.5

High compression and conventional engines: how they compare

necessity when the engines are ultimately used at the high compression ratios for which they were designed.

For the Olds, a fuel consumption of .533 lbs.—fuel/bhp-hr is reported, against about .56 for the old engine. This is, of course, no breathtaking change—only about five per cent. A 12.5:1 compression ratio would improve this to about .45, or by about 20 per cent. The mileages should follow the same trend.

Cadillac, Oldsmobile and Buick, all overhead valve engines, have hydraulic valve lifters. This is a real necessity on this engine type, since it eliminates tappet clearance, which makes the O.H.V. engine noisy. (By the way, engine sound proofing is very carefully worked out on the three G.M. cars). The hydraulic valve lifter has been redesigned to avoid collection of sludge in this mechanism, which gave a lot of trouble on the old V-12 and V-16 Cadillacs.

Summing it up, the high compression engine is the only really different basic item in '49 cars. It is likely to influence car design for years to come. There will be trouble, grief, and lots of griping about the engines for awhile, but that is natural, and no change is made without it.

Chevrolet's compression ratio is 6.6:1, as against 6.5 before. Nash has a 7:1 compression ratio on both the side valve "600" and the overhead valve Ambassador. Chrysler has not released much information about '49 models to date (February, 1949), but it is known that all compression ratios will be 7:1, except for the Chrysler 8, which will have 7.25:1.

Chemical hay for mechanical horses

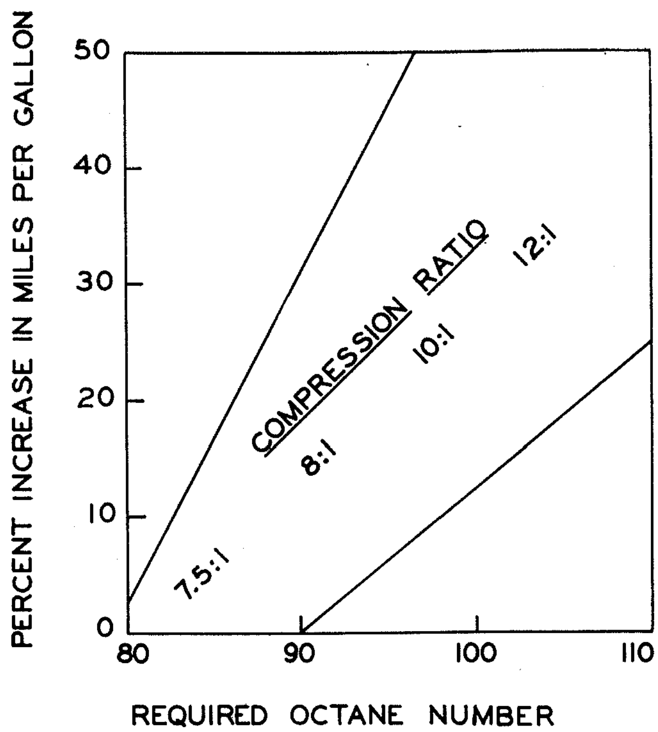
In the foregoing discussion there is an apparent discrepancy. On the one hand, we see the possible gains due to high compression ratios; on the other hand, we find the actual engines (Olds and Cadillac) with compression ratios only slightly higher than before.

The answer is that higher compression ratios require fuels with higher knock ratings. The chart (right) shows a correlation of compression ratio, octane number requirement, and gain in fuel economy. The data were obtained on experimental engines; the gains are expressed in per cent of consumptions of 1946-47 production cars.

The development of the high compression engine was carried out, using the miracle fuel "triptane" (2,2,3 trimethyl-butane). One can get an idea of its relative rating by comparing critical compression ratios (i.e., the maximum compression ratio with which the fuel will operate without detonation or knock).

	CRITICAL CR
Fuel with zero octane number (normal heptane)	3
Commercial gasolines (1948)	4.5 → 7.5
Iso-octane, Octane number 100 by definition	8
Natural gas (mixture of different hydro-carbons)	11-12
Triptane	13
Benzene	16
Methane	16

Road experience with the high compression engine has shown that a fuel of somewhat less than 100 octane number can be used. This is, nevertheless, still far



Center area, bounded by rules, shows how octane number requirements and fuel consumption improvements increase with higher compression ratios.

above the present commercial gasoline rating, and inexpensive high octane fuels are not yet in sight. As a result, the present high compression engines are operated at compression ratios comparable to the present fuels. It is clear that the gains in fuel economy are not spectacular, perhaps five to ten per cent over other engines. As better fuels become available, it will be possible to raise the compression ratios.

Several subterfuges are possible which, theoretically at least, could be used to reconcile the user to high fuel cost.

