

PREVIEW: The '62 Cars

POPULAR MECHANICS

AUGUST, 1961 • 35 CENTS

**SURVIVE in the
WILDERNESS ?
WE DID — on
10 Minutes' Notice!**

Scheduled to fly this month!

**World's
Safest
Plane?**



**Storage
Shelters
for bikes and tools**

NOW ADD SOUND TO YOUR 8-mm. MOVIES

A man wearing a white bucket hat and sunglasses is sitting on a white beach chair. He is shirtless and wearing orange shorts. He is holding a pack of Lucky Strike cigarettes in his right hand, with a cigarette lit. The background is a light blue sky.

**Remember
how great
cigarettes
used to taste?
Luckies still do**



**Change to Luckies and get
some taste for a change**

PPG's sensational new LATEX House Paint resists blistering and peeling!

Protects homes years longer . . . Easier to apply . . . Goes over damp surfaces . . . Dries in 30 minutes

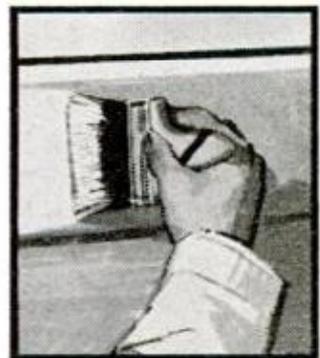


• Experiences of thousands of homeowners the country over confirm the results of years of laboratory and field tests . . . prove that sensational new PPG LATEX is Pittsburgh's greatest advancement in house paint in nearly three-quarters of a century.

• Made with new miracle resins, this new paint protects homes for extra years with an

amazingly tough and flexible film that resists blistering, peeling and discoloration.

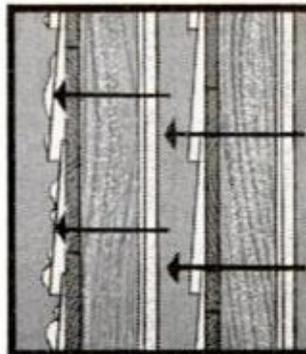
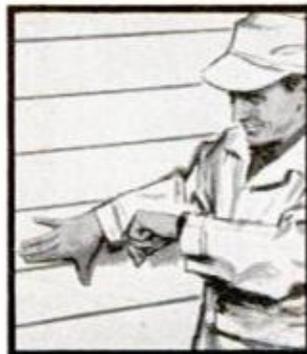
• New Pittsburgh LATEX House Paint can be applied over damp surfaces—also gives you greater ease and speed of application. You can use it with remarkable results on wood, brick, stucco, asbestos shingles, cement blocks or metal surfaces.



• Sensational new Pittsburgh Latex House Paint can keep your house looking "just-painted" years longer. The colors are fade-resistant . . . white stays white, colors retain their

crisp, clean beauty . . . and the new miracle resins are so durable they fight the effects of time and weather far longer! The result? A money-saving bonus of extra years between paint jobs!

• You'll save hours because Latex goes on so fast and smooth! No brush drag, no lap marks. Use brush, roller or spray.



• Paint over damp surfaces! With Latex you can paint over surfaces damp with dew or rain . . . or paint between showers.

• Dries in 30 minutes! Forget about rain, dust and insects messing up your paint job! Latex dries in only 30 minutes.

• Resists blistering! Correctly applied, Latex resists blistering. It lets trapped moisture out, yet will not let moisture in!

• Clean up with water! Cleanup and brush care is a snap! Just wash brushes, roller or spray gun in plain soapy water!



PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

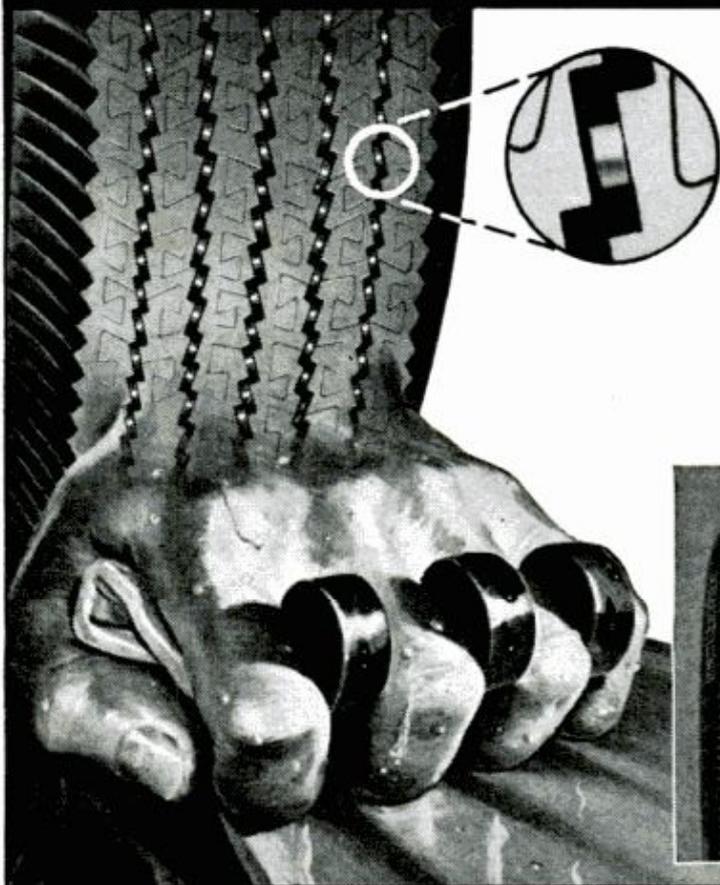
PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED



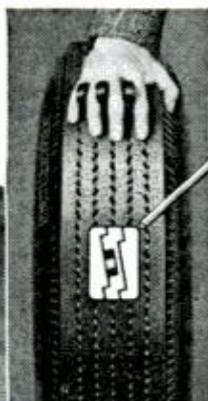
• For America's finest oil-base house paint, ask for Sun-Proof—famous for highest quality since 1892.

ARMSTRONG SAFETY DISCS CAN SAVE YOUR LIFE!



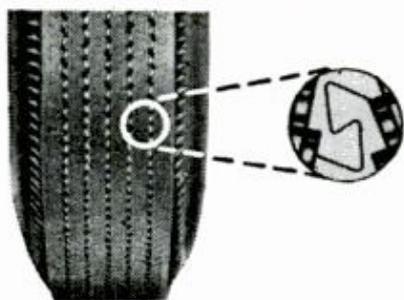
ONLY ARMSTRONG TIRES HAVE THIS PATENTED SAFETY DISC TREAD
 — Makes them grip the road to stop deadly skids as no other tires can.

When you hit your brakes, the weight of your car is thrown on the tires. Their tread can be squeezed together into a smooth, slippery surface. To overcome this danger, Armstrong engineers invented the famous Safety Disc tread design, which holds the tread ribs open, always ready to grip the road to stop deadly skids.



OVER 1000 SAFETY DISCS are *molded* between the tread ribs of the Armstrong tire. Just as the discs in hand at left keep the fingers apart, so Safety Discs keep the tire's gripping edges apart. They can't squeeze smooth, no matter how hard you brake. But the tread of ordinary tires, lacking discs, can squeeze together, go smooth . . . and you skid!

Patented Interlocking Sipes
ADD GRIP in ALL DIRECTIONS



Sipes are slots put in tire tread to add gripping edges. Armstrong's S-shape interlocking siping gives sharply improved traction to protect against both forward and side skids.

ARMSTRONG EXCLUSIVE UNI-CUSHION CONTOUR



Puts more rubber on the road — where it counts!
 Gives greater traction, more even wear.

Diagrams show Armstrong tread is flatter when inflated and rolling. Gives more road contact, greater stability and traction — vital for today's high-power cars and express highways. Armstrong Tires grip the road to stop deadly skids as no other tires can!

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Why do owners *love* this Rambler Wagon?



because...

the Rambler Classic Cross Country Station Wagon has more passenger room than any other compact, more front-seat headroom than Ford, Chevrolet, Plymouth—any "Big 3" make. It lasts and lasts—with rattle-free, Single-Unit Construction, Deep-Dip rustproofing, the Ceramic-Armored muffler and tailpipe that won't rust out, cushioned acoustical ceiling of molded fiber glass that cuts road noise 30%.

because...

it has big-car room and comfort with compact-car economy and handling ease. The gas-saving Rambler Classic is unmatched over the years for lowest maintenance and highest resale value. And this all-purpose compact has the most power-per-pound of any standard six-cylinder U.S. car. You, too, can enjoy all this Rambler Excellence in America's only *middle-sized* car and save hundreds of dollars doing it.

because...

it has the widest tailgate opening of any compact station wagon, plus smart Roof-Top Travel Rack at no extra cost—and big 15-inch tires that last longer—Deep-Coil springs on all four wheels—and the low-cost option of Airliner Reclining Seats that convert into Twin Travel Beds—and a wide choice of engines, transmissions and axle ratios—4 or 5 doors, 2 or 3 seats. Just see your Rambler dealer *now*.

WORLD'S BEST-SELLING 6-CYLINDER WAGONS



AUGUST 1961

World Standard of Compact Car Excellence

This One



9DEY-HZ4-K6QF

3

POPULAR MECHANICS®

AUGUST 1961
VOL. 116 NO. 2

INTERNATIONAL EDITIONS • SPANISH: Mexico-Caribbean, Southern Hemisphere • FRENCH •

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Next Month . . .

PM's House of Imagination, filled with exciting new products, awaits your inspection. Special 48-page section will introduce you to centralized vacuum cleaning, wheel-out tool caddy, time-saving laundry organizers, TV intercom, ultrasonic workshop washer, install-your-own "luxury" walls . . . In the same issue: "Are You Taking Counterfeit Drugs?" and "Used Car Best-Bargain Time?"

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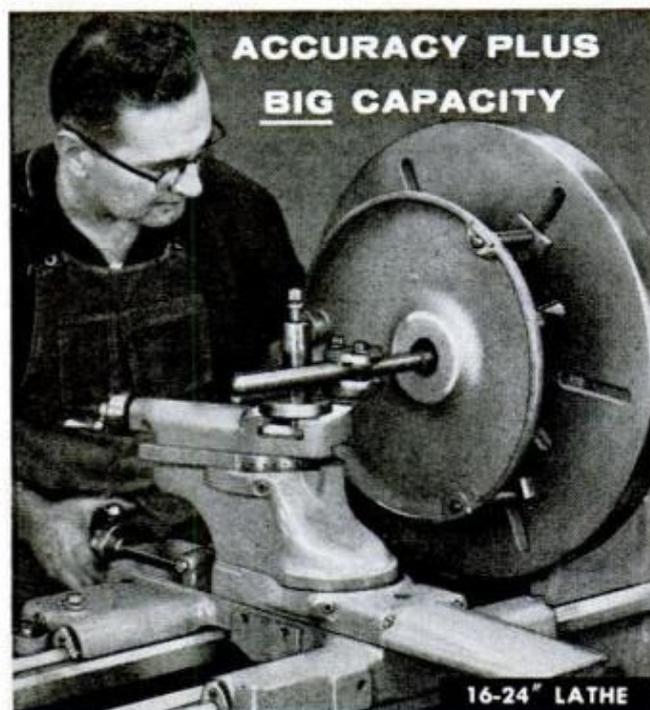
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Automatically fired by cartridges at the instant of a collision or panic stop, a plastic mesh screen covers the windshield and dashboard of a car to protect front-seat passengers. The net, folded away in the roof lining when not in use, is triggered by cartridges set at the top of two guide rails running down each side of the windshield. When the car's speed is arrested suddenly, a swinging arm under the hood closes an electrical circuit that fires the cartridges. According to the Austrian inventor, road tests show that the net pops in place within 10 milliseconds of the instant the electricity triggers the cartridges.

82 Percent of Helicopters Built in United States

There are more than 260 helicopter operators in 63 foreign countries, but 82 percent of all helicopters in service are U.S.-built, according to a survey by the Aerospace Industries Association. The total number of helicopters in service is more than 1660. Other findings included:

The largest commercial helicopter operator in the world is Petroleum Helicopters of Louisiana. The largest outside the U.S. is Okanagan Helicopters Ltd. of Canada, which has 50 in service, including 14 used by the Royal Canadian Air Force. In South America, the largest helicopter fleet operates in Colombia. The smallest country with helicopter service is Kuwait, an oil-rich nation between Iraq and Saudi Arabia.

Scrambled Textbooks Speed Up Learning

The pages of TutorTexts, a series of new textbooks, are numbered in sequence but are read out of sequence.

Each page ends with multiple-choice questions. The reader picks an answer and turns to the page indicated beside it. If it is the correct answer he has turned to the correct page; he is then directed to go on to another page where he will learn new material. If his answer is wrong, he will have turned to the wrong page. However, his error will be explained on this page, and he will be directed to go back to the original lesson and try again.

The format is planned to make a game of learning, making it enjoyable and speeding up the learning process. The books were originated by Norman A. Crowden, director of training systems at Western Design and Electronics Division of U. S. Industries, Inc.



ROOM FOR STEREO? Sure—and a good-sized record collection, too, in today's mobile home! Step inside and you'll be surprised . . . they're really spacious! Ten feet wide by fifty feet long, and that's just the basic size. Some models, like the Great Lakes "Double Extension" shown here, have extendible rooms that double their living space.

Mobile living is just as Care-free outside . . . exteriors of many models, like the Great Lakes, are panels of colorful Alcoa * Tone-Cote. These handsome exteriors of Alcoa Aluminum stay new-looking longer because they resist corrosion, fading, peeling. Occasional washing with water is all the care Alcoa Tone-Cote needs.

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YES, I'd like more information about Great Lakes mobile homes . . . and a copy of your free booklet, *Home Is Where You Take It.*

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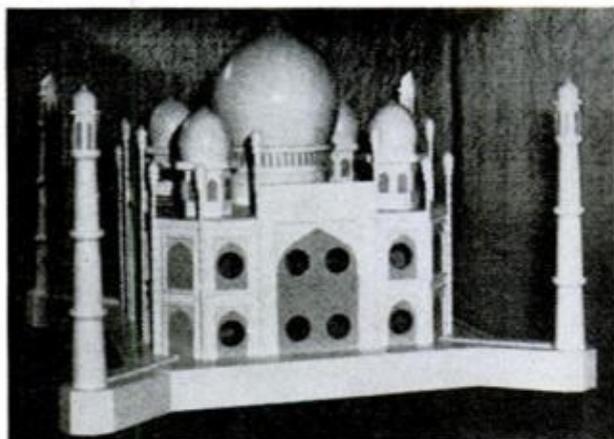
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OVER THE EDITOR'S DESK

Taj Mahal for Martins



My husband, a retired Chicago letter carrier, patterned this martin bird house after a picture of the Taj Mahal. He had to figure out all dimensions and even improvise a couple of tools to do it. The bird house has 28 rooms.

Des Plaines, Ill. MRS. WILLIAM PENFIELD

Tell your husband that he is spoiling those martins rotten with such elegantly-crafted quarters.

Where's the Skill?

Agree with R. G. Wadsworth (June PM). Plastic model kits come from dies or molds made by die makers getting about \$3 an hour. Where is any skill shown by the modelmaker who assembles the model?

I still have—and am still proud of—a nine cylinder radial aircraft engine model I made 25 years ago. It had a solid crankcase and cylinders built up of laminated paper and balsa-wood sheet. Paper disks represented the cooling fins. Although only 2½ inches in diameter, it had push rods and valve covers and represented the full-size engine in every respect.

Hawthorne, Calif. HENRY SEVCIK

... Many of us who built and flew our handmade airplanes up to about 10 years ago believe that our personal effort and satisfaction were very definitely related. Assembly of a prebuilt kit may be too superficial to result in a lasting and satisfying hobby.

Hudson Falls, N. Y. GERALD TURNER

Does anyone else feel that creativity is in danger of being prepackaged out of existence today?

Fur for the Squawkers

Thank you for the amazing information on tying fur in a cherry tree to keep away the birds (May PM, page 159). For the first time in 15 years we have a beautiful crop of ripe cherries to pick. Before, I was lucky to get enough half-ripe ones for a pie.

We only used three pieces of fur in our big tree. Early in the ripening stage, a few starlings flew in for a meal and flew away squawking. Since then, they fly over without stopping. You should print that notice again each spring.

St. Louis, Mo. MRS. IRVIN HALBACH

Less Slap by Quartering?

Your June article, *How to Handle a Small Boat in Rough Water*, has many good points. But on one I beg to differ. I say do not hit the waves head on. If you do, you will beat the boat apart. In Toledo we quarter into the wave. You have better control for the boat is not slapping and banging.

Toledo, Ohio DAVID S. WALBORN

That's a moot point, Dave. Inexperienced skippers who try quartering into storm waves run into steering problems and risk of having the boat broach so they lose control and capsize. This is especially true of smaller open boats. Heading into the wave is better as long as you can keep control and your boat can stand the pounding. Well-built small boats can, but with bigger boats and bigger waves, your method is sometimes best.

Radio-Controlled United States

This radio-controlled 8-foot working model of the S.S. *United States* is the largest and finest model I have ever made. Took about five years of my spare time to build. It weighs about 90 pounds and I drive it with three car-heater fan motors running on a six-volt car battery, with a car horn located in the bow.

I used layers of ¾-inch spruce for the hull, 6-inch paint cans for the smoke stacks,

(Continued to page 10)



What keeps YOU from making more MONEY?

Just what is the matter—why aren't you making more money? Look around—probably many of the people you know are doing a lot better than you. What is the reason?

Your own native ability is probably just as good as theirs—your personality and appearance are probably just as good.

But—they have something you lack—the fact that they have a better job and earn more money proves that. Success today is measured by the dollar sign.

The secret is this—the man or woman who prepares and trains for the job ahead is the one who gets the advancement and more money. The person who really has something on the ball doesn't need "Pull"—"Push" is the thing that enables him to get what he or she wants.

Ambitious men and women have found the proved and tested way to get ahead in life—through LaSalle training. Hundreds of thousands of students have enrolled—our files are full of grateful letters from people who have bettered their earnings and posi-



tion through LaSalle training.

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Bradford, Penna.

lifeboats cast from liquid plastic and railings of baling wire with each joint soldered. I am now putting in a four-channel receiver in place of the original two-channel radio to get more control. Built the ship almost entirely from pictures taken of the actual ship as no hobby shop would have plans for a model this large. She sails beautifully at the local park lake.

Plainfield, N. J. HAROLD B. WHITING

Reminds us of the much smaller 36-inch model of the same ship which we ran back in December, 1952.

Par Excellence

Your March issue stated that Volkswagen set the all-time-high Owners Report Excellence record with 95.6% in 1956. However, in your September 1955 issue, Packard (Patrician, 400 and Caribbean) scored 97% Excellent.

Chicago, Illinois

DAVID L. WESSON

You (and several others who wrote in) are so right, Dave. We said in the March PM that no other American car in recent years has received an Excellent rating as high as the 85.4 percent for the '61 Buick Special. Our definition of "recent" just didn't go back to 1955. We hope that the Special doesn't come to the same end as the "Excellent" Packard.

Kink Champ?

One question PM editors hear frequently is: "Where do you get all of those neat how-to tips you publish every issue?" The answer is that we buy them from a far-flung network of imaginative craftsmen and home workshoppers whose praises should have been sung a long time ago. Typical of these handy hintsmen would be brothers Richard and Henry Hanscom of Elmhurst, Ill. We counted up their contributions the other day and were surprised to find that, since 1957, we had purchased a total of 392 short how-to kinks from these two brothers.

This might constitute a record and it might not. We'll have to do some more counting. But the point is that, despite the large output of how-to hints from faithful contributors, we can always use more good tips on clever workshop, home or car techniques, or shortcuts which save time, work or money, or add enjoyment to daily living.

If you have some good ideas you think would qualify — and can use some extra cash — let's hear from you.

The Editors

Important News for the man who needs a **GOOD JOB, MORE MONEY AND GREATER SECURITY**

1. Air Conditioning and Refrigeration offers better opportunities in a growing uncrowded field
2. CTI provides proven Home Training which lets you learn by practicing with real equipment

Why worry about a poor-pay or unsteady job when the blessings of a big-money career in Air Conditioning and Refrigeration are within your reach? This fast-growing industry needs 20,000 newly-trained mechanics each year. It is pleading for skilled men who can install the 8 million air conditioners, refrigerators and freezers that are produced annually . . . and service the 150 million units already in use. Send for complete information on how you can qualify for a full-time, top-pay job in a dynamic, uncrowded field!

CTI Home Training Is Easy — Fast — Proven

CTI Home Training is prepared so that even a man of limited education, who has been out of school for years, can understand it. The lessons are written in simple English, and many illustrations are used to explain operating principles. Training kits of parts and tools are provided so that the student can develop his skill and acquire practical experience. CTI instructors are efficient and courteous. The student gets personalized training as well as extra help if he needs it.

Why Many Students Earn Cash as They Train



A CTI student spends a considerable part of his time training with kits we send. The 20 field-type projects provide him with experience. Due to the practical nature of this exclusive training, many students soon do repair work in spare time for profit. They make calls on their own, or develop servicing arrangements with local distributors and contractors. Their earnings often pay the cost of tuition before graduation.

How to Start a Business of Your Own

Once a student begins to do part-time servicing, he actually puts himself in his own business. Some students make contracts with owners of food stores, restaurants, and air conditioned buildings to handle servicing on a monthly fee basis. An impressive number of CTI students follow this success pattern—have a prosperous business under way by the time they graduate. Air Conditioning and Refrigeration is well suited for starting out on a modest basis, with very little capital, and then expanding as service calls increase.



Letters Prove Value of CTI Training

We want to send you a fascinating booklet called *Proof from Graduates*. In their own words, men who have earned diplomas record their successes. Better jobs, higher pay, self-employment, confidence—these are a few of the rewards of a sound training program carried to fulfillment. We'll rush this testimonials booklet, along with other factual information, as soon as we hear from you.



COMMERCIAL TRADES INSTITUTE CHICAGO 26, ILLINOIS
A Non-Profit Organization • Accredited by National Home Study Council



You train at home with real equipment

**YOU BUILD THIS
1/4 H. P. HEAVY DUTY
CONDENSING UNIT!**

you get 25 Kits!

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Opportunities Are Great for a Fresh Start

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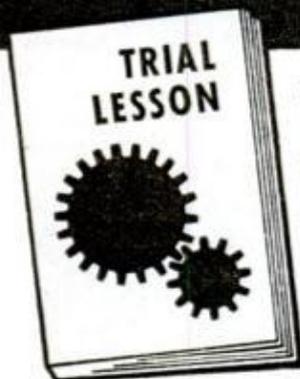
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SIDELIGHTS ON AVIATION



AIR-TRAFFIC CONTROL, and its solution, is still pretty well divided down the middle between those who would keep the control on the ground and those who would give it all back to the pilot and his instruments. New equipment is under study to serve both masters.

A new and unique antenna, for installation on aircraft, is now being tested. It would be part of an airborne system that would warn a pilot well in advance of an impending collision, even feed the information to the automatic pilot which would make the necessary evasive maneuver.

Critics claim airborne equipment is too expensive to install on all aircraft and, unless all aircraft have it, collisions would still occur. They favor "cautious and responsible" teamwork between pilot and ground controller, with heavy assistance from ground-based equipment, and ultimate control of all aircraft from a central controller on the ground. With aircraft operating independently, they say, sudden deviations in flight paths would create collision hazards for other planes and chaos would result.

Recent successful tests of so called 3-D radar backs up their claim that new ground equipment will eventually solve the problem. The 3-D, for the first time, gives a controller a simultaneous picture of, not only distance and direction of all aircraft, but altitude as well. It is accurate to within 500 feet at a distance of 20 miles.

Perhaps the final solution lies between the two extremes, a well-equipped ground controller keeping all aircraft under strict and efficient control, plus anticollision devices aboard the planes for emergencies.

Supersonic airliners, which some expect to be hauling passengers within a decade, may be too expensive for one aircraft manufacturer to handle. The formidable cost may force several of them to pool their efforts to build the first one, which is expected to carry about 150 passengers, at two to three times the speed of sound, on intercontinental routes of 4000 miles or more.

It may be a "first," so just for the record: A baby was born aboard a Canadian bush plane, 1000 feet up, as it was rushing the mother to a hospital.

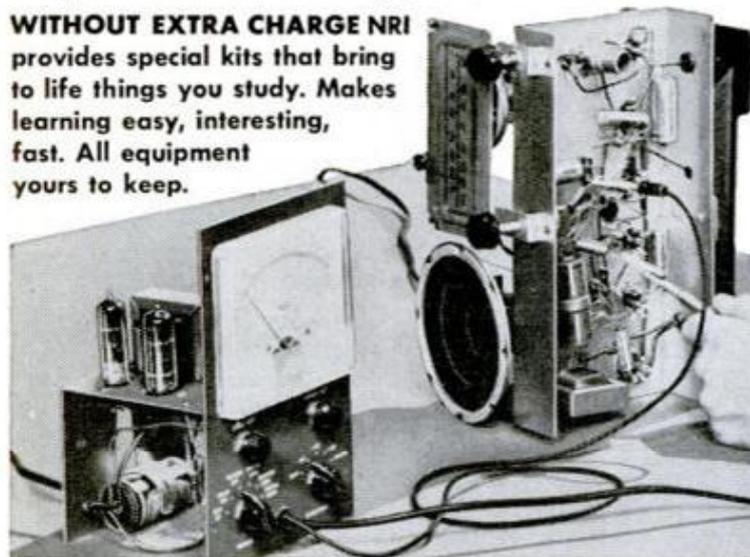
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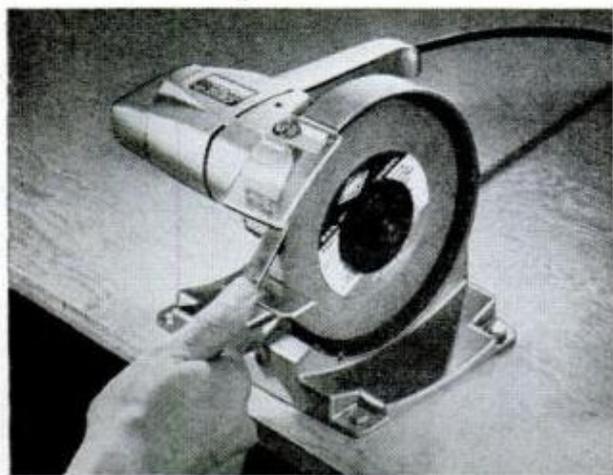
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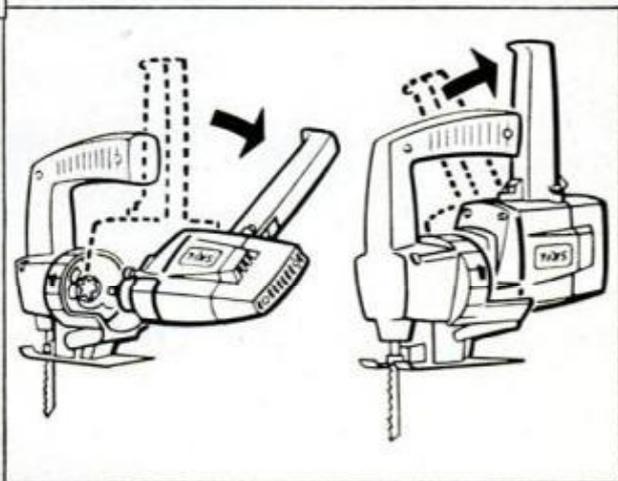
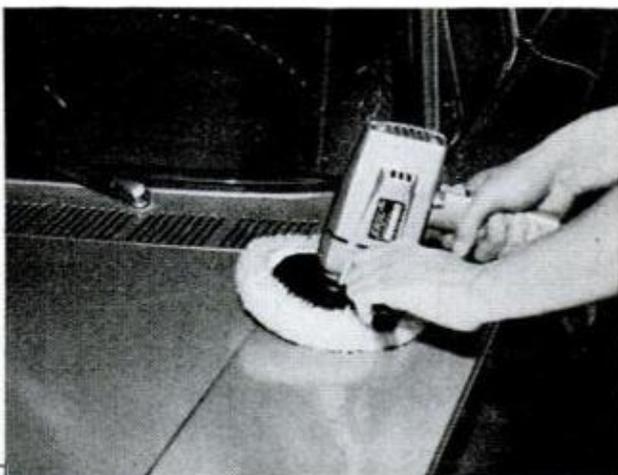
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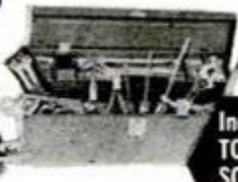
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SIDELIGHTS FROM THE PENTAGON



By William R. Kreh

Underwear made from peanuts? This nutty idea may be used by the Navy for its high-altitude balloonists. Tests of "long johns" woven out of peanut shells indicate they may be ideal for such flights. The underwear is porous and nonabsorbent, and wearers are thus able to stay dry despite the heavy outer garments required in the extreme cold of high altitudes.

Jet bombers may really blast off in emergencies. The Air Force's new B-52H models will be equipped with ammonium-nitrate cartridges which will fire electrically at the push of a button, starting two of the jet's eight engines. The other six will be started by cross-bleeding power produced by the first two.

Power carts, normally used for starting jet engines, will still be employed for normal training operations but, in emergencies or when there's an alert, the new cartridges will give them quick starts.

Bats that spear fish are under study by the Navy. These are the *noctilio leporinus* of Panama and Brazil. They seem to have built-in sonar systems that enable them to find fish just beneath the surface of the water. Just before dipping their well-developed claws into the water to spear their prey, they step up the output of their sound signals. The Navy thinks this may lead to a new underwater detection system.

Now then, about tattoos. The Office of Naval Research has made the startling announcement that a recent study shows that sailors with more than one tattoo are not as well adjusted psychologically as those with only one or none at all.

Drinking water from sea water may be possible with a new "still" under study by the Army. It resembles a file of correspondence. The top sheet is a black plastic film, the second a paper toweling, the third a water-repellent screen, the fourth a sheet of aluminum and the fifth a piece of cloth.

The "still" is dipped in sea water and the black plastic turned toward the sun. As the heat evaporates the sea water, fresh water collects on the aluminum which is cooled by the wet cloth backing. A sponge collects the fresh water. When there's no sun, the shipwreck survivor can sit on the plastic to heat it up with body heat.

Missile-makers get mail—and what mail! It seems the nation's teen-age scientists assume the Army's Redstone Arsenal at Huntsville, Ala., is the place to write for information on missiles.

A recent letter from a New Jersey lad, who sent along a diagram of a proposed missile, indicated that he needed some safe, economical fuel. He wondered if the base could loan him "about a gallon of rocket fuel." Another asked for nitroglycerine.

A young man in Indiana made this request: "I would like some information on rockets and missiles, if you know anything."

A boy in California, who had received a packet of unclassified information and photos of Army missiles, complained that almost everyone else in his science club had gotten similar material. He wanted "a few secret things" to spice up his report.

And from Texas: "I have to hand in a report on missiles. Please send me a composition typed on white paper, double spaced."

You can't comb your hair at Picatinny.

The Army's experimental-fuse laboratory at the Picatinny Arsenal in Dover, N. J., contains explosives so sensitive that even static electricity created by a person combing his hair can set them off.

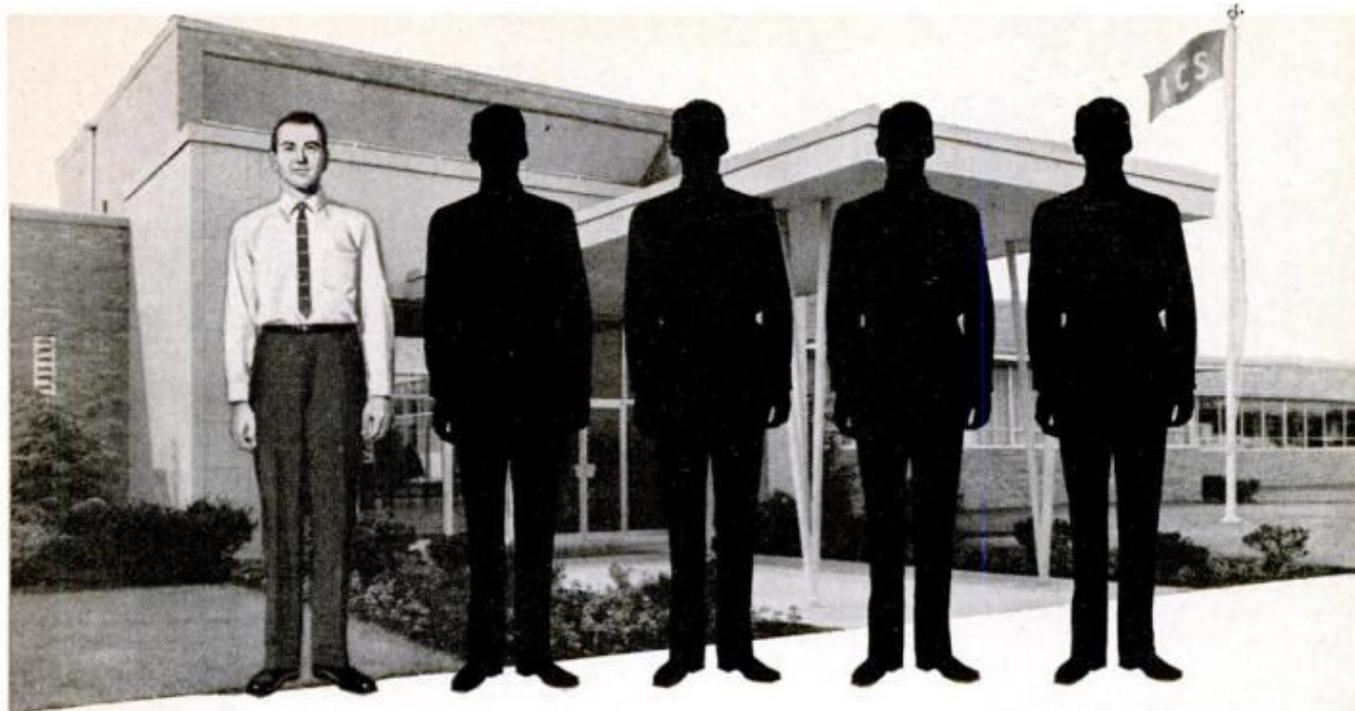
So combs are prohibited and scientists there must wear metal "wristlets" to which ground wires are attached. Visitors must drag metal canes after them to drain off any static electricity. All electrical equipment is specially designed to minimize sparking.

Woodchucks are widening the missile gap. It seems the missile men store missile parts and solid-fuel rocket motors in earth-covered bunkers called "igloos." It also seems these huge mounds make ideal places for woodchucks to tunnel their homes.

The result is that the woodchuck holes cause the earth to wash away from the concrete bunkers. Then dirt thrown up by tunneling woodchucks sometimes blocks the ventilation shafts of the igloos.

The problem was solved by connecting a hose to a jeep's exhaust, sticking the nozzle into the woodchuck holes and running the engine. The watery-eyed woodchucks are now looking for new homes.

Love and marriage, fine. But no wedding rings. That's the Navy's semiofficial attitude in the wake of a series of accidents in which sailors have lost fingers when their wedding bands got caught in machines. The men are now discouraged from wearing them, at least while working. ★ ★ ★



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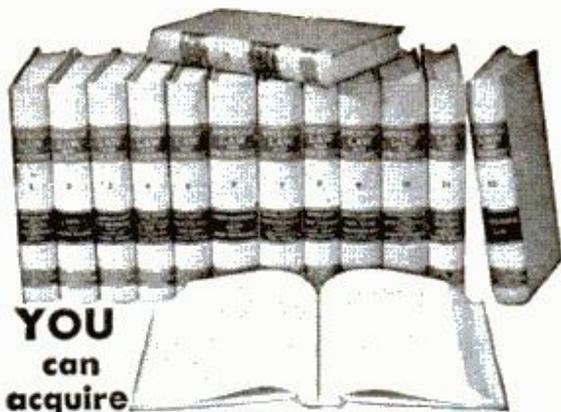
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The most reading for the money of any government publication is the Official Gazette of the United States Patent Office. The 300-odd page weekly publication lists new patents, design patents, and other developments in the patent area. At \$30 a year, it's a year's full-time reading. Here's an assortment of recent items:

Special Jigsaw Puzzle. Willie Hammer, of Los Angeles, Calif., was awarded Patent No. 2,987,318 for a three-dimensional jigsaw puzzle, with the usual freeform interlocking pieces fitting together over a core to form a sphere—if you can get it together.



Theftproof Auto Lock. James A. Mathews, of Michigan City, Ind., was awarded patent No. 2,984,318 for a thiefproof auto lock. With his device, a cable control on the dashboard inserts a bolt into a perforated disk attached near the drive shaft, immobilizing the car.

Plastic Pill. Charles Levesque, of Philadelphia, Pa., assigned his patent No. 2,987,445 to Rohm & Haas Co., of that city, for a plastic pill—a composition of porous, inert plastic and a soluble drug dispersed among the pores. In the user's stomach, the drug is released gradually over a predictable period of time.



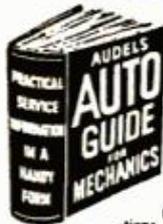
Slim Swivel Seat With Flap. Harry Morrill, Jr., of Atlanta, Ga., was awarded patent No. 2,987,115 for a swivel seat attachment for vehicles which doesn't appear to be much bigger than a ventilated wicker seat cushion. A cushion with a smooth underside is mounted on a frame with a smooth top. The two are pivot-mounted a little off center, so when the user turns toward the door, the cushion turns easily with him and drops an extending flap over the door side of the seat.



Dry-Land Surfboarding. Robert Carrier of Lakewood, Calif., was awarded patent No. 2,982,547 for a portable plastic sliding surface that makes a back-yard game for the kids. You coat the surface with water and they slide across it like riding a surfboard.

Copies of the original patents may be ordered for 25 cents each from the Commissioner of Patents, Dept. of Commerce, Washington 25, D. C.

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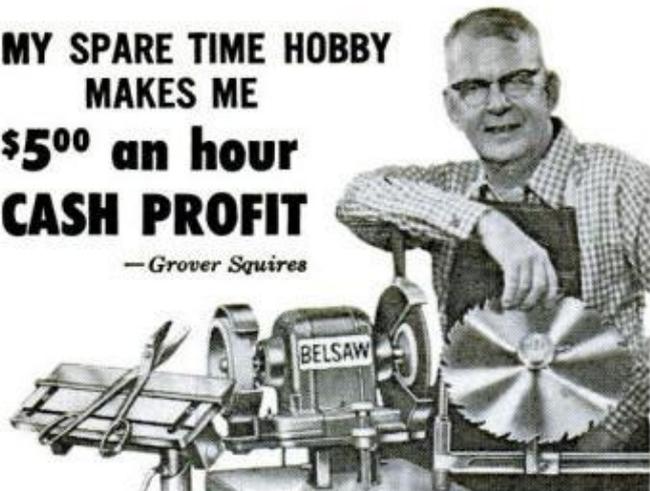
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To live anywhere in New Mexico is to live better. The superb climate, naturally air-conditioned in the summer and brilliantly sunny in the winter—the breathtaking beauty of a lavish Nature—the young vigor of a state that is causing an unprecedented business and investment boom—the record which shows that one lives longer, that health improvement is almost miraculous—these are the reasons that tens of thousands of Americans already have come here to live, and hundreds of thousands of others will be following in the immediate years ahead.

Consider, then! Here in the center of this miraculous climate and beauty is a cosmopolitan city of more than 260,000 people which has grown 800% in 30 years. Founded in 1706, the population of Albuquerque as late as 1930 was only 36,000. Then things began to happen. The incomparable climate and the staggering beauty began to draw Americans to the Big Sky Country. By 1950 there were 97,000 Albuquerqueans. And in the next 10 years, to 1960, this quaint

Southwestern town rocketed to the status of a major city—the 7th fastest growing city in the U.S.! Professional estimates of Albuquerque's future vary. But the most cautious guess is more than 500,000 by 1970; and far more many experts predict that by that time Albuquerque may reach a population of one million.

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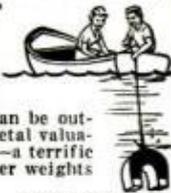
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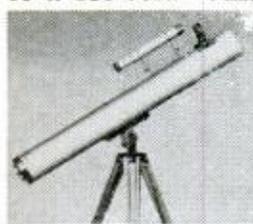


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BULLETINS FROM THE WORLD OF SCIENCE

Our oceans were blown to Earth from the sun.

Dr. C. M. de Turville, writing in a British scientific journal, explained how this could happen. He said hydrogen ions travel from the sun on the so-called solar wind. They combine with Earth's oxygen to form water droplets.

If the total amount of these ions which have been bombarding Earth (in the amount of 1 1/2 tons a second) were converted to water, said Dr. de Turville, the result would be equivalent to the present volume of water stored by the oceans.

The Fluta, a food fish in Southeast Asia, is the latest candidate for the missing link in the evolution between fish and land-living animals.

These fish grow about four feet long and often come out of the water to slither along in the mud like an eel. Their blood and blood system have many resemblances to those of land animals, including man.

Karel F. Liem, who was honored by the American Society of Ichthyologists and Herpetologists for his study of the Fluta, also found that its skin has developed defenses against drying out—a condition fatal to other species if exposed to the air.

Next time you swim, don't try to set any records for holding your breath under water. You might drown, says Dr. Albert B. Craig, Jr., of the University of Rochester. He found that when experimental subjects over-breathed—like swimmers who take a big gulp of air before starting a long underwater swim—and then exercised, holding their breath as long as they could, the concentration of oxygen in their lungs became extremely low. One danger of low oxygen concentration, says Dr. Craig, is that the person has little or no warning that he is about to pass out.

Eve may be paying Adam back for the loan of that rib: A University of Southern California woman doctor and four male colleagues have found that female hormones, given to male heart patients, help their chances of survival.

James Biery

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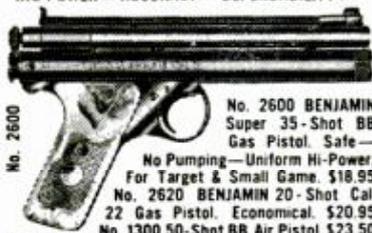


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If the Cincinnati Reds continue the red-hot pace they opened with this year and win the National League pennant, part of the credit will have to go to BB guns! Ohioan John Hughes, in training Cincinnati batsmen, has them sharpening their reflexes and batting eye by shooting BB guns with the sights removed at BB shot tossed in the air. Swinging the gun quickly onto an aerial target only .175 inch in diameter, says Hughes, develops the same natural reflexes that the batter uses in judging—and hitting—a pitched ball.

Maybe the most remarkable aspect of his report is his claim that sometimes the players can hit the tiny targets. Try that some time if trap and skeet shooting are getting too easy for you.



Any boater who has tried to con his craft into a harbor through fog—especially the opaque goop that occasionally shrouds the Pacific Coast harbors—will appreciate the radar surveillance system being built into the new \$30 million Redondo Beach small boat harbor. The system, first to be used in a marina, will work like an airfield's ground-controlled-approach system to guide boats in through darkness or bad weather. All the boat needs for its part is a radiotelephone and a compass. The shore-based Bendix marine radar, augmented by a special plotting grid and an automatic radio direction finder, does the work.

With the system, an approaching boat calls a harbor traffic controller for guidance. The controller locates the boat on his radar screen, then radios the safe compass bearing into port. He can follow the boat's progress and radio course corrections as needed until the boat is in sight. In a pinch, with a lost boat with no radio, the same equipment can guide a radio-equipped boat out to guide the lost boat home. Range of the setup is 20 miles.



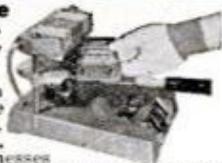
Spit on your bait? If you're a believer in this old custom you may be improving your luck as well as your attitude. A recent study by marine biologists shows that human saliva actually stimulates the taste apparatus of some fish.

Dick Liebpatrick

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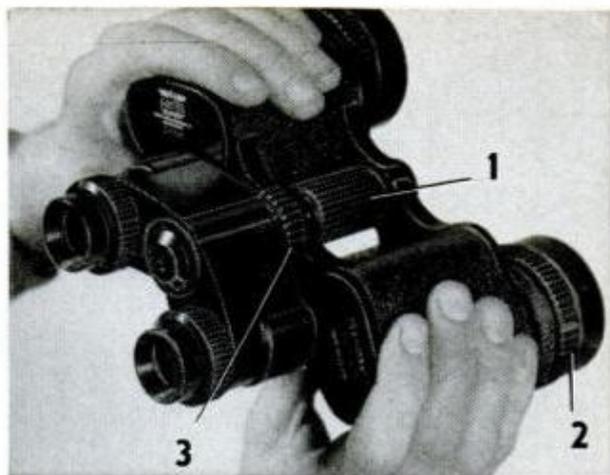
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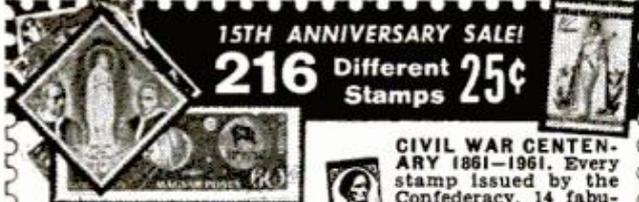
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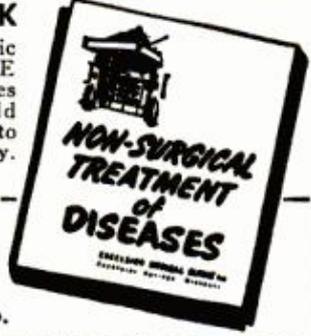
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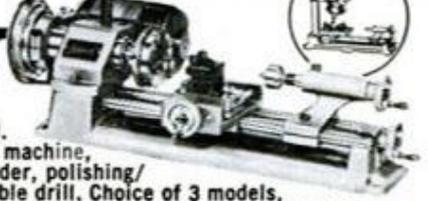
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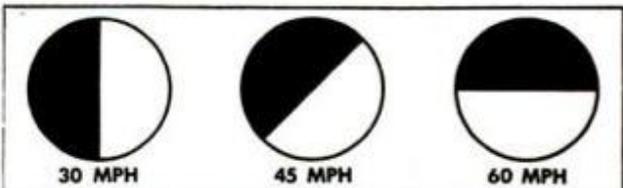
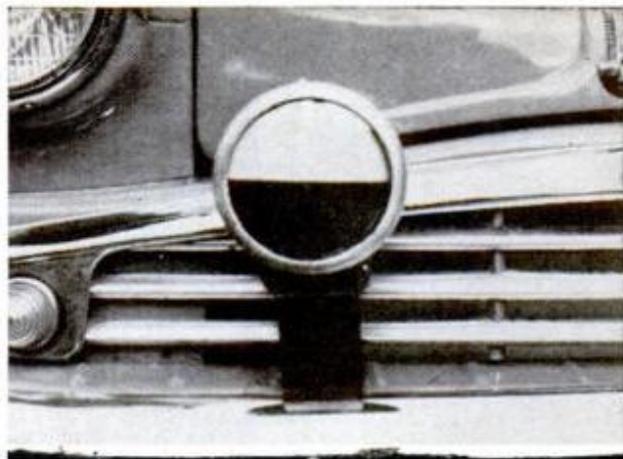
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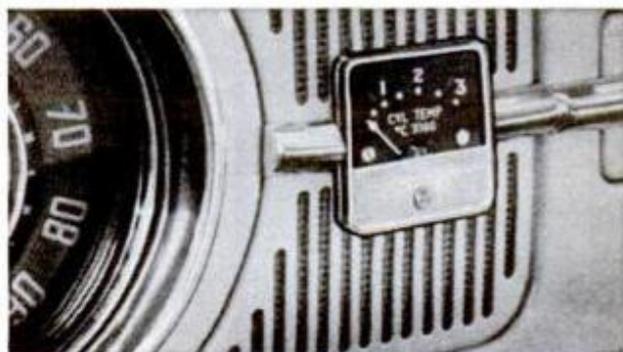
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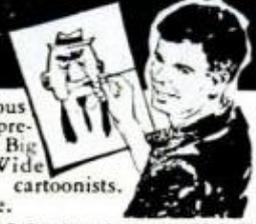


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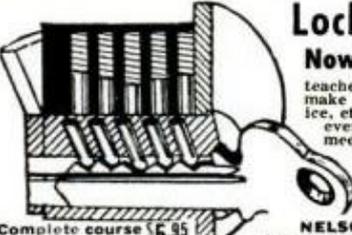
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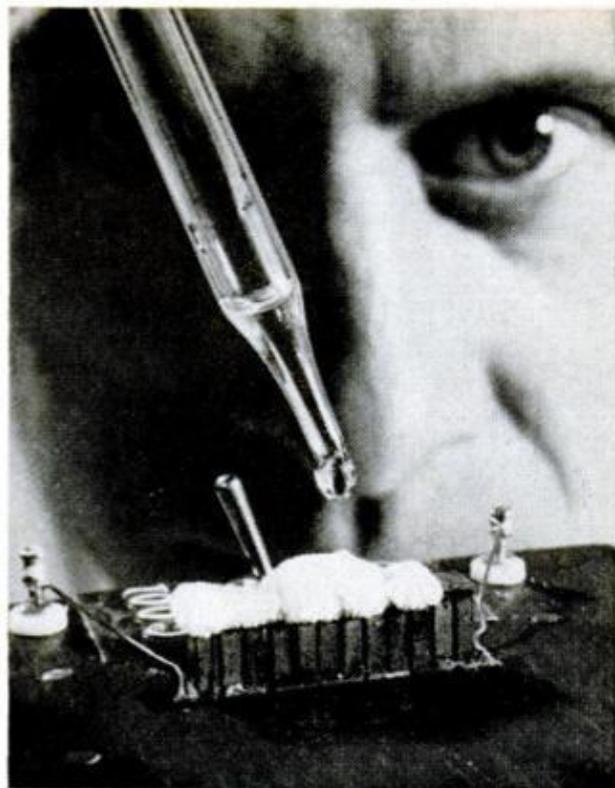
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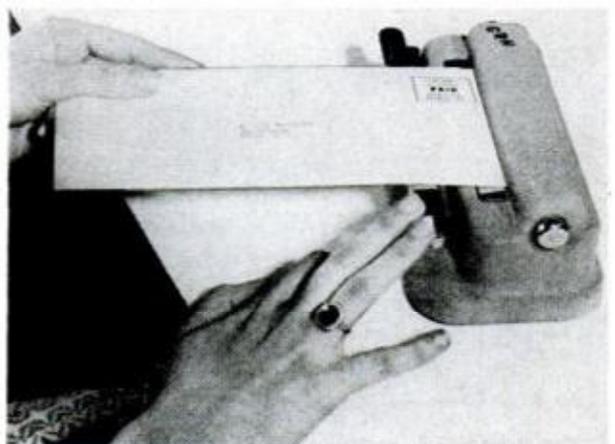
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CHRISTMAS Cards—the easy way to that extra income you need. Personal and business designs, with customer's name imprinted, all in one album. These deluxe cards pay deluxe commissions. Earn \$300 to \$500 (plus bonuses) easily this season, even in spare time. Sales experience unnecessary. Free sales kit includes our outstanding 40th Anniversary sample album and easy-to-follow selling instructions. Send for kit now; pocket profits next week! Write Process Corp., Dept. D-2, 3450 S. 54th Ave., Chicago 50, Ill.

SELL Greeting cards. Make extra money. Christmas, all occasion assortments, stationery, jewelry, gifts, name imprinted Christmas cards. Experience unnecessary. Write for salable samples on approval, details. Hedenkamp, 361 Broadway, Dept. PM-68, New York.

MAKE \$50, \$75, \$100 extra money. Run greeting card, gift shop at home, visit friends. Show thrilling Evans Christmas card assortments, gifts, exclusive 25 for \$1.50 personals. Experience unnecessary. Write for sample boxes on approval. Free imprint albums, surprise gift offers. New England Art Publishers, North Abington 80, Mass.

NEW! Wonderful new sign maker kit. Makes signs, showcards, banners, streamers in colors in seconds. No skill. A child can make a professional looking sign in seconds. Send \$1.00 for sample signs (your name on one). Complete instructions. Refundable on first order. Variety Advertising Company, Dept. 14A, 1219 Douglas Street, Alton, Illinois.

IF You sell Christmas cards, make most extra cash with lines of all leading companies from one firm. World's biggest line. Over 150 Christmas, everyday box assortments, 600 big money-makers. Make up to 50% profit plus big cash bonus. Free giant color catalog of all lines; samples on approval. Arrow Greetings, 513 Fourth Ave., S. Dept. 83-D, Minneapolis, Minn.

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\$2.50 PER Hour or more for part or full time route work. Large repeat orders. Man or woman. Write McNess Co., Freeport 24U, Ill.

\$480 MONTHLY Commission on 4 easy orders a day, selling nationally advertised line comfort shoes, warm jackets, 230 styles. No investment—postcard brings free outfit. Mason, Chippewa Falls K-376, Wis.

WILL You test new items in your home? Surprisingly big pay. Latest conveniences for home, car. Send no money. Just your name. Kristee 85, Akron, Ohio.

OUR First man made \$250 weekly selling lumber, hardware, garage, filling station and tire dealers. Exclusive territory. Commissions on repeats. Hiram Barber Co., Crete, Nebraska.

FASCINATING New novelty. Thousand laughs! Eight samples \$1.00 refundable. 300% profit. Bertman, P.O. Box 8615, Philadelphia 1, Penna.

LENS-BRITE The wonder eyeglass cleaner. Inve \$30.00 make \$40.00 profit. Nationally advertised. Commonwealth Distributors, 789 Tyler St., Pittsfield, Mass.

DAMASCENE Earrings! Exotic Orientalism. Huge profit. OHGA, PM-289, Sigakokusatu, Japan.

AKWA Swim lung. Demonstrate this self-selling item for quick profits. The Weavers, P.O. Box 13164H, Louisville, Ky.

300 WAYS To make money with no selling effort! Pre-tested best selling gifts for men, women, children, the home! Distinctive greeting cards, stationery, novelties, jewelry, cosmetics, toys, gadgets. Make up to 92% profit. No minimum order. Samples on approval. Write today for colorful free catalog. Greetings Unlimited, 1-409 Park Square, St. Paul 1, Minn.

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100 FREE Wholesale catalogs! Complete directory, \$1.00. (Refundable). Parmelee's Supply, Marshfield, Wisconsin.

BUY Below wholesale! Thousands of nationally advertised products. Drugs, clothing, housewares, cameras, jewelry, hardware, sporting goods, etc. Postcard brings price list showing actual factory cost. Buy-Rite, 310 Main, Bennington 2, Vermont.

SAVE! Name brands at special discounts—free catalog. Unlimited Sales Co., Box 9250, Chicago 90, Illinois.

97 PAGE Wholesale import catalog. Order by dozen. Sell to neighbors. \$1.00, refunded first order. Ben-Jean Importers, 2631 Raymell, San Diego 11, California.

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USED And new watches \$2 up. Free list. Southern Watches, 5-PM So. Wabash, Chicago 3.

128 PAGE Wholesale catalog of nationally advertised brands \$1.00. Refundable with first order. Zietz Enterprise, White Temple Rd., Vandalia, Mich.

WHOLESALE Catalog \$1.00 refundable. General merchand. JMS Associated, 1010 Stone, Great Bend, Kansas.

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MAKE Big money taking orders for Stark dwarf fruit trees. Everybody can now grow giant size apples, peaches, pears in their yards. Also shade trees, shrubs, vines, roses, etc. Outfit free. Stark Bros., Desk 30182, Louisiana, Mo.

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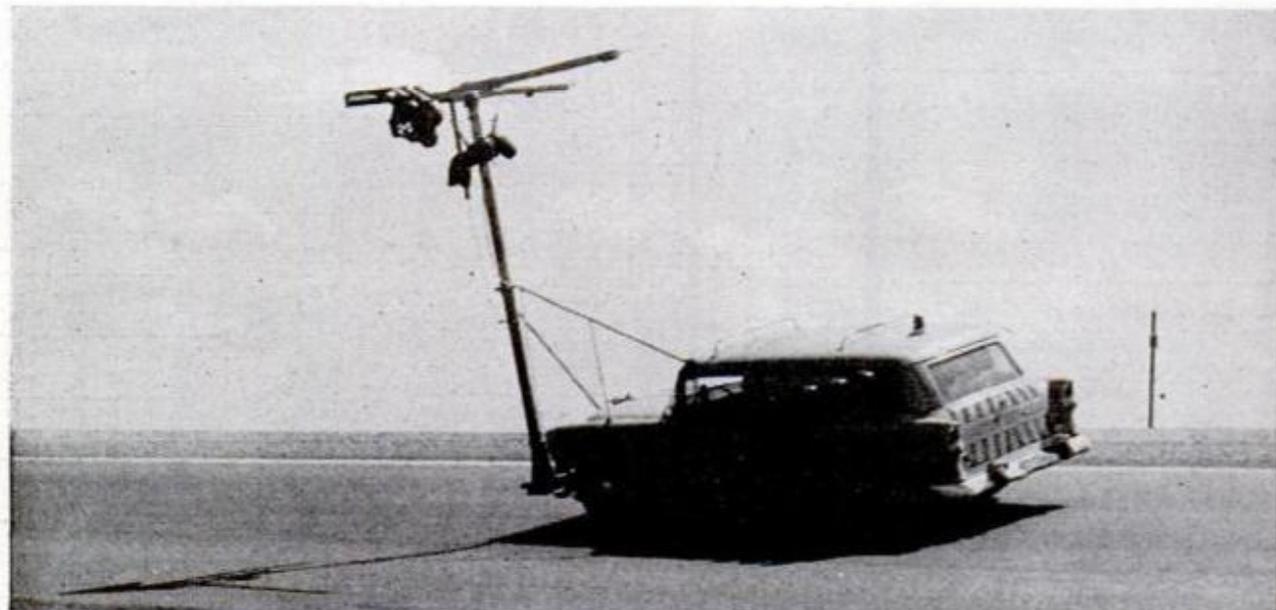
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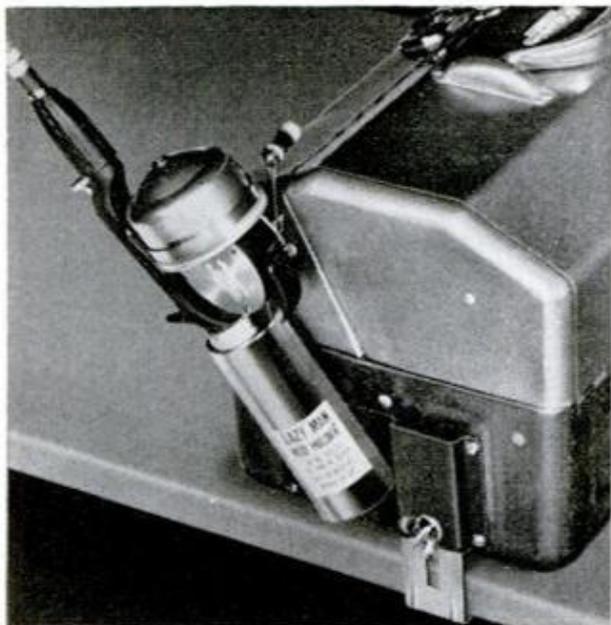
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IMPORTANT, REWARDING EMPLOYMENT OPPORTUNITIES

by B. Richard

The demand for highly-trained electronics technicians and servicemen has been growing steadily. This growth is expected to continue as the Armed Services and industry make ever greater use of the advantages of electronics.

Industry is only beginning to exploit the use of electronic control equipment in manufacturing, communications and data processing and virtually all branches of the Armed Services are using Electronics to an ever greater degree each year.

Not only will employment opportunities grow in existing fields of Electronics, but many new areas of electronics work are expected to develop in coming years. This will create an unmeasured additional demand for skilled technicians and servicemen.

The advent of color television will do much to intensify the need for technicians and servicemen during the 1960's. It is expected that great numbers of color sets will be installed in the coming 10 years, and the fact that these sets will be, initially at least, considerably more complicated than black and white receivers will open up additional opportunities for highly skilled, specially trained television servicemen.

Electronics service and repair is a rapidly growing field with excellent employment opportunities for skilled workers who have an understanding of electronic principles.

Among the jobs in this field are radio and television repairman, broadcast technician, radio and radar operator, and electronic data machine serviceman. There are also an increasing number of openings for electronic production work in major industries, and highly-trained technicians are needed to assist engineers in the design of electronic systems and equipment for use in manufacturing, guided missiles production and aircraft work.

Salaries available in this field rise proportionately with a man's experience. In 1958, for example, experienced men in specialized electronics jobs were earning about \$10,000 a year, exclusive of overtime. In 1958, most radio and television servicemen earned up to \$130 per week.

Technicians who worked with companies manufacturing electronic equipment in 1958 were paid up to \$3.00 an hour with ample possibilities for overtime, especially in aircraft, military and commercial manufacturing plants where complex production schedules were required.

Also, it is often possible for technicians holding production jobs in manufacturing to repair television and radio sets in their spare time, and in this way, add a substantial amount to their income.

Therefore, not only do electronics technicians and repairmen earn far above average incomes, but as they accumulate additional knowledge and experience, they have the opportunity to earn greatly increased salaries by becoming specialists in the more complex electronic equipment that is becoming more and more a part of today's industry.

If you are interested in electronics, you should investigate this type of work, not only because of the opportunities that exist at present, but because even greater income potentials and an even larger number of job openings are being predicted for coming years.

How would you go about training for this field of employment? First of all, you should have an understanding of the basic principles of electronics in addition to a certain amount of practical training and experience so that you can specialize in a particular phase of the industry.

Most training authorities recommend a one or two-year course in electronics at a good technical school or institute as the best preparation for a high-level electronics job. These technical institutes provide classroom and workshop instruction in the fundamentals of electronics and often make night courses available so that you can continue your present full-time job.

Another good way to learn fundamentals is through correspondence training. Some institutes offering correspondence training in electronics even provide testing equipment for their students' use at home, and

the cost is included in tuition. This type of training has the advantage of letting students set their own classroom hours so that full-time jobs can be held while a course of instruction is in progress.

Because so many new developments are taking place in the field of electronics, workers must continue learning new techniques throughout their careers. Technical school courses, correspondence training, and manufacturer-sponsored training programs provide the training you need to take advantage of the extra income offered by more highly technical jobs.

The fact that employers often prefer technical school graduates for high-level electronics jobs doesn't prevent men who are just starting out from progressing to more highly skilled positions. Correspondence training and night technical school courses let you learn new skills while you are getting practical experience in your beginning electronics work.

It might be well for you to investigate the opportunities for valuable training and work experience offered by the Armed Services. Since World War II, Armed Forces technical schools have helped thousands of men qualify for well-paid civilian electronics jobs.

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Armed Forces, greatly increasing quantities of electronic equipment are being used. In 1958, more than a quarter-million members of the Armed Forces were engaged in operating and maintaining electronic equipment. More than 100,000 of these men specialized in the maintenance of such equipment as radar, guided missile controls, radio, and fire control instruments.

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As increasingly complex equipment comes into wider use, there will be more and more demand for highly-skilled and specialized electronics technicians to keep this equipment in top condition.

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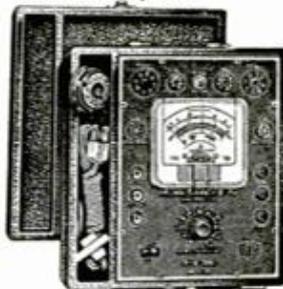
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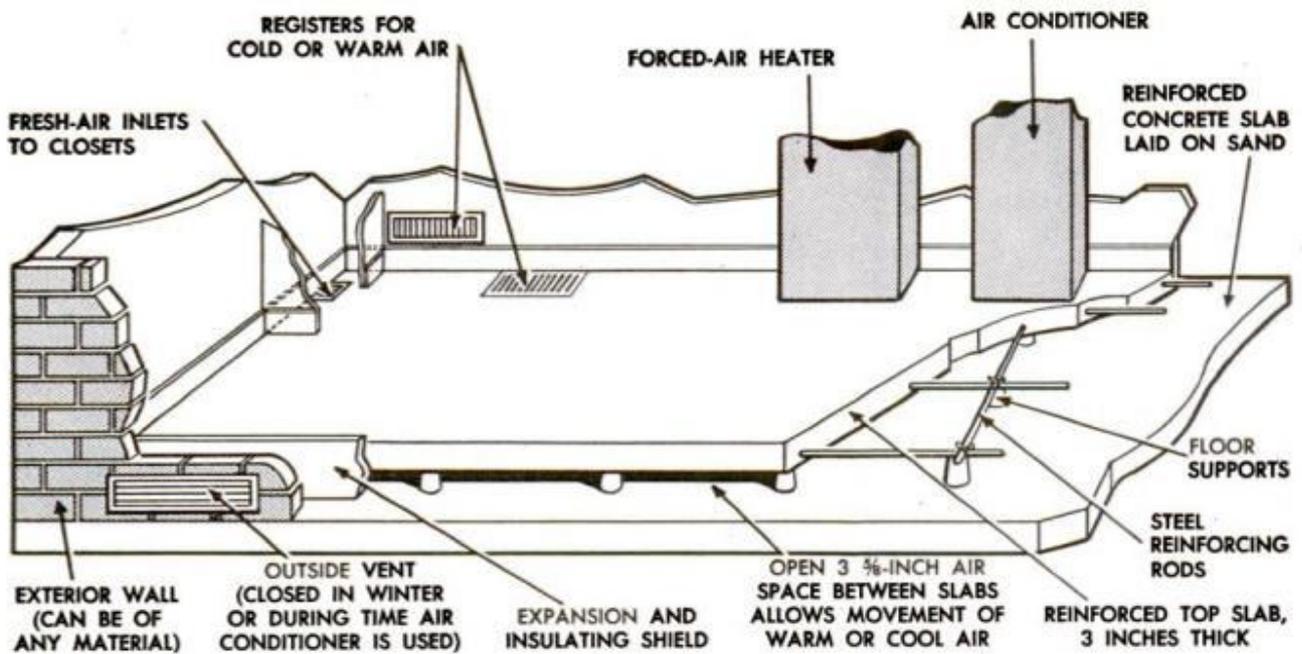
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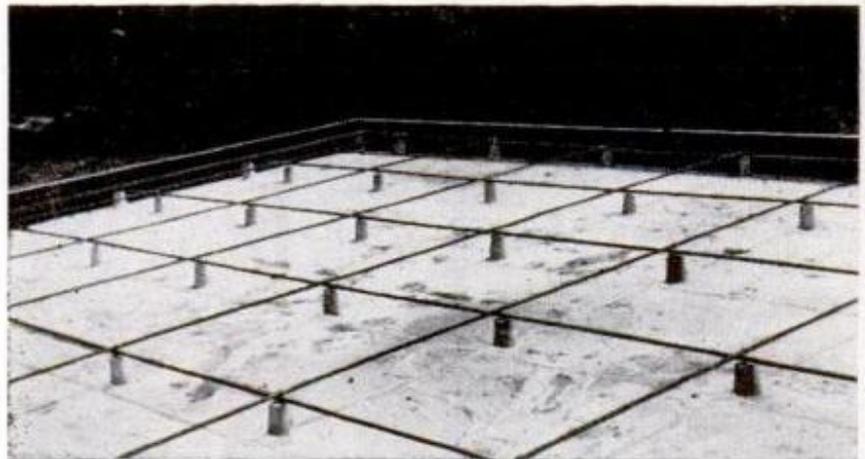


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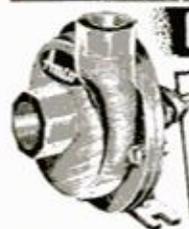


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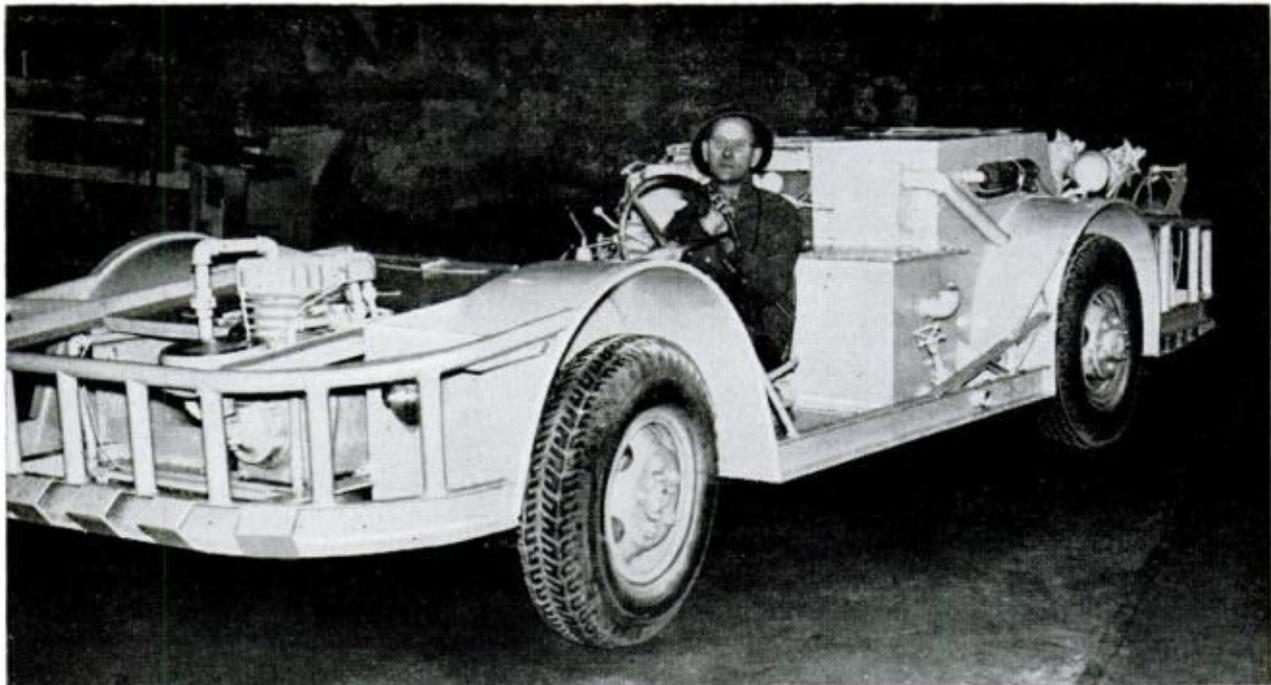
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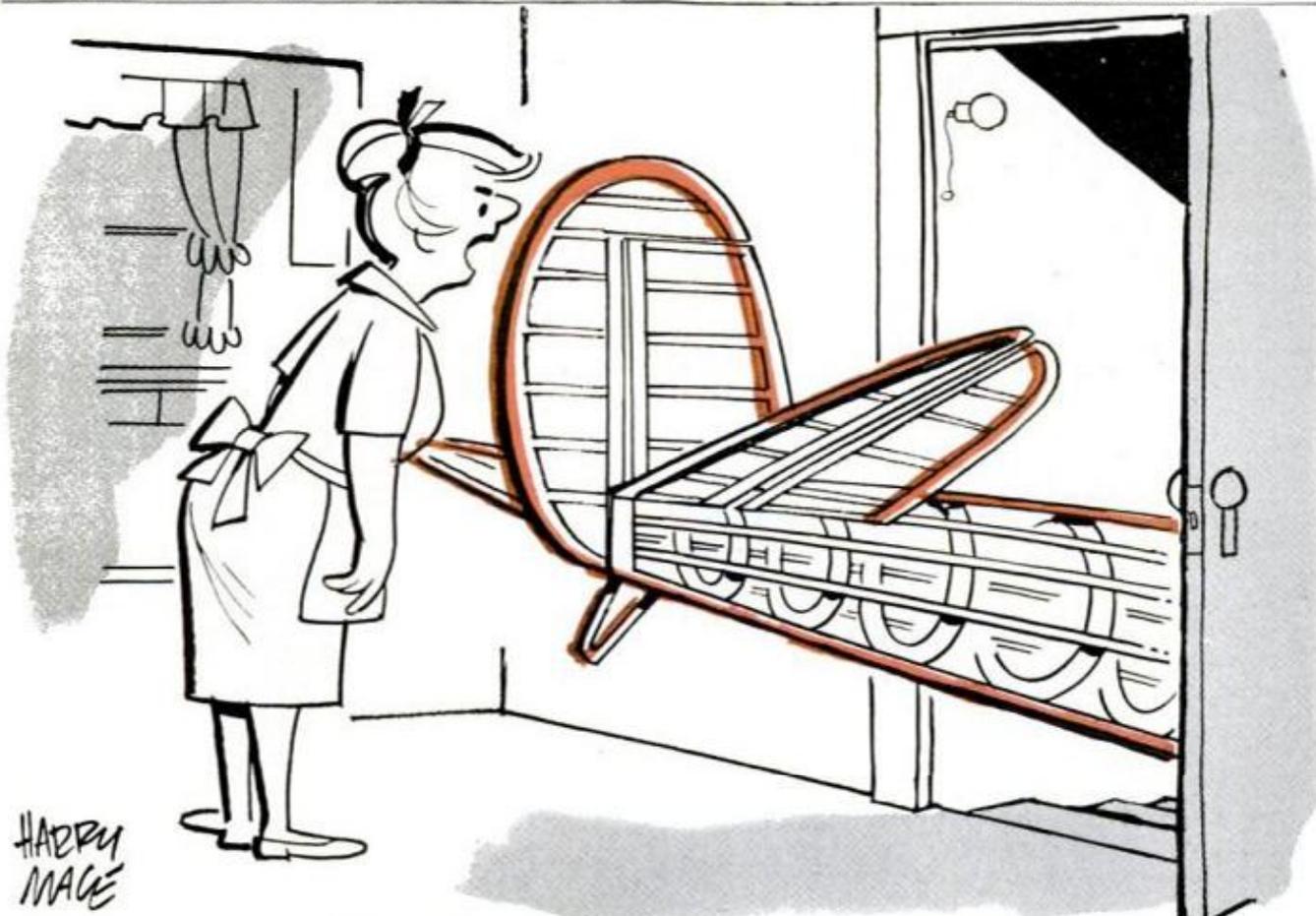
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SCOUT SCARES TROUT as it churns merrily upstream through a foot of water on soft gravel creek bottom

SPOTLIGHT ON THE International Scout

By Jim Whipple

Ex-GI's who drove the Army's famed Jeep, (Truck, 1/4-ton 4x4, to you soldier!) may go into shock when they get behind the wheel of the Scout, International Harvester's stylish new utility vehicle.

Try to imagine yourself on winter maneuvers snugly buttoned up in a three-passenger steel cab looking out through clear glass windows, warmed by the soft breezes from the fresh-air heater, while the Scout's four-wheel drive pulls you through creekbeds and up muddy hillsides.

And that's not all, you've got a five-foot pickup box hauling a 500-lb. load tacked on behind you! All this on a mere 100-inch wheelbase and measuring less than 13 feet from bumper to bumper.

But the Scout's real trump card is riding comfort. We can still recall the creeping paralysis of the posterior that set in during one three-day period when we drove a WWII Jeep some 1300 miles. We wound up sitting on two folded GI blankets.

No such problem with a Scout. Its riding qualities are comparable to that of a modern pickup truck—quite firm but never harsh or jouncy on the road. Crossing a plowed field will bounce you around some but no more than with any other vehicle capable of traversing rough terrain.

But, in spite of Scout's sinful comforts and civilized ways, it's ready, willing and able to slog across country with the best of



FROM THE DEEP TO THE STEEP was next move for Scout equipped with the optional Travel Top enclosure

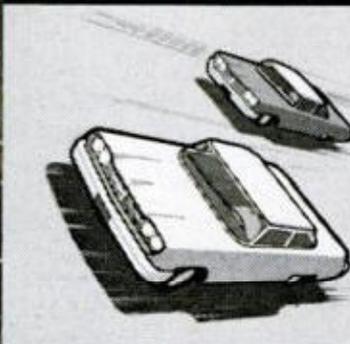
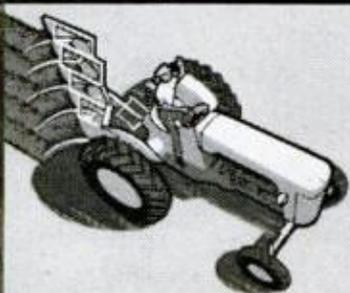
the "off-the-roaders." It has low-range gearing in the transfer case permitting a power ratio of 2.46 to 1 to be applied to front and rear axles when in four-wheel drive. Total reduction; low gear (3.33 to 1) x transfer gears (2.46 to 1) x axle ratio (4.27 to 1) or 35.07 to 1 over-all.

When you couple this compound gearing to Scout's beefy, 93 horsepower four-cylinder engine, you've got real stump-pulling power to work with. As an option you can have a limited-slip differential on the rear axle which means that three out of four wheels **must** turn. If you don't think that you can make it with this setup, add the optional power takeoff and Ramsey winch and haul yourself up a cliff.

The Scout's sleek, enclosed bodywork may lead you to believe that it isn't suited for deep-rutted forest roads (or no roads at all), but its angles of approach and departure (47 and 35 degrees), which govern how steep a ditch side it can climb, are competitive with the Jeep's. Ground clearance, at 9.3 inches front and rear, is superior to Jeep's by an inch. Tires are 6:00 x 16.

(Continued to page 62)

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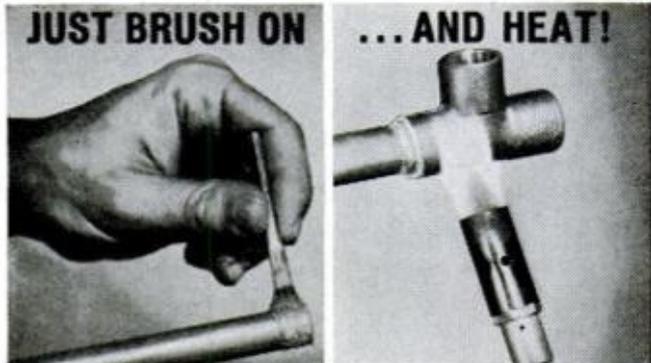


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TWO-WHEEL-DRIVE model Scout has standard cab, can ride four adults on "seats" in five-foot pickup box

After you tire of fording streams or climbing stone walls, you may wonder what Scout's like out on the pavement. Well, it's no Thunderbird, but after you disconnect the optional locking front hubs to deactivate the front drive, you find that you can roll along at 50, 60 or up to 70 with no trouble, although with more noise and vibration than you might expect from, say, a Falcon Ranchero. The transmission is synchromesh, clutch and brake pedals require more than passenger car pressures but work well and the engine is surprisingly smooth. Incidentally, Scout's power plant is the righthand bank of International's 304-cubic-inch V-8 truck engine.

Steering is fairly easy and most women won't find driving the Scout in traffic too troublesome. Its high cab, compact dimensions and good glass area make for excellent vision and aid parking in close quarters.

For those who don't do too much off-the-road work, Scout is available with two-wheel drive and I-beam front axle. This model costs \$1750.84 at the Fort Wayne, Ind., factory, which is \$378 less than the four-wheel-drive job.

Adding Powr-Lok limited-slip differential at \$38 would give you some of the mud and snow traction of the four-wheel-drive job.

Although Scout looks like a permanently enclosed vehicle, cab top, windows and doors can be unbolted and windshield folded down in minutes to make a hunter's field car.

As an option to the standard cab you can get the Travel-Top enclosure, for the entire body, which turns it into a small station wagon at an extra cost of \$128.

If the Scout's many abilities fit your transportation needs, by all means get one—it's a lot of fun for a reasonable cost.

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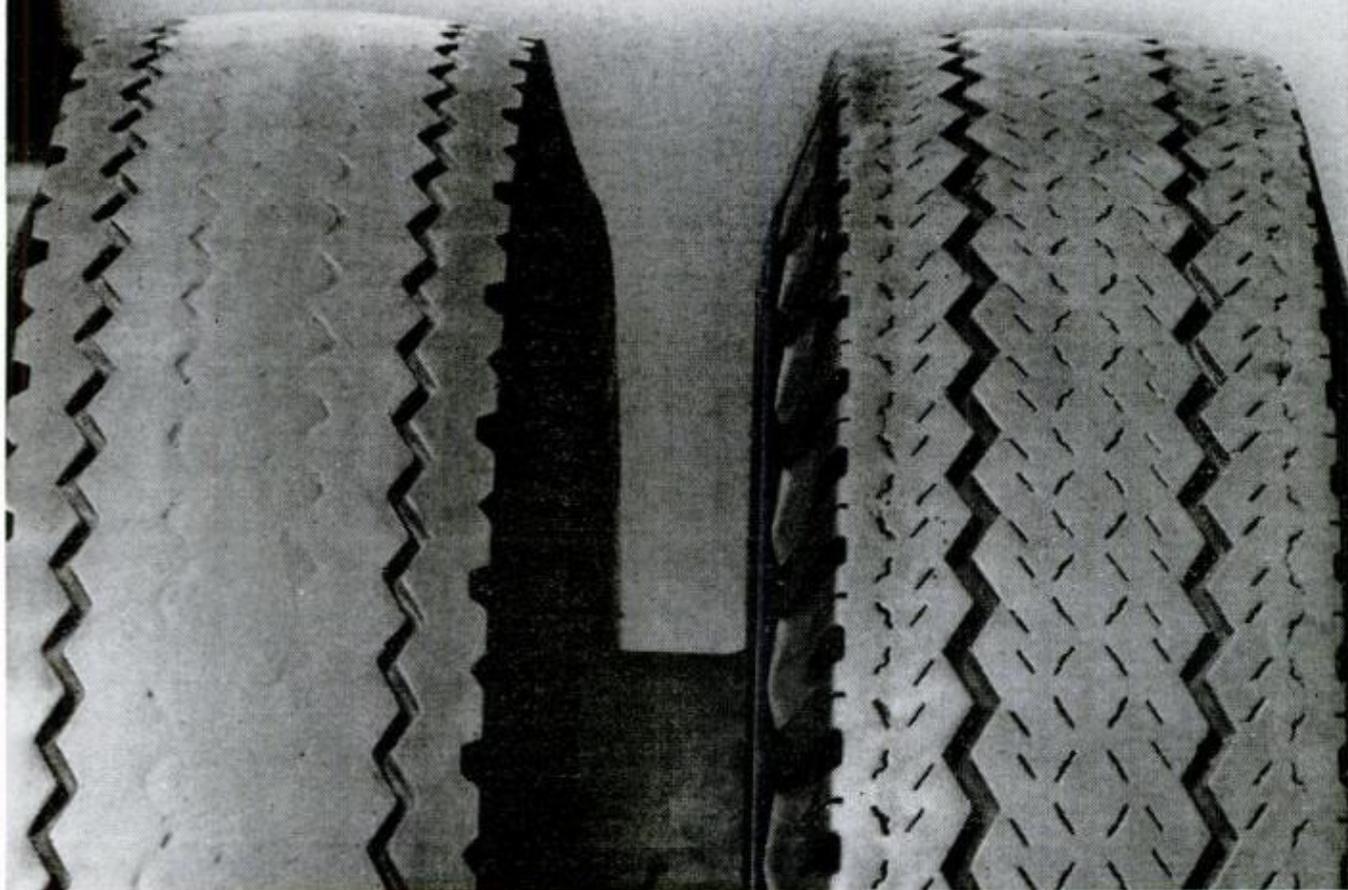
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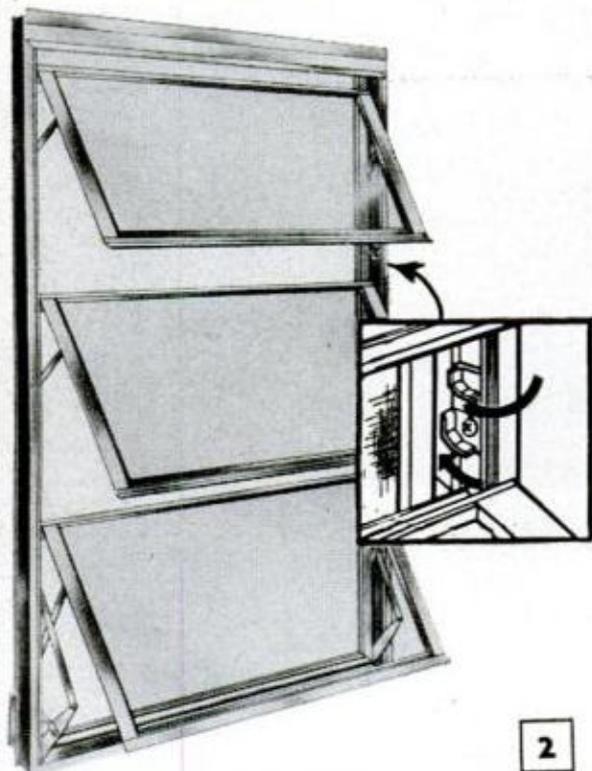
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1. ROOF AND SIDING PAINT comes in seven colors, can be applied with a roof brush. Paint spreads easily as it comes from the can, dries to the touch in about two hours. Also can be applied to asphalt siding, concrete and cinder blocks, metal roofing and siding. Al-Chroma Paint Co., Inc., Stevens Point, Wis.

