THE ECONOMY RUNS...

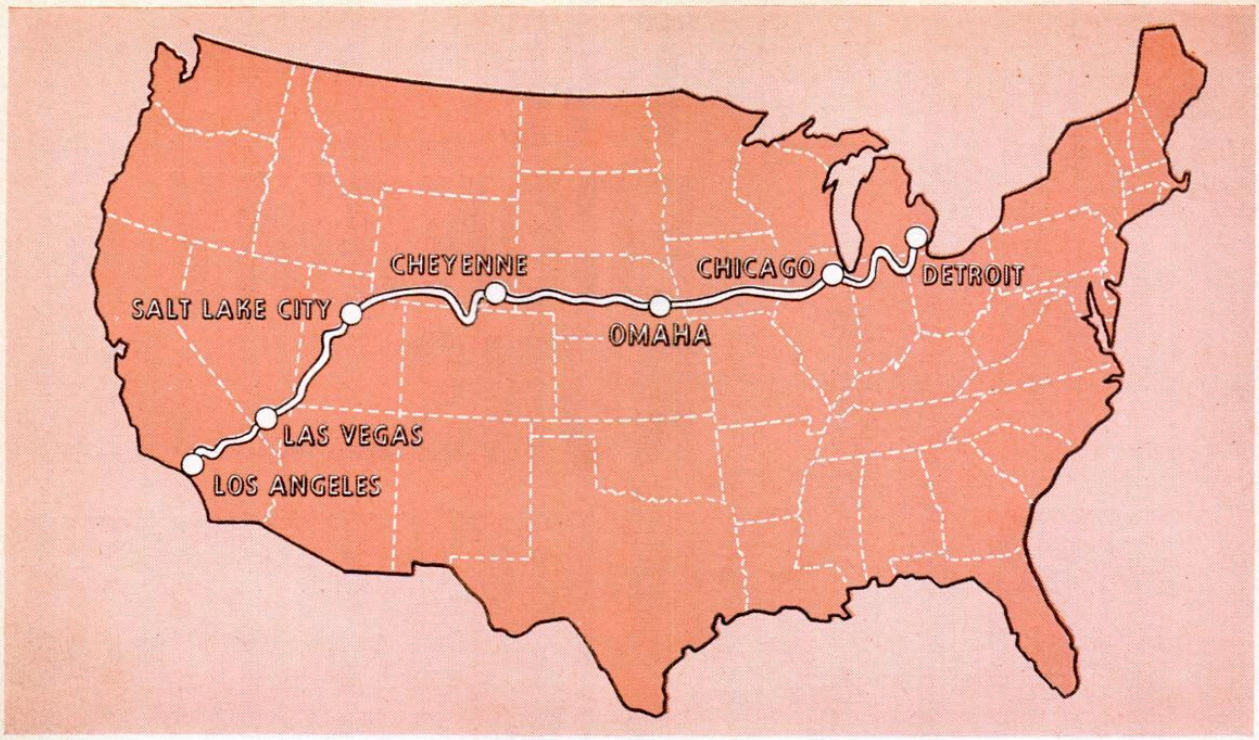
DO DRIVERS OR GIMMICKS WIN THEM?

PM's auto editor competed in the '63 Mobil Economy Run to find out what it takes to rack up those high mileage figures

