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# Popular Science

MONTHLY

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- Basic Rooms You Can Add to Any House
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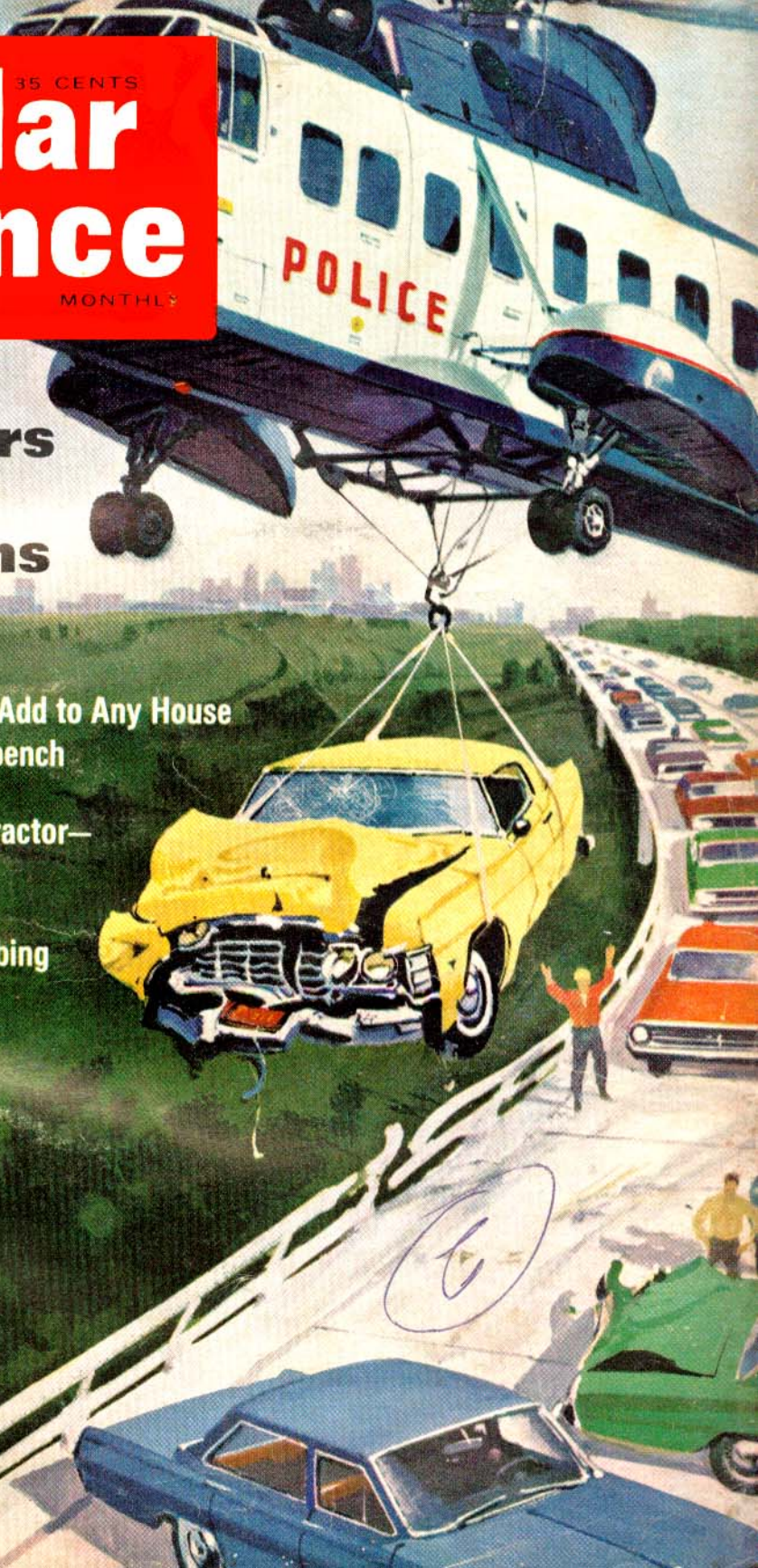
### Riding Mower or Yard Tractor—Which Is Best for You?

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*"If you have so little confidence in us," said the*

## GUS DISAGREES WITH A

**Gus felt funny about invading a dealer's service department but his job was to save the car—not the manager's feelings**

**"K**eeep right, Fred—right! Oh gosh, now we can't make the exit," muttered the girl as the sedan rolled alongside a truck and an exit ramp appeared on the right.

Tight-lipped, the young man who was driving sped past the long trailer.

"Should have told me before we got to it," he grumbled. "It's sure too late now."

"I know," she said miserably. "I thought you'd remember. Now we have to go six miles out of our way and six back."

Fred looked in the mirror. Well ahead of the trailer, he returned to the right lane, slowed, and pulled onto the shoulder. As the

car stopped, the truck and a long string of traffic behind it roared by.

"What's wrong now?" the girl asked.

"I've had enough of the seeing-eye bit," Fred snapped. "You know this turnpike, and it's your Dad's car, so you drive it."