2. AWNING WINDOW has an automatic locking system that secures four corners of each ventilator without use of latches or operating mechanisms. Nylon bushings, bearings and vent locks eliminate metal-to-metal contact. Hardware easily installed. Stanley Building Specialties Div., Stanley Wks., N. Miami, Fla.

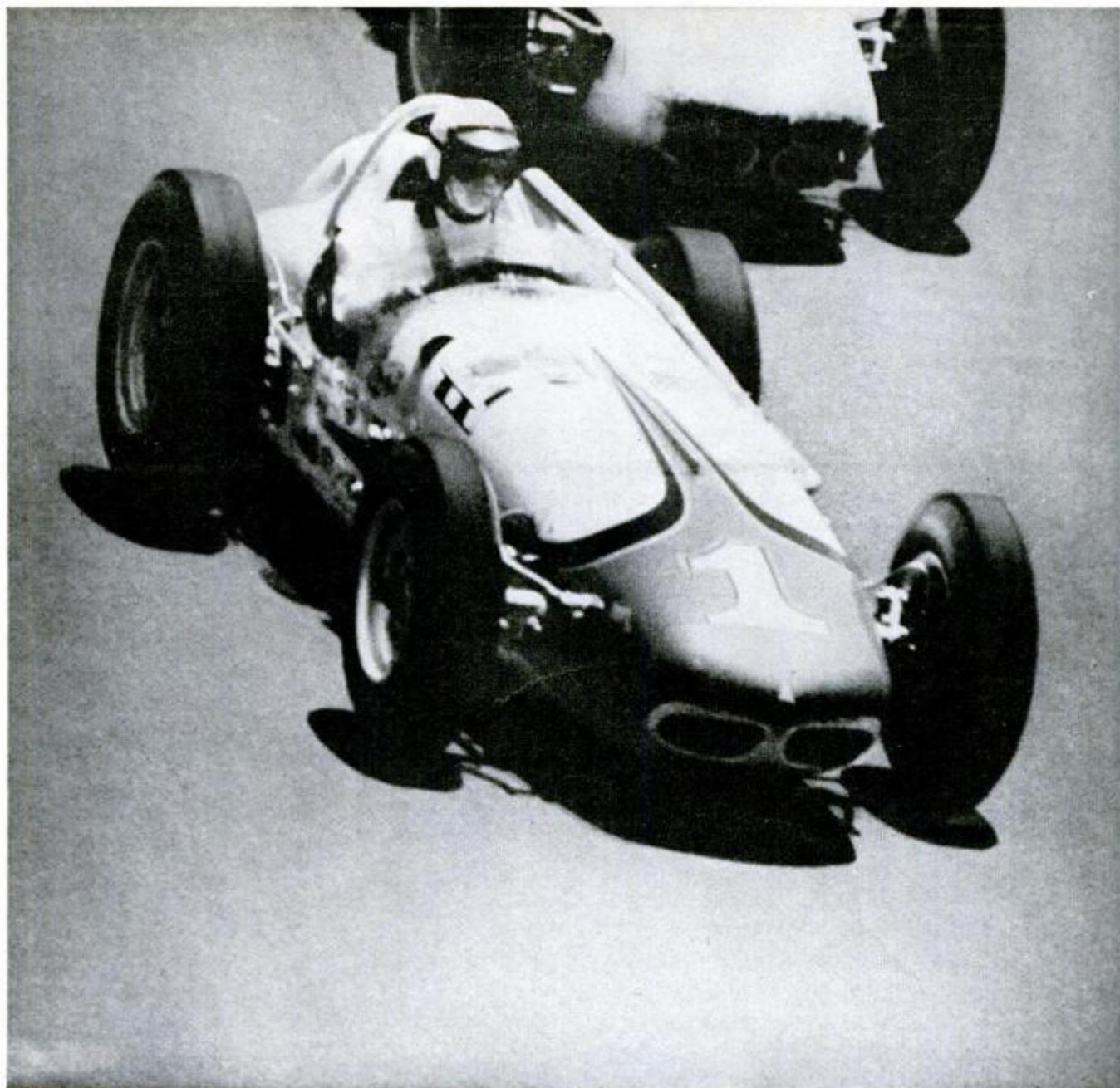


3. "PLEASE" always says more than "don't." That's why this script-stamped lawn marker is so effective in guarding your lawn. It's made from heavy-gauge steel and has a white-enamel finish to contrast with the lawn. Priced at \$1.95 each by Oxboro Heath Co., Box 7031, Highland Station, Minneapolis 11, Minn.

4. ELECTRONIC PROBE inserted in your lawn or garden reads "wet," "moist" or "dry," to indicate moisture available at plant-root level. If indicator reads "dry" in wet soil it means soil is lacking in soluble minerals necessary for vigorous plant growth. Price \$5.95. Franklin Scott, RFD #1, Farmington, Wash.

5. ADJUSTABLE SHELF SUPPORT is made of plastic with spring-type brackets which can be pressed inward, permitting shelf to be raised or lowered. For book shelves, kitchen cabinets, anywhere it is handy to have adjustable shelves. Comes in 24-in. lengths. By Michigan Plastic Products, Grand Haven, Mich.





A. J. Foyt Jr. in his Champion-equipped Bowes Seal Fast Special

11 of the last 12 Indianapolis winners
used Champion spark plugs
because this race demands
blazing performance!
Why settle for less in your car?



10 MINUTES TO SURVIVAL

THE SOUND OF THE DOORBELL was no more urgent than usual. When I opened the door, I was surprised to find two strangers standing in the half-dark of a Texas spring evening.

"Good evening," said the one who was not holding the camera. "I'm Jim Biery from *Popular Mechanics*. I'm here to see if you'll do a special camping article for us." I had done several articles for *PM* in the past, so I readily agreed.

And at that moment began the most shattering—and exciting—experience of my life.

"The article," said Jim, "begins right now. You have exactly 10 minutes to get your family and any supplies you need into your car and get started out of town to a location as far removed from any other human life as possible.

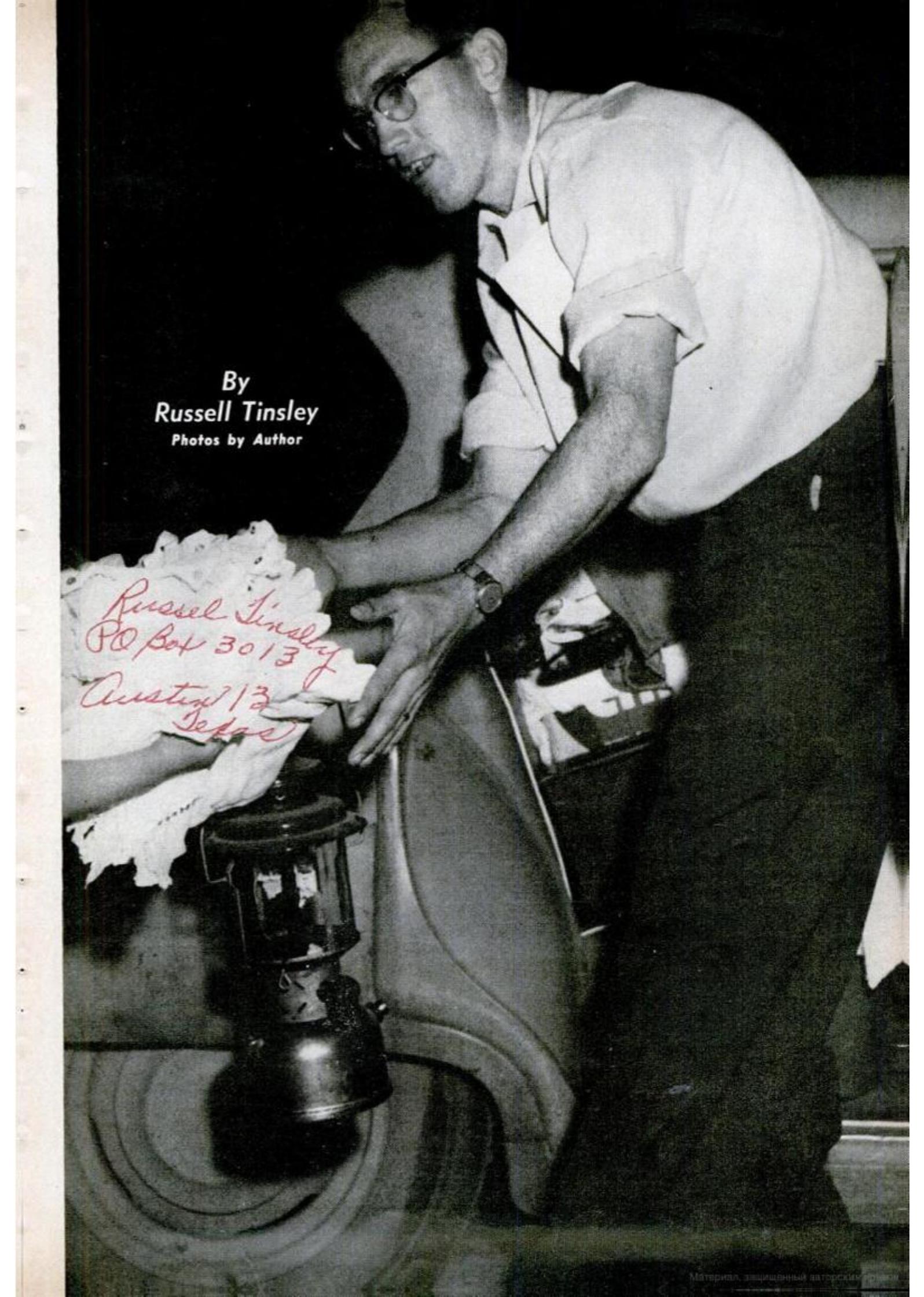
"You are to stay at that location without help and without contact, testing your ability to survive—if you can—for an indefinite period with only what possessions you can pack in the next 10 minutes. Your time starts NOW."

In this age of thermonuclear weapons and threatening headlines I, like many other fathers, have been nagged in the privacy of my own mind with the question, "Could I protect, feed and shelter my loved ones if we were suddenly thrust alone out of this civilized environment and into the wilderness?"

I was soon to learn the answer.

In that frantic 10 minutes I, my wife Marjorie and our four-year-old son Reed gathered a hodgepodge of belongings. With Abigail, the family basset hound, we migrated into the wilds and set about making a home for ourselves as if we were





By
Russell Tinsley
Photos by Author

Russel Tinsley
PO Box 3013
Austin 13
Texas



"First we set out bank lines . . . then went to work on a lean-to for shelter. Our whole day is filled with providing shelter . . . and exploring for natural food."

going to spend the rest of our lives there. In that first few seconds, my reactions were surprise and shock. Ten minutes! You've spent an entire married life accumulating the basic necessities, and perhaps a few luxuries, of everyday living. Now, abruptly, you are told to analyze this vast collection of goods, culling out everything except those necessities for surviving in the woods, in a mere ten minutes' time.

"March 14: First night in camp, made cottontail stew. When we returned from a night hunt the dog had eaten the stew. . . ."

What is important, necessary? What is not? I ran to the closet in my den and jerked open the door. My eyes scanned the contents and my mind tossed aside the unnecessary items at top speed.

A gun. Ammunition. Fishing tackle. These were the first things I picked. I knew I could, with a little luck, use these tools to provide my family with food. Then I thought of other essentials, a hatchet, flashlight, matches and bedroll. My wife's first consideration was food. She cleaned out the pantry, getting in the process twenty-four assorted cans of food, parts of a loaf of bread and box of crackers, coffee and sugar. In her haste she overlooked things like flour, grease, cornmeal, dried fruit and beans.

"March 15: Lugged rocks up the hill for fireplace and table. Made ten or twelve trips, and tonight I ache all over. . . ."

She also picked up an old sheet to use as bandages, medicines, and a bottle of water, something which Civil Defense television announcements had impressed upon her.

(While we rushed and worried, *PM's* editor calmly clocked us with his watch, while his photographer flashed his lights in our eyes.)

Together we collected three additional blankets and what we hoped would be adequate clothing.

Reed's survival equipment consisted of six comic books.

The final things Marjorie grabbed were a hair brush and lipstick, her lone luxuries for life in the wilds.



“The lean-to was crude but adequate shelter. . . . Three nice catfish, staked in the creek for breakfast, were stolen by a raccoon.”



As we grabbed up belongings, I searched my mind for a place to go. We had three-quarters tank of gasoline in our car. I picked the so-called hill country of central Texas, a granite upheaval called the Edwards Plateau, about 120 miles west of our home in Austin, in a valley at the junction of the Llano River and Honey Creek. I reasoned I could catch fish there and knew that the area should have plenty of cottontail rabbits and fox squirrels. There was a spring-fed creek that could be our water source. I knew, also, that this area was heavily wooded, so there should be ample wood both for building a shelter and for fuel.

The site and route were out of any traffic pattern, well off the beaten path, and away from predicted atomic fallout paths. The drive would leave some gas for emergency use around camp. And that's where we headed—our car loaded with just the equipment we had been able to grab in that crucial ten minutes.

Only later did I realize what a realistic test this was. A person would have enough forewarning of an approaching disaster to flee with something more than just the clothes on his back. He also would have the family auto, an important survival tool in itself. The length of time he would have to spend in the woods would be impossible to determine. Perhaps he could return to his original home within two weeks. Maybe he would have to spend the remainder of his life hacking a living from the earth like his earliest forefathers.

One ominous fact soon hits you. What a person can take with him—on short notice in an emergency—will only be enough to tide him over the critical period while he and his family learn to live off the land, perhaps indefinitely.

“March 17: Knowing we have the car for emergency shelter gives me some sense of security, even out here. . . .”

“March 18: What a chore it is carrying water up from the creek—I’ll always appreciate running water after this. . . .”



"Mostly we existed on rabbits and squirrels . . . also one soft-shell turtle. We were amazed at our loss of appetite—none of us could eat more than a cupful each meal."



"The three jars Marjorie grabbed were lifesavers. . . . One, with a hole in the lid, made a minnow trap. . . ."

Besides the clothes they were wearing, the Tinsleys collected:

24 cans assorted vegetables
Two cans evaporated milk
¼ pound soda crackers
¾ loaf white bread
¼ jar instant coffee
One pound ground coffee
One pound salt
2½ pounds sugar
Can opener
Five empty glass jars
One six-inch frying pan
One quart sauce pan
Kitchen knife, serving spoon
One pocket knife
60 matches, assorted types
One camp hatchet
.22 rifle, 100 rounds ammo
Two fishing rods with reels

One gasoline lantern
One fishing tackle box
Six comic books
One half pint rubbing alcohol
One dozen strip bandages
One hair brush
One lipstick
One pocket comb
One towel
One bedroll, three quilts
One "Christmas tablecloth"
Six men's handkerchiefs
One torn sheet
Four pairs slacks, Marjorie
Five skirts, Marjorie
Four blouses, Marjorie
One sweatshirt, Marjorie
One pair pajamas, Marjorie

One housecoat, Marjorie
Five sweaters, Marjorie
One lace half-slip, Marjorie
Five pairs trousers, Reed
Three pairs pajamas, Reed
One jacket, Reed
One sport coat, Russ
One hunting jacket, Russ
One pajama top, Russ
Three sweaters, Russ
Five undershirts, two shorts, Russ
Five pairs trousers, Russ
Two dress shirts, Russ
One lavender silk tie, Russ
One leather belt, Russ
One pair tennis shoes, Russ
One pipe, pouch of tobacco

So it came to be that we found ourselves all alone in the quiet woods one March morning. What to do first? There were many things to be done. Food and shelter we considered most important—we were hungry already. First, we set out bank lines along the river, hoping for catfish. Then we went to work on our lean-to.

"March 18: Man made a great stride forward when he invented mattresses. The ground just wasn't made for sleeping."

It was a crude, but adequate, shelter. Two gnarled trees were chopped off to five-foot stumps to act as permanent uprights. Ridge poles, three of them, were run back at about 45 degrees.

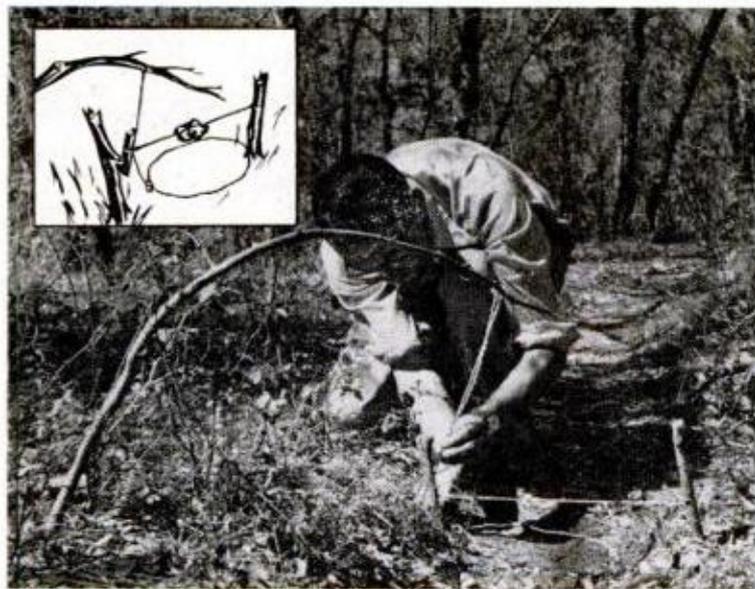
These were lashed to the permanent poles with coat hangers (to think we'd considered them a bother when we jerked them, laden with clothes, from the closet!). Other cross pieces were cut and lashed with fishing cord and strips of bedsheet along the top and sides. Cedar boughs were woven tightly between these cross pieces.



“The scope-sighted .22 rifle is a good survival weapon . . . it will keep the average hunter in meat . . . the secret is in being a deliberate, thorough stalker and hunter.”



“Reed gets a splinter removed. Living on the ground, there is a constant danger of disease and infection . . . hands cracked from immersion in cold water.”



“For any long-term survival in the woods I would depend on a series of snares as another source of food. But it would take at least a dozen.”

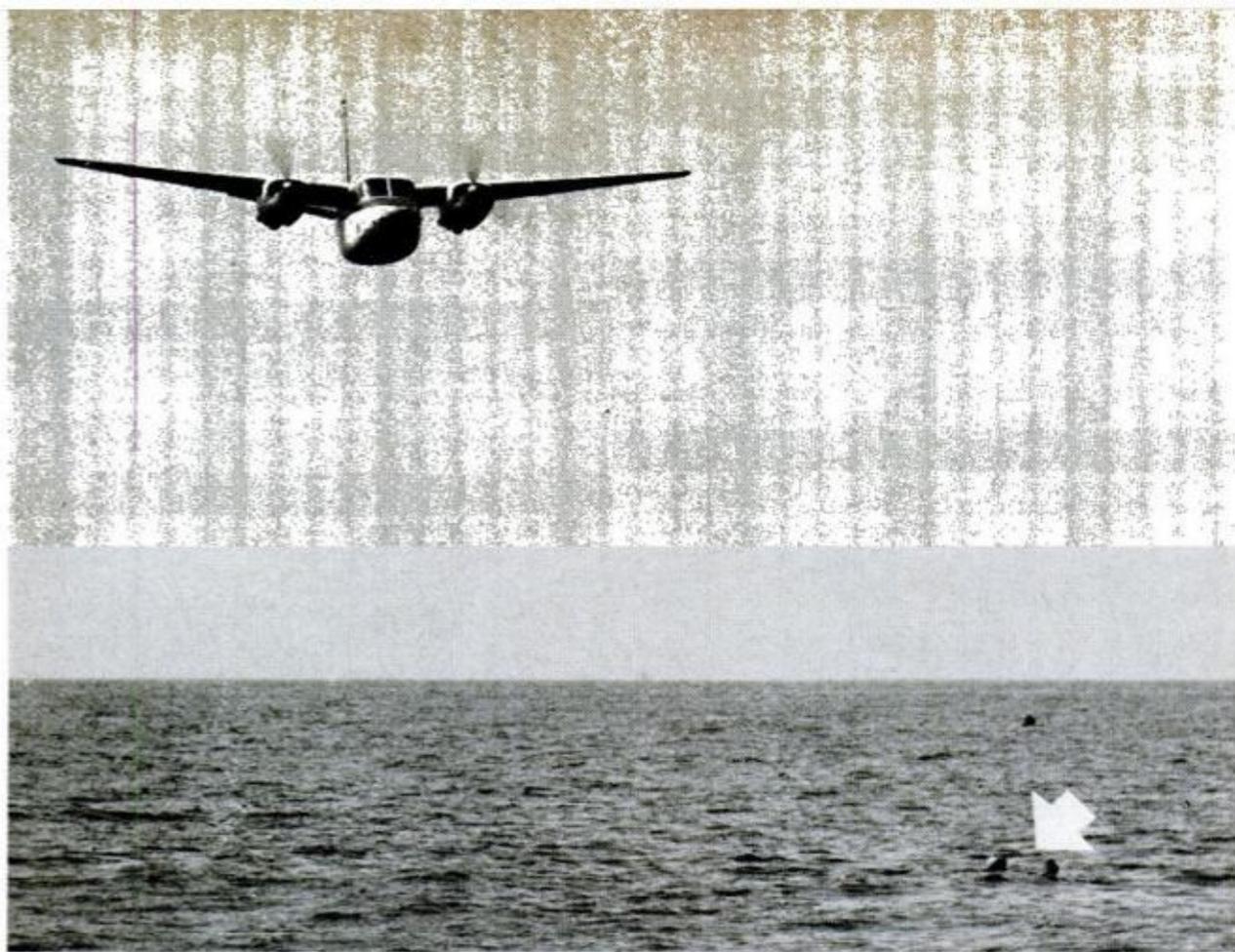
More loose cedar went on top to make a rough thatched roof.

The entrance faced south. If a cold front moved from the north we reasoned a reflector fire at the entrance would keep us warm. Ditches dug with the lug wrench of our car surrounded the shelter to divert any run-off of rain. The first night we covered the shelter with Marjorie's Christmas tablecloth, which inexplicably showed up in our hastily collected gear, to protect us from the dew. The cedar was added the second day. During our entire stay we were harassed by brisk March winds, but the shelter kept us protected and warm even in night temperatures down into the forties.

Later, a thundershower was to pounce on us suddenly one black night. I remember we slogged around in the darkness, carrying equipment to the car. Although a brief shower had blown in earlier

“March 19: It seems so far from anywhere out here, especially at night. . . . I'd give a small fortune for a glass of iced tea.”

(Turn to page 222)



Floating Antenna Sends SOS

Pilots downed at sea will have a new floating antenna that sends out signals for rescuers to home in on.

The antenna is housed in an inflated bag which floats upright to permit accurate tracking of its signals. It is connected to a waterproof transmitter worn around the pilot's waist.

Heart of the system, however, is a new, ultrasensitive radio receiver, installed in rescue planes, which can pinpoint the source of the emergency broadcasts.



Toy Keeps Them Jumping

Jack, you'll have to be nimble to jump over this revolving stick.

A new plastic wind-up toy has swinging arms with a four-foot spread that can revolve at heights up to 15 inches. Speed of revolution is set by adjusting flags on the arms.

The toy, Eldon's Jumping Jack, sells for \$3.98. It is designed for the quick of all ages.

SOURCES OF FURTHER INFORMATION on articles are listed in the WHERE-TO-FIND-IT list which is available to readers from the

SERVICE BUREAU
POPULAR MECHANICS MAGAZINE
200 East Ontario Street, Chicago 11, Illinois.

POPULAR MECHANICS

*Tired of rumor-mill dream sketches?
Well, here's a factual preview of*

What You'll Find in the '62 Cars

By Donald MacDonald

Veteran Automotive Writer

Marginal and boldface comments by

Jim Whipple, PM's Auto Editor

**They'll embody the latest
engineering practices but
you won't see anything
exotic like air-oil
suspension or disk brakes** →

**The prices will overlap so
that buyers will be deter-
mining the size cars that
they really like, not just
the size that they can
afford. Of course there
will be plenty who'll pay
more than they can afford!** →

IF YOU GUESSED that the 1961-model year with its crop of new compacts and mid-year sports coupes would end the auto makers' mad scramble to produce a car for every taste and budget, you guessed wrong. The dynamics of this amazing industry never cease to amaze even those of us who know it well.

Far from resting on its oars, Detroit is bringing forth what amounts to four new-from-the-wheels-up cars. They will be carrying Ford, Mercury and Chevrolet name plates, but will be as different from their sister models as if they came from different factories.

Like inveterate gamblers, the manufacturers' idea is simply to place a chip on every number—give their car dealers a complete range of models of every size, price and performance level. The principal objective for next year, then, is to fill the gap between compacts and "full-sized" cars, and, in the case of one company, to explore the "subcompact" market area, up to now the exclusive province of the imports.

In addition there will be an impressive array of engines fresh off the drawing boards—new 4s, V-6s and V-8s.

Which cars will have what goodies? Well, let's take a closer look:

Big Ford news for 1962 will be two new models presently coded Canadian X and Canadian Y.

The first is a Ford Division product to replace the present Fairlane and Fairlane 500. The difference is that the Canadian X, which will actually inherit the Fairlane name, will fit into a box 197 inches long, 53½ inches high and 75 inches wide. Except for height this

**This car could help Ford →
get new customers for a
larger car to replace those
who deserted Ford for the
Falcon—which is less profit-
able for the dealers**

**Models will be confined to →
two and four-door
sedans. Wagons may
come later**

**Cardinal will be →
basically a four-passenger
car, but like its German
cousin Taunus, will be wide
enough to squeeze in an
occasional extra passenger
or two**

is just about the package size of the 1949-54 series of Fords, especially considering the 115½-inch wheelbase.

There are even many similarities to the past. For example, the windshield cannot fairly be called "wrap-around," and the standard headlight setup is a single unit on each side which saves a cool \$3.55 per car. Body lines are patterned after the T-bird with flowing knife-edge fenders and crisp, angular roof. Engine is an overhead-valve V-8 of about 220 cubic inches. It will have a cast-iron block and be liquid cooled.

The Canadian Y is an almost identical car, with the same unitized body of slightly greater length. It will fit into the Mercury lineup to replace the present Meteor. The plush Mercury Monterey on the 120-inch wheelbase will be continued with little but surface changes, as will Ford's equivalent Galaxie.

Ford at one time planned to pop with a front-wheel-drive T-bird in 1962. This is the reason for the generous overhang on the front of the current model. However, these plans have been shelved at least temporarily. Lincoln will add the already-designed four-door hardtop to its thriving line.

The other Ford surprise—not really because of so many leaks—is the Cardinal. This 100-inch-wheelbase car is slated for spring, 1962 introduction on this side of the ocean. It is a liquid-cooled V-4 with front-wheel-drive and an over-all length of about 167 inches. Engines and transmissions will be built in Germany, and a basically similar vehicle will be assembled there and in the United States. For a rough idea of the Cardinal's styling, look at a picture of the current Taunus on page 76.

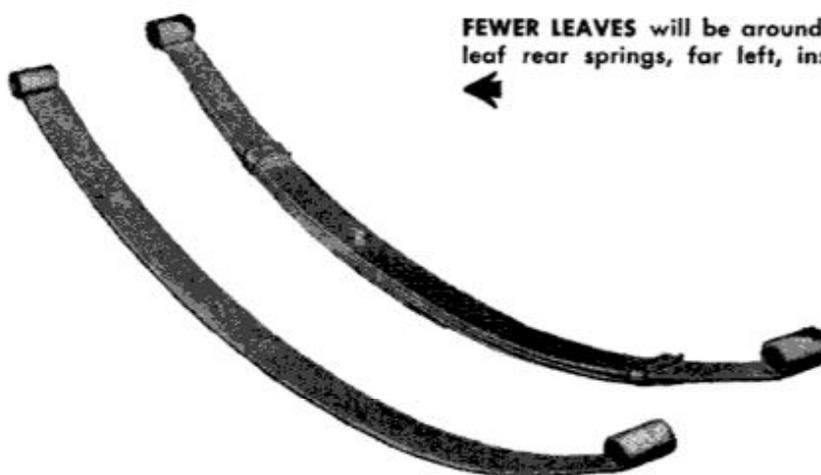
The Archbishop?

Rumors of a car facetiously called "Archbishop" for British building actually stem from a confusing parallel program for a new English Ford Anglia, numbered Model 109E. An interesting sidelight is that the body dies for the new Anglia were made in Detroit.

Chevrolet is closely following Ford's attempt to bracket the volume market, and at the same time keep a full-sized series going in what used to be the low-price field.

Chevy has, of course, its Corvair which will be continued with little change except for the addition of a convertible. But new for 1962 is a series coded H-35.

This 110-inch-wheelbase car (*not* to be called Corsair) will



FEWER LEAVES will be around this autumn as Chevy plans on single-leaf rear springs, far left, instead of multileaf on new H-35 series

TWO-PLY tires, right, will be original equipment on several compacts in 1962

AUTOMATIC valve adjusters on '62 Fords, far right, keep constant zero lash

NEW FAMILY-SIZE WHEELBASES

FORD

CHEVROLET

PLYMOUTH



NEW SHAPES AND NEW SIZES will give the low-priced three a total of nine different wheelbase lengths and body sizes. Cars under wraps, Cardinal, Canadian X and Y, Corsair are brand new

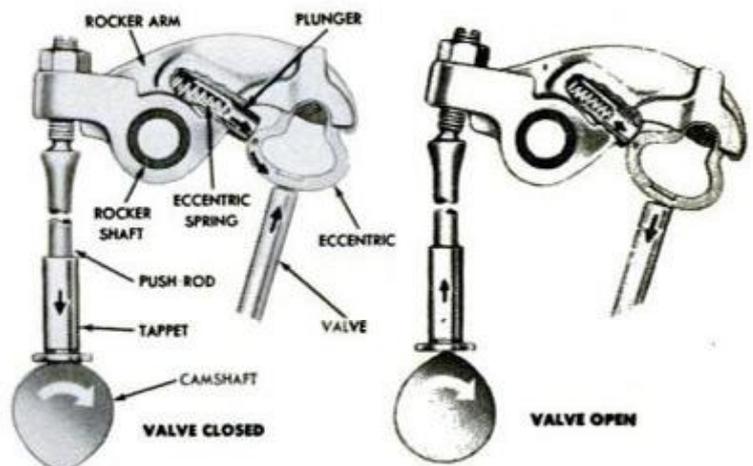
be offered with a choice of front-mounted four, six, or V-8 cylinder engines. The four and the six are especially interesting because they can be machined on the same tooling line with less than two-hour's downtime for changeover. Obviously, many of the reciprocating parts are interchangeable.

Chevy's Four is somewhat bigger than the Tempest engine, and stands upright under the hood. The new six, of about 230 cubic inches, will supplant the time-honored unit that has powered a majority of this make since 1929. The V-8 in this series is also a new design, and it will be mostly used in top-line H-35 sports models that are designed to give Ford's T-bird indirect competition.

Corsair will have a unit construction body using some of the shell stampings of the Special-Tempest-F-85 body but will look very different. Suspension and driveline will follow conventional practices—i.e. engine in front, followed by transmission, drive shaft and conventional rear axle



AUGUST 1961



75

These cars—Dart and Plymouth—will still be wide, six-passenger jobs with full assortment of engines; the slant six and a spate of V-8s →

The four-door "300" is Chrysler's answer to the compact luxury trend kicked off by Lincoln Continental this year →

The company has yet to decide whether to continue or not all three series of its present standard-size car. Odds are that only the Bel-Air and Impala will be kept. The expensive, complicated Turboglide transmission has been abandoned in favor of a modernized, two-speed Powerglide for all models. In addition, of course, are the three and four-speed manual shift options.

Continually recurring rumors that Chevy will switch to a metal body for its Corvette are still false. Actually about the only reliable mechanical news other than engine changes on the line is adoption of single-leaf rear springs for the H-35 series.

Chrysler Corporation, despite its legal troubles, is up with competition—or should we say, shrinking with competition. Both Plymouth and Dart have been redesigned to fit a 116-inch wheelbase. This is the standard car which has been shrunk rather than the Valiant enlarged. Both the Valiant and the Lancer will be continued without too much change, except for more general availability of the die-cast aluminum six-cylinder engine.

Most assuredly Dodge will drop its unpopular reversed fins, as well as the Chrysler-sized Polara model. Chrysler Division itself will drop the Windsor and concentrate at one end with the \$2964 (delivered) Newport, and at the other, with an enlarged "300" series. Enlargement comes from adding a four-door hardtop which will use the Newport body shell.

Imperial is a question mark, because as of July 1 the separate plant that made these was closed. It could continue as a low-production, almost hand-built job, or it could also be continued as a really dressed-up New Yorker. The problem is bringing a chassis-type assembly operation back into a plant that is set up for unitized bodies.

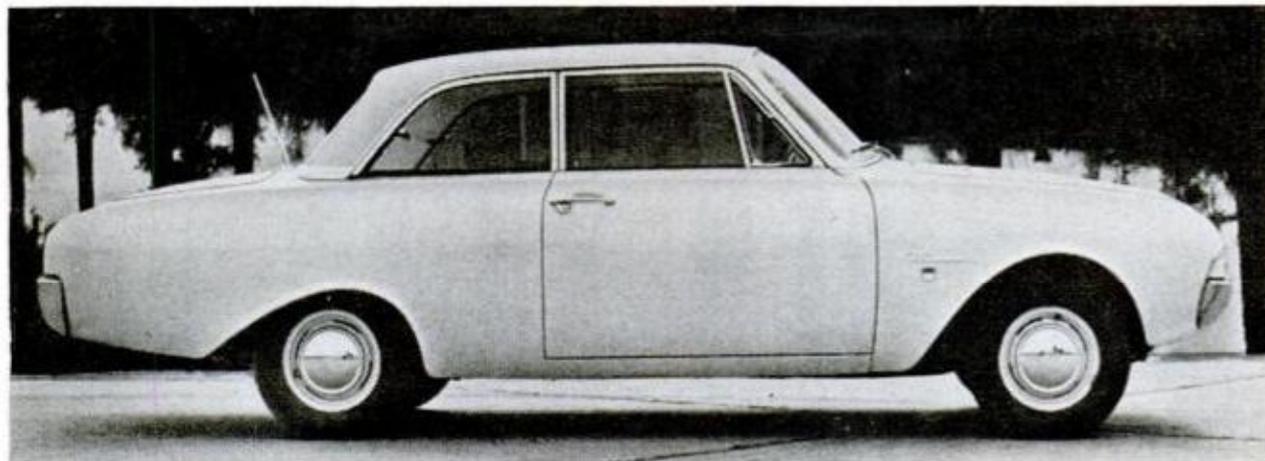
Everyone Alternates?

Chrysler's exclusive on the alternator will end in 1962. Practically every make will offer these as standard equipment by then. Also, another rumor can be completely discounted, and that is revival of the DeSoto in any form. Management would like to make a "T-bird-type" car to carry on the name, but the project is a luxury that does not fit into present Chrysler Corporation financial plans.

Also in the category of well-intentioned but abandoned projects are baby cars by Studebaker and Seagrave. The latter is a Columbus (Ohio) based maker of fire engines that planned to go into the automobile business. There

(Continued to page 218)

THIS SLEEK SHAPE is a German Ford (Taurus) but experts peg it as a look-alike for the upcoming Ford Cardinal



Gen. Curtis E. LeMay was appointed Air Force Chief of Staff in May of this year. A pioneer in the concept of strategic bombardment, Gen. LeMay, 54, served with distinction in command posts in both Europe and Asia during World War II, and, later, in the Strategic Air Command.



My Most Exciting Moment

TIME, PLACE, AND CIRCUMSTANCE combine to produce exciting moments. The time and place for me was May, 1938, during Air Corps maneuvers on the East Coast. The circumstance was a mission for three B-17 Flying Fortresses to find the Italian liner *Rex*—700 miles out in the vast Atlantic.

The embryonic GHQ Air Force had been seeking just such an opportunity to show the capability of long-range bombers. But the task was not going to be easy because only sketchy information was furnished the crews on the probable location of the New York bound liner. My crew was selected to lead the formation. I was to be the lead navigator.

This was enough responsibility to set any lieutenant on edge, but when we took off early on the morning of May 12 my problems were compounded. On board was a radio transmitter belonging to the National Broadcasting Co., two engineers and an announcer. On the other aircraft were news reporters.

We passed over Sandy Hook at 08:45 hours and headed out to sea with the ominous forecast of bad weather ahead. Based on my estimated time of interception of a few minutes past noon, NBC scheduled an on-the-scene broadcast for 12:30. Millions of radio listeners would witness our success or failure.

A thick overcast forced us to fly at 1000 feet. Occasionally we caught glimpses of the choppy sea, but it was not until 10:00 hours that sporadic sunshine broke through the blanket of clouds and I was able to check the wind. I quickly replotted our position and the formation altered course to the area where we expected to intercept the *Rex*. But our troubles were far from over. Ahead towered a turbulent cold front.

The formation spread out at 11:00 hours and bored into the gray-black cliff of clouds. We were caught in the fury of the storm for fifteen minutes.

Our estimated time of interception was now 12:25.

It didn't seem probable that we would find the *Rex* in five minutes. I could already hear the radio announcer reporting our futile search efforts. And then at noon we flew into an area of poor visibility and heavy rain squalls. The *Rex*, we realized glumly, could be under any one of them.

I checked and rechecked my computations. As the hands of my watch moved to 12:20 I anxiously scanned each rain squall, trying to retain my confidence. Where was the *Rex*? Had I made an error in my navigation? At 12:23 I glanced down momentarily to recheck my log again. Then I heard the shout:

"The *Rex*! Dead ahead."

The Flying Fortress flew over the sleek liner at 12:25. We had proven our point. Land and sea masses were no longer barriers to long-range air power.

Curtis E. LeMay



SCIENCE OVERSEAS

By William Kreh

The cleanest money in circulation, according to a report from a French laboratory, is the American dollar. Tests of bank notes picked at random, showed, in order of cleanliness, that next came French, Katanga, French African, Moroccan, Argentine, Spanish, Chinese Nationalist and Greek.



Old silk stockings are in great demand at the Wildlife Conservation Department of Lusaka, Northern Rhodesia.

They are used to save wild animals from ultimately drowning from the water rising behind the dam across the Zambesi River. A giant hydroelectric project there will create a lake 175 miles long and up to 20 miles wide.

As the water rises, animals are trapped on islands—and that's where the stockings are used. After the animals are captured in traps, they are trussed up in the stockings and then ferried to safe ground. Silk doesn't cut the animals as deeply as would rope.



Soviet astronomers say they've made the first photographs of a solar eclipse from a vehicle in space. It was recorded in February by cameras lifted above the atmosphere by rockets. The payload packages were cast loose from the rockets and stayed stabilized long enough for the cameras to take the pictures. Then they were parachuted to Earth.



Christian Christensen of Fune, Denmark, likes to look at the bright side of life. So he's built a revolving house that follows the sun's rays all day long. The house rests on eight large truck wheels and is turned by a one-horsepower electric motor. He's hooked it to a timing device that keeps the swivel moving like clockwork to keep the house always facing the sun.



A Norwegian scientist says dinosaurs lived as far north as the Arctic 120 million years ago. Prof. Anatol Heintz has turned over to the Norwegian Academy of Science a set of nine footprints, each 26 inches long and 23 inches wide, found on a sandstone cliff on the shore of Spitzbergen Island, 600 miles from the North Pole.

He said the prints were made by two iguanodons, creatures that were 40 feet long and stood 12 feet tall. Previously, no trace of the great reptiles, once common in Europe, had been found north of southern Sweden.



How do you give an insect a medical injection? A firm in Great Britain has come up with a hollow steel tube with an outside diameter of .00073 of an inch—one quarter the size of a human hair. It's used for artificial insemination of bees, to give shots to insects used in research on tropical diseases.



Two oceanic projects have captured the approval of the scientific world.

Under sponsorship of the Non-Governmental International Council of Scientific Unions, four years' exploration of the Indian Ocean is scheduled to start this year. Twenty vessels with facilities for some 350 scientists from 14 or more nations will take part. Our least explored ocean, the Indian stretches over 28 million square miles, covers more than 14 percent of Earth.

The U.S. Coast and Geodetic Survey is going to gird the globe with seismic equipment with which man might eventually predict earthquakes. By agreement with 65 nations, technicians will have installed equipment in 125 stations by late 1962.

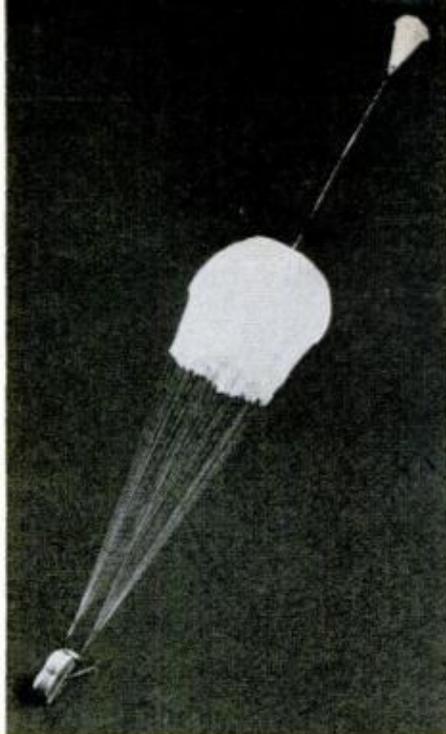


Fish from the East Indies may be making long ocean voyages against their will. The Scripps Institution of Oceanography, La Jolla, Calif., some time ago found that a rapid current under the Pacific Ocean runs east some 6000 miles. Recent Japanese research indicates this Cromwell current may extend across the Pacific.

This explains how species of fish plentiful in the East Indies have arrived in South America, and survived what had been thought was a 10,000 mile swim against the Pacific's prevailing western current.



This won't come as much of a surprise to anybody who's been on KP: Britain's National Physics Laboratory has found that the sound most annoying to man is the scraping of a knife against the bottom of a saucepan. ★ ★ ★



Rock-A-Bye in the Sky at Supersonic Speeds

Resembling a baby carriage, a seat that converts instantaneously into a sealed capsule will float B-70 crewmen safely to earth in emergency bail-outs at Mach-3 speeds.

Normally, the crew will operate in a fully

pressurized cabin but, if cabin pressure fails, the seats snap shut and each man can continue to carry out his duties. If bail-outs were necessary, each capsule would be rocketed from the plane to float to earth.

Sprayer Handles All Suburban Jobs

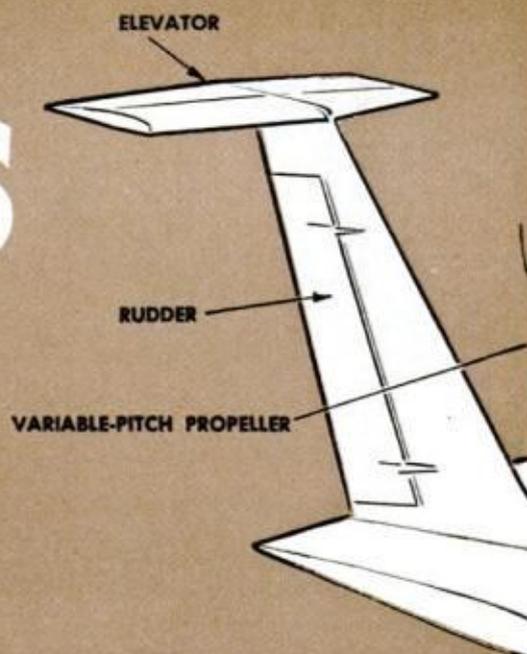
Suburban homeowners can handle all their spraying jobs with one piece of equipment—a new power sprayer that uses a two-horsepower engine to develop 150 pounds of pressure and an output of 2½ gal-

lons per minute. An adjustable power gun will spray treetops, and a spray-bar attachment covers a five-foot swath of lawn. The Suburban is made by Hudson Mfg. Co., 589 East Illinois St., Chicago.



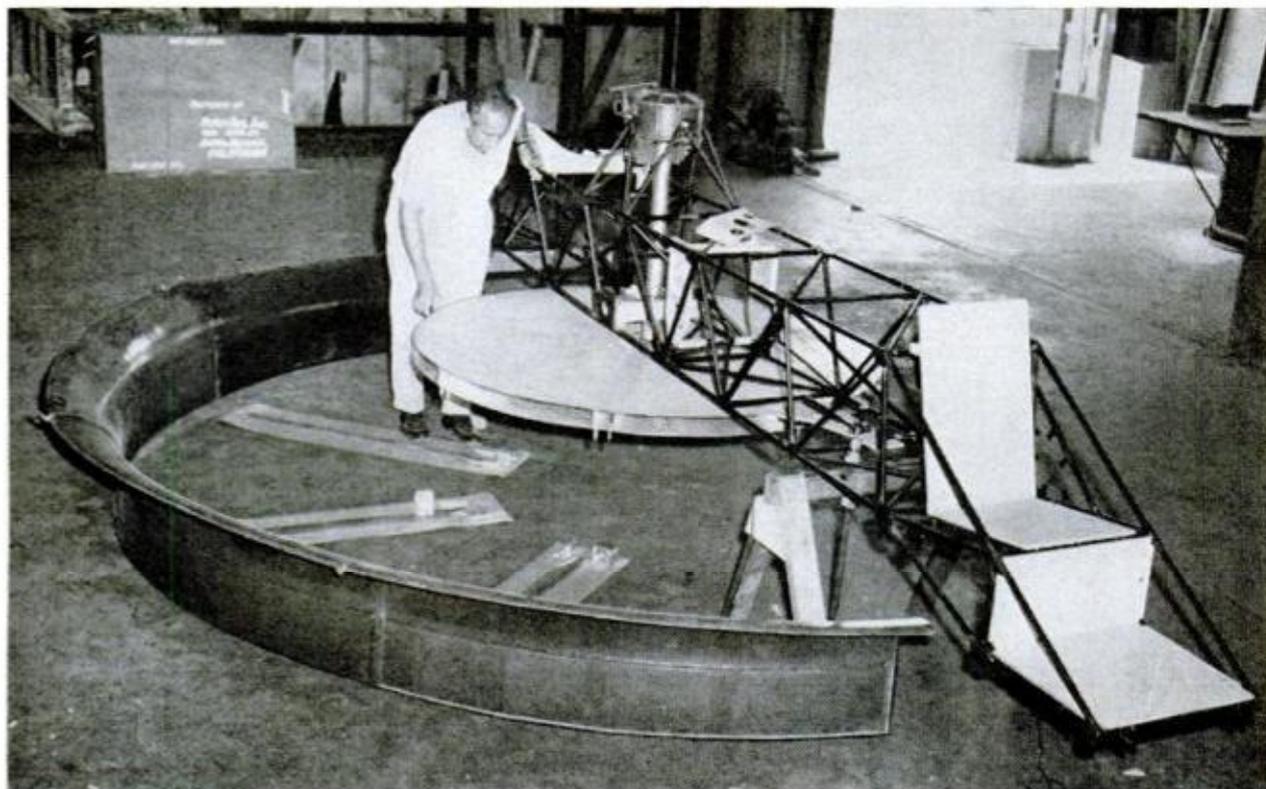
WORLD'S SAFEST PLANE?

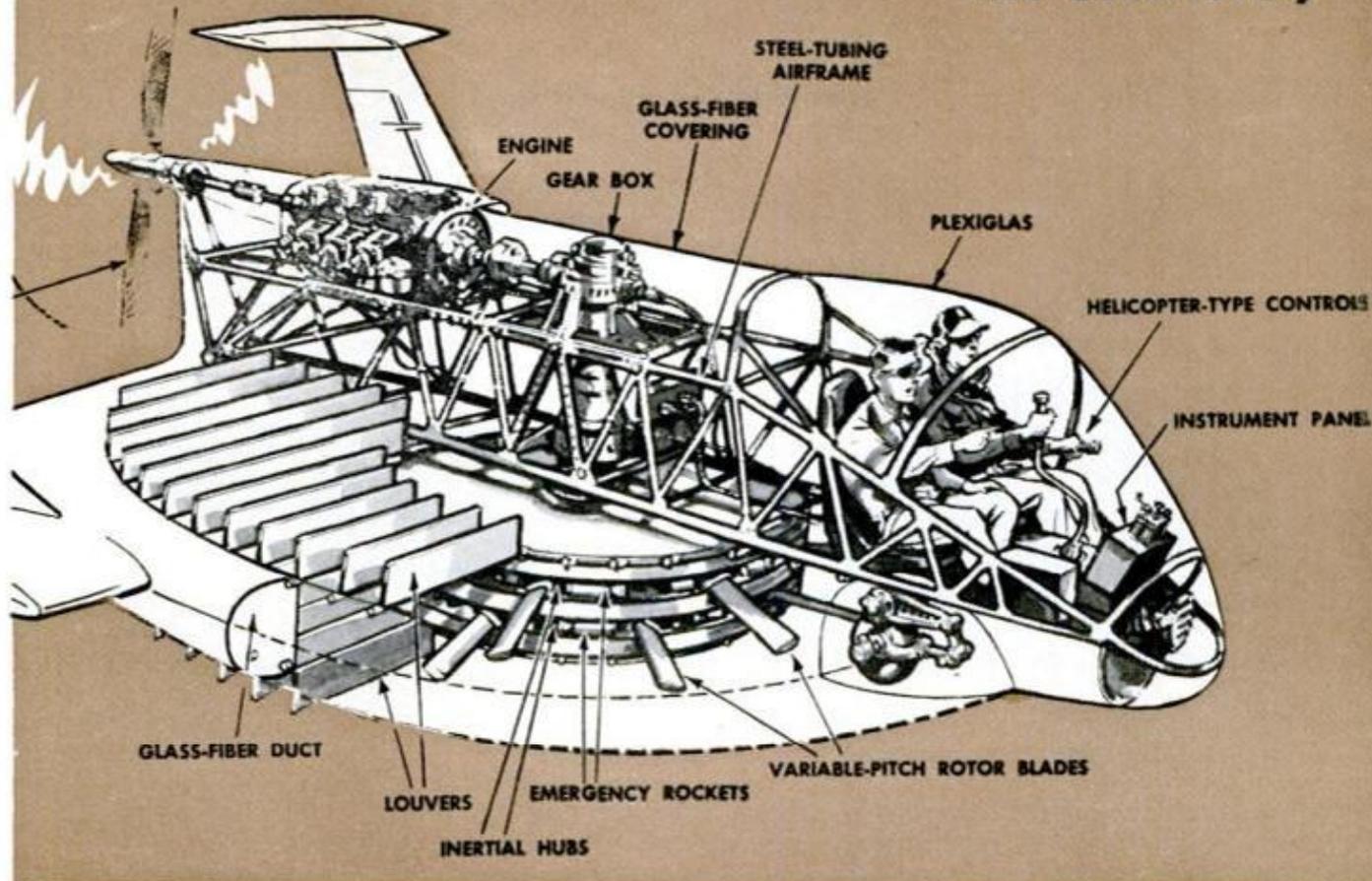
By Thomas E. Stimson, Jr.



It promises to ease you back to

ROTAVION PROTOTYPE is partially shown in mockup of some of its parts, including portion of duct fairing, one of inertial hubs, gearbox, steel-tubing fuselage and pilot's seat. Production model will have twin seats





earth, no matter what the trouble

IF 40 AIRCRAFT ENGINEERS pooled their know-how to design a safe aircraft for the general public, what would it look like?

It would look like the Rotavion, shown on these pages for the first time.

The Rotavion is the spare-time project of several dozen airplane engineers and aircraft shop men. All are employed in California's aircraft and missile factories and they have been getting together nights and week ends to build what they believe is the world's safest aircraft.

What they've come up with is a machine unlike anything ever seen before.

Basically it is a ducted fan, a vertical-takeoff-and-landing craft. At the same time it is a fairly conventional airplane that can cruise at 175 m.p.h. in level flight.

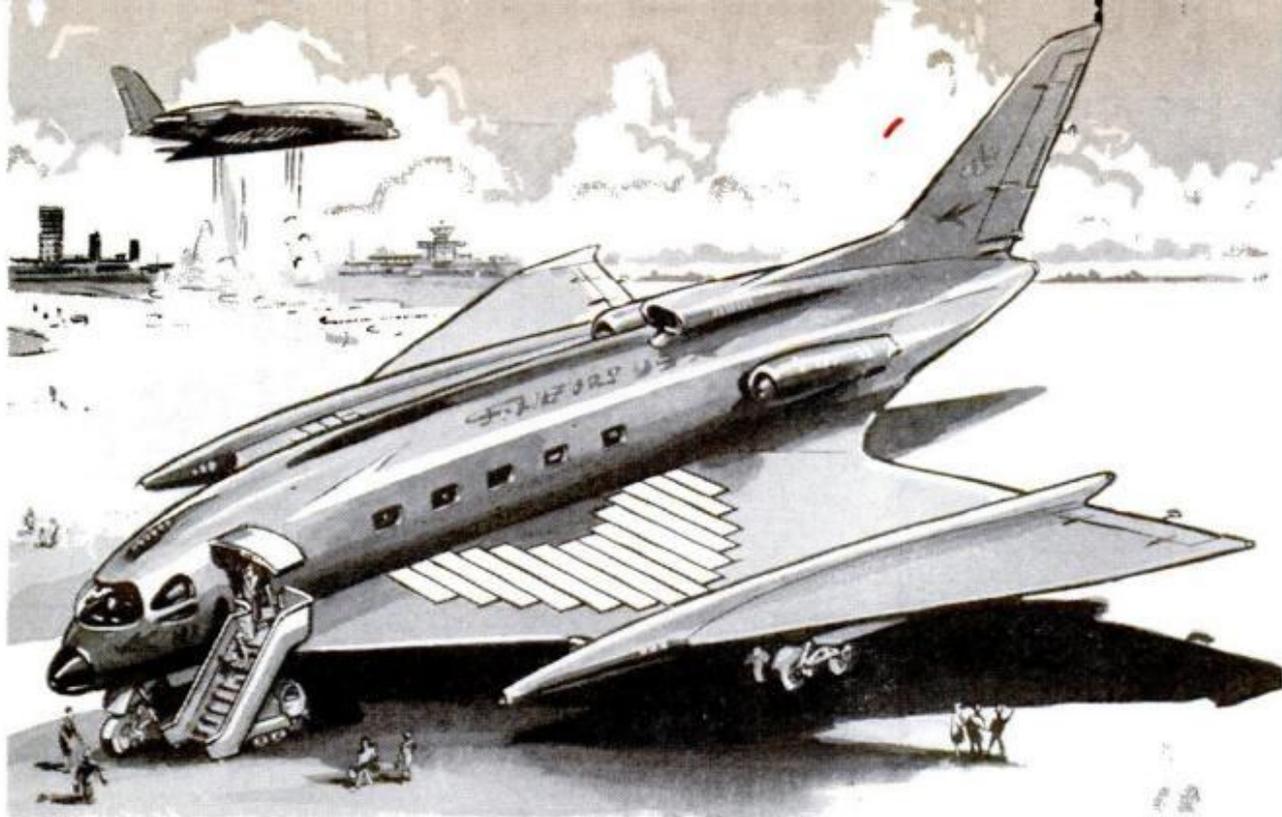
It is intended to stay out of trouble even with a dead engine. It involves no new, untried principles.

The Rotavion XR-62 (for experimental rotor, 62nd design study) has two contra-rotating sets of rotor blades inside a circular duct that is 13 feet in diameter. Across the top of the duct are louvers that are hinged to close in a forward position;

across the bottom are other louvers hinged to close toward the rear. Mounted above the duct is a fuselage containing the cockpit and a 260 hp. Lycoming engine that is geared to the rotor assembly. The engine also is connected permanently to a variable-pitch propeller that is mounted between the twin tail groups.

Controls are something like those of a helicopter. To fly the Rotavion the pilot runs up the engine with the rear propeller set at zero pitch, then he increases the collective pitch of the rotor blades to create lift and the machine climbs straight up at the rate of 600 feet per minute.

After rising above any nearby obstacle the pilot advances the propeller's pitch control to provide forward thrust and the machine begins to move ahead. The louvers above and below the duct begin to close, converting the duct into an oddly shaped but nevertheless efficient airfoil. Within a few seconds the plane is traveling faster than its stalling speed of 40 miles per hour. The pilot disengages the rotor clutch so that all power is delivered to the propeller and from then on flies the craft like an ordinary airplane. Range is 400 miles.



JETLINER VERSION of Rotavion might look like this, fly 400 miles an hour, yet be able to take off vertically

The pilot can make a transition back into VTOL configuration for a vertical and slow descent to the ground at any time. And, as with a helicopter, he can hover motionless, rotate the craft on its own axis or travel backwards or sideways.

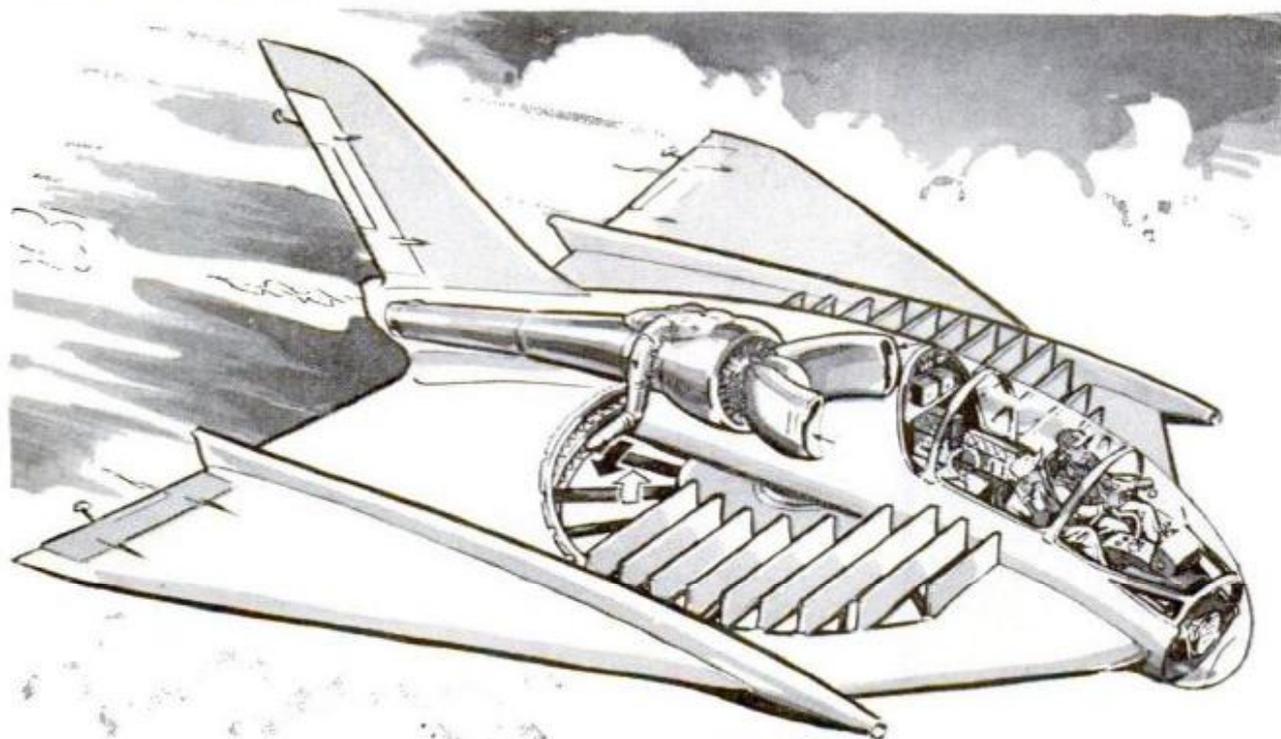
Or, with the louvers closed and all power applied to the propeller, the pilot can use the craft exactly like any other airplane. He can take off from a short runway and make a normal, airplane type of approach and landing, at a speed under 50 m.p.h.

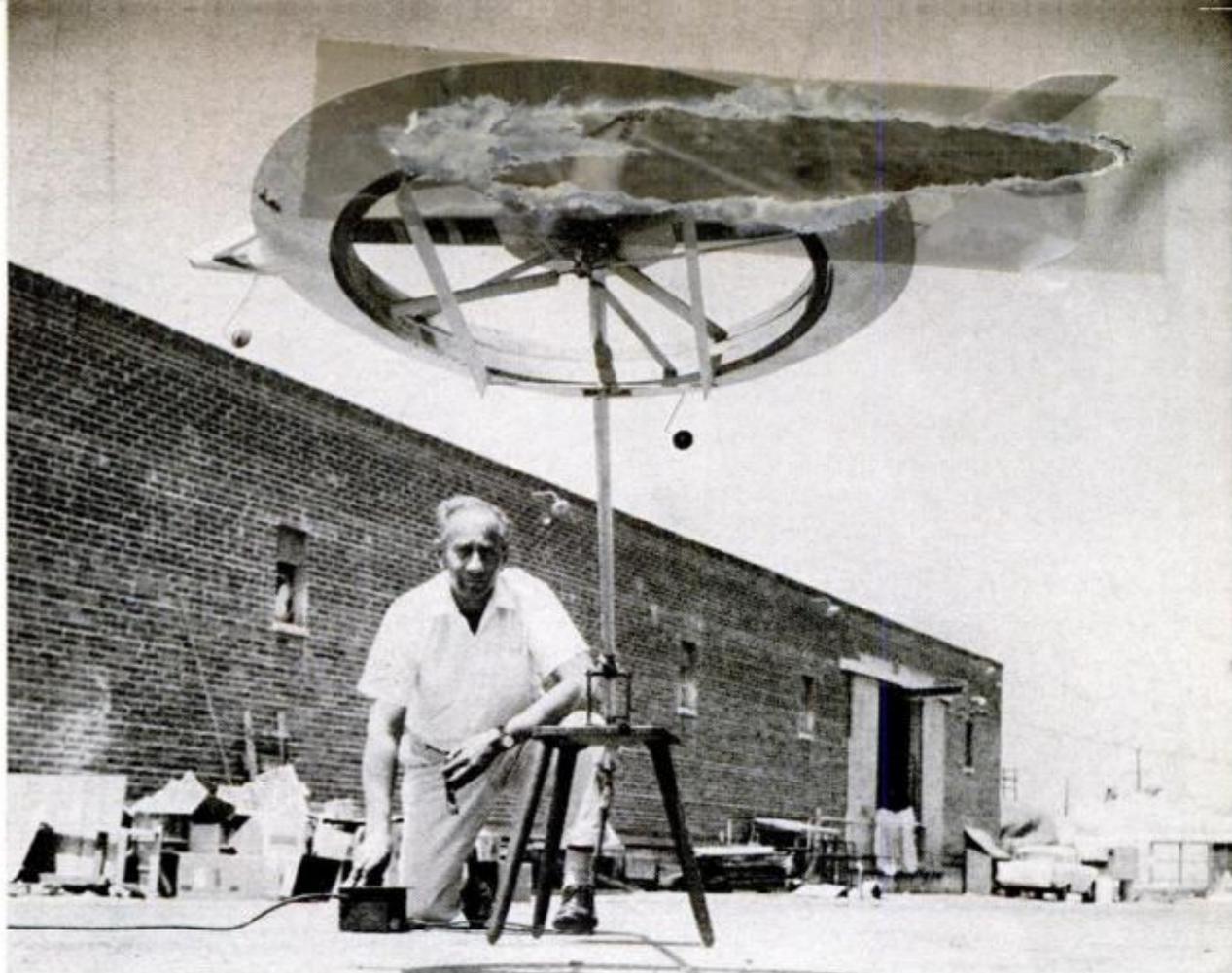
The Rotavion is 23 feet long, 22 feet wide and 8 feet high. With two people and 110 pounds of baggage on board it has a takeoff weight of 1850 lb. Its hovering ceiling is 4300 feet away from ground effect. The craft is equipped with retractable nose wheel and two rear landing wheels plus small skids to prevent accidental damage to the lower louvers.

The duct, stub wings, louvers and tail assemblies are of glass-fiber-covered honey-

(Continued to page 216)

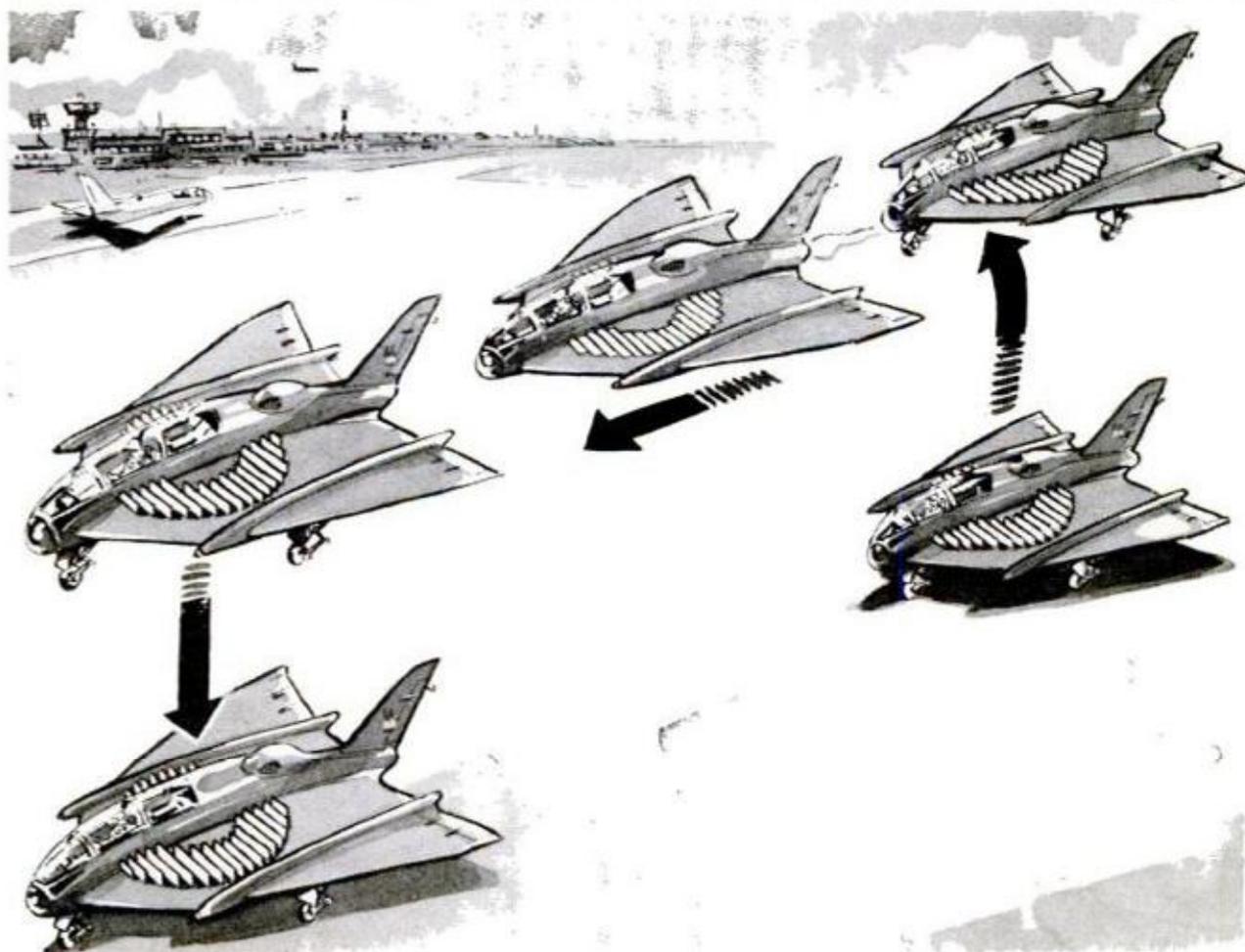
CUTAWAY SKETCH of jet Rotavion shows how air from turbine would drive rotor blades from perimeter of duct





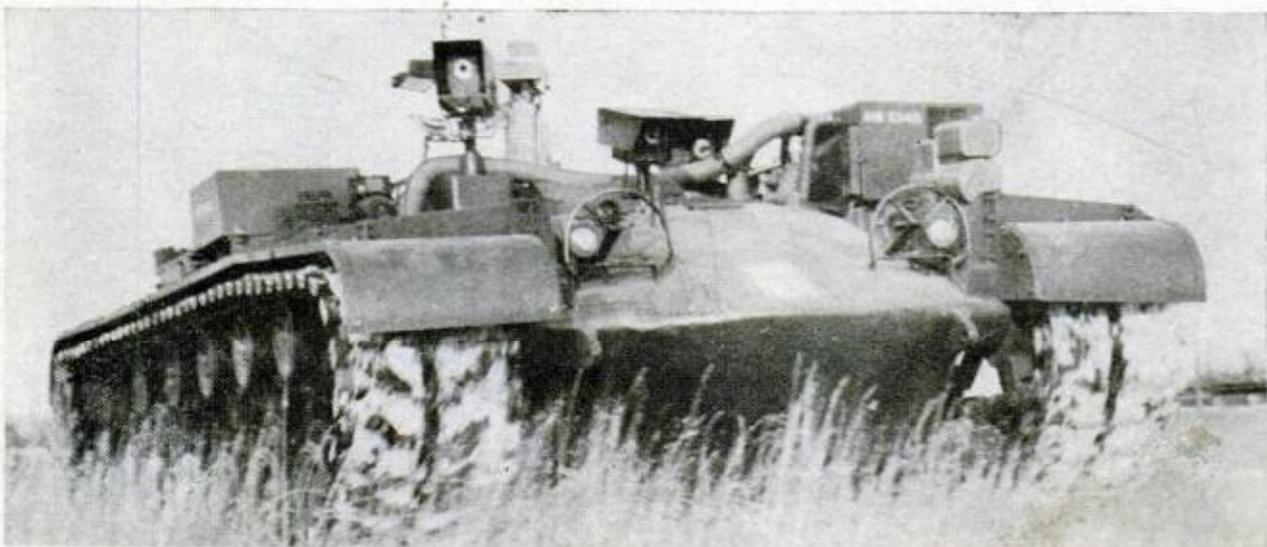
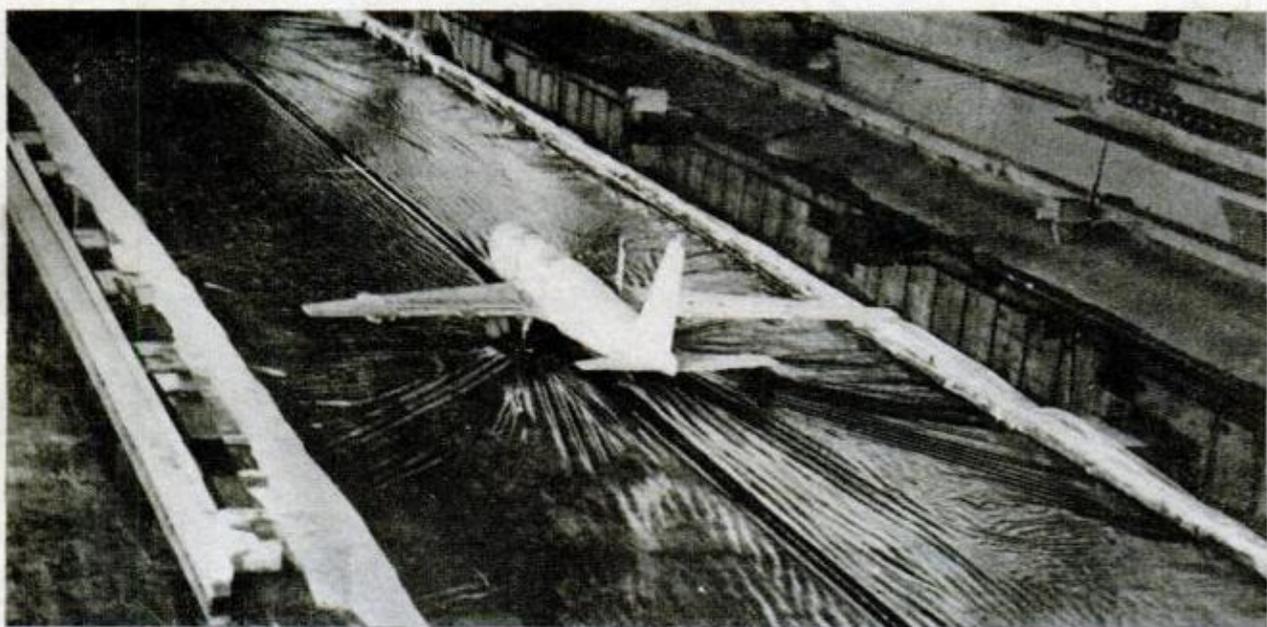
BEN KAUFMAN, spark plug behind Rotavion, tests early scale model. Though crude, it proved craft's principles

SEQUENCE DRAWING shows vertical takeoff, cruise and vertical descent. Louvers are closed during cruise



AUGUST 1961

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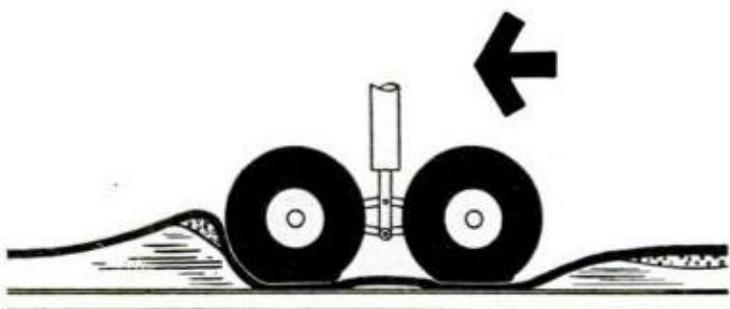
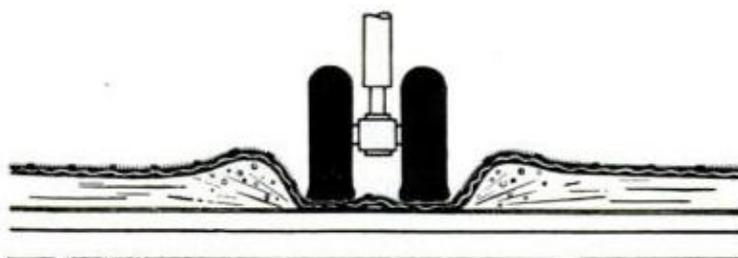
Autogiro Built From Kit

Furnished with plans in kit form, the Skyskooter—a compact, two-seat autogiro—can be put together at home and flown by amateur pilots.

Like all autogiros, the Skyskooter will take off after a short run. In the air, it has a cruising speed of 65 miles per hour, a maximum speed of 85 and will hold level flight as slow as 25 m.p.h. Its range is 250 miles and its ceiling 12,000 feet.

Measuring 10 feet from nose to tail, with folding rotor blades, it can be stored in a garage.

Its maker, Saalfeld Aircraft Co., P. O. Box 84, San Diego, Calif., claims it will not stall or spin and will descend safely from any altitude with power on or off.

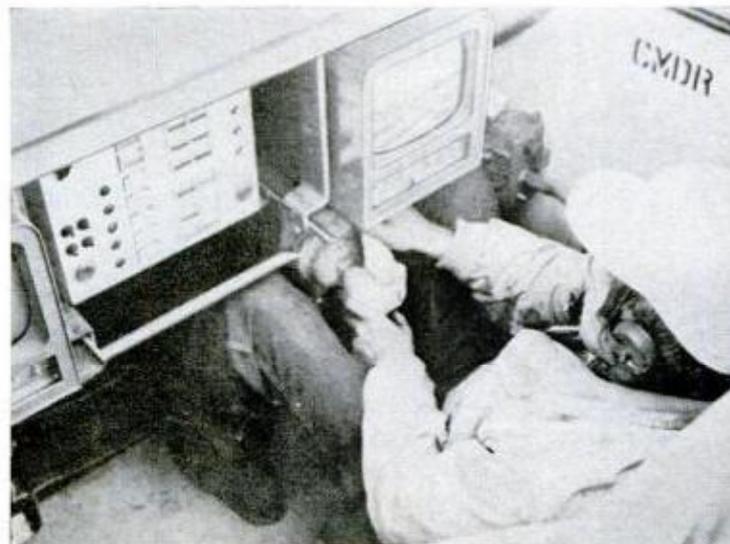


Water Puddle Stops Jets

Overshoot accidents, in which aircraft run off the end of runways, may be solved with a water trough at the end of the runway.

The problem is more serious with jets than with propeller planes because jet engines can't develop as much reverse thrust as propellers. Also, because jets are heavier and faster, they are more likely to overshoot.

The water trough, up to 18 inches deep, would slow the jet the same way flooded streets slow automobiles. The trough would also have a tough, flexible cover to keep the water spray from damaging the plane. Antifreeze would be added in winter.



Tank Driving by Television

In an atomic battlefield, tank crews would have to operate while completely sealed in because of dangers of radiation. The Army is testing a closed-circuit television system which would give the crew visual contact with the outside without exposure to radiation.

The driver and gunner have TV screens in front of them. The cameras give a 45-degree field of view horizontally and 37 degrees vertically.

In tests, the loss of depth perception was a problem, but with practice drivers overcame it.

Cabin in a Kit

**Building a vacation home for your family
is as painless — and economical — as
possible with a new set of kit cabins**

"WHITE FIR" kit cabin with about 600 square feet of floor space is designed to fit the average family





DRAWING of the kit cabin (in this case, with the plan reversed) shows big front deck, living room window-walls and roof overhang. Siding is 1 by 6 white fir; deck is side-laid 2 by 4s

THE GREAT AMERICAN URGE to get away from it all is becoming stronger every day, as thousands of families build homes away from home for week-end and vacation hideaways.

Catering to the demand for cabin designs, how-to instructions, convenience and economy from do-it-yourself outdoor builders, the Western Pine Association developed the design shown here exclusively for *Popular Mechanics* readers. It is available in kit form. The materials and accessories come ready to assemble in a big plastic bag.