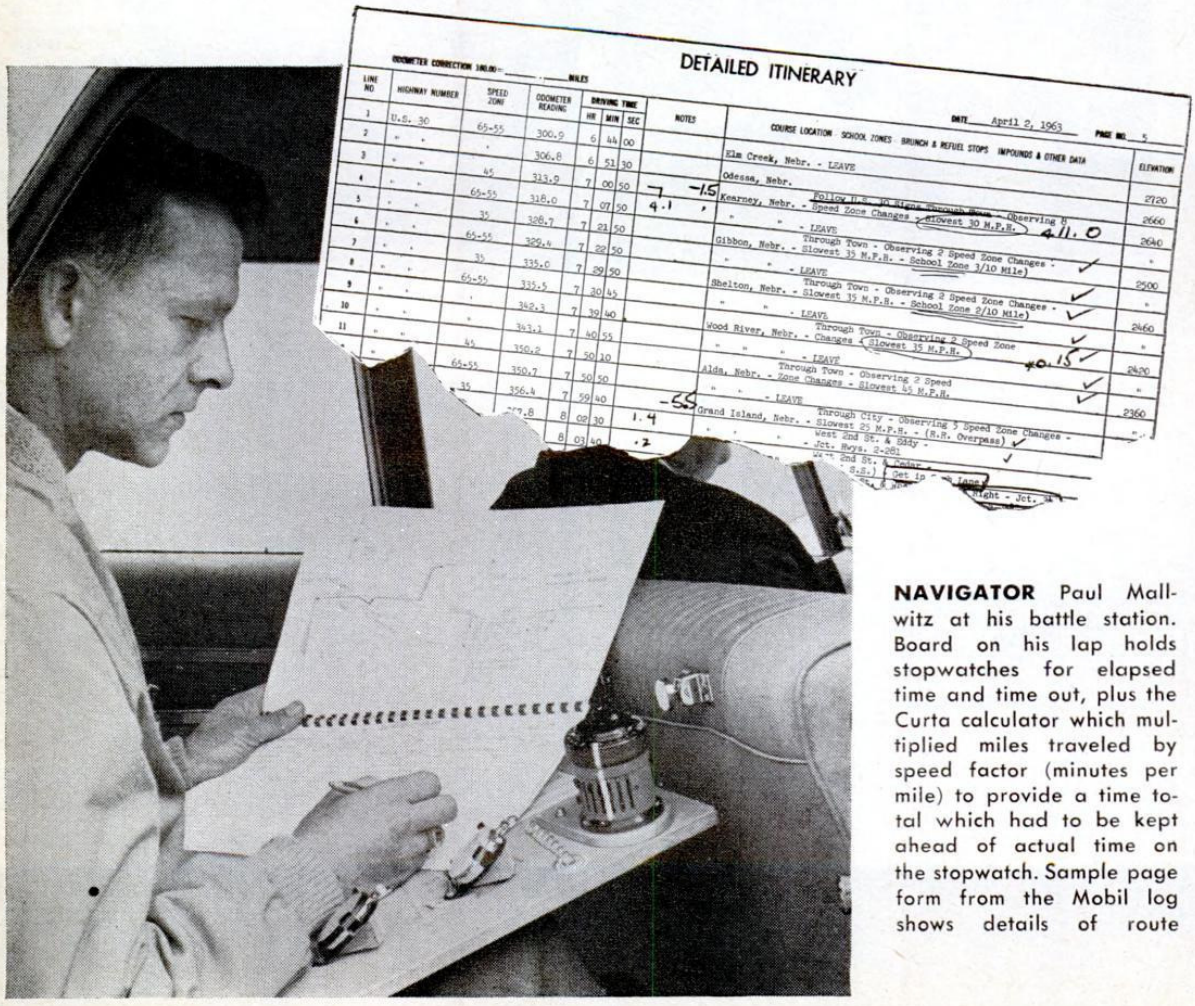
By Jim Whipple

WHAT DOES IT TAKE to win a big cross-country economy run? Must you sandpaper your feet or drive in your socks for a more sensitive feel of the throttle as some people think? Or do winners rely on cars gimmicked to the hilt with 50-pound tire pressures, super-lean carburetors and long-legged axle ratios creeping along at five knots?

I've always wondered what methods economy-run drivers use to coax 20 to 28 m.p.g. out of cars in a cross-country trek involving everything from rush-hour city traffic to climbing the Rocky Mountains and



OUR ROUTE led through the Sierras and desert to Las Vegas, up through the Rockies to Salt Lake, up over the Continental Divide to Cheyenne, down the eastern slope to Omaha, through Iowa farms to Chicago and Detroit



