

MARCH 1967 35 CENTS

# Popular Science

MONTHLY

Special Save-It Section:  
High-Speed  
Math Short Cuts

UFOs—The Sense  
and the Nonsense  
By PHILIP WYLIE

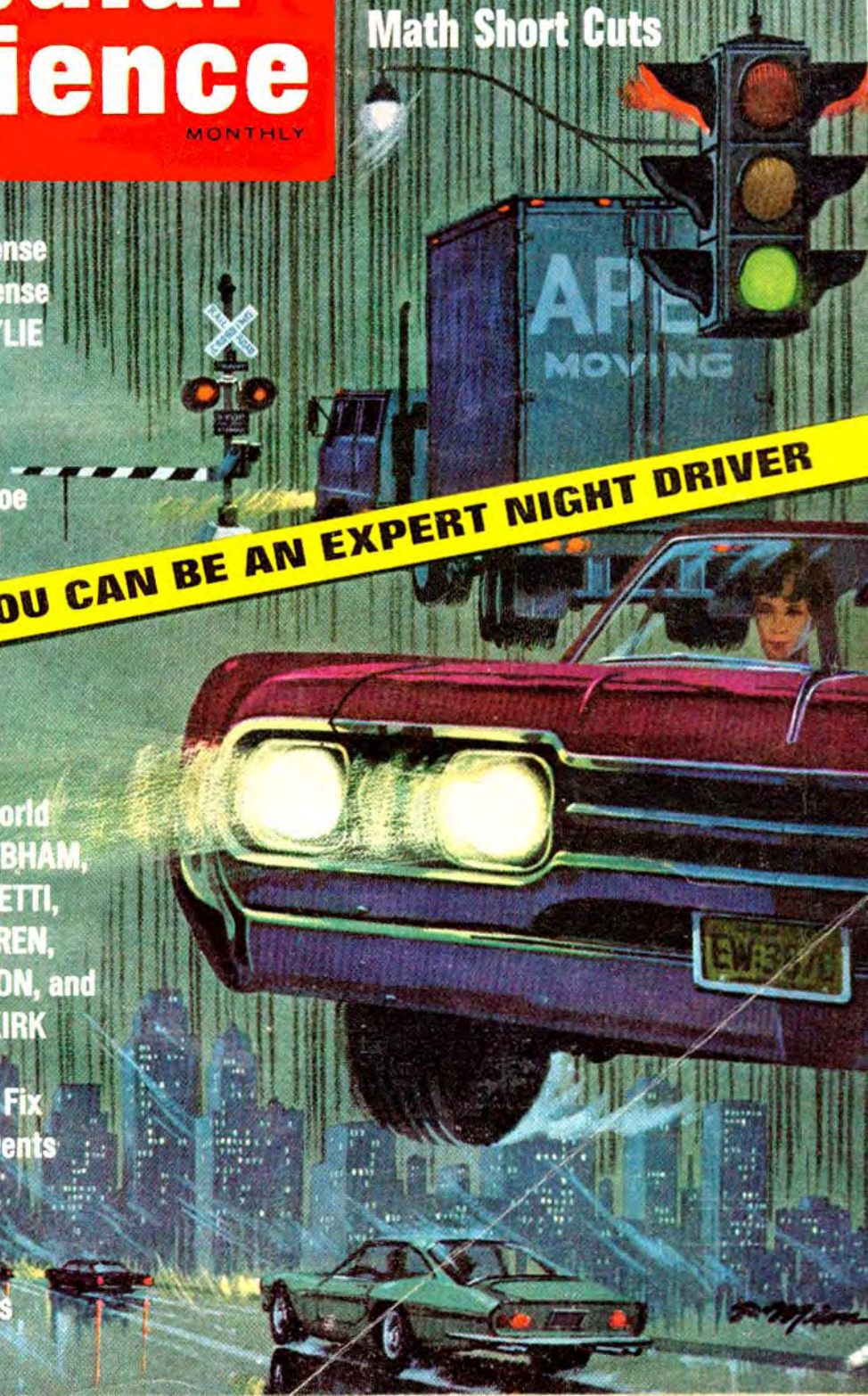
Blueprint:  
Unique  
Redwood Canoe  
You Can Build

**HOW YOU CAN BE AN EXPERT NIGHT DRIVER**

In Full Color:  
Auto Racing  
Around the World  
By JACK BRABHAM,  
MARIO ANDRETTI,  
BRUCE McLAREN,  
DAVE PEARSON, and  
PADDY HOPKIRK

How You Can Fix  
Those Little Dents  
in Your Car

Fine Lacquer  
Wood Finishes



# Gus Puts an Offbeat Combo Back in Tune



The "Mourners" were a real go-go group, but they wouldn't be doing much going unless Gus could fix their antiquated heap

By MARTIN BUNN ILLUSTRATION BY RAY QUIGLEY

Mrs. Landers fluttered out of the house. "My club people are due in 20 minutes!" she wailed. "Please tow it away."

**T**hat Friday afternoon, the supermarket parking lot was jammed. But Gus Wilson found the Plymouth station wagon exactly where Mrs. Landers had said it would be.