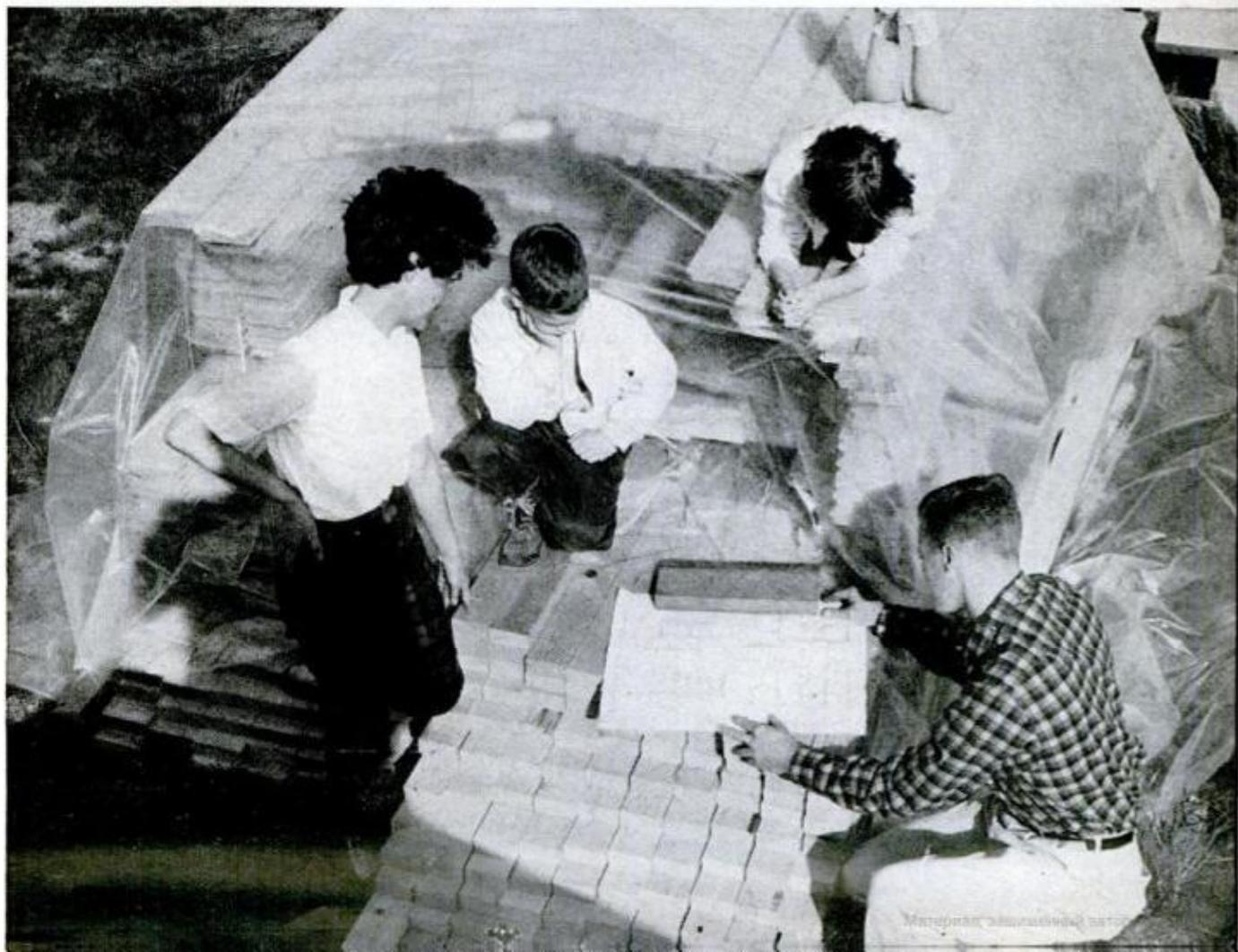
The kit includes pre-cut lumber, pre-assembled cabinets for kitchen and bath, pre-assembled window and door units, elec-

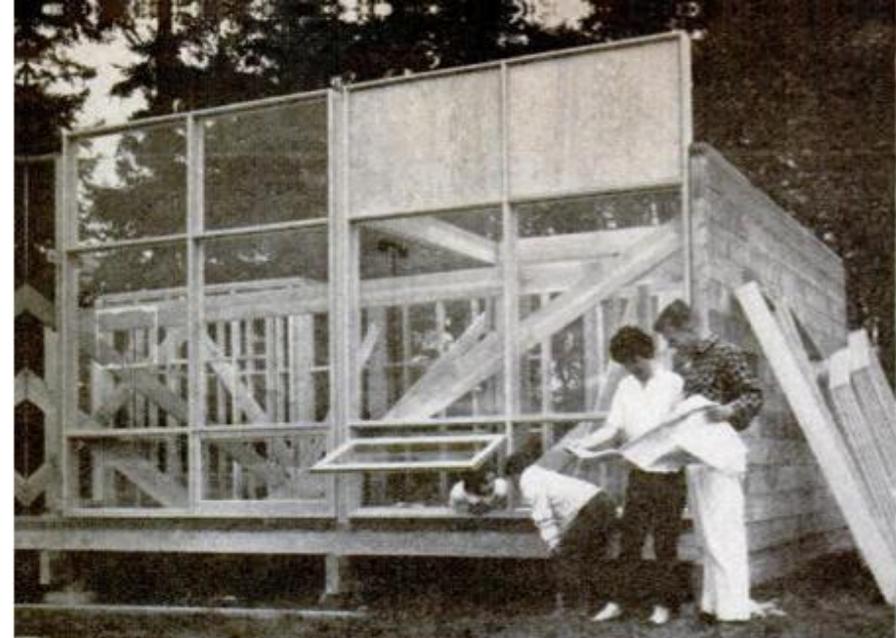
trical wiring, electrical fixtures, rough and finish plumbing, metal fireplace, hot-water heater, shower stall—even a range and a refrigerator with a freezer. The kit can be assembled by a do-it-yourselfer with or without professional help in 200 to 250 man-hours.

Compared to the cost of buying a plan and ordering your own materials locally, the kit's cost is slightly higher. But with all the materials on hand, cut to the right size and with much of the work already done, the saving in time pays for the difference.

Called the "White Fir," the cabin is an almost-two-story structure with an upstairs sleeping and storage loft around a

FIRST JOB in building the cabin is unpacking and checking materials delivered in their plastic wraps

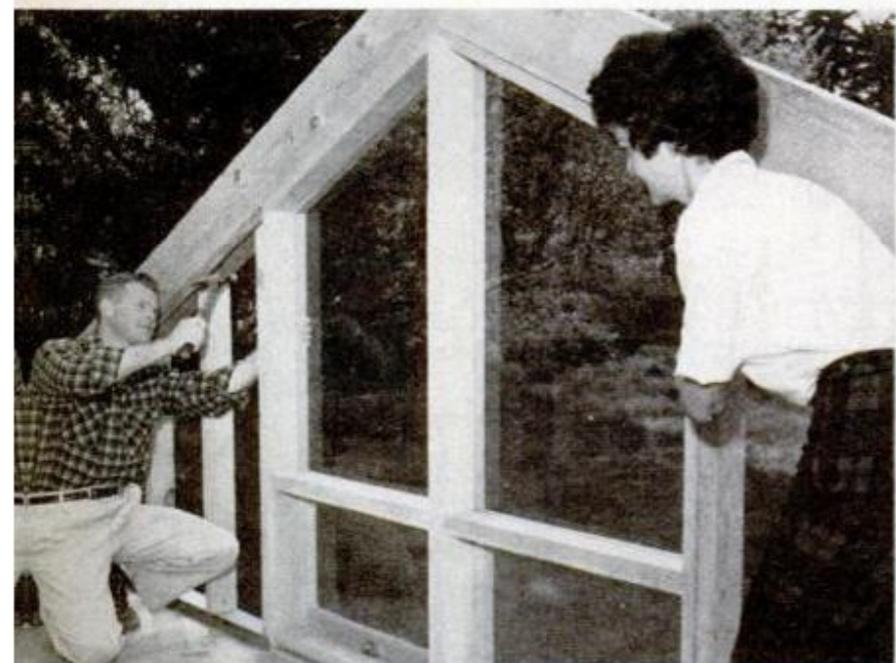




PREASSEMBLED WINDOW UNITS for living room are nailed in place to make window-walls after 2 by 6 framing is in place



FLOOR BEAMS of fir 4 by 10s bridge concrete piers; 2 by 6 joists cross on 16-inch centers



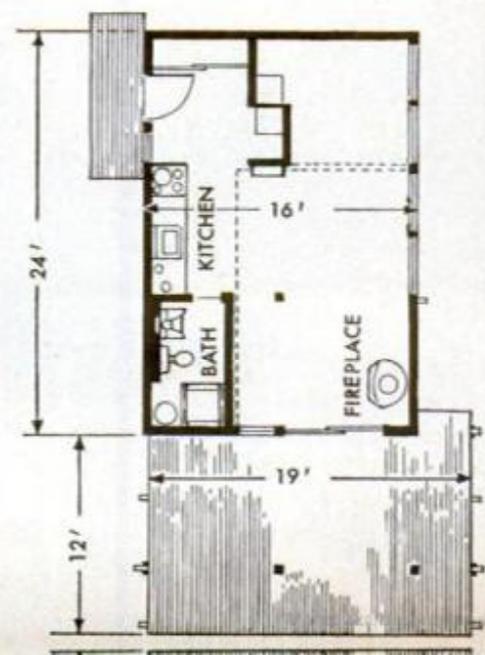
WINDOW UNIT at rear of loft area is also preassembled and needs only to be nailed in place between roof and loft floor



ROOF is formed of 2 by 6 decking, layer of building paper, then natural cedar shingles

INTERIOR VIEW of finished cabin, looking from the "master bedroom" toward the living room, kitchen, bath and front deck

BASIC PLAN view: Dotted line shows overhang of upstairs storage and sleeping loft





VIEW TOWARD REAR from the living room. Main bedroom fits under sleeping loft, reached by ladder, center

roof-high living room. It has almost 600 square feet of living space, plus a 240-square-foot roofed front deck. The kit sells for \$4195, FOB Portland, Ore. Other kits are available in a 10-cabin series. They run from a 376-square-foot model at \$2995 to a 700-square-foot model at \$4795. Piece-meal materials for the same kits would cost from \$2700 to \$3800.

And the kits offer another advantage—portability. Their component parts can be trucked to any site—even carried to a remote location (piece by piece, if necessary), up a mountainside or by boat to your private island.

Designed to be built over 15 concrete spot-footings, the White Fir cabin can be built on stilts as easily as on level ground.

Built out over a lake shore, the big front deck could do double duty as a dock and boat shelter.

Finishing is left to the option of the builder. The exterior can be sealed and left natural, stained, or painted; the interior paneling can be finished in any way, but the designer recommends a pigmented stain to give color but let the wood grain show through.

Copies of the Western Pine Ass'n booklet, "Ideas for Vacationland Homes," which shows and describes all 10 cabins, are available at lumber dealers, or through Dept. MC 12, Western Pine Ass'n, Yeon Building, Portland 4, Ore. For more information, write Product Information Div., 526 American Bank Bldg., Portland 5.



Road's-Eye View of Tires

To demonstrate how tire treads wear in violent maneuvers, a tire manufacturer has built a road that has one 36-foot-long section paved with glass.

As cars roll over the glass bridge, they are put through all kinds of violent actions, from sharp turns to screeching stops. Below the $\frac{3}{4}$ -inch tempered glass, cameras and sound equipment record the stresses and sounds.

The B. F. Goodrich Co. uses the films to show why most wear occurs on the outside ribs of the tread.

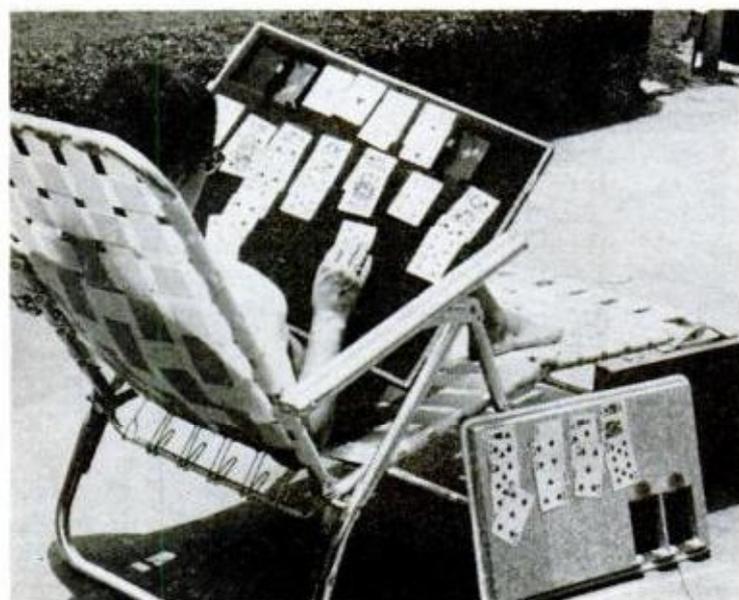


Cleaner for Golf Balls

Clamped on the handle of a golfer's cart, a new portable golf-ball cleaner allows scrubbing as often as necessary.

A synthetic-sponge liner in the aluminum cup cleans the ball with water and detergent in a few turns of the handle. The detergent comes in a plastic squeeze bottle that can also be carried along by the golfer.

Ball-Bath sells for \$4.95 and is available from Andia Progress Co., Inc., 47 Soundview Ave., White Plains, N.Y.



Magnetic Cards Stay Put

In the wind or where there's no flat, smooth surface to play on, card playing becomes difficult.

A new card set solves that problem with plastic cards containing a magnetic material and a playing surface backed with permanent ceramic magnets. The cards will stick in any blow or at any tilt of the board.

The sets vary from a plastic folder at \$7.98 to a slim attache case with felt playing surface for \$57.50. They are made by Magnetic Cards of California, Inc., 2314 Santa Monica Blvd., Santa Monica, Calif.



By Jim Whipple



Aluminum bumpers face a stormy reception Rotating combustion engine nears production

The battle of the bumpers is shaping up in Detroit. The aluminum industry has a candidate soon to debut on the ends of some U.S. cars. Aluminum bumpers have some obvious advantages and perhaps some unknown drawbacks.

The "pro" factors are reduction of weight and cost saving due to elimination of chrome plating necessary on steel bumpers. Aluminum needs only polishing to achieve the glitter of chrome.

Some of the questions yet to be determined by daily use are: How will the aluminum bumper stand up to dents and gouges? How will it take the winter-long attack of road salts? Can it be worked back into shape after a minor collision?

Aluminum's competitors, the steel suppliers, have already started to exercise the power of negative thinking by showing (in trade magazines) test photos of battered and corroded aluminum bumpers. Of course, they did the testing themselves!

Here we go—it will be that "weighted arrow" routine (remember the antirear-engine propaganda that preceded the Corvair?) all over again.

Another tempest may brew up over the two-ply tire, destined to become original equipment on some compact cars in the coming year. However, this will happen only if some manufacturer who is sticking with four-ply tires tries scare tactics.

Such an ill-advised move would eventually backfire however, as the two-plys do the job for which they are designed as well as, if not better than, the four-plys.

Some of the most specific rumors heard in a long time concern the rotating combustion engine invented by Dr. Felix Wankel (PM, Apr. 1960, p. 96). This revolutionary power plant, about to be put into production by NSU Werke of Germany and our own Curtiss-Wright Corporation, consists of a three-lobed rotor in a cylindrical combustion chamber.

This rotor revolves on an eccentric, draws in fuel and exhausts as side ports are uncovered and receives three power impulses per revolution.

A two-rotor water-cooled version will be introduced as a V-drive marine engine in

the U.S. sometime during 1962. This 70-horsepower unit will be followed by a three-rotor engine of 105 b.h.p. and a four-rotor unit developing 140 b.h.p.

Volkswagen is said to be experimenting with a Wankel engine as a possible power plant. If VW engineers should OK the switch from piston power to rotating combustion they could stick with their traditional air cooling, as the rotating combustion engine can be cooled by either air or water.

The engine offers more than just simplicity and smoothness. A Curtiss-Wright source claims a weight of 2.4 lb. per horsepower for the complete engine—that's only 168 lb. for the two-rotor, 70-horsepower model. To top off the picture is the report that a U.S. automaker is working on a prototype rotating combustion engine.

Seat belts go international as two European automakers, British Motors Corp. and Volkswagen, are now building seat-belt mountings into the Austin-Healey Sprite, Austin 850, Morris Mini-Minor and upcoming Volkswagen 1500.

This is a praiseworthy move, but there's a long way to go. Recent statistics show that fewer than two percent of U.S. motorists on the road at any given time are actually buckled in.

A peek at '62 styling through Detroit's "gauze curtain" reveals that the fin is just about as dead as the mackerel from which it was stolen. Rear fenders will no longer soar skyward to give jittery drivers the impression that they are being followed.

In place of the fin, which was waning fast on '61 models, we will see more of what has come to be known as "the sculptured look," i.e. lines and creases pressed into body panels to accent length and lowness and add interest to bodies whose outlines are basically rectangular.

The fin served a purpose however, but not as a "high-speed" stabilizer as some airborne copywriters claimed. Its shock value on both the public and designers back in 1957 served to get styling out of the rut into which it had fallen during the late 'forties to mid-fifties and put an end to "loaf-of-bread" auto bodies. ★ ★ ★

Ford Owners Find It an Easy Traveler—But a Thirsty One

Marginal and boldface comments by Jim Whipple, PM's Auto Editor

FORD WINS CHEERS FOR . . .

Sure and easy handling
Relaxing, comfortable ride
Classic, T-bird styling

DRAWN GRIPES ON . . .

Fuel consumption
Pitted, chipping paint
Body squeaks and rattles

Fleet owners (and the industry in general) don't subscribe to inflexible, 4000-mile oil changes, they feel that the interval should match driving conditions →
(PM, June '61, p. 90)

Ford deserves plenty of credit for initiating "maintenance-free" features—will win eternal fame if they prove out over the years →

Many new owners traded lighter 1953-57 cars for their '61 Fords, and you still need more gas to haul a heavier load →

This is the exact same figure obtained on PM's test Pontiac Tempest, a manual-shift, four-cylinder job. (PM, June '61, p. 74) Ford's 16.8 m.p.g. is not bad for a big car with V-8 and automatic transmission →

ALTHOUGH NOT AN entirely new car this year, the 1961 Ford has given its owners a hatful of innovations designed to reduce maintenance problems. Such items as 30,000-mile sealed-in chassis lubrication, self-adjusting brakes, "no-wax" finish, rustproofed rocker panels and 4000-mile oil change interval have made a real impression on owners as a genuine move in the interests of lowering costs of ownership.

But, since few owners had run their new Fords more than 10,000 miles at the date of reporting, (one cab driver reported 15,500), they've had little opportunity to evaluate these "longer life" features. Our owners' judgment of their cars therefore, had to be made on such "here and now" attributes as performance, comfort, workmanship or economy.

Although a solid 61.5 percent of owners reporting gave their Fords an Excellent rating, 34.5 percent rated the car Average. And a disgruntled 4.0 percent rated their Fords as Poor.

Greatest cause of owner disappointment by far was poor fuel economy as 27.9 percent of all owners reporting complained about it.

In an attempt to emulate the choice of the average '61 Ford buyer, PM chose as its test car a middle-of-the-line Fairlane 500 four-door sedan with the smallest available (292 cubic inches) V-8 engine, the lowest priced automatic transmission (two-speed Fordomatic) plus a radio and heater. Steering and brakes were nonassisted.

The car performed smoothly and quietly and was completely free from flaws at 3000 miles. For a relatively hefty car its fuel economy was creditable. The following are constant speed mileages:

24.55 m.p.g. at 30 miles per hour
23.4 m.p.g. at 40 miles per hour
22.0 m.p.g. at 50 miles per hour
19.4 m.p.g. at 60 miles per hour
17.06 m.p.g. at 70 miles per hour

Over-all mileage, including idling, stop-and-go runs in city traffic, hard acceleration and open country driving, was 16.8 m.p.g.

Now to find how this new Ford shapes up in the eyes of the owners themselves. Here in the order of frequency of mention, are the first six best-liked features of the '61 Ford.

"This Ford is easy riding, easy handling, and has good cornering."—Kentucky mortician.

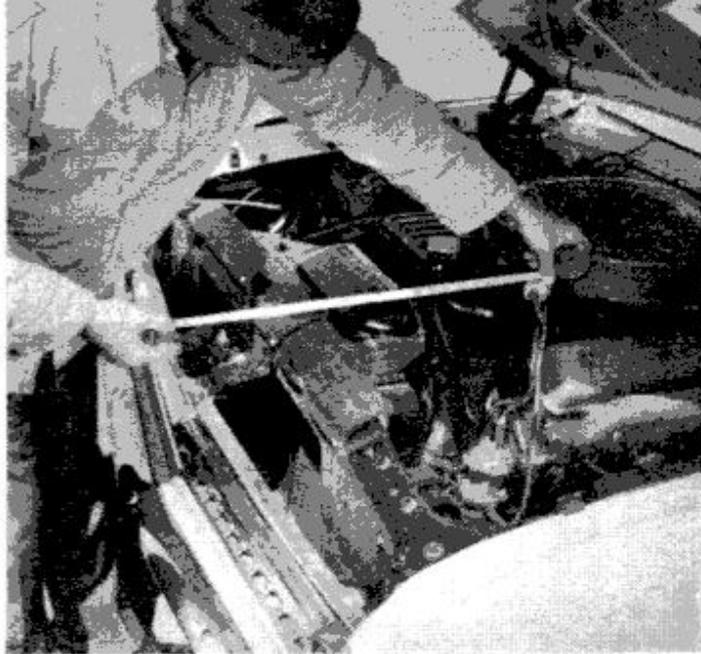
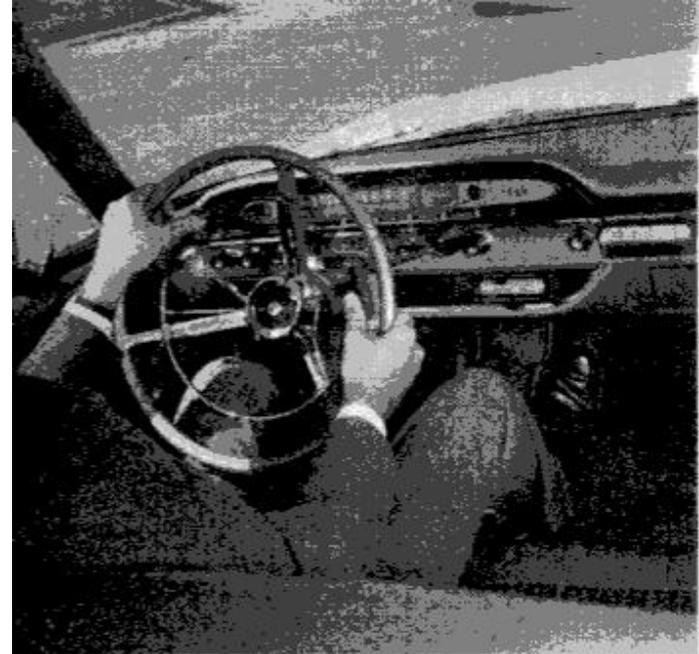


**BASED ON 1,636,461
OWNER-DRIVEN MILES**



SIMPLE, CLEAN-LINED styling of '61 Ford, with its de-emphasized fins, received nearly universal cheers
PM'S TEST CAR proved stable and controllable even in severe slide, below. Owners, too, praise handling





SOME OWNERS feel that there's too much glass area in Ford, left, others complained of glare from panel top. If a few of these 24 inches between engine and bumper came off, Ford would be that much easier to park

Agreed. We found test Fairlane 500 as comfortable as an old pair of sneakers to hack around in →

He should have driven this engine in lighter 1956-57 Fords—it ran like a streak, gave up to 21 m.p.g. →

Fore and aft legroom is one of '61 Ford's really strong points, you'll never rub the fuzz off your tweed-suit's knees in its back seat →

Some of the world's greatest "economy runs" take place on the salesroom floor. Best to multiply all claims by 7/10 →

"Handles and operates as easy as a kiddy car."—Maryland plumber.

"Steers easily, and is extremely stable in high winds."—Utah engineer.

"It travels easily at all speeds and is comfortable to drive."—Wisconsin realtor.

"My 1961 Ford Fairlane 500 takes road bumps without unnecessary vibrations."—Ohio accountant.

"This Galaxie has good-looking, clean-cut lines—I call it my "poor man's Thunderbird."—Tennessee store owner.

"I like the clean, stylish, classic look of the 1961 Ford models."—Michigan engineer.

"I especially like the performance this car has."—Alabama machinist.

"This Ford has surprising pep for a six cylinder car."—N. Carolina chemist.

"We have plenty of legroom and find the back seat is not too crowded."—Texas student.

"I like the amount of room in it. I stand six feet tall and need a lot of room."—Indiana supervisor.

"My ranch wagon has lots of room for children and for camping-trip gear."—California serviceman.

"From the driver's seat I can see all four fenders without too much stretching. This is a big help in parking."—New Jersey linotypist.

"The lower hood gives a better view of the road."—Alabama paper maker.

But, not all Ford owners have found the going this smooth. Here are the first of the gripes, number one through six in the order of mention.

"I'm getting low gas mileage on my Ford Six—only 17 miles per gallon over-all. My 1959 Ford always averaged 20 miles per gallon or better."—Iowa salesman.

"My gas mileage is 15 to 17 miles per gallon on long trips—far below what the salesman led me to expect."—Texas manager.

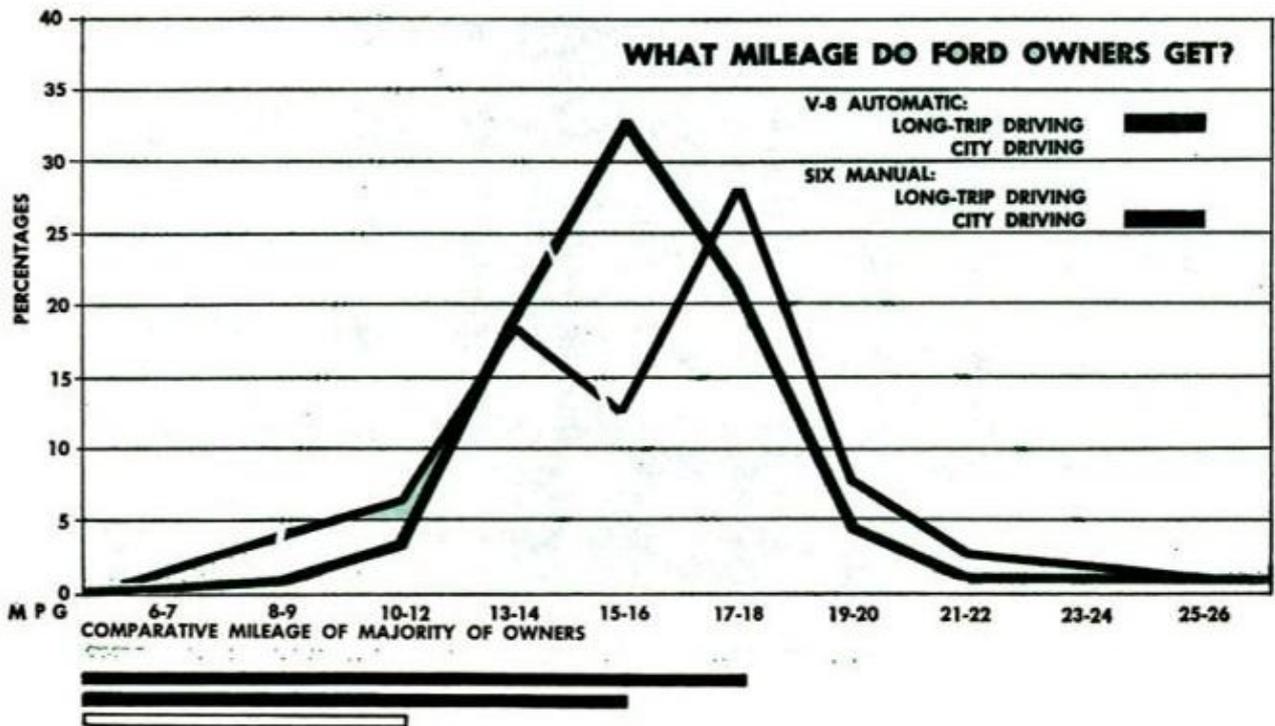
"I realize that the manufacturer cannot build a heavy car, then hang more weight on it and expect it to go very far on a gallon of gas. But the 11 to 12 miles per gallon I get on my '61 Ford is ridiculous."—Florida insurance man.

"I had a '50 Ford with 100 h.p. V-8 and overdrive which gave me 25 m.p.g. whether I drove at 20 or 90 m.p.h. I now



OWNERS SAY that trunk, left, is too shallow to hold their luggage. However it has the cubic feet, would be great for hauling Ping-Pong balls. Rear seat, right, has loads of room, but wide sill makes entry a problem

FUEL CONSUMPTION GRAPH, below, shows that manual transmission six-cylinder combination, light green line, gives 7 to 10 more miles per gallon than average V-8 with automatic transmission, white line



get an average of 14 m.p.g. with this '61. Where has the automobile industry gone?—Illinois dairy employee.

"I do not know anyone who is satisfied with the mileage he gets on any car."—Utah manufacturer.

"The finish chips easily and there are many small rust areas here and there."—New York physician.

"The paint is not durable—it mars too easily."—N. Carolina adjuster.

"The paint on the outside is very poor. Open pores in the paint cause rust spots."—Iowa livestock buyer.

"This '61 Ford rattles like a tin can."—Colorado manager.

"The doors and windows rattle."—Texas coach.

"Noisy connecting rods either due to loose tolerance in bearings or a weak oil pump."—Ohio carpenter.

"The workmanship on this car is below par. The plant

In two directions at once;
 ← **with big, roomy powerful cars like Ford and smaller, lighter cars like Falcon**

There were no rattles in PM's test Ford, proving for the umpteenth-hundredth
 ← **time that the biggest difference between a good car and a bad car is quality control**



FINGER POINTS to one of the plugs that must be removed every 30,000 miles to renew Ford's chassis lube; other object is the special filler hose needed

Here's the way trouble starts. Ford's "take-care-of-itself" features have confused this man into thinking that he doesn't need to change his oil filter



inspectors do not check and reject enough cars."—Indiana student.

"This car must have been thrown together. I've had nothing but trouble with it."—Kansas serviceman.

"The fact there is very little care taken in final assembly is very evident. This is typical of American auto manufacture."—New York salesman.

"There's too much sun glare through the too-big windshield."—Illinois draftsman.

"There is too much glass in the windshield and rear window."—Alabama nurse.

"They should reduce the weight by several hundred pounds. The car is too heavy for a six-cylinder engine."—New Hampshire engineer-designer.

"The small V-8 engine is inadequate for this 4000 pound station wagon."—New Mexico serviceman.

"With this 292-cu.-in. V-8 engine I find myself in a sort of "never-never land—no economy and no performance either."—Illinois hairdresser.

Now, let's take it on the bright side once more and look into the best-liked features of the '61 Ford ranking seven through twelve in their order of frequency.

"What I like most are the self-adjusting brakes and the idea of no grease job for 30,000 miles."—Kansas farmer.

"Self adjusting brakes are a good idea."—Missouri executive.

"I appreciate the elimination of such frequent preventive maintenance as lubrication, and muffler and oil filter replacement."—Ohio salesman.

"It is low in cost to operate yet has all the comforts of a big heavy car."—Texas serviceman.

"I recently drove 1045 miles to the northern end of California and with overdrive I got an over-all mileage of 19.3 miles per gallon."—California salesman.

"Appreciate the Diamond-luster paint that needs no waxing."—California lineman.

(Continued to page 212)

FORD Owners Report:

Excellent 61.5% Average 34.5% Poor 4.0%

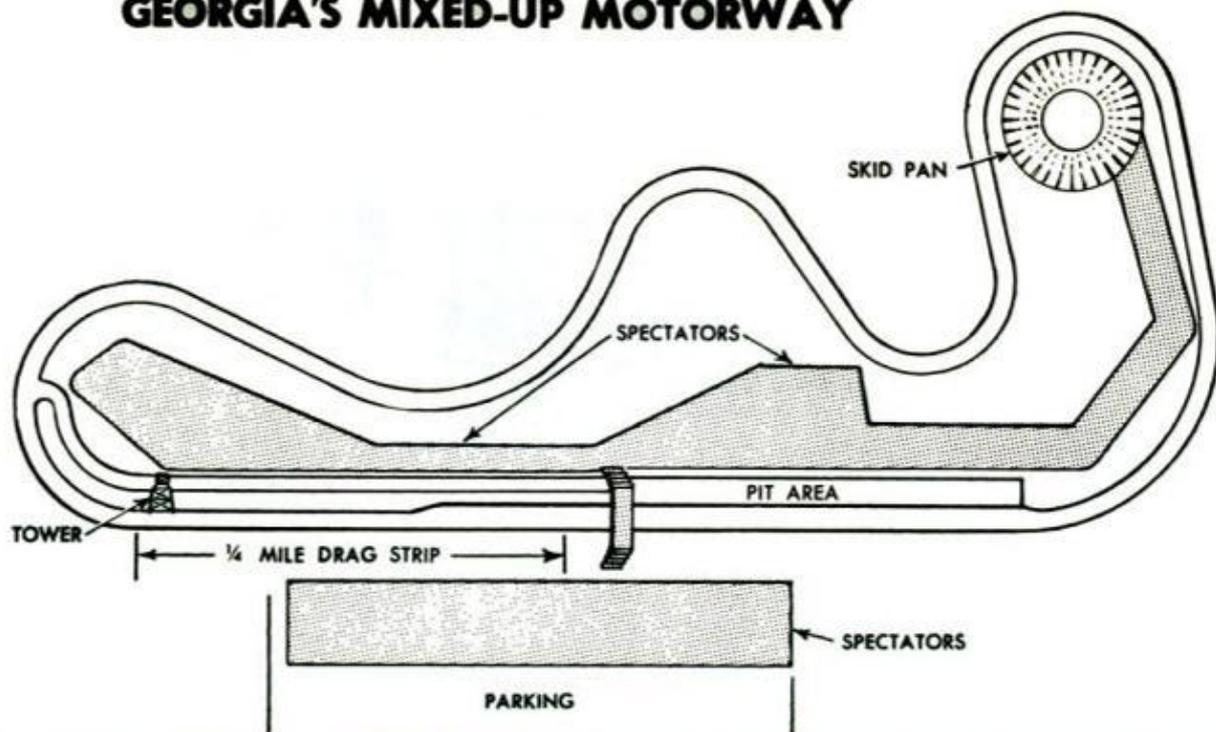


Satisfied V-8 auto. economy?	
Yes, satisfied	53.0%
No, not satisfied	47.0
Satisfied Six manual economy?	
Yes, satisfied	66.3
No, not satisfied	23.7
Best-liked features	
Handling ease	40.3
Riding comfort	33.3
Styling	32.4
Power, performance	25.7
Roominess	22.0
Visibility	20.3
Self-adjusting brakes	14.7
30,000-mile lubrication	14.4
Most-frequent complaints	
Poor gas mileage	14.1
Paint	8.2
Rattles and squeaks	7.9
Poor workmanship	6.5
Windshield too large	5.9
Had mechanical trouble?	
No, no trouble	66.5
Some trouble	29.6
Considerable trouble	3.9
What was trouble?	
Transmission	6.5
Turn signals, taillights	5.1
Carburetor	3.1

Best-liked exterior features	
Simple, clean lines	18.5%
Taillights	10.2
Rear end	9.9
Front end	6.2
Grille	4.8
Least-liked exterior features	
Tail fins	4.0
Grille	3.4
Front end	3.1
Hood	2.8
Chrome trim	2.1
Best-liked interior features	
Dashboard	22.7
Upholstery	20.3
Comfortable seats	14.7
Colors	5.4
Considered a higher priced car?	30.4
Pontiac	24.1
Buick	19.4
Mercury	18.5
Oldsmobile	14.8
Considered a compact?	34.9
Falcon	48.4
Comet	22.6
Corvair	14.5
Valiant	12.9
Tempest	8.9
Olds F-85	5.6

Ford is only car in family?	
Yes, it is	55.0%
No, it is not	45.0
Make of other car?	
Ford	16.9
Other Ford Co. make	7.6
Chevrolet	6.5
Other G.M. make	10.2
Plymouth, other Chrysler make	5.6
Other U.S. make	3.7
Import	3.7
How is dealer service?	
Excellent	51.2
Average	38.1
Poor	10.7
Would buy from him again?	
Yes, would buy	56.6
No, would not buy	13.8
No answer, don't know	29.6
Make of car traded in	
Ford, other Ford Co. make	52.1
Chevrolet, other G.M. make	19.4
Plymouth, other Chrysler make	8.1
Other U.S. make	1.7
Import	2.0
Would buy another Ford?	
Yes, would buy	83.4
No, would not buy	9.3
Undecided, don't know	7.3

GEORGIA'S MIXED-UP MOTORWAY



When the people of Savannah, Ga., decided to war against traffic accidents in 1957, the programs they offered were mixed: Some wanted to clear hot rodders off roads, some wanted a driver training range, and others wanted a safety program.

Today all three programs are integrated at the Savannah-Effingham Motorway. On

a two-mile paved circuit some 15 miles from town, there is a track for sports-car racing (spectator admissions help pay for the Motorway's operation), a quarter-mile drag strip and a driver training area. The latter includes such innovations as a skid pan—a paved, bowl-shaped structure covered with oil in which control of skids is taught.

Magnetic Letters Stay Put

Users of a new signboard are finding they can literally throw a sign together in a matter of minutes. The letters—they come in various sizes and colors, including colors that glow brilliantly in sunlight or glow in the dark—have small magnets attached to their backs, and they stick to the signboard with ease.

All of the characters are laminated with soil-proof plastic. Characters range in size from one inch to five inches; panels measure from 10 by 18 inches to 20 by 36 inches. Sign kits are available from Dick Joiner & Associates, Lemont, Ill.





JIM JR., named for a raven owned by the late Curly Twiford, a famous movie bird trainer, is an "old pro" in the business. Ravens are crafty, resourceful, wiser than owls, and make good pets—or watchmen

He Trains Hollywood Stars

Bird stars, that is. Moe DiSesso has been giving Hollywood the bird for years

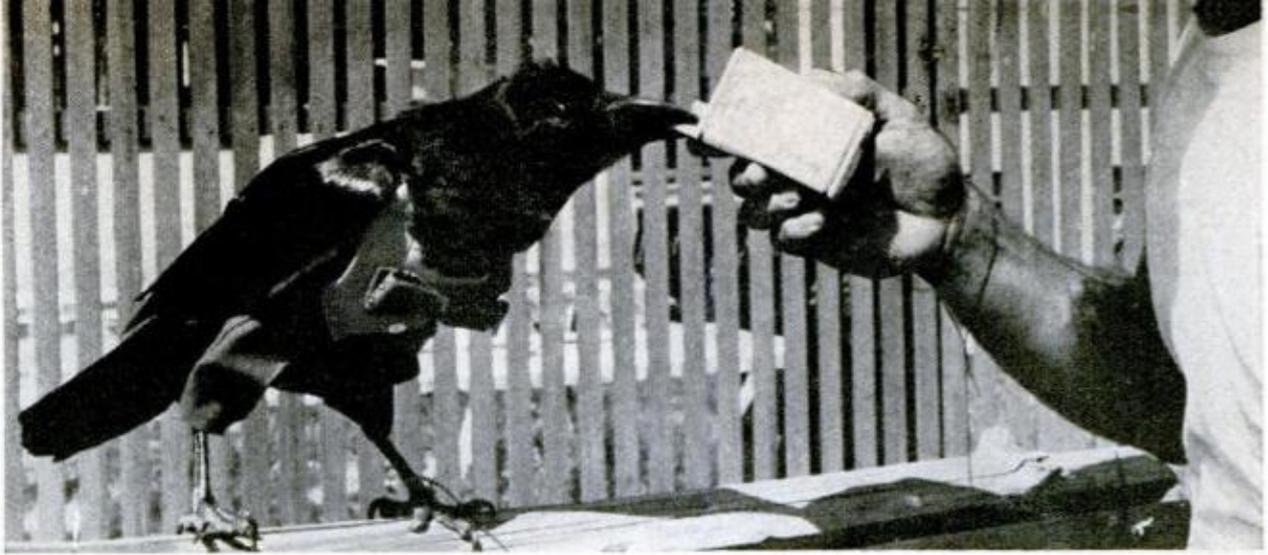
By
**Jack B.
Kemmerer**

A CHARACTER NAMED HERMAN in MGM's movie "The Gazebo" comes in the window in one scene, goes to a bookcase, and removes a bullet from a book. Simple? Sure, except that Herman is a pigeon, and pigeons just don't do things like that on cue.

The difference is that this pigeon is owned and trained by Moe DiSesso, Hollywood's most outstanding trainer of unusual birds for unusual jobs in the movies. His stable of feathered stars reads like a "Who's Who" of birdland, and he can supply anything from a pigeon to a raven to an owl or an eagle on demand. And if his stable doesn't include the right kind of bird, he'll get one and train it.

Moe started in the business 10 years ago with a life-long interest in birds and a clutch of five raven eggs. One of those eggs hatched into Jim Jr., the top bird star shown on these pages, who has 32 movie parts to his credit and three more coming up. Other birds in Moe's "stable"





SOME OF JIM'S repertoire—taking a cigarette, loading a sixgun, and croaking on cue. Jim, an accomplished actor, can do almost anything the script calls for



ANOTHER MEMBER of the "stable," a Cara-Cara, or Mexican eagle. He's faster than a hawk, braver than an ordinary eagle, and a fine actor



BARN OWL, above left, was brought to Moe more dead than alive. Now trained, he's working off his "hospital bills." Top right, Herman the pigeon, star of "The Gazebo." Bottom, a half-grown pair of field rats

include pigeons, eagles, hawks, owls, finches, parrots, doves and chickens. For good measure, he has dogs, raccoons, turtles, rabbits, squirrels and skunks, all trained and ready to perform.

Most important asset to a bird trainer, Moe says, is a genuine interest in them—they don't work well without it.

The other prerequisite is patience, both in finding the right birds and in training them. Moe estimates that, while any raven can learn the basic tricks, only one in 100 can learn movie stunts, and Jim Jr is one in 100,000. The trainer must get his birds as young as possible then spend as much time with them as he can. Moe has help there in



SON MOE JR., upper left, works with another movie veteran, a tiny finch. Raccoon, upper right, was a birthday present, now also works in pictures. Moe hatches and raises his own animals, seldom buys one

his two sons, Moe Jr. and Glen, who play with the young birds and accustom them to handling. When the birds are a month old, he begins teaching them the basic “come” and “go” commands, working with voice and hand signals and rewarding correct performance with food. After a month, they’re working without rewards and ready for other tricks.

Bird tricks are built up around a simple act like pulling on the end of a piece of string. The trick is worked into the action, and triggered by the key command “pull” written into the dialogue. To the audience, it looks like a smart bird instead of a lot of hard work. ★ ★ ★



Household Flame Thrower

While it may be a little awkward for roasting wieners, a new kerosene-burning flame gun takes on other household chores.

It can kill weeds, melt ice, sterilize soil and thaw out frozen pipes. A quart of kerosene provides an intense flame for 30 minutes. The five-pound gun is available from E. C. Geiger Co., North Wales, Pa.



Polaroid Print Coater

Attaching permanently to the Polaroid camera, a new accessory coats Polaroid prints for permanence and provides a straight edge for taking out the curl.

The top flips off, allowing an exposed print to be run through the opening. It is sold at \$4.98 by Perma-Coater Corp., 9350 Wilshire Blvd., Beverly Hills, Calif.

FURTHER INFORMATION about the articles in this issue can be obtained from addresses given in the free Where-to-Find-It list. Send stamped, self-addressed envelope to



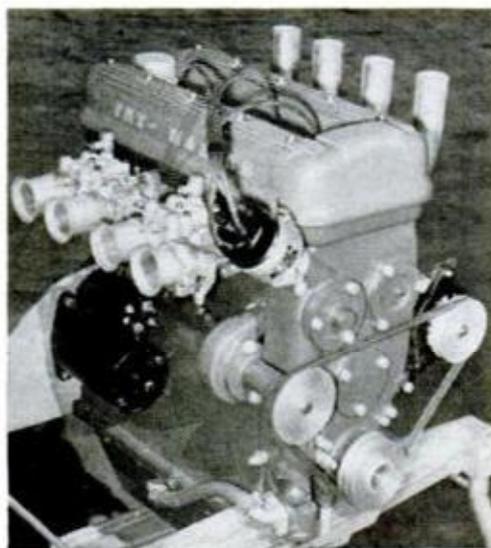
SERVICE BUREAU
200 E. Ontario, Chicago 11, Illinois

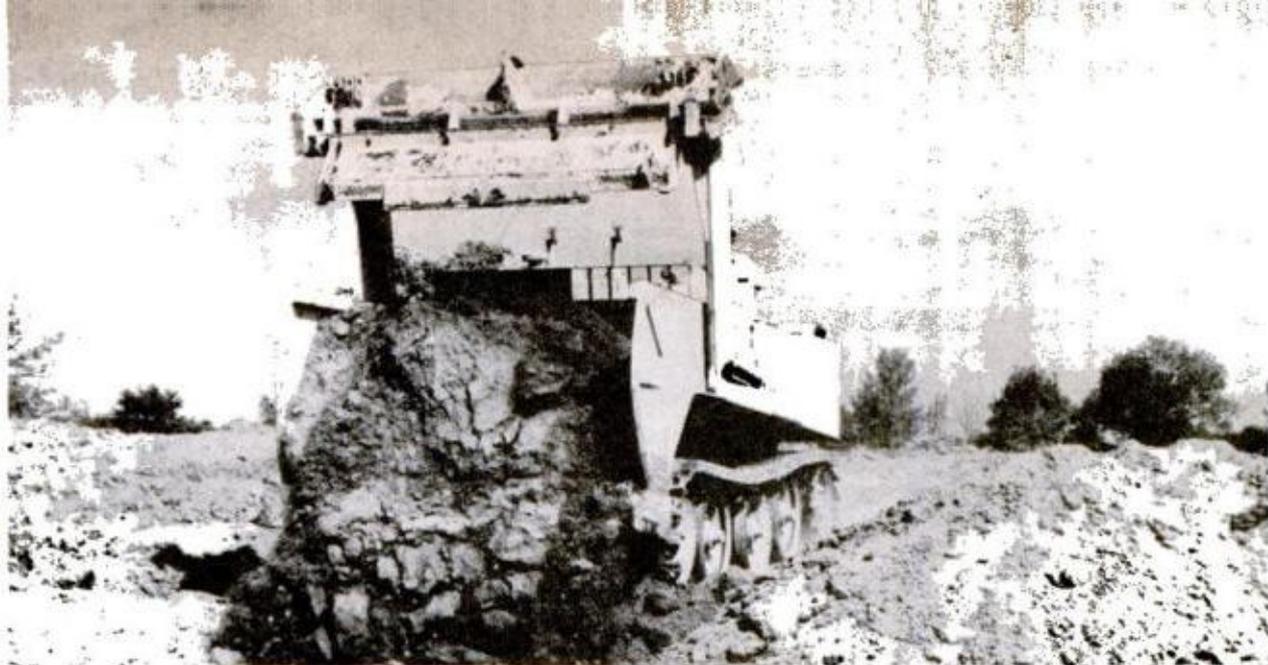
One Horsepower Per Pound

Building an engine block of stainless steel sheet has enabled an engineering firm to manufacture an engine that produces one horsepower for each of its 175 pounds of weight.

Use of thin steel not only cuts down weight but eliminates corrosion problems in the four-cylinder water-cooled unit, according to the manufacturer, Tyce Engineering Corp., Chula Vista, Calif.

The engine dissipates heat quickly and uniformly, eliminating hot spots that may cause conventional engines to ping. It is now being tested in cars and boats.





Floating Earth-Mover

After crossing a river at four miles an hour, an experimental International Harvester tractor can climb the bank, then move onto a highway where the operator can speed it along at 30.

The tractor undergoing tests for the U. S. Army, is a multi-purpose vehicle designed to be airlifted to work areas. It is 30 to 40 percent aluminum, weighing only 20,000 pounds empty. It loads itself with earth ballast to get working weight.

The machine is also a dozer, scraper, dump truck and a personnel carrier.



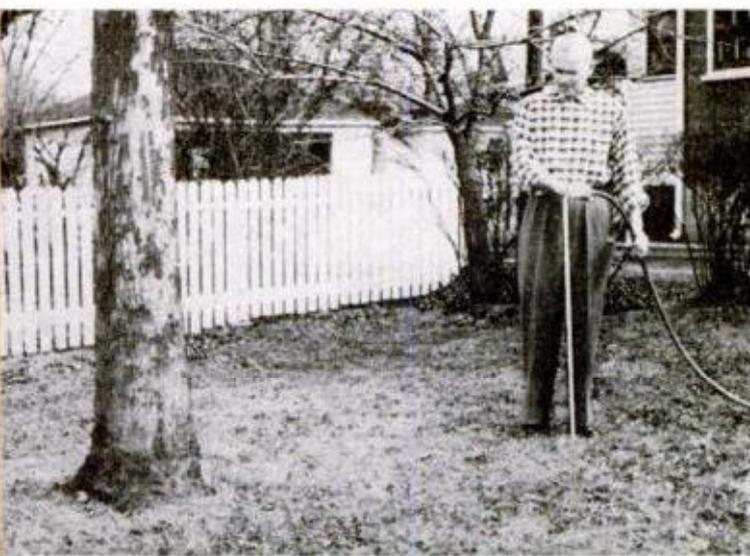
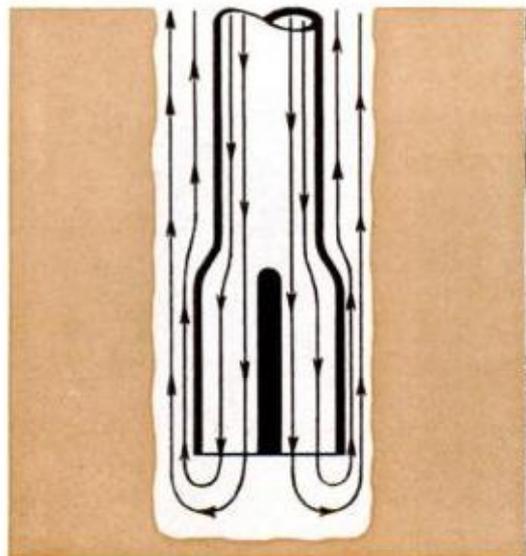
Self-Drilling Tool Digs Holes for Fertilizer

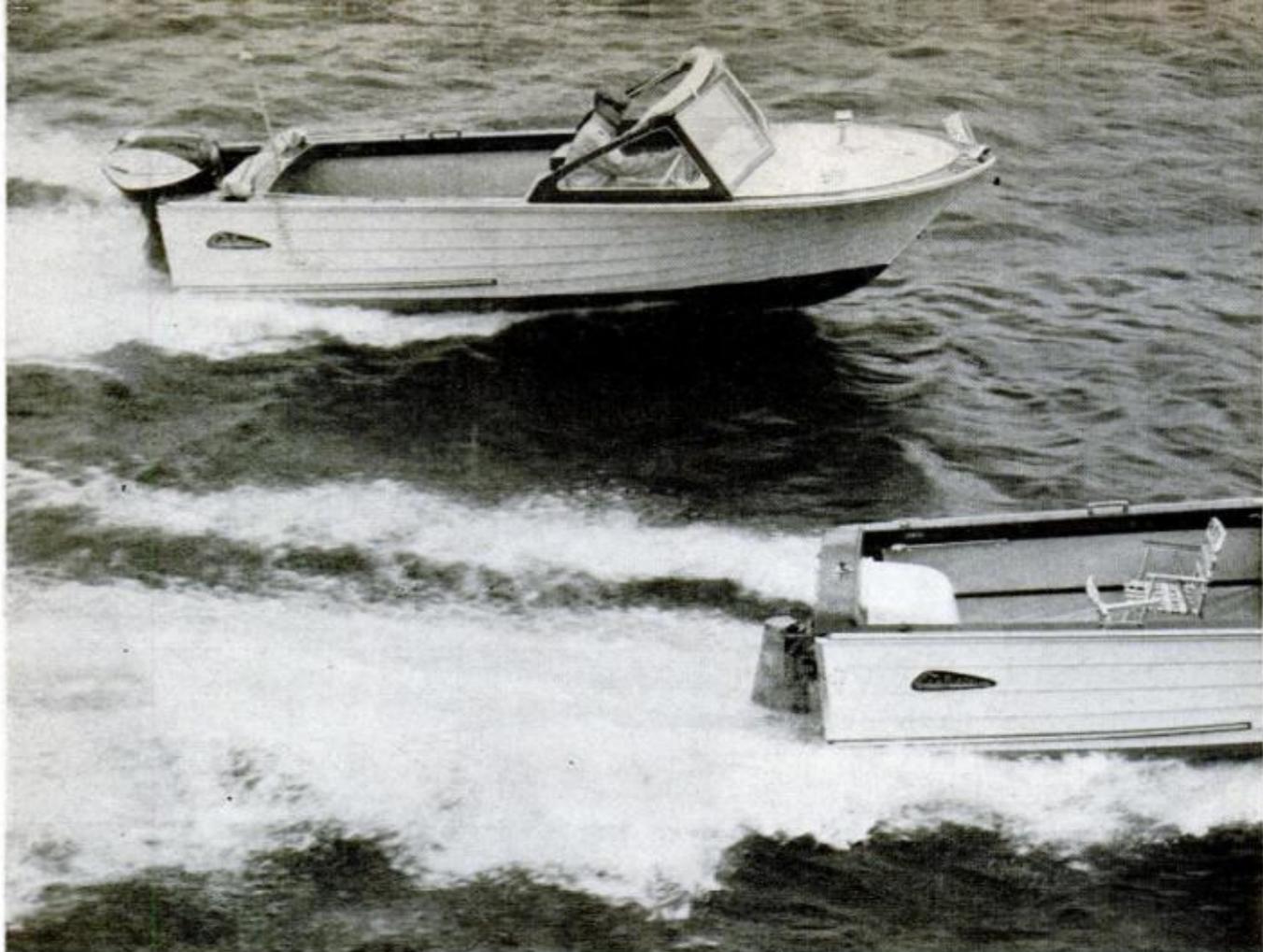
This water drill needs no hand pressure, even in hard clay soil. The water does all the work.

It has a jet drilling nozzle which, through the force of the water pressure, opens up

a one-inch-diameter hole to a depth of four feet. The hole can be filled with fertilizer which will be absorbed by roots.

It sells at \$2.95. Maker is Eynon-Dakin Co., 9900 Freeland Ave., Detroit, Mich.





IDENTICAL 18-foot test boats turned in near-identical performance with stern drive and 75-hp. outboard

PM Checks Out New Inboard-Outdrive

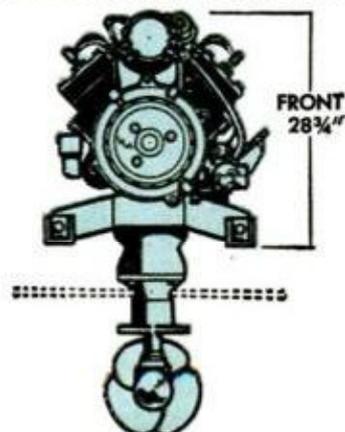
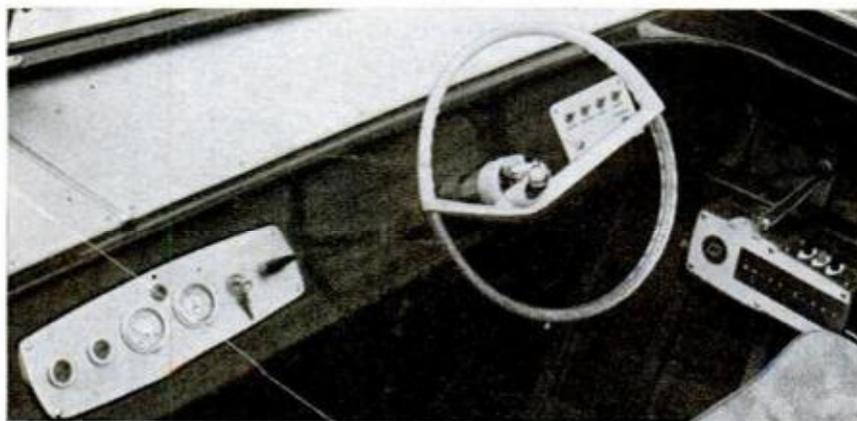
WE ARRANGED A "ROAD TEST" of the newest thing in inboard-outdrive systems to see what happens when the great thrust-per-pound efficiency of the two-cycle outboard engine is harnessed to a stern drive unit.

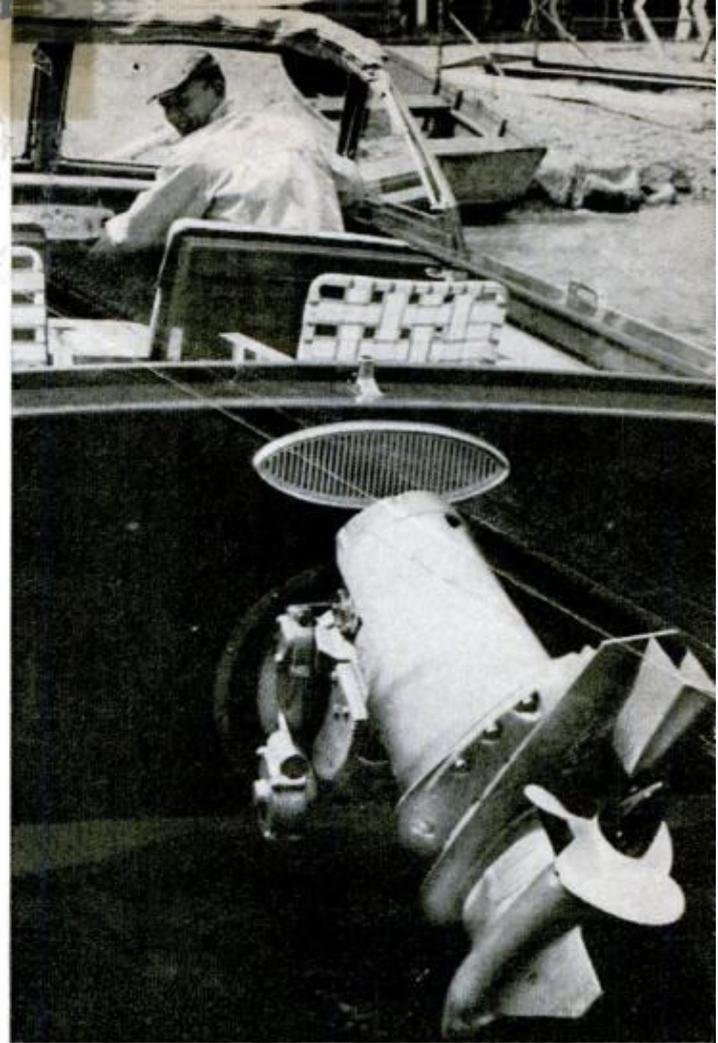
We ran the new Outboard Marine stern drive side by side with its mechanical brother, an Evinrude 75 hp., V-4 outboard, basically the same powerhead though carburetor improvements give the OMC engine five extra horsepower.

Performance of the two boats was nearly identical—both hit 36 m.p.h. under ideal conditions, though the outboard had a small edge on acceleration. The stern-drive boat handled better in turns with less tendency to cavitate because of its lower center of gravity. Sound level in the two boats was about equal.

Fuel consumption was about the same for both outfits—around eight gallons per hour at top speed and five and a half at a fast 30-m.p.h. cruise. Fuel cost, however,

COCKPIT VIEW shows two-instrument version of dash panel and single-lever, push-button remote control unit





POWER TILT raises lower unit from cockpit. Unit has no U-joints; drive is through a ball gear coupling

will be less with the stern drive, since an oil injection system saves mixing fuel and allows buying oil separately in larger quantities.

The full-height transom gives the OMC outfit a quality inboard look, plus protection from following seas. Appearance alone should sell a lot of the stern-drive boats.

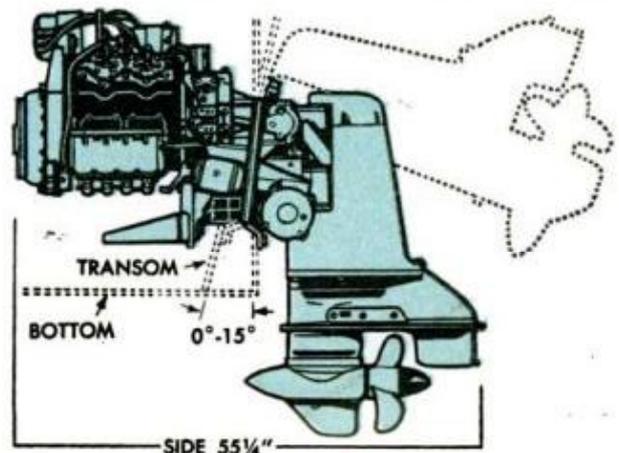
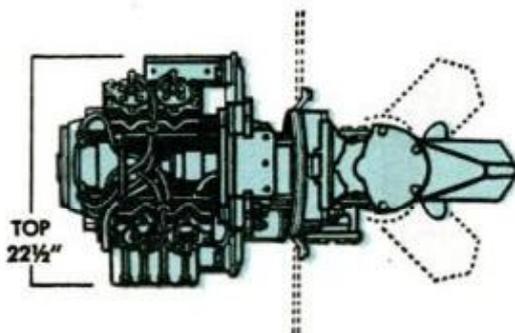
The controls are all new and all nice. The single-lever remote control unit is electric with a push-button shift, and the steering is through a cable-and-pulley system with a spiral drum feature that makes it as smooth as geared steering. A trim tab compensates for torque, and the unit

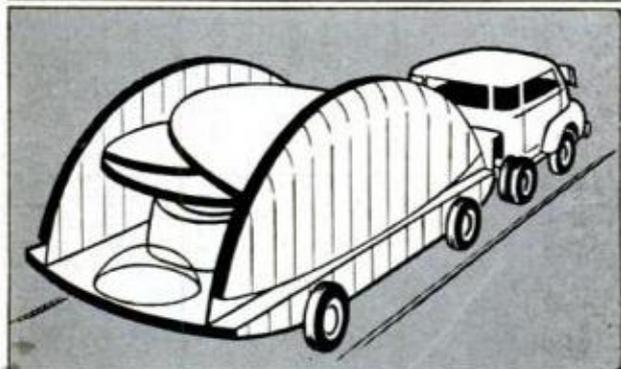
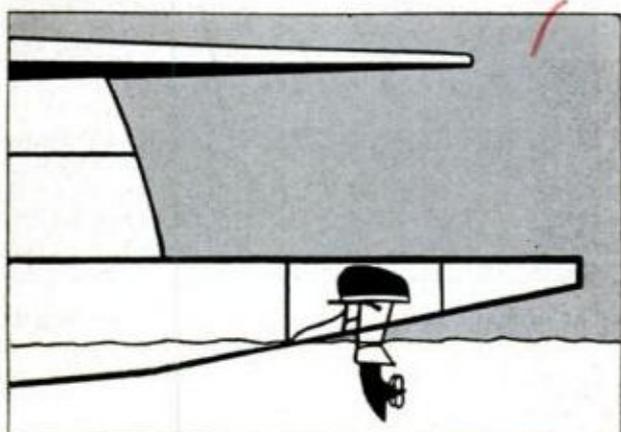
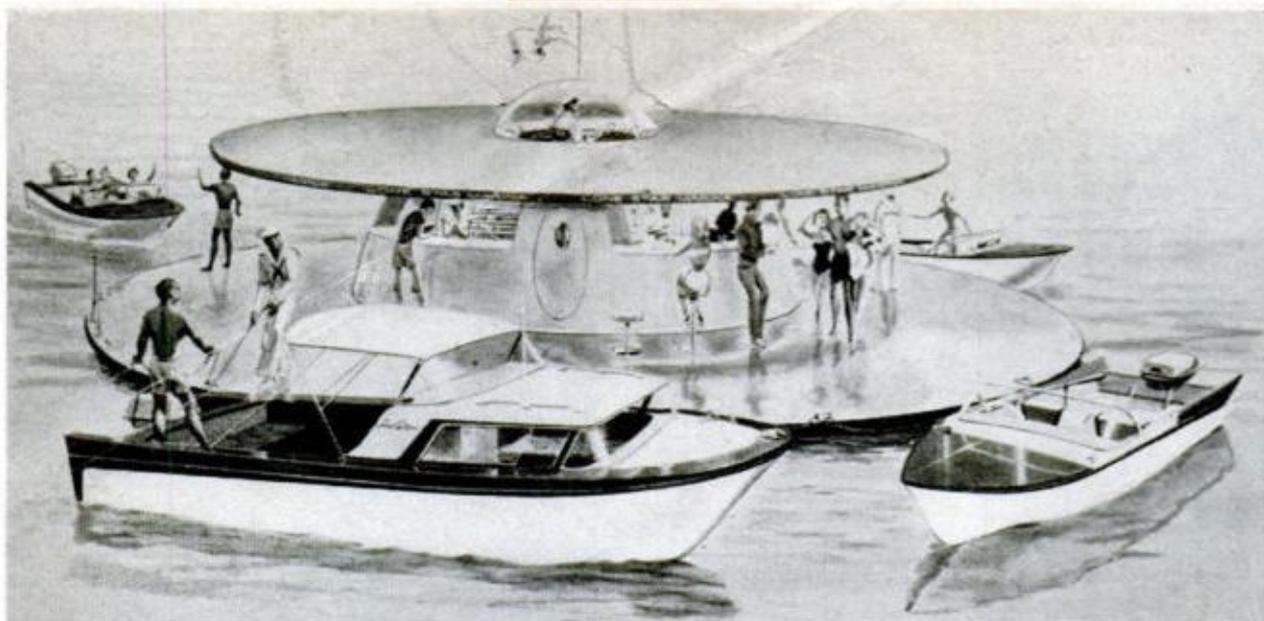
locks itself for no-hands course holding.

Available in package boats only, the stern drive's cost will vary with the boat manufacturer, but will be less than the familiar inboard-outdrives using four-cycle automotive-type engines. While the units are for sale to all boat builders, a new division of OMC will soon begin building a fiberglass boat for matched package sales.

The new rig looks good. It will have definite advantages over its competition, the big outboards, but like all good things, you'll pay for them. But if you're thinking about a new boat, it'll pay you to check out the OMC package outfits. ★ ★ ★

PLAN VIEW of the new unit. Suspension is with two mounts on transom, two on bottom hull frame members





Floating Marine Service Shop Built Into 35-Foot Saucer

Not a ditched flying saucer, but perhaps the ultimate in mobile service for boaters is a proposed floating marine service store. It would anchor near popular boating waters and supply "boat-in" customers with snacks, showers, fuel, fishing tackle, bait, boating supplies—even first aid or saucer-to-shore radiotelephone service.

Designed by a development group at Olin Mathieson Chemical Corp. for the Lone Star Boat Co. of Plano, Tex., the marina will be powered by two outboard motors mounted inside the hull and controlled from the domed cockpit above the canopy. Fuel is stored inside the hull and dispensed through hoses that pull up from recesses around the edge of the deck.

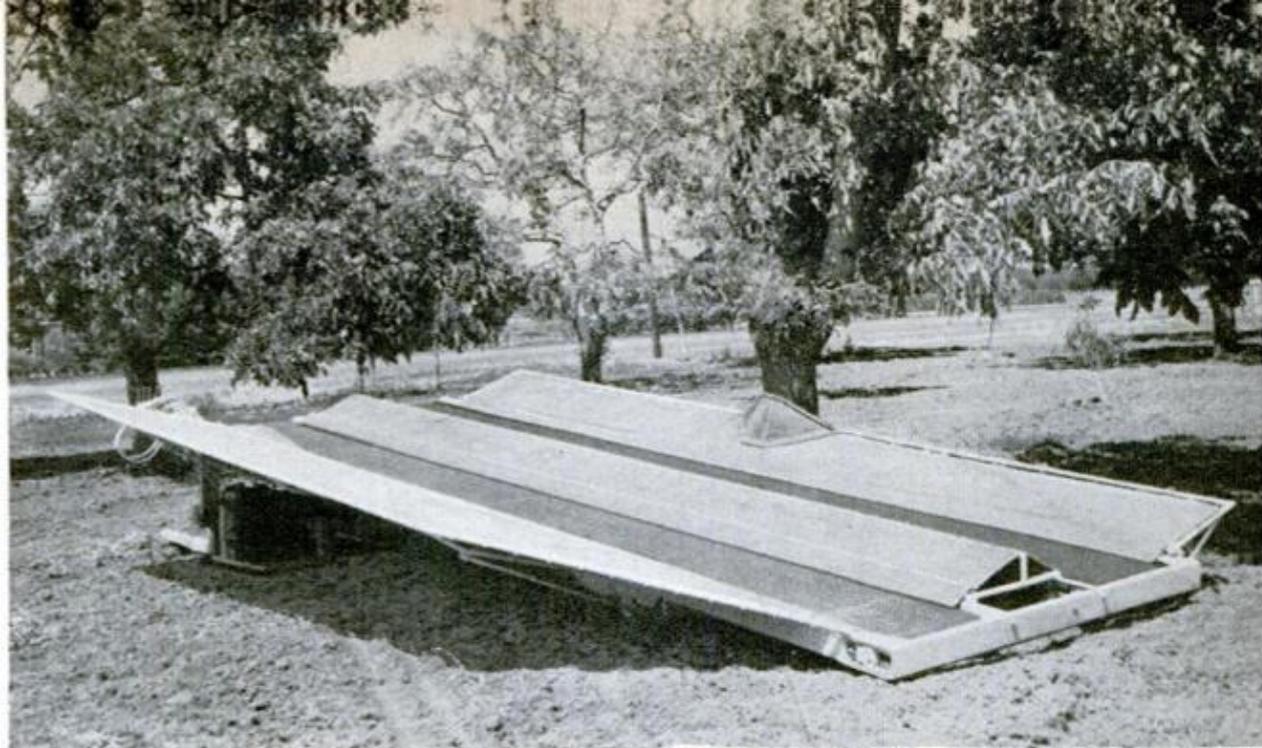
The 35-foot craft would fold up as shown for transport with the canopy hinged inward with two hull sections folding upward. The Lone Star Company, manufacturer of aluminum boats, is considering the design for possible production.



Magnet Holds Warning Flag On Body of Disabled Car

With a magnet affixed to its base, a warning flag made in Germany is easily attached to any part of the body of a disabled car. Brightly colored so that it's visible from a distance, it serves to warn oncoming traffic that the car is stalled, thus minimizing the danger of collision.

☐ According to the U. S. Weather Bureau, tests indicate that wind flow is increased up to 40 percent on the leeward side of trees which have shed leaves in the fall.



Nut Harvesting Is a Shakedown

Walnut trees are shaken by a new mechanical harvester until they shower down their crop. It is caught on canvas frames and conveyed into tubs which store up to 1500 pounds of nuts for sacking later.

The two-part harvester was developed by Russ Gould of San Jose, Calif. The first part consists of a hydraulically operated boom with a large claw at the end. The boom, mounted on a tractor, is driven to a tree and the operator wraps its two arms about a limb and shakes.

As the nuts come down, they fall on two frames, one on either side of the tree. The frames can be raised or lowered and driven directly under the low hanging limbs. Each carries the nuts along on a moving endless belt to two tubs. Each tub can store the harvest from 10 average walnut trees.

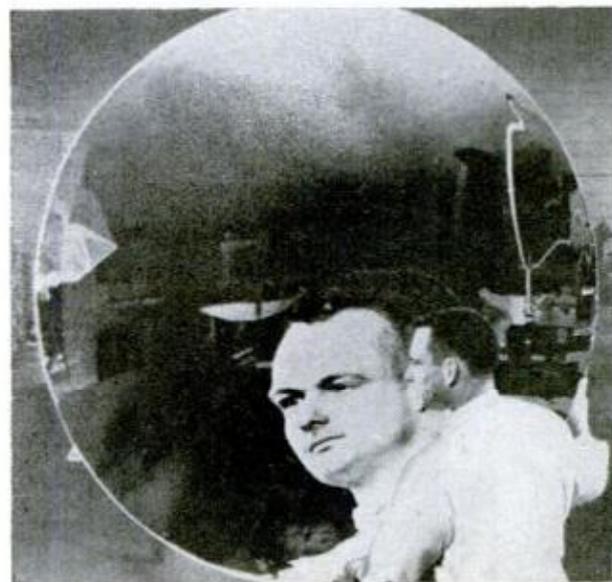


Space Talk by Mirror

Flashing over the Mojave Desert, a beam of light has transmitted messages in tests of a communications system that may be used by vehicles in space.

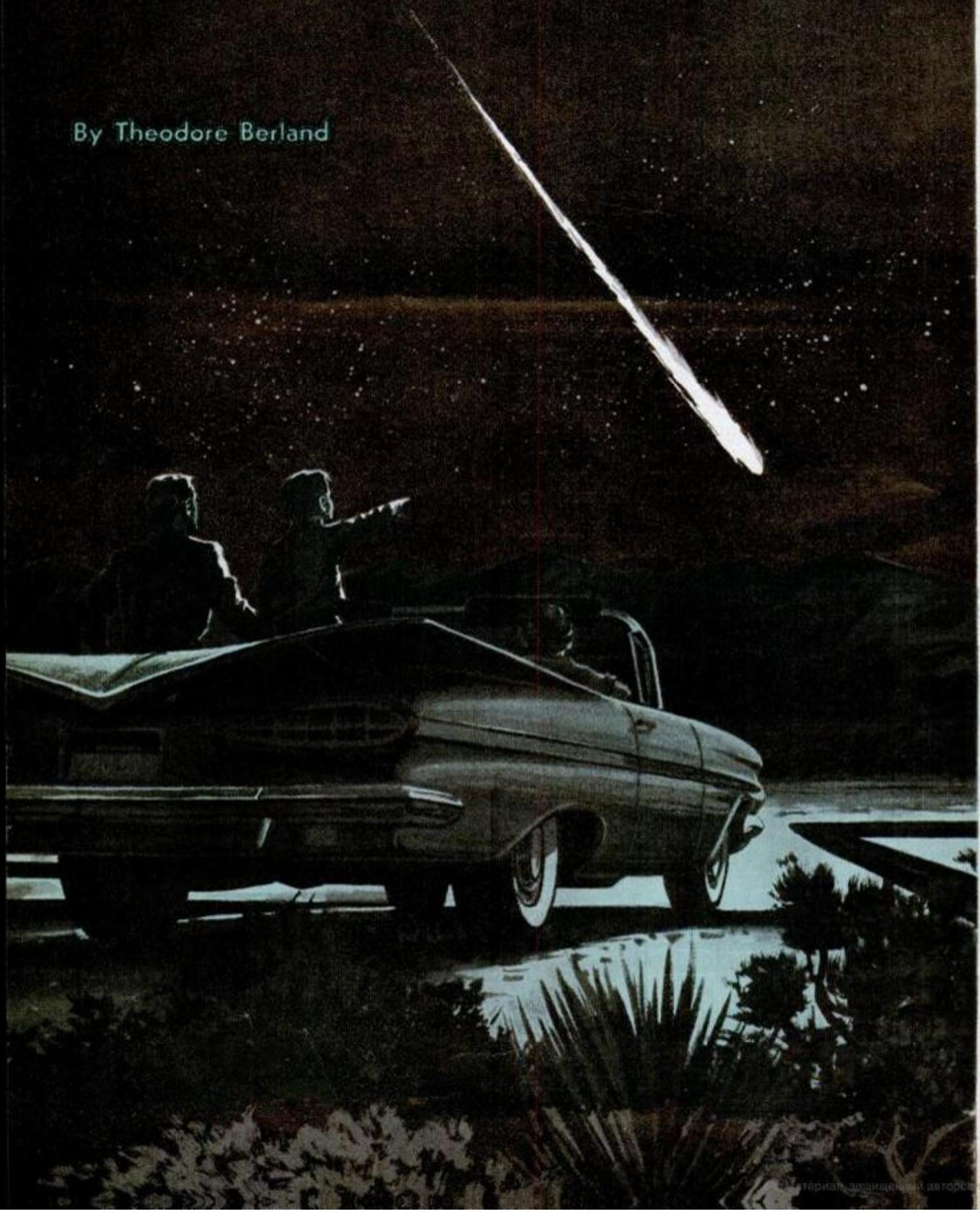
Both sun and moon were used as a light source. Messages were sent from mirror to mirror over an eight-mile range under conditions that simulated distances as great as 10 million miles.

Electro-Optical Systems, Inc., Pasadena, Calif., in developing the lightweight system for the Air Force has fabricated mirrors that weigh less than .4 pounds per square foot. Sunlight, collected with a mirror antenna, is funneled through a modulator for coding and into a second mirror system for sending. The signals, caught on the detector mirror, are then decoded.



METEORITES: Proof of Life on Other Planets?

By Theodore Berland



Some scientists say yes. Others say no. But their study is giving science exciting new discoveries

*I*N AN ultra-clean laboratory near Washington, D. C., in April of this year, a white-smocked scientist peered through a microscope at a drop of cloudy amber fluid. As he focused, he saw swarms of germs that looked like wee sausages that had been twisted, dropped to the floor, and stepped on.

This scene was part of the most dramatic science story of our time. If Dr Frederick D. Sisler's laboratory procedures were up to snuff, here was life from another world—a world that had been destroyed billions of

CONTROVERSY centers around these scientist's claim that hydrocarbons discovered in meteorite prove life exists elsewhere



COLLECTION of 684 meteorite fragments is catalogued at Arizona State University to provide raw material for further research





FOREMOST COLLECTOR of meteorites in the U.S., Dr. Harvey H. Nininger, 74, analyzes fragment in laboratory

HOW YOU CAN HELP METEORITE SCIENTISTS

1. If you should see a meteorite fall to the ground, note the time you saw it, and its direction from you.
2. If you think you have come across a meteorite, make this simple check: meteorites are usually enclosed in a dark crust, have few sharp corners or edges, and may have many thumb-marklike indentations. If you apply an emery wheel you will see shiny metal in iron meteorites. A magnet will also tell you it's made of iron.
3. If you did see a meteorite, call your nearest museum or astronomical observatory. If you own the property on which it fell, you are entitled to sell it. But don't expect a fortune.



CHARACTERISTIC PATTERN, revealed by etching a smooth cross section of an object with acid proves it is a meteorite. Pattern is caused by separation of two kinds of nickel-iron alloy that took thousands of years to form. Similar manmade alloys do not show the pattern when they are etched



PREHISTORIC AX, found at Xiquipilco, Mexico, in 1929, is made of iron from a meteorite. Meteorites were a source of high-grade iron to such men



DR. NINNINGER tracked down meteorites all over the world. He sold his collection to Arizona U. for \$250,000

years ago! For the microbes he was growing came from a piece of that world, locked in the heart of a meteorite that streaked to Earth at Murray, Ky., 11 years ago.

Meteorites were once a source of folk superstitions and for centuries remained mere scientific curiosities. Today we realize that these shooting stars are space messengers—the only matter from beyond Earth that we can hold in our hands or test in a laboratory.

Our rockets won't be able to bring back samples of the moon or pieces of the other planets for at least a decade. That's why Dr. Edward Anders of the University of Chicago calls meteorites a "poor man's space probe." Right now they hold the keys to some of the universe's most profound questions: How and when was the solar system formed? How long ago and how were the elements in the universe created? Is there life on other worlds?

As to whether he has proved the last question, Dr. Sisler is a cautious man. A microbiologist with the U. S. Geological Survey, he has spent more than 15 years studying the germs that seep into rocks on Earth. And he knows that after millions of years, these germs become inactive, are chemically altered, and change their form. That could have happened to this meteorite. But the "bugs" he grew from it are unlike anything he has ever seen before.

Dr. Sisler worked with Dr. Walter Newton, chief of the germ-free laboratory at the National Institutes of Health at Bethesda, Md., who helped make sure that no Earth germs entered the meteorite samples they tested.

They sterilized the surface of the meteorite sample with ultraviolet light and chemicals. Then they put it in a germ-free cabinet, took small amounts out of the core, and crushed them with a sterile mortar and pestle.

They suspended part of this cosmic dust in water and injected it into chickens, rats, and mice that had lived their entire lives in germ-free conditions. The rest of the dust they put into test tubes filled with a clear amber solution of salt water, proteins and sugars, and incubated it at constant warm temperatures.

After months, the scientists could find no trace of germs in the animals. If there were any microbes in the meteorite, they just wouldn't grow in fowl or rodents as Earth microbes and viruses do.

But something did grow in the test tube solution and make it cloudy. Under Dr. Sisler's microscope it looked like germs.

Researchers have looked for signs of life in meteorites before. For one thing, most meteorites contain carbon, the main element of life. For another, scientists analyzing meteorites that fell on South Africa

in 1838, at Hesse, Sweden, in 1863, and at Novo Urei, Russia, in 1886, thought they detected minute amounts of hydrocarbon.

Chemicals of hydrogen and carbon may be either the products or producers of life. Some scientists even suggest that such chemicals or germ spores carried to Earth by meteorites actually gave rise to life here.

Dr. Melvin Calvin of the University of California then began work on the Murray, Ky., meteorite as well as one that fell at Orgueil, France, in 1864. With modern chemical tools, he was able to find chemicals like some of the components of nucleic acid that pass on the heredity of all living things—but they were considered more primitive. So he concluded in 1960:

"It is clear that there are, floating around in outer space, already rather complex carbon compounds in these meteorites before they come to Earth." Can these chemicals give rise to life? His answer was "at least tentatively, in the affirmative."

This March, three chemists from the East Coast made a far stronger statement about the Orgueil meteorite. In a report to the New York Academy of Sciences, Drs. Bartholomew Nagy and Douglas J. Hennessey of Fordham University, New York City, and Dr. Warren G. Meinschein of Esso Research and Engineering Co., Linden, N. J., said:

"We believe that wherever this meteorite originated, something lived."

The trio had made a different analysis of the meteorite and found three varieties of complex hydrocarbons that on Earth are made only by living plants and animals. One is similar to sex hormones. Another is like cholesterol, a fat found in butter. A third is paraffin, similar to the kind in the waxy coating of apples and in crude oil.

The waxy paraffins are particularly important since they come only in chains of 19, 21, and 23 carbon atoms—and living things on Earth produce only paraffins with odd numbers of carbon. This is one reason they claimed that "this is the first physical evidence for the existence of forms of life beyond our planets."

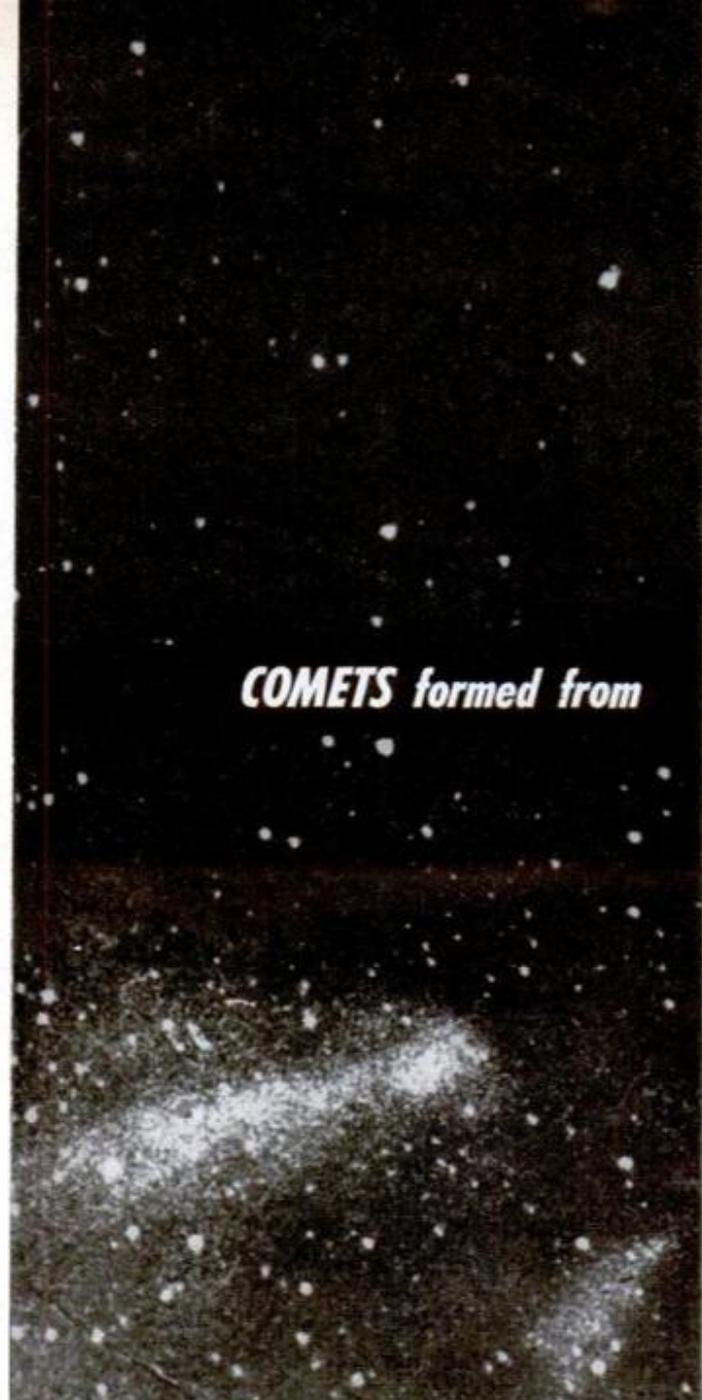
Their claim brought a storm of comments.