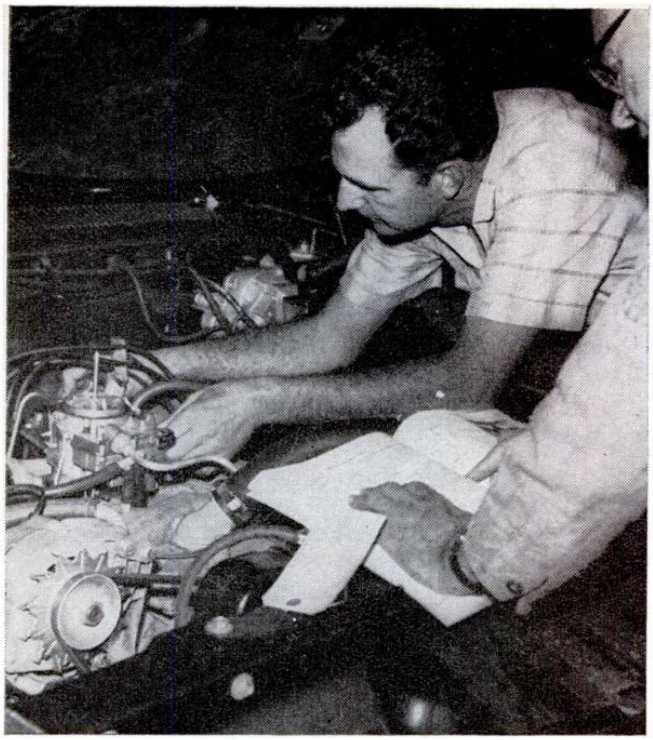
DETAILED ITINERARY

ODOMETER CORRECTION 340.00 — MILES

DATE April 2, 1963 PAGE NO. 5

LINE NO	HIGHWAY NUMBER	SPEED ZONE	ODOMETER READING	DRIVING TIME HR	MIN	SEC	NOTES	COURSE LOCATION · SCHOOL ZONES · BRUNCH & REFUEL STOPS · IMPOUNDS & OTHER DATA	ELEVATION
1	U.S. 30	65-55	300.9	6	44	00		Elm Creek, Nebr. - LEAVE	2720
2	" "	"	306.8	6	51	30		Odessa, Nebr.	
3	" "	45	313.9	7	00	50	-1.5	Kearney, Nebr. - Follow U.S. 30 Alone Through Town - Observing 2 Speed Zone Changes - Slowest 30 M.P.H. 41.0	2660
4	" "	65-55	318.0	7	07	50	4.1	" " - LEAVE	2640
5	" "	35	326.7	7	23	50		Gibbon, Nebr. - Through Town - Observing 2 Speed Zone Changes - Slowest 35 M.P.H. - School Zone 3/10 Mile)	
6	" "	"	328.4	7	22	50		" " - LEAVE	"
7	" "	65-55	335.0	7	29	50		Shelton, Nebr. - Through Town - Observing 2 Speed Zone Changes - Slowest 35 M.P.H. - School Zone 2/10 Mile)	2500
8	" "	35	335.5	7	30	45		" " - LEAVE	"
9	" "	65-55	342.3	7	39	40		Wood River, Nebr. - Through Town - Observing 2 Speed Zone Changes - Slowest 35 M.P.H.	2460
10	" "	"	343.1	7	40	55		" " - LEAVE .15	"
11	" "	45	350.2	7	50	10		Alda, Nebr. - Through Town - Observing 2 Speed Zone Changes - Slowest 45 M.P.H.	2420
"	" "	65-55	350.7	7	50	50		" " - LEAVE	"
"	" "	35	356.4	7	59	40	-.55	Grand Island, Nebr. - Through City - Observing 3 Speed Zone Changes - Slowest 25 M.P.H. - (R.R. Overpass)	2360
"	" "	"	357.8	8	02	30	1.4	West 2nd St. & Bldy -	"
"	" "	"		8	03	50	.2	Jct. Hwys. 2-281	
								West 2nd St. & Cedar -	
								(S.E.) Get in [illegible] Lane	
								Right - Jct. [illegible]	

NAVIGATOR Paul Mallwitz at his battle station. Board on his lap holds stopwatches for elapsed time and time out, plus the Curta calculator which multiplied miles traveled by speed factor (minutes per mile) to provide a time total which had to be kept ahead of actual time on the stopwatch. Sample page form from the Mobil log shows details of route



TUNEUP of eight man-hours is permitted before the run under the close supervision of U.S.A.C. observer who checks operations in car maker's own shop manual

GASOLINE is metered into special Mobil Run tank by a U.S.A.C. official at two daily fuel stops. Gas is measured in 1/50th gallon increments at topoffs

traveling over truck-filled, two-lane roads. Similar cars in the hands of regular drivers make only 14 to 22 m.p.g.

This year I had a golden opportunity to discover where that "extra" economy comes from. Dodge invited me to drive one of the official entries in the Mobil Economy Run from Los Angeles to Detroit. During 5½ days (it seemed longer) and 2654 miles at the wheel of Car No. 29, a 6-cylinder Dodge 330 sedan, I learned a great deal about what makes the economy run tick. And I drove with my shoes on all the way.

In the process I managed to squeeze an over-all 23.69 miles per gallon out of Car No. 29's 225-cubic-inch engine. To my amazement, this placed me second among the four cars in Class E (standard size six cylinder) behind the winning Plymouth Savoy Six (24.33 m.p.g.) and ahead of both Chevrolet Biscayne (22.61 m.p.g.) and Ford 300 (21.50 m.p.g.).

