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July
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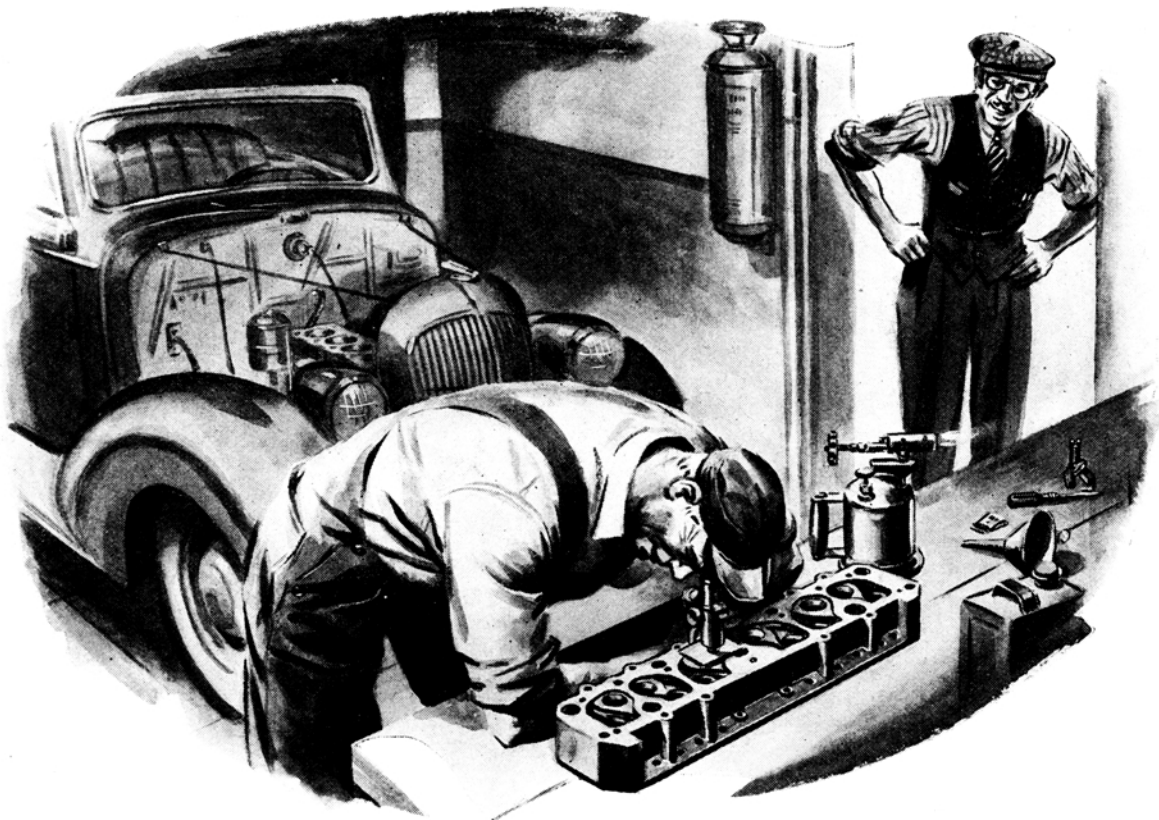
MONTHLY

Mechanics & Handicraft



Two Magazines in One.. 15¢

SEE
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105



"What the dickens are you up to?" Joe Clark wanted to know. "I thought you were an automobile mechanic—not a 'bugologist,' or something."

Gus Looks for Trouble

JOE CLARK, hustling out of the office of the Model Garage into the shop where Gus Wilson is boss, stopped dead in his tracks and stared at his partner in surprise.

His surprise was justified. Gus seemed to be engaged in scientific research. He was hunched over his workbench, on which lay an engine head. His right eye apparently was glued to the eyepiece of a microscope, its base and mirror removed, which he held with its stage on the engine head. His other hand gripped a flaming blowtorch. First he'd play the torch's flame on a few inches of the surface of the head; then he'd examine the same section carefully through the microscope. As Joe watched him, he carefully re-examined one of the exhaust-valve seats, let out a grunt of satisfaction, and looked up.