"This is really exciting, if it can be confirmed," said Dr. Willard F. Libby, 1960 Nobel Prize winner in chemistry.

"I don't believe it in the slightest," said Dr. Harold C. Urey, another Nobel laureate in chemistry. He objects primarily to the trio's laboratory techniques. "I'm discouraged with this subject," he explained.

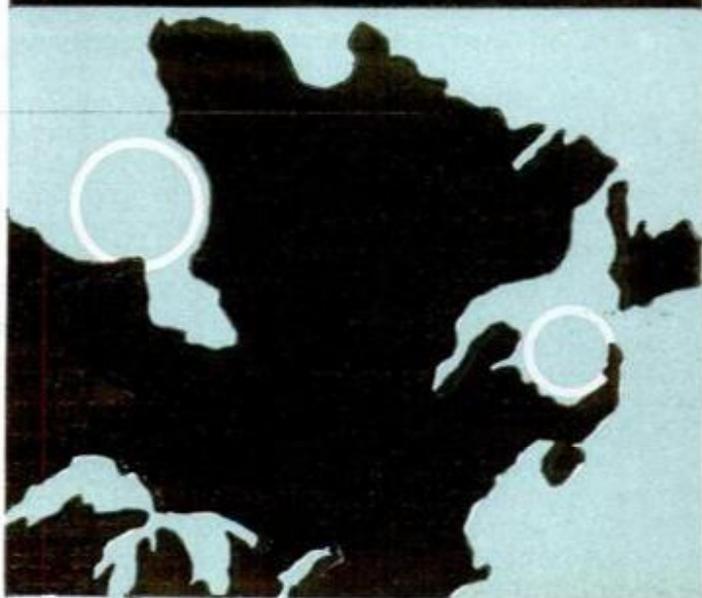
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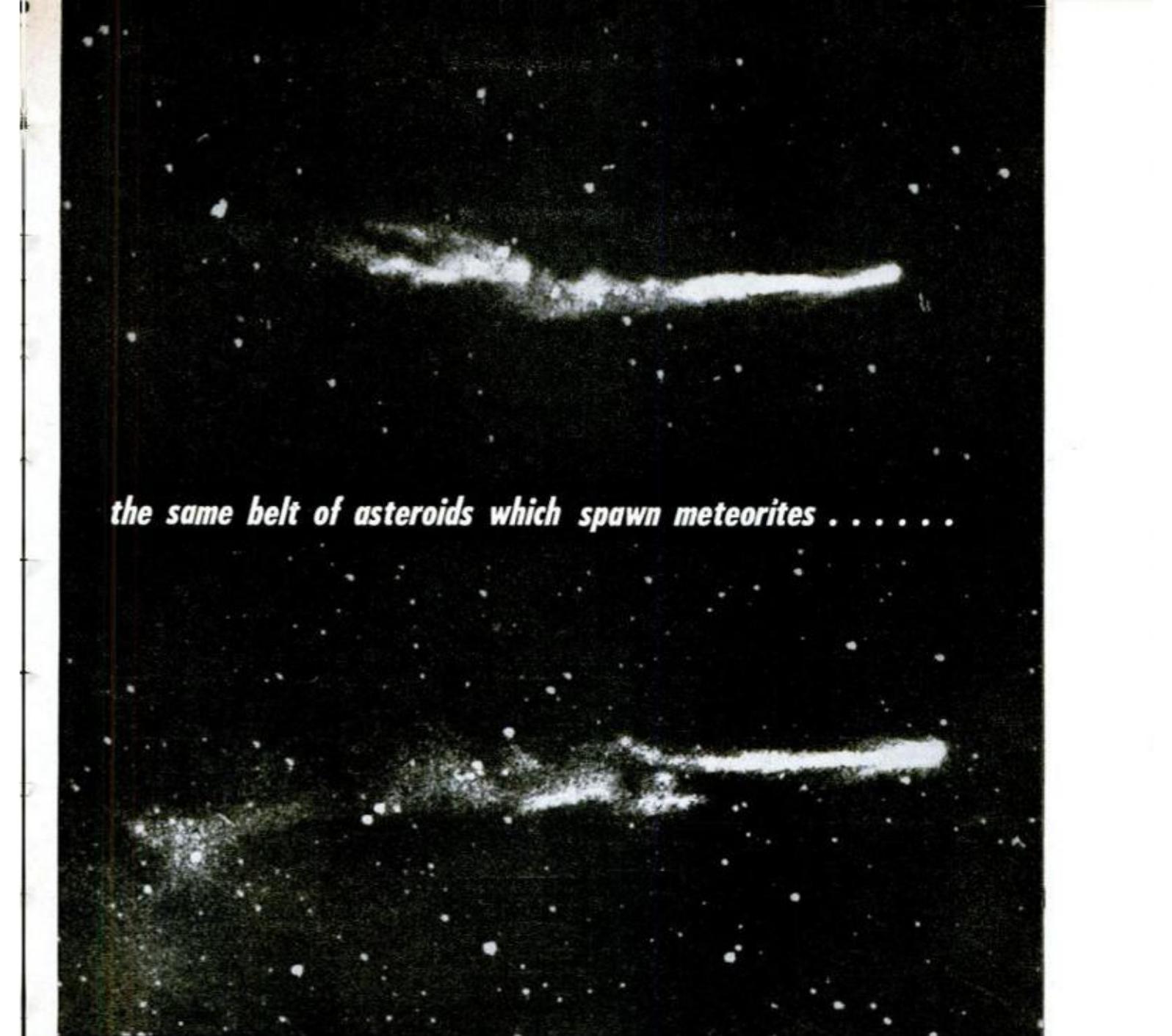
WHEN EARTH OR MOON pass through the wake of comets, they receive a meteorite shower that possibly results in earthen depressions such as those circled at right in Canada, that puts craters on the moon



COMETS formed from

provide spectacular

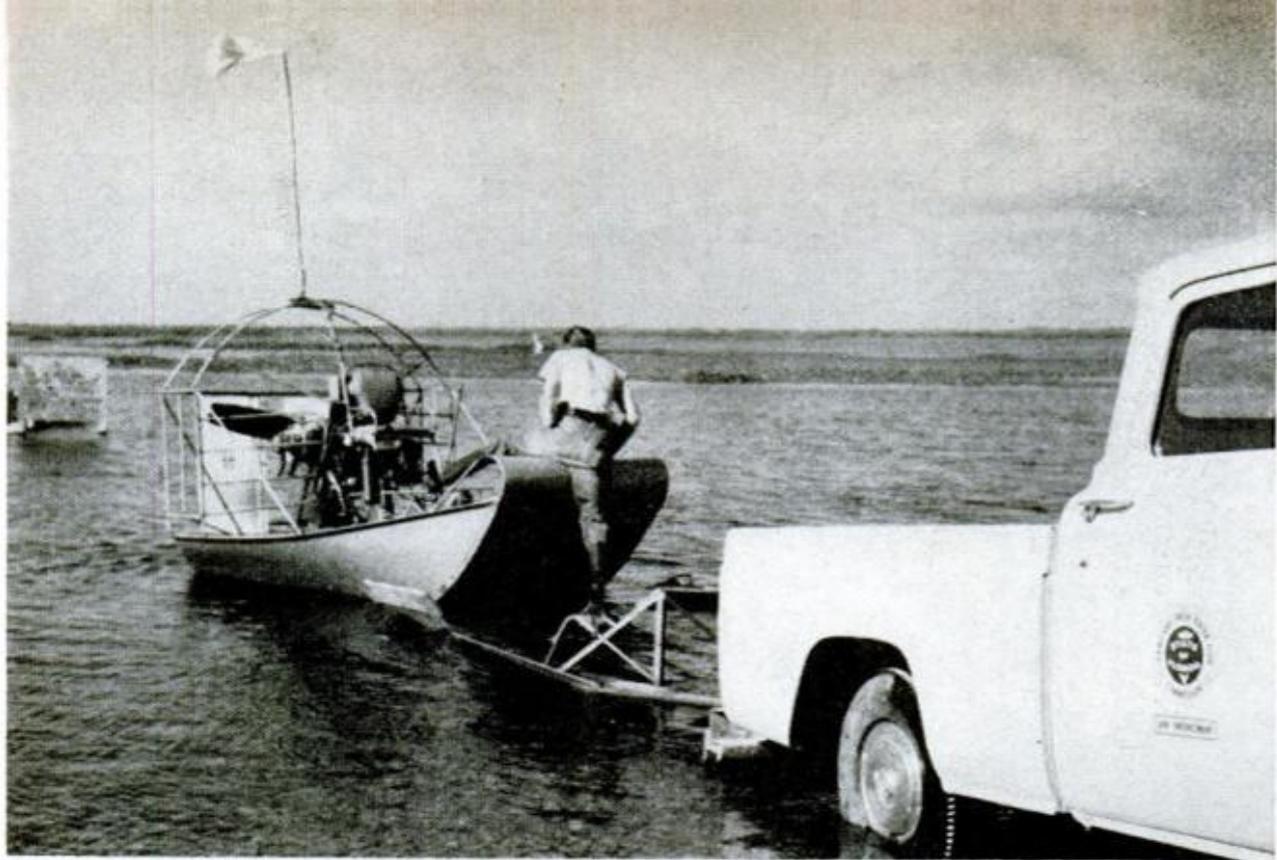




the same belt of asteroids which spawn meteorites

meteor showers for Earth, give pocks to the face of the Moon





WILDLIFE OFFICERS launch an airboat west of Fort Lauderdale at the start of an Everglades rescue mission. Boats are specially built with a high bow to permit running through—and over—tall sawgrass flats

They Rescue the Everglades Deer

PORTRAIT of a deer in trouble. Marooned, hungry and weak, he's easy prey for unscrupulous hunters



By George X. Sand

SOUTHERN FLORIDA's fine deer hunting was faced with complete disaster in the fall of 1960, when floods in the Everglades country threatened to drown and starve—or expose to unscrupulous hunters—the entire deer population of the 750,000-acre Everglades Management Area. The surviving deer had, naturally, migrated to high ground on small hummocks and tree islands. They soon ate all the feed and remained, weak and sick, where they could be easily killed or captured even by unarmed men.

Only fast, positive action by a group of dedicated conservation men saved the survivors. The Florida game commission delayed the opening of deer hunting season, and their wildlife officers went to work carrying thousands of pounds of fodder out to the high spots in airboats—the only means of transportation in the ocean of sawgrass that is the Everglades in flood.

The men dropped feed to deer on safe ground, helped others to better spots and treated injured and sick deer as well as they could. Game biologists went along to tag the deer and take blood samples, and a photographer went along to get these on-the-spot action photos . . .



SHOULDER-DEEP in water, buck stays quiet while the airboat closes in



THE HARD WAY—leaping from a moving airboat to grab a stranded deer before he can escape into the sawgrass. If he does, he'll die there

EVEN STARVED, a deer can put up a good hand-to-horn fight, and his antlers and hoofs can do a lot of damage. Tall, tough grass prevents use of lassos, but the weakened animals are quickly worn down and subdued in a wrestling match



OVERPOWERED, the deer lies quietly while officers attach a neck tag and collar so they can lead him to high ground. Once there, they take a blood sample, treat any injuries, and rub him down with dry grass before leaving him with a supply of cattle feed and a chance to live



Look What's Happening



Elaborate Tracks



INDOOR TRACKS, such as Chicago's International Amphitheater where U.S. Presidents have been nominated, hold winter racing

OUTDOOR TRACKS, such as this one near Rockford, Ill., cost as much as \$85,000 but can return investment within 90 days

IN AUGUST, 1956, Chicago's International Amphitheater and San Francisco's Cow Palace held the national conventions, Anthony Armstrong-Jones was a London photographer, Air Force General Curtis LeMay was complaining about being second to Russia in aircraft, Racers Jim Rathmann and Roger Ward were dreaming about winning the Indianapolis "500," and Art Ingels of Glendale, Calif., was tinkering with a surplus lawnmower engine, a tubular frame and four small wheels.

Today they all have something in common.

When Ingels finished tinkering, he had created what became the first kart. Rathmann and Ward have since won the "500," General LeMay is now complaining about being second to Russia in space, and Arm-

strong-Jones has married a princess—but all four are enthusiastic karters.

So are several million other people, and many of them who started out driving karts around deserted supermarket parking lots on Sunday afternoons, are now racing them in such lush settings as the Chicago Amphitheater. San Francisco's Cow Palace, the Bahama Islands and at other tracks made specially for karting that cost as much as \$85,000 to build.

A recent survey revealed more than 500 karting tracks for racing and another 1400 for "week end" drivers who just want to rent a kart (at about 50 cents for three minutes). And this is just in the United States for a sport that didn't exist five years ago.



New Karts



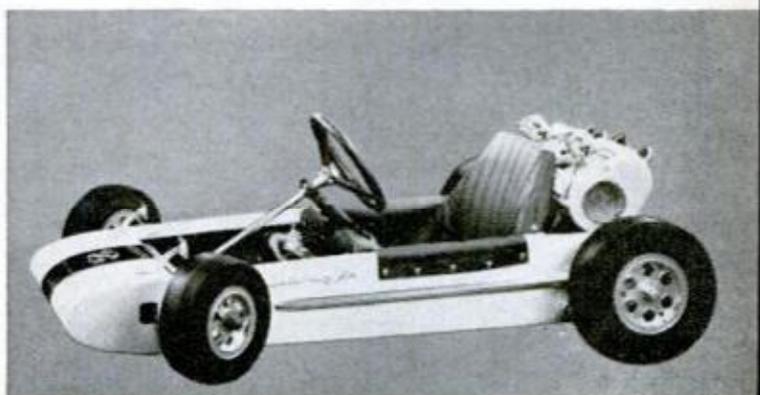
↑ **SNOW KART** replaces front wheels with short skis, puts tracks on rear wheels, becomes year-round kart

↓ **FAMILY KART** gives driver's seat to Junior, another seat to Dad for some nearby side-seat driving advice



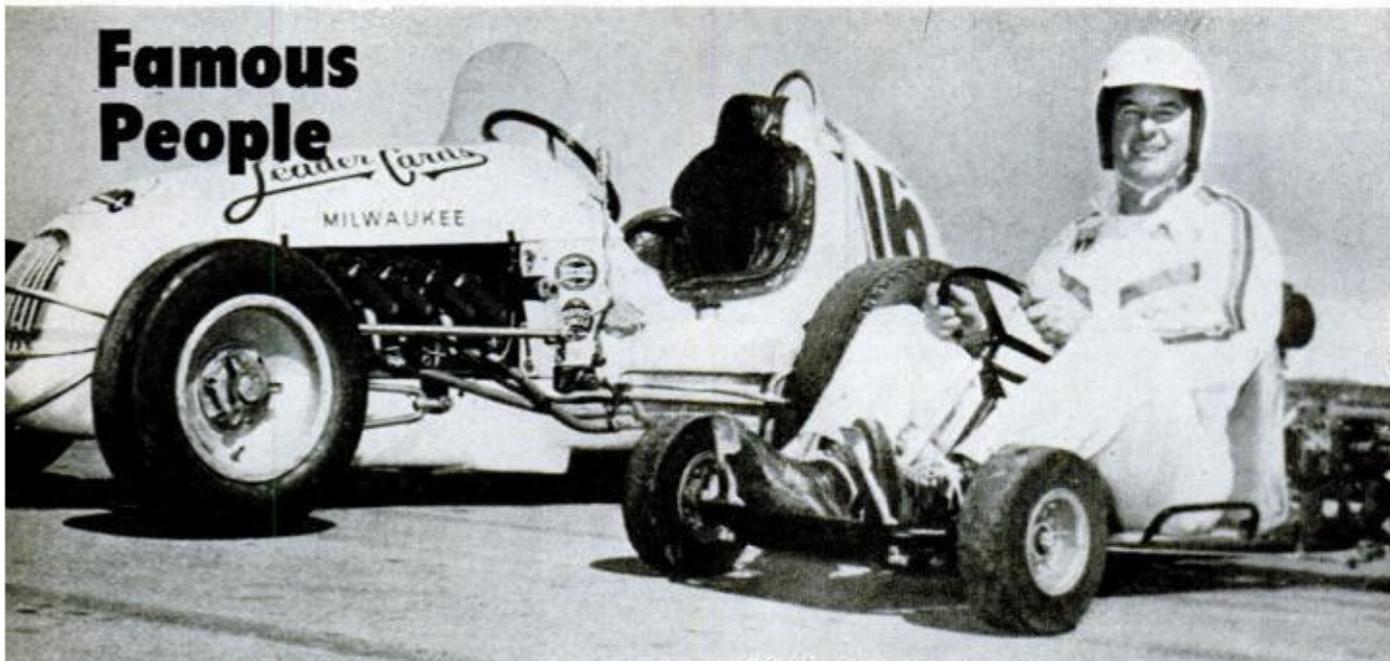
↑ **ICE KARTS** have cleated steel bands on all four wheels. Some zealous karters hold races on frozen lakes

↓ **LUXURY KARTS**, frowned on by purists, add sporty body, trim to basic configuration of wheels and frame



Karts (continued)

Famous People



ROGER WARD, 1959 '500' winner, is a kart convert. Ward and other racers are hired as kart consultants



KING HUSSEIN of Jordan, sports-car enthusiast, switched to karts after introduction by GIs overseas



Karting has also spread overseas. Nassau in the Bahamas has been the scene of international karting races. Besides Armstrong-Jones, Prince Charles and Princess Ann are reported to be among England's most enthusiastic supporters. So is Sterling Moss, famed sports-car driver. Germany and France both have karting associations—introduced chiefly by GIs. In Italy, recently, a karting race was held in the courtyard of a Roman Catholic seminary for priests. In the Middle East King Hussein of Jordan is a rabid fan.

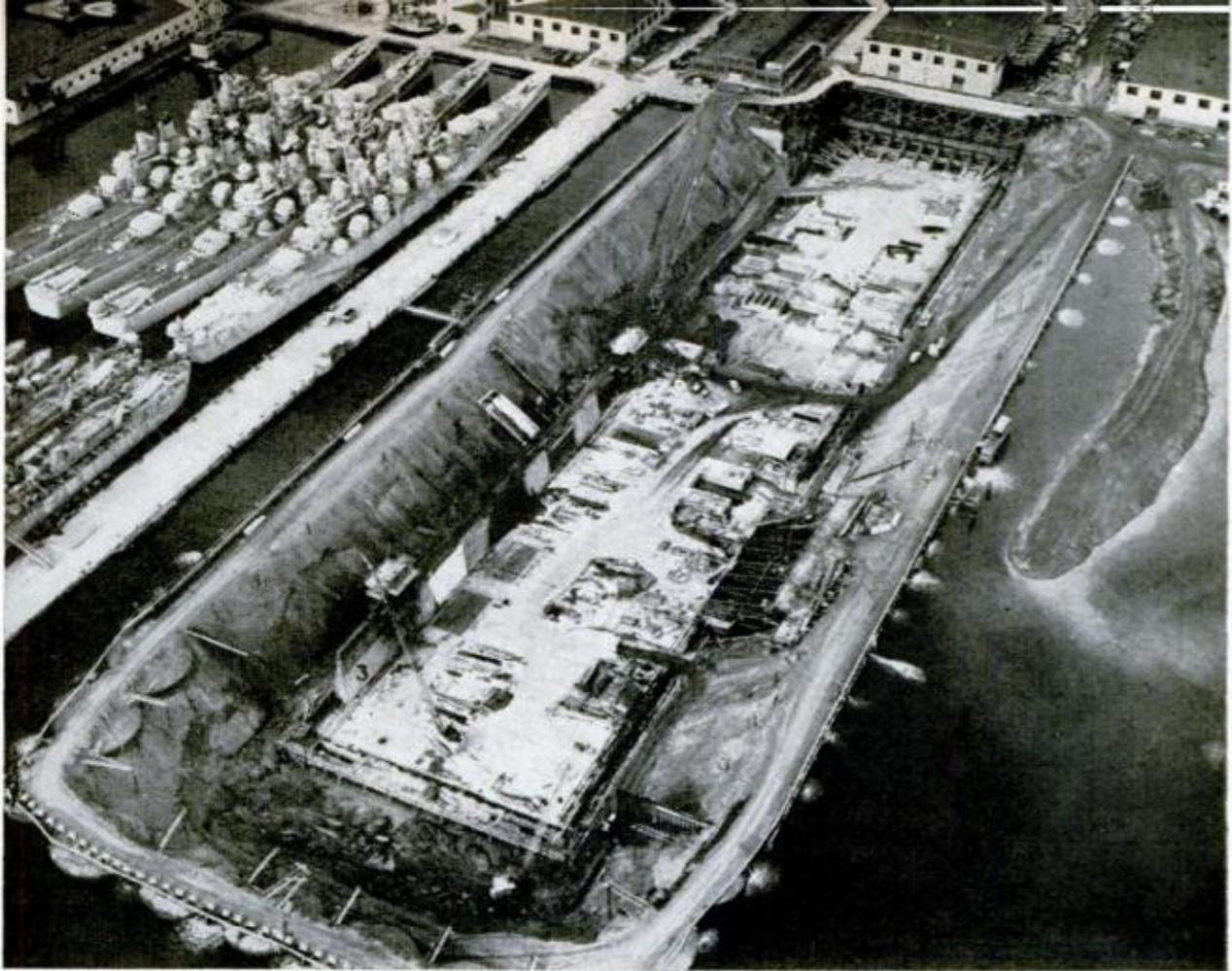
Karts have also gone beyond Ingels' simple conception of an engine, four wheels and a frame. Some do-it-yourself kits still sell for less than \$100 (the original idea was to build the most inexpensive and frill-less automotive vehicle possible) but other custom-made models cost \$500 or more.

And summertime driving is not enough. Neither is wintertime driving in such indoor arenas as the Amphitheater. Some zealous karters put tracks and cleats on their karts and race them outdoors on ice.

Where will it all end? Karting is already a multimillion-dollar business, with more than 400 manufacturers of karts alone, and more joining the list monthly.

Whatever the future, karting's fantastic past has dramatically demonstrated one point: You just can't tell where a good job of tinkering will take you. ★ ★ ★

GENERAL LEMAY, Air Force chief of staff, is among the many professional men who let off steam driving karts



Giant Dry Dock Will Accommodate Nuclear Carriers

When completed next year, the U. S. Navy's huge dry dock at the Puget Sound Naval Shipyard in Bremerton, Wash., will be the world's largest and will handle the world's largest ships, including the 86,000-

ton nuclear aircraft carrier, USS *Enterprise*.

Built for carriers, the dock is 1180 feet long, 180 feet wide and 61 feet deep. When filled to sea level, it will hold 96 million gallons of water.

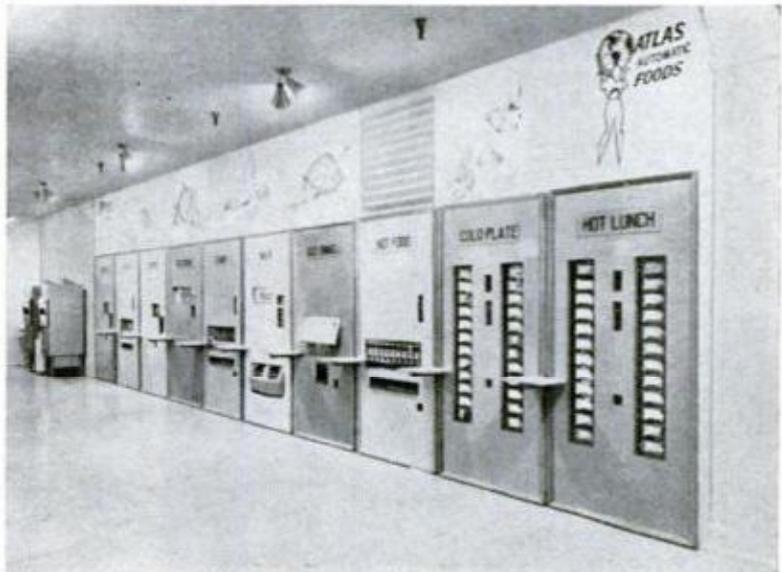
Cafeteria Customers Heat Their Own Frozen Meals

Diners at some cafeterias are, to a degree, their own chefs.

They drop a coin into a vending machine and receive a frozen (but precooked) pie, side dish or complete meal. Then they pop

the plate into a nearby microwave oven.

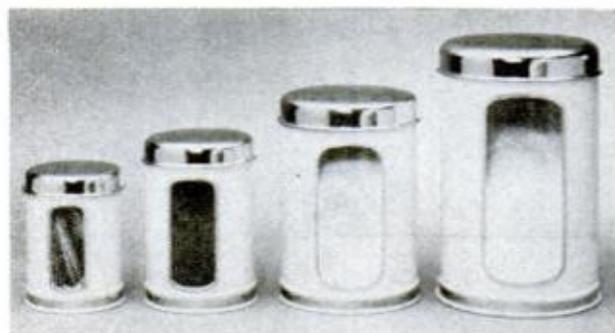
The plate bears a colored strip across its cover. The customer pushes a button of the same color on the oven to get the proper cooking time—from 5 to 65 seconds.



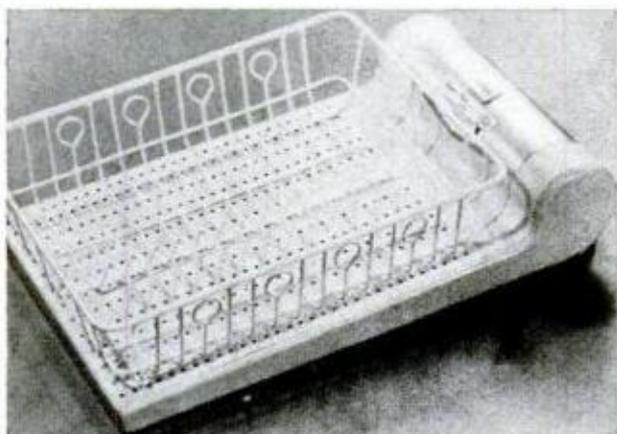


COMPACT STEAM-VAPOR BATH made for the home requires no plumbing. Fiberglass unit has aluminum fittings, plugs into 115-volt outlet. Cost is \$199.50 from Battle Creek Equipment Co., Battle Creek, Mich.

WHAT'S NEW FOR



KITCHEN CANISTERS WITH WINDOWS show level of contents at all times. Enameled steel canisters, ranging from four to eight inches high, cost \$5.95 for a set. By Pampered Kitchens, Inc., 220 Fifth Ave., New York

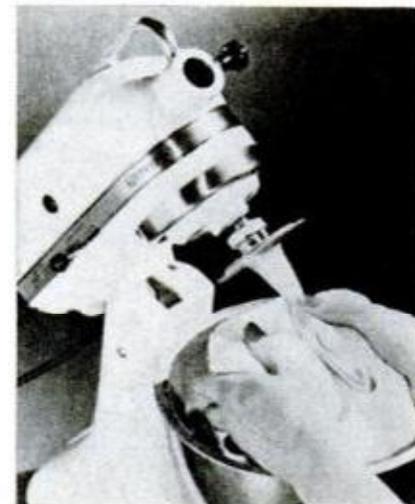
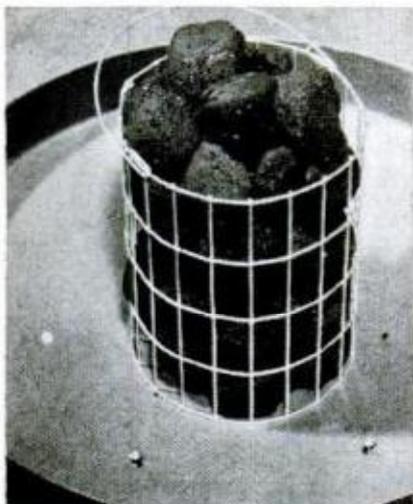


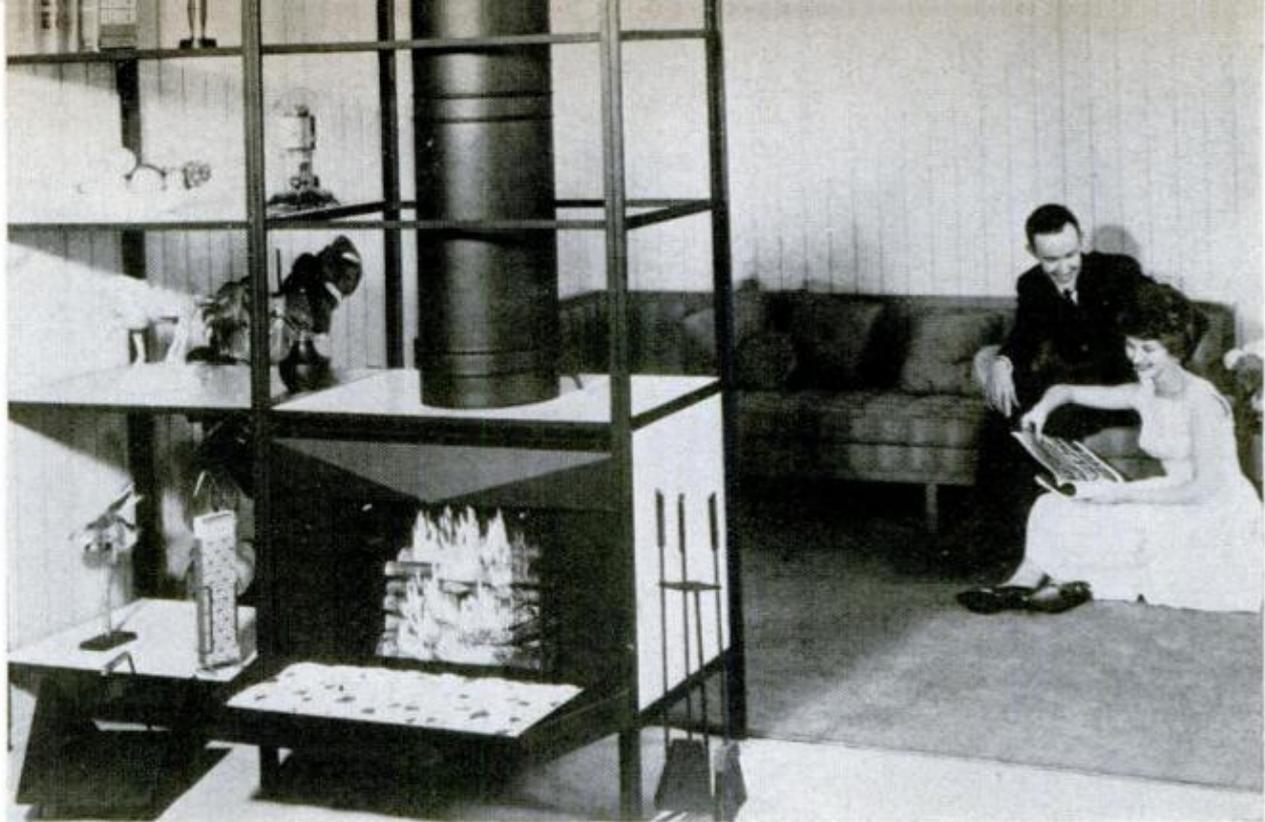
WIRE MESH BASKET holds charcoal in pile until it burns to a glow. Then lift the basket and spread coals to the desired bed. Price: \$1 from Idlewood Creations, Charlotte, N. C.

ELECTRIC DRAIN RACK dries dishes and sanitizes them as you proceed with washing. Heat is thermostatically controlled and circulated by double fan. Built-in germicidal lamp destroys bacteria, and unit emits ozone to kill odors. Price is \$39.95; Elcond Inc., Leroy, N. Y.

LUBRICANT for dry or steam irons lets iron move smoothly over fabrics, keeps starch from sticking to sole plate. Sold by Merrimac House, Argo, Ill., \$1

KNEADING ATTACHMENT fits into mixer of same make, kneads enough dough for two loaves of bread in three minutes. Made by KitchenAid Div., Hobart Mfg. Co., Troy, Ohio



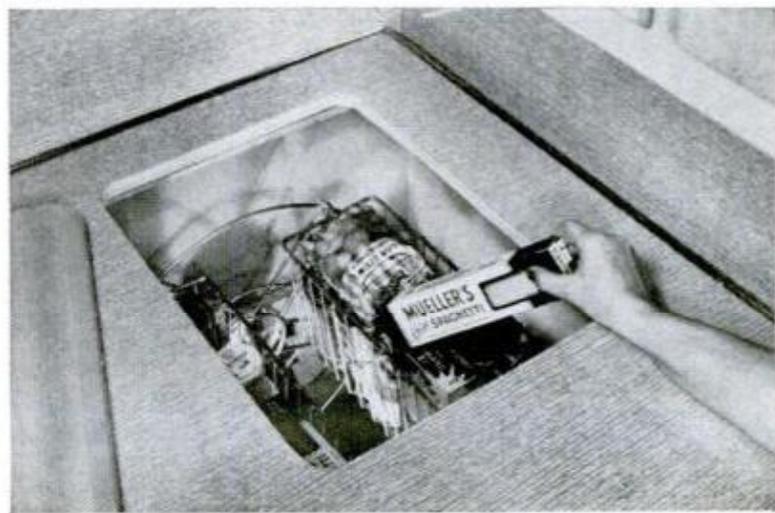


COMBINATION FIREPLACE-ROOM DIVIDER installs in a day's time in any location. Chimney runs through roof to draft height required. Triple-wall construction affords complete insulation. By the Condon-King Co., Seattle, Wash.



RESIN-COATED FRYING PAN has no-stick properties, requires no grease. Permanent coating is unaffected by heat, imparts no taste to foods, makes washing easy. Made by T-Fal Corporation, 217 East 25th St., Baltimore, Md.

KITCHEN "FERRIS WHEEL" holds five wire baskets and allows them to rotate for easy accessibility. The unit, which holds up to 7 pounds of canned goods and groceries, is designed to make use of "dead space" in the kitchen. The wheel is made by Murray Equipment Co., Inc., 66 N. Murray Place, York, Pa. It retails for \$85



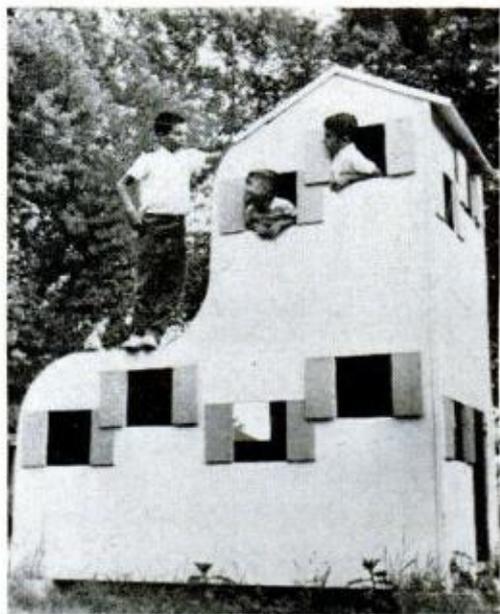


One Family's Playhouses

None of the three Ziebelman boys or their friends need get bored on a drowsy day in Oconomowoc. The Wisconsin youngsters—aged 3, 7 and 10—have four playhouses on their lawn.

For about \$60 each (for plywood and other materials), father Donald built a shoe, a rocket ship, a pirate ship and a log cabin. All but the cabin first saw service as floats for Halloween parades.

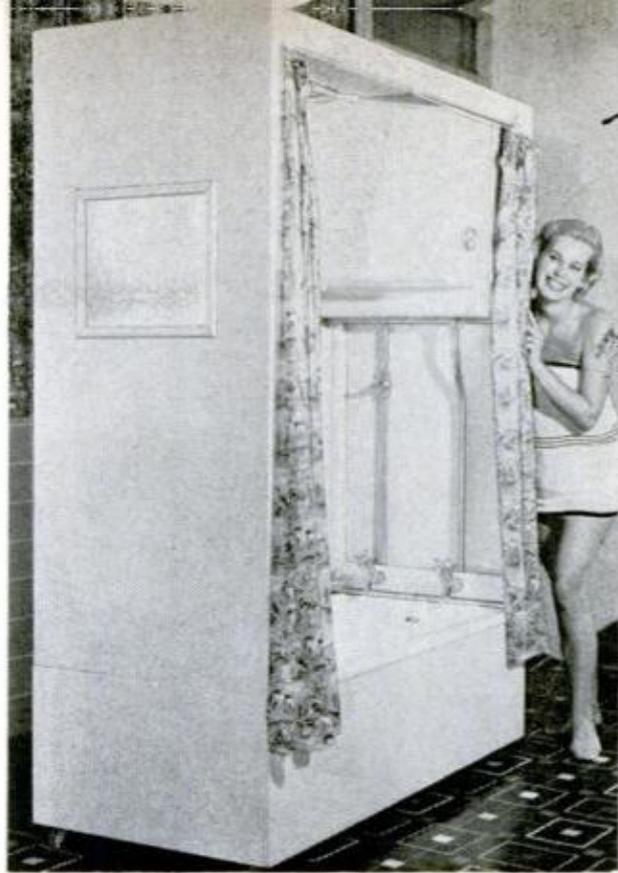
When the boys tire of walking the quarter-deck, climbing on shoe-strings and fighting Indians, they rocket into the night.





Motorcycle With V-8 Engine

Determined to get greater pickup from his motorcycle for drag racing, Ron Kagel of Chicago invested in a Corvette V-8 engine. After spending many hours of work installing the powerful engine on his cycle, Kagel was able to reach a speed of 90 miles per hour on a quarter-mile drag strip in the vicinity of Chicago.



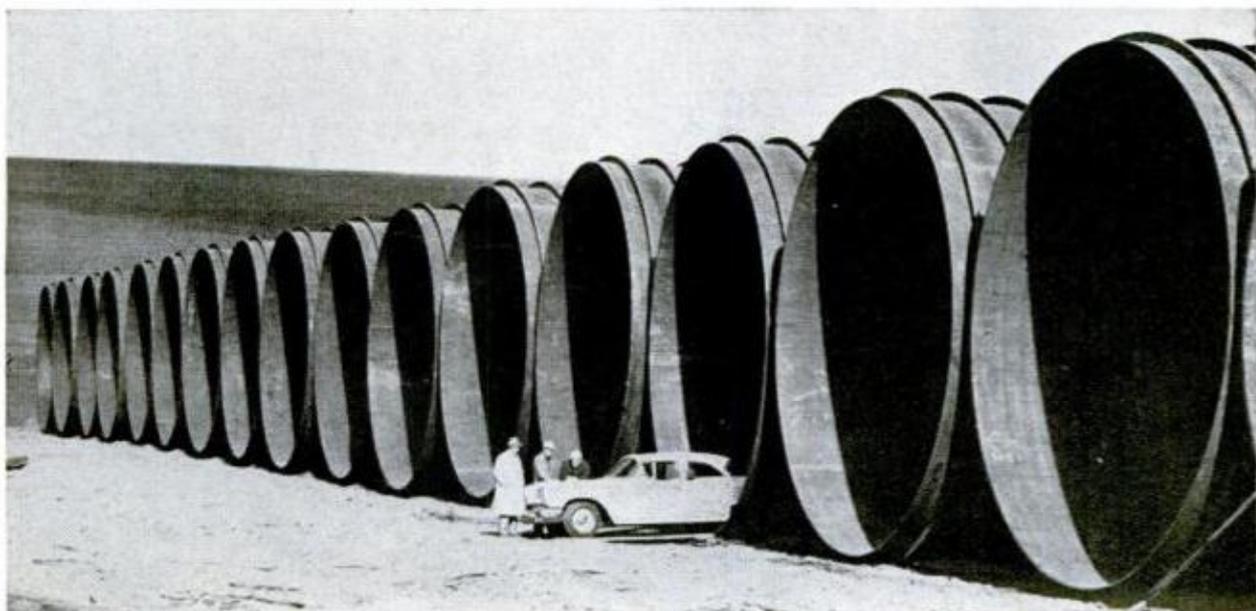
Roll Out the Bathtub

Complete bathing facilities—tub, shower, storage tank and water heater—are built into a portable British bath unit that's mounted on casters. Designed to provide facilities in homes built before indoor plumbing, it can be installed by making only two connections. Casters come off for permanent installation.

Missouri River Will Flow Through Huge Pipes

Dwarfing a passenger car, giant steel tunnel liners await use in the Oahe Dam near Pierre, S.D. When placed inside the seven hydroelectric power tunnels of the earthen dam, the liners will carry the waters

of the Missouri River. Each of the huge sections is approximately 40 feet long, 24 feet in diameter and 60 tons in weight. Some 449 liner sections are being assembled on the site from steel plates.





MOST IMPRESSIVE structure—and last modern convenience—on the Pan-American Highway was the Choluteca Bridge between El Salvador and Honduras. Beyond this bridge, the first gap occurs a few hundred miles south in Costa Rica

THE PAN-AM HIGHWAY itself isn't always the smooth ribbon that appears on the map. This washout in Guatemala is typical of the devastation that occurs every year even along the main highway

U.S. ARMY ANGRC/9 ("The Angry Nine") radio transceiver provided the expedition's only contact with civilization during 134 days in the jungle. The fascinated Indian at left is a member of the local Cuna tribe





We Built Our Own Road Through the Darien Gap

***The 300-mile "missing link" in the Pan-American Highway
isn't really impassible—but don't try it in your car . . .***

By Richard E. Bevir

A LETTER from the International Road Federation in Washington, D.C. was what really sent my roommate Australian Terry Whitfield, and me into the wildest adventure of our lives. I had written them in 1958—mostly out of curiosity—about the possibility of driving some kind of rugged vehicle from North America to the foot of South America.

"Dear Mr. Bevir," came the emphatic reply. "Your idea of driving overland from North to South America is an impossibility."

Over the river and through the mud . . .



PLUCKY LANDROVER fords one of the 180 streams that had to be crossed. This was three feet deep and too fast to wade



WORSE THAN any river—five and a half miles of three-foot-deep mud, winching all the way

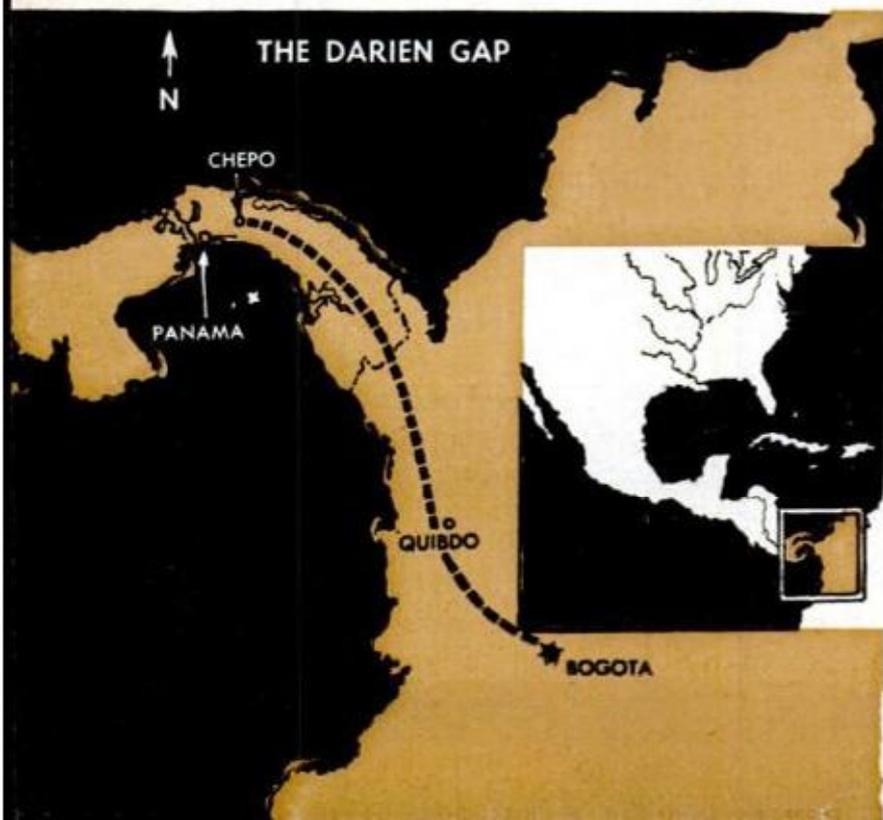
That wasn't all. The letter went on to say that beyond Panama City the Pan-American Highway extended only 40 miles to a village called Chepo. From there, through the remainder of Panama and down into Colombia, no road existed. The terrain was hopelessly impassible to any motorist. To link the Americas, I was told, the Darien jungle would have to be crossed—a feat that no wheeled vehicle had ever achieved under its own steam.

The Darien, stretching for 310 miles south of the Panama Canal, is a steaming

snarl of ancient vegetation with a gruesome history of murder, treachery and disease. I'd read books about its swamp-ridden booby traps. I'd heard of its reputation as an outpost of pirates, and as a haven for savage tribes and runaway slaves.

For centuries this tropical rain forest has completely defied all efforts of hardy souls to penetrate it on wheels, and several lives have been lost in carefully planned—as well as foolhardy—attempts.

Oddly, all the discouragement served to whet my appetite. Terry felt the same way.



MISSING LINK in the Pan-American Highway runs 310 miles from Chepo in Panama to Quibdo in Colombia. Expedition's route went on to Bogota, its official goal. No wheeled vehicle had ever made the trip before—it had been thought impossible

RIGHT, midway camp on the Ipeti River. Curious Cuna Indians in foreground stopped to investigate but proved most interested in the Landrover's electric lights and horn

Building bridges along the way—sometimes they worked



ONE OF 125 palm-log bridges built across jungle gullies by the expedition's crew



THIS BRIDGE DIDN'T HOLD, and the Jeep went into the gully. Vehicles took turns winning each other out of trouble

The thing grew into a compelling challenge. If no one else had done it, we might ring up a "first." Certainly with the right kind of vehicle, modern tools and equipment and carefully planned logistics, there should be a good chance of success.

So, early in 1959, the plans and lists for Trans-Darien Expedition began to grow. Our Toronto apartment became a clutter of supplies and equipment—a powersaw, razor-sharp machetes, axes, compasses, dysentery and malaria tablets, cameras, mechanical tools, ropes, cables, blocks and

tackle, survival gear—even crash helmets.

The real key to our success would be our prime mover. It would have to be bulldozer rugged, light enough to lift or winch over rough spots, big enough to carry half a ton of gear plus passengers but small enough to squeeze along a jungle animal track. In short, an impossible combination.

We finally settled on a British built, 88-inch-wheelbase Landrover station wagon. Its powerful four-wheel drive boasted a whole series of high and low range gears, with a first gear low transfer offering a 40



Balsa-log rafts work where bridges can't . . .



RAFTED LANDROVER "parks" in a backwater overnight. BELOW, winch-repair job draws a spectator



to 1 ratio. The uncluttered four-cylinder engine developed 52 brake horsepower, with power take-off for a drum winch that could pull 8000 pounds. Heavy-duty springs, an all-aluminum body, a cross-country payload of 1200 pounds and two passengers, and a two-inch steel roll bar—all these features would help. The main gasoline tank carried 12½ gallons, with three jerrycans holding an additional 15. We estimated our maximum highway range at 450 miles—about 60 miles in the jungle. We promptly christened her *La Cucaracha Cariñosa*—The Affectionate Cockroach.

After much preparation, we were ready to take off on October 16, 1959. The Mayor of Toronto bade us farewell at a crowded sendoff in the city's big plaza, and we roared away on a wave of cheers.

We turnpiked our way through the United States to Mexico. Then, in contrast, bumped and bounced southward over the Pan-American Highway to Costa Rica in Central America.

Last Look at Civilization

San Jose was our last contact with civilization before we tackled the 135-mile Costa Rica "gap" on our way to the Darien "gap." By then it was December. Terry and I were destined to become the first humans to manhandle a vehicle through this missing highway link during the wet season. Though we didn't know it, the experience was just a foretaste of what was waiting for us in Darien.

The Costa Rica gap starts 100 miles southeast of San Jose, and comprises the only land bridge into Panama. It is a wild, rugged, mountainous country through which highway engineers have been trying to carve a road for eighteen years. So far they haven't made it. The narrow, washed-out track twists and turns through 39 bridgeless rivers and over 23 landslides.

At one rain-swollen river we had to build a crude raft of balsa logs, load the *Cockroach* and lash her down. Then we swam to the other side with a Dacron line, keeping a sharp lookout for alligators. On the far bank, three natives helped us to haul the raft and its cargo of 4800 pounds to safety. The 120-yard crossing ate up three days and left us exhausted.

Our next obstacle was 30 yards of landslide. To get over it, we dug with picks and shovels. After half a day of digging with painfully blistered hands, we had carved a narrow channel through the slide, and we took a run at it. We went through at about 20 m.p.h., hitting a hidden rock

(Continued to page 202)

But only if the water's deep and manpower plentiful



LAST BIG RAFT floated the vehicles fine, but the river went down and left them high and dry after 200 yards. Below, welcome in the mid-jungle village of Yavisa, normally accessible only by air or riverboat





TOW TRUCK, remotely controlled, hauls huge B-52 around Larson Air Force Base, Wash. Thirty feet long, eight feet wide and four feet high, it weighs 10½ tons but can tow bomber that weighs up to 450,000 pounds. It is guided by member of ground crew from small control box. He wears tiny radio receiver on head through which he receives reports on wing and tail clearance from other members of the ground crew



Brakes and Accelerator Work from One Control

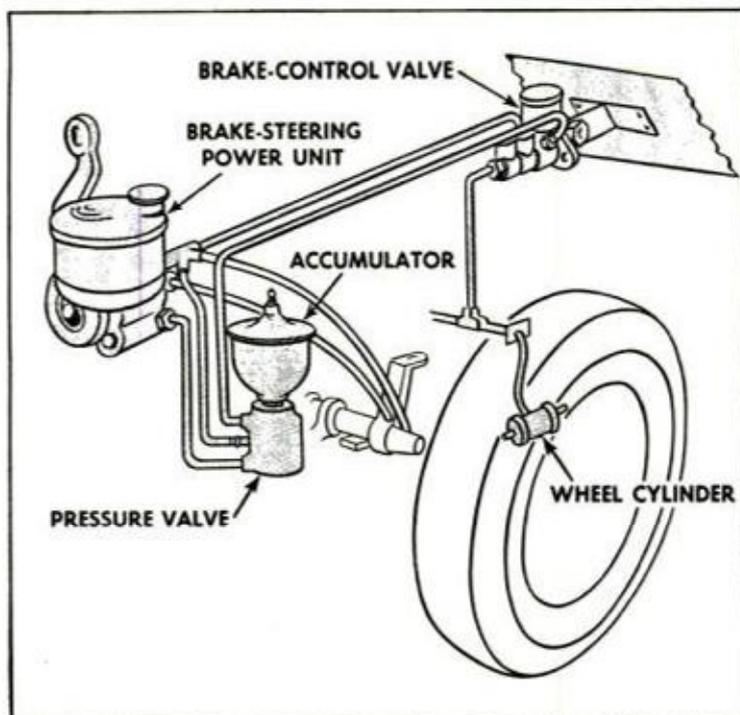
Separate brake and accelerator pedals are eliminated in a system now being tested by the Bendix Corporation, Detroit, Mich., which combines the accelerator and brake pedals in one flush-mounted floor control.

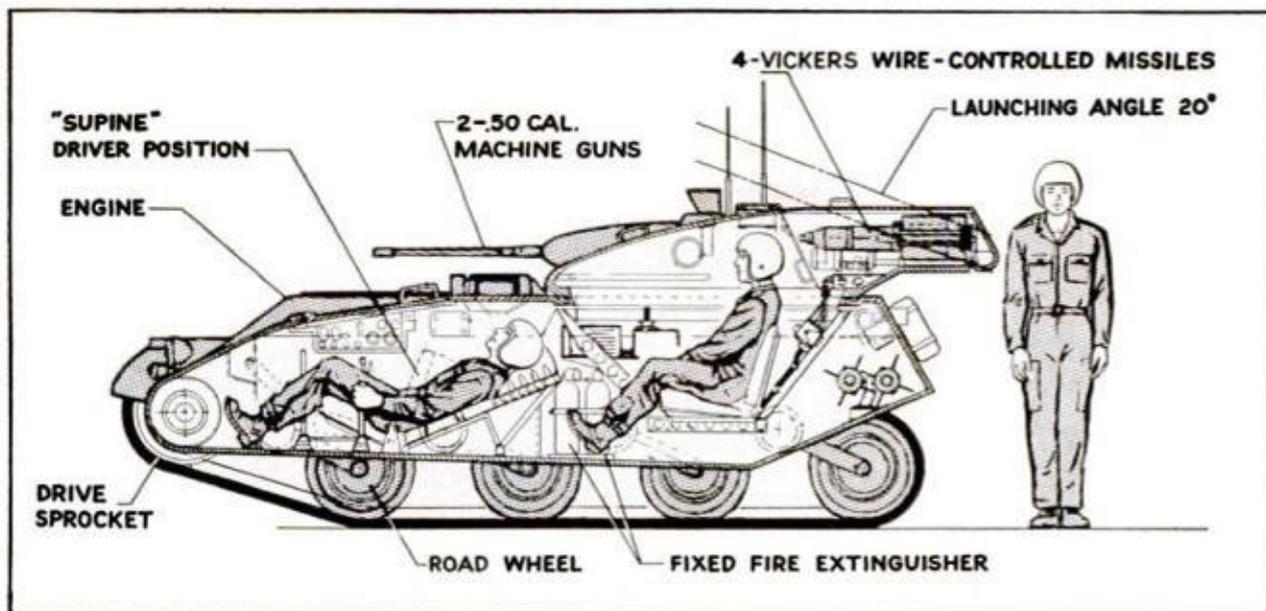
Pressure on the right segment of the control serves to activate the accelerator, while pressure on the left side applies braking action. These are the same relative positions of controls in cars with conventional pedals. With his heel resting on the floor, the driver merely swings his foot to one side or the other.

Hydraulic Pumps

The system uses dual hydraulic pumps, combined in a single housing, which provide two separate sources of fluid power—one for power braking and one for power steering. Hydraulic fluid is stored under pressure through the use of an accumulator and regulator. Details of the brake-steering power components are shown in the schematic diagram.

Construction of the floor-mounted control makes use of a pivoting action which allows conventional carburetor-accelerator linkage to be used without extensive modification.





TWO-MAN TANK, still in planning stage, could accommodate armament up to missiles and nuclear weapons. Light enough to be transported by helicopter, it is designed to combine aluminum armor—with future possibilities including nylon and plastic—and compact-car engines, automotive gas turbines, liquid-spring suspension systems and advanced torque converters. Reduced vehicle height also reduces target silhouette

Aku, Aku, Aku-Choo!

It's ticklish business — swaying atop a ladder to touch up the nose of a statue.

Bertil Johansson, a sculptor in Halmstad, Sweden, had that job when he cast in cement an exact replica of one of the famous statues on mysterious Easter Island.

Johansson raised his replica on the outskirts of Halmstad.



AUGUST 1961

Oatburner Tries Oxygen

Looks like the feed bag of the future, but it's really a plastic oxygen mask designed to provide oxygen therapy for ailing horses. Sudden changes in climate and racing in cold, damp air can cause upper respiratory ailments in thoroughbreds—which oxygen helps prevent and relieve. The mask is made by NCG Div. of Chemetron Corp.



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JACK TAR HOTEL in San Francisco has a two-acre patio with swimming pool. There's ice-skating on fourth floor

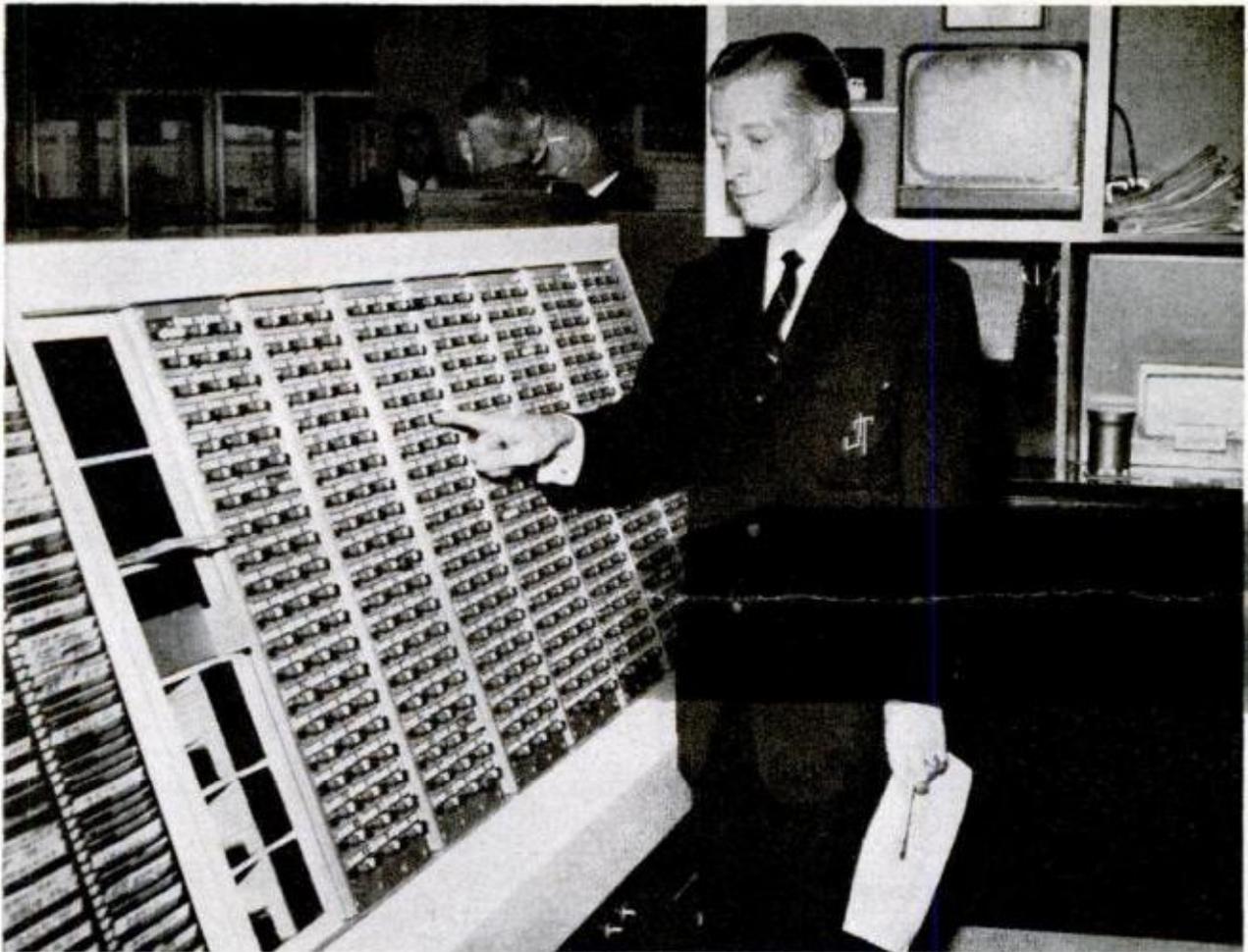
Electronic Hotel



GARAGE CHECK-IN. Guests step from car onto mat that automatically turns on TV circuit to room clerk. Floor plans and prices are posted at counter. Pneumatic tube delivers key. Check-out is similar: Payment and key are sent by tube from another desk to the cashier

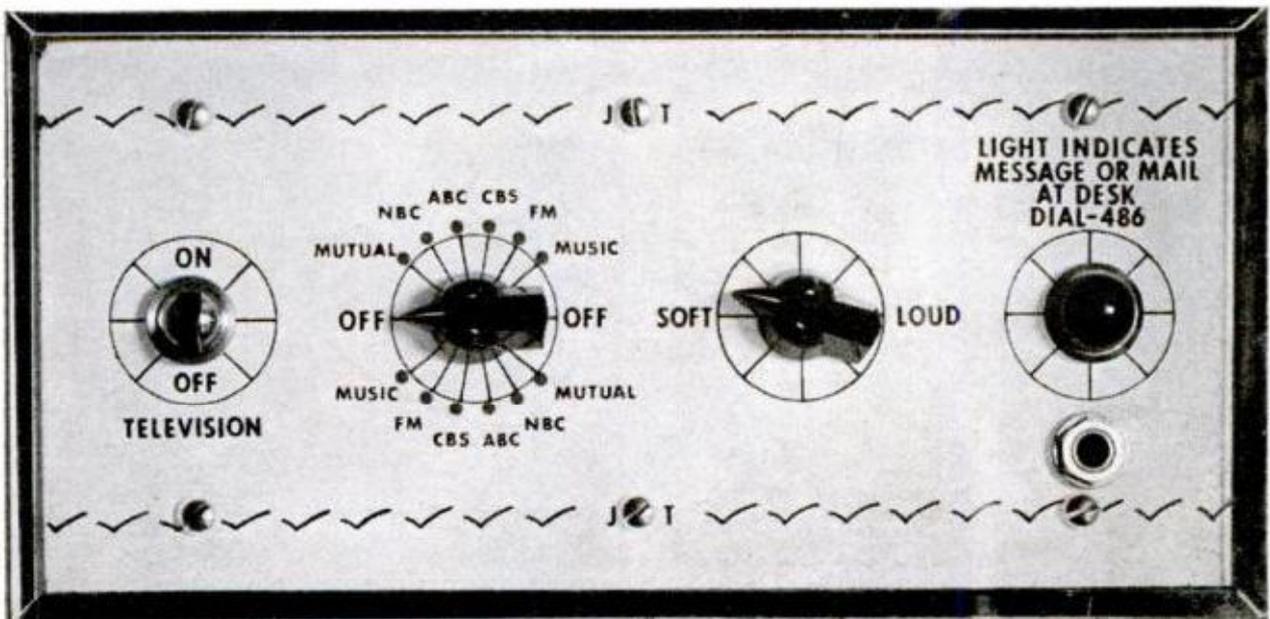


CONTROL BOARD gives guest selectivity of TV, radio or music program. A green light turns on if guest has message at desk



ROOM RACK in clerk's office shows, by system of lights, if room is occupied, being cleaned, or ready for guests

MORE THAN \$1,000,000 worth of electrical work has turned the 403-room Jack Tar Hotel in San Francisco into an electronic showplace. Check-in and check-out is by closed-circuit TV. An absentee message rack causes a green light to light in the guest's room. Closed-circuit telecasting facilities reach every room. TV sets, including some for color, are in each room. There is an air raid warning alert siren in each room. Fifteen thousand bulbs light the place.



X777 Garden Waterfall Pool

**Everything you need in a kit
except sand, rocks and pump**

THERE'S SOMETHING RESTFUL, even magical, about the sound of water rushing over rocks and spilling into a quiet garden pool. Such a waterfall and pool can be created in your own back yard from a fiberglass garden pool kit retailing for about \$25 at garden-supply stores. A small capacity pump, needed for recirculating the pool water to the waterfall, is extra.

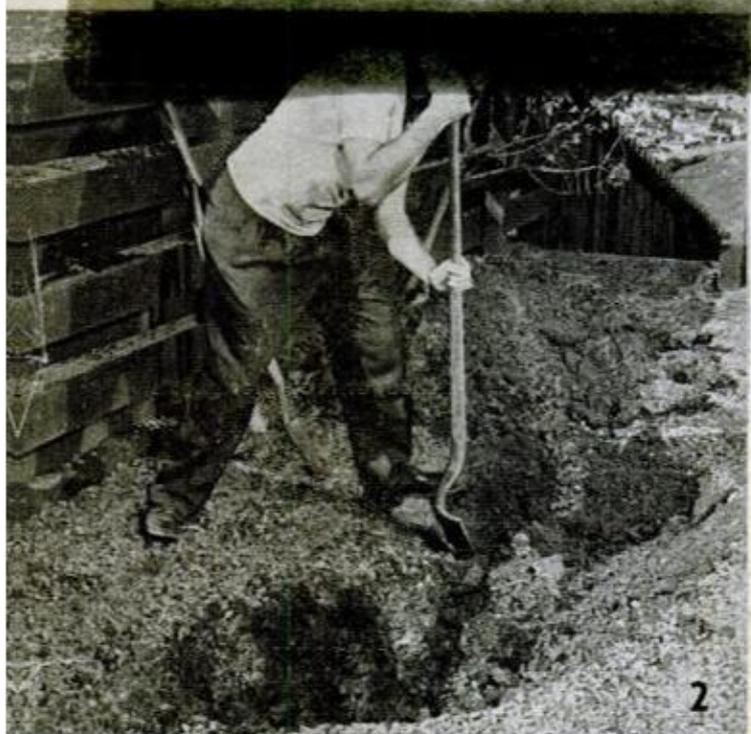
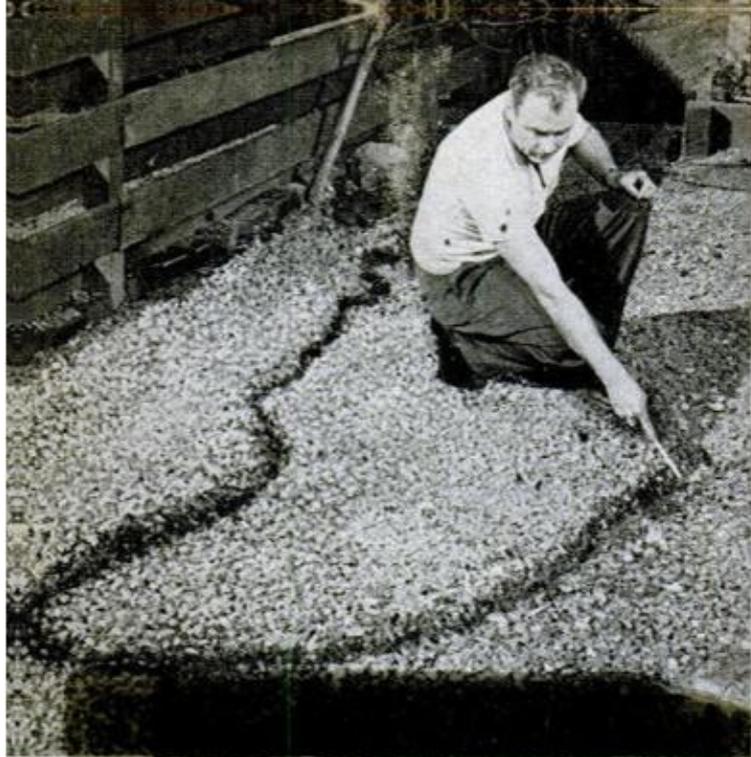
The pump may be of the submersible type installed as detailed on the opposite page, or it can be a nonsubmersible pump installed outside the pool in a protective housing located below the level of the pool and having a screened outlet between the pool bottom and pump.

Each kit containing sufficient material to construct a pool of about 30 sq. ft., includes

1. ROUGH OUTLINE of pool is first made on ground, limiting its size to coverage of fiberglass in kit

2. POOL AREA is excavated to slightly greater depth than desired, piling dirt at end to make waterfall

3. LAYER OF wet sand, used here to shape smooth contours inside pool, serves as form for fiberglass



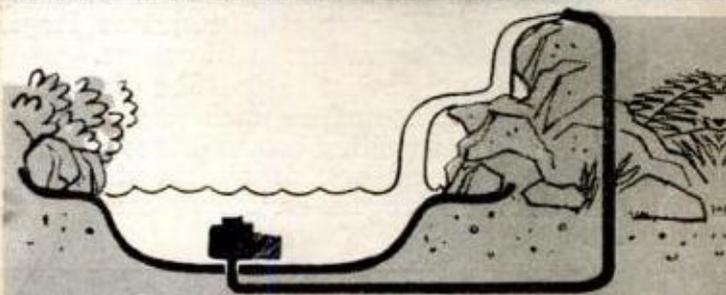
SHOP NOTES AND CRAFTS



4. FIBERGLAS MAT squares are wetted with activated resin before smoothing them to pool contours

5. FIBERGLAS mold is started at top of waterfall mound, mat squares being overlapped 1 in. all sides

6. AFTER 4 or 5 squares of mat are laid, more resin is applied to blend seams and thicken mold shell



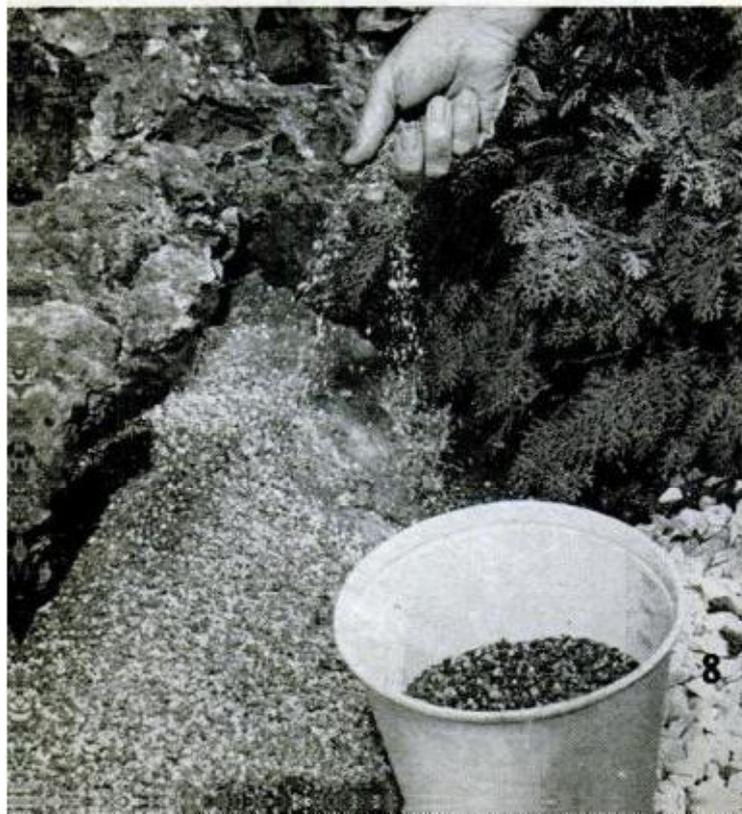


7. TEXTURED surface that blends with the ground is created by sprinkling coarse sand on last resin coat

2 gal. of polyester resin, 40 squares of 12 x 12-in. fibreglas mat, 8 ft. of 1/2-in. vinyl tubing and 1 pt. of acetone for cleaning brushes. A larger pool requires larger portions of the materials, of course.

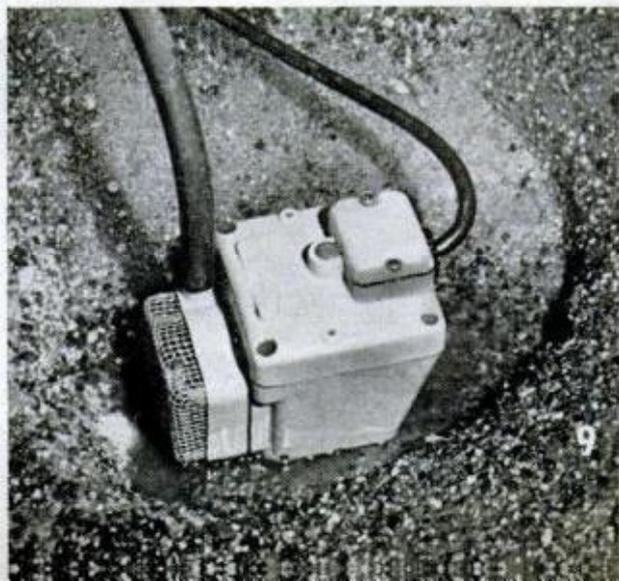
In applying resin to the fibreglas mats, use any clean surface such as a piece of plywood as a coating board. Place a mat on the board and wet it with resin, using either a brush or roller. Now place the mat

on the sand of the pool bed, wet side up. Continue adding resin-soaked mats, lapping the edges 1 in. all around, and while still wet, brush lightly over the seams to make sure that the complete fibreglas liner will be waterproof when it cures. If the pool kit is not available locally it can be ordered from Taylor & Art Plastics, Inc., 1710 E. 12th St., Oakland, Calif. Complete how-to-do-it instructions are included. ★ ★ ★



8. GAPS between rocks arranged to form waterfall, are bridged with mat and pebbles to form channel

9. SUBMERSIBLE pump located at lowest spot in pool recirculates water to waterfall as shown in drawing



QUICK AND EASY

Trellis From Coat Hangers

An attractive, expandable trellis can be fashioned from wire coat hangers in a few minutes' time. Fasten the top hanger with hooks or nails in an inverted position and bind each hook with light wire to the hanger below. The bottom hanger is partly buried or staked to anchor the assembly. Such a trellis will serve for many climbing plants that need only a light support.

—Grace Arnold



Tape Aids in Mending China

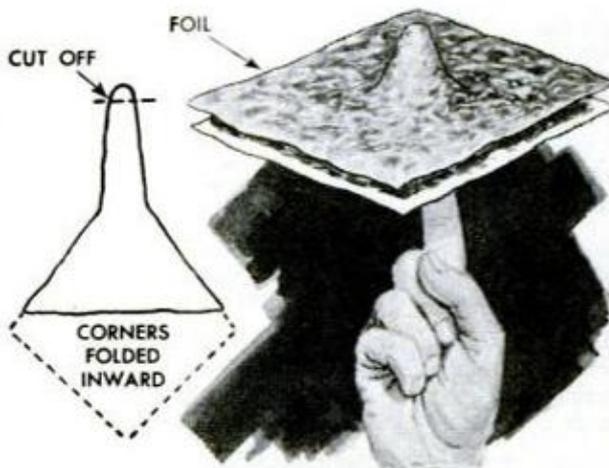
When repairing broken chinaware the main problem is holding the joining pieces in place until the cement sets. That's where cellophane tape in different widths comes in handy for keeping the joining edges in contact and preventing them from offsetting until the cement hardens. First, apply cement according to instructions, working with one break at a time. Run a strip of tape over the joint as you press the parts into close contact. On long breaks it's best to run a strip of tape on both sides of the break to make sure of holding the parts in perfect alignment.



Cheap Funnels From Foil

Disposable funnels are easy to make from square pieces of aluminum foil. They are inexpensive and will save time and effort cleaning up after messy solutions such as paint or garden sprays. Cut two 12-in. squares of foil then place the forefinger in the center of each piece and shape the foil around it and the clenched fingers. Finally, fold the corners in to form the cone. Snip off the tip of the spout with scissors and you have an improvised funnel that can be discarded immediately after use.

—S. N. Stresnic



Matchbook Pill Case

Carry this slim, crushproof pill case made from an empty matchbook and your daily prescriptions of pills will not end up crumbled and useless. The altered matchbook is handier than any box and thin enough to be carried in a billfold. Remove the staple and match stubs from the book and replace with a thick cardboard insert from which you cut away enough of the center to hold the daily prescribed dosage. The cardboard is then stapled in the book to form a case. Jot a warning on the flap to protect finders should you lose the case.

—William A. Crane





BEFORE



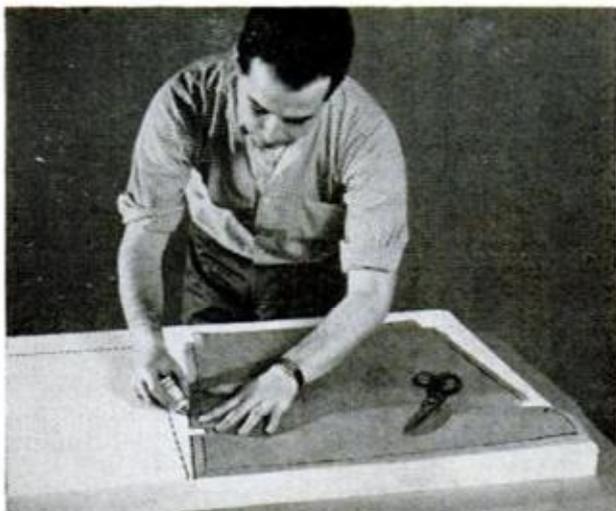
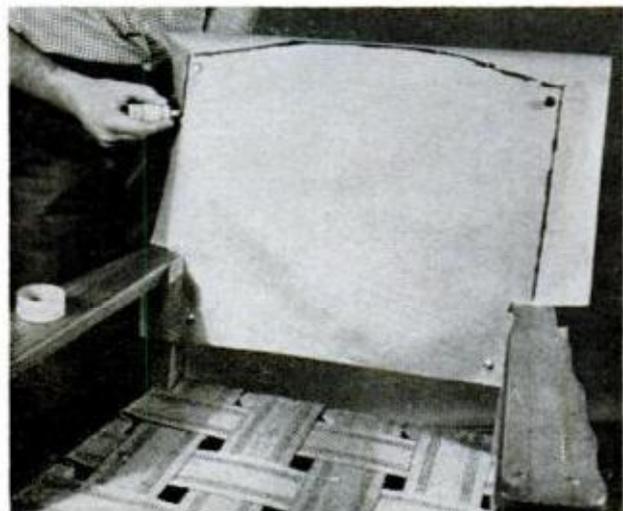
Re-Do It With

PADDED occasional chairs that "have seen better days" can see still better days when reupholstered with foam rubber and new fabric. Upholstering with foam rubber is as easy as it looks. No complicated assembly of springs and layers of padding are involved. If the basic steps are followed as shown, anyone who can wield a pair of scissors and stapling gun with reasonable dexterity is assured of a professional-looking job. Available in various thicknesses by-the-foot and in molded shapes,



FIRST STEP after stripping chair of old upholstery, above, is to staple new webbing across seat framing, using stretcher to pull it tight. Next, patterns of seat and back, below, are traced on wrapping paper

AFTER ADDING $\frac{1}{2}$ in. to all sides of pattern, it is cut out and tracing made on foam-rubber slab. Extra $\frac{1}{2}$ in. helps to maintain fullness of cushion. Note that pattern is notched to take arm and back members

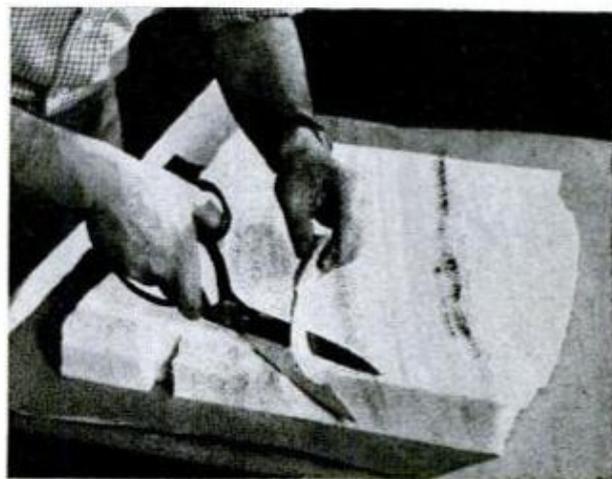




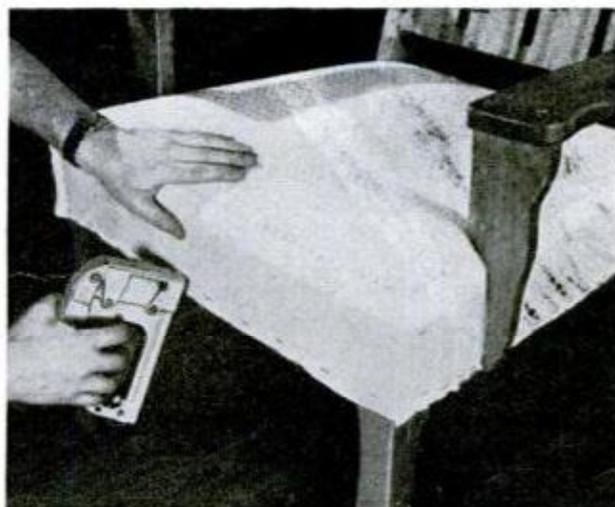
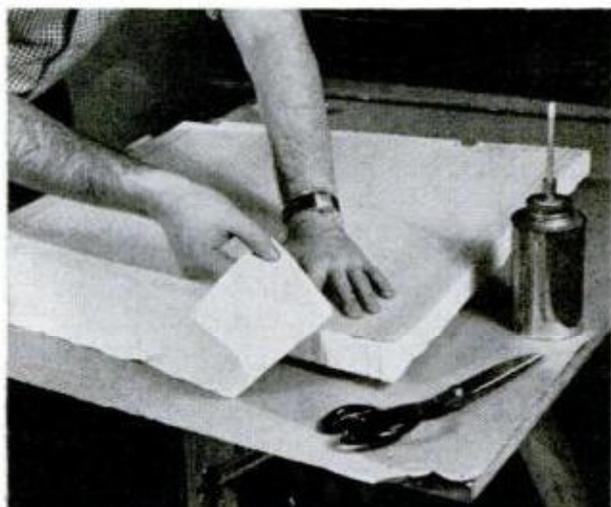
Foam Rubber

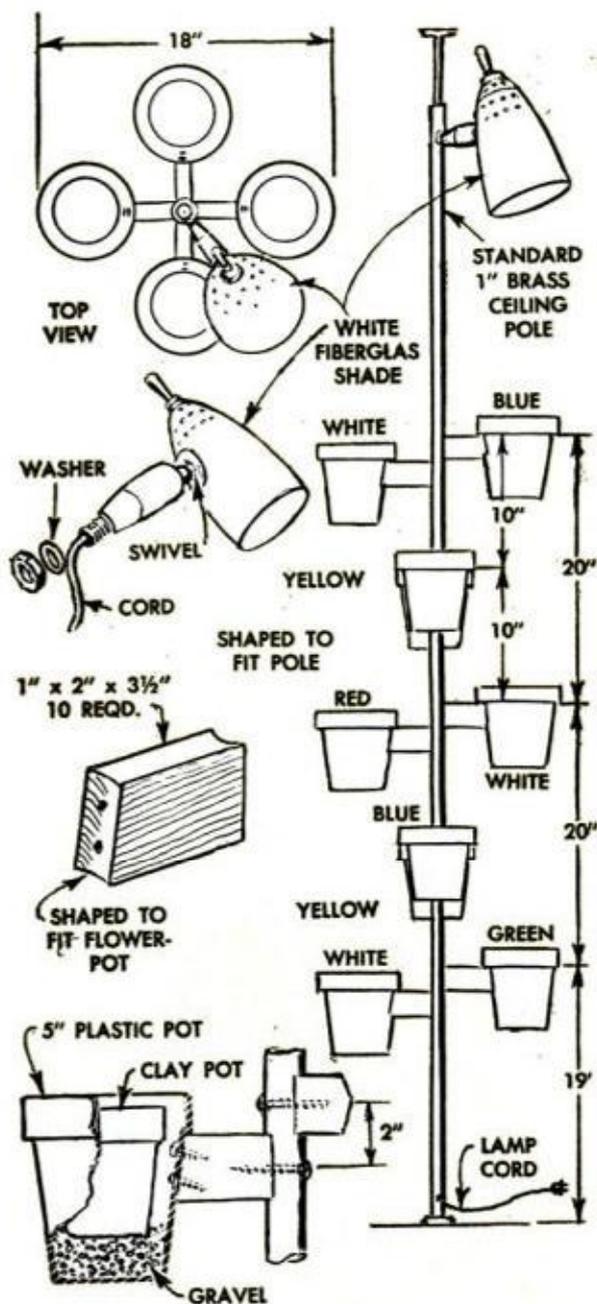
foam rubber cushioning material is suitable for padding hard surfaces, topping spring cushions and other applications. When more than normal depth (2 in.) and buoyancy are required, cored utility stock in thicknesses of 4 in. and up is recommended. The extensive line of materials available at department and mail-order stores — foam rubber, seat webbing, webbing stretchers, rubber cement and fabrics—is evidence of a wide interest in do-it-yourself upholstering with foam rubber. ★ ★ ★

THIRD STEP, center right, underside edges of cutout are beveled to fit snugly against webbing and chair framing. Below, muslin tacking strips then are cemented to edges of foam rubber, except at notches



FIFTH STEP, below, tacking strips are pulled tight and stapled to seat frame, back cushion is next. Last step, top of page, cover fabric is cut to fit snugly over cushion and stapled to inside of frame





Flowerpot Pole Lamp

POTTED PLANTS get attractive day-and-night display on this combination pole lamp and flowerpot tree. Fitted with 10 water-tight pot holders, it not only shows off plants to best advantage but frees windows and tables of "flowerpot clutter" as well. The holders consist of 5-in. plastic flowerpots screwed to wooden spacer blocks, one end of which is shaped to fit the pole, the other to fit the pot curvature. The drain holes in the pots may be sealed shut with modeling clay or tight-fitting corks. Gravel placed in the bottom of each holder allows drain water to evaporate and elevates the flowerpot to a level slightly below the rim

of the plastic one as shown in detail above.