Winning the Mobil Run involves a number of special techniques, but drivers with supersensitive feet and cars with gadgets or special economy tuning are not among them. I doubt if toes as sensitive as fingers would do much good (a foot as solid as rock would be much better). And any modification whatsoever of the engine, transmission or chassis is not only forbidden, but prevented by round-the-clock vigilance on the part of the United States Auto Club observers. You must run your car dead stock.

The nearest thing to an exception is tire inflation. Mobil inflates *all* tires to four pounds more than manufacturer's recommended figures. The air used is "standard", i.e. pure and bone dry to eliminate as much expansion as possible.

Another item not required is great physical stamina or athletic ability. The ordinary driver is a desk-bound engineer whose biggest athletic event may be a round of golf or a week-end stint behind his lawn mower.

This year, eight of the 36 cars were driven by women, two of whom won first in their classes.

What is required of drivers and co-drivers in large measure is a high degree of concentration, better - than - average judgment of traffic and highway conditions, and a thorough mastery of the techniques of driving smoothly and efficiently.

For above all else, the Mobil Run is an exercise in precision driving, a giant rally. However, it differs from the normal Time/Speed/Distance rally in that the possibilities of getting off route (lost!) are all but eliminated.

All cars must complete the same course within the same time limit. This year's Run was 2654.7 miles that had to be completed in not more than 60.39 hours of running time. This works out to an aver-

age of 43.77 m.p.h. for the entire trip.

The objective, of course, is to finish each day's run as close to the allotted time limit as possible without running beyond it and incurring a penalty. On the other hand, to finish too early would only increase the average speed of the car and raise the fuel consumption as well.

For me the Mobil Run began on the morning of Thursday, March 28, at a motel in Pasadena, Calif., less than 48 hours before the first car was to leave the Mobil Impound.

Here I met the Dodge-Plymouth team, a group of 11 engineers and technicians who were to man Chrysler Corporation's six official entries. These six included a Valiant and Dart sedan, both with 170 cubic-inch, 101-horsepower engines; a Plymouth Six matching the 145-horsepower Dodge Six that I was to drive, and a pair of Dodge and Plymouth V8s. These cars were equipped with automatic transmissions, as were all other cars in the 1963 Mobile Run.

Although the Plymouth and Valiant teams were competing directly with the three Dart and Dodge teams, all 12 of us cooperated during practice and on the Run itself. The unspoken feeling was, "It would be great to beat Plymouth (or Dodge), but the main job for everybody is to finish ahead of the guys driving Brand X!"

Our team did all right for itself with Dodge and Plymouth splitting first and second place honors in two classes and the Valiant missing first in its class by .03 of a mile per gallon.

To a degree, the team's success was due to car weight advantages of 200 to 600 pounds, and the greater fuel economy of a three-speed-plus-torque-converter automatic transmission over a two-speed unit.

Engine displacements were evenly matched in the case of the compacts at 170 cubic inches for all cars in Class B, while the Class E Sixes ranged from 223 to 230 cubic inches. (Dodge and Plymouth share the same 225-cubic-inch engine).

Den Mother and Mules

To give the team every possible competition advantage, operations chief Bob Cahill, a Chrysler engineer (known to the group as "Den Mother") set up shop in Pasadena some three weeks ahead of the Run. The "Den Mother" and his boys used this time in practice and preparation.

In addition to half a carload of maps, graph paper, slide rules and pocket calculators, the Dodge-Plymouth competitors brought "mule cars" which were exact replicas of the cars to be used in the Run.

Run cars themselves had been purchased by U.S.A.C. operatives in various parts of the country and shipped to Mobil's Pasadena Impound. Neither contestant nor manufacturer has any idea where his actual entry car will come from. My Dodge, for example, was picked out of a dealer's stock in Missouri. Once the car is selected it never leaves sight of a U.S.A.C. observer. All this precludes any mechanical hanky panky which would make the car anything less than a randomly selected,

U.S.A.C. OBSERVER sat beside me every minute to check on speed limits and "write up" unsafe driving or the smallest infraction of traffic regulation

LOSING YOUR WAY is almost impossible on the Mobil Run as all route changes are marked with signs and guides as well as being spelled out in the Mobil Log

GRADES, like this one in the Rockies, may look level but your foot goes down, down, down on the accelerator as you buy altitude with gasoline

pure stock product of the assembly lines.