A dual fuel system is one possibility. Since high octane fuel is only needed at high power, an automatic shift from regular fuel to high octane fuel could be made. A similar scheme has been used successfully for take-off of aircraft. This would reduce the overall cost of operation, and also increase the effectiveness of the limited quantity of high octane gasoline which can be produced. Nevertheless, it would be a nuisance on a passenger car and would most likely not work half the time.

Injection of water, water-alcohol mixtures, or alcohol, water and tetra-ethyl lead, is another possibility to increase the octane rating when the throttle is opened wide enough to require a high octane fuel. The feasibility of this scheme has also been demonstrated in air-craft engines. For passenger cars it is pretty well ruled out by considerations of engine lift, since injection of water and high lead content increases cylinder wear and promotes oil contamination beyond the tolerable limit.

Direct injection of the fuel into the cylinder near top dead center (Diesel style) allows utilization of low octane fuels. Experimental engines have been operated at 10:1 compression ratio with 40 octane fuel. The high cost of injection systems is a serious obstacle to this mode of operation.

The practicability of any of these proposals, as well as their acceptance by the driving and buying public, remains to be established.

It is well to emphasize here that engine fuel and operating conditions are inseparably interconnected. Each engine type has its peculiar problems and there are great differences between passenger car service, heavy duty truck and bus service, and air-craft engine service. Many schemes are perfectly useful and applicable in one type, and utterly out of the question in another.

Mechanized minds for cars

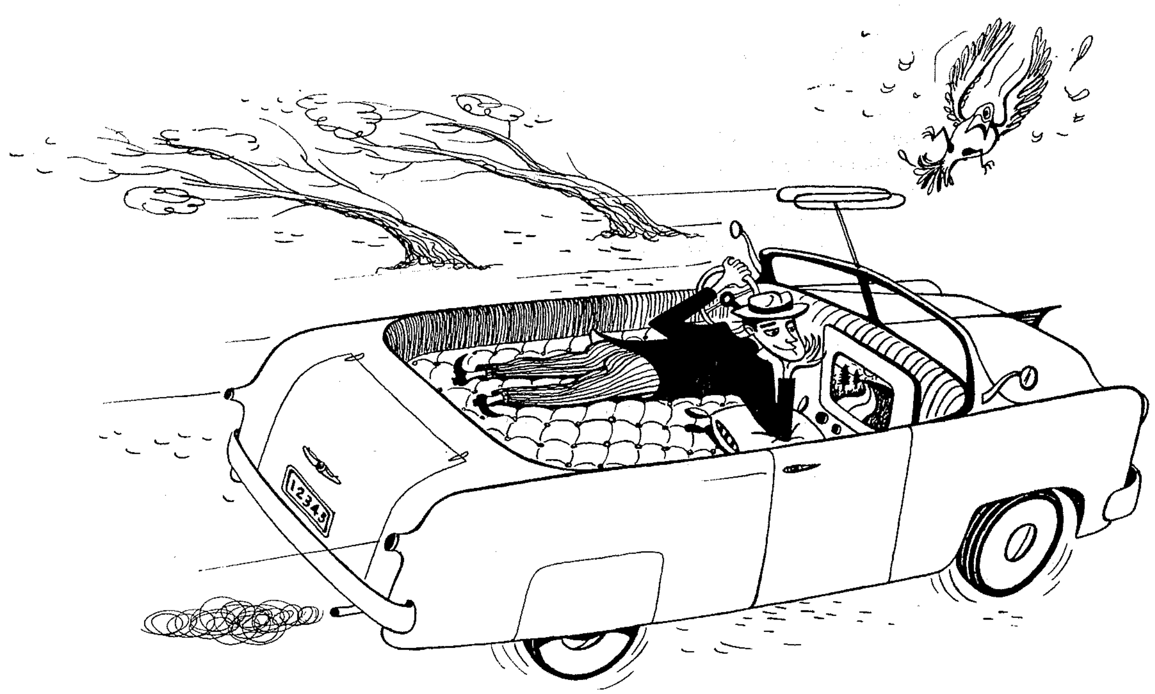
Automatic transmissions are like electric razors: you hate them when you first get them. But the automatic transmission is here to stay. It is really a sound development.

Engineers—as a matter of fact many men—take great pride in shifting gears without clashing. Women, in general, do not share this feeling, and they have for years been strongly in favor of more automatic operations.

By far the simplest arrangement is the Chrysler fluid drive. It is, after all, a conventional transmission with a fluid coupling. It is the best compromise between a conventional and a fully automatic transmission. Service experience is excellent over a long period of years. I hope the fluid drive will appear eventually on the Plymouth, at least optionally.