The basic unit, the expansion-spring pole, may be a pole lamp you already have, or an inexpensive ceiling or room divider pole may be used. If the latter is used, it will be necessary to install a light fixture at the upper end, then run a lamp cord through the pole center and connect it to the fixture. If a pole lamp is used, all spotlights are removed and one is installed just below the tension spring assembly at the upper end. The wooden spacer blocks may be cut from any solid stock and finished to match or compliment room decor.

—Howard N. Sersen



Flip-Over Fence Clears Way for Mower

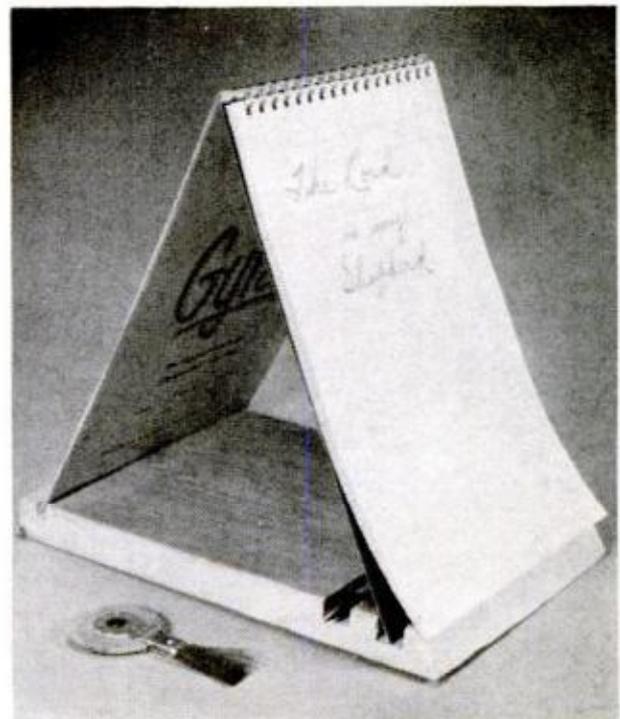
Flip it over out of the way and mow right out to the property line. Flip it back and you have a neat, continuous picket fence and a clean fence row with no grass whiskers left to clip by hand. It's made in 8-ft. sections, each pivoted independently by means of two A-frames and two braces per

section as you see it pictured. The ends of the two sections are pivoted to a single stub post by means of a short length of pipe or conduit turning in conventional pipe straps nailed or screwed to the post and A-frames. The pickets can be any design that may strike your fancy.—*Janice Krenmayr*

Notebook Easel

Anyone who transposes from a shorthand notebook or who has need to make constant reference to notes while carrying out a research project will appreciate this notebook easel. It holds the book at a convenient angle so that the notes are easily followed without leaning or craning to see clearly. It's simply a piece of scrap stock $\frac{3}{4}$ in. thick and about 6 x 9 in. in over-all size. The front edge is beveled about 30 degrees. Two $\frac{1}{2}$ x $\frac{3}{8}$ -in. grooves are cut near the front edge and a single $\frac{1}{4}$ -in. groove is cut near the back edge. One of the two front grooves is used to park your pencil.

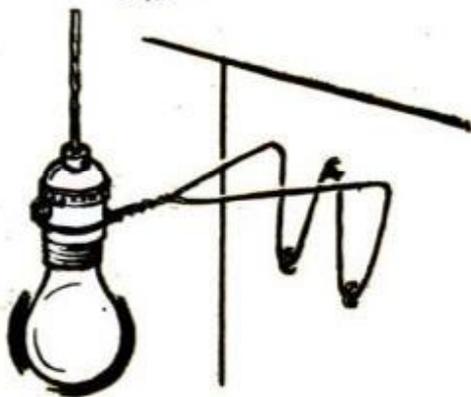
Flat headed screws can be set flush with the surface of sheet metal by countersinking the hole with a small ball-peen hammer. Rest the workpiece on a block of wood, place the hammer peen over the hole and strike the bell of the hammer. One blow will form a neat countersink for the screw.



Solving HOME PROBLEMS

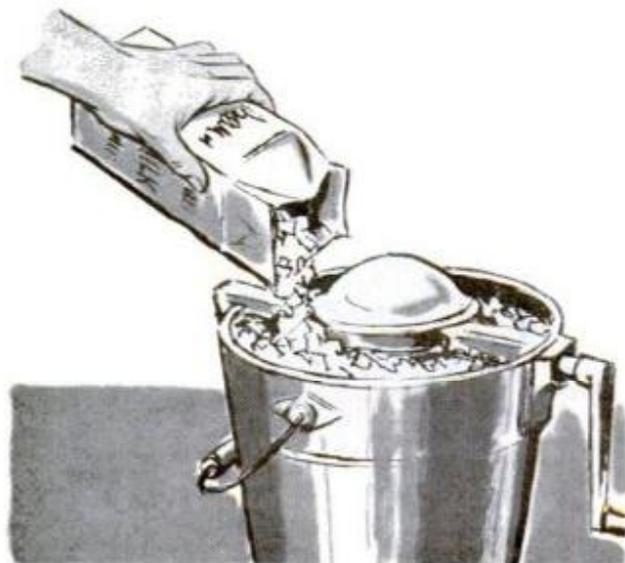


PIPE BUSHING can be used to repair broken push-broom handle. Make hacksaw cuts across threads on inside and outside of bushing. Taper end of handle until it will turn into bushing tightly. Then turn bushed end of the handle into hole in back of broom



A DROP LIGHT can be prevented from swinging with a bracket made from a wire coathanger. Bend the hanger to a W-shape and staple to the wall to form the bracket. Bend the hanger hook to take the lamp socket snugly. Slip socket in place and screw in bulb

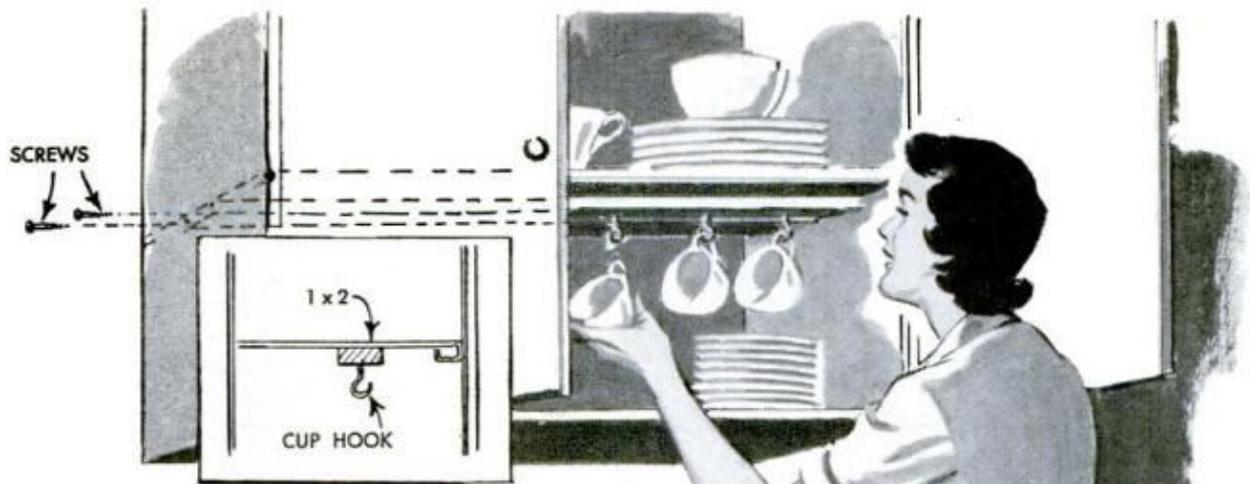
CRUSHED ICE will always be available for your ice-cream freezer if you fill $\frac{1}{2}$ -gal. milk cartons with water and keep in food freezer. Crush by striking carton squarely on each side with a short length of 2 x 4, or, lacking this, the flat side of a hatchet



ADD HANDY POCKETS to back of lawn chairs when you re-cover them. Pockets will hold magazines, cigarettes, matches, swim caps, etc. Just buy additional material and after sewing backing in place sew excess matching fabric to back to form two wide pockets

BUNDLE OLD NEWSPAPERS and magazines with adhesive tape rather than cord and avoid the three-handed struggle of keeping stack in order while you knot cord. Wind tape around stack, keeping it tight as you wrap. Once or twice around each way does it





THERE'S SPACE in metal kitchen cabinets for hanging cups but where and how to screw the hooks in place? Drill two holes through each end of cabinet just below a shelf. Cut a wood strip to length and attach with screws passing through holes. Turn hooks into strip



A PASSABLE SHINE on patent-leather shoes or handbags can be produced with tissues used for cleaning eyeglass lenses. These are silicone treated and will remove dust and smudges from smooth surface of the leather. Rumples two or more tissues into a pad

NOVEL PINCUSHION can be made from an adhesive-tape spool, a disk cut to the spool diameter from ceiling tile and a square of figured fabric. Place the disk over the spool, center the fabric on top and then press the spool cover down over the fabric

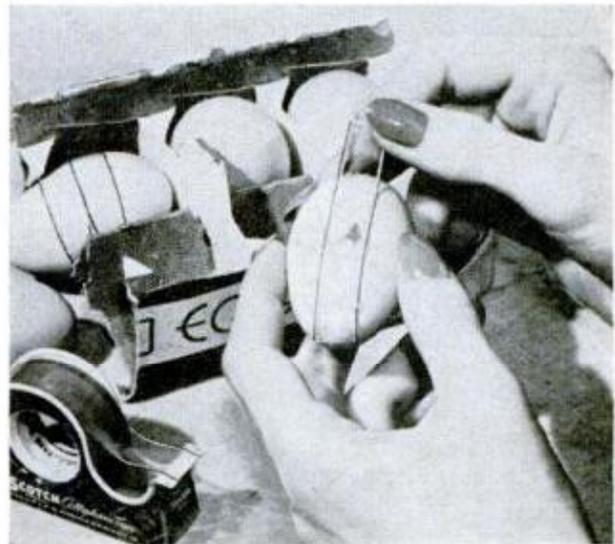


AUGUST 1961



EVERY SPOOL of thread in the sewing basket needs this keeper that hangs onto the end of the thread and prevents it from unwinding from the spool. It's simply a short length of light wire with an eye at the center. Bend each end to right angle and insert in hole in spool

DON'T PANIC when you find a cracked egg in the carton. Just seal the cracked shell with a length of cellophane tape and the egg will be as good as new, that is, for a time. Of course, you can't boil the egg with the taped shell. But at least you can save it



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KEEP THESE IN MIND



Turtle Back for Steel Wool

Press a steel-wool pad into half of a hollow rubber ball and you can apply pressure without running the risk of getting your fingers full of painful steel slivers. Just cut the rubber ball in half, taking care to cut on the center line so that you get two equal parts. Half of an average sized ball will hold a steel-wool pad nicely.—*Bil Toman*

Removing Hardened Putty

Old, hardened putty is easily removed from window sashes with a 1/4-in. drill bit chucked in a portable drill. Hold the drill at an angle of about 60 degrees with the glass. The rapidly rotating point of the bit will remove the putty strip neatly.



Figure 8s With a Garden Hose

Coiling a rubber garden hose, especially one that's getting a little stiff from old age, can produce one to a half dozen kinks in a 50-ft. length. Uncoiling usually means a trip back along the hose to straighten it out. Try coiling it in a figure 8 to make it behave. When you finish coiling, pick the coils up at the ends of the 8, fold the two together and hang on a hook or peg. To uncoil, open the coils to the original figure 8 form. You'll find the hose will uncoil without kinking.—*F. C. Gardner*

COMING UP NEXT...

Spice Cabinet. A few generations ago spice cabinets went into attics and from there most of them just disappeared. Now reproductions of spice cabinets are back again, favored as decorators in modern kitchens. Next month **PM** tells how to build one like great grandmother's.

Ideas for Clothes Sorters. Machines do the washing and drying of clothes but the housewife does the sorting. Think of a row of sorting hampers along the basement stairway, a rotating sorting table—that isn't all but it should be enough to alert husbands to what's coming in September **PM** on sorters.

Built-In Vacuum Cleaner. Up to now vacuum cleaners have been dragged, pushed, or lugged about. Now the cleaning unit is installed in basement or utility room and you plug the suction hose in the wall. Next month **PM** tells how to make a typical installation of a unit that never needs to be emptied.

Outdrive for Your Boat. Yes, your boat, if it's 15 ft. or more. An outdrive gives you everything in inboard power and economy yet retains all the portability, ease of trailing, beaching and detaching found in outboards. In the coming issue **PM's** boat editor tells the story of outdrives.



QUICKIE SAND BOX

TWO HOURS' WORK and \$18.07 (including the sand) went into this ultra-simple sand box. Using standard concrete blocks, ready-mixed bag mortar and 1 x 10 boards, it's a box that anyone can make since the blocks are merely placed end to end without mortar.

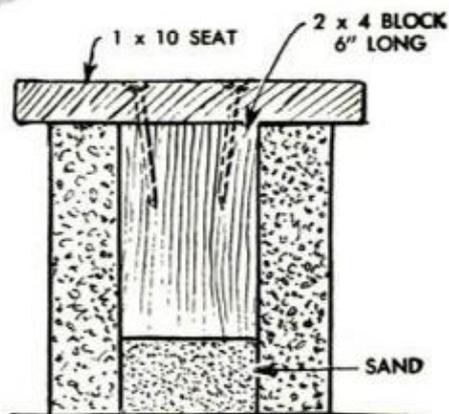
The house foundation can serve as one side of the box, or you can build the box anywhere there's play room. You'll need ten standard concrete blocks if you use the house foundation as one side. Otherwise fourteen blocks will be required.

As the first step, level the area where the box is to be built. Then lay the side and end blocks with the ends butted. Be sure the blocks are in line and the corners of the box square.

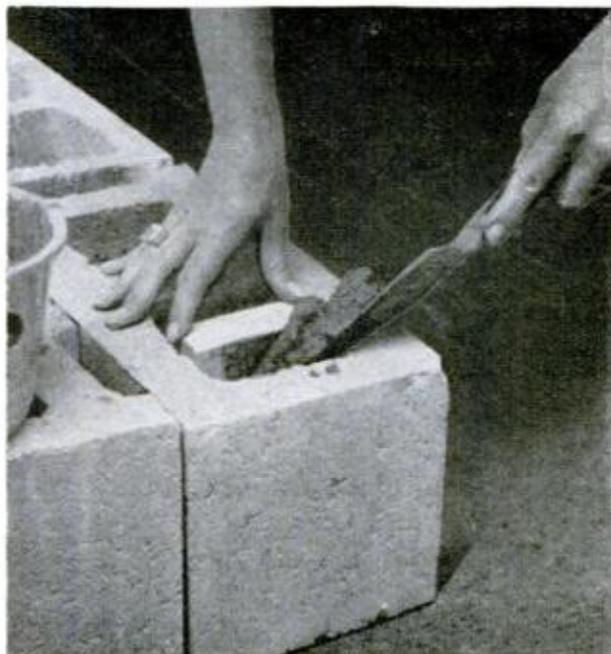
Wood blocks cut from 2 x 4 and mortared in the holes in the concrete blocks serve to anchor the well-sanded seats. There are two anchors at the ends and three along the side, seven in all.

Pour a little more than 2 in. of sand into the center hole in each block and place the 2 x 4 blocks end up in the holes into which sand was poured. Tap the wooden blocks down flush with the top edges of the concrete blocks. Then fill in around the wooden blocks with cement mortar, allow to dry and you have a nailing base for the seats which are centered over the blocks.

—Barbara and Jerome Bakst



WOODEN BLOCKS set in ready-mix mortar anchor the wooden seats and help to hold the sandbox together





Tips for Underwater Shutterbugs

with plans for an easy to make, easy to use housing for twin-lens reflex cameras designed by Bruce Mozert, Florida's Silver Springs' chief underwater photographer

By Earl Wobeck

TAKING PICTURES among the fishes of the sea no longer is a novelty, nor is it any more difficult to learn than surface photography. At least, not since scuba (self-contained underwater breathing apparatus), high-speed roll film and a suitable compact camera have become available at affordable prices. By "suitable" camera, it is meant one that has most of the automatic features, ground-glass viewing, built-in light meter and of a size that will produce a $2\frac{1}{4} \times 2\frac{1}{4}$ -in. negative or larger. Most twin-lens reflex cameras score high on all of these points, making them ideal for underwater use.

The housing or case presented here is designed to accommodate such cameras. It is easy to make, costs only about \$15 for materials and operates beautifully.

Ground-glass focusing eliminates underwater focusing problems of view-finder cameras. Everything you see underwater appears about $\frac{1}{4}$ larger than its actual size, requiring a focus setting of $\frac{1}{4}$ less than the actual camera-to-subject distance, when a nonreflex-type camera is used. Reflex cameras are a good compromise between 4 x 5-in. press-type cameras and 35 mm., eliminating most of the bulk of the former, while retaining the roll-film loading and compact

features of the latter. If there is an occasional need to take more than 12 shots on one loading, 35-mm. film adapters are available for many models, permitting up to 36 exposures.

Tips on how you can take professional quality pictures follow the construction steps given next. While the controls shown are designed for one popular make of reflex camera, slight modification of the end fittings is all that's necessary to accommodate other makes.

Assembly Sequence of Case

1. First, clamp one end of the $\frac{3}{8}$ x $5\frac{3}{4}$ x 32-in. plastic to the back of the forming block and make the four bends required, Fig. 7. Use a torch to soften the plastic, Fig. 2, and then press evenly against the point of bend with a wooden block as in Fig. 5.

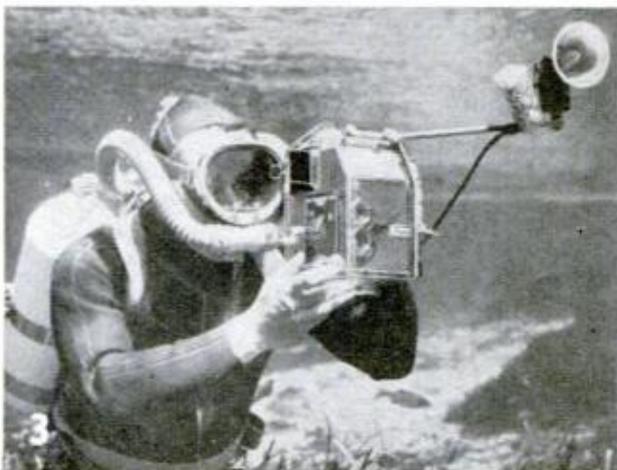
2. After making the previous bend, the end is overlapped onto the back edge and cemented to it by dipping the joint in a V-shaped tray, Fig. 14, of methylene chloride. The latter should just cover the joint. When the plastic becomes soft, clamp the joint until the cement sets. Methylene chloride is used for cementing all joints.

3. Sand down edges of plastic on both sides of the case, first smoothing wrinkled corners. Make sure you keep the edges square.

4. Cut out side pieces, check them for tight fit against case edges and cement right side to case. (Cement is poured in shallow stainless or enamel pan to $\frac{1}{4}$ -in. depth, then case is placed in it, right side down. At the same time, cement is brushed on mating surface of side piece.) Plastic lugs are made next and cemented to the inside

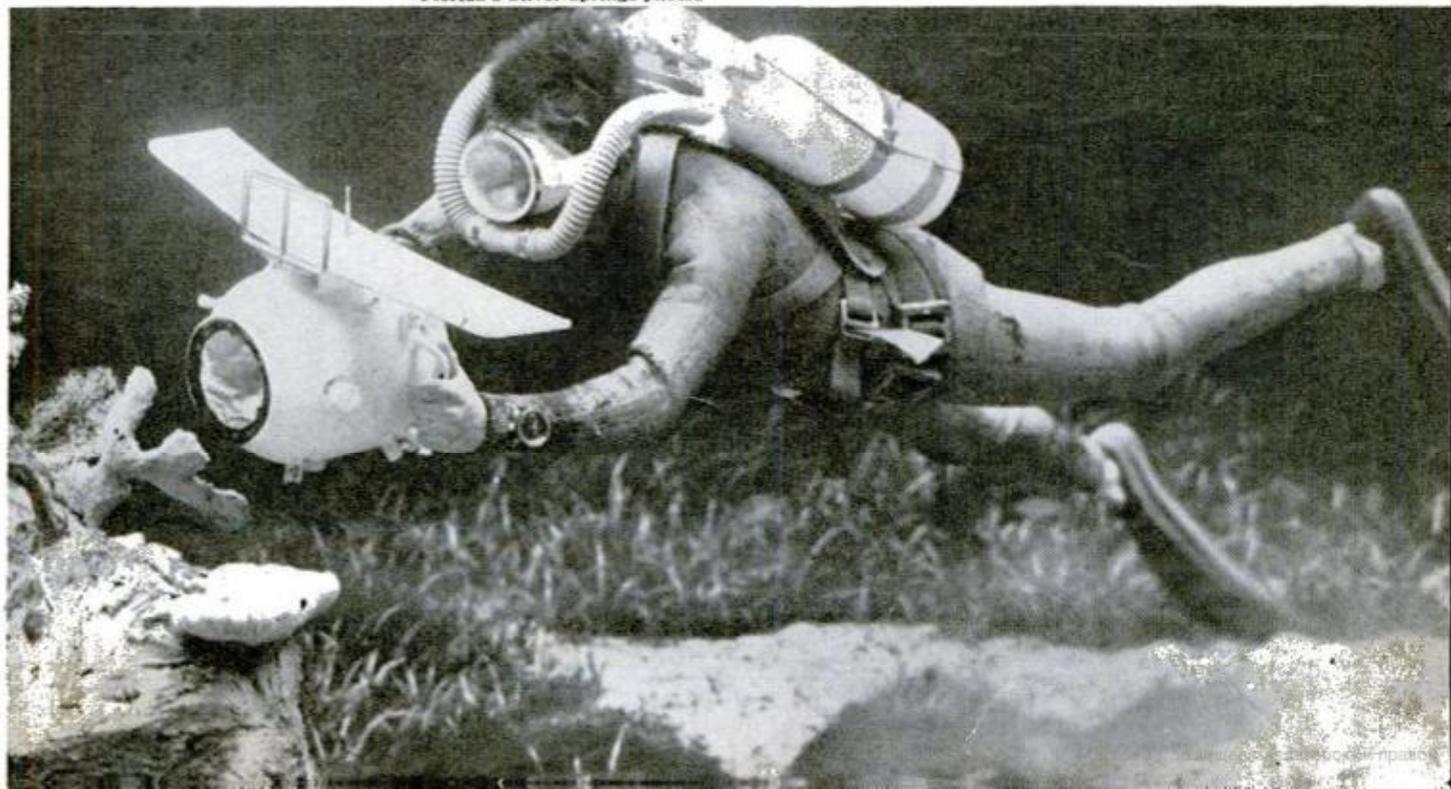


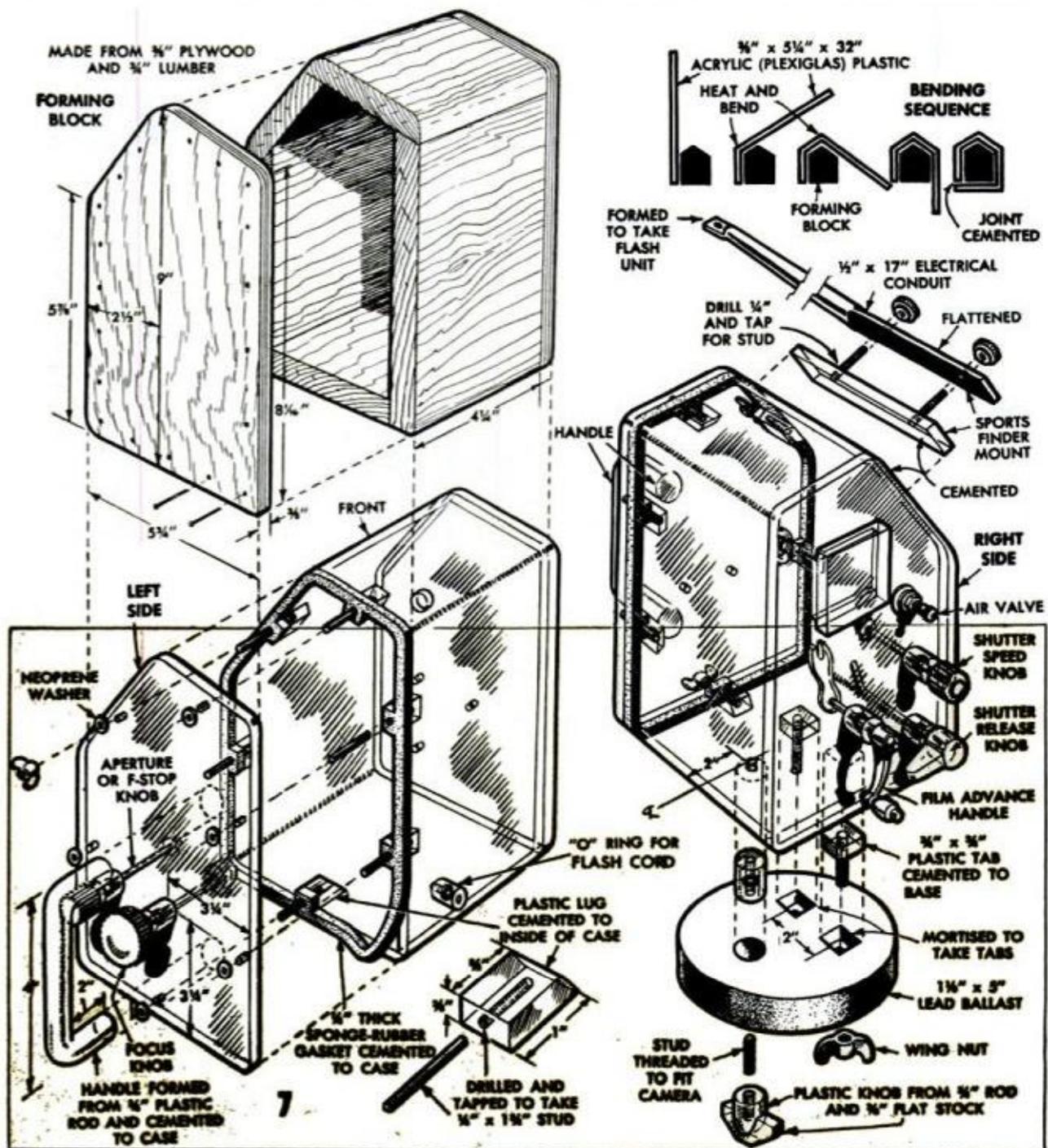
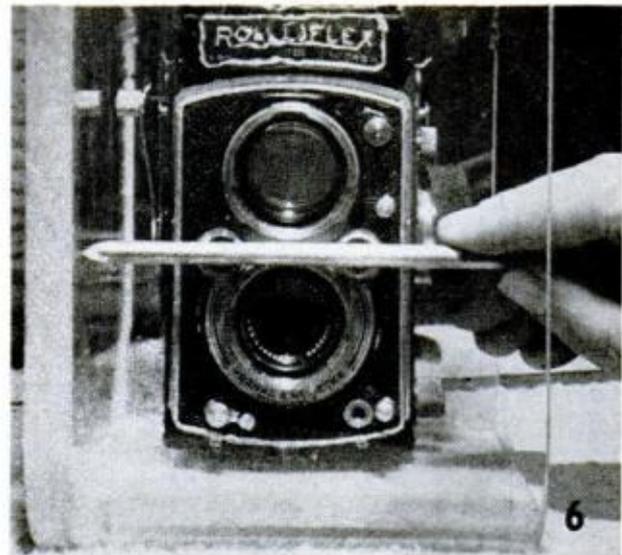
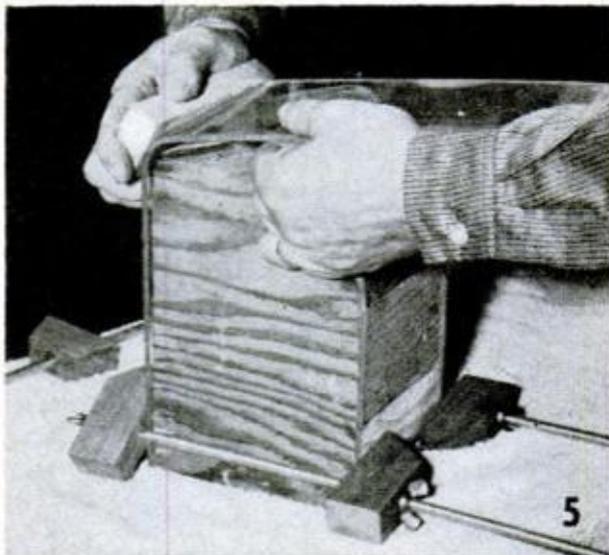
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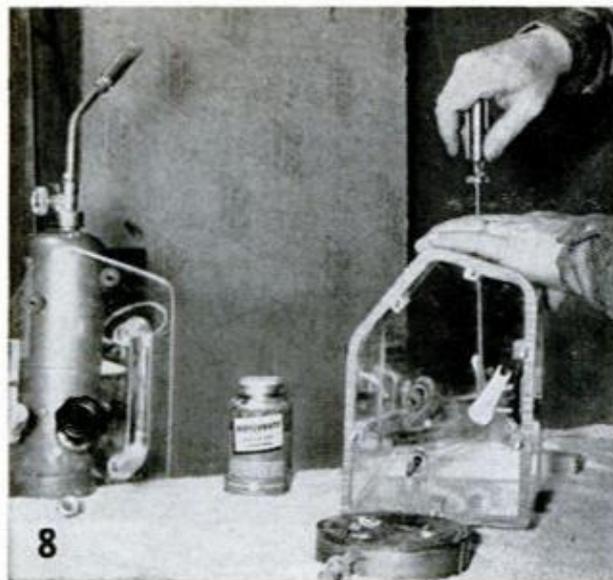


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Florida's Silver Springs photos







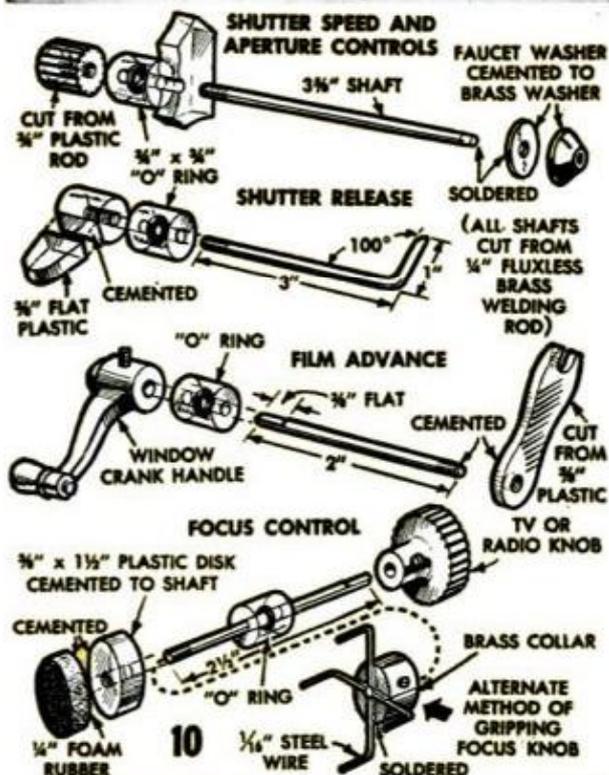
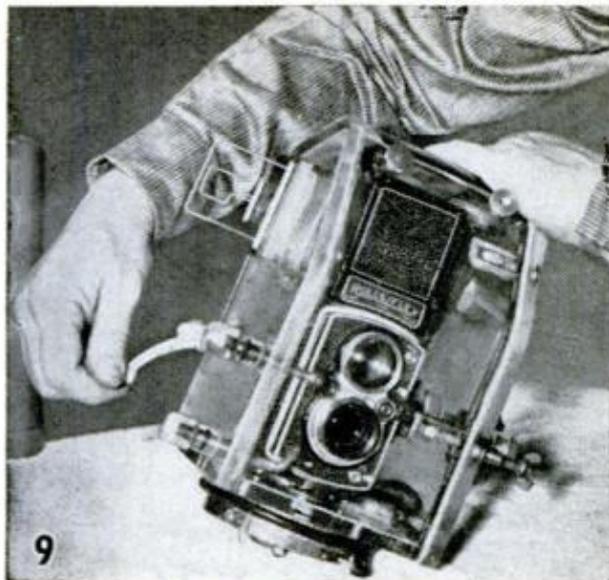
of the case to take the left side, which then is drilled to take the studs as in Fig. 7.

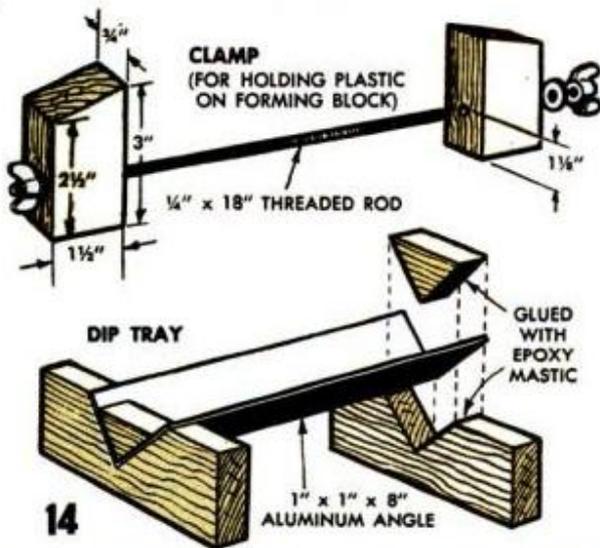
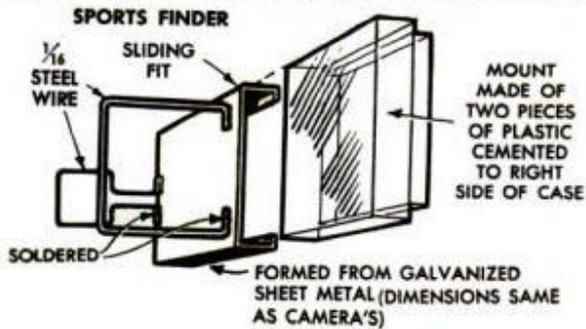
5. Next, the camera is mounted in the case, after drilling a hole in the bottom to take the fastening screw as shown. The lens board should be fully extended when doing this to assure adequate focusing clearance. Shutter speed and aperture-control shaft holes are located by positioning a spike (large nail) over the centers of these controls on the camera and marking for the hole on the right side first, as in Fig. 6. A 1/4-in. hole then is drilled through at the mark, after which the left side is fastened in place temporarily and the same procedure used for marking it to take the aperture-control shaft. The holes to be drilled in the case sides for the shutter release, film advance and focus shafts are best located by first making a template of each side of the camera, with the axial centers of the camera's controls (handle, in case of film advance) marked on it. The template then is taped in place on the appropriate case side and the holes drilled as marked.

6. Each control and through-case connection is fitted with an "O"-ring cemented to the outside of the case to seal out water. To assure proper alignment of the O-ring hole with case hole, insert one of the 1/4-in. shafts in the latter, then apply methylene chloride to the mating surface and slide the O-ring in place on the shaft. All control assemblies are detailed in Fig. 10.

7. The air valve is a standard tubeless tire valve, which is installed on the case with the parts that come with it. Air pressure from a few pumps of a tire pump before each submersion will leave a trail of bubbles in the event of a leak and give you time to surface before water enters.

8. The lead ballast at the bottom of the case is necessary to counteract the buoyant effect of the entrapped air in it. About 8 lb.





of lead are required (enough to allow the camera and case to settle slowly in the water) so that it won't float away when you set it down. A 1-lb. coffee can makes an excellent form for casting the lead weight.

9. When forming the handle from plastic rod, be sure to apply heat entirely around the point of bend. The 1/4-in. sponge-rubber gasket that seals the removable side of the case, is cut in one piece from a bathroom mat and cemented in place with electrical coating dope, such as Scotchkote. The thick part of a truck inner tube, also may be used for gasket material. The sports finder, Fig. 14, is an optional accessory.

Acrylic plastic scratches easily, so when making the case and later when transporting or storing it, protect the surface with a soft cloth. Shallow scratches can be removed by buffing with Cadillac polishing compound or similar fine-grade buffing material.

Shooting Tips

The same general principles apply to underwater photography as surface shooting, excellent pictures being the result of



correct exposures and good composition, lighting and printing. The only difference is that each of the above requirements is more critical in submarine photography.

Surface light loses intensity rapidly as it penetrates the water, partly because of reflection and partly due to minute particles of matter in suspension absorbing and diffusing (scattering) the light rays. In addition, a choppy surface normally will result in a loss of about one-fourth of the light intensity just under the surface. Therefore, try to shoot at close range and in shallow depths, unless flash is used. Fig. 3 shows an inexpensive flash unit bracketed on a camera case. Metal-clad batteries are used, while the flash cord is connected to the camera in the usual manner, after it passes through an O-ring at the back of the case, Fig. 7. Flash bulbs are carried in a small plastic bag attached to the bracket. The range is small but effective for fill-in light as demonstrated in Figs 12 and 13. Note how flash has improved the exposure in Fig. 12, whereas photo Fig. 13, taken under the same condition as Fig. 12 but without the aid of flash, has heavy shadows in critical areas and poor contrast. When a relatively large picture area must be flash illuminated, a larger unit must be used as in Fig. 1. These can be molded of fiberglass or made from suitable containers fitted with a bolted-on plastic window.

Effect of Depth on Color

Certain colors of the spectrum are absorbed at various depths, which tends to produce flat black and white pictures as well as fading or even total loss of reds, orange and yellow in color photos. Some of this can be corrected through the use of certain filters, but the latter then reduce the amount of light reaching the lens, usually canceling out any beneficial effect. When light intensity is high, sometimes a light yellow filter may be used to get more contrast in an exposure. Photos in Figs. 15 and 16 illustrate such a case. Note the flat, "burned-out" reef in photo Fig. 15 (no filter) as compared to the fine detail and good contrast of photo 16 (medium-yellow filter used). A depth of fifty feet is the practical limit for color photography when using available light. At 15 feet red and orange are filtered out, resulting in color exposures showing blue-green and yellow. At 30 feet, blue-green predominates with yellow appearing only faintly. The best time of the day to take color is when the sun is high. Low shooting angles produce a greater feeling of depth and get more marine life in the background. As in surface shots, look for background objects with which to frame your subject. ★ ★ ★

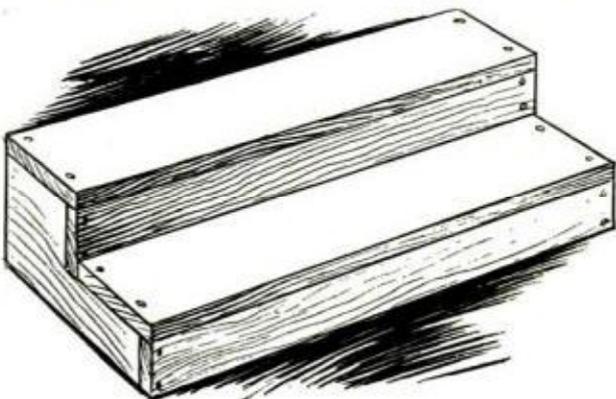


Depth Marks for Posthole Digger

It's easy to dig postholes to uniform depth when you've calibrated one of the handles to indicate distance from tip of the digger blade to each calibration. The latter are spaced at 2-in. intervals.—*Bil Toman*

Display-Type Shelf for Cabinets

Cabinet shelves have one common fault: it is so difficult to see what is stored in the back rows. This can be corrected easily by making display-type racks for each shelf as shown below.—*Fred Haitz*





Need a Trolling Motor?

For less than \$5 you can make one from a car-heater motor and a few odds and ends

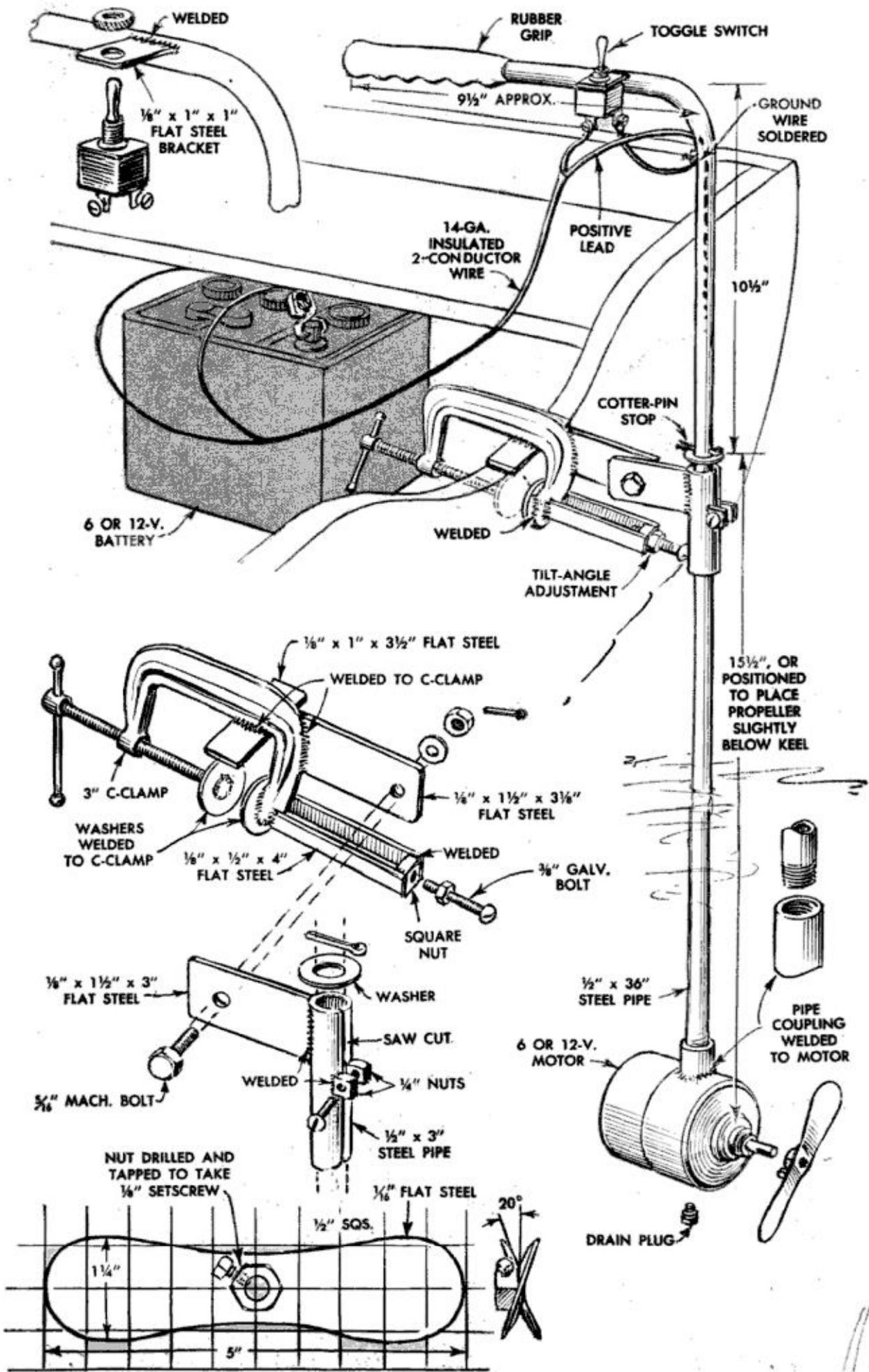
By Richard Hanson

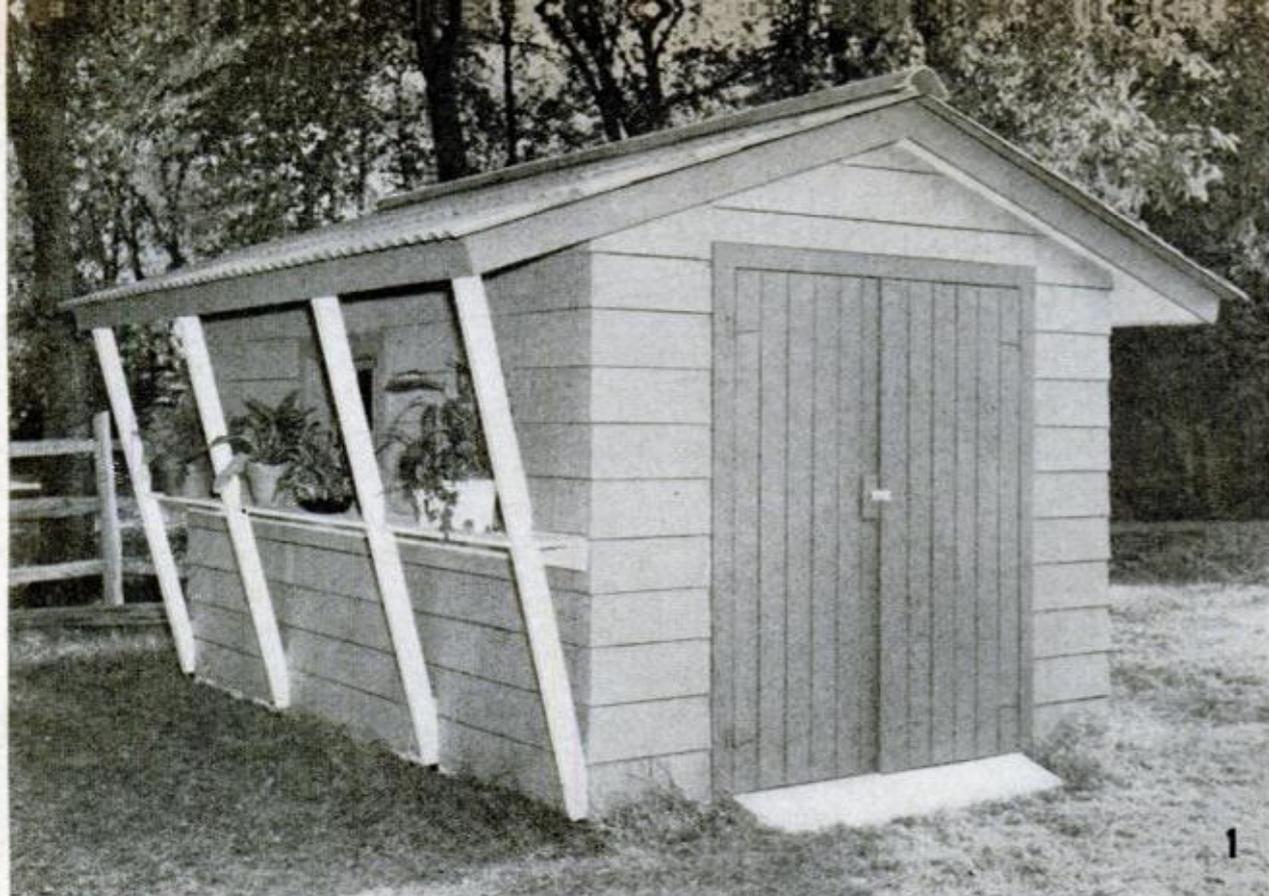
HIGH-POWERED outboard motors are fine for zooming out to your favorite fishing spot, but once there, all those "horses" are not needed for treading slowly (about 2 m.p.h.) among lily pads or over other likely lunger hangouts. What you really need is an electric trolling motor like the one pictured in use above. The assembly, detailed on the opposite page, is simplicity itself.

The basic part of the troller is the motor. The one used in this one is a 1952 Oldsmobile 6-v. heater motor obtained from a wrecking yard. Except for cleaning it and installing new brushes, the motor was used as is. A 12-v. motor may be used, but keep in mind that it will discharge the battery more quickly. If the power lead on the motor you use leaves the housing at the rear end, it must be relocated to a side position in an area that will permit a hole to be drilled through the housing. When doing this, first grind one end of the pipe coupling to fit the housing contour. Then, position it on the motor and plot the hole so

as not to interfere with vital motor parts.

Next, the coupling is centered over the hole and welded in place, after which the lead is fished through and solder-connected to the positive lead of the two-wire conductor. Be sure to make the latter long enough to reach from the battery to the lead on the motor. Since the conductor wire makes an exit through a hole drilled in the handle at the bend, it should be fished through the handle before soldering it to the motor lead. The slit-pipe sleeve below the cotter-pin stop must be slipped on the handle and the stop hole drilled before connecting the leads. If you intend to use the motor on rental boats, it's a good idea to drill several additional holes spaced 1 in. apart to permit raising and lowering the motor to match variable transom heights. Since the motor is not sealed, it should not be used in salt water. Fresh water in the motor will not short it out, but when storing it for a long period, it is advisable to disassemble the motor, clean the parts and coat them lightly with oil.





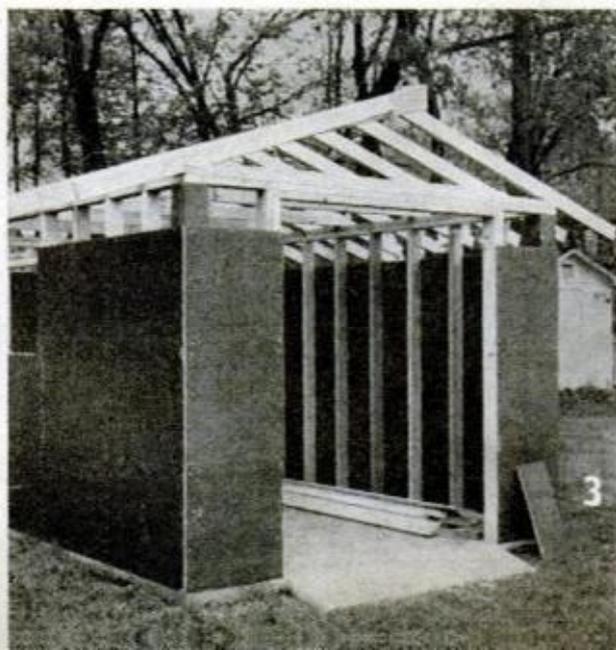
THE *Real* SPACE PROBLEM

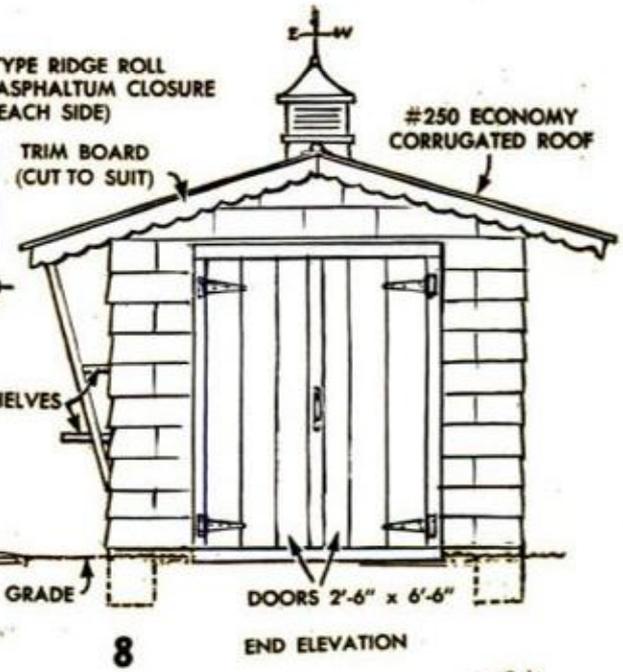
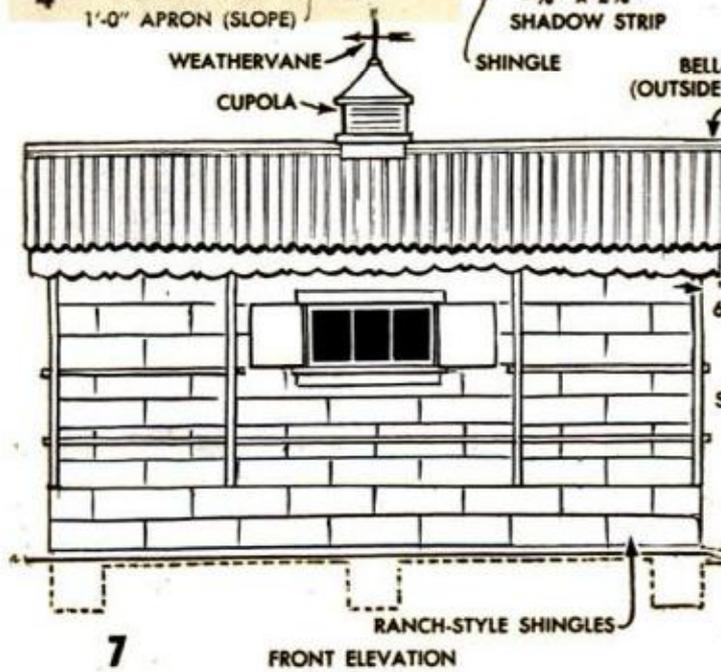
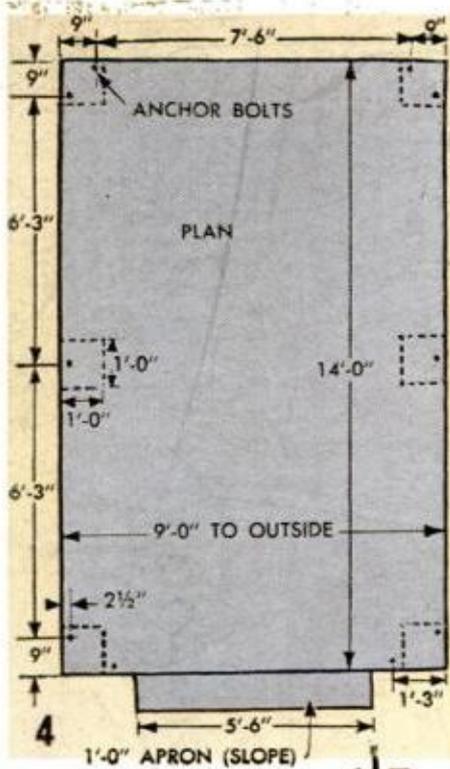
By E. R. Haan

It's not outer space but inner space that is the crying need of most families — where to put the 101 things that go with modern living is today's real space problem

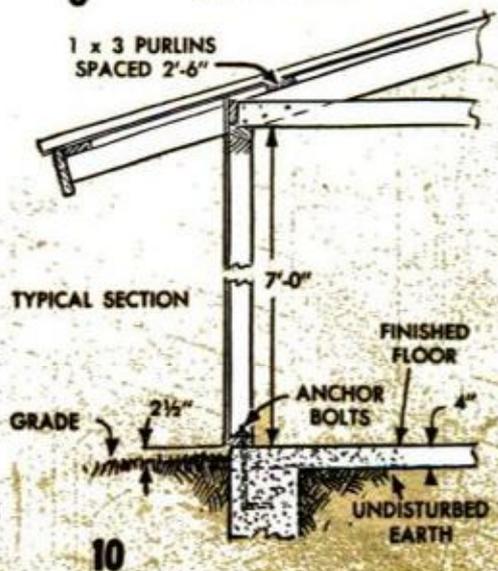
IF YOUR family is a typical one, the things you've acquired are already spilling right out of the garage and basement into the yard. Such rolling and hanging things as the garden cart, bicycles, kid's toys, power mower, garden tools—what to do with 'em? Build an outdoor storage room to take the overflow.

Your outdoor storeroom doesn't have



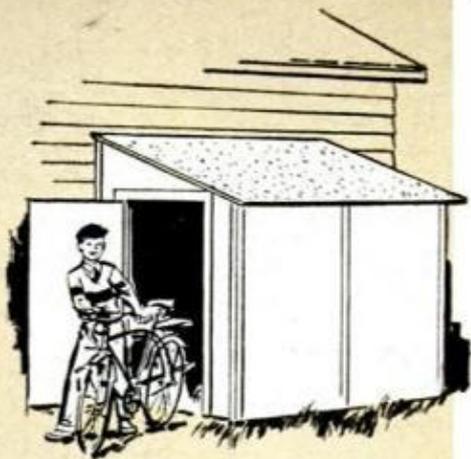


Design By National Gypsum Company

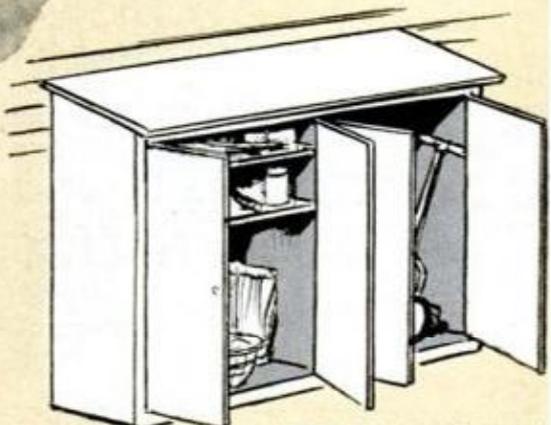




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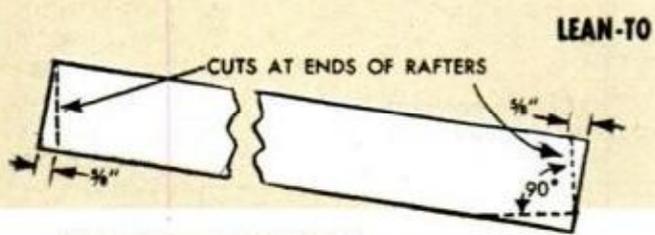


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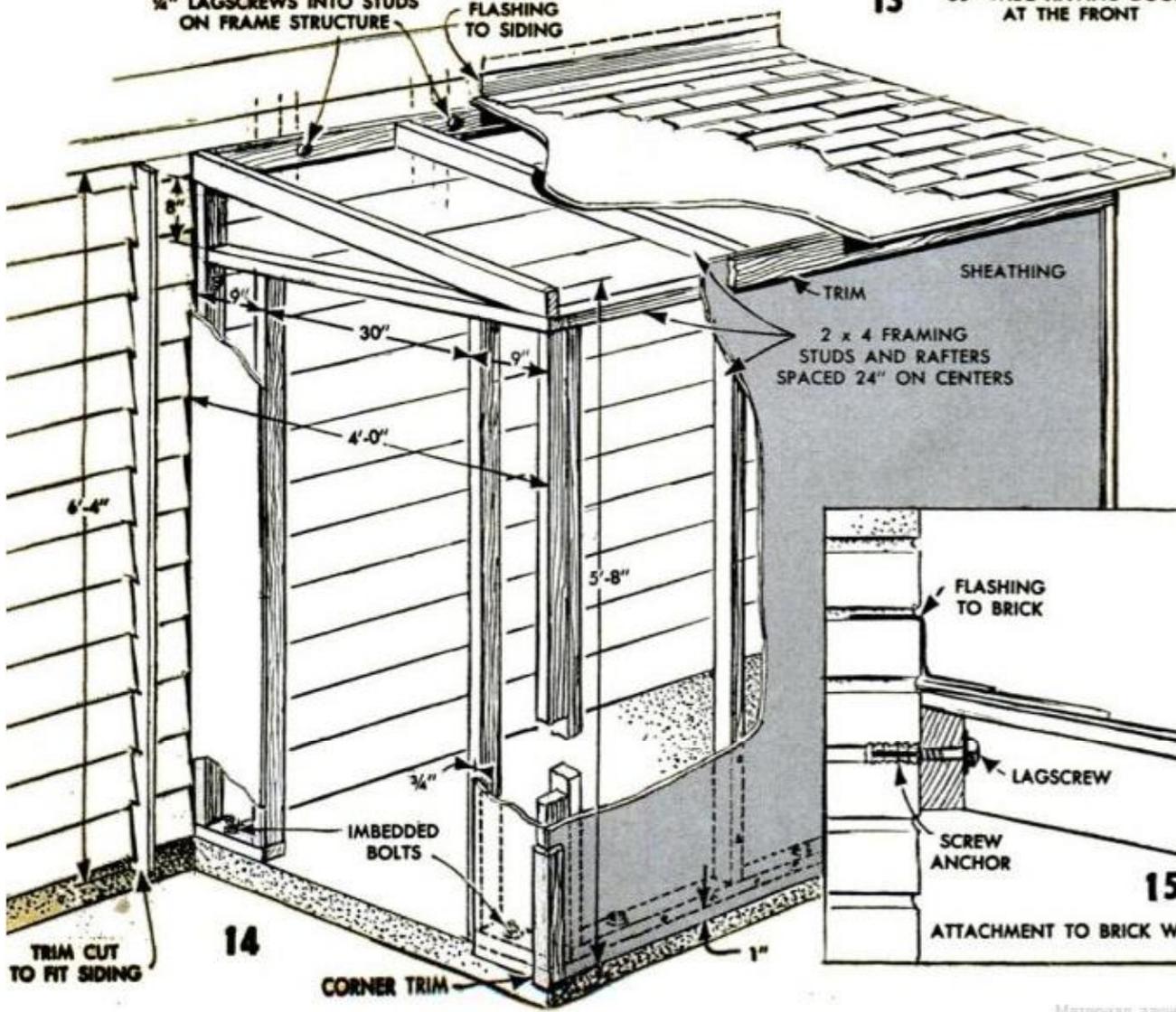
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ALTERNATE ARRANGEMENT
30" WIDE HAVING DOORS
AT THE FRONT



1/4" LAGSCREWS INTO STUDS
ON FRAME STRUCTURE

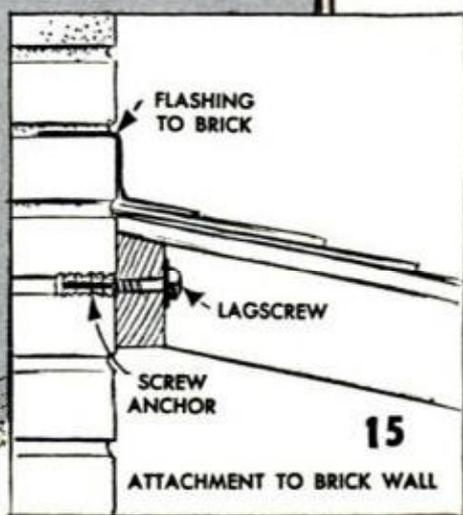
FLASHING
TO SIDING



14

CORNER TRIM

TRIM CUT
TO FIT SIDING



15

ATTACHMENT TO BRICK WALL

to be just plain utilitarian. You can even think of a part of it as a retreat, a hobby shop or a potting shed and plan a part of the interior-exterior accordingly. It can be a lean-to, a free-standing structure with some architectural detail matching the home; it can be built on as an addition or it can be a take-apart deal, which, if you rent the property, can be dismantled and taken along when you move. And it can be built for less than a pocketful of money.

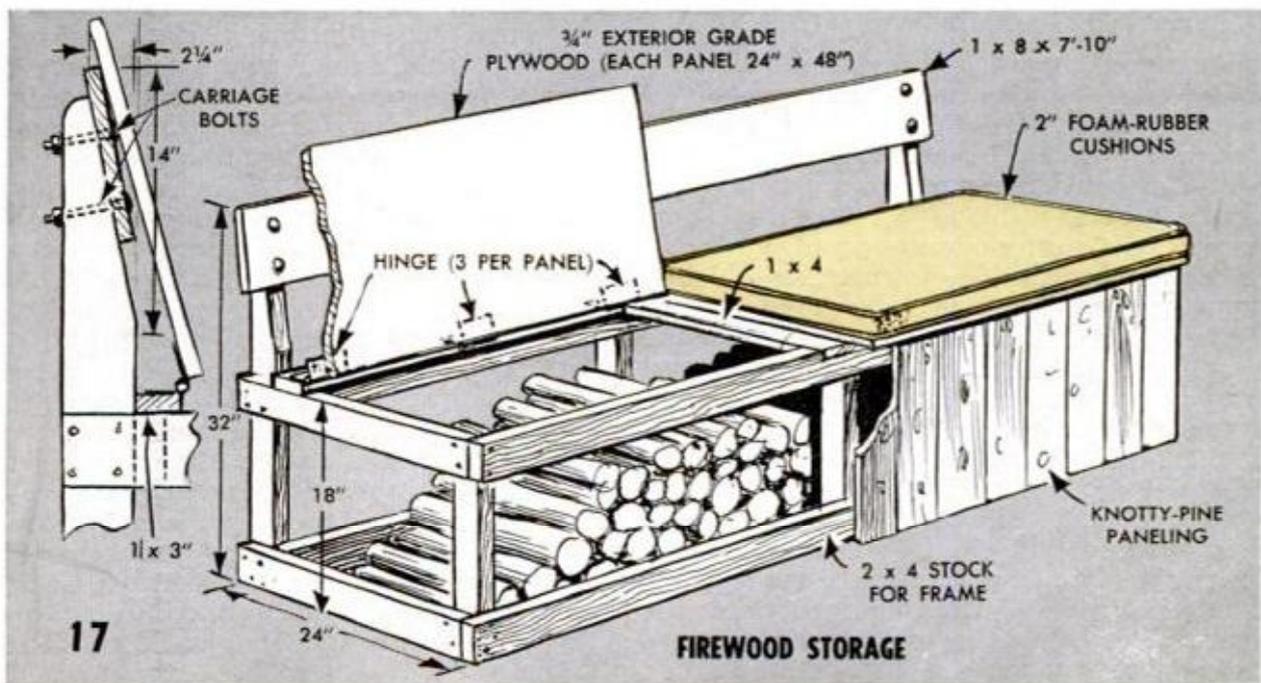
Free-Standing Storeroom. As an example of what can be done in making an outdoor storeroom look like something it isn't, note the classy little structure in Fig. 1. Sharp, isn't it? And it can be yours in less time and at less cost than you think. Figs. 2, 3 and 9 picture it in three progressive stages of construction and Figs. 4, 5, 7, 8 and 10 give you all details you need to know in order to build it. Note especially the floor plan, Fig. 4, and the sectional view, Fig. 10, both of which show how the concrete, slab-type floor is supported on concrete piers which should extend about a foot below grade in warm climates but from the grade down to the normal frost line in cold climates. Once the floor is poured with its apron, or ramp, the rest of the construction is simple. Fig. 6 shows how to cut studding by placing several 2 x 4s edge to edge and flush at one end. Measure the required length and strike a pencil line across the faces of all the pieces at a point that is equal to the required length of the studs. Then clamp or tack a guide strip a distance from the line equal to the measured distance from the edge of the sole plate to the side of the blade on your portable saw. Now you're set to cut all the 2 x 4s to duplicate lengths with just one pass of the saw.

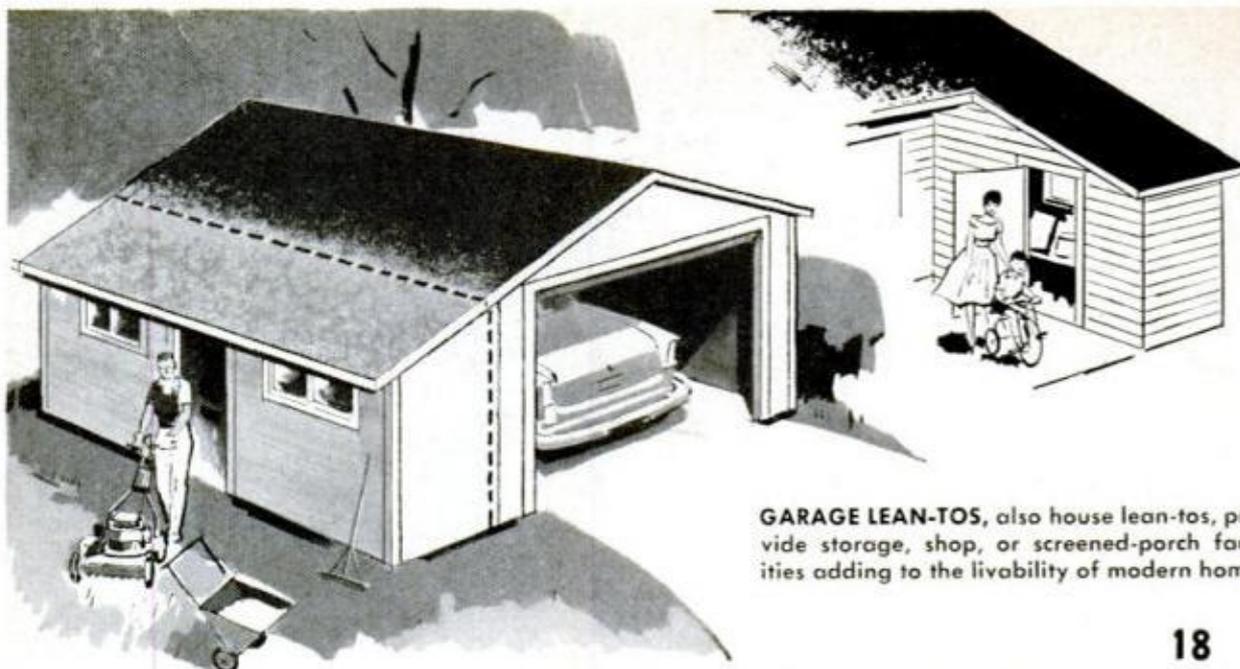


16

Once the studs and plates are in place on the slab you fit the rafters, joists, purlins and trim boards, the latter either plain or scalloped as in Figs. 7 and 8. Then apply the gypsum sheathing, the ranch-style shingles over shadow strips and finish up with the corrugated gypsum roofing capped with a bell-type ridge roll. Taking it from there you can add a cupola and weathervane and install the slanting shelf supports and out-swinging doors and windows as detailed, or complete it in a design and detail that suits your fancy.

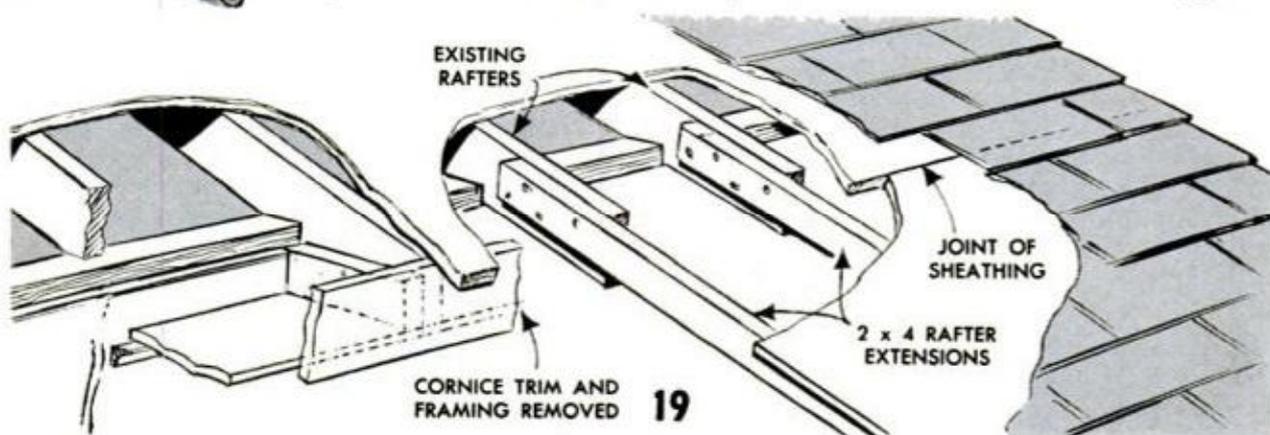
Lean-tos. A lean-to makes about the simplest practical storage unit you can build. It can be the three-sided affair you see in Fig. 12 and detailed in Fig. 14, or you can turn it a quarter of the way around and build it to appear more as an addition to





GARAGE LEAN-TOS, also house lean-tos, provide storage, shop, or screened-porch facilities adding to the livability of modern homes

18



19

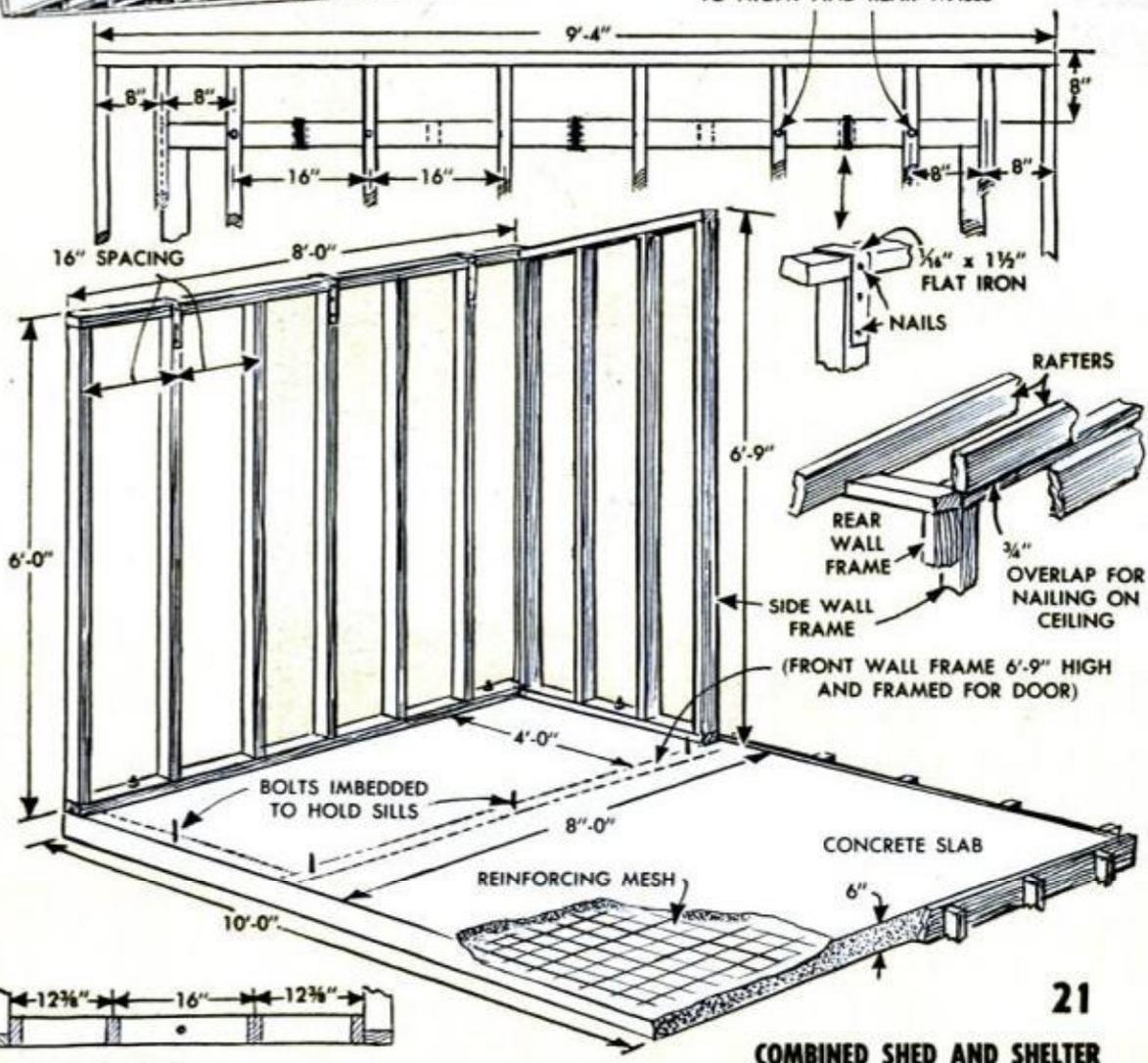
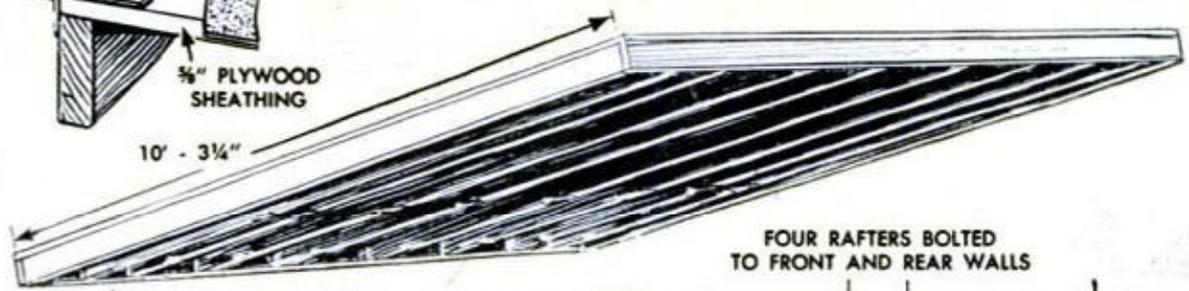
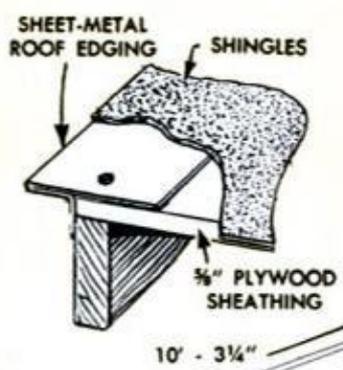
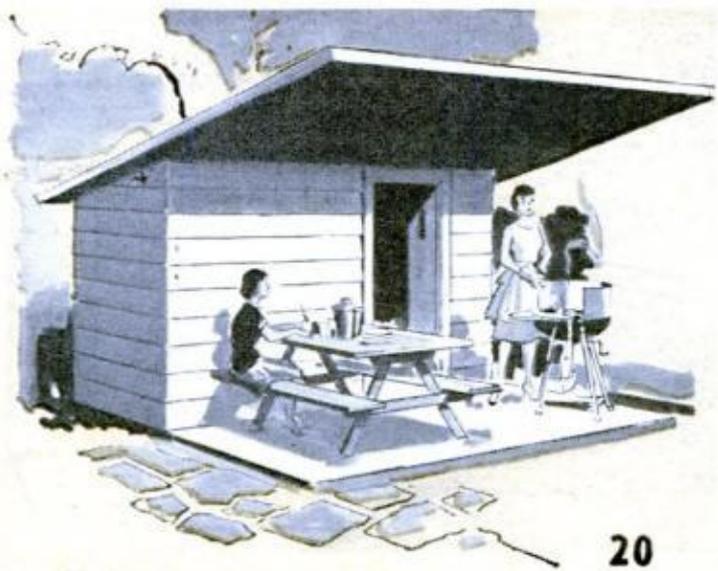
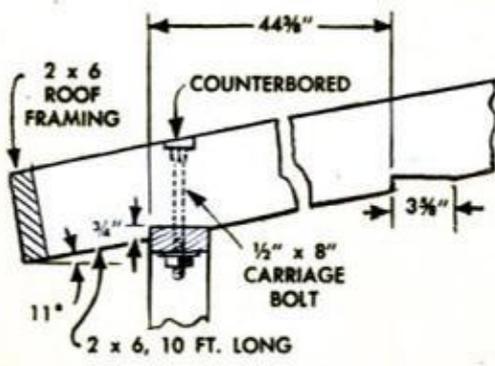
the house as in Fig. 11. The latter structure has the advantage of a center door and is built on an extended concrete slab, the exposed part of which can serve as a patio or as a parking pad for the car. Still another version of the same simple lean-to built for storage only is shown in Fig. 13. Here the unit is compartmented with one pair of out-swinging doors opening on a compartment having shelves, the other pair opening on a compartment designed for storage of the power mower. Such a structure is very simple to build using a framing of 2 x 2s or 2 x 4s and a siding of waterproof plywood or cement board. The framing should be supported on a concrete slab poured over a tamped gravel fill or on concrete blocks placed with the top faces just above grade level. The roof should be flashed to the house siding as in Fig. 14, or to a brick wall as in Fig. 15. Where the lean-to wall joins siding the joint should be covered with a trim board notched as in Fig. 14 to a neat, close fit against the siding. Fig. 14 suggests dimensions for a true lean-to such as shown in Figs. 12 and 13. The same general construction can be followed when building the addition shown in Fig. 11, but, of

course, the over-all size can be made larger if desired.