From the time the car is selected until the Run is completed it is either in a guarded garage or within sight of a U.S.A.C. observer around the clock.

However, contestants do get a chance to check out their cars. As a matter of fact the authorized driver-contestant is permitted 1500 miles of break-in mileage with a U.S.A.C. observer at his side and stamped lead seals on hood and trunk.

To bring the Run cars up to reasonable equal condition, U.S.A.C. permits a maximum of eight man-hours for tuning or checking the car during or after break-in. Entrants may also align and balance wheels in addition to eight hours of work permitted on the engine. Entrants are permitted to check the distributor and set the timing to their preference as well as set spark-plug gaps and point dwell.

But work on the carburetor is limited to adjustment of the idle speed and the idle air screw. If there is an imperfection inside the carburetor, nothing can be done about it and the car becomes a "bad" car which must either be used as is or with-

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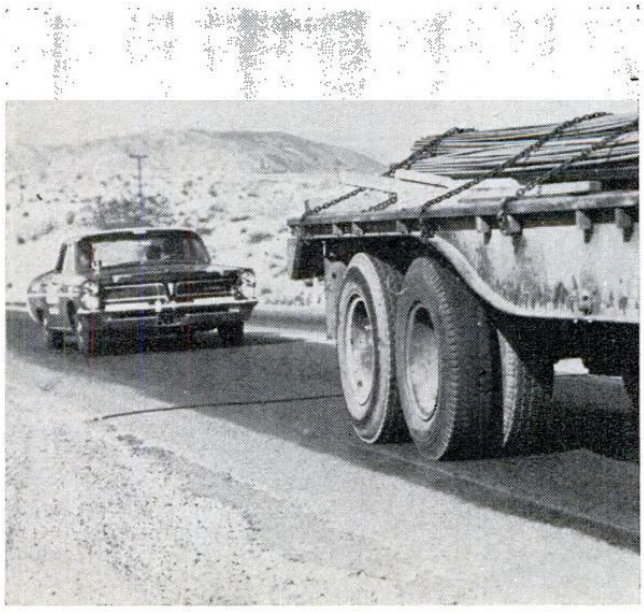
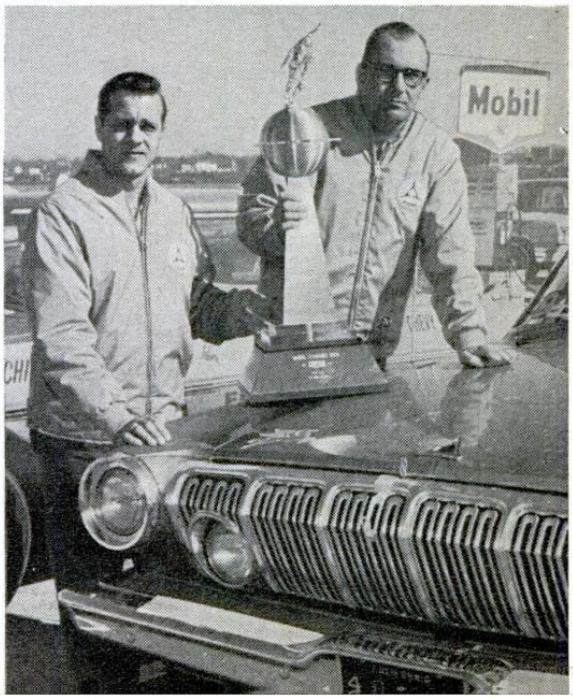
YOUR ENEMY is a truck crawling up a grade. Stay behind and you drop below your precious average speed. Blast around him and you've used precious fuel



THE END finally comes for brain-bushed navigator Mallwitz and this nerve-shattered driver, leaning on our Dodge and clutching our second-place Mobil trophy



Mobil Economy Run

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drawn. Here's where the manufacturer's quality control enters the picture.

My teammates informed me that both my Dodge Six and the Plymouth Six were excellent cars, as their economy potential had been checked during the last miles of break-in against the "mule car," another Dodge Six set up to factory specs.

Practice sessions with mule cars are important because they permit drivers to develop a "feel" for the most economical cruising speeds under varying conditions. Some teams use fuel meters in the cars so that drivers can polish their techniques and make immediate comparisons, checking results on the spot. Another aid on the mules is a vacuum gauge which tells the driver how low the vacuum in his engine's intake manifold has fallen during acceleration or hill climbing.