She hadn't told him it was bouncing with children. Five of them, from four to about 12 years old, were whooping it up inside. Through closed windows came the beat of rock-and-roll music from the radio. Gus rapped on a window. A golden-haired mop-top of six rolled it down an inch.

"I'm not allowed to talk to strangers," she

announced firmly. "My mother says so!"

"Just tell me where to find your mother."

"In the library. She works there."

Gus tried again. "Where's Mrs. Landers?"

"She went back in the store for something she forgot. She said if you came to fix the car, go ahead. She'll be out."

"She's coming now!" bawled a boy, as a harassed-looking matron came to the car.

"You were quick," she said. "I'm so glad. My club is meeting at my house at seven and there are a million things to do and this battery's gone dead again."



"Do you often leave the radio on while you're shopping?" asked Gus.

"Of course. It helps keep the children amused. They aren't all mine—I'm only minding three of them."

Gus refrained from comment on the risk of leaving ignition keys in a car full of kids. "I'll check your battery," he said.

The starter responded with only a click. A hydrometer showed the 12-volt battery almost completely discharged. The fan belt was so loose it slipped in his fingers.

"I'm sure it's just the battery," said Mrs.

Landers, as Gus adjusted the belt tension. "The other times a man hooked on another battery and it started fine."

"Until next time," returned Gus. "So far, I find three reasons why your battery let you down, Mrs. Landers. Leaving the radio on when you're parked is one of them."

"How can that matter?" asked Mrs. Landers stiffly. "I don't even make long trips—just around town shopping and carrying about the children. Besides," she added triumphantly, "this car has an alternator. That always keeps the battery charged."

"Your short stop-and-go trips are the second reason," Gus continued. "In winter especially, when starter drain is extra heavy and you have to turn on headlights earlier, your alternator doesn't keep up."

"But they told me it would..."

"Alternators aren't magic, Mrs. Landers. They'll charge even at idling, but not with the motor off. Besides, the belt was slipping and not driving your alternator at full power. I've taken care of that.

"I'll put in a charged battery I brought along. We'll check and charge up yours and, when you come for it, I'll check the alternator output and the regulator."

With the Model Garage battery installed, the Plymouth started at once, its engine roar almost drowned out by cheers.

**Gus stayed late** that night, checking bills. He was about to quit at about 6:30, when the phone rang.

"Mr. Wilson?" an agitated feminine voice asked. "I'm in awful trouble."

"It's Mrs. Landers, isn't it?" asked Gus. "That battery didn't let you down?"

"Oh no, it's fine. I mean it's awful, but it isn't my car. It's that—that thing in our driveway. You must come and take it away—I don't care what it costs."

Though Gus wasn't eager to make a late service call, the woman sounded so upset that he hadn't the heart to refuse.

At the house, a long black vehicle loomed up in the driveway. It was a hearse! Its hood was up, and bobbing busily about it like acolytes were four black-garbed figures. Had he been called, Gus wondered, to get a stalled funeral moving?

He had another shock as he walked up. The four men, somberly dressed in black tuxedos, were all extremely young.

*Continued*

Mrs. Landers fluttered out of the house. "My club people are due in 20 minutes!" she wailed. "Please tow it away. It looks as if somebody died!"

One of the young men pushed forward, his thin, handsome face showing concern as the woman went back inside.

"I'm Bob Landers. Can you just tow us off? It's got my mother making like crazy."

Gus shook his head. "I didn't bring the truck. What are you doing with *this*?"

"We've got a combo going for weekend dances; call ourselves The Mourners. It's a gas. We play with deadpan, sourpuss faces. The gag goes over so big, we bought this crate to go to jobs in—it's a real blast at the scene."

"It's a 1950 Caddie and it goes pretty good," put in a tubby lad. "Only thing is,

caught at once. Gus turned the distributor back to the mark and locked it.

"Cosh, that was wonderful," breathed the Landers boy. "How'd you do it?"

"Never mind that now," returned Gus, seeing Mrs. Landers twitching in the doorway. "Get this thing out of here. If you still want to know, see me tomorrow."

The four piled into the hearse more like firemen than undertakers, and the unwieldy vehicle backed out. A still-grim Mrs. Landers pressed a bill on Gus.

**Before noon** next day, Stan Hicks, Gus's helper, opened the shop door in response to an imperious horn toot. In swept the hearse.

Stan's respectful mien underwent a startled change as the four young men tumbled out, dressed formally as before.

"We couldn't stand not knowing," said Bob Landers to Gus, "even though we're on the way to our next stand."

"A grade-school afternoon dance," put in the redhead. "So we can pay you, if you'll tell us how you got it

to start—and at double forte, too."

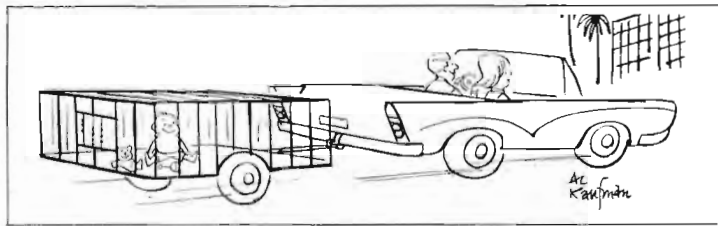
"I made a far-out guess," Gus began. "But first, what have you done besides putting in that hot new battery?"