"What the dickens are you up to?" Joe

wanted to know. "I thought that you were an automobile mechanic—not a 'bugologist,' or something. Why the highbrow apparatus?"

Gus grinned at his partner. "Trouble comes in funny places," he said, "and sometimes you have to turn sleuth and track it down. That's what I've been doing for the last three hours—tracking down trouble. I just found it. Come over here; take a look."

He handed Joe the microscope, and indicated the valve seat. "What do you see?" he asked.

Joe squinted through the brass cylinder, and said that he didn't see anything unusual.

"All right," Gus said. "Now wait a minute." He heated the valve seat with the torch flame. "Take another look. Now what do you see?"

Again Joe squinted through the microscope. "Why," he said after a moment, "there's a

small crack, right on the angle of the valve seat. Funny I didn't see it the first time."

"No, it isn't," Gus contradicted him. "Heating the metal makes the crack expand enough for you to see it with the microscope. As a matter of fact, it makes the crack expand enough for water to pass through it from the water jacket. As soon as the metal starts to cool, it contracts enough to close the crack."

"That's a new one on me," Joe said.

"It was a new one on me, too," Gus admitted. "Young Dick Coleman—you know him, Henry Coleman's boy, the one who goes to engineering college—came in this morning with a used roadster he'd bought cheap and partly on time up in Boston. The dealer he got it from must be a real honest guy. He told the kid that the radiator wouldn't hold water for long. He admitted that he'd tried unsuccessfully to find the leak, and told Dick that if he could locate it and fix it up, he could take what the job cost him off his monthly payments.

"Well, Dick's a clever kid with cars, and he thought that finding the trouble would be easy enough, and that maybe fixing it wouldn't be much more difficult.

"He drove the job down from Boston, and had to stop and put water in the radiator every forty or fifty miles. When he got home, he swore that he'd spend his whole vacation, if he had to, trying to find that mysterious leak. There was no trace of water in the crankcase oil pan. He put air pressure on the radiator, but couldn't find any sign of a leak. The gasket on the engine head was good as new.

"So he went to work on the engine itself. He took off the head, washed it with gasoline, and went over it carefully for cracks. Then he put it in a tub of water, boiled it to remove every last trace of grease and oil, and went over it again. Still no cracks. He examined the block, inch by inch. Still nothing doing in the leak line!

"Apparently there was no leak—but the water was going *somewhere*. Naturally enough, young Dick was up a tall tree. So he towed the job around here to the shop, and asked me to take a look at it.

"I know Dick well enough to know that anything he does on a car he does carefully. But I thought that somewhere in the engine head there must be a crack so small that he hadn't seen it—maybe so small that I wouldn't see it, either. So I sent him around to borrow one of Doc Marvin's microscopes—this fifty-power glass that I have here.

"When Dick came back with the microscope, I took off its base and mirror, leaving the stage in place so I could brace it against something solid, and went over every inch of that engine head with it. But I couldn't find any indication of even the smallest crack. And then I was up a tree!

"While I was smoking a pipe and thinking the puzzle over, I remembered something that Dick had told me—that the radiator didn't lose any water while the car was standing in the garage. That gave me an idea—that maybe a crack opened somewhere and let the water leak out only when the engine got hot. So I started heating a few inches of the head's surface with the blowtorch, and then examining it through the microscope before the metal had time to cool off. At last I found the crack I showed you."

"Good work, Sleuth!" Joe applauded. "But what's the answer for Dick?"

"There's only one answer for Dick," Gus said. "A new engine head. He will be able to take what it costs him off the balance that he owes, and when he gets it, he'll have a car that will do him all right for the rest of his time in college."

"Here's another detective job for you, Gus!" Joe Clark called from the office door a couple of hours later. "Mrs. Miller is on the phone, and she says that her car is acting in *such* a funny way! She wants to know if you can fix it for her right now."