Using a Vacuum Gage

There is only one reason to consult the vacuum gauge and that is to develop a "feel" for the engine and keep the vacuum reading above 10 inches of mercury. Below this level a step-up jet in the carburetor opens and permits additional gasoline to enrich the mixture. The engineers told me that it was more economical when pulling steeper grades to downshift into the 1.45-to-1 intermediate ratio which would speed up the engine, but also increase the vacuum and allow the step-up jet to close.

Proving-ground studies had shown the optimum economy speeds for pulling various grade percentages. On the Dodge Six I was advised to let the speed drop off from about 47 to 37 m.p.h. whenever we estimated grade steepness had increased from two to five percent. At six percent it was more economical to shift into intermediate range and increase the speed to about 42 m.p.h.

I was able to practice such grade techniques for about two hours before the Run commenced. I would have liked about 20 hours of it, complete with fuel meter, to put me in shape for the climb over the Sierras and Rockies that filled the first three days on the road.

Kicking the Gears

In traffic practice I was schooled in the technique of "kicking" the automatic out of the 2.45-to-1 low ratio at under 5 m.p.h. and getting into the 1.45-to-1 intermediate gear, thus dropping engine r.p.m. and saving gas. It was done by ear. When the ascending whine of the transmission reached a certain pitch I knew it was ready and that if I lifted my foot off the pedal quickly the car would upshift. Doing this too soon would keep the transmission in low and slow the car down.

Acceleration was accomplished as slowly as possible, avoiding by all means the "pump shot" or jet of fuel from the carburetor's accelerator pump that's intended to cover the quick loss of vacuum caused by opening the throttle rapidly.

Thus, whenever passing became necessary the problem was not to blast around the slower car, but to float by at my own preferred speed, as long as it was safe.

At no time during the Run was it necessary to drive unsafely, but there were times when courtesy to fellow motorists went out the window. On dual-lane divided highways I often spent as much as a minute in the passing lane while tourists lined up behind me in fuming frustration, waiting to pass.

Altogether I had about five hours of practice in the eastern suburbs of Los Angeles before the start of the Run.

Although terrain, traffic and scenery changed from mile to mile, the routine inside Car No. 29 varied little from day to day as the Run progressed from Los Angeles to Las Vegas to Salt Lake City to Cheyenne to Omaha to Chicago, then on to the windup in Detroit. These big cities were the overnight stops, for rest and rehabilitation of the groggy crews. The Run cars remained sealed and guarded overnight just as the contestants left them. In the mornings they would leave in the reverse order of their arrival.

Three in Each Car

Each car carried three people, the driver, the U.S.A.C. observer (who was switched from one car to another twice each day), and the co-driver in the right rear seat. Actually the co-driver is a driver in name only, as he is permitted to drive only in case of driver illness; however, his role as navigator is extremely important. It is the navigator's primary job to see that his car uses the full time allotted for the day's run. To finish too early would mean that too much fuel had been burned in driving faster than necessary; to finish late means a penalty from U.S.A.C. officials in the form of gasoline added to your total tankage used during the Run, and don't forget that *not using* gasoline is the point of the whole affair. My navigator, Paul Mallwitz, was a Chrysler engineer and extremely proficient at his job. On the Omaha-Chicago leg of 499 miles and a running time of 12 hours and 9 minutes, Paul brought us in to Chicago just 90 seconds before our time ran out!

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Mobil Economy Run

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Almost equally important is the navigator's other job: briefing the driver on upcoming route changes and traffic conditions. All day long the navigator feeds his driver information from the Mobil Log, a printed listing of every turn in the route, stop sign, town, major intersection and speed-limit change with the indicated mileage between each point and the altitude at each point.

Thus if you are in Grand Island, Neb., and must make a right turn onto a new route, the navigator tells you in time so that you can get in the right lane smoothly to turn without stopping or downshifting, both of which are gas wasters.

Make-up Penalty Stops

Paul also kept me alerted for speed-limit changes and compulsory stops at intersections. Both stops and speed limits must be carried out perfectly or the observer will penalize you. A missed stop sign or a not-quite-complete stop can be made up by making an extra, unnecessary stop. I did one of these in California, but waited for my "make-up" stop until I had to slow down for a right-angle turn thus wasting as little fuel as possible.

Have you ever driven 2600 miles, making every stop a full stop and every 20-m.p.h. school zone and not 21 or 23 miles per hour? Try it sometime, if only for a few hours, and you'll have some idea why the Mobil Run turns what might be a pleasant sightseeing trip into a tense, nerve-chewing grind.