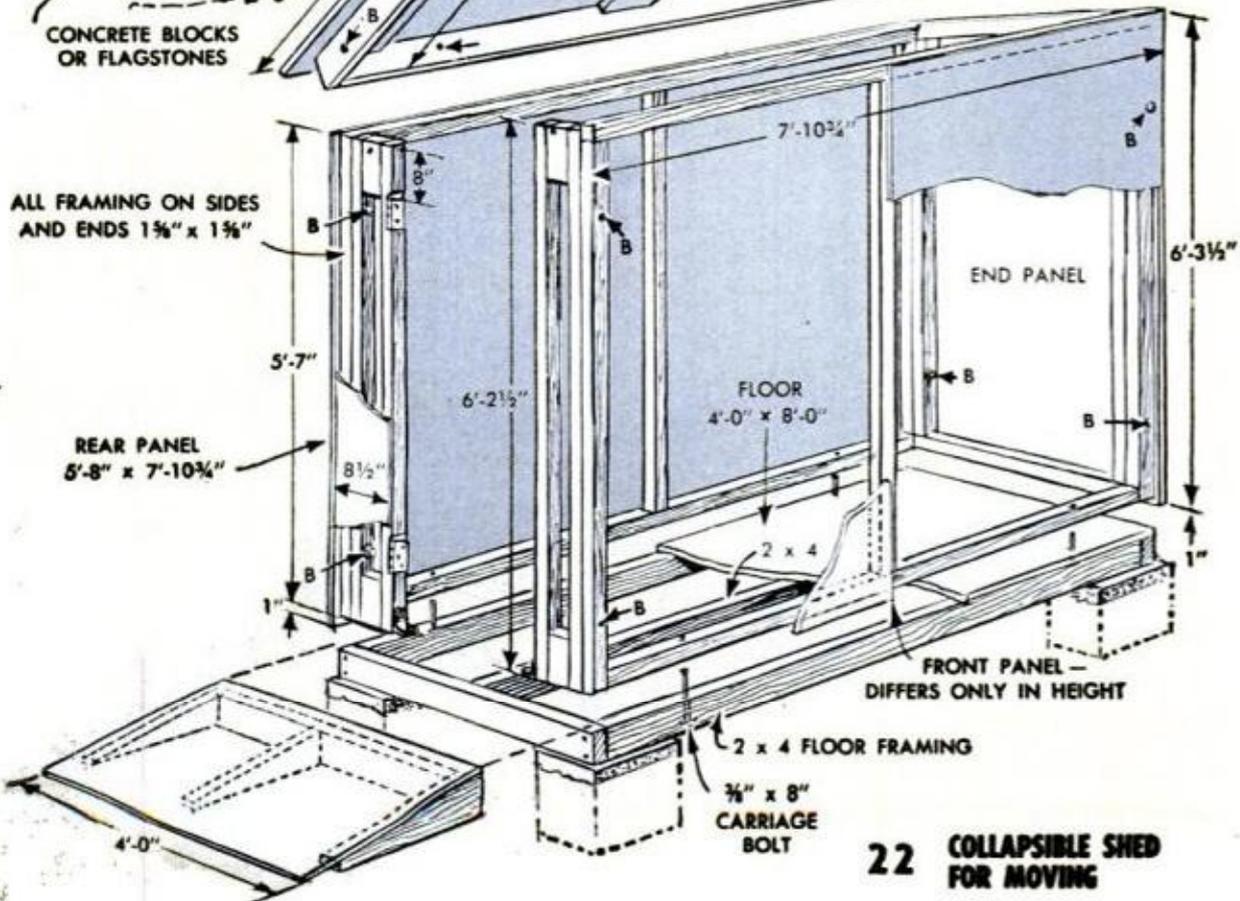
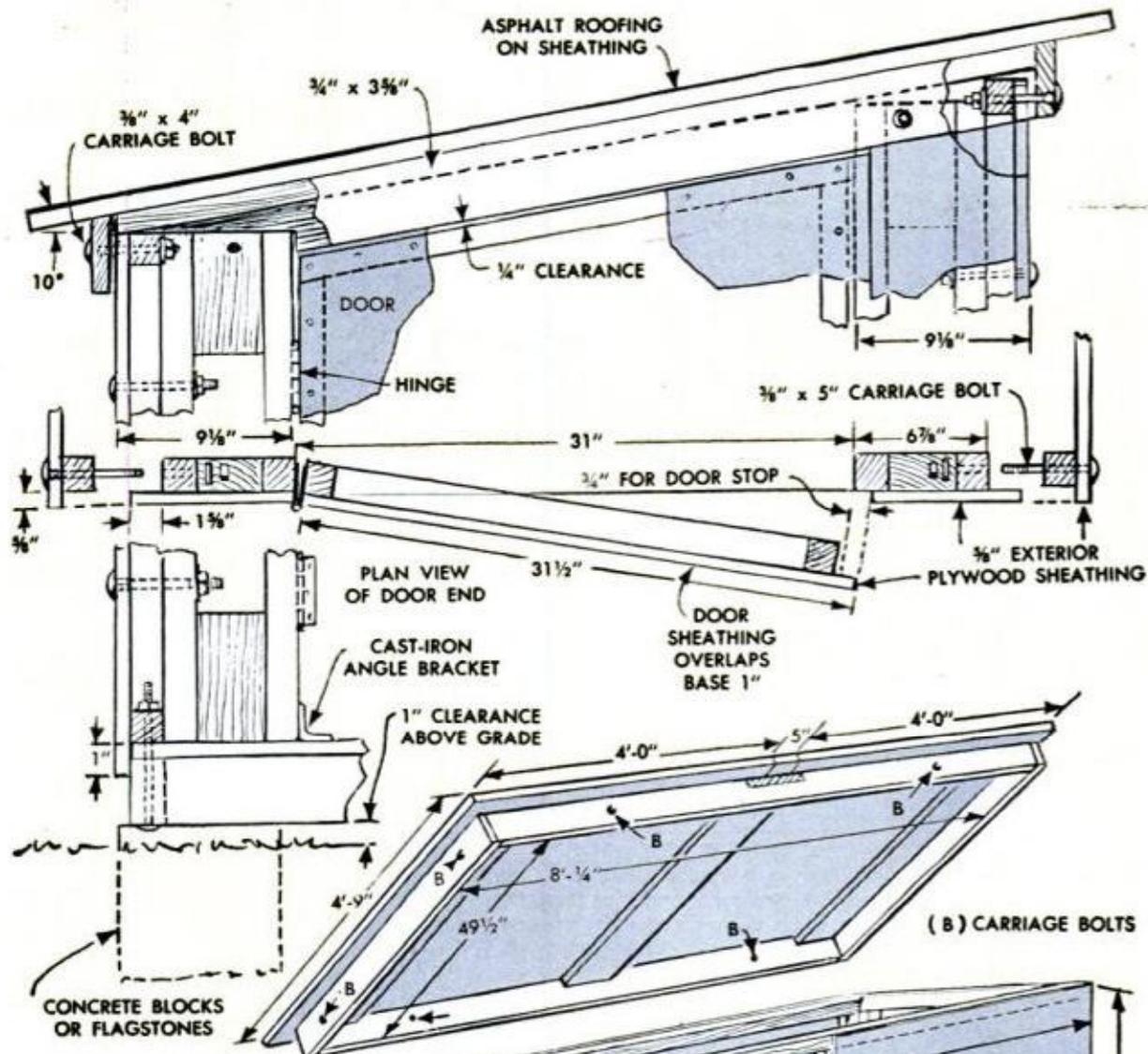
Lean-to Additions. Lean-tos which are really structural additions to a house or garage are shown in Fig. 18. Such additions can be made to existing buildings where the roof pitch of the original will permit extending the rafters in a straight line without going much below head height at the plate of the new structure. Of course, roofs of lean-to additions are often pitched at lesser angles than that of the original structures but this sometimes is very unsightly. For this reason the best practice requires that the lean-to roof be pitched at the same angle as that of the original gable. As a rule a more pleasing roof line results.

Fig. 19 shows in detail how to open an existing cornice and build in lean-to roof members when making additions to a home or garage. Such additions can be utilized for storage purposes only or they can provide storage with a partial patio enclosure or part of the new structure can be partitioned as a hobby room, a screened area or perhaps a studio or potting shed.

Combined Shed and Shelter. You'll like the sheltering overhang of the storage shed



21
COMBINED SHED AND SHELTER



22 COLLAPSIBLE SHED FOR MOVING

in Fig. 20. This novel design feature adapts such a structure to the back of the lot where the sheltering overhang gives a feeling of privacy and invites a cookout even on a showery day. Fig. 21 gives the construction details and suggests over-all dimensions. Note especially the flat iron straps joining the plate to the rear-wall studs and the provision for nailing the ceiling material (plywood) to the rafters on the overhang. The iron straps prevent the weight of the unsupported overhang from pulling the plate loose from the studs. Note also that four of the rafters are bolted to both front and rear walls and that the roof framing is edged with strips of sheet metal bent to the shape indicated in one of the details.

Collapsible Shed. If you rent, then the collapsible shed in Fig. 22 is for you. It can be set up or taken down in a few minutes. Just unscrew the carriage bolts, B in Fig. 22, and down it comes piece by piece. Set up it's a complete weatherproof structure with a shed, or lean-to, type roof. Support the floor sills on concrete blocks or flagstones and provide a ramp as detailed for easing the power mower, barrow or cart up to and through the door. Use framing materials of the sizes indicated in Fig. 22 to keep the prefabricated parts as light as possible and still retain the necessary strength and rigidity. Note that the entire structure is covered with $\frac{5}{8}$ -in. exterior Douglas fir plywood.

Firewood Storage. No one who has a fireplace escapes the wood-storage problem. Where to put fireplace logs where they are always readily accessible, always dry, yet out of sight? Just a box won't do and a woodshed has been long since outdated. Usually there's space on a patio or porch for wood storage, but don't just cord the wood along the wall or build a box with a hinged lid. Go a step farther and build a combination seat in the sun and storage box in one as in Figs. 16 and 17. You'll always have clean, dry wood for the fireplace, a comfortable patio or porch lounge and never an unsightly woodpile.

Put together a frame of 2 x 4s as in Fig. 17, hinge lift-up seat panels of exterior plywood to a 1 x 3 strip along the back of the seat frame, using three hinges per panel. Then cover the front and ends of the seat-woodbox combination with knotty-pine paneling. Attach the back, or backrest, with two bolts through each of the three supports. Make foam-rubber cushions with waterproof covers. Finish the paneling and backrest in the natural color with an outside clear finish. Each hinged seat measures 24 x 48 in. and is cut from exterior plywood. ★ ★ ★

FOR CAMERA BUGS



Garbage-Can Tanks

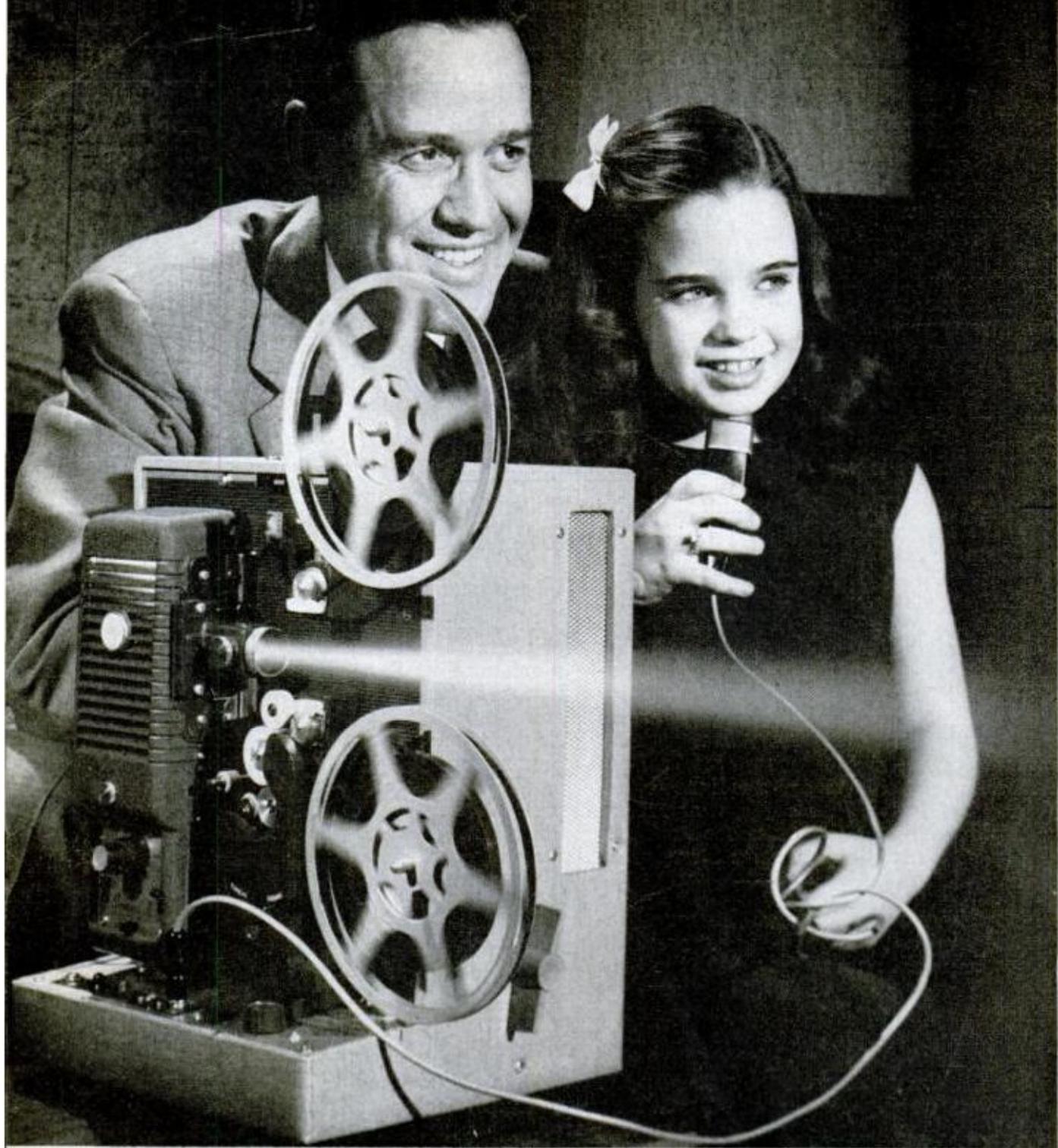
Photographers who mix large quantities of chemicals at one time, such as the replenishers in color processing, have a problem of finding containers large enough for storage. This is easily solved by using plastic garbage cans which are lightweight and inexpensive. Most of them have covers that can be locked on by twisting which will prevent evaporation, keep the solutions clean and retard oxidation. By placing the tanks on individual dollies or on a caster-fitted platform large enough to hold the group, the tanks can be kept under the darkroom work table and rolled out for convenient use. A graduate is useful as a calibrated dipper to scoop out measured amounts.—Wayne Floyd

Paper Clip Holds Thermometer

This simple idea will keep your stem thermometer upright in a photo chemical tempering tank so that you can note the temperature at a glance without reaching into the tank for it. Make a hook out of a large paper clip by straightening out one end. Wrap this around the stem of the thermometer just under the dial and hook the loop over the edge of the tank.

—Duane Honsowetz





NOW—Sound for 8-mm. Movies

By Robert L. Hering

EQUIPPED WITH an 8-mm. sound projector, owners of silent 8-mm. movie cameras now can add sound to their films. Thanks to a magnetic-oxide coating which is applied to the edge of the film alongside the perforations at the time the film is processed, the amateur can enliven his silent movies with speech and music. Even films shot years ago may be edited, the oxide stripe added and the sound dubbed in.

Commentary is recorded by speaking into a microphone supplied with the pro-

jector as the film is projected. Music or other sound effects also can be added through use of a tape recorder or record player. The sound track plays back when the film is projected again.

The coating service is now available through dealers and can be applied at any time—before processing, at the time of processing or after the film has been returned from the laboratory. This means you can edit your old films, combine old scenes with new ones, return them to your



WITH TRAVEL MOVIES you can bring back the sounds as well as sights of your trip



SOUND PICTURES make wonderful records of every-day activities and children at play



FAMILY HOBBIES will be more fun if photographic records are made of them (above). With sound also on film you will own a film library that friends will enjoy seeing

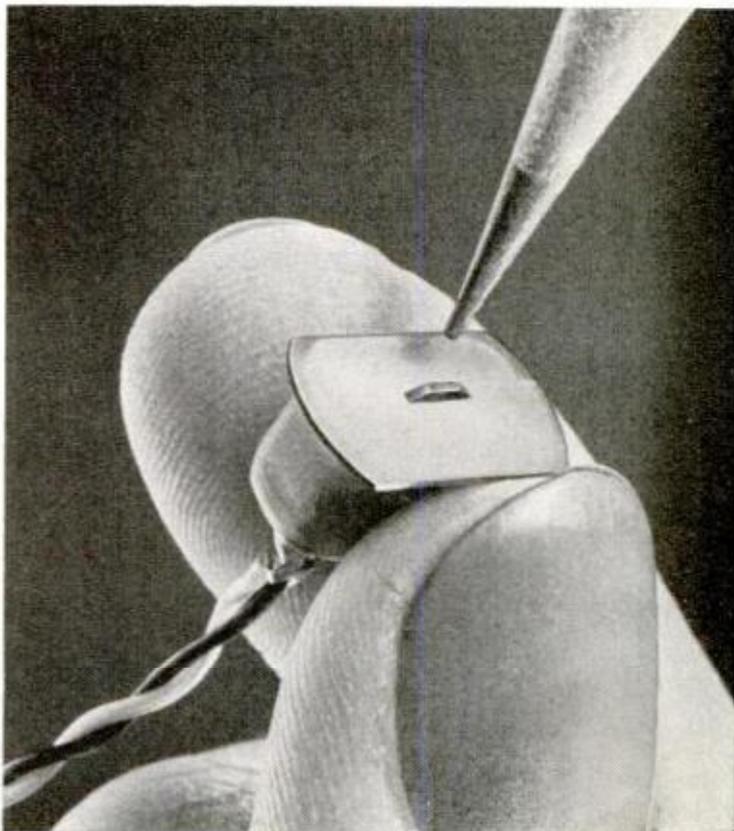


AUGUST 1961



THERE MUST BE ROOM enough on the narrow 8-mm. sound film for a 30-mil oxide stripe, sprocket holes and picture. For the best sound, recording head should be narrower than oxide stripe

THIS SMALL SOUND HEAD is made from a new metal called Alfenol. Its characteristics are such that the head is hard enough to wear well yet magnetically "soft" to transmit magnetism well



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ELECTRONIC ACCESSORIES, such as a tape recorder, make the 8-mm. sound projector much more versatile. The tape recorder, left, requires pre-amplifier, above center. Mixer, above right, mixes sound from several sources. A balance meter is shown above left. With it you can balance volume from two sources

dealer to have the sound track added and then record speech and background music on the film itself.

Here's how the sound is added: As mentioned, you must have a sound projector. And it is best to have independent micro and phono inputs that make it possible to mix voice and musical background at the desired sound levels. Basically the new 8-mm. sound projectors combine a projector and tape recorder in one unit. The projector has a sound head which picks up sound from the magnetic-oxide stripe. Then an amplifier increases the strength of the electrical signal so that it can be played back through the speaker. To make changes in the sound track, you simply re-record and the new track wipes out the previous one as music and speech are added.

To mix voice with phonographic or tape-recorded music, insert the microphone plug in the projector receptacle and adjust the volume to the desired recording level. Then plug the phono cord into the second receptacle on the projector. Connect the other end of the cord to the loudspeaker terminals of the phonograph or tape recorder. The volume control is then adjusted to the background level desired. With independent feeders, it is possible to raise and lower the level of background music to fill in time lapses in the narrative.

The breakthrough in 8-mm. sound came when Navy research developed an aluminum and iron compound called Alfenol, which is magnetically "soft" yet physically hard. With these properties it was possible to reduce the size of the sound heads to the extremely narrow width needed for record-

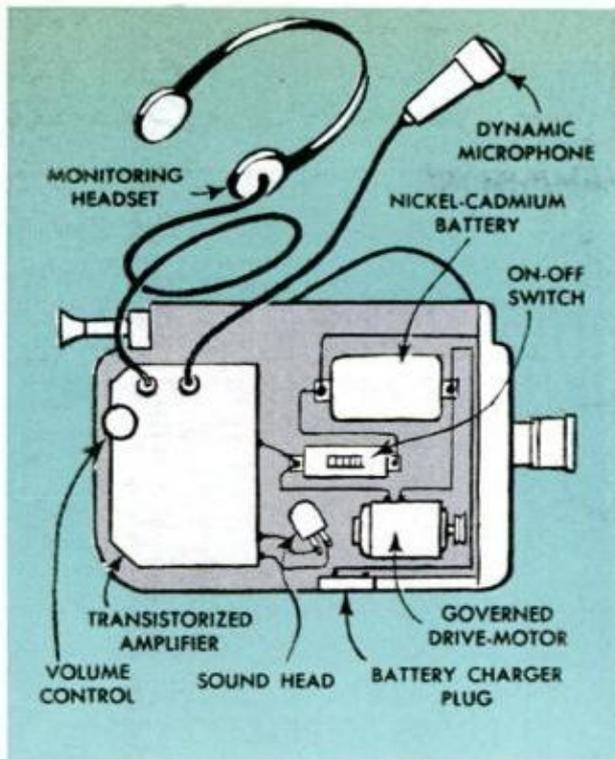
ing on the 30-mil-wide magnetic-oxide coating used on 8-mm. film.

While 8-mm. sound is not practical for large professional film productions, it is far more than just a toy for movie hobbyists. For the home market there's already a brisk business in 8-mm. silent film releases. And even at this early date in the development of 8-mm. sound, several Hollywood movies have been leased from major studios for sale to the home movie market. Just as soon as more sound projectors are in the hands of the public there is sure to be an increasing number of old movie classics available for home use.

Standard optical sound used for commercial motion picture production is too expensive for the hobbyist and other small user, both in time and money. To change the sound on an optical sound track, for example, a new film must be recorded and processed. With magnetic sound-on-film it is possible to change the original sound track by simply recording over the old track as you do on a tape recorder.

Optical sound is permanently made a part of the film, and it cannot be erased. But a magnetic sound projector needs a foolproof way of locking the machine to prevent accidental erasures. The ease with which you can change a magnetic sound track is one of its big advantages. Still, at present, accidental erasures are possible if the operator is careless.

Until the recent introduction of 8-mm. magnetic sound striping, the cost of sound movies was prohibitive for the hobbyist. But now 8-mm. materials, for example, are priced roughly at one third that of 16-mm.



CINEPHONIC 8-MM. SOUND CAMERA includes the amplifier, motor, battery and controls in one unit



SINGLE-SYSTEM SOUND CAMERA assures accurate lip synchronization. The 8-mm. camera is easy to load

sound materials and use only one fourth the amount of film stock that 16 mm. does.

Processing costs for 8 mm. will be approximately half of 16 mm. once production problems are solved and volume increases as expected. For large print runs, gang printing will probably be used—possibly four 8-mm. films printed on one preperforated 35-mm. film, which will result in still further savings for quantity users, who in turn can sell prints at lower prices for home use.

A portable recorder is undoubtedly the most useful piece of auxiliary equipment. Recorded music, sounds and narration simply can be re-recorded from the tape onto the film sound track. With tape you'll be able to pick up sound effects that otherwise would never be practical. The tape recorder extends the use of magnetic sound recording for motion pictures by its ability to fit in with the 8-mm. system at little additional cost. It's a lightweight, convenient tool.

Where several sources of sound are mixed on one film track, an external mixer is used to record electronically, with each source controlled by an individual volume control for different sound effects.

As this story goes to press only one 8-mm. movie camera is available for single-system sound recording, the Cinephonic. But you can expect other cameras to be on the market soon. The real advantage of a single-system, sound-recording camera is for lip-synchronized scenes or whenever sound and screen action must match. ★★★



THIS NEW RECORDING PROJECTOR is designed to be used with the Cinephonic 8-mm. sound camera



MR. DO-IT AND BUNGLE



HEY DOEY! WHY DON'T YOU COME OVER AND CHAT AWHILE —

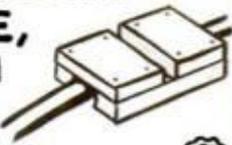
TO TELL THE TRUTH, BUNGLE — I JUST CAN'T STAND TO LOOK AT THE WAY YOU TREAT YOUR HOSE

I WAS JUST READING ABOUT THE PROPER CARE OF GARDEN HOSE...FOR INSTANCE

IF YOUR HOSE CROSSES YOUR SIDEDRIVE, PROTECT IT FROM TRAFFIC WITH A WOODEN BRIDGE.

A GOOSENECK CONNECTOR OR SEVERAL LOOPS OF FRICTION TAPE EASE STRAIN AT SILLCOCK.

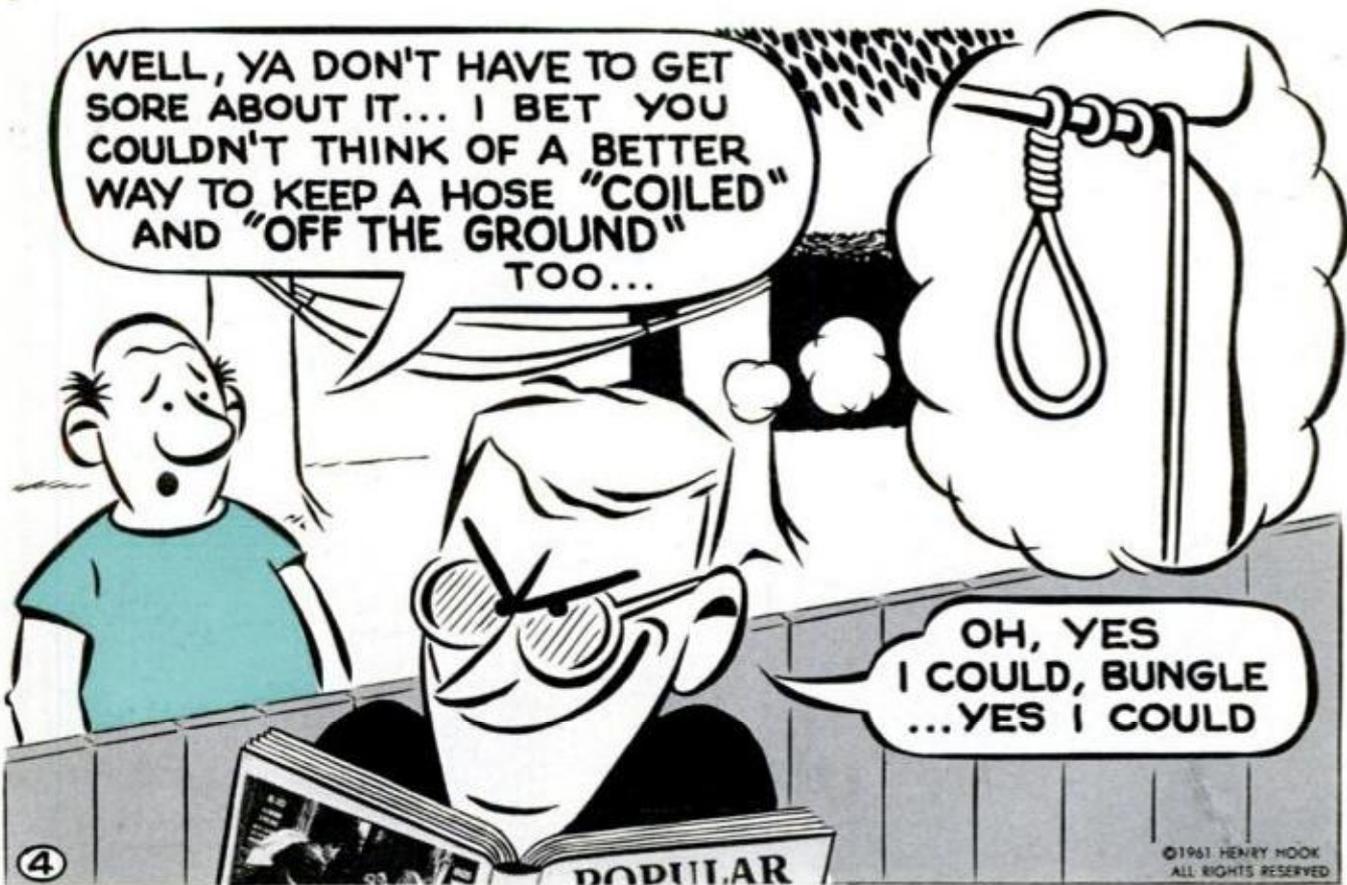
KEEP YOUR HOSE ORDERLY AND NEATLY COILED!



HOW'S THIS FOR "UP OFF THE GROUND"? PRETTY COOL, EH DOEY — HAW HAW YA GET IT, DOEY "COOL" YA SEE THE WATER RUNS THROUGH THE HAMMOCK AND...

AW SHUT UP!

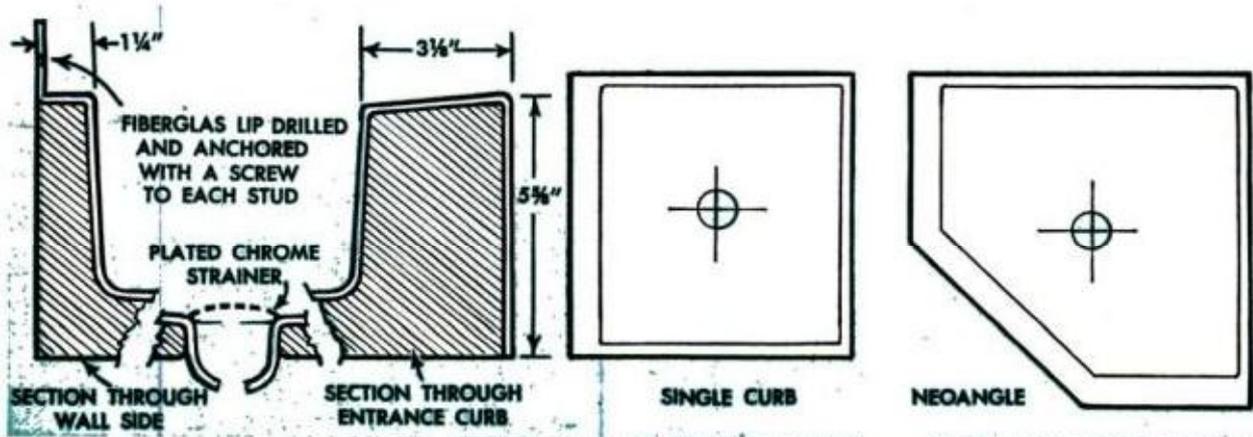
Guilty of hose neglect? Properly cared for, your hose should last a long time. If you treat it like an old shoe, you may wind up buying a new one each year



PM REPORTS



WHERE ONE WALL is exposed as in this in-a-corner installation, a textured-glass panel is available. Standard door is of same glass but a smart decorator door of butterfly-and-leaf design can be specified with kit



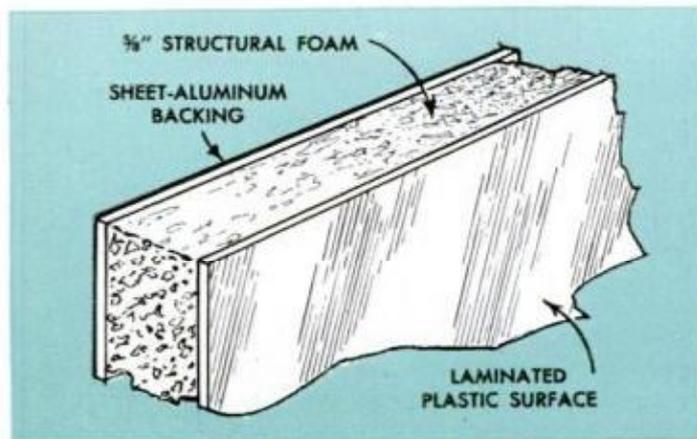
SHOWER STALL

In a Package

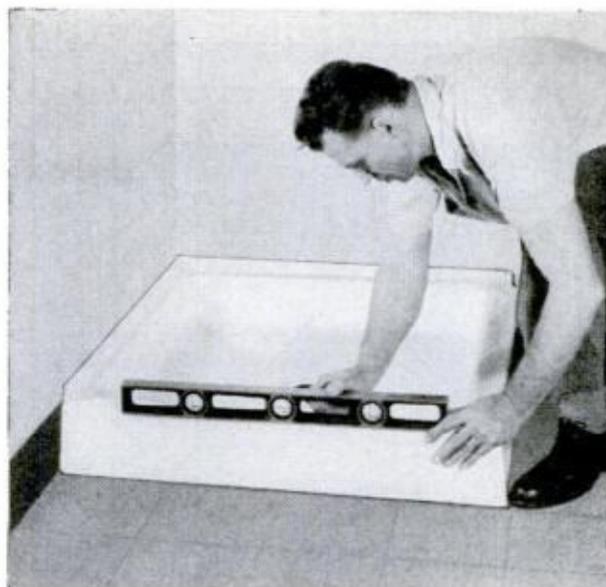
HERE'S YOUR do-it-yourself shower stall in a kit. It is manufactured by the Loup Engineering Co. of Columbus, Neb., and on your order can include a fiberglass receptor with double curb for in-a-corner installation, neangle curb for across-the-corner placement or a single curb for along-the-wall locations. You have a choice of sandwiched stall panels, foam filled and aluminum backed, in a range of decorator colors flecked in gold and white. Sandblasted, textured glass in a variety of patterns also is available. Doors come with anodized aluminum frames in satin, gold and black with panels in laminate, with or without flecks, and in various designs such as the butterfly pattern pictured on the opposite page.

Installation of an in-the-corner stall begins with the placement of the receptor and drain connections. Make sure the receptor is level so that proper fit of the panels and frames is assured. Next, you set up a panel on that side where the plumbing taps are located and mark where holes are to be drilled through the panel for the shower head and faucet stubs. When drilling the holes bore through the laminated panel from both sides.

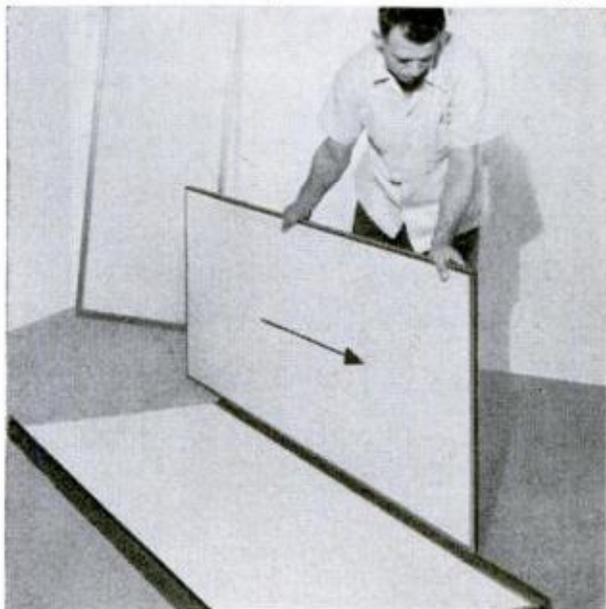
Next, you assemble stall panels simply by sliding them in aluminum corner posts. Apply calking compound to the receptor flanges and set the panels in place on the receptor. Drill holes and attach the panels with the self-tapping screws supplied. Follow with installation of the header frame which is fitted and attached with screws. Finally, snap the metal sill into place, making sure that it fits properly, and you're ready for the door. Attach the handle and catch to the door, set in the opening and drive the fourteen self-tapping screws which hold the hinge. ★ ★ ★



AUGUST 1961

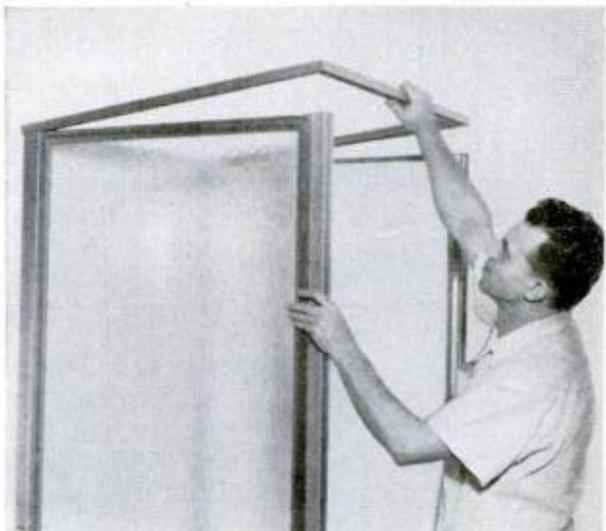


RECEPTOR is leveled so that frames and panels fit properly. Fiberglass receptor comes in three curb types



PANELS slide together with interlocking corners. A smear of light grease permits them to assemble easily

ONCE HEADER FRAME is in place assembly is ready for door. Parts are assembled with self-tapping screws



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By
Will
Hector

HOW TO ADJUST BENDIX BRAKES

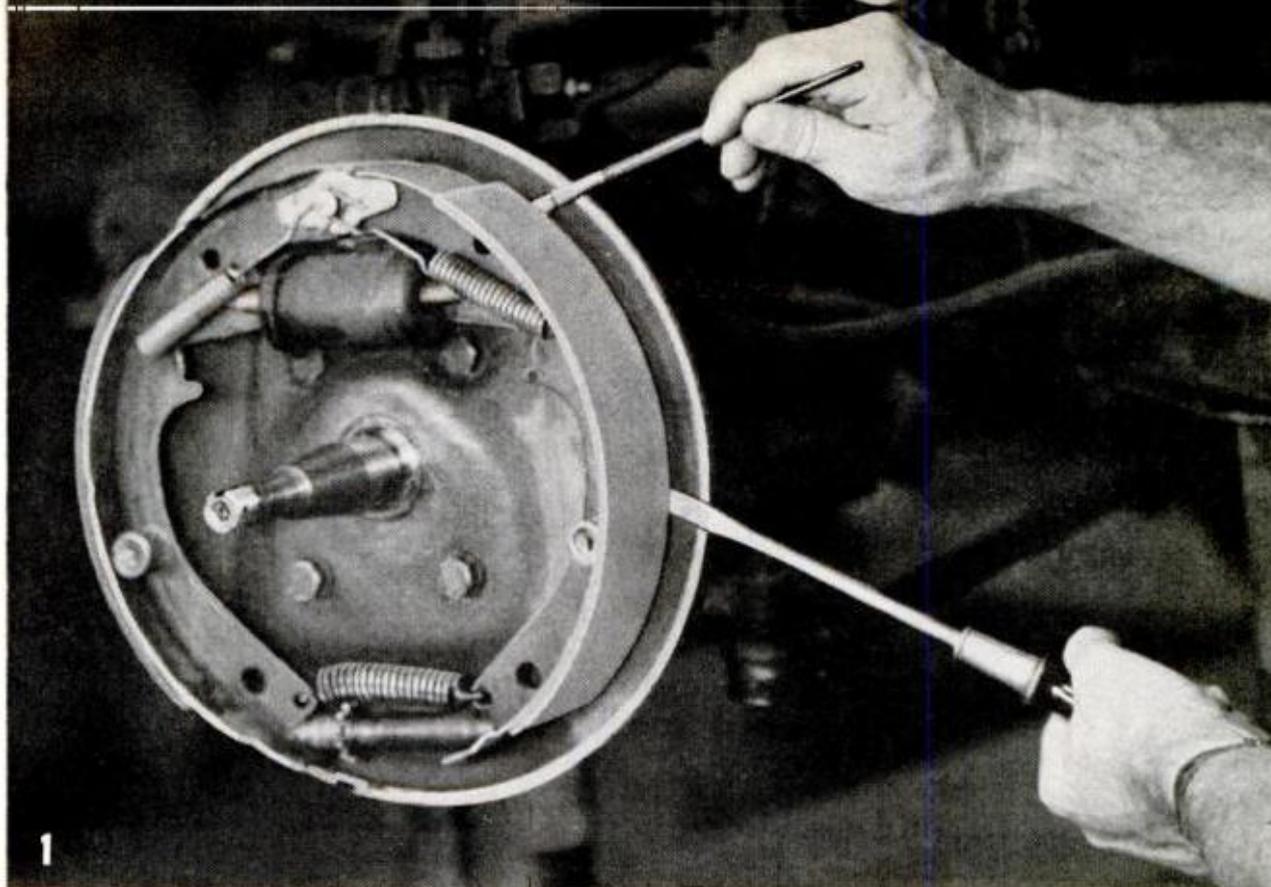
Nearly all car manufacturers except Chrysler install Bendix brakes as regular equipment. Here's how to service and adjust them properly

WHEN A sudden emergency develops at highway speeds you have little more than the flick of an eyelid to tramp on the brake pedal and stop your car short of a crash. In such situations it's too late to guess about the condition of your brakes. You have to know—and for sure.

A few simple adjustments every 5000 to 8000 miles will maintain car brakes in prime condition. Peace of mind as you drive, longer brake life, easy, sure stops and minimum expense at relining time—these are a few of the rewards of timely

brake care. And like other car owners, you'll be surprised to learn how simple it is to service and adjust brakes.

Read the chart of common symptoms of brake defects, study Fig. 4 carefully, then if there is reason to believe your brakes need attention, carry out an inspection. Jack up a wheel. Pry off the hub cap with a heavy screwdriver or use pliers. Clean the hub cap so that you can use it as a receptacle for bearings and any other parts you may remove. In any case, be sure you store these parts in a safe, clean place while



THOROUGH CLEANING of brake mechanism is important step in servicing. Use brush and vacuum cleaner

SYMPTOMS THAT SHOW NEED FOR BRAKE ADJUSTMENT

Minor care

- Excessive pedal action
- Brakes drag
- One wheel drags
- Car pulls to one side
- Excessive pressure required on pedal
- Brakes too sensitive
- Brakes chatter or squeal

NOTE—Brakes should be cool when making adjustments

Major care

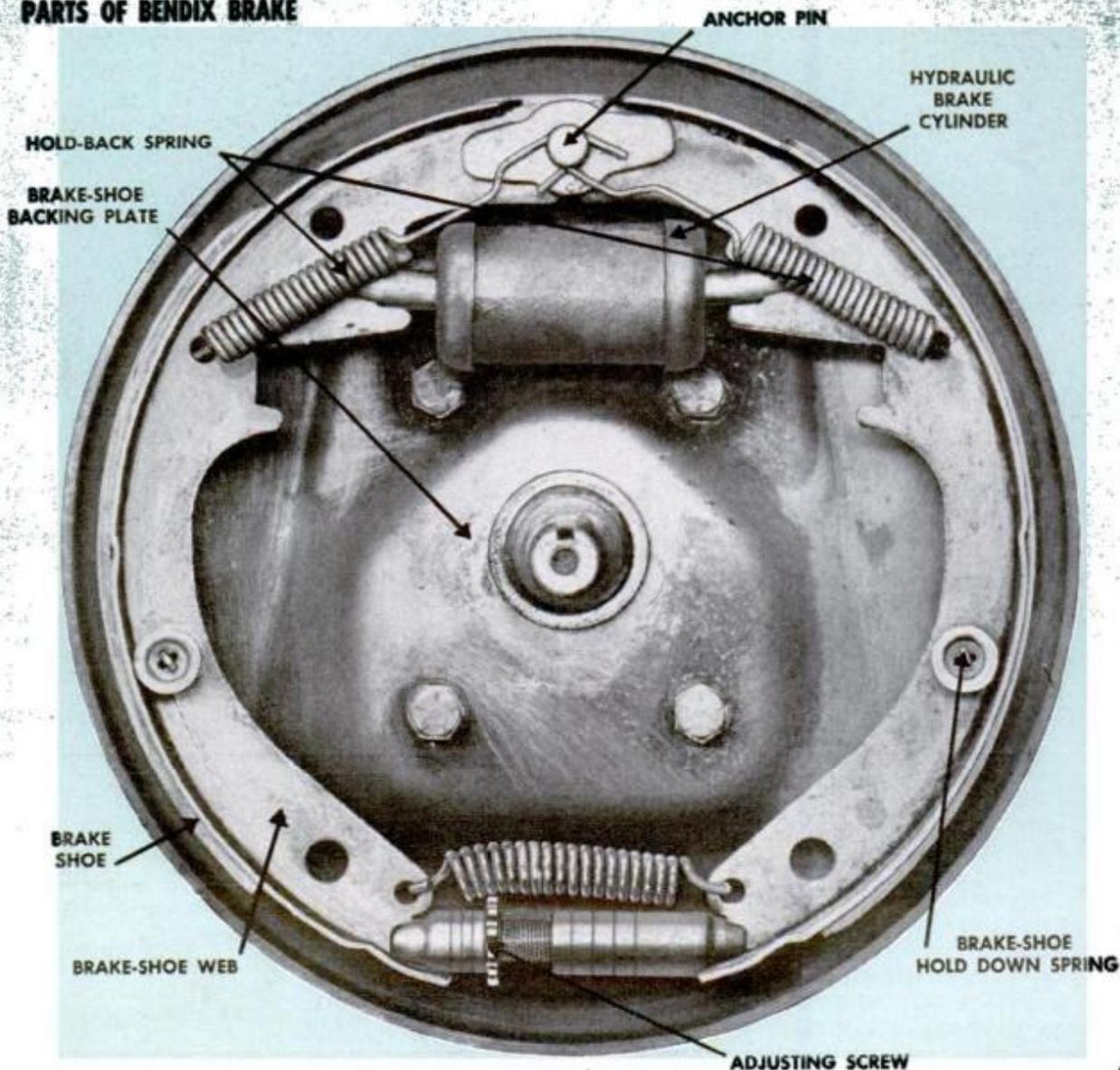
- Brake drum grooved, out of round
- Linings covered with grease or fluid
- Brake lining worn (1/32 in. from rivet heads)
- Bonded lining worn (1/16 in. or less from web)
- Lining not fully contacting drum

IN REASSEMBLY after servicing, tighten castle nut to nearest slot, then back off until wheel turns freely

TORQUE WRENCH or adjustable wrench can be used on wheel bearing, but be sure that wheel turns freely



PARTS OF BENDIX BRAKE



4

BENDIX BRAKE MECHANISM with drum and wheel bearings removed. Note position, relation of various parts

you are inspecting the brake system. Remember, one grain of abrasive grit in the grease can seriously damage a bearing if you should find it necessary to reassemble without cleaning and repacking.

Now, pull off the wheel, remove the drum, and examine the brake assembly carefully. If your brakes have riveted linings, do you have more than $\frac{1}{32}$ in. of lining above the rivet heads? Even though this dimension is close to the danger point you're still safe, but you should make a note to do a brake relining job in the very

near future. With bonded linings, $\frac{1}{16}$ in. is a danger point.

Should you wait until the lining is worn down to the rivets just because they're brass and the drum is cast iron? Ask your auto parts dealer how much replacement drums cost. You won't be long deciding to have the brakes relined!

Look at the edges of the linings. You will see one of three conditions: 1. An even thickness around the edge; 2. Thinner at the top; 3. Thinner at the bottom. The latter two conditions indicate a history of

TOOLS AND MATERIALS NEEDED

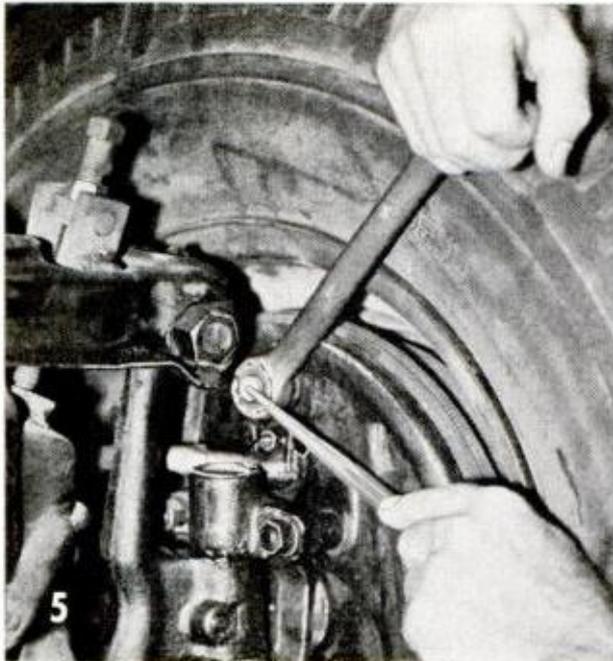
Tools

Brake tool, or spoon
Diagonal cutters
Water-pump pliers

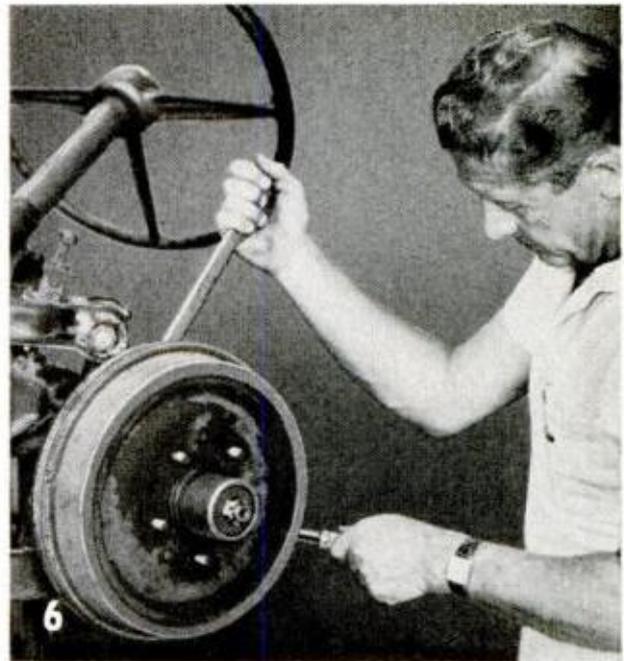
Rubber mallet
Heavy screwdriver
Wrench (or torque wrench)
Lug wrench

Materials

Wheel-bearing grease
Brake lubricant
Grease solvent



ADJUSTMENT OF ANCHOR PIN normally should be done with the wheel off and only brake drum in place



RELEASING LOCKNUT on anchor pin one turn permits pin to be adjusted either with wrench or soft mallet

improper or infrequent brake servicing.

Before proceeding with the brake adjustment, this is a good time to clean and re-pack the front wheel bearings, assuming they are not dry, and that the ball races show no sign of scoring or undue wear.

To disassemble the bearings and grease retainer, tap them out from the opposite side of the wheel by using a long punch or rod, noting the order in which the bearings are removed. Don't pry out the grease seal or retainer with a screwdriver as you may damage it. Use a rubber mallet and a heavy cardboard mailing tube. And incidentally, if for any reason you do not remove the bearings, do not add grease unless it is the same brand. Some greases will not mix. The result? Burned-out bearings.

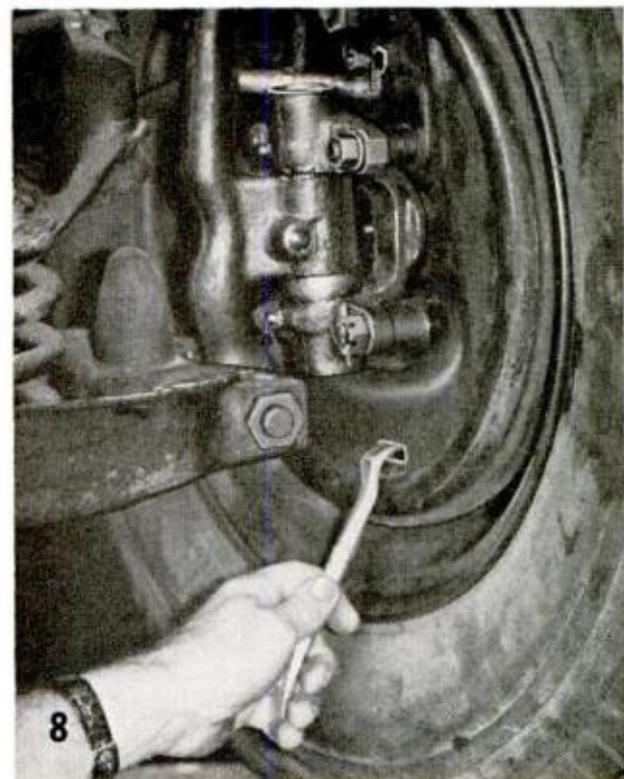
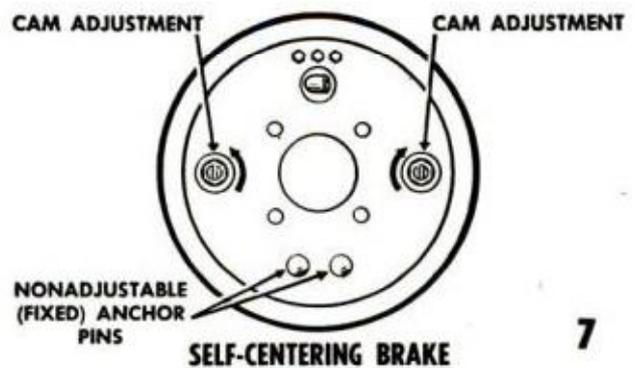
Otherwise, clean the bearings by soaking in a grease solvent containing carbon tetrachloride (do not use gasoline) until all the old grease is dissolved. A stiff brush and agitation will help to wash it away. Then blow out with pressurized water or air to get rid of any remaining abrasive particles. Clean the axle of any surplus grease, also the inside of the hub. Remember it's the grease in the bearing, not on the axle, that does the work.

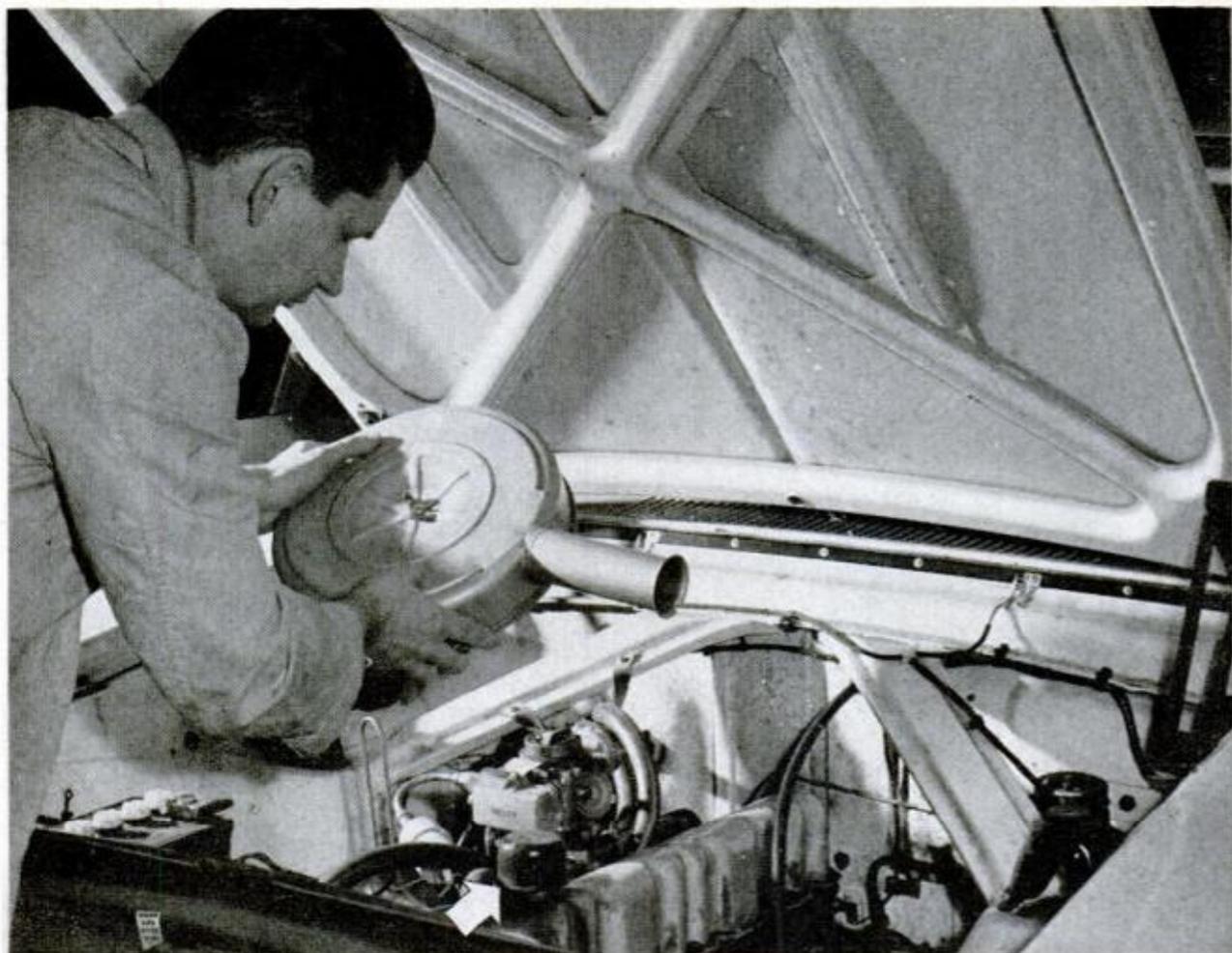
Work wheel-bearing grease into the bearings thoroughly. Assemble the bearings in the hub. Place each component in order with the grease seal last, tapped in place with a rubber mallet and the mailing tube.

Dust the inside of the brake drum and brake assembly thoroughly with a brush.

(Continued on page 198)

BRAKE TOOL, or spoon, is used to adjust brake shoes between inspections. Insert in slot in backing plate





BREATHER, OR FILLER, CAP indicated by white arrow above should be cleaned periodically in suitable solvent

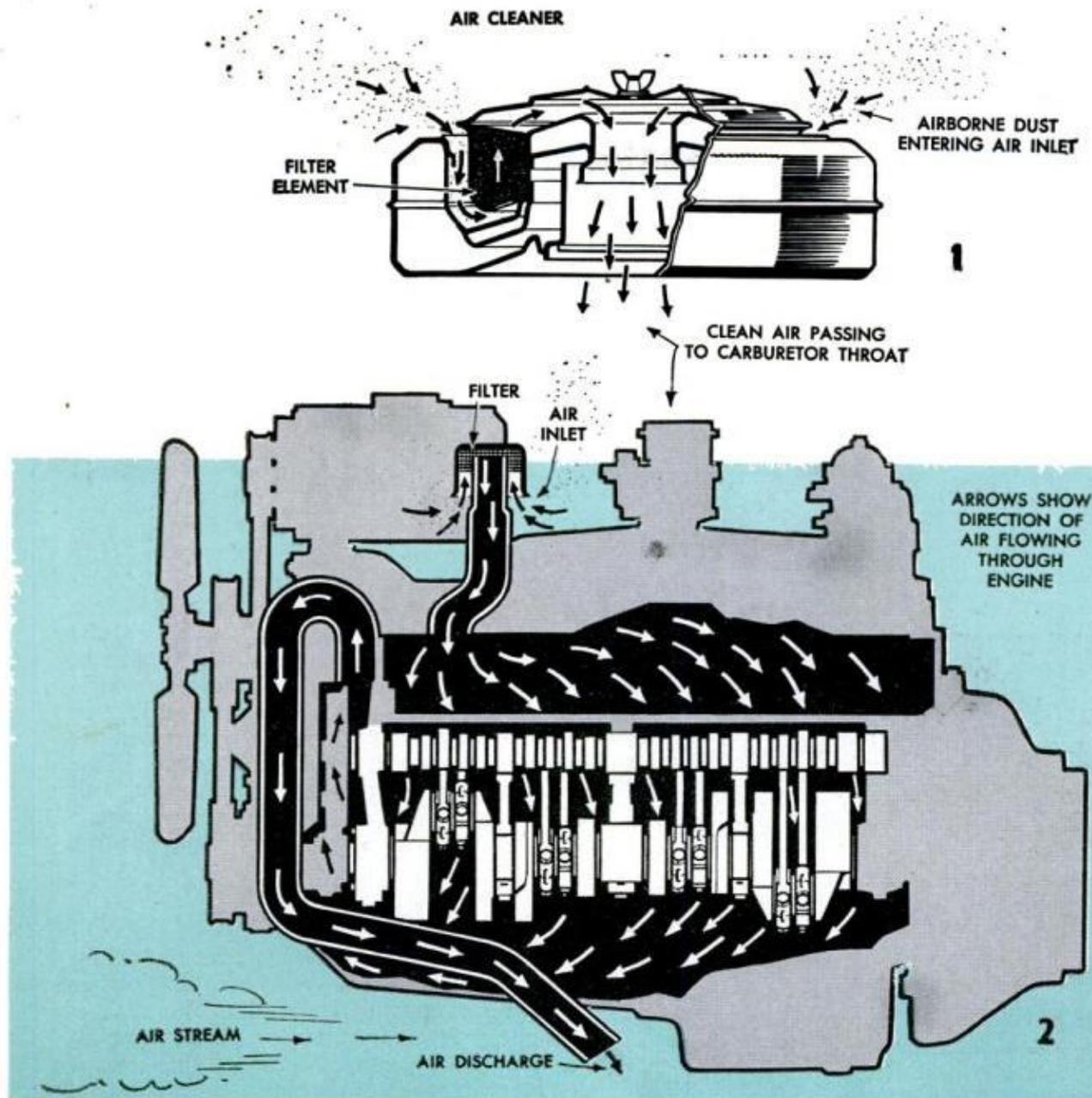
Clean Filters Breathe Easier

CLEAN AIR in your car engine is just as essential in preventing undue wear as oil in the crankcase. Every minute the engine is running, dust-laden air streams are continually being pulled into the crankcase and cylinders through the oil-filler cap and the carburetor. There are filters in both these air streams and to do their job they must be cleaned regularly and thoroughly.

In Fig. 2 the white arrows show in a general way the course of the air stream drawn through the crankcase by the ventilating system. From this the importance of periodic cleaning of the filter in the filler cap, or breather cap, will be apparent. Although this filter is nearly always well oiled due to the escape of oil vapors from the crankcase, the cap is usually in the air stream from the fan where it picks up the larger particles of abrasive dust coming in through the radiator. In addition the filter element gradually becomes coated with the gummy sludge originating in the crankcase. This can greatly reduce the filtering efficiency of the element and at the same time have the effect of restricting the breathing ca-

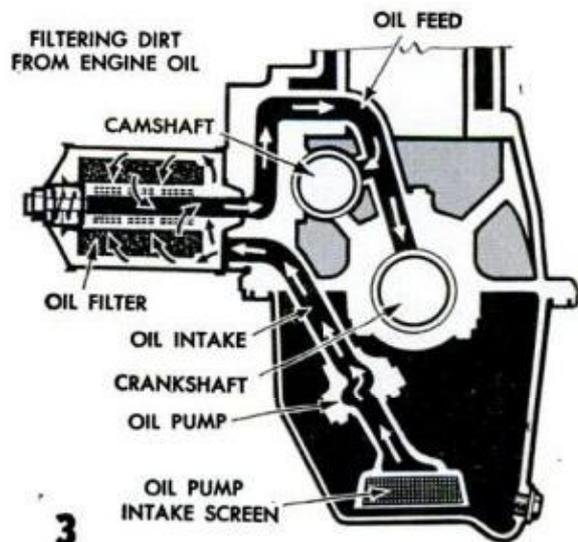
capacity of the crankcase system. Clean the filler-cap element on a regular schedule, just as you change oil and check the tires, always adapting the schedule to the driving conditions. Use a suitable solvent and rinse to be sure the element is thoroughly cleaned each time.

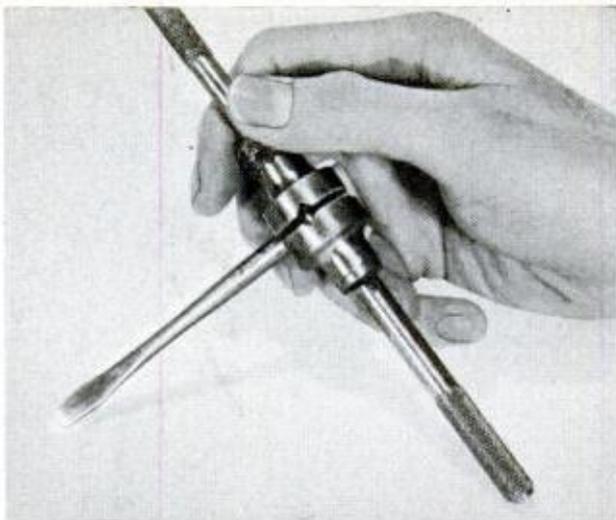
Just as important to peak engine performance is the condition of the filter element in the carburetor air cleaner. Fig. 1. Like the filler-cap element, the air cleaner element, of the so-called dry type, should be cleaned periodically, always adjusting the schedule to the driving conditions. Again the reason for periodic inspection and cleaning should be apparent. Dust-laden air is drawn into the carburetor at high velocity and only the air cleaner prevents airborne abrasive dust from being drawn directly into the cylinders with every fuel change. Clean this element periodically with a suitable solvent and in carrying out this important step follow the instructions printed on the cleaner or in the instruction book that came with your car. Be sure to follow through with all details as directed. If you drive under extraordi-



narily dusty conditions, clean both the filler-cap element and the air cleaner element immediately afterward. Oil-bath air cleaners also should be emptied, thoroughly cleaned with a solvent and the oil renewed periodically, or as required by driving conditions. Follow in all details the instructions supplied by the manufacturer.

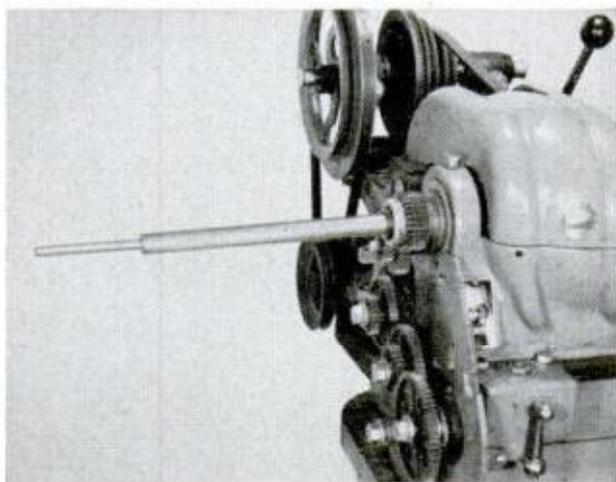
Even though your car engine is guarded by two efficient air filters, some abrasive particles are sure to find their way into the crankcase. That's why nearly all cars come to you equipped with an oil filter. Fig. 3 shows a sectional view of one type. Oil from the oil-pan sump is drawn through the intake screen and then is pumped through the filter and back into the engine lubricating system under pressure. Don't forget to replace the filter element regularly or clean it as directed by the manufacturer's instructions.—Ben L. Davis





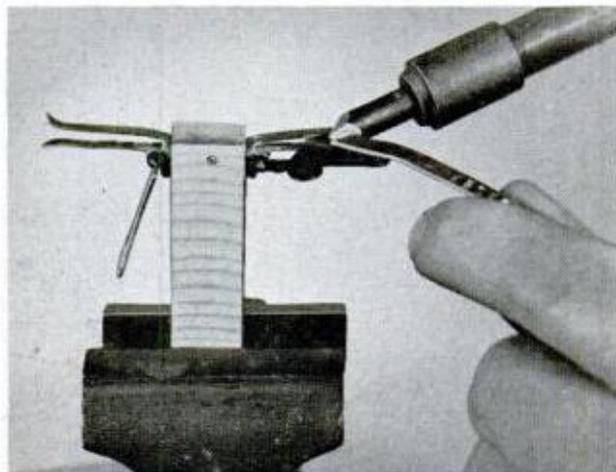
Emergency Stubby Screwdriver

When the job calls for a short screwdriver and there's none at hand, grab a tap wrench and a screwdriver bit, the kind with a squared shank, put the two together as in the photo and you've got the tool you need. The tap wrench gives you plenty of "twist" and the short length of the driver permits you to get into places inaccessible to any ordinary screwdriver. Of course, with this improvised driver you have to take it easy as otherwise you very likely will crack the screw head or wreck the screwdriver bit. The tap wrench will take almost any pressure you can put on it, but not the screwdriver.—*Henry Hanscom*



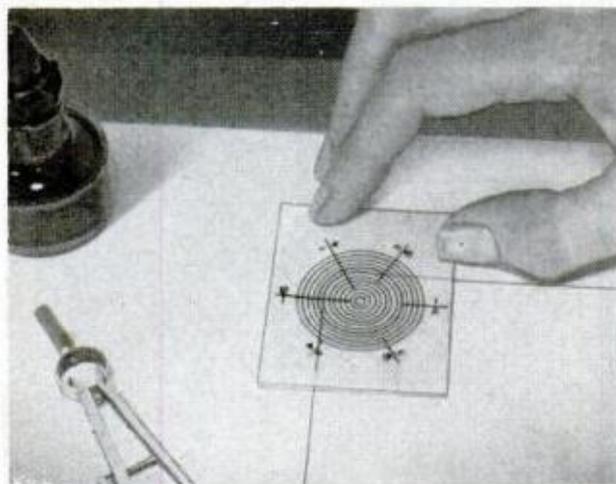
Rod Whip Eliminated

Long, small-diameter rods fed through the lathe spindle to the chuck tend to whip rather violently if turning is done at relatively high speeds. Rather than resort to a separate outboard support, one machinist shoulders a length of tubing to a slip fit in the spindle. The inside diameter of the tubing takes the rod in an easy sliding fit and the projection of the tubing beyond the spindle keeps the rod turning true. This prevents the end from whipping which might bend the rod and possibly cause a serious injury to anyone working nearby.



Handy Soldering Clamp

Maybe you hadn't thought of it, but when the need arises a bow-tie clip has other uses. As an example, it makes the perfect soldering clamp for holding small parts in position. Due to the design of the clip, it does not dissipate heat from the soldering iron. Mount the clip in a small block of wood, grooving the block and using a small screw to clamp the clip rigidly. Locked in a vise the mounted clip can be used in the horizontal position as pictured, or tilted at any angle.—*Ken Patterson*



Rounded-Corner Template

When planning parts requiring rounded corners you can save time by making this template from $\frac{1}{16}$ -in. clear plastic. Locate the center of the square of plastic and drill a $\frac{1}{16}$ -in. hole. Using this as a center, ink a number of concentric circles, identifying the diameters as pictured. To use, place the template with the circle of the desired radius tangent to the perpendicular lines. Insert the point of the compass through the center hole and punch the paper. Remove the template and scribe an arc joining the perpendicular lines.



Powered Unloading of Field-Cut Silage

Silage cut in the field must be handled fast to prevent loss of nutrients and the main problem, of course, is delivery of the material from field cutter to blower with the minimum of handling. Some farmers do not put up enough silage seasonally to make special unloaders pay out, so they use manure spreaders of the power-takeoff drive type as haulers. The spreader box is fitted

with sideboards to increase its capacity and when loaded can be hauled from field to blower at top tractor speeds. The blower hopper is backed with a high baffle of corrugated roofing supported by steel fence posts as pictured. Then the spreader beaters are driven at slow speed through the power takeoff to dump the entire load in a few minutes time.—C. F. Marley

Rope Winch on Tractor Wheel

Farmers who put up hay cured in the swath can make use of this tractor-mounted winch for operating the fork lift to the hay mow. It's simply a spoked wheel rim U-bolted to the tractor drive wheel of the same rim size. The free end of the lift rope is passed through the valve-stem hole and knotted as pictured. Then the tractor is blocked and the rear end jacked up so that the winch can be operated by clutching and declutching at low speed.—A. M. Wettach

Soap Guards Against Spatter

Liquid soap spread over a finished surface adjacent to a weld can prevent weld spatter from adhering, permitting it to be brushed off without spotting or marring the finish. This eliminates one of the troublesome problems of welders, makes refinishing unnecessary after welding finished parts. Be careful to cover all the exposed surface with the liquid.—Ted Pankowski



Plus or Minus With a Dial Indicator

Fine accuracy checks with a dial indicator are as easy as telling time with a watch. Use it to check setups, to position work, determine runout

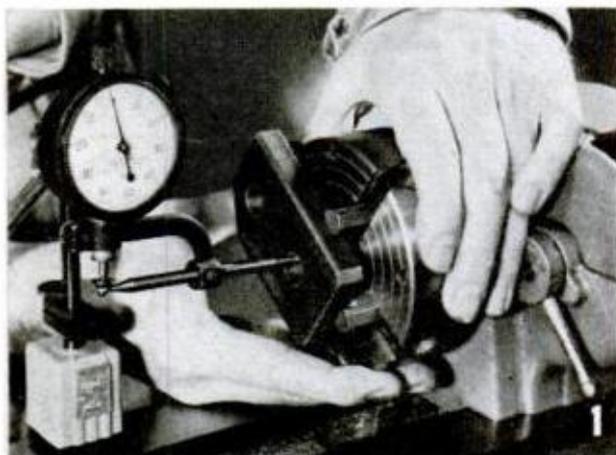
X223

By Manly Banister

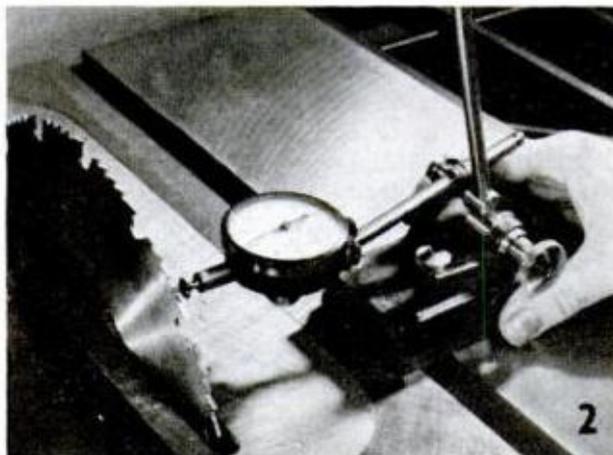
WHEN THE JOB calls for accuracy measured in thousandths of an inch, a dial indicator can give you the correct reading at a glance. Most useful in small shops is the instrument having a movable dial and known as the universal type which gives a plus reading to the right of zero on the dial scale and a minus reading to the left of zero, with a capacity of about 0.3 in. On such an instrument one revolution of the needle usually indicates 0.10-in. movement of the contact button.

A complete instrument set should include the dial and several accessories which increase the range of its usefulness. There should be a tool-post bar and mounting

rods to carry the dial, also a clamp or a base containing a permanent magnet so that the instrument can be placed at any point on machine or work where measurements are to be taken or a workpiece accurately located. The dial also can be mounted on a surface gauge for operations on a surface plate, for checking runout is in Fig. 2 or a dimension check on a finished part as in Fig. 8. The magnetic base is of special value to modelmakers and others who use small machines for fine work. Here placing the instrument in its proper relationship to machine and work can prove to be quite a problem with only a dial clamp to work with. But the magnetic base holds with a



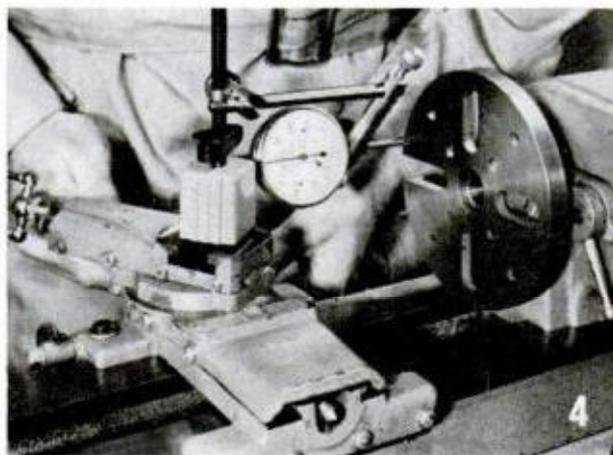
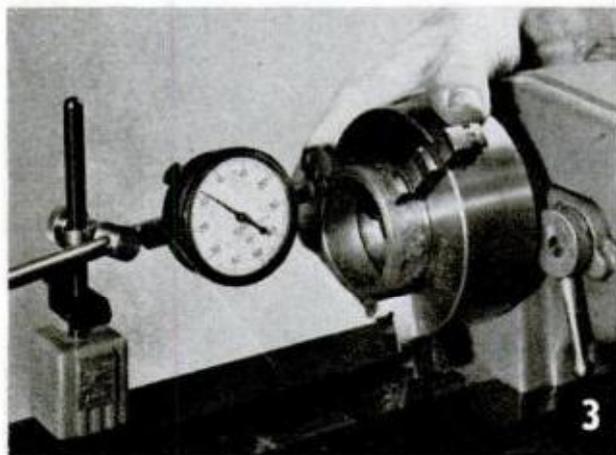
CENTERING A HOLE for a reaming operation takes the minimum of time when you use a dial-indicator setup

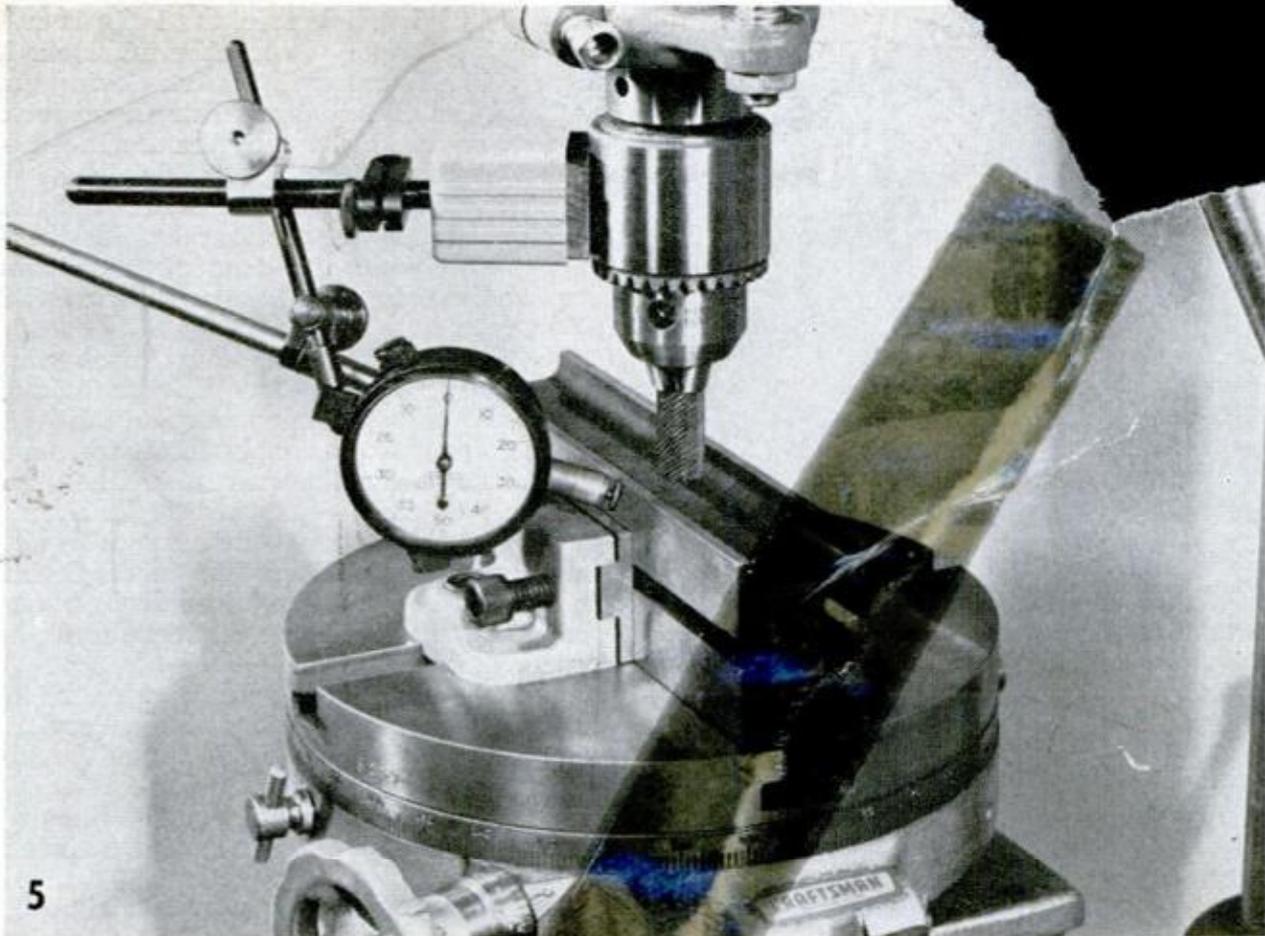


CIRCULAR SAW BLADE must run true otherwise there's trouble. Dial indicator shows up slightest deflection

DEAD TRUE means just that when you use indicator to locate workpiece in either three or four-jaw chuck

FACEPLATES need checking occasionally for runout, especially large faceplate on which work is mounted





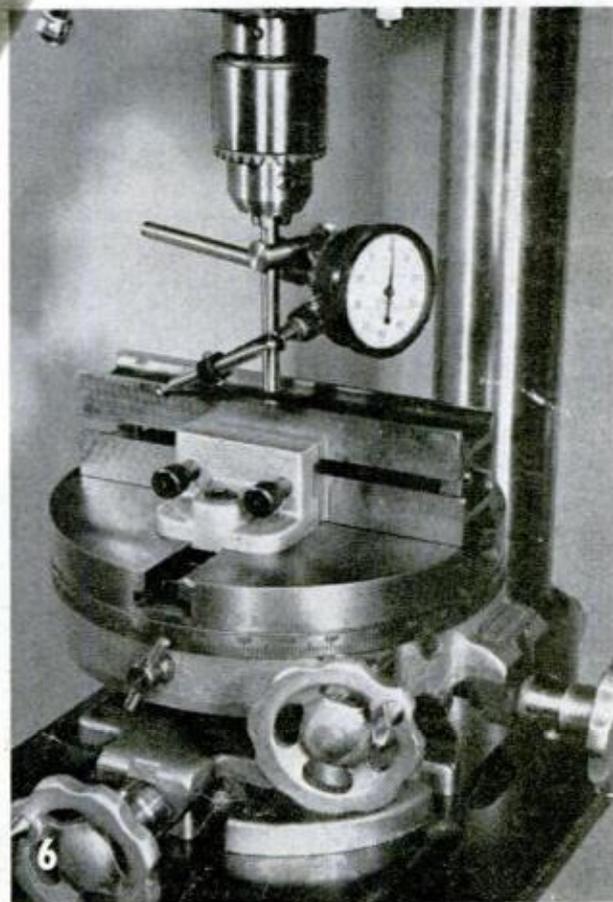
5 **SETUP FOR ALIGNING** drill-press milling table can be made this way when no hole attachment is at hand for dial

50-lb. constant pull on any ferrous metal surface, and this assures stability. Even when placed on a painted metal surface that is fairly smooth it will hold.