"Oh, gosh!" Gus groaned. "That woman! All right, tell her to bring it over."

Mrs. Miller drove into the shop less than ten minutes later, and began to talk before she was halfway out of her sedan.

"Oh, Mr. Wilson," she gushed, "my car is acting in a way that is just too, too mysterious! I'm sure that there must be something dreadful the matter with it. But no matter how bad it is, I know that you'll be able to fix it for me so that I can get over to Pleasantville in time for Mrs. Bunker's tea. I always say to Mr. Miller: 'Henry, I think that Mr. Wilson is just too, too marvelous with machinery!' Why, only the . . ."

Gus managed to edge a few words into the torrent of Mrs. Miller's flood-stage conversation. "Now, this mysterious trouble . . ." he suggested gently.

"Oh, yes—the trouble," she said. "Really, it's too queer for words! The car runs perfectly until I get up to twenty-five miles an hour. *Exactly* twenty-five miles an hour! Then the motor stops, and the car slows down. And then the motor starts again, and runs all right until I again get

**Even If It Takes One of
Those Microscopes That
the "Bugologists" Use,
the Model Garage's Boss
Finds Hidden Car Troubles**

• • •
BY MARTIN BUNN

up to twenty-five. Now, Mr. Wilson, what in the world do you think is the matter?"

"Perhaps we'd better take a little ride down the road," Gus suggested. "You drive, please."

Mrs. Miller succeeded in backing her car out of the shop without hitting anything, and headed down the road. Gus kept his eyes fixed on the needle of the speedometer. It climbed up to twenty-three—twenty-four—twenty-five—

The instant the needle reached the twenty-five mark, the engine quit as if some one had turned off the ignition! The car slowed down. Then, as suddenly as it had stopped pulling, the engine caught hold again, and ran smoothly.

"There!" Mrs. Miller said, triumphantly. "Didn't I tell you!"

"You did!" Gus admitted. "Now, if you'll drive back to the shop, I'll try to find the trouble."

Back in the shop, with Mrs. Miller fidgeting about being late for her tea date and keeping up her ceaseless flow of chatter, Gus carefully checked the car's wiring system. Everything seemed to be in the best of condition.

He was pretty well stumped, and Mrs. Miller was getting badly in his hair. Suddenly, he had a hunch. That speedometer—and the engine always stopping just when the speedometer needle reached the twenty-five-mile mark on the dial. The speedometer must be the key to the mystery of the engine's unusual behavior!

Lifting the hood, he carefully traced the speedometer cable to and through the cowl, and to the dashboard. He noticed that there was a sharp bend in the cable just after it passed through the cowl, and that not more than an eighth of an inch from that bend there was a small spot where the insulation of the "hot" dash wire had been worn through.

He had to stop for water every forty or fifty miles

Gus put down the hood, and got back into the car. "I'll have to ask you to take me for another little ride, Mrs. Miller," he told her. "Yes, I realize that you are in a hurry, but I have to find the trouble before I can fix it!"

Again, Mrs. Miller backed the car out of the shop. When they were on the road Gus crouched forward, with his head half under the cowl. As the car's speed increased, he saw the speedometer cable move very slowly over toward the bare spot in the insulation of the dash wire. "Faster, please," he said. "Up to twenty-five."

As he felt the car's speed increase, he saw the cable move still closer to the worn insulation. Suddenly there was a flash, and the engine quit. As the car slowed down, the

cable began to move back toward its original position. Then there was another spark, and the engine began to fire evenly again.

Gus withdrew his head from under the cowl, straightened up, and laughed as he looked at Mrs. Miller. "That one had me stopped for a while," he said. "Stopped dead! Don't bother driving me into the shop. I can take this bug out in half a minute, and you'll be in plenty of time for your tea party."

"You're so wonderful with automobiles, Mr. Wilson!" Mrs. Miller enthused. "But do tell me just what is the trouble that it took you so long to find, and that you will be able to fix so quickly."