To bring their drivers to the end of the day's run within a few minutes—seconds for the nervy ones—of the allotted time, most navigators use the Curta, a miniature, crank-operated calculator that looks like a pepper grinder.

Calculating Navigator

Into his Curta Paul set our odometer error (97.5 miles per indicated 100) as a correction, then added the multiplier. This latter figure was the number of minutes required to complete each mile at our daily average speed in miles per hour. The daily average was arrived at by dividing running time into total distance of the day's run.

The multiplier usually ran about 1.4 minutes for each true mile. By turning the crank once for each mile indicated on the odometer, Paul could find the correct cumulative total time if we were to be on schedule at a particular mileage. He constantly compared this artificial or average time against the actual time recorded on the stopwatches clipped to his work table. For example, after 10 miles Paul's calculator should show a time total of 14 minutes. However, if traffic prevented us from making our ideal average of 43 m.p.h., the stopwatches might read 15.5 minutes; we would then be 1.4 minutes late. Thus the Mobil Run becomes not just a contest with other cars on the road, but a race between the calculator and the clock. The navigator's job is to tell the driver the correct speed to keep feeding enough mileage into the calculator to keep it up with the stopwatches.

That's why coming 499 miles from Omaha to Chicago within 90 seconds of a preset time represents a day's work for two men. If you're still not convinced, try it on your next long trip.

Here then is the Mobil Run; a driver trying to maintain speeds requested by his navigator over unfamiliar roads, through strange towns, at altitudes from below sea level to 9000 feet, obeying every speed-limit change and posted traffic regulation under the watchful eyes of an official observer on the seat beside him, *and* doing it all with as small a throttle opening and as few stops as possible.

Nor can you study or pre-run the route because the Mobil Logs are issued at the end of each day for just the next day's run. That's all you know in advance.

Time Cushions

Our team held meetings after each day's run—sort of skull practice sessions—to estimate the time it might take to go through larger towns and cities on the next day's run. The object was to enable the navigators to build up a "cushion" of plus time ahead of the 1.4 minutes-per-mile formula so that running speeds below the daily average could be made up smoothly and gradually.

Paul was constantly asking for slight speed changes in the open country. I might run at 51 m.p.h. for 20 minutes and, finding traffic favorable, then be able to drop to 48 and save precious fuel.

What made driving through traffic-clogged cities and towns all the tougher was that we aimed to run close to the posted speed limits, losing as little off the average speed as possible. The urge to run through changing traffic lights was almost unbearable. Rules permitted moving through an intersection on yellow, but if your observer caught the light changing to red while you were still in the intersection you were penalized. Driving the Run through towns and cities became a constant guessing game as to

whether you could make it to the next light before it changed to red, or whether you should slow down, waiting for it to cycle back to green again just as you reached it. Thus I found myself "playing" the third or fourth light ahead of the block I was in, as well as trying to keep from downshifting, running over the white line or tangling fenders with another car. Not a restful way to drive, believe me!

This is what it takes to average 23 to 24 miles per gallon across country if you obey all traffic laws. What does the Mobil Run prove? Basically it shows that any standard American production car can make phenomenally good mileage at reasonably fast average speeds if fantastic amounts of concentration and a fair amount of brain power are expended on the part of two people.

Mobil is simply supporting the manufacturer's claim that such a car, properly broken in and well tuned, can do it.

Lessons Mobil Teaches

What did I learn that might make me a more economical driver in everyday motoring? Basically this: If you are intent on reaching a destination on time, do a little planning for your trip. Unless you're traveling on turnpikes, 45 to 50 miles an hour average (not counting time stopped for fuel or lunches—which are "time outs" on the Mobil Run) is about all you can make legally in a mixed bag of city-country driving throughout the U.S. To conserve fuel, simply make up time by increasing speed where you can do it most economically. Roll fast in the open country, and "think your way" through traffic rather than accelerate and bull your way through; save your passing until you can do it both safely and without full throttle acceleration. Play it that way and you can probably come within two or three miles per gallon of the Mobil Run averages and have a much less exhausting drive than I did.