He put the shift into neutral, opened the door, and began to get out.

"You're just sore because you couldn't take your Ghia," retorted the girl, hitching herself over the seat.

Fred was already walking around. She swung one foot over the floor hump, and suddenly the idling engine roared. Fred leaped in alarm, but the car didn't budge, though its engine reached a screaming crescendo before the young man could go around and tear the door open. The girl was halfway across the seat, one leg bent oddly, her foot, in a high-heeled shoe, awkwardly jammed on the gas pedal.





redheaded man, "you'd better pay for the tow and diagnosis and have your crate hauled out of here."

## DIAGNOSIS By MARTIN BUNN ILLUSTRATION BY RAY QUIGLEY

"Turn it off, Lucy!" Fred yelled above the banshee howl of the motor.

White-faced, she did not move. Before Fred could reach the switch, the engine stopped like a sound tape snapped short. In deafening silence, he turned off the ignition, then worked the girl's foot free.

"Move over, Lucy," he said gently. "I guess you won't want to drive just now."

He sat behind the wheel fully half a minute before turning the ignition key.

A dull thunk was the only response.

Switching off the ignition, he put the shift lever into high, then got out and tried to rock the car.

"Shoulder's too soft," he muttered, getting in again. Once more he tried the starter. Again there was a dull thud.

"That's it," said Fred. "We're stuck until somebody sends a tow truck. Let's have your scarf to tie to the door handle."

A stocky, square-jawed man in a sports coat was pacing before the Bensen showroom as Gus stopped the Model Garage tow truck at the curb.

"I'm Herb Radcliffe, who phoned you," said the man. "I wanted to meet you out here to talk before we go inside."

"Okay, I'm listening," answered Gus.

"My daughter and her boy friend were going upstate last weekend in my Chevy. He was driving, but on the way they decided to change off. In sliding over, her foot jammed the gas pedal and the engine almost ran off its mounts. Before they could stop it, it quit and wouldn't start again.

"Lucy had it towed here because it's where I bought the car. I wouldn't let them fix a tri-cycle myself. They once charged me for work that should have been under the warranty. So it's the money, not just the princi-

*Continued*

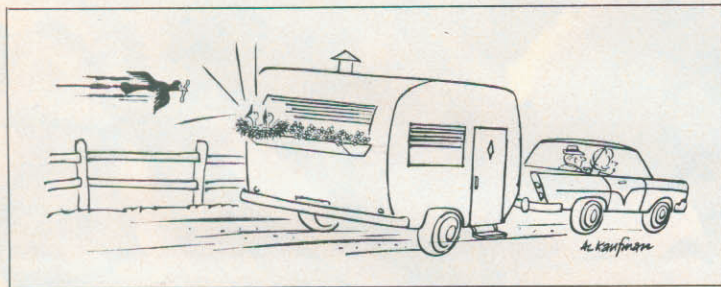


ple of the thing," confessed Radcliffe, "Anyway, it's getting old. I was going to let Lucy take it back to college for her last term, then trade it in next year, so it isn't worth spending much on."

"Did they say what's wrong?" asked Gus.

Radcliffe shrugged. "They're guessing. They say my daughter must have panicked, tried to switch off the engine, and turned on the starter instead, jamming the starter and flywheel teeth. They say the solenoid's probably shot and the flywheel teeth are broken, so the car'll need a new flywheel.

"But Lucy and the boy swear she didn't touch the key—the engine stopped by itself. I told the service manager that I wanted to call in another expert. He didn't like it, but



here we are. I'll pay whatever you think right for anything you do."

As they entered the repair shop, a big redheaded man frowned at them angrily.

"I told you what we decided," he said.

"I told *you* I wanted somebody to back-stop you," retorted Radcliffe. "Here he is."

"If you have so little confidence in us," said the redhead, flushing, "you'd better pay for the tow and diagnosis and have your crate hauled out of here."

Gus went out to get the tow truck.

**Back at the Model Garage,** Gus tried the starter of the Chevy. The thunk was exactly like that heard from the solenoid when the battery is too weak to crank the starter. But a hydrometer read 1,260, and all battery, solenoid, and starter connections proved to be clean and secure.

On a load-meter test, the battery fell only to 10 volts under a 200-ampere draw, confirming that it was in fairly good shape. Propping the meter where he could see it, Gus turned the key again to "start." The needle dropped to three volts, indicating the heavy draw of a locked armature.

Gus disconnected the meter, then loosened the starter. It came off with no indication of jammed teeth. On a test bench, he connected it and the solenoid to a 12-volt battery. Both worked perfectly.

After removing the power-steering belt, he tried to turn the engine by hand. It wouldn't budge. Crankshaft and block might as well have been one solid chunk.

Gus removed the spark plugs, and mixed a pint of penetrating oil with as much kerosene. With a siphon bulb, he squirted a few ounces into each cylinder, then replaced the plugs and the starter.

**Late in the afternoon,** a saucy horn announced the arrival of a sleek little sports car. The young man who stepped out of the black Karmann Ghia glared at the Chevrolet.