Figs. 1, 3 and 4, also Figs. 7, and 9 through 13 show a dial indicator in use on a lathe, both for checking the work and the lathe itself for accuracy. Figs. 1 and 3 are typical setup checks. In Fig. 1 an indicator with a hole attachment is being used to center a hole for a reaming operation. Any eccentricity shows on the dial in thousandths of an inch. In Fig. 3 the workpiece is being squared in a three-jaw chuck, the dial being zeroed against the workpiece. Using the indicator in this way it is possible to position work so that it runs dead true. In Fig. 4 the operator is checking a faceplate for runout. In all three checks the indicator is held by a magnetic base.

Figs. 7, 9, 10 and 12 picture steps in aligning the lathe tailstock with the headstock. Figs. 7 and 9 show the first operation with the dial adjusted to a zero reading at the tailstock end of a test mandrel on which a light cut has been made for a distance of about 6 in. Note that this measurement is not dialed from the tool post side, or working side of the lathe. Next, measure 6 in. from the end of the test piece, move the carriage to that position and take another reading, Fig. 10. If the reading is on the

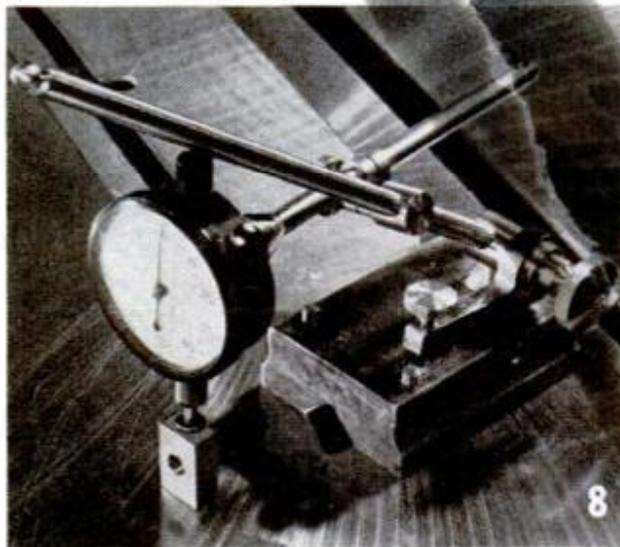
SETUP FOR SAME PURPOSE as above made with hole attachment. In both checks drill spindle must be locked



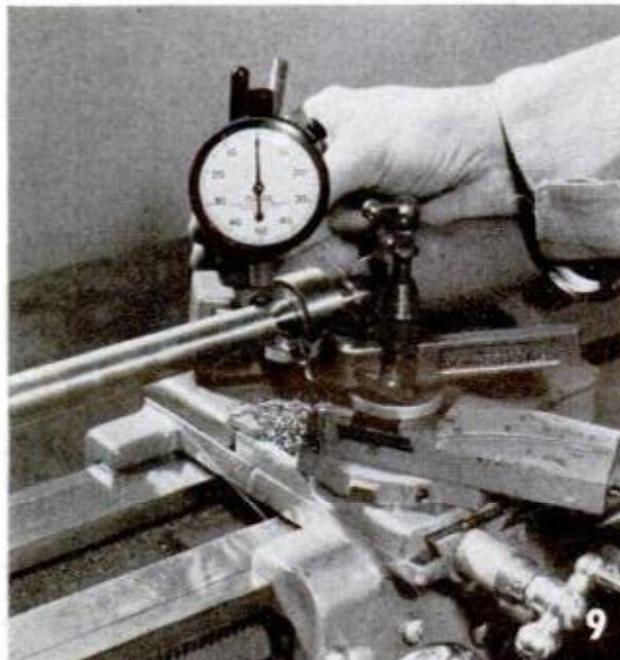


FIRST STEP in checking lathe centers for alignment. Note that indicator is placed on the lathe carriage

INDICATOR IS MOUNTED on surface gauge for comparative dimension checks on duplicate workpieces



SECOND STEP IN CHECKING lathe centers for alignment. Here the indicator pointer is being set at zero



plus side of the dial scale, the lathe is cutting a slight taper toward the tailstock. If the reading is minus, a taper is being cut with the small end toward the headstock. Divide the dial reading by the distance between the two check points (6 in.) to get the amount of taper in thousandths. Multiply this value by the number of inches, that is, by 6. The result is the amount of setover required to bring the lathe centers in exact alignment.

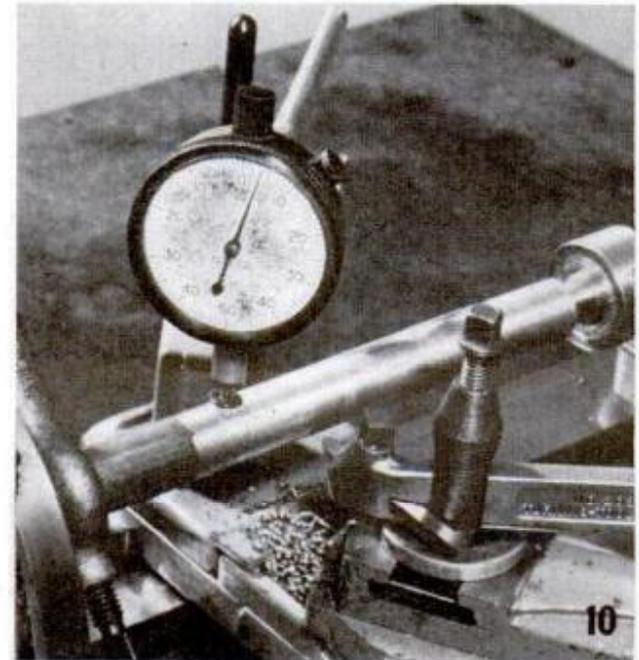
Fig. 12 shows the final setup for aligning the centers. Note that the dial is zeroed at the tailstock end of the work and that it is mounted on the tool post by fixing the magnetic base to the tool-post bar. Then the tailstock is moved forward or back until the needle registers the amount of setover calculated. When the tailstock has been moved over the required distance and locked at this point, the centers should be precisely in line.

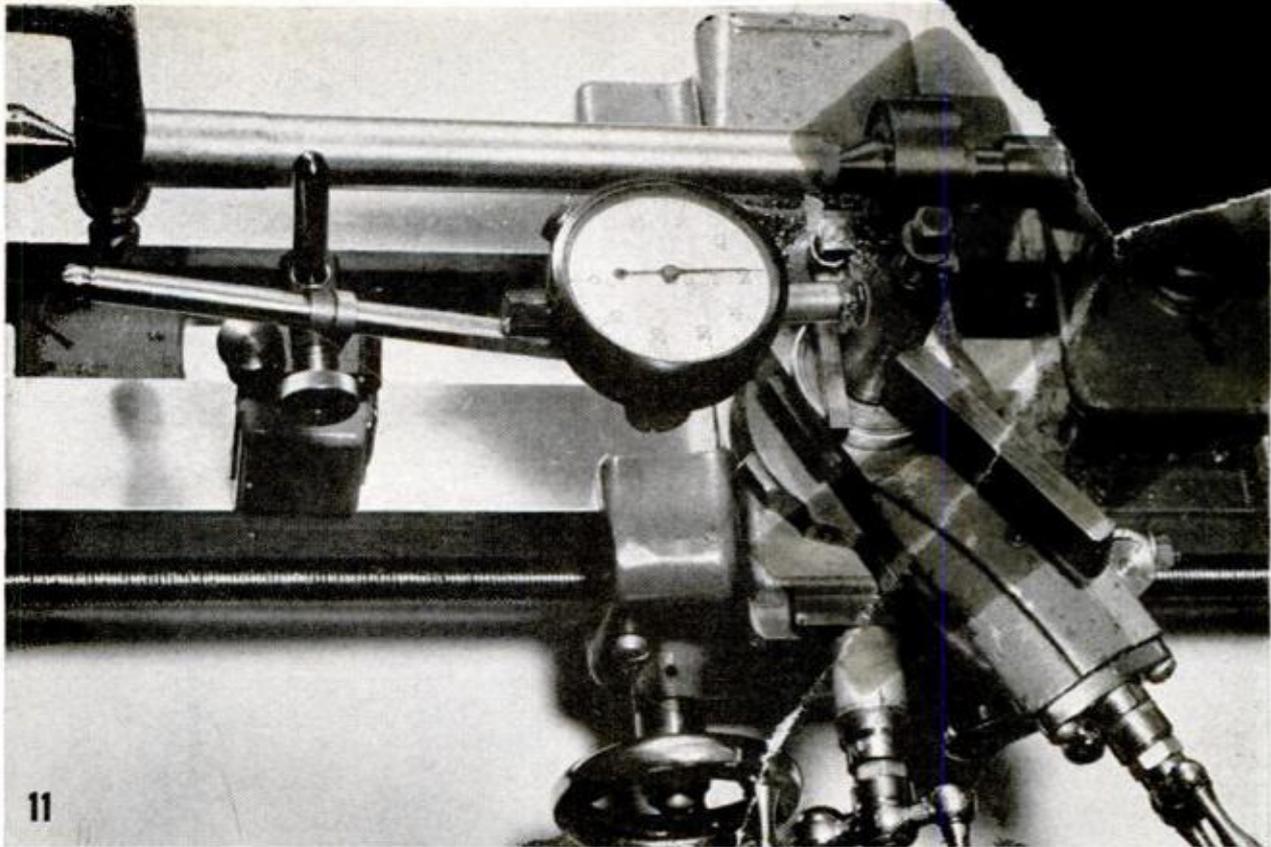
Another important operation with the indicator is setting off a shoulder where the length of the cut must be right on the nose. Fig. 11 pictures the setup with the magnetic base of the indicator fixed on the flat way of the lathe. The indicator button bears against the tool post as pictured.

The squareness check shown in Fig. 13 is similar in purpose to that in Fig. 3, except that here the cross-feed is run in and out in order to move the indicator contact button along the surface of the cylindrical workpiece.

Figs. 5 and 6 picture two ways of aligning the rotary table of a drill-press milling accessory so that work can be mounted and accurately traversed under the spindle. If you do not have the ball-point hole attach-

THIRD STEP in aligning lathe centers. Carriage with indicator is moved to left to determine degree of taper



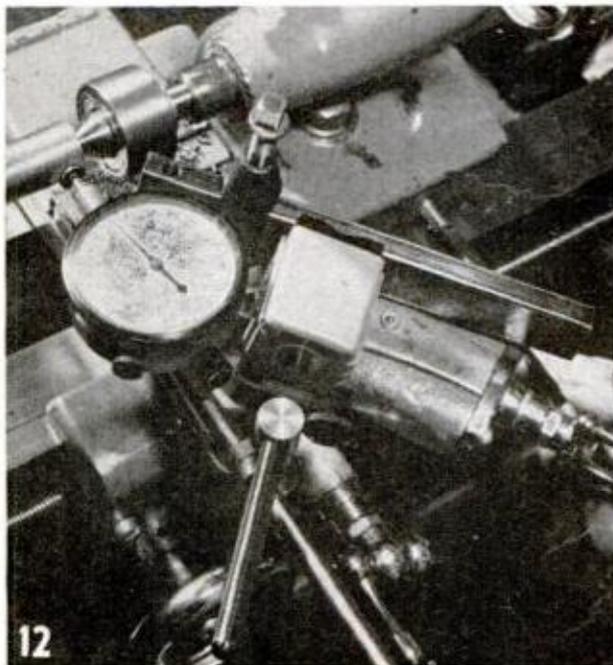


SETTING OFF SHOULDER where length of cut must be held within close limits is done with dial setup shown

ment for your indicator, you can lock the drill-press spindle and make a setup with the indicator button bearing against parallels as in Fig. 5. On the other hand, if you have the hole attachment for the dial, then make the setup as in Fig. 6. Although the first method can be considered accurate enough for all but the finest work, the latter method is always to be preferred.

When you use a dial indicator take every

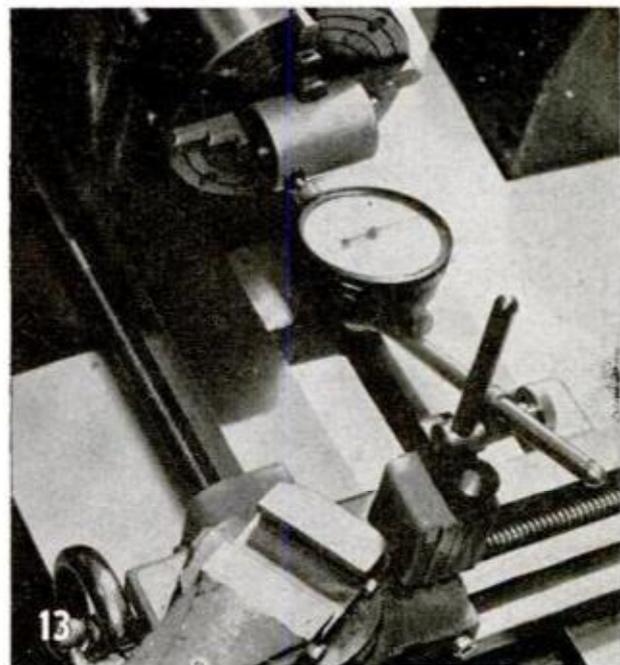
FINAL STEP in checking alignment of centers. Here indicator is mounted on tool-post bar. See Figs. 7, 9, 10

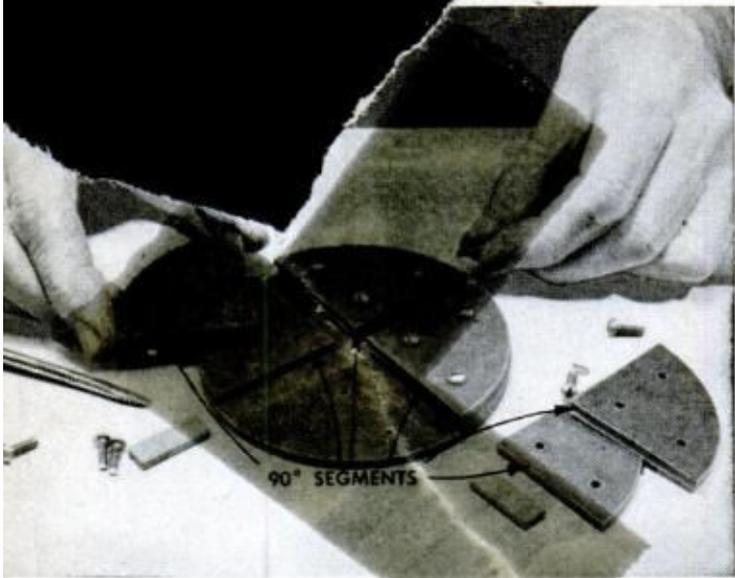


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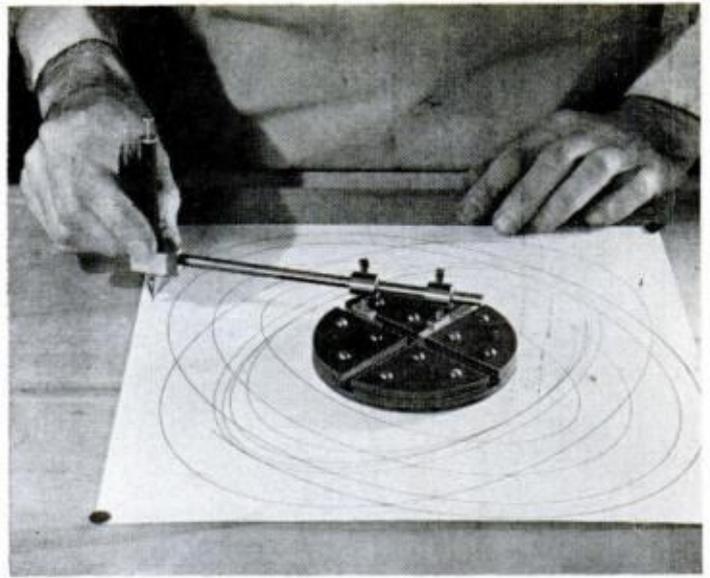
precaution to avoid dropping the instrument on the shop floor or even onto the lathe bench top. Such a shock can seriously damage the indicator unit and cause it to register inaccurately. Much the same precautions should be taken with the accessories. Tiny nicks, scratches or dents also can cause inaccurate readings and a costly waste of near-finished parts. Coat accessory parts with light oil to prevent rust. ★ ★ ★

IN SQUARENESS CHECK cross-feed slide with indicator mounted is run in and out to get deflection reading

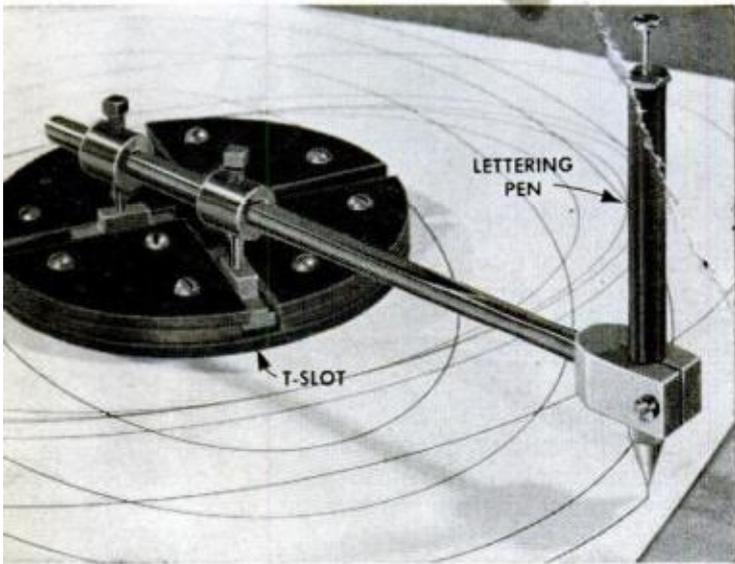




BASE FOR THE ELLIPSOGRAPH consists of a disk and eight segments cut from $\frac{1}{8}$ -in. tempered hardboard

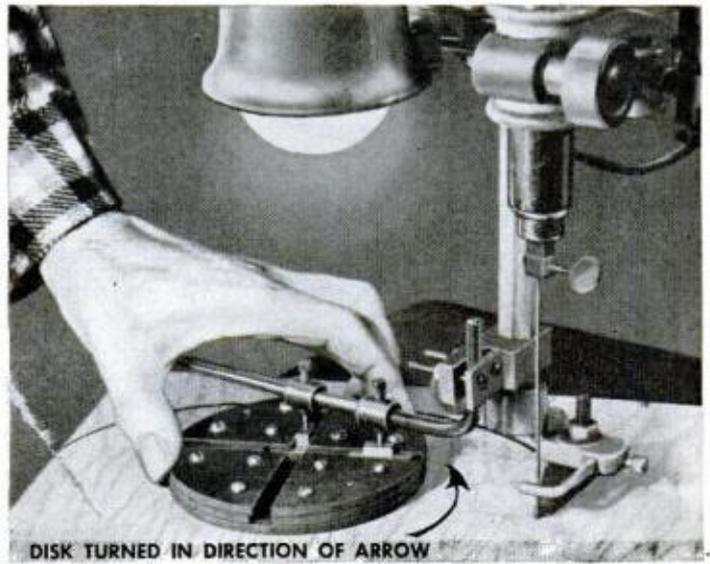


DRAWES ANY ELLIPSE in one sweep of the arm. Size is determined by position of sleeves on arm, or sweep



HOLDER on outer end of arm can be made to take a lettering pen, ordinary pencil or a metal scriber

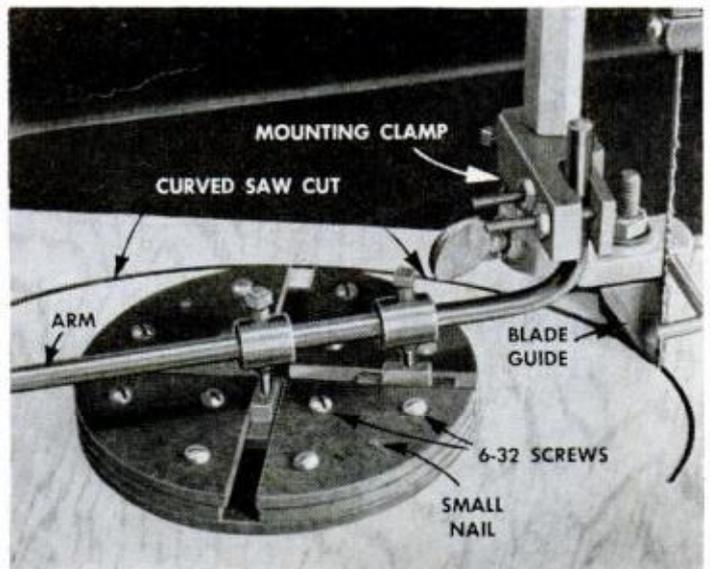
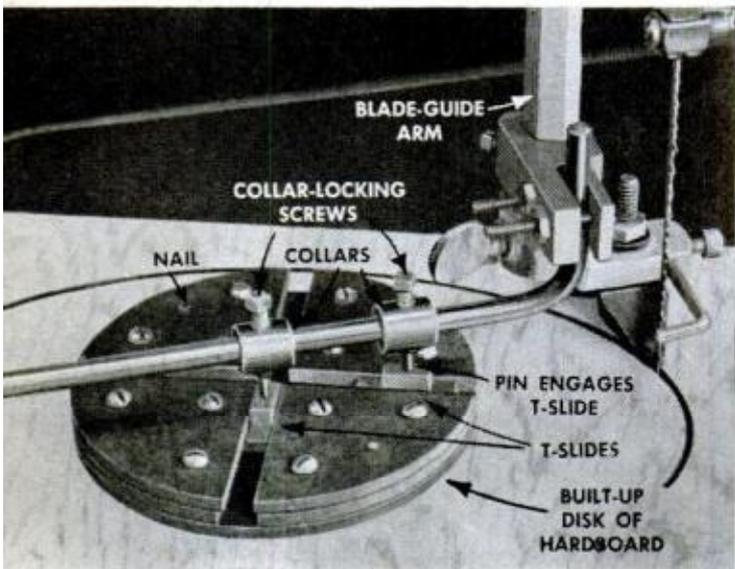
THIS VIEW and one at right show relative positions of the parts when set up for jigsawing oval shape



DISK TURNED IN DIRECTION OF ARROW

IN THIS SETUP ellipsograph base is attached to plywood with two small brads. Turning base produces cut

MOUNTING CLAMP which carries the ellipsograph arm is fitted onto the blade-guide arm of the jigsaw



X259

Make Yourself an ELLIPSOGRAPH

By Walter E. Burton

WITH THIS ellipsograph it takes just one sweeping stroke to draw a perfect ellipse of exactly the size you want. Not only that, you can set the gadget up on your jigsaw or bandsaw and cut just as perfect elliptical shapes from plywood or solid stock. You don't buy it; you make it in your own shop from materials you may already have at hand.

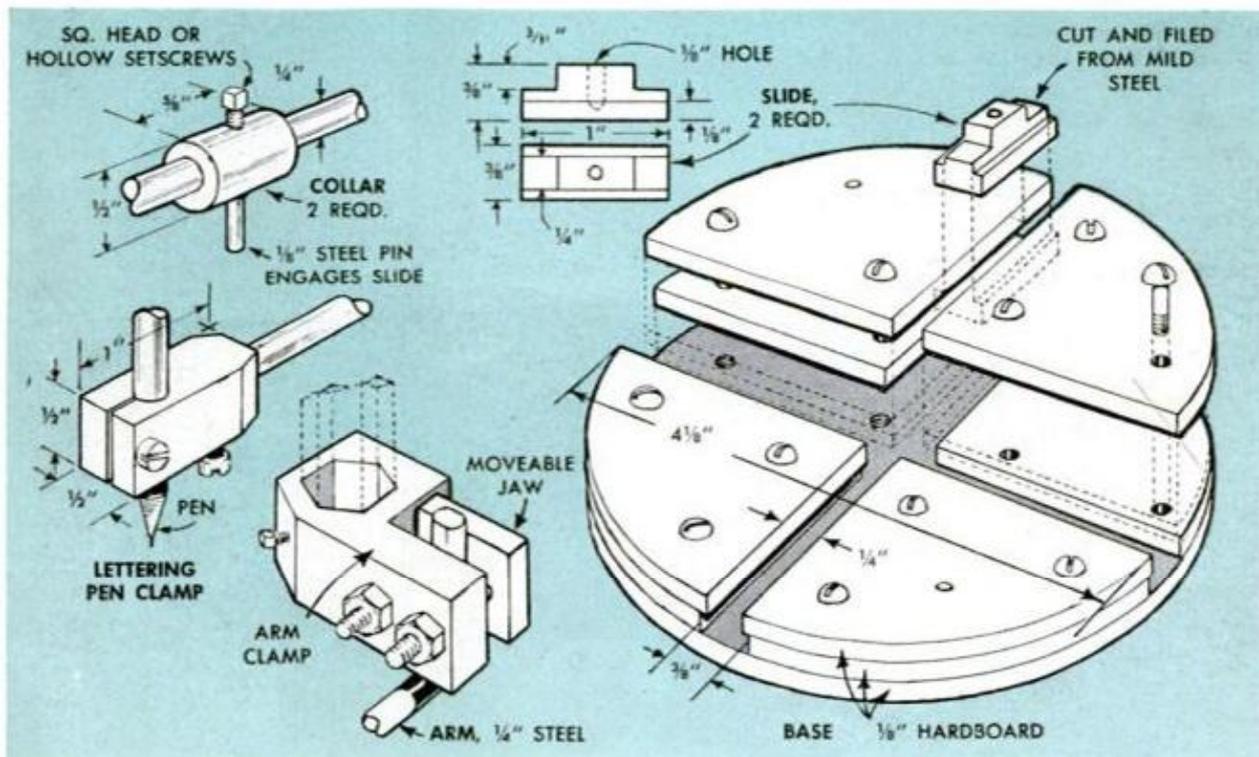
The ellipsograph, or elliptic trammel, pictured consists of a base built up sandwich-fashion from a disk and segments cut from hardboard. Note that segments are in two sizes, four of each size. The parts are arranged and screwed together to form two perpendicular T-slots intersecting at the center of the built-up base as you see detailed below and pictured on the opposite page. Two steel slides engaging mounted sleeves carry an adjustable arm which in turn carries the pen and pencil clamp.

All parts must be made accurately so that when assembled the steel slides work freely in the T-slots. Slides are easily made from mild steel with a file and fine-toothed hacksaw. The lettering-pen clamp and arm clamp should be cut and filed from metal.

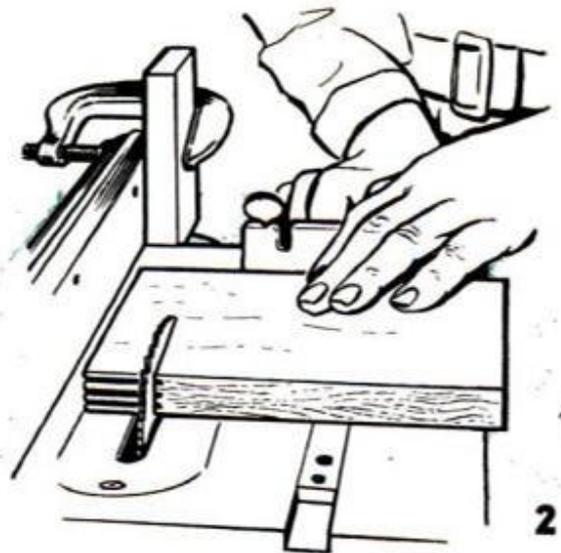
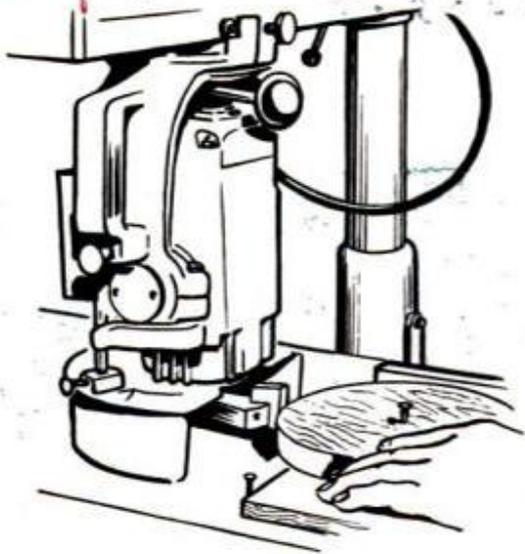
For drawing an ellipse with a pen or pencil in the holder the arm can be any conven-



ient length. For cutting elliptical forms on a jigsaw or bandsaw the length of the arm is, of course, limited by the swing of the saw. The two lower photos and the right-hand center photo on the opposite page show the setup and arrangement of parts when cutting an oval shape from plywood with a jigsaw. The other three illustrations show the ellipsograph in use on the drafting table and a view of the assembly of the base. Use only tempered hardboard for the parts of the base. Plane and sand the edges of the segments and seal with lacquer to form a smooth surface. ★ ★ ★



Shop Projects 1961



INSTANT JIGS

**Quickie Setups Assure
Identical Cuts in Jig Time**



A SIMPLE JIG, often made from scrap stock, can save you minutes and even hours of time on short production runs and individual cuts on radial saws, table saws and other power tools commonly used in small shops. A jig can produce more accurate work, assure repetitive cuts of exact length or width and guide stock past high-speed cutters safely.

Truing a Disk

For example, you can true a wooden disk with very nearly the accuracy of a lathe with a radial-arm saw as in Fig. 1. First rough-saw the disk and center-drill it. Then pivot the disk on a nail driven into a scrap board. Mount a molding-cutter head fitted with straight knives on the saw arbor and tilt the motor to the vertical position. With the scrap board against the saw fence, start the motor and feed the disk slowly into the molding head until the board contacts a nail stop. Then proceed to slowly rotate the disk.

When crosscutting to length on a table saw always butt the work against a stop block clamped to the ripping fence as in Fig. 2. The stop enables you to position the work for each cut so that you get multiple pieces of exact length, but more important it prevents the severed work from jamming between the blade and fence. Fig. 3 shows how a similar stop block is used with a radial-arm saw to mass-cut tenons.

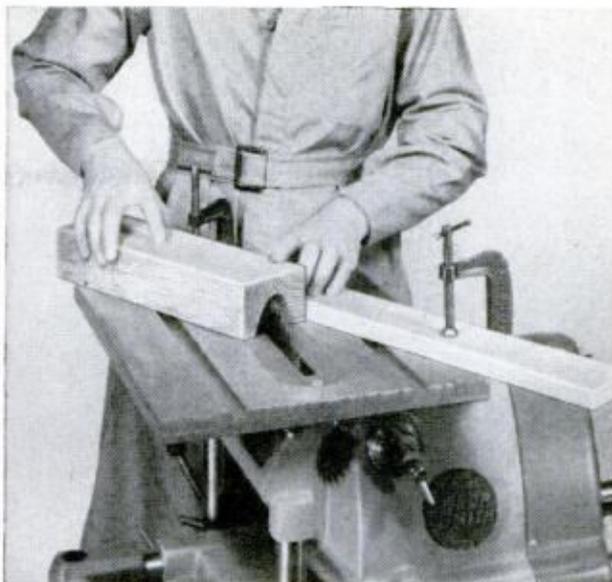
Cutting a Cove

For cove cutting you need a straightedge clamped to the saw table at an angle as in Fig. 4. Here the straight edge is positioned to center the work over the blade which has been lowered to project about 1/16 in. above the saw table. To make the cove, move the stock slowly along the guide strip and lower the table slightly after each pass.

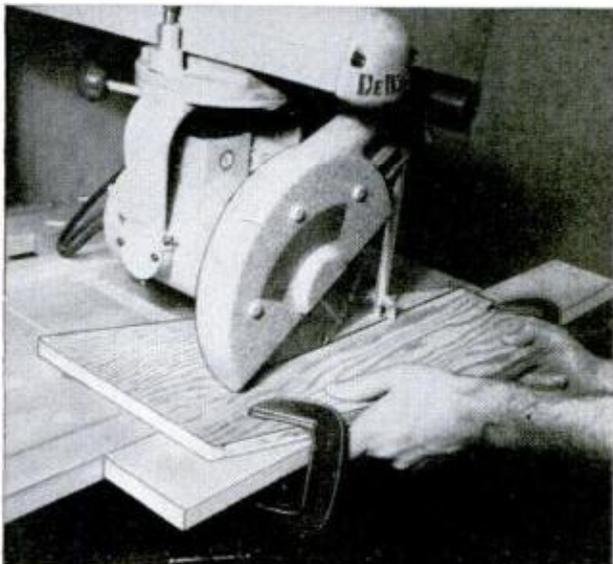
It's simple to make a taper cut on a radial saw. Pick a strip with one straight edge, clamp the work to it at the angle you want, bring the saw blade out flush with the edge of the table and then slide the work along the table edge as in Fig. 5.

Or, if you need to make saw cuts across the end of a workpiece, tilt the saw motor to the vertical position as in Fig. 6. Then block up the workpiece so that the saw spindle will clear the table. Replace the fence with a 1 x 4 and clamp the work to it as pictured.

When the job calls for routing a groove near the edge of a disk, make a setup as in Fig. 7, using one of the pieces of waste from the disk-cutting operation. Place this between stops clamped to the saw fence and you have a ready-made guide for the disk. When you require a stopped molding cut, use hand screws as stops, placing them

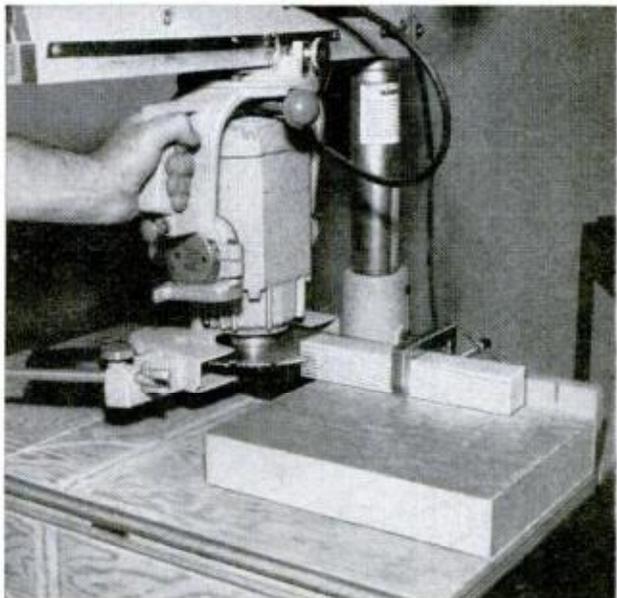


4. COVE CUT requires a guide strip with one straight edge clamped to saw table. Take light, successive cuts



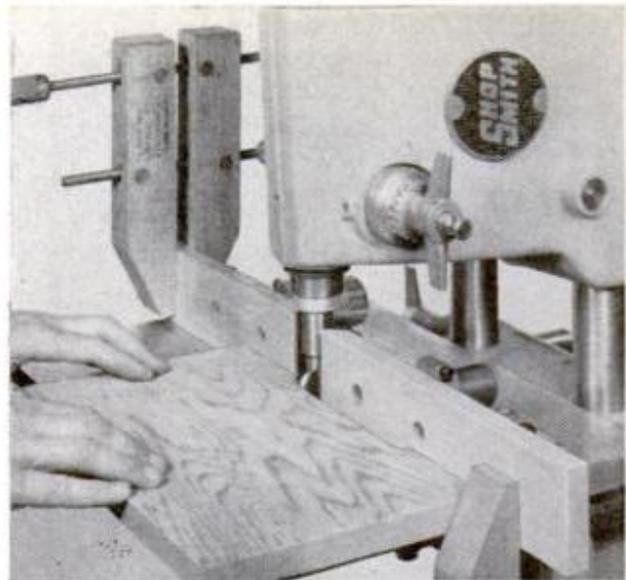
5. TAPER CUTS are made on radial saw by clamping work to guide strip, then sliding strip along table edge

6. CUTS IN END GRAIN can be made by blocking work up so that the saw spindle will clear the table

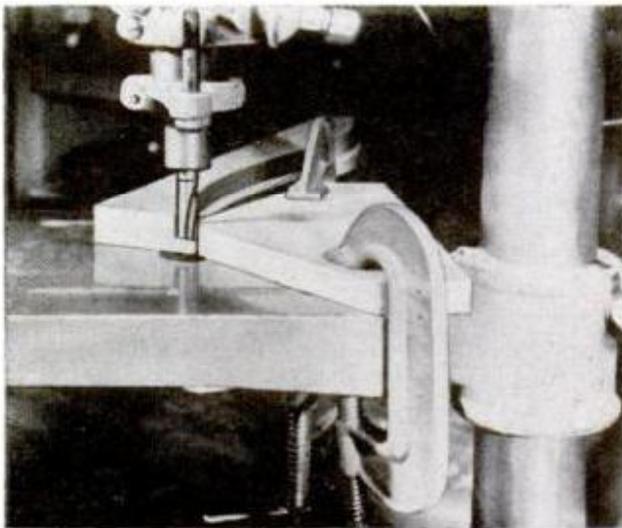




7. ROUTING GROOVE near edge of disk is easily done if you use waste piece from disk as circular guide



8. STOPPED MOLDING can be made by clamping hand screws to shaper fence in positions shown



9. POINT GUIDE is used when cutting rabbet on curved workpiece. Point is located on center line of bit

10. CONCAVE, or saucer, cut is easily made with radial saw. Tilt motor and adjust to swing 360 degrees

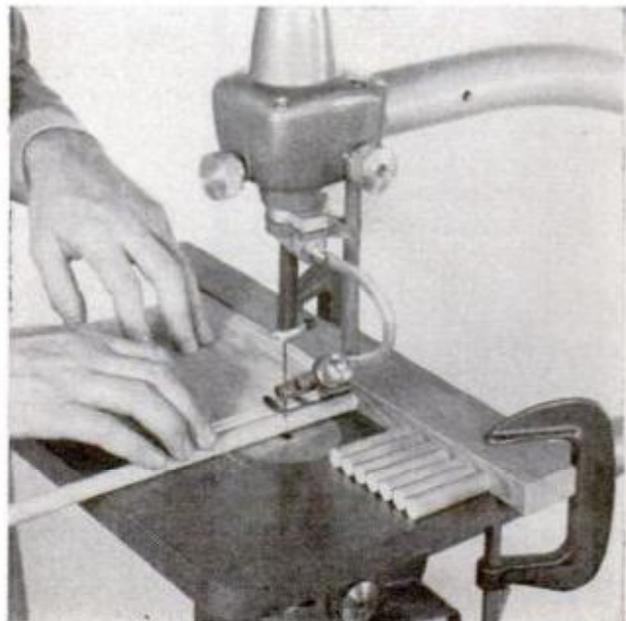
on the guide fence as illustrated in Fig. 8.

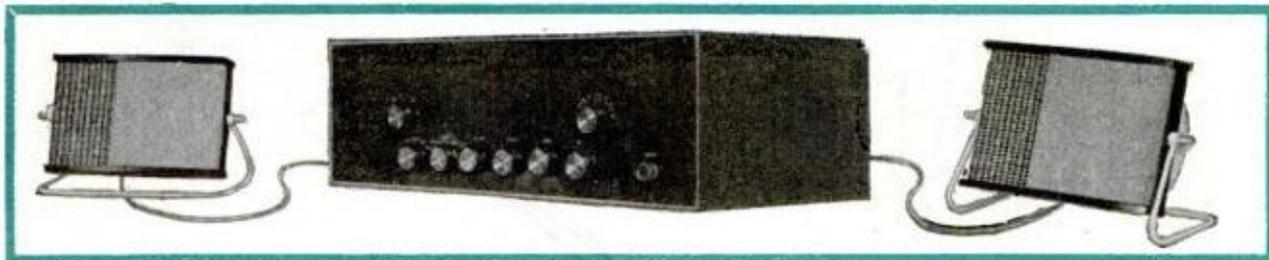
Cutting a curved rabbet with a routing bit in a drill press comes easy and safe if you use a triangular-shaped guide as in Fig. 9. Cut the guide piece to a sharp point, round the point slightly then clamp to the table with the rounded point just clearing the router bit as pictured.

It's simple to make a round-bottom concave cut with a radial saw, Fig. 10. Tilt the motor to about 30 degrees and adjust it so that it can swing through 360 degrees. Start with a very light cut and lower the arm slowly as the cut progresses.

And then there's that tricky job of cutting dowels to length on a jigsaw or band-saw. One way is to clamp a fence to the table as in Fig. 11, and then back up the dowel with a following block. ★ ★ ★

11. DOWELS are cut squarely to length by using fence and follower block to guide stock squarely to blade





One Chassis Space-Saver Stereo

By Otto Fried

Part 2

IN LAST month's issue, we began the construction of the "One Chassis Space-Saver Stereo" system. By now you have obtained the chassis and completed the punching. You probably have a good deal of the wiring well under way too.

This month we will conclude the wiring and describe the correct installation of the system.

As the amplifier is stereophonic, it must, by nature, be symmetrical. To simplify parts listing, you will find part numbers for "A" channel duplicated in "B" channel. One side is a direct image of the other.

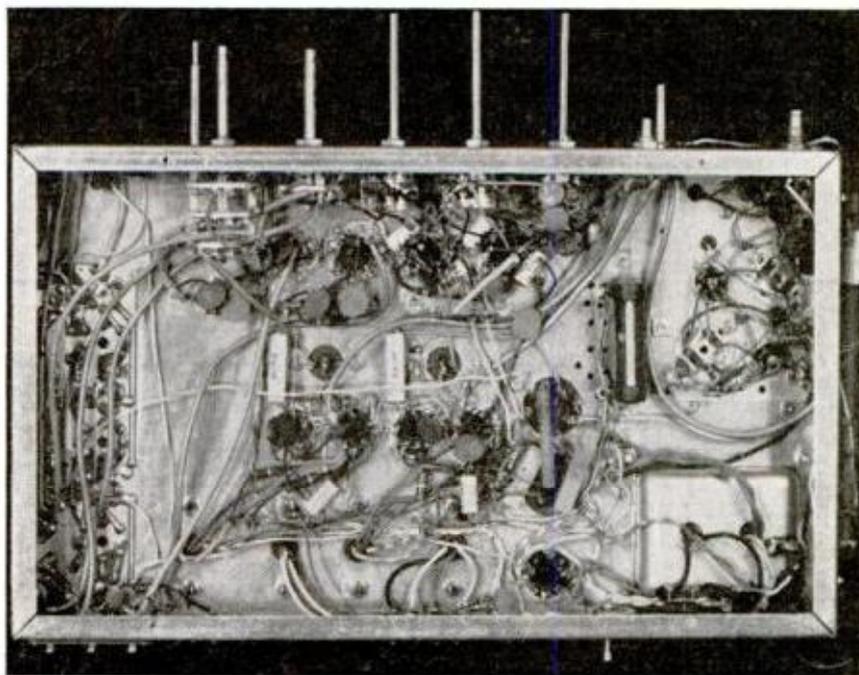
Use shielded wire wherever it is called for in the schematic, and use care to avoid cold solder joints which downgrade a high-fidelity amplifier. Mount bypass capacitors

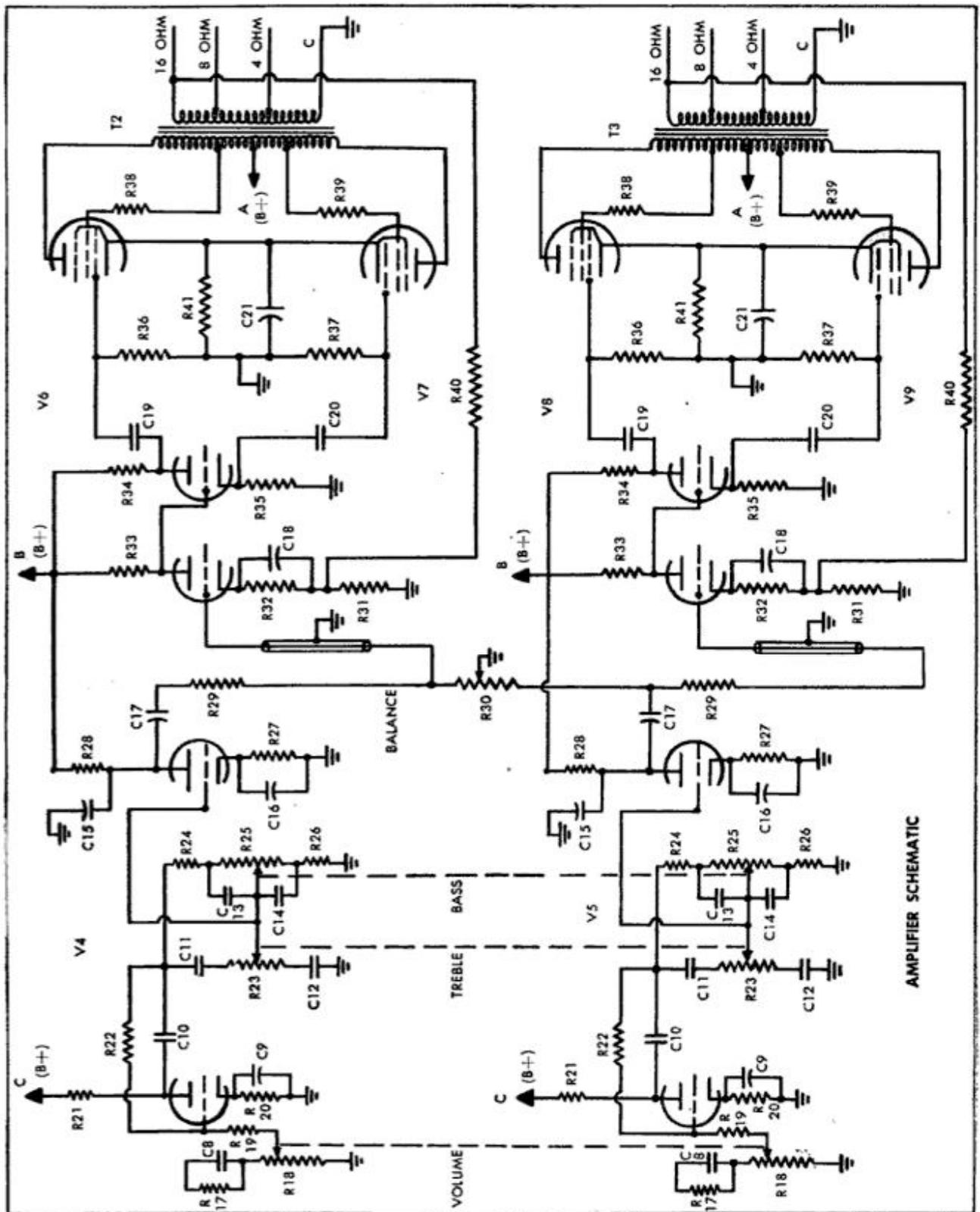
directly at the tube socket with the shortest possible leads. Keep all filament and a.c. wiring as short and direct as possible.

Where a.c. leads parallel, twist them together to help reduce hum. By placing a.c. wiring in first, it is kept closer to the chassis, and the wiring which follows can be more easily isolated. Having d.c. signal and power wires cross any a.c. wiring at right angles minimizes picking up stray a.c. through induction.

Installing the FM Tuner. The FM tuner is a prewired, printed circuit chassis that comes in two pieces. Mount the tuner section at the front of the FM cutout, and mount the IF strip behind it. When unpacking the printed circuit components for the tuner and IF strip, don't discard the

UNDER-CHASSIS VIEW may seem to be a complex rat's nest of wire. This is not the case. As the various sections are modular in construction, most of the wire is used to interconnect from a module to the power source or to provide signal paths from a source module such as a tuner or selector switch to amplifier



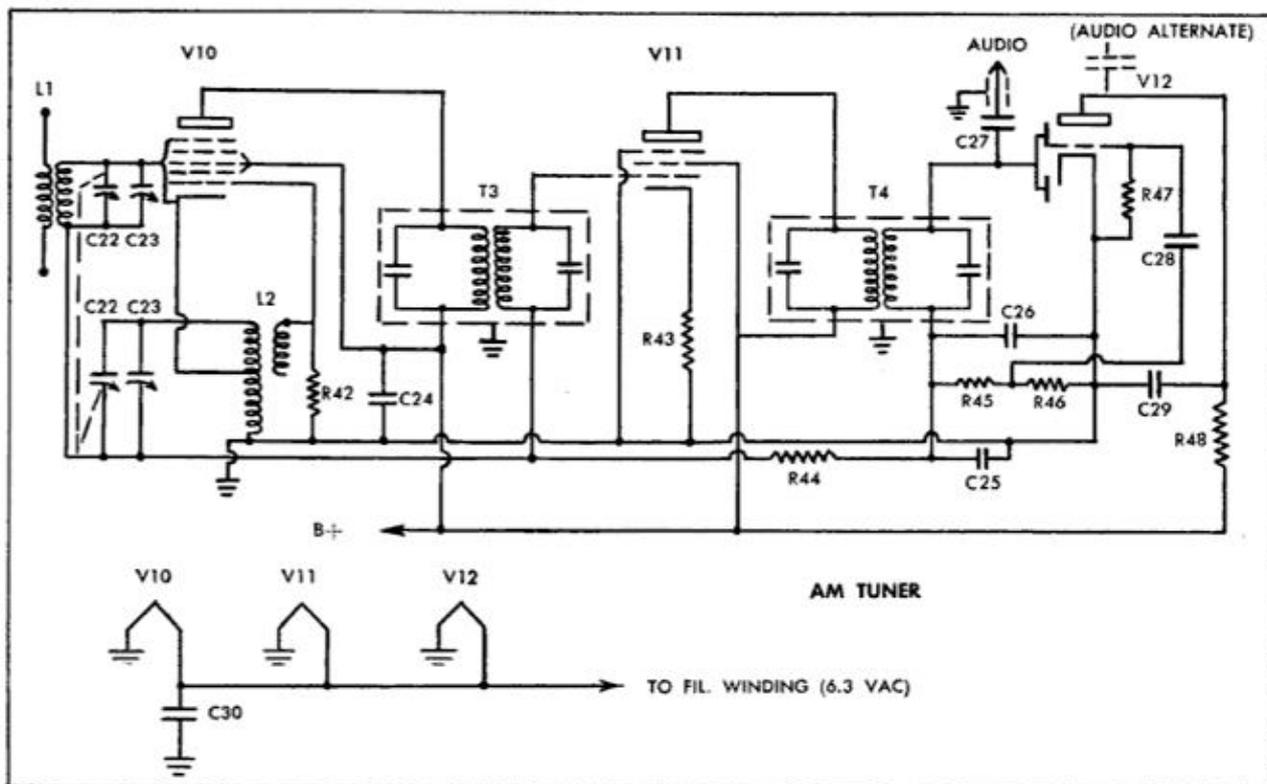


instruction sheets that show the proper connections. All you have to do is provide soldered connections into and out of the units. By using these prewired components, we avoid the tricky problem of alignment and trimming. One important word of caution!

Because the tube projecting from the top of the tuner is exposed when the chassis is inverted, don't insert it in its socket until after the entire unit is completed.

Wiring the AM Tuner. Notice from the schematic that the AM tuner is essentially a small radio front-end. V10 is the mixer, V11 the IF and V12 is the detector, first audio stage. The tuner output is applied to the audio amplifier when the function switch is in the AM-FM position. After wiring the AM tuner on its flat metal plate, place this module unit in position on the main chassis.

Three-Speaker Output. If your speakers



are placed too far apart (perhaps the wife's idea of decoration) for proper stereo sound, you may be conscious of a "hole in the middle" between them. Before you rearrange any furniture, though, try correcting the speaker phasing, which may be causing a divergence rather than a blending at the center. Simply disconnect one speaker, and reverse the leads. If the sound seems to "fill" but is still weak in the center, follow the diagram provided to derive a third channel output. Use a third speaker at these connections. ★ ★ ★

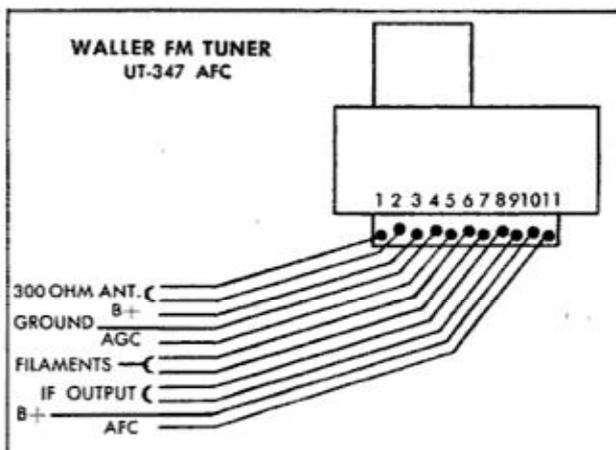
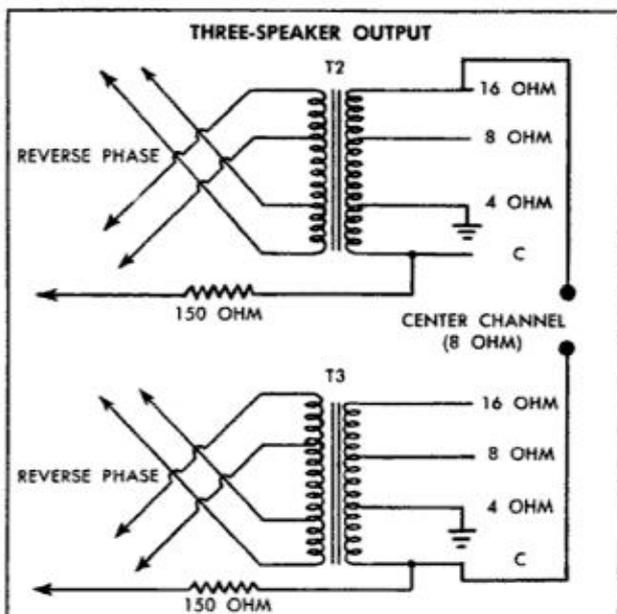
Multiplex on the Way

FCC-approved Zenith-GE FM multiplex system provides FM reception in stereo. This permits the user to enjoy full-dimensional sound. System is compatible, will not make older sets obsolete. They will continue to receive FM monophonic material with no changes.

Conversion to multiplex may take time as broadcasters require multiplex transmitters also. Many manufacturers have already tooled up for consumer sales of multiplex adapters.

Tape recorders are in for a change. Machines with stereo playback but monophonic record will require stereo in both conditions to permit owners to record stereo FM.

As TV sound is also FM, it seems a short jump to having stereo sound with TV programs before too long.



TREASURE FINDER'S PAL

Combines a Metal Locator • Geiger Counter • Radio

IF HIDDEN TREASURE is not the reward you seek, a buried metal pipe can be located in short order

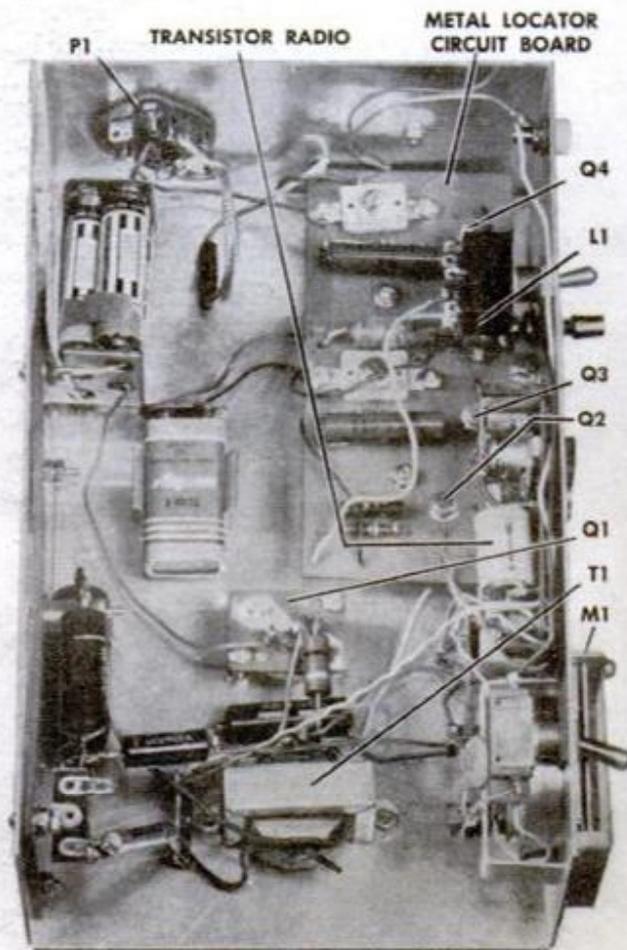
By Gus Wesenfeld

THIS VERSATILE unit consists of a transistorized radio; a metal locator and a Geiger counter or radiation detector—all in one box.

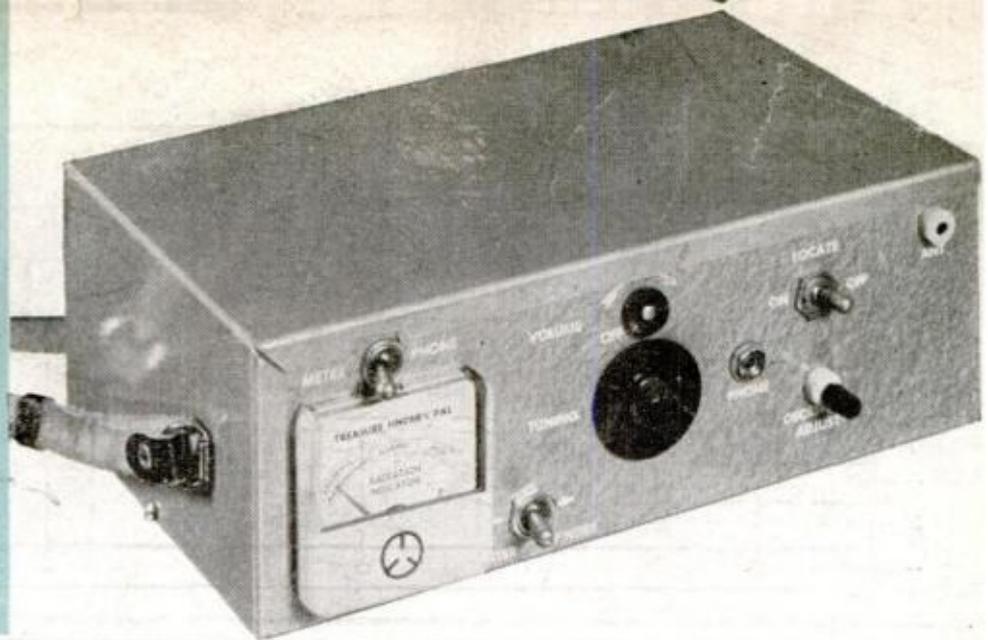
A unique switching system permits you to operate the transistor radio as a radio, or switch it to operate in conjunction with the metal locator or the Geiger counter. You can apply the output of the transistor radio either to the earphone or the meter. The Geiger counter is sensitive enough to register the presence of a radium dial watch, which makes it a good field instrument for locating worthwhile radioactive deposits or indicating the presence of radioactive fallout.

The metal locator is operated with a hand-carried probe which is swept before the operator in arcs, parallel to the ground. As the metal locator produces a squeal in

FOLLOW THE LAYOUT shown here. Part locations can be approximated, keep all leads short and direct



ALL-IN-A-BOX design provides the ultimate in flexibility. Use wire nut on oscillator adjust to serve as a tuning knob



Treasure Finder's Pal — Parts List

- | | |
|--|--|
| V1—CK1026, Raytheon Geiger tube (Allied Radio Corp.) | P1—earphone jack |
| Q1—transistor 2N256 Motorola | R1—220 K, ½ watt resistor |
| Q2—CK722 transistor | R2, R3—47 K ½ watt resistor |
| Q3—CK722 transistor | R4—100 ohm, 2 watt resistor |
| Q4—CK722 transistor | R5—3.3 megohm ½ watt resistor |
| D1—diode, International Rectifier Corp. U40HFP | C1, C6—.01 mfd mica capacitor |
| D2—diode, 1N34 | C2, C5—.005 mfd ceramic disc capacitor |
| T1—universal output transformer, Allied #62G023 | C3, C4—170-780 mfd trimmer capacitors |
| B1—4 Eveready #E94 | C7—.1 mfd, 12 vdc electrolytic capacitor |
| B2—9 volt mercury battery | C8—.01 mfd 600 volt plastic capacitor |
| SW1—SPST toggle switch | C9—.01 mfd 400 volt plastic capacitor |
| SW2—DPDT toggle switch | C10—100 mfd ceramic capacitor |
| SW3—DPDT toggle switch | L1—ferrite loopstick |
| M1—0-50 microampere meter | Any small transistor radio, cabinet, assorted hardware |

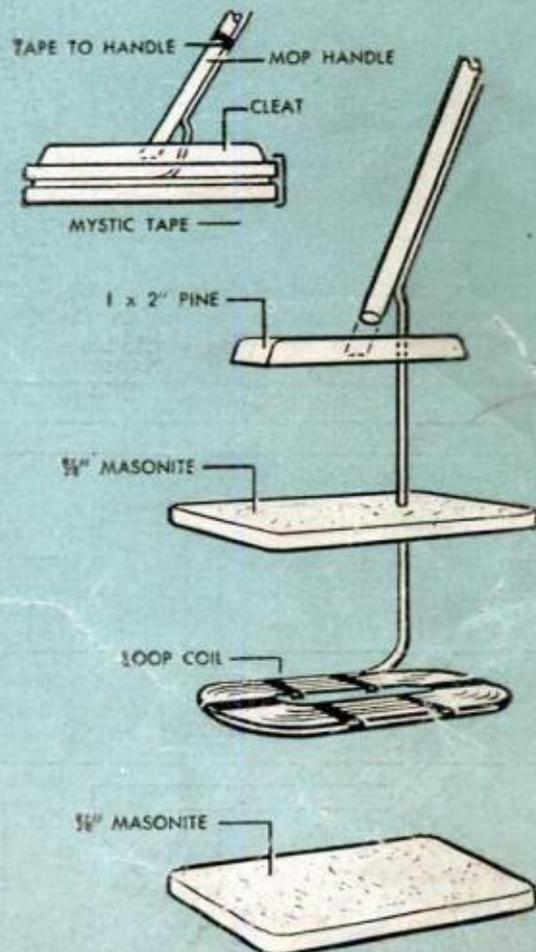
the earphone, the presence of buried metal is indicated by a change in the pitch or frequency of the squeal. When any change occurs, simply repeat the arc, and by advancing while swinging the probe, you will get some guide to the area of hidden metal. You can also use this technique to locate hidden iron pipes or steel conduits, and follow their direction of travel.

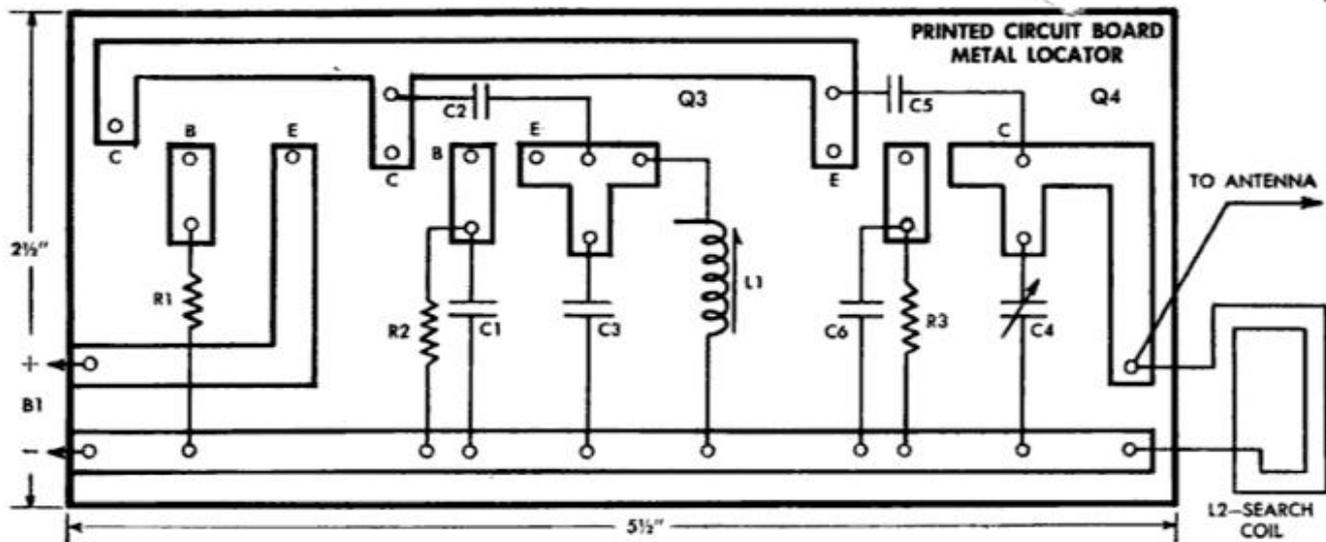
To build the unit, mount all components in one half of the case for easier servicing. Follow parts list on page 191 and the schematic diagram on page 192 closely. You can photographically enlarge or reduce the layout for the meter panel to suit almost any meter you may use. To attach your own meter, carefully remove its face, paste the new face on the reverse side of the meter face and remount it.

The metal locator can either be wired by conventional means or you can use the printed circuit layout on page 192.

To operate the metal locator, tune the receiver to a point high on the band, near but not on a station. Adjust the loopstick, L1, until an oscillator squeal is heard. Then, bringing the probe coil into the

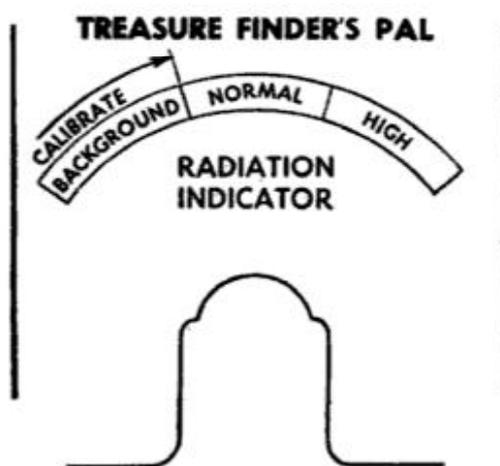
LOCATOR PROBE is fashioned from a discarded loop antenna salvaged from an old radio set. It uses a mop handle support and is sandwiched in hardboard





PRINTED CIRCUIT diagram for metal locator. If you prefer printed circuitry to direct wiring, use the above as etching pattern

METER FACE can be enlarged or reduced to suit your own particular meter. See text

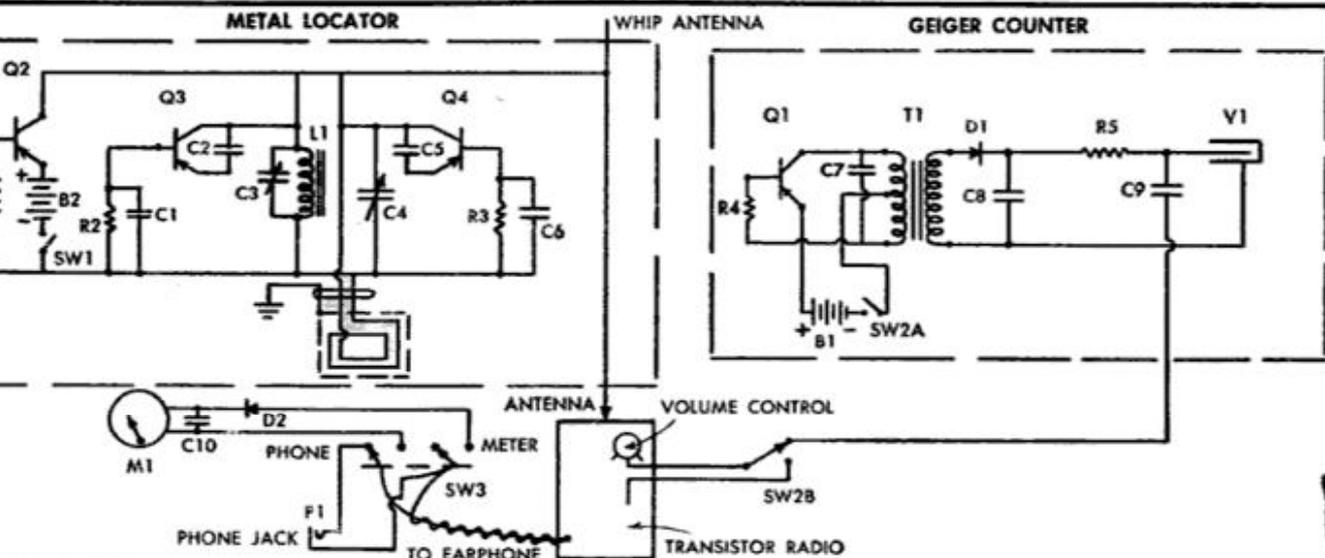


SCHEMATIC DIAGRAM of the complete circuit. All part values are given in the parts list. Do not substitute part values

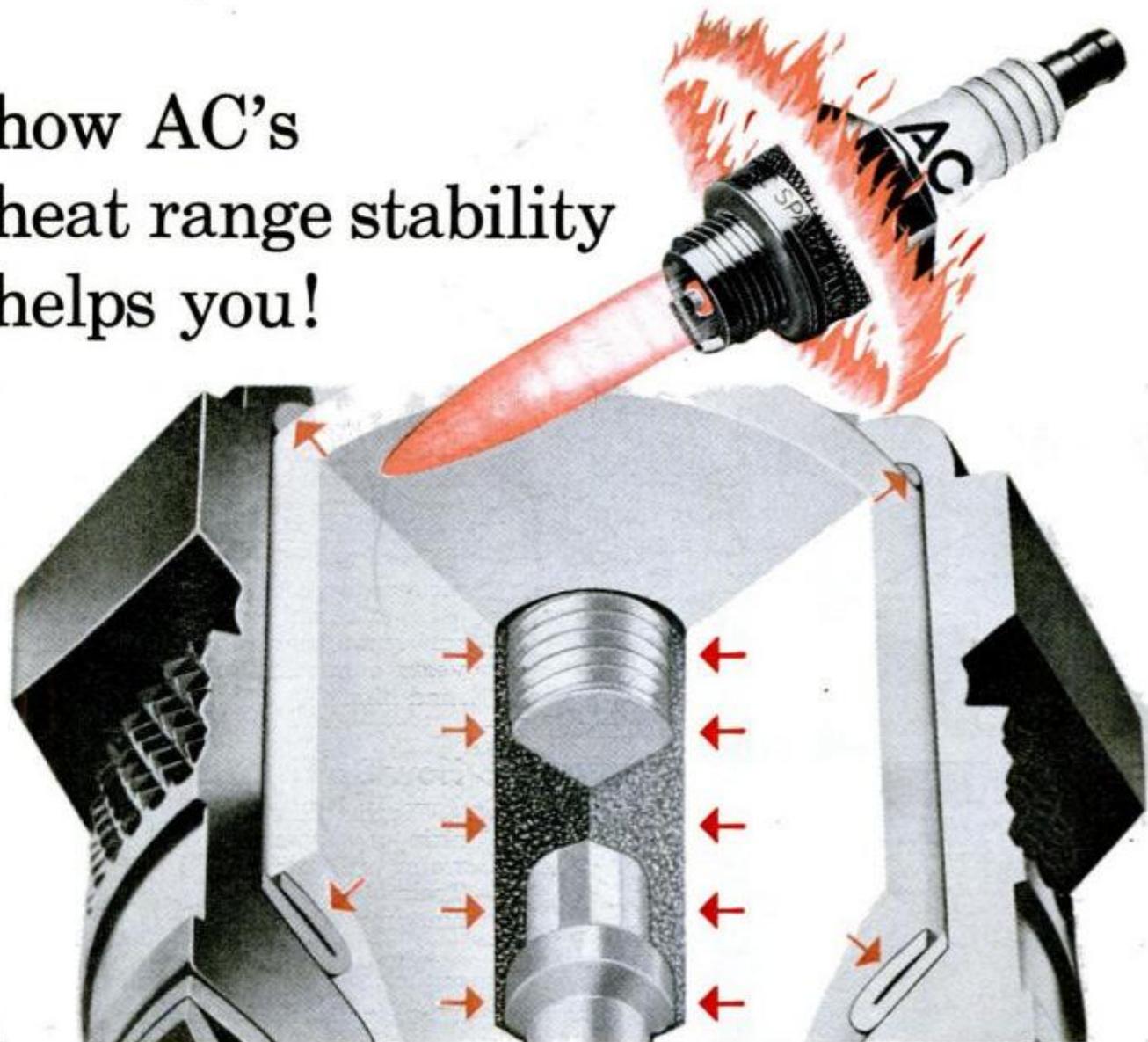
presence of metal should result in a change of pitch.

The **Geiger counter** provides a series of clicks in the headphone when radiation is present. Or, if you want to enjoy the radio while you prospect for uranium, set the output switch to **meter** position and radiations will register on the meter while the radio plays. Of course, the amount of radiation will determine the number of clicks. Some background count is inevitable, so set the volume control with the output switch in the meter position, and adjust for level not to exceed calibration on the scale. Bring a radioactive source into the field of the counter tube to set the high level. Now any radiation will deflect the meter between normal and high. Earphone monitoring of background can be had by flipping the output switch to **phone**.

If you provide a means (a simple plug-in arrangement will do) for connecting the loop search coil to the radio antenna, the search coil can be used for direction finding. Just raise the coil and rotate it for the strongest radio signal, using the meter as a strength indicator. Switch to earphone, to hear the station's identification and location. ★ ★ ★



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AC SPARK PLUG  THE ELECTRONICS DIVISION OF GENERAL MOTORS



Fire-Ring spark plugs

BUILT BEST FOR EVERYTHING YOU OWN
THAT RUNS ON GASOLINE



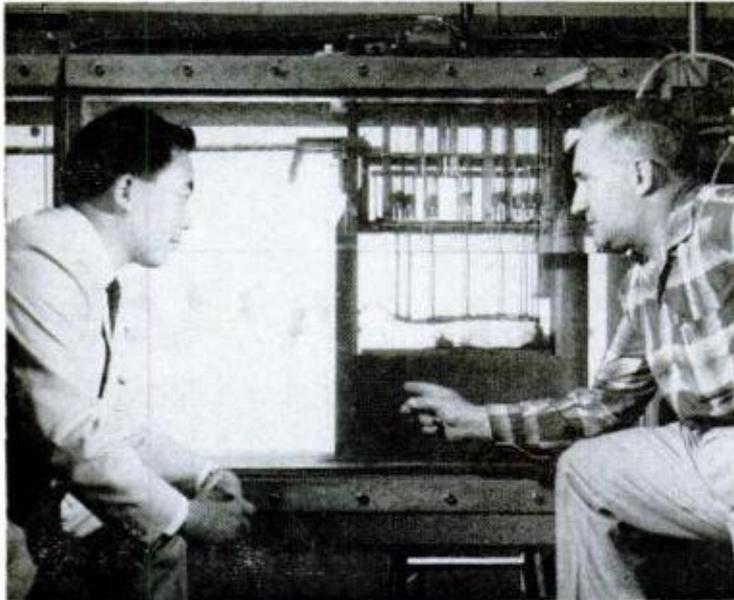
Automatic Leaf Picker Made From Discards

Too many trees and a big yard created an overwhelming leaf-gathering job each autumn for Earl Scott of Fort Thomas, Ky., so he built an automatic leaf picker from odd parts and junk.

All materials were purchased secondhand, picked up free from friends or collected from junkyards. They include an air check from a furnace pipe, a second-hand blower from a junkyard, some scrap iron, two discarded power mowers, the bottom of an old supermarket cart and an idea from a cotton-picking machine he had seen in Arkansas.

One of the motors runs the picker; the second runs the cart.

Scott came by his do-it-yourself habits naturally. He has 40 years of mechanical training behind him.

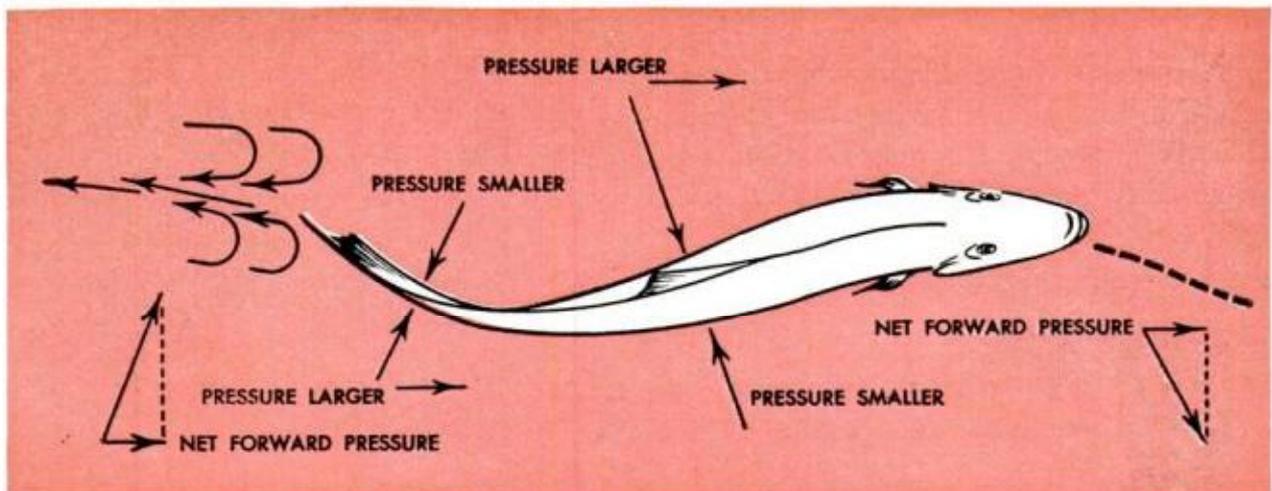


How Do Fish Swim?

Wiggling like a fish, a foot-long strip of copper foil in a tank of water at California Institute of Technology has provided information on how fish swim so fast.

Dr. Theodore Yao-tsu Wu, an authority on hydrodynamics, developed the theory that fish fins don't speed the species along. The body does. Wiggling motion produces a difference in pressure across two sides of the fish. Forward thrust is achieved if the body is angled so that the side of greater pressure pushes the fish forward.

The foil simulator, wriggled by rods at left, indicates this is so.



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The Black & Decker 1/4" CORDLESS Electric Drill is completely portable—no cord, no plug, no outlet.

The power is right *in* this revolutionary tool. A self-contained energy source combines a series of power cells (called the Power Pack) with a highly efficient motor radically different from other power tools.

Charging is by a Power Pack Charger which is connected with an electrical source. On one

charge, for example, the 1/4" CORDLESS Electric Drill will drill 300 1/8" holes, or 200 1/4" holes, or 75 1/2" holes in 3/4" fir before recharging is needed. The Power Pack itself takes 400 charges before replacement.

This great new power tool expands the famous B&D line—does not replace existing B&D Heavy-Duty Drills.

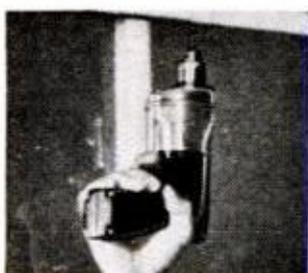
You can see and buy it soon—ask your B&D retailer! The price: \$49.95 with Power Pack. \$59.90 with Power Pack Charger. \$9.95 for Power Pack Charger only.



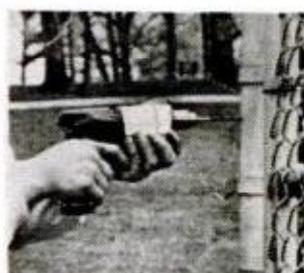
Drill miles from electrical source



Shockproof—another unique feature



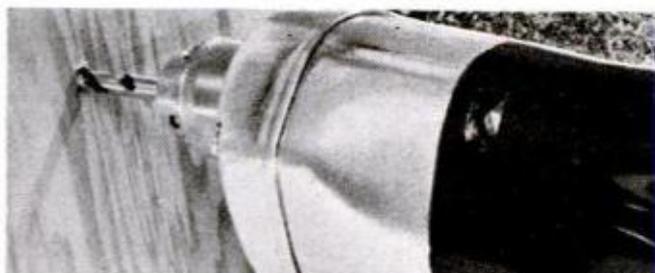
Lightweight—only 4 pounds



Motor cannot be overloaded



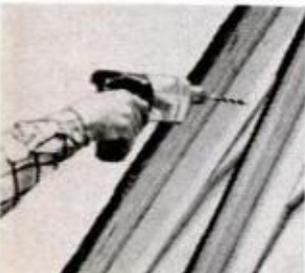
Superbly balanced; one-hand control



Protected against dust and dirt



Amazingly quiet



Drills in wood, steel, plastics, etc.