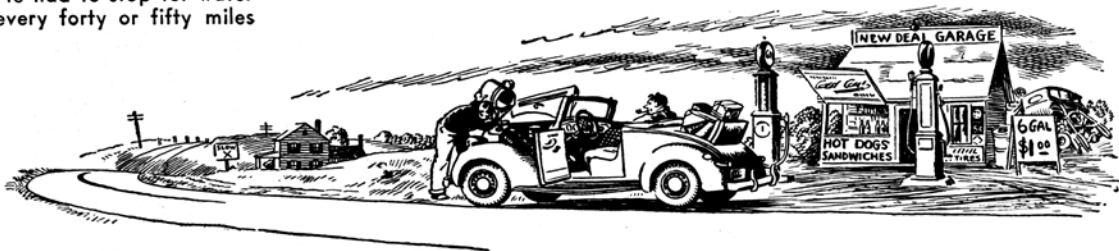
Gus groaned—mentally. "Well," he started to explain, "you know, of course, how a speedometer works. The cable . . ."

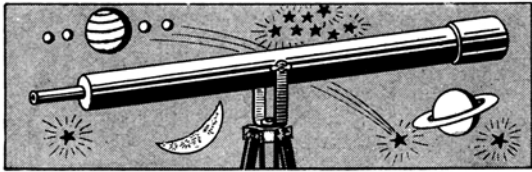
"Oh, yes—the speedometer!" Mrs. Miller was bright, if vague. "Yes, I know about that—it tells you how fast you're going."

"Yes," Gus said. "Yes. Well, the cable has—do you know, Mrs. Miller, I think it would be better if I fixed (*Continued on page 230*)

GUS SAYS:

Most people do a lot of long-distance driving during the summer. That's fine for everybody, but what's the fun of tiring yourself out by trying to turn a nice two-day trip into a one-day race? Stop before you're tired, and rest. Then go on next day. You'll drive better and have a much safer trip.





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Gus Looks for Trouble

(Continued from page 132)

your car up now, and told you about the trouble some other time."

He jumped out of the car, and hurried into the shop. In a moment, he came out with a six-inch strip of tire tape in his hand. Reaching under the cowl, he wrapped the tape expertly around the worn spot in the dash wire's insulation.

"Now, you won't have any more trouble," he assured Mrs. Miller. "I don't want to hurry you, but it's almost five o'clock, and the traffic—Good-bye, Mrs. Miller!"

He watched her drive away, and turned back toward the shop to see Joe Clark grinning at him from the office door. "Have a nice visit with Mrs. Miller?" Joe wanted to know. "Say—what was the matter with her car, anyhow?"

Gus told him.

Joe scratched his head doubtfully. "I guess maybe I'm as dumb as Mrs. Miller," he said. "But I'll have to admit that I don't see what made the cable move over toward the dash wire, or why . . ."

"Huh?" Gus said. "Oh! Well, you know that a speedometer cable has a rotating core, don't you? And that the faster a car travels, the faster the core rotates? What happened in this case was that the core rotating in that bend in the cable caused a torque which pulled the cable over toward the spot where the insulation had worn off the dash wire. When the speed got up to twenty-five miles an hour, the torque was sufficient to pull the cable over against the bare spot in the insulation to cause a short in the wire leading to the engine switch. That short, of course, killed the engine. As soon as the torque decreased, the cable moved back and the engine fired again. Simple enough!"

"Sure," Joe said. "Simple enough—once you've found it."

Paint Prevents Damage by Incendiary Bombs

DAMAGE from incendiary aerial bombs is said to be prevented by a mineral paint recently developed in England. In tests, a coating only a sixteenth of an inch thick on beams, joists, and flooring was found to keep the woodwork from catching fire during the time it takes for a one-pound thermite bomb to burn itself out. Since small bombs would only penetrate the roof of a house and stop at the first wooden floor, painting the attic of a home with the new paint is believed to be sufficient protection.