"I'm Fred Clark. I was there when that bus conked out. Any luck with it?"

"Too soon to tell," replied Gus.

"It would never have happened if this glorified VW hadn't let me down." He jerked a thumb at the Ghia. "Lucy Radcliffe and I go to the same college, and I drove her home in my car. On the through-way, it began missing at high speeds. We had to poke along under 50.

"We stopped to put in new points, plugs, even a condenser. It still missed. I got a new coil and plug wires, and put on a spare fuel pump I carry. Nothing helped. It runs fine cold, but as soon as it warms up you're back to 50 per."

Gus raised the engine deck, lifted off the distributor cap, and turned the little engine over to bring the breaker point on a high spot of the cam. The gap checked out at sixteen thousandths.

"Let's take a ride," he suggested.

Acceleration was good through all gears. Gus tentatively ruled out a clogged exhaust system, dirty air cleaner, sticking choke, and defective vacuum advance. A mile's run warmed the engine and brought them to an expressway. As Gus opened the throttle, the little car leaped forward, reaching 65 with plenty of pedal left. But half a mile later it suddenly faltered, dropping



rapidly below the 50 mark. There it cruised smoothly, but when Gus floored the throttle the car surged forward only momentarily.

It felt like fuel trouble, Gus thought as he headed back. If the ignition were cutting out—because of point bounce, say—the car would hold that critical 50-m.p.h. speed without responding to more gas as it did. Unless both fuel pumps were defective, or pump stroke too short, the trouble must be in the carb. Or the fuel line—which had, Gus recalled, a vulnerable link in it.

Back in the shop, he jacked up the left side of the car, then slid under it.

"What're you looking for there?"

"Your high-speed miss," replied Gus, emerging, some limp tubing in his hand.

"This connects the gas line from the tank to one that goes through the front wall of the engine compartment," Gus explained. "It's synthetic rubber, gone soft with heat and age. When the fuel pump pulls a lot of gas at high speed, the tubing collapses and chokes off fuel as if you'd pinched it. At lower speed the suction is less, so it passes gas."

"Why did it work with a cold engine?"

"While cold, the tubing was stiff and didn't collapse. I'll put on a new piece."

On the second road test the Ghia hit 80.

**At noon next day,** Radcliffe appeared.

"Heard you licked Fred's trouble," he said. "What's the word on my car?"

"Let's go try it," suggested Gus.

He got into the Chevy and turned the key. There was a thump, a hesitation, and then the starter ground sluggishly. In a second or two, it turned faster. Suddenly the engine fired, with a belch of blue smoke. The oil-warning light blinked off.

"Migosh!" gasped Radcliffe at the bluish exhaust. "It never did that before."

"That's just some solvent oil I put in burning out," Gus assured him. Clapping an exhaust hose to the tailpipe, he let the car idle for a short time, then drove it onto a lift and cut the engine.

"The parts seized," Gus explained to Radcliffe, "because the throttle was full open for too long at such high revs they didn't get enough oil. When the existing oil film was scraped off, tiny hot spots practically welded themselves together."

"Why did the oil fail just because the engine was revving up? I've had this car do 90, and cruise all day at 75."

"It never revved up as fast, even at high road speeds, as it did running with no load," returned Gus. "It threw off oil mighty fast, and at that speed the oil-pump output tends to fall off because of cavitation—that is, the pump spins a hole in the oil instead of moving the stuff along."

"You think it did the engine any harm?"

"It didn't improve it any—probably took 30,000 miles out of it. In 10,000 or so more, it may start pumping oil."

"But it's okay for now?"

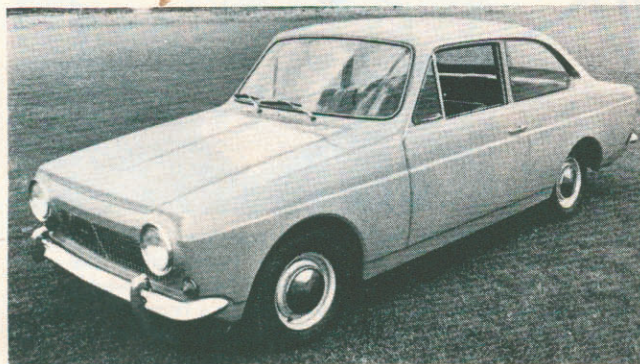
Gus nodded. "I'd change the oil—that engine needs the best of lubrication now—add a pint of friction-reducing agent, and drive slowly for the first hour."

"Okay," agreed Radcliffe. "I'm glad I don't have to pay for a flywheel, because it looks like I'll have a wedding to pay for soon."

"In that case, you don't have to worry about how long this car's going to last."

"Why not?" asked Radcliffe.

"It'll last out this term," Gus assured him. "Then it'll be up to the Ghia." P E



### Fiberglass sedan is Turkey's first car

The Anadol is the first car ever made in Turkey. The two-door five-seater uses a British Reliant engine, gearbox, and differential, but the body is made domestically and the entire vehicle is assembled in Istanbul. The Anadol costs \$3,000, and 5,000 will be built this year.