A chorus answered. Distinguishable in it were a few words "new points," "coil," "spark plugs," "starter," "tune-up."

Gus held up a hand. "I guessed you'd tried all those, and that the ignition was okay. It isn't the first time I've run across an old engine with lots of mileage, and probably thick carbon deposits, which the starter can barely swing over when warm.

"It acts as if the battery's low, but that's not the trouble. When the engine is cold, raw gas coming into the cylinders takes a few milliseconds to fire up and explode. But when those carbon deposits are hot—and remember they boost compression, too—incoming fuel flashes into hot vapor that fires mighty fast. So fast, it happens before the top of the compression stroke. The explosions try to turn the engine backward, bucking the starter.

"Last night, I simply retarded the spark more than the automatic advance allowed. You heard the engine turn over faster be-



it starts up fine cold, but won't when it's warm. When it quit here, while Bob was getting some music from the house . . ."

"It didn't quit!" hissed a redhead savagely. "You turned it off, Tubby."

"So I forgot! It was missing anyway."

"Let's just move it before those old birds of Mom's show up," put in Bob Landers hastily.

Gus leaned over the grimy engine. "Let's hear you try it," he suggested. He pulled off a spark-plug wire and held it near the block.

Sluggishly the engine turned over, hesitating periodically as if barely able to get past compression. But a good hot spark jumped from the cable to the block. Gus signaled to cut the motor, replaced the cable, and looked at the big six-volt battery.

"That's a 140-ampere-hour job," explained Landers. "We put it in last week."

Taking tools from his kit, Gus loosened the distributor lock nut. After scratching a position mark on the casing, he turned it to retard the spark about 10 degrees, and signaled the boy behind the wheel.

The engine spun briefly at fair speed, and

fore it started up. That was what did it."

There was a brief silence.

"How about leaving the spark like that so it'll always start up hot?" asked the tubby lad eagerly.

Gus shook his head. "You couldn't get out of your own way with it retarded."

The questioner's face drooped. "Thought if we knew the reason we could lick it."

"Well, you can—two ways. One is a pretty expensive engine overhaul—"

"We'll take the other," said Landers.

"Okay," chuckled Gus. "It's only a make-do fix, but easy and practical."

In the stock room, Gus picked up a hose clamp and a length of  $\frac{3}{16}$ " steel rod. He bent the hose clamp around the neck of the vacuum-advance unit on the distributor and secured it. He then drilled a  $\frac{1}{4}$ " hole in the firewall in line with the clamp.

Having made a short L bend at one end of the long rod, he passed it through the hole and hooked the bent end into the hose clamp. Under the dash, he made a larger L bend at the other end of the rod. Then he loosened the distributor lock nut until a 10-pound pull on the rod would rotate the distributor casing. But he set the rod at the original advance mark on the casing.

"Start her up," said Gus.

Bob Landers turned the key. The starter churned as slowly as before.

Reaching for the rod, Gus slowly pushed it in. The starter picked up speed. He moved the rod farther. Abruptly the engine fired up. As it idled, Gus detected a slight skip in its beat.

He got out to file a nick in the rod at the

firewall. Then he connected a timing light, pushing on the rod to advance the spark until the timing mark lined up. Then he filed a second notch in the rod.

"You'll feel those nicks drop into the hole," he explained as he disconnected the light. "Push the rod forward to start, pull it back to the other nick for running. But don't forget that, or the engine will have no pep, and will overheat besides. Now, what have you done about that miss?"

"Nothing," responded the redhead. "We just put in new plugs so it must be a warped or stuck valve."

"Did you gap the new plugs first?"

"Fellow we bought 'em from did."

Gus got his oscilloscope plug checker and hooked it up. At once seven normal traces slid up the screen. The eighth fell far short.

"Which of you dropped number-five plug?" asked Gus with a grin.

"How'd . . . Did that gadget tell you that?"

Gus nodded, shut off the engine, removed the damaged plug, and held it out.

"See where it landed on the electrode? That closed the gap. There was no spark."

Gus reset the gap with a gauge, then screwed the plug back in. Restarted, the engine ran smoothly.

"You're okay, Mr. Wilson," said Landers.

"Okay? He's great," declared the redhead. "How much is the bill?"

"Mrs. Landers paid me enough last night to cover this," Gus said. "But there is one thing you can do for me—"

"Just name it!" said the tubby one.

"Move it out," begged Gus, "before somebody comes in—and takes the Model Garage for the morgue." P 5



### Passing motorists play Good Samaritan

One driver can help another without a stop—just by blinking his lights—in an experimental system shown here in a trial on New York's Long Island Expressway. The sign at left asks any driver seeing a disabled vehicle along the

highway to signal by flashing his headlights three times, at a point a quarter-mile ahead. An electronic recording device installed beside a second sign (right) relays the message to the highway patrol's headquarters. The project is being conducted by the Airborne Instruments Laboratory for the U.S. Bureau of Public Roads.