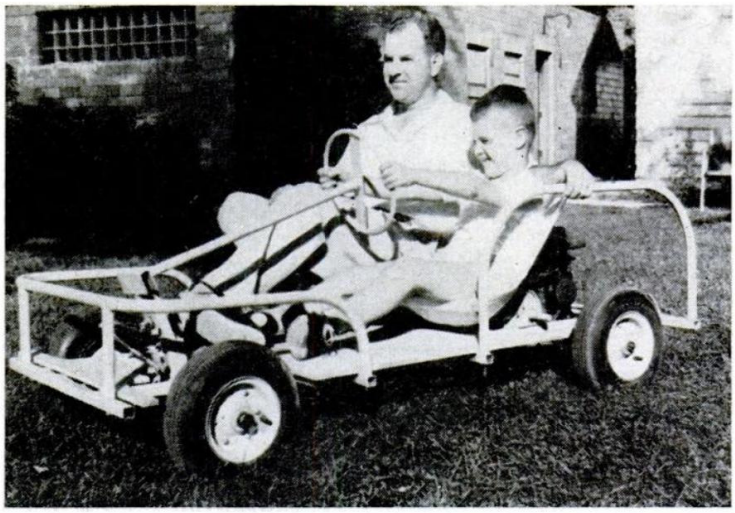
Was the Mobil Run fun, despite the nerve strain and fatigue? You bet! Next year, I'll be back at it shooting for first in my class! ★★★

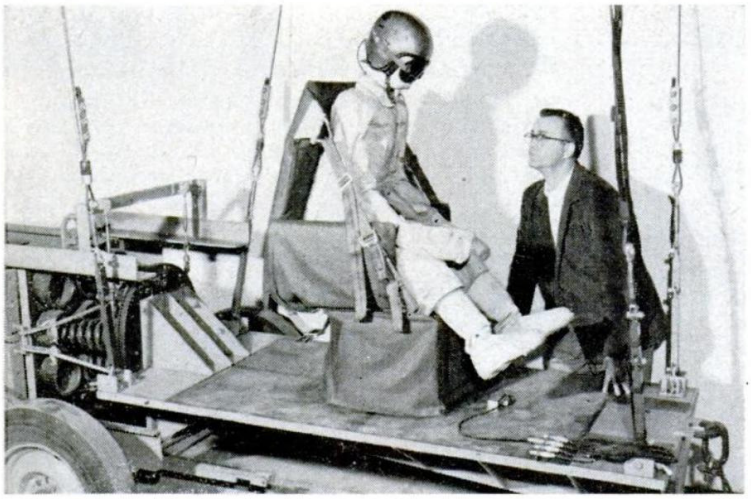
Nitrogen Helps Date Fossils

Scientists can now tell a fossil's age by determining how much nitrogen it contains. Describing the method as an auxiliary to the radiocarbon test for dating fossils, a British researcher reports that once the nitrogen content is known, it's easy to determine the amount of organic carbon present in such fossils as bone, antlers and teeth.

Kids' Midget Racer Is Stripped Down

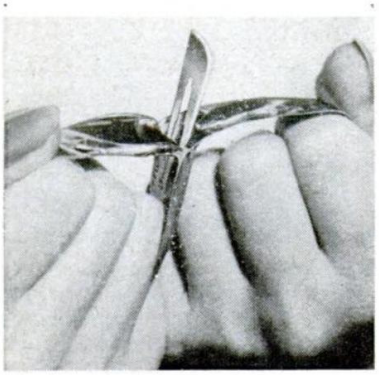
A TEEN-AGER can design his own dream car around this steel chassis. Chain-driven, it has a 2½-hp. rear engine with foot throttle and a geared transmission. Axles are tubular and the one at front has cantilever action for easier riding. Midget Motors Supply, Athens, Ohio, expects the kids' car to sell for around $200.





Dummy Is Crashed To Test Plane Seat

THE dummy at left has just endured a "crash landing" in the National Advisory Committee for Aeronautics' laboratory in Cleveland. His seat is of experimental construction, with inflated back, arms and cushion and no sharp edges. A body striking it would be well cushioned. The seat will not look like this if it is accepted commercially.



Scalpel Sealed Clean

STERILE scalpel blades now come in sealed foil envelopes. A nurse can peel one open, drop the scalpel onto a sterile surface and fasten it to a handle in seconds. American Safety Razor Corp., 315 Jay St., Brooklyn, N. Y., manufactures them.

"Brain" Fits Hand

A TURN of the crank of this circular, hand-held Curta calculator enables you to solve mathematical problems from simple addition to square roots. The Curta Calculator Co. 3851 W. Madison St., Chicago, distributes it.

Radio Lights a Path

AS AN additional selling point for the camper, Philco has slipped a flashlight into its newest line of portable radios. The business end of it is visible above at the right. Both radio and flashlight operate from two double-size batteries.