Cadillac and Oldsmobile are using the hydramatic transmission, and Pontiac joined them last year. This is a combination of a planetary transmission (of model T fame), a fluid coupling, and an automatic shift mechanism. In spite of what you may hear, this is a popular transmission. Ninety-eight per cent of the Cadillac buyers specify it in preference to a conventional transmission.

Service experience is fairly good and service facilities



Television in automobiles offers many exciting possibilities.

are improving, as mechanics are getting more familiar with the device. The factories have worked out very good trouble-shooting techniques.

This is not the place for a detailed description of the hydramatic drive, but those who are interested can find explanations on all levels of elaborateness in the automotive literature.

One thing must be borne in mind in connection with any automatic transmission: It is designed around average normal driving requirements, and that does not include lugging trailers, off-road driving, or similar stunts.

The Buick Dynaflow differs from the other transmissions in principle of operation. It consists essentially of a centrifugal pump driving a hydraulic turbine. Such an arrangement is called a torque converter in contrast to a fluid coupling (Chrysler and hydramatic). This is not a new device, but has been in use for years on heavy duty equipment, such as power shovels and winches. (No comparison between Buicks and steam shovels is implied or intended, even though some rumor-mongers are trying to find similarities as far as fuel consumption is concerned.)

The Dynaflow transmission includes a planetary gear and reversing gear, combined in one box between the torque converter and the drive shaft. The planetary gear is used as an "underdrive", i.e., it gives a lower gear for maximum torque, or added braking power going downhill. It can be engaged or disengaged at any speed below 45 mph, and serves as an accelerating gear. The conventional clutch has been eliminated entirely.

Chevrolet has given up the vacuum gear shift and now has the conventional manual shift. Presumably, a torque converter type transmission is in the offing for 1950 Chevrolets. That will no doubt shift the so-called "low priced car" (Did I hear anybody laugh?) to automatic transmissions, no matter how loud the protestations ("Who, me? Never!") in some quarters today.

One change for the Chevy

Aside from restyling, this is the only significant change the 1949 Chevy seems to have. An access hole from the hood to the instrument wiring should prove a boon to the serviceman, even though it will remain unnoticed by most owners.

It is often argued that an automatic transmission necessarily results in higher fuel consumption. This is true if we consider transmission efficiency only. Actually, automatic transmission, engine, and rear axle are an integrated unit. By proper selection of gear ratios and shift points, the designer can see to it that the engine operates at a lower specific fuel consumption (lbs-fuel/bhp-hr) than the average driver would and does obtain. As a result, the road economy is not necessarily lower for automatic than for conventional transmission.

There are two general objections to non-conventional transmissions today: it is too hard to start an engine by pushing the car, and there is no way to make the engine hold the car when parked on a hill.

Both items are minor, but a great nuisance. The Buick Dynaflow has a locking device for this purpose. Ford is equipped with an overdrive, but otherwise a conventional transmission. Studebaker has the same overdrive-free wheeling combination that has been used for many years. Hudson has what is called the "drivemaster" transmission. According to the sales literature, this is an ingenious device which relieves the driver of all responsibilities. But the drivemaster is actually a new name for an old improvement. Though Hudson introduced an automatic shifting gear a good many years ago, before everyone else, it is essentially the same mechanism today.

Softest ride this side of heaven

Periodically, the low pressure tire is revived. This seems to be one of those periods. (Someone claims that the occurrence is $\pi/4$ times the period of appearance of the sea snake in Loch Ness.)

There is no doubt that bigger and softer lines give softer rides, and keep the car from shaking apart. Even though people inflate these tires to the conventional pressures, an improvement in ride quality is obtained. (22 lbs. per square inch is recommended for the low pressure tires). Besides, the monotony of standardized tire sizes is broken. Other advantages—parking is harder; the old tire chains won't fit, which is just as well, because on some bodies there is no room for them anyway between the low pressure tire and the fender.

Small, light cars

High initial prices, high monthly payments (due to government regulation), and high operating cost have revived the question of whether the U. S. public wants a small car or not. A survey has shown that people are interested in a cheaper car, but that they expect it to be equivalent in size to the present "big three".

Small European cars are being sold in this country as long as anything with four wheels sells. Tolerable for city traffic, they are painfully underpowered for anything outside the city, just as U. S. cars are too bulky for comfort on the European road. This is not a question of good or bad, but one of design to fit the needs.

Industry is definitely working on smaller cars. Plymouth and Dodge are going to offer a "small series" with a wheelbase of 111 inches (Plymouth) and 115 inches (Dodge) against 118½ and 123½ inches for the De Luxe series. What price reduction will go along with this is not known yet.

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