Power Pack Charger

Left: The Power Pack Charger is compact, convenient. Two settings: Normal; and Special for fast charging.



Chuck



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CLINIC FOR HOMEMAKERS



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—editors of Popular Mechanics invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, Ill.

Smoky Fireplace

Q—I have a baffling fireplace problem that neither I nor my neighbors have been able to figure out. Frequently, but not always, after I start a fire there is smoke in the basement—not much, but enough to be visible and make a noticeable odor throughout the whole basement area. I sealed the cleanout door at the foot of the fireplace chimney. Still I can smell the smoke shortly after starting the fire. I give up. Why?—M.M., Ill.

A—You say that “frequently, but not always . . . there is smoke in the basement . . .” and from this it is possible to make a deduction. Under certain atmospheric conditions you will notice that smoke curls from a chimney and immediately the smoke column turns downward, spreading out just above ground level in many instances. The blaze in your fireplace requires a certain amount of air for proper combustion. This, of course, is drawn from the house and must be replaced by air from the outside in order to equalize atmospheric pressures. Some comes down the flue but most of the air drawn in from outside is coming in the basement windows, bringing the smoke with it.



Lawn Feeding

Q—My lawn has been established for many years and is now about “run out,” that is, there are some weeds, a few small bare patches, or spots, and the grass remaining lacks color and vigor. I have been told that I should use a 10-10-10 commercial fertilizer instead of a regular lawn fertilizer and that there should be at least two applications yet this fall. Can you outline a procedure I should follow in trying to renew my lawn?—H.J., Ia.



A—You do not say whether the lawn is level or is on a sloping lot. In any case, it would seem advisable from your description to level it up with a top dressing of black soil, peat moss or, if readily available, an application of mushroom compost. However, before this application is made it may be best to sprinkle the lawn just enough to dampen the surface and then go over the entire area with a rotary spiker, weighted if necessary, to make the spikes cut in at least an inch or more. Work the entire lawn in this manner in at least two directions. Then apply peat moss, compost or black soil and rake this covering into the loosened top soil. Apply a lawn plant food which is especially formulated for lawns, following in detail the instructions on the container. Sow grass seed rather liberally on all the bare spots, give the balance of the lawn a light grass seeding and then spike the entire lawn again, running the spiker in two directions. Then water the lawn thoroughly, but be careful not to apply too much water which might cause puddling of the clay soil. Keep the surface damp by continued watering at regular intervals until the new grass is at least 1 in. high. At the end of four to six weeks, depending somewhat on the season, give the lawn a second application of lawn fertilizer, watering immediately after application. ★ ★ ★



Buck Rogers, 5 Centuries Early

Predicted by science-fiction writers for the 25th century, a rocket belt has been developed for the Army that will allow infantrymen to leap from the ground, hover in mid-air, fly over rivers or up hillsides.

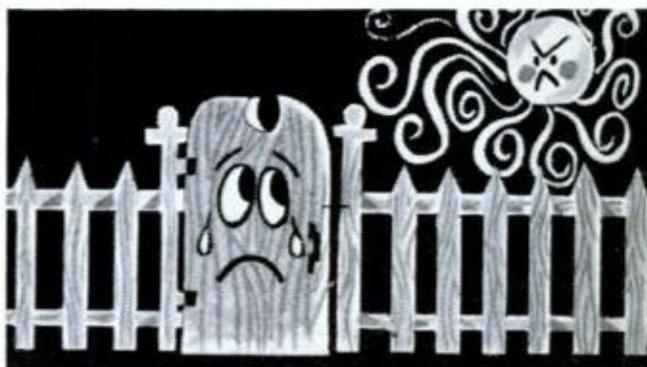
The SRLD (for small rocket lift device) is powered by hydrogen peroxide which, when forced into a gas generator, meets a catalyst and decomposes into steam. Discharged through two nozzles aimed toward the ground, the steam provides the necessary thrust.

The system is mounted on a fiberglass jacket molded to fit a man's back and hips, and fastened in front by two quick-release belts. Two control tubes, one governing power and the other direction (through jet deflectors on the nozzles), extend forward on each side of the wearer.

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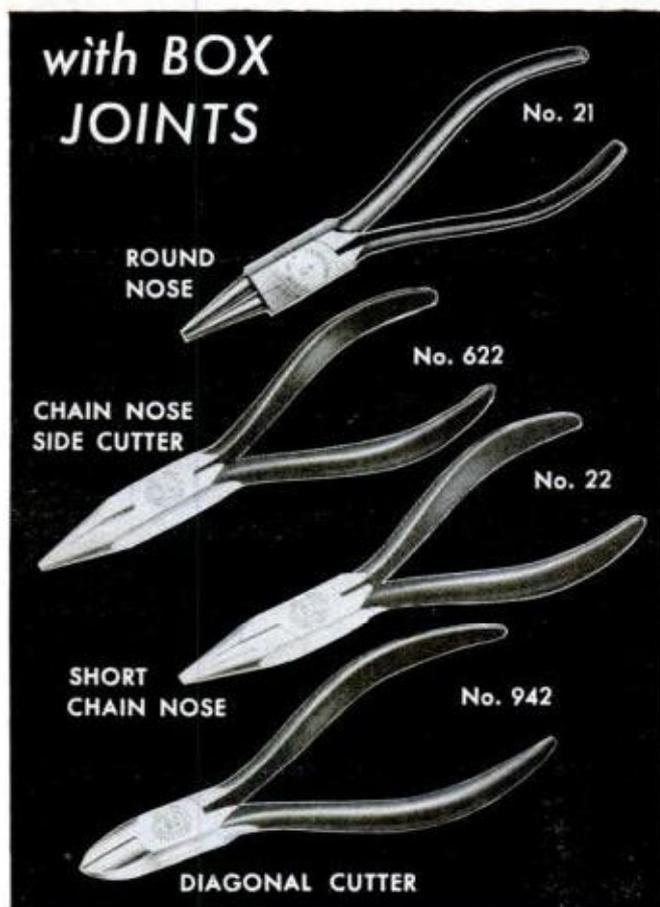
Rain. Ice. Sunlight. Salt air. Weldwood® Spar Varnish beats them all. It's unexcelled for toughness and durability, by actual lab tests. Resists yellowing, discoloration, checking and cracking—even under the severest conditions. And it also resists fungus and mold! For sidings, boats, outdoor furniture, sports equipment—use Weldwood Exterior Clear Spar Varnish—it protects as it beautifies.



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CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

How to Adjust Bendix Brakes

(Continued from page 173)

Then use a vacuum cleaner with brush attachment to get all the dust out of the assembly. Grit on the brake surfaces will score the drums and cause the wheels to drag. Keep your fingers away from the surface of the brake lining. Even the slightest trace of oil on the surfaces will cause the front wheels to pull to one side when braking hard.

Now, using the screwdriver, pry the brake shoe away from the brake plate. Fig. 1. For the sake of clarity certain photos were taken of a stripped chassis in a school shop. At the same time, put a small trace of Lubriplate on the brake shoe ledges only. This will keep the shoes from sticking on the dry surface which prevents complete release and causes the brakes to drag.

Reassembly

Slip the hub of the wheel over the axle carefully so you don't score it or get grease on the brake lining. Add the rest of the bearing parts and tighten the axle nut until the wheel starts to drag, using an adjustable wrench, Fig. 2, or a torque wrench, Fig. 3. Then, back off the castle nut to the closest cotter-pin hole.

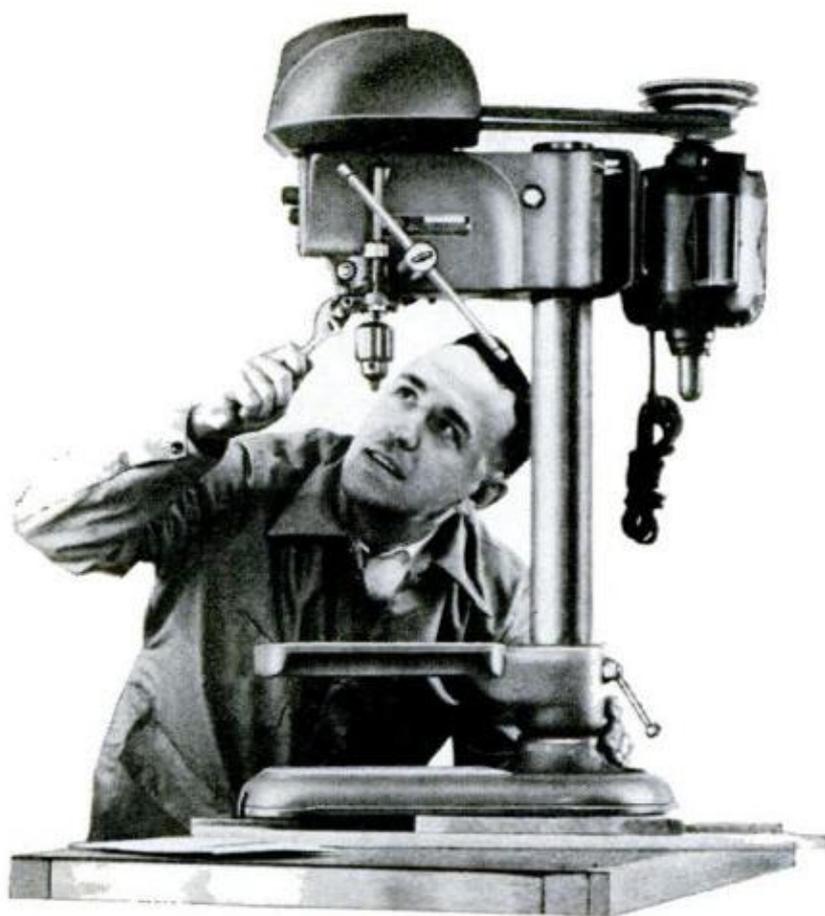
To check, grasp the wheel on each side and push forward and pull back alternately. If any looseness is felt, readjust the axle nut. Now, replace the old cotter pin with a new one, bending the ends of the pin down over the end of the axle as it was originally. Clip off any excess. Tap the hub cap back in place with the rubber mallet.

To adjust the brakes between inspections use the brake tool, working upward on the adjusting screw, one notch at a time as in Fig. 8, until the wheel can't be turned. Release by working the screw downward one notch at a time, until the wheel turns freely. It takes a movement of 5 to 10 notches as an average to tighten and release the wheel. If the wheel will not turn freely, there likely is dirt between the lining and drum, or, a major adjustment is required.

Anchor-Pin Adjustment

Adjustment of the anchor pin, Fig. 5—this is sometimes referred to as a major adjustment—can only be approximated with the wheel on. Take off the wheel only, leaving the brake drum in place. The major adjustment of a Bendix brake consists of setting the anchor pin to bring the lining to within .010 in. of the brake drum at the upper edge. This is done by releasing the locknut on the anchor pin (back side of brake plate) Fig. 6, approximately one turn

(Continued to page 200)



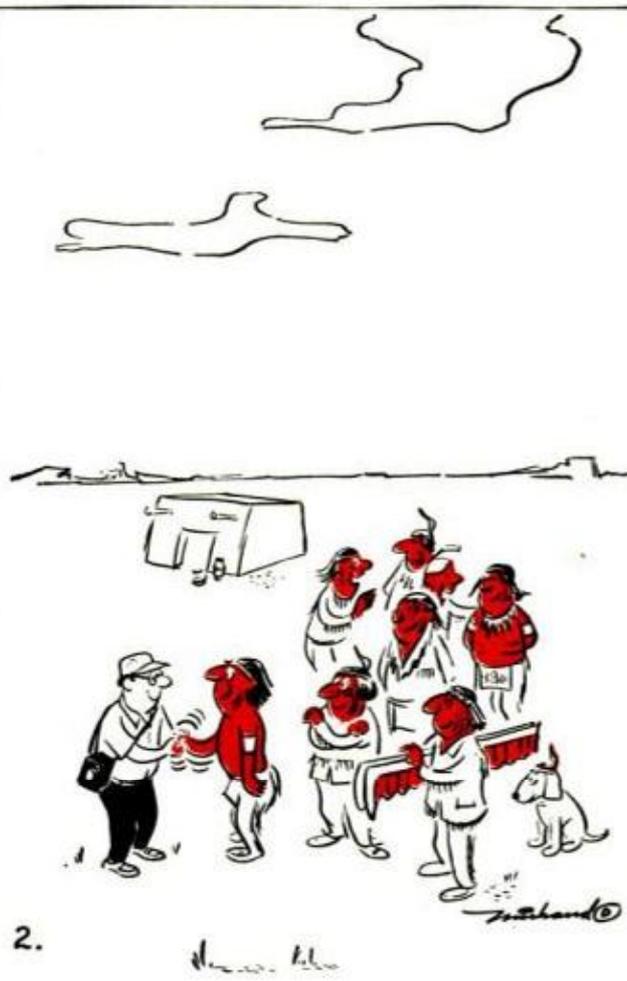
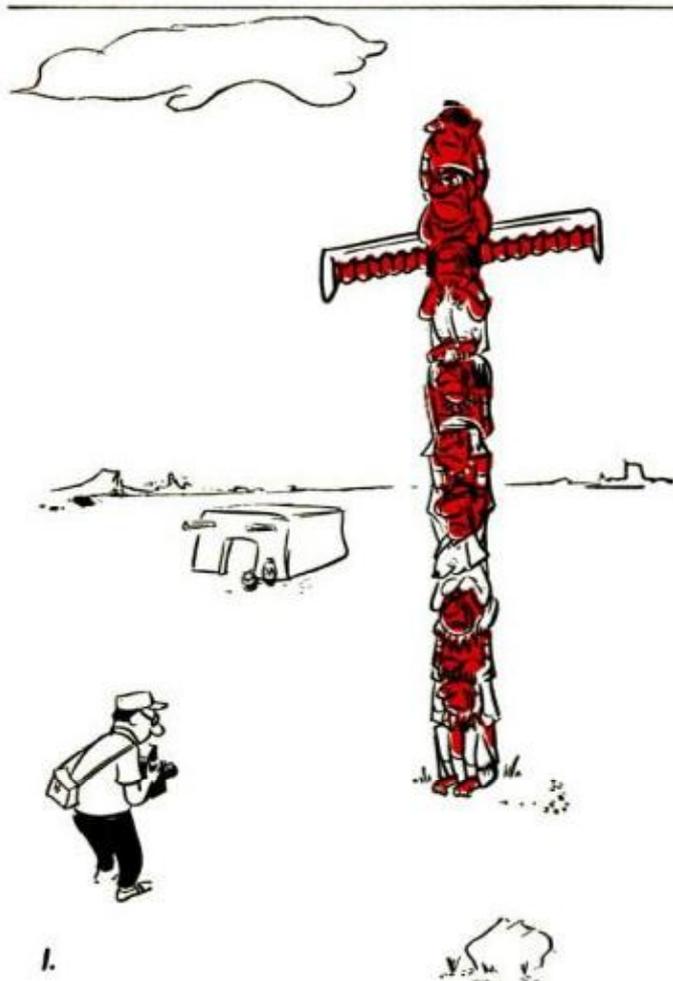
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Heavy-Bodied KLEAN-STRIP

and setting the anchor pin itself. Depending on the type of anchor pin, this is done by tapping with a rubber mallet or hammer or turning the anchor pin with a wrench.

The proper setting can best be found by using an .010 feeler. First, insert the feeler gauge into the adjusting slot at the bottom end of the secondary shoe (the one towards the rear of the car). Set the adjusting screw until the gauge drags. Then move the slot upward to the upper end of the shoe. Again adjust the anchor pin until the gauge drags. Tighten the locknut. The adjustment is then complete. Recheck after the locknut is tightened to make sure the correct adjustment is retained.

There are modifications of the basic Bendix brake. Some 1955 and later cars have nonadjustable anchor pins, Fig. 7. Brake shoes and drums must be arced or ground for concentricity of lining and drum. Auto dealers and parts shops have these facilities. Self-centering shoes have two eccentric cams, one for each shoe, instead of just one adjusting screw. Always check carefully for any modifications that may affect adjustments. ★ ★ ★

Australia's Huge Warragamba Dam Will Hold 460 Billion Gallons

Jammed into a rocky gorge in the mountains behind Sidney, the newly completed Warragamba Dam will provide storage for 460 billion gallons of water, an amount Australia figures will be needed to supply demand in the area 30 or 40 years from now.

One hundred years of contemplation and 10 years of construction went into the 450-foot-high dam, Australia's largest, which cost some \$80,000,000. Its main wall, which is 1150 feet long, 340 feet thick at the base and 28 feet thick at the top, alone required three million tons of concrete.

The gorge of the Warragamba River leads from the Burrarorang Valley, which is 50 miles long and which was flooded when the dam, taking water from a catch basin with an area of 3383 square miles, formed a lake 200 miles in circumference and 340 feet deep.

The weight of this water, as it gathered, caused the rock strata of the valley to bend. It pushed with three million tons pressure on the base of the huge wall.

To detect such pressure and to monitor the movement of the dam, there are four seismological stations located in deep vaults at its site. The dam does move slightly, and the seismographs, sensitive to vibrations of less than one-millionth of an inch, recorded a slight downstream expansion as the lake level rose.

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DEPT. W-6

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JOINT AND SHARPEN ALL SAWS



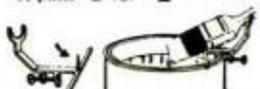
SUPER FILER NO. 11 joints and sharpens hand and circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits steel roller, teeth are finished. Saw runs true **\$9.95 PPD** with no side pull. Includes 8" file. . . .

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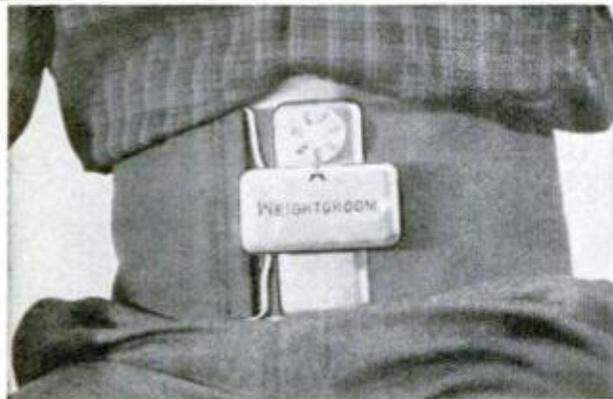
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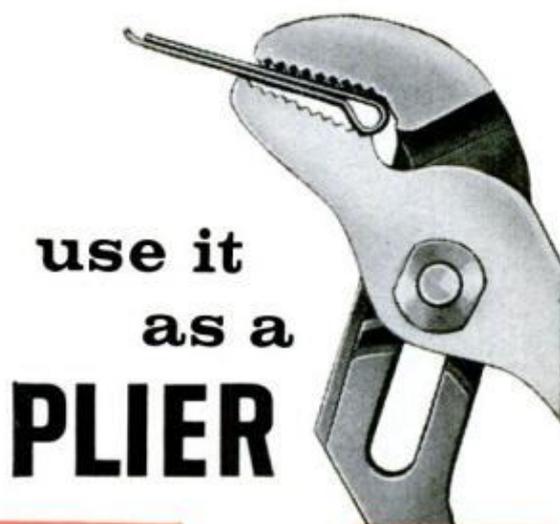


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AUGUST 1961

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201

Road Through the Darien Gap

(Continued from page 129)

with the right front wheel, which tilted the whole vehicle as close to the "angle of no return" as anyone would care to go. I'll never know how the *Cockroach* ever righted itself.

Days later, we ran into a 5½-mile stretch of knee-deep mud. We winched through the entire distance 150 feet at a time—the length of our winch cable. It took three days to reach dry ground again.

On December 22, we decided not to spend Christmas in the gap, even though Panama City was still 400 miles away. I swallowed a handful of vitamin tablets, double doses of Enterovioform tablets to combat an attack of dysentery, and, telling caution where it could go, we drove like madmen through jungle and rain.

It had taken us 13 days to cover the 100 miles through the last part of that first gap. But once out of it, we covered the remaining 350 miles to Panama City in one day over an all-weather highway. We reached it on a hot, humid Christmas Eve, bone tired but jubilant, and next day had garlic hamburgers for Christmas dinner.

Radio Added to Equipment

So far, we were on schedule. Plans had called for leaving Panama, our jumping off point into the Darien, early in January when the rainy season is usually over. But the downpour kept coming. While waiting, we contacted Thomas Guardia, Director of the Darien Sub-Committee, an international group of engineers from Panama, Colombia and the United States. Theirs is the forbidding task of exploring and eventually recommending a route for a future all-weather Pan-American Highway which will one day link the Americas. Although convinced we'd never make it through the Darien, this group agreed to help us try. A model ANGR/9 ("Angry Nine") radio transceiver, a crew of machete workers, and guides, food and gasoline were generously provided. The U. S. Army built us a winch anchor, which Terry had designed, for travel in muddy and swampy ground, and we were invited to spend two days at their Jungle Warfare Training Center.

With the sub-committee, we spent the last weeks planning, checking out equipment, gathering food supplies, ammunition and lifesaving medical stores. Then, just before we were due to move in on the jungle, the sub-committee told us they had bought a jeep pickup which would join the expedition for the push through to Colombia. This was great news. Besides the

extra vehicle, we gained a group of needed extra hands—Otis Imboden from Memphis, Tennessee, an expert cameraman; Amado Arauz, cartographer and historian, and his attractive wife, Reina, a brilliant young professor of anthropology at the University of Panama. The Trans-Darien Expedition was now both scientific and international.

At 11 a.m. on February 3, our two-vehicle expedition left Panama City of Chepo. True to the rumors, all semblance of roadway ended against a towering wall of green jungle. A rusty, weather-beaten sign told us in Spanish and English: "End of the Pan-American Highway—here begins the Darien Gap."

In a steaming 110-degree-atmosphere, we edged cautiously forward into the tangle. My log for February 10 reads: "Twenty-two miles into the Gap. We are making three miles a day. The sun is unable to pierce the ceiling of matted vegetation, and we travel in semigloom. Already, the front of the Landrover is battered and bent from forcing our way through. We have broken two winch cables in a week. Our routine in the jungle becomes standard: Up with the sun at 5:30. Breakfast of rice, beans and coffee, and our daily radio contact with Panama City completed by 6:30. By 6:45, we start slashing our way deeper into the jungle's mass of tangled undergrowth. All day long we cut trail and manhandle the Landrover as she slips and slides on the grades.

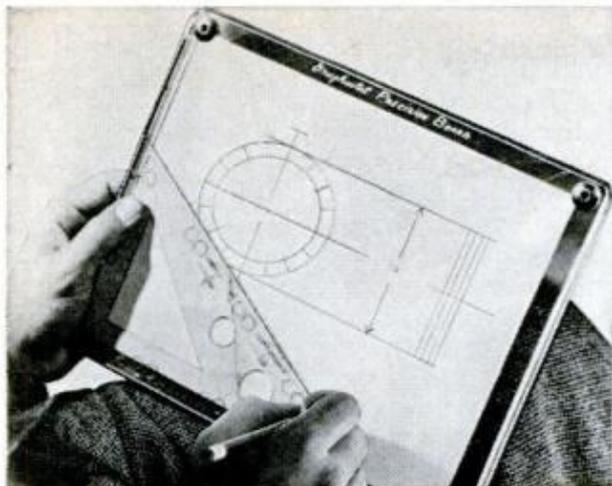
Hands Full of Steel Slivers

"We use the winch to haul ourselves up the steep grades—a painful business since guiding the steel cable into the drum leaves hundreds of tiny slivers of steel in our hands. Descending, we have to tie two Dacron ropes to both rear springs, take two hitches round a tree and ease the vehicle down inch by inch."

On March 3, we reached the River Ipeti—67 miles into the jungle, having averaged 2.2 miles a day. Already we had built 35 crude palm-log bridges. At the Ipeti, we radioed Panama for supplies to be sent ahead by canoe and cached at an advance base camp.

Meanwhile, word reached the Cuna Indian chiefs, out ahead of us in the jungle, that white men were in their territory. Cuna hunters had probably been silently following our progress. One day a G-stringed native appeared at our camp with a message. His chief, an interpreter told us, had ordered us to their village. One of the chief's sons escorted us downriver to a full-scale tribal conference, which was to

(Continued to page 204)



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Sketches, tracings or precision drawings can be made on the spot with an eight-ounce drawing board.

It has spring clips for holding paper in place without tacks, straight edges which eliminate the need for a T-square, and a 30/60-degree triangle and 45-degree triangle with special spring clips on the underside for storing them when not in use.

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AUGUST 1961

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203

decide if we should be allowed to proceed.

The Indians wanted to know where we were going and when we would be leaving their territory. Elaborately, through interpreters, we explained the purpose of our mission. Since we were already halfway into their lands, they decided to let us proceed. But they made it abundantly clear—with gestures—that they wanted us to move on quickly. We were not welcome and knew we were being carefully shadowed. Once, after Terry tried his hand at prospecting for gold, his small find, left with the duffle at camp, disappeared as soon as our backs were turned.

Lost

Day after day we pressed through endless rain forest. During April we covered a hard 105 miles. By early May, when heavy rains announced the arrival of the new wet season, we suddenly realized we were not sure of our position. We knew we had hacked our way through 255 miles of a dank and musty Hades but, according to local Indian guides, we should have crossed the River Cue long before. It took another eight miles of trail cutting to convince us we were lost.

And during that last eight miles, our radio generator fell off the back of the jeep, smashing the 600-volt regulator. For five days, Terry tried to repair it, while a blanket of isolation and depression hung over us. We were now cut off entirely from the outside world. For the first time, we really appreciated the value of our early morning radio chats with Panama City.

Eventually, Terry got the generator working again. We tuned in to the familiar voices in sub-committee headquarters and our spirits soared. We were given fresh bearings and carried on—but not for long.

Two days later, while winching the Landrover up a tortuous, 65-degree hill, the winch pulley pin sheared!

Somersaulting Landrover

Without warning, the *Cockroach* plunged backwards with Terry inside. Gathering momentum, it curved its way through a half somersault and landed with a loud bang on its roof, bounced four feet in the air, completed another half somersault with a half twist, and landed right side up with a tremendous thud against a tree—70 feet below. For several seconds nobody moved. I was sure that Terry was dead, the Landrover wrecked and the expedition finished. We scrambled to the battered vehicle. Looking through the window, I saw Terry, his face covered—not with blood—but calamine lotion. Everything inside the vehicle was a shambles, but Terry was alive, un-

hurt, and grinning! His safety belt had saved him from having his brains dashed out. Even more amazing, when he stepped on the starter, the vehicle's engine roared up as well as ever. Terry wryly remarked, "You know, Dick, that was the fastest 70 feet we made during the entire trip."

When we reached the advance point where our supply canoes were supposed to have cached food for us, there was no sign they had been there. So we were soon reduced to a diet of rice, oatmeal and a sickly hot drink made from blocks of unrefined sugar. We had shotgun shells, but no shotgun—it had been lost. The wild turkeys, boars, monkeys, deer and iguanas we had depended on for fresh meat were crossed off our menu.

Rain and Mosquitoes

Then Terry went down with malaria. For four days, we traveled with him wrapped in his sleeping bag and strapped in the front seat of the Landrover. By now the rain was vicious and almost incessant, and for the next six weeks we were to remain soaked to the skin. With the tropical rains came plagues of mosquitoes. It had been bad enough with hordes of ticks, chiggers and ants, together with the constant danger of snakes, scorpions and spiders.

Finally, on May 13, we crossed the border into Colombia, the first people to link the two American continents overland in a vehicle.

The frontier was marked by a small concrete monument, built years before so that the border could be seen from the air. Around the monument some 50 acres of jungle had been cleared, and it was exhilarating to see the blue sky again. Grins broke out on bearded faces. But they were short-lived. There were still five miles to go before we reached the River Cacarica, where we planned to build rafts and float men, supplies and vehicles 40 miles downriver through the infamous swamps of the Atrato. By using the Atrato waterway, we could reach the town of Quibdo, where the South American highway system started again.

Blood and Lemon Juice

It had all looked so easy on the maps back in Canada. Three days of trail-cutting brought us to the Cacarica's banks—our escape route out of the Darien. But it took us a week to find 20 suitable balsa logs, each 30 feet long, and float them down to our camp where we assembled the two rafts. We worked for six days in water up to our waists. The stones on the river bed cut deeply into the water-softened soles of

(Continued to page 206)

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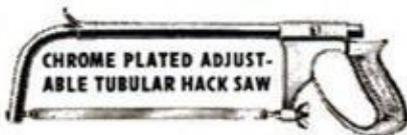
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our feet, making them raw and bloody. Just trying to walk hurt, but even more unpleasant was the job of rubbing lemon juice in the sores to harden them.

From here, we sent two of our crew downriver to the hospital in Quibdo. They had become critical cases of jungle exhaustion and malaria.

Then Nature doublecrossed us. Right in the middle of the wet season it stopped raining, and our rafts took us just 200 yards before we were held fast by rocks in the first rapids. We waited for rain for two days, hoping that the water level in the river would rise. When the storm broke, we floated almost out of control over another twenty rapids and two whirlpools. Twelve miles later, we were stopped by an extensive barrier of rocks, water plants, logs and weeds. It was a fantastic job even to work a canoe through, let alone two rafts. So, wearily, we started hacking out another 19 miles of trail to bypass the river.

Malaria Strikes Once More

Just before we reached the edge of the Darien jungles, I came down with my first bout of malaria. My kidneys ached, my legs stiffened, my head spun and throbbed to a temperature of 104 degrees. I sweated, shivered and prayed we would get to Quibdo fast.

June 17 was our day of glory—the day the town of Quibdo turned out to welcome us as heroes, and give thanks for our safe deliverance from the hazards of Darien. A week later we arrived in Bogota, capital of Colombia, and our journey's official end. Although the Colombians treated us royally, the real hero of the expedition was *The Affectionate Cockroach*—battered now almost beyond recognition. Her jungle scars included smashed windshields and a stripped differential. Her roof rack was torn off and her body dented and scarred. But the ragged Canadian ensign still flew proudly from the roof, and her motor still purred proudly.

During the 134-day ordeal in Darien, we had left behind 310 miles of trail, built 125 palm-log bridges and forded and waded through 180 rivers and creeks. Darien had claimed 36 pounds from my malaria-ridden body, and 12 pounds from Terry's. More than once the jungle had reached for our lives as well.

But we had proved the skeptics wrong. One day, the motorists who follow us will drive along a fine highway carved out of green jungle in ease and comfort. But more important to us was the knowledge that, even in today's space age, man still has frontiers to cross in forgotten corners of his Earth. ★ ★ ★



Single Charge of Gas Will Inflate 16 Tires

Charged with carbon dioxide gas, a British tire inflator will fill 16 conventional tires or seven tubeless ones on one filling of gas. According to the manufacturer, the inflator brings a tire up to proper pressure in a few seconds, and the pressure of the inflator is more than enough to spring the beads of a tubeless tire against the wheel rim. The manufacturer is Colebrook Engineering Co., Ltd., London, England.



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Meteorites

(Continued from page 113)

"Anybody says any damn thing he wants to. If life exists on Mars or some other planet it is the most interesting datum in modern science. It's too important for anybody to fly off the handle."

"The hydrocarbons could easily have been produced in space without having a living organism as its source," said Dr. Anders, who last year won a top award for his meteorite studies. "Hydrocarbons are known to exist in comets and I don't think anybody suggests that comets ever supported life."

Dr. D. P. Stevenson, director of basic and geological science research, Shell Development Co., Emoryville, Cal., said: "The chemicals they found are like those we find in geological formations before we strike petroleum. In Louisiana, for instance, if there is oil at depths of 8000 to 14,000 feet, we'd find these kinds of compounds at 1500 feet."

One of the world's pioneer meteorite scientists, Dr. Harvey H. Nininger of Sedona, Ariz., believes the Fordham-Esso work "has opened up the question of whether meteorites come from a life-bearing planet." He adds that other facts and theories support the notion. Here's some background on them.

Collision of Tiny Planets

Meteorites seem to be the pieces of two or more tiny planets that once collided somewhere between the orbits of Mars and Jupiter. Their pieces flew in all directions. Some went into strange orbits and became comets. Others splattered Earth, the moon, and the rest of the solar system.

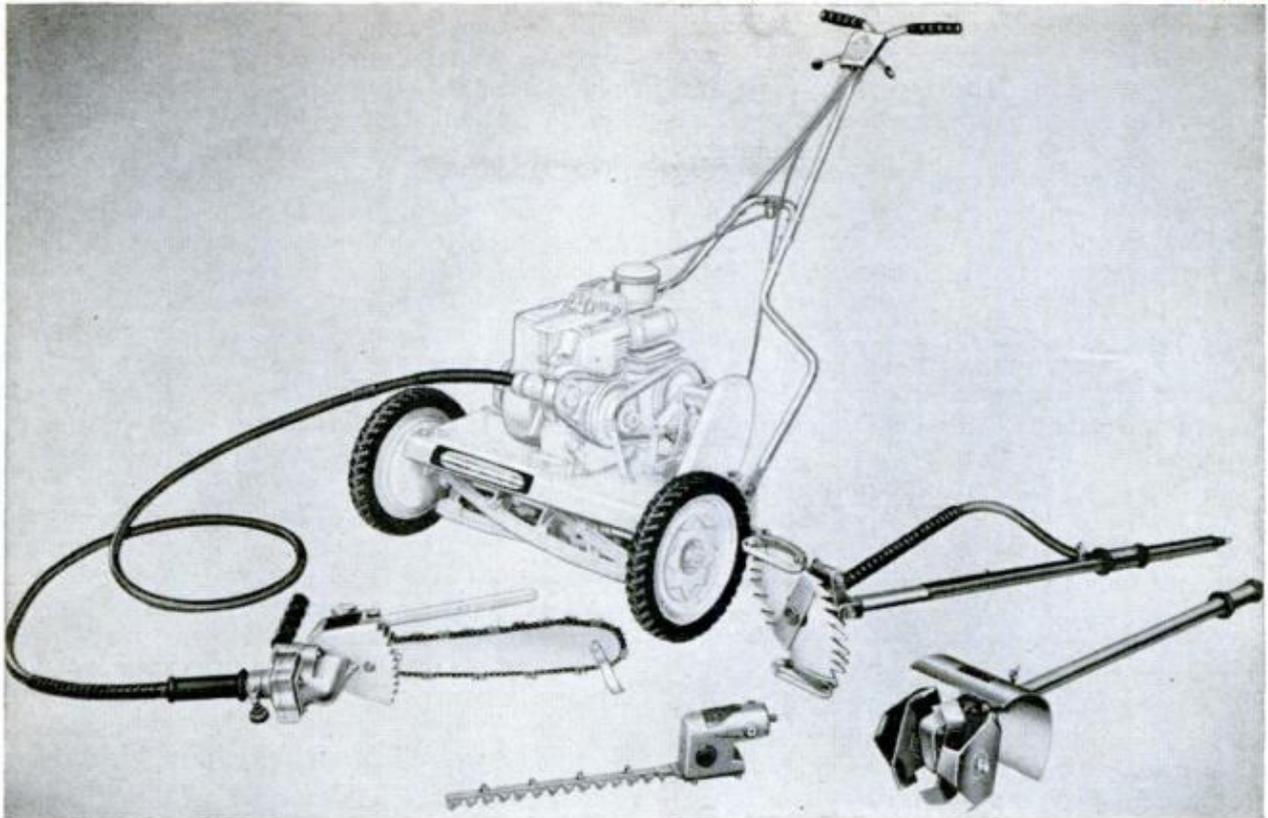
They also left behind a belt of asteroids—something of an outer space garbage dump of chunks which occasionally hit one another, fall out of orbit, head toward the sun, become attracted by the far reaches of Earth's gravity, and drop through our atmosphere. If they burn up before hitting the ground, they are called meteors; if they hit the ground before burning out, they are meteorites.

Of two kinds of meteorites found (stone and iron) almost all iron meteorites contain small amounts of nickel. But a few have no nickel; these are the interesting ones.

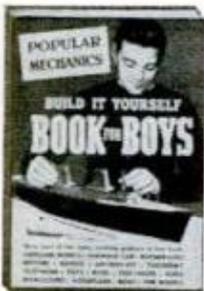
The chances are that at least one of the small planets that collided was built much like Earth—with a heavy core of molten iron and nickel surrounded by a thick mantle of rock. Iron-nickel meteorites probably

(Continued to page 210)

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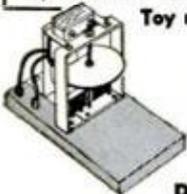
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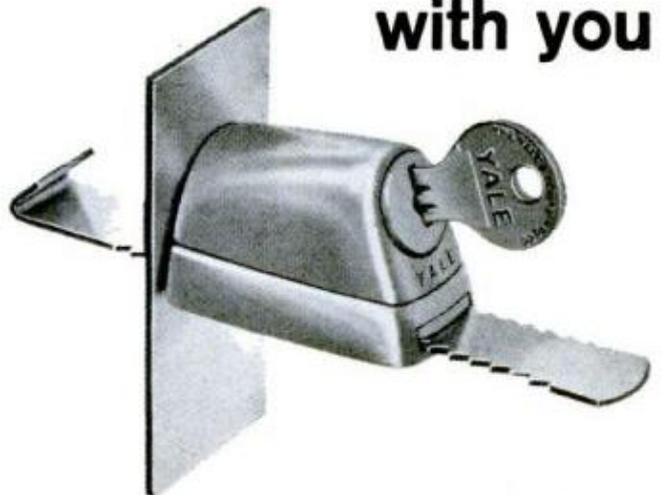
Boomerangs

"Ju-be"—the punt



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were in the core, while stone meteorites were from the mantle, says Nininger.

Iron as we mine it in the relatively thin crust of Earth is hardly ever found together with nickel. So the nickel-free iron meteorites are like our iron ore.

Here is the crux of Nininger's reasoning. It involves "bog iron," a strange kind that is associated with microscopic life in swamps. Since most of Earth's surface was once tropical, today's rich veins of iron may have been first deposited as bog iron by these tiny creatures and changed to ore through millions or billions of years of time, temperature, and pressure.

In other words, iron meteorites with no nickel could be another bit of evidence that there was life on other worlds.

Meteorites are also the reason the moon's face is so pock-marked. The moon never had an atmosphere to slow or burn up meteorites or to wear away their craters. The moon is a scarred life record of meteorite and comet impacts.

Fragments from some of the moon's meteorite collisions may even have fallen to Earth. Dr. Urey thinks that this is what stone meteorites are. Nininger and other scientists believe this is the best explanation for tektites—smooth, glassy black rocks the shape of balls or dumbbells.

Splashing the Moon

Tremendous meteorite explosions may even have splashed material up and onto the moon. If so, scientists believe, the most recent splash-up was probably from the 1908 Siberian meteorite.

In fact, Prof. Anthony Turkevich of the University of Chicago suggests that, since meteorites have pelted Earth for billions of years, the first men to reach the moon may find there microscopic life now extinct on Earth. This primitive life—shot from Earth to moon—could have originated here. But it is also likely, says Dr. Anders, that these spores of life came to Earth on meteorite wings or from the splash-up of meteorites colliding with Mars or another near planet. It's even possible that such life was shot here from planets outside our solar system when they were hit by their own kind of meteorites!

Meteorite studies have also given us the latest age of the solar system. This dating relies on the fact that when the solar system was formed it was intensely hot with radioactivity. Now radioactive elements are fickle: they give off radiation in order to change, or decay, into something else. Some radioactive elements can change in seconds, minutes, or days. Others take millions or billions of years. These are called half-lives and are established for

every known isotope of every element.

So measure the minute amounts of decay products—the chemicals that radioactive elements have changed to—and you have an atomic cosmic clock. Chemists have thus been able to work backwards and establish the age of meteorites, Earth, and the entire solar system as 4.5-billion years old.

This was first found by Dr. Claire Patterson of California Institute of Technology, who used the 4.5-billion-year half-life of uranium-238 to lead-206. Most recently, Dr. John H. Reynolds of the University of California used the 16-million-year half-life of iodine-129 to xenon-129.

Reynold's work with iodine was especially interesting to Dr. William A. Fowler, an eminent Cal Tech physicist concerned with how the elements were created. Most were formed at the birth of the universe some 15 to 25 billion years ago and can be accounted for. But iodine is younger and was one of the stumbers. "Now," says Dr. Fowler, "we're convinced that iodine-129 was made when our solar system was formed, by the radiation from fierce flares of the sun."

The finding of lifelike hydrocarbons in meteorites is right in line with his concepts. While small bodies (planetesimals) that were later to be the planets were being formed, he says, "conditions were highly favorable for the building of biological molecules."

Even before there was an Earth, the right combinations of nitrogen, hydrogen, carbon, and oxygen were present and the nuclear and ultraviolet radiation from the sun was intense enough to put these pre-life chemical pieces together.

Could such a molecule, or a single germ spore, from outer space have been brought here by a meteorite to start life on Earth? Says Dr. Anders, "The odds for such an event are quite favorable and it may have happened more than once in Earth's history. We may all be descendants of this spore." ★ ★ ★

Electronic Guide for the Blind

Resembling a flashlight, an obstacle detector for blind people sends out sound waves that are reflected back from objects, giving the operator a clue to the nature of the terrain ahead. The "sondar signal" consists of short bursts at a fairly high audio frequency, the repetition rate of the bursts being in the region of 50 to 100 per second. When beamed at objects at a distance, of up to 20 feet, the reflected signal is changed in tone. This change, to the trained ear, gives the distance and location of obstacles.



Movie and Slide Film Coordinated on Same Screen

Simultaneous slide films and sound motion pictures, electronically synchronized to a preset program, are being used in sales and training presentations through a system called Duo-Pic, developed by Carter and Gallatin Corp., Chicago. An inter-

locking cable controls the slide projector through a subsonic signal tone cut into the sound track of the movie film. Two images can be shown side by side, or can take turns on a single screen. The method saves production cost on nonanimated subjects.

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Owners Report on the Ford

(Continued from page 96)

"I like the lifetime wax finish."—Texas distributor.

"Steering is very easy on this Ford."—Maryland service manager.

"I like the steering. Ford's front end evidently is put together well, using the best steering system. The car handles better than some cars with power steering."—California manager.

"The '61 Ford seems to be much better built, tighter than any Ford bodies made in the past."—S. Carolina engineer.

"This new one has good body construction."—Nebraska salesman.

"It's so good that after 15,500 miles to date, I have never gone back for service."—New York cab driver.

Hold it, hackie, you've already missed three tune-ups and a wheel bearing repack!

Back to the gripe column, the Ford's shortcomings numbering seven through twelve.

"Trunk is not deep enough. You can't put anything high in it."—Pennsylvania cost accountant.

"The trunk doesn't have enough room and I don't like the spare tire up front in the trunk."—Kansas service-station manager.

For its cubic content Ford's trunk is ill-shaped for standard luggage sizes. It's more like the world's largest attache case than a real trunk.

"Seats too low. This makes leg position uncomfortable, particularly for women wearing high heels."—Illinois advertising man.

"The center of the rear seat is most uncomfortable due to bad engineering of the mid-floor hump. This means only two people can sit in back."—California sales manager.

"Sounds petty, but we don't like this small glove compartment."—Michigan tavernkeeper.

You're not petty; a six-passenger car needs interior storage space that will hold more than just a pair of gloves.

"The windshield wipers are too small and leave a six-inch blind spot in the middle of the windshield."—Nebraska engineer.

"Would have liked 1960 Mercury windshield wipers on this Ford."—Pennsylvania superintendent.

So would buyers of the 1961 Mercury! "Big sweep" wipers were abandoned when Mercury switched to Ford body shell for '61.

"I have a noisy engine and am never able to make it idle quietly."—Texas telephone employee.

"The '61 Ford is essentially too low."—W. Virginia salesman.

"Not enough road clearance for a hunter-fisherman."—Illinois diemaker.

Ford would be happy to sell you a high-wheeled pickup for your off-the-road trips.

Back to the bright side of things, here are more plaudits for the new Ford, numbering thirteen through twenty.

"It holds to the road and curves beautifully."—Iowa farmer.

So it does. And the lowness objected to by the man from Illinois (above) is a major factor contributing to its roadability.

"The roadability is good in mountains and in flat country too."—Texas farmer.

"The dash is well designed and the upholstery is excellent."—Nebraska insurance investigator.

"It is nice and easy to get in and out of."—Missouri foreman.

"I have power-steering and it handles very well."—Minnesota banker.

"Engine starts easily and runs smoothly."—Tennessee school superintendent.

"I like the Cruise-O-Matic transmission."—Missouri manufacturer's agent.

"The guarantee and the service are what I am pleased with."—California engineer.

To balance off the words of praise, here are the final complaints, numbering thirteen through eighteen.

"Don't like the lack of headroom."—Kentucky welder.

"The glass does not fit tight enough—causes rattles and wind noise through the cracks."—Virginia train engineer.

"Car is too low. When parked near a curb passengers cannot get out on the curb side. Also very difficult for older people to get in and out from the front and rear seats."—Illinois realtor.

He's got a valid complaint; low roof line combined with high, wide door sills creates entry-exit problems. But would he buy a car that's five inches higher?

"Handles like a matchbox with crazy wheels at high speeds. No cornering ability. Soft springs."—Virginia technician.

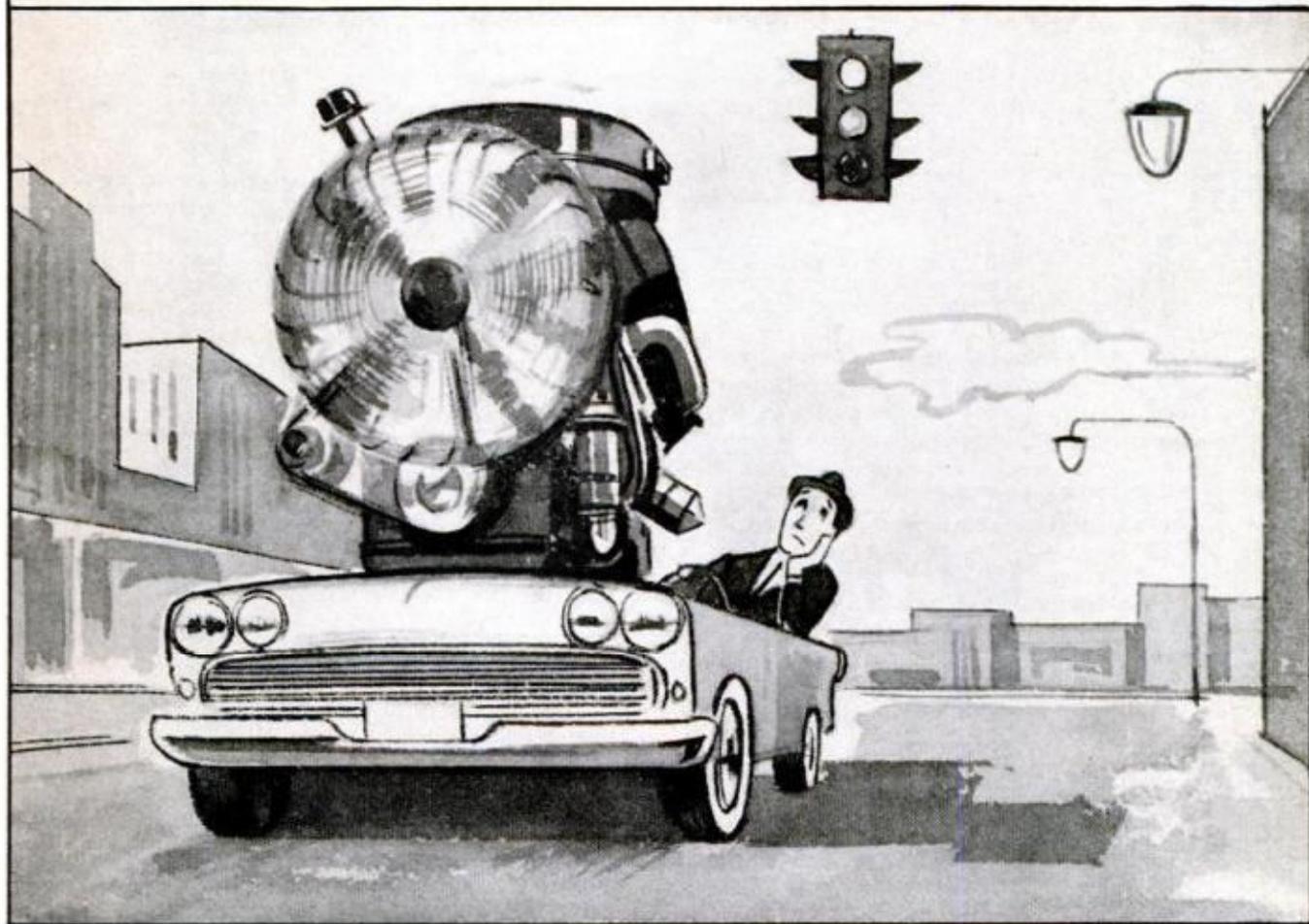
It sounds like faulty shock absorbers. PM's test car cornered fairly flat and sway-free.

"My new Ford is hard to start."—Texas minister.

"There is too strong a reflection off the dashboard."—Utah truck driver.

(Continued to page 214)

What to do about engine wear . . .



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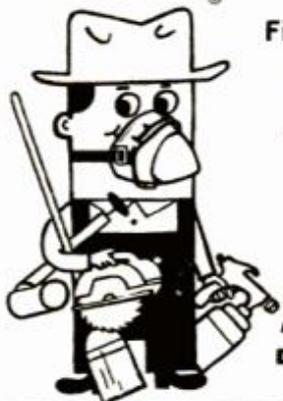
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"Gas gauge doesn't register last five gallons accurately. Trunk closes too hard and the locks freeze too easily." — Wisconsin manager.

"With the 30,000-mile grease interval, my car doesn't get a chance to be looked at from underneath as often as it should. I now also neglect some of the other services which were done when my former car was greased." — Illinois salesman.

Good point. Our advice would be to take it in for regular oil changes, ask serviceman to look it over.

There you have it. The pros and cons as expressed by owners with a sum total of 1,636,461 miles of experience driving '61 Fords.

Monzas, Greenbriers, Lakewoods and garden variety Corvairs. What do their owners think of them? Read the answers in the September issue Owners Reports.

QUOTE:

"It seems to have become an increasingly popular pastime on the part of some in their talks or writings to deprecate the wisdom of placing so many dollars into medical research. . . . Research in the medical and biological arena needs to be increased with greater usage of the physical, chemical and mathematical tools. Lest we become too much satisfied with our recent accomplishments and think no more money is necessary let us take a look at our deficit. In the field of organic afflictions of the brain and nervous system, we are barely beyond the point of naming them accurately. . . . The whole array of mental disorders will probably some day yield to a biochemical-biophysical explanation, but as yet our book of knowledge about this, the most prevalent of disorders, is still in the preface stage. In the field of infections we have made the most notable strides, but here again the infectious agents, like all living things, eventually learn to fight back, and more and more pathogenic strains are gradually exerting a greater stubbornness about yielding to medication. An antibiotic has not been found for a virus infection, we have not succeeded in forcing the common cold to yield, and there are probably literally dozens of yet-undiscovered new strains of virus pathogens."

—DR. LOWELL T. COGGESHALL,
Vice-president,
Medical and Biological programs,
University of Chicago



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World's Safest Plane?

(Continued from page 83)

comb; fuselage is steel tubing covered with glass fiber and a Plexiglas cockpit area.

The spark plug behind the Rotavion, Ben Kaufman, is a rotating-wing aircraft engineer who for years had the dream of creating an aircraft that the public could fly easily and safely. Ordinary helicopters didn't appeal to him because they can crash under some circumstances if power fails at low altitude. Too, helicopters are expensive and difficult to fly. Even a typical ducted fan, a "flying platform," didn't seem to be the answer; it can be unstable and fall like a rock if power is lost.

Air Jets Whirl Rotor Blades

Six years ago Kaufman began designing a ducted fan that would use jets of air to whirl the rotor blades. The idea looked good but called for more research than he could afford. He turned to other ideas and meanwhile some of his engineering friends became interested. They began contributing their knowledge and experience.

Soon the after-dinner discussions turned into serious sessions on the drawing board. News of the part-time project spread and the group began to grow. Aerodynamicists became interested, and wing and power-plant engineers came in. Weight and balance men and control system experts joined the group. Small models were built and tested. New designs were put together.

Eventually everyone was satisfied with the design. Now a way had to be found for building a prototype. The project had begun as a cooperative effort and has largely continued to be. One friend furnished enough money to get things started and a corporation was formed. The "employees" became stockholders, putting in an average of 10 hours per man per week. Many of the suppliers also are stockholders.

Final assembly of a one-place test model began early this summer. The first test flight is scheduled for late August.

Flywheel Effect

One of the big safety features of the Rotavion is its unique rotor system. The two rotor assemblies, one above the other, rotate in opposite directions to neutralize torque. Each assembly has four pairs of blades that extend out from an oversized hub that is six feet in diameter. The big hub adds rigidity to the blades and is heavy enough to have a flywheel effect. Because of this inertia the rotors would continue to spin long enough for a safe descent through a helicopter's "no recovery" region if the engine should quit. The flow of air through

the blades would not reverse during the descent. Kaufman's engineering staff estimates that the craft would descend slowly to a safe landing from any altitude below 100 feet if power should fail.

One of the contributing factors to the slow descent is the fact that the loading on the rotor disk area is only 12 pounds per square foot compared to a loading of up to 300 pounds per square foot on some other ducted fan designs.

"If the power fails at some altitude above 100 feet the pilot has plenty of time to close the duct louvers and then stall in like an ordinary airplane at 40 miles per hour," Kaufman says. "However, in some congested districts the pilot may not be able to find an area large enough for bringing the craft in like an airplane, deadstick. In this case there is an emergency button.

Standby Rockets

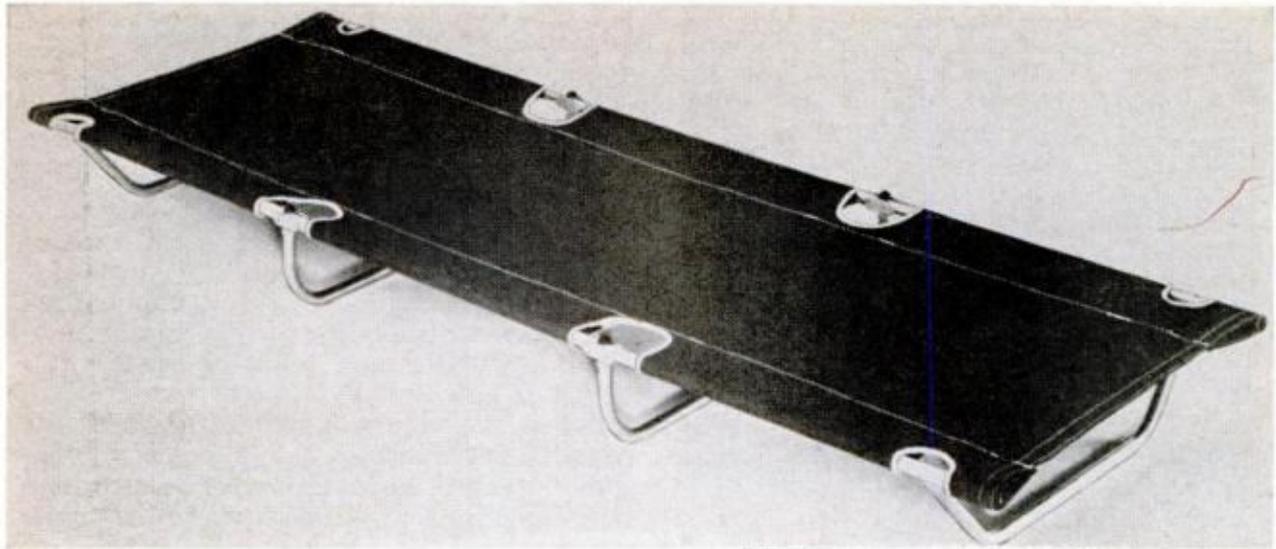
"When he hits the button he ignites several JATO units attached to the rotor hubs. Each rocket weighs one pound, is of the dry-powder type with a long shelf life, and develops 50 pounds of thrust. These rockets would keep the rotors spinning long enough for a slow, vertical descent from several hundred feet in the air."

Rotavion, Inc., has a number of designs on its drawing boards all using the same principle. One such craft would be powered by a jet engine of 2500-pound thrust that would use a pneumatic drive to spin the rotors, eliminating the usual gears and clutches. The jet model would carry five people at up to 400 m.p.h.

Even the current two-place Rotavion will be fairly expensive at first. In limited aircraft-type production involving hand assembly the two-place propeller-driven model will list at around \$16,000. Kaufman and his engineers think that this price can be cut to \$8000 or less.

The helicopterlike controls of the first prototype can be simplified and made semi-automatic, lowering costs at the same time that flying the craft would be made easier. The engineers have plans for a different kind of rotor drive that would eliminate expensive gear trains. Instead of using honeycomb they may be able to fill the duct enclosure and wing stubs and other portions of the craft with one of the new plastic foams, substances that provide rigidity and strength at low cost.

Getting a new aircraft into production takes time and there usually are unforeseen delays. But if all goes well the Rotavion will be on the market in the next year or two, an aircraft that promises to be safe, easy to fly and relatively inexpensive. ★ ★ ★



Cot Folds Up Into Handful

Opening to a 6¼-foot length, a compact cot folds up into a four-pound handful.

Suitable for camping, station wagon, guest room or sun bathing, it features a 26-inch-wide aluminum frame and washable, green duck cover. It can be carried as shown or stored in carrying carton that comes with the cot.

Compac-Cot, as it is called, is manufactured by Goode Products Co., 7542 Maie Ave., Los Angeles 1, Calif. Retail price of the cot is listed at \$15.95.



(Item 24)



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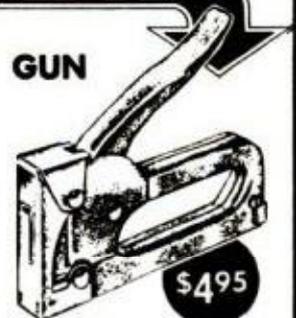
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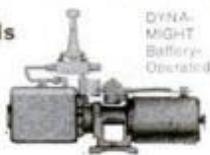
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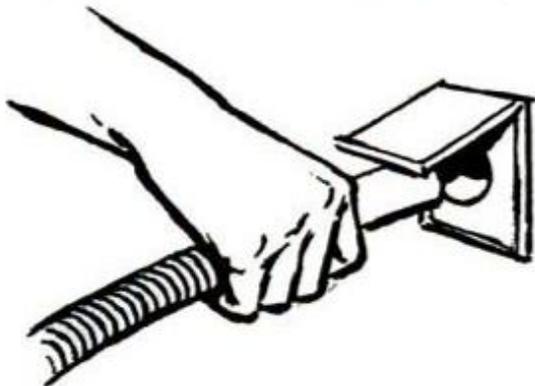


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SEPTEMBER

What You'll Find in the '62 Cars

(Continued from page 76)

was a management change and the incoming president took one look at present profits (\$300,000 for the year) and blue-penciled the idea.

Studebaker's project was further along than Seagrave's, but met the same end. The small Studebaker would have had a slant-four engine with conventional drive. This, like the power plant of the Pontiac Tempest, is the V-8 block cut in half lengthwise, a procedure that drastically cuts tooling costs. Development of the engine is being continued and it could someday be offered in the Lark. Meanwhile Studebaker will content itself with a Lark facelift.

This engine could be expected to turn up about 90 horsepower and would enable Studebaker to market a really low-priced Lark competitive to anything produced in the States.

Mr. Compact Car himself, President George Romney of American Motors, will stick to his promise that change will not be made for change's sake. He has already licked the problem of the independent manufacturer; namely, a good product is no better than the dealer organization. Big Rambler news for 1962 is a highly technical breakthrough on casting techniques that will permit an overhead-valve cylinder head to be die-cast in aluminum.

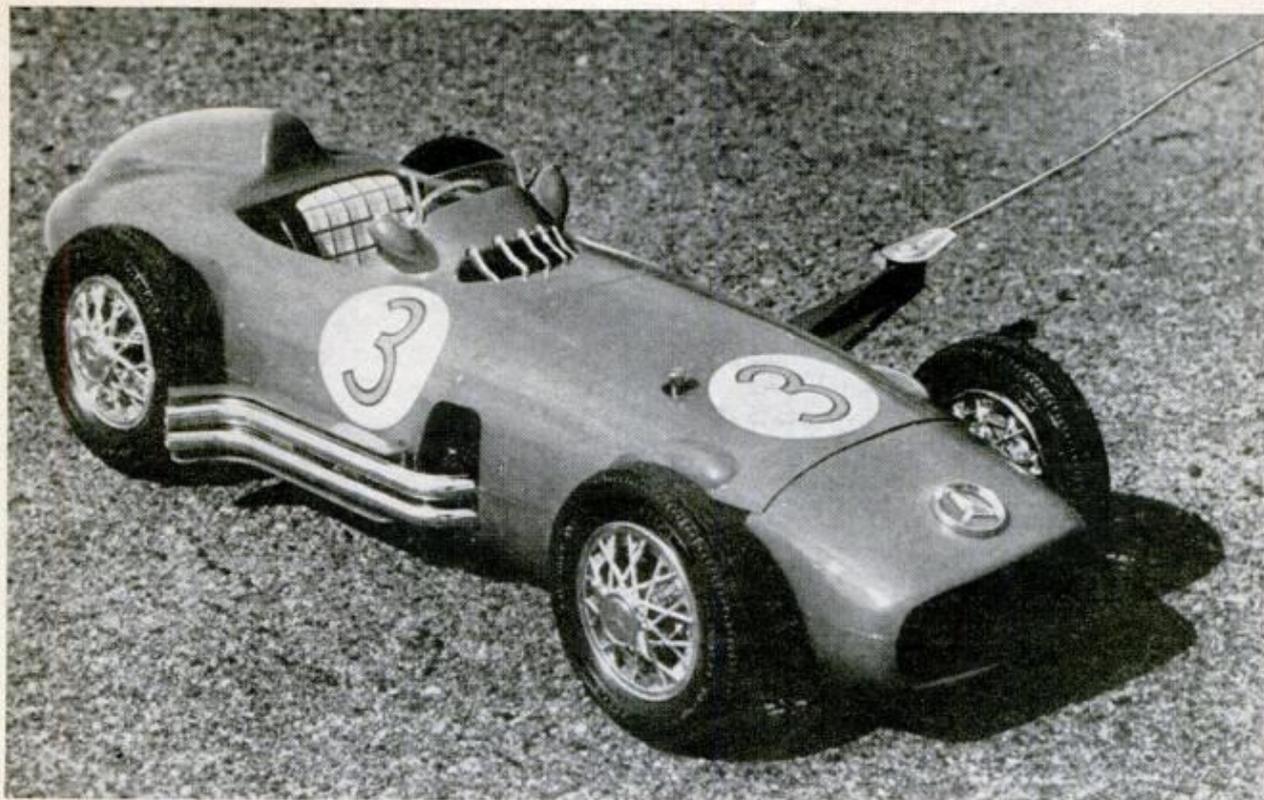
Buick V-6. The additional \$216 that customers were asked to pay for the aluminum V-8 used on Buick Special and Olds F-85 sent a lot of customers over to Pontiac's lower-priced four-cylinder Tempest.

This new V-6 is going to be surprisingly light, although made of cast iron. It should weigh in at about 375 lb. be rated at 125 to 130 horsepower.

Buick and Oldsmobile Divisions are determined to retain their beachhead in the compact field. Buick intends to do so by means of a compact V-6 engine, water-cooled, cast iron and lower priced. This becomes the standard engine for Special while the current aluminum V-8 engine will be an option, much as on the Pontiac Tempest.

The General Motors body shell used on upper-medium-priced lines will sport a revamped roof line for two-door hardtops. Typical of this approach will be extension of Oldsmobile's Cadillac-priced Starfire convertible series to include two- and four-door hardtops. One thing sure of Cadillac is that it will retain its fins.

(Continued to page 220)



Miniature Racer Uses Authentic Big-Car Engineering

Scaled down from blueprints of the Mercedes-Benz W-196, a powered model racer incorporates miniaturized big-car engineering in every important part including the engine, chassis, body and wheels.

It features forced-air cooling, double

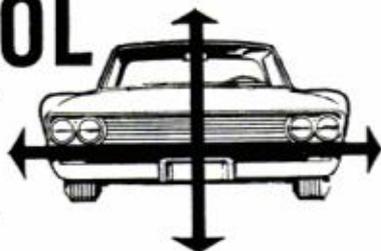
U-joint drive shaft which connects the engine to the two-wheel rear drive, and individual spring suspension on all four wheels.

The model retails at \$23.50 with accessories. It is manufactured by the L. M. Cox Manufacturing Co., Santa Ana, Calif.



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This is GM's year for a thorough facelift, but not a complete body redesign. Restyling on BOP compacts will be negligible.

Big car engine development, which has been in limbo ever since the Automobile Manufacturers Association's voluntary decision to get out of stock car racing, will stay in limbo. There are all-aluminum V-8 designs in the works at GM, but when you can't talk about horsepower, the motivation to spend money on higher cubic inches and compression ratios just isn't there.

The stock car racing taboo for manufacturers is a lot like U. S. Prohibition—it's hard to remember who wanted it and why.

Perhaps limbo is the wrong word. The latent horsepower race is better compared to a keg of stored dynamite that needs only to be fused. Although it is too early to tell, the fuse could well be touched off by Ford which, when it bought rights to the Autolite trademark recently, also inherited a thriving \$1.7 million stock-car racing program.

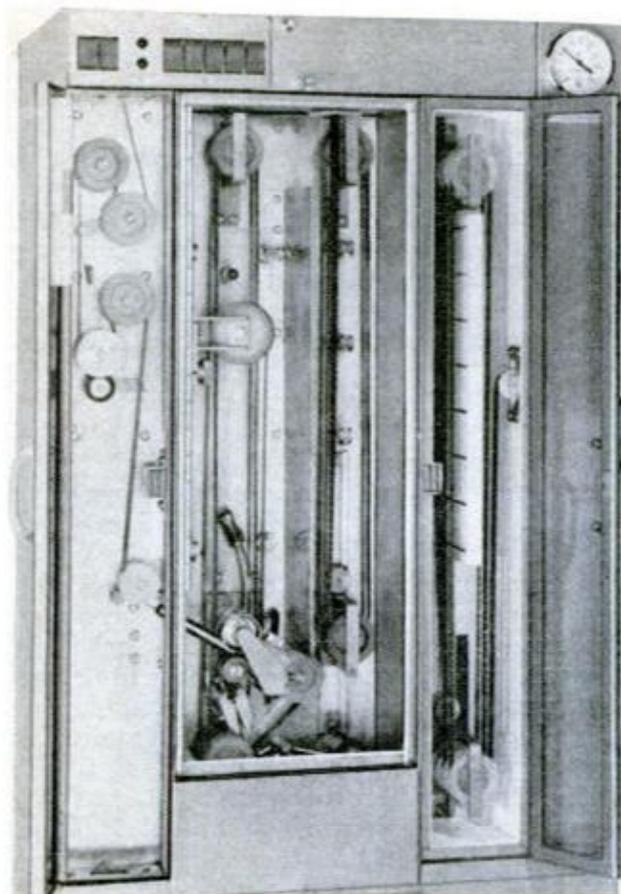
There will be plenty of scurrying back and forth with "optional" hot-rod parts in the mysterious twilight zone that exists between manufacturer's engineering labs and the pits at stock car races.

Autolite entered into it because spark plugs are best sold by proof performance. Ford may stay in it for exactly the same reason applied to cars, now that it has the excuse.

But these industry problems are of little real concern to the consumer. He will find 1962 a year that offers more choice in cars than at any time since the industry began. While name plates may not be as numerous as in the prewar era, any one of the top 10 makers can currently manufacture over two million cars without duplication. ★★★

Electronic Water Purifier For Swimming Pools

Minute quantities of copper ions and silver ions can be electrolytically deposited in swimming-pool water by an electronic device hooked up to the pool's circulation system. The silver and copper elements have germicidal and algicidal power which purifies the water without the need of any chemical additives, some of which can be harmful to the eyes. The Aquatrol purifier, which operates on this principle, has been successfully tested in the Southern California area. It was developed by Aquatronic Industries, Inc., 12478 W. Washington Blvd., Los Angeles 66, Calif.



Film Processor

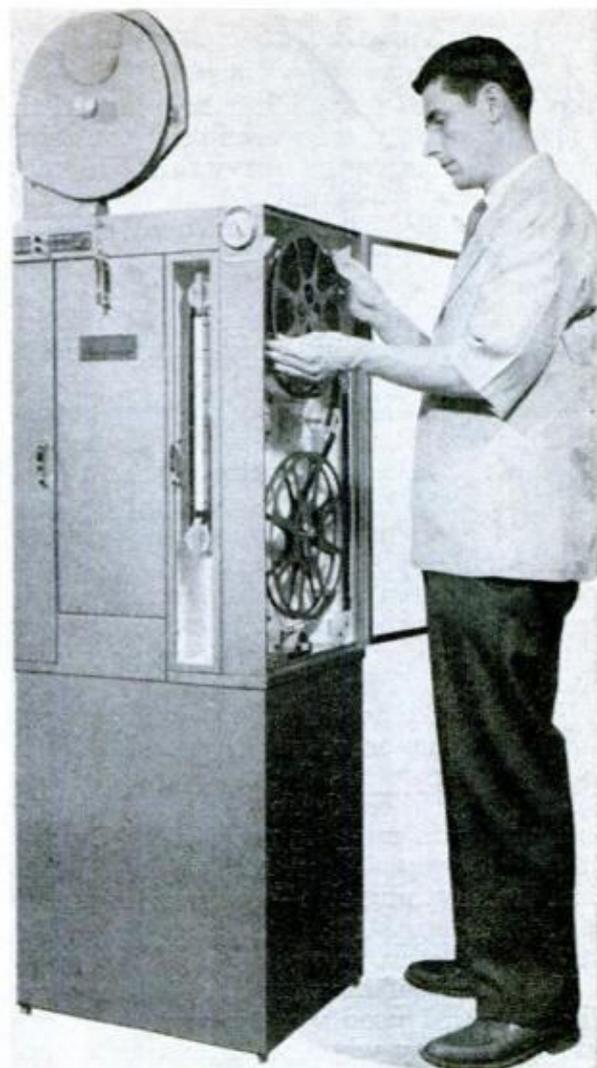
PROCESSING 16-mm. black and white positive movie film can be done as quickly as it takes to shoot it, using this new machine soon to be available for professional use. Using fresh chemicals in a viscous form, each cycle is performed as the film travels at the rate of 36 feet per minute.

An ingenious system furnishes a continuous supply of chemicals packaged in collapsible bags which are tapped with puncture-type probes. When almost empty a preset timer sounds an alarm and the operator inserts the probe in a replacement, keeping the operation continuous. All mixing and replenishment is eliminated.

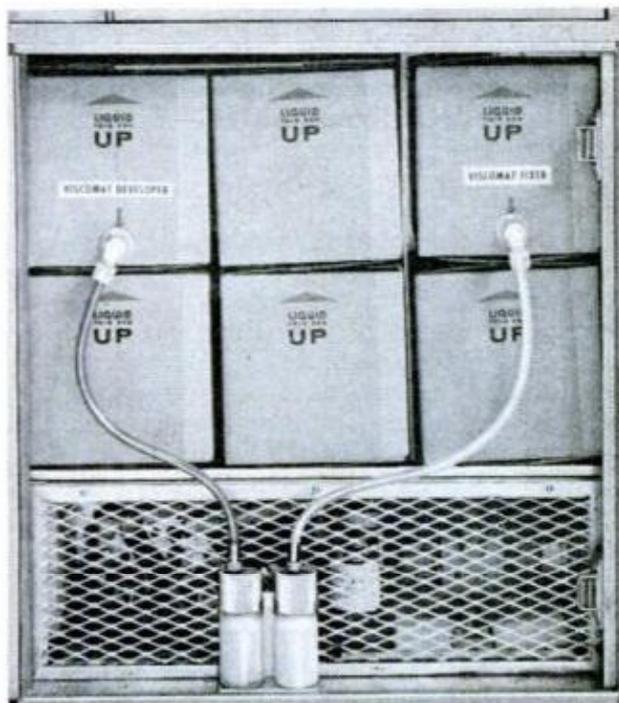
Control of film density and contrast with a viscous application process is believed to be a major breakthrough in movie-film processing. Developing time can be varied from 2½ to 7 seconds. Entire process takes about one minute—dry-to-dry time—and produces top quality.

The first compartment has an end-of-roll detector and a rubber-covered pacer roller which feeds the film into the machine. Processing takes place in the second compartment and drying in the third. Machine is about the size of a 4-drawer file cabinet, of stainless steel on casters and requires only two hose connections. For full information and price write Eastman Kodak Co., Motion Picture Film Dept., Rochester 4, N. Y.

AUGUST 1961



WITHOUT SLOWING DOWN the process the film is cut with built-in device and threaded on the other reel



VISCOUS CHEMICALS are fed into the system continuously through this setup without stopping the machine

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10 Minutes to Survival

(Continued from page 71)

that week and our shelter had turned the water admirably, we weren't sure our shelter would survive the heavy rain. We knew the car was waterproof.

Surprisingly, our shelter held up well. In the big test it turned most of a drenching downpour. The turf beneath the lean-to remained dry with the only moisture of consequence being wind-blown through the entrance.

At best, this shelter was only temporary. By the end of two weeks the cedar had dried and needed replacing. Next time—if there ever had to be one, God forbid—I would build a more permanent shelter of logs, chinked in between with mud, and topped with sod or thatch made from long grass. And I would make sure to bring an ax with me for this job—instead of the puny hatchet I took this time.

Food proved to be quite a headache. At home I've never given a second thought to the three meals I consume each day. But in the wilds three daily meals loom as a constant, nagging problem. We found that the demand for food left us little time for anything else—even our camp.

Routine Proves Important

The secret, if there is one, is a routine. The system I used was to hunt early and late in the day when wildlife was up and about. During the day I concentrated on chores around camp and collected bait for my fishing. In the moist earth along the creek bank I found earthworms. Cutting a hole in the lid of one of the empty jars Marjorie brought along made an effective minnow trap. I baited it with bits of bread. Overturned rocks along the river revealed many-legged hellgrammites—fine bass bait. The worms we used to catch sunfish. We ate the larger fish and used the smaller ones to bait our bank lines.

Mostly we existed on rabbits and squirrels. The fish refused to cooperate, but there were enough caught to vary the diet four or five times. We also caught and feasted on one soft-shelled turtle.

I didn't get around to improvising a snare until the end of the first week. I set one in a well-traveled game trail. Two stakes went on either side of the trail. These were notched to hold the trigger, a piece of almost invisible monofilament fishing line. Anything which stumbled into this line, set about three inches off the ground, would release the trigger. The snare itself was tied to a sapling, bent down to form a bow. When the trigger was touched off, it released the sapling, allowing it to snap upright, jerking the loop shut.

One morning in mid-week I went down and found the snare released. The ground around it was torn up where some caught animal had fought frantically. From all indications it was a large raccoon. But the sapling hadn't been strong enough to keep the animal from gaining a foothold on the ground and pulling its trapped forepaw loose. Basically, however, the idea was sound, and for any long-term survival in the woods I would depend upon a series of these snares to provide another source of food. But it might take at least a dozen to be sure of catching something.

On a good morning I'd get a cottontail or perhaps a squirrel, or maybe even two. We'd have one for breakfast and prepare the other for lunch. Supper was dependent upon the evening's hunt. At times, the weather was warm enough to create a serious food storage problem. The most logical way to preserve meat in camp without refrigeration, we discovered, was blanching. We cut the meat into chunks and dropped them into a boiling salt brine. When the flesh turned white it was removed, tied in a rag to protect it from flies, and hung in the shade. We kept some rabbit as long as three days using this method.

Another is to hang the meat to cool at night, then bury it deeply in the cooler earth during the day. Or it can be cut into thin strips, salted and smoked, or even dried in the sun, jerky style.

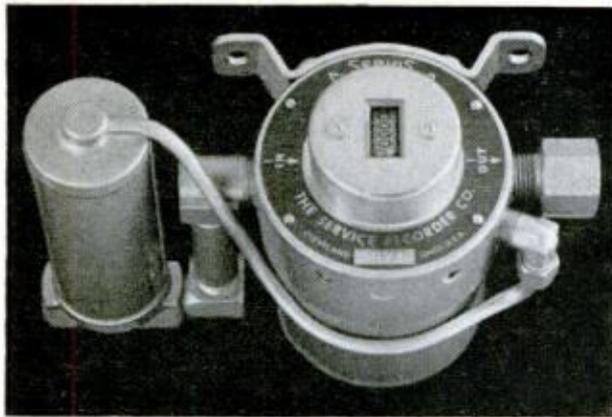
Bugs No Problem

Because of the time of the year, March, we weren't bothered too much with insects. We kept our meat well protected with sacks improvised from the bedsheet. Occasionally bugs attracted to the fire and flashlight would tumble into our pans as we cooked. At first this was disgusting, but after a few days we got philosophical about the entire matter. We simply picked the bugs out and went on cooking or eating. You can tolerate many things when you're hungry.

Adaptation to a near-fatless diet came painfully slow. During our ordeal, I lost four pounds, Marjorie dropped nine and Reed lost one. Perhaps it was a combination of several factors: Less fat and starches; a drop in food consumption; more tiring work. Our food intake remained low during the entire trip.

For several nights we heard an armadillo around the camp. I had eaten armadillo a few times—its flesh is fatty, tasting a lot like pork. It would be a welcome relief after the dry meat. Finally I got a shot at it only to have it escape,

(Continued to page 224)

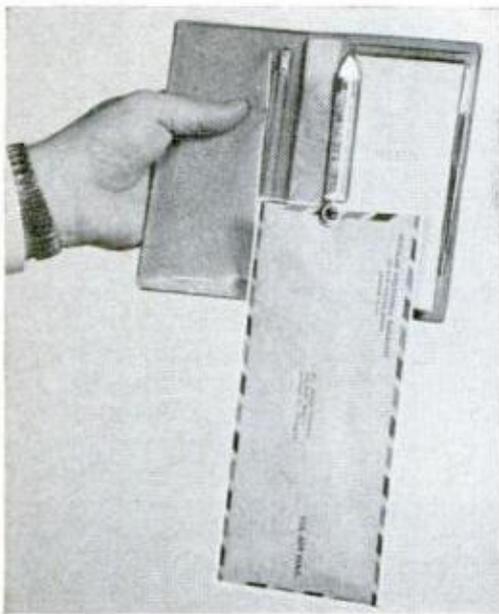


Meter Keeps Track of Gas

Mounted between the fuel pump and the carburetor of a vehicle, a new positive-displacement meter is equipped with a counter which records actual fuel usage up to 10,000 gallons.

The meter measures fuel consumption of new and rebuilt engines to check relative fuel economy, measures off-the-high-way consumption for tax purposes, and checks different types of equipment to enable owners and operators to make consumption comparisons.

Manufacturer of the Servis Fuelometer is Service Recorder Co., 1017 Rockwell Ave., Cleveland, Ohio.



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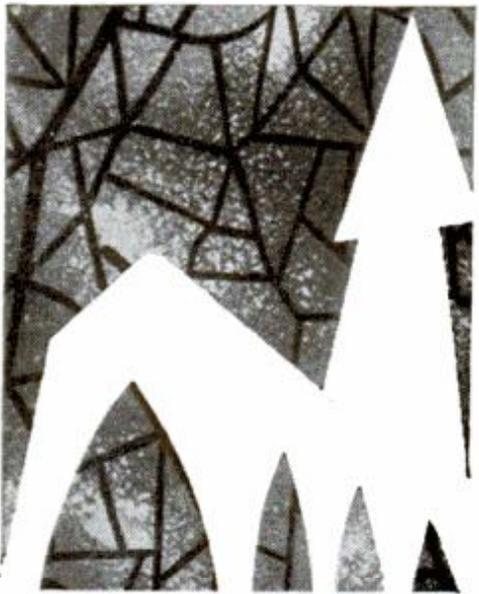
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WORSHIP TOGETHER THIS WEEK



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crippled, into its burrow. For more than an hour, in the middle of the night, we dug for it, using a tire tool and tin can. Finally we gave up in frustration.

To supplement our meat we had two dozen precious cans of food. Marjorie rationed them wonderfully — we came out with three still intact. Otherwise, we explored the land for natural foodstuffs. Wild onions and watercress grew profusely along the river and creek. We dug them with a tire tool from the car. Later in the year there would be persimmons and grapes and other wild fruits, various roots, prickly pear cactus apples and even mesquite beans which can be ground into a substitute flour.

Naturally, any food you bring along would only be a temporary supply bridging the gap until the time when you have to become completely self-reliant. Man exists on gathering during times of plenty to carry him during the leaner seasons—like storehousing nuts in the fall, for instance, and collecting meat in the fall to last through the winter. Food can also be cooked and "canned" in large containers. Mold is allowed to cover the top. This forms a natural seal, one that was popular in frontier days. When the food is to be eaten the mold is scraped away.

The diet of natural plants and berries varies with different areas, but almost without exception there is something everywhere in the wild that is good to eat, nourishing and filling. In our case these wild plants were used both by themselves and in seasoning foods, such as onions for stews and soups. If you're worried about poisonous plants, taste a bit with the tip of your tongue. If it's bitter, don't eat it. Watch animals and birds, too. You can eat the plants they eat.

They were our predictable assets, these wild plants. We learned where they grew in what numbers. It was easy to get all we needed. Our primary problem was meat, the core of our diet. The success of our test would depend on our ability to keep ourselves fed—and well.

On the second night out, Marjorie wrote in her daily diary: "This is a beautiful spot, tucked away behind low-slung hills. . . . The creek rushes along merrily over clean sand with the trees crowding along its banks. . . . Too bad we can't relax and enjoy the scenery."

She was so right. We couldn't afford to relax.

Editor's note: Next month in PM, the Tinsleys report on the results of their survival test, and what their findings could mean to your family.



More Bounce to the Ounce With Synthetic Rubber

No, this man isn't playing games; he's demonstrating the greater bounce of polybutadiene rubber over natural rubber.

The United States Rubber Co. has begun producing truck tires with treads containing a blend of the synthetic and natural rubber. Tests indicate the tires run from 15 to 20 percent cooler and give about one third more wear than all-natural rubber tires or those with polyisoprene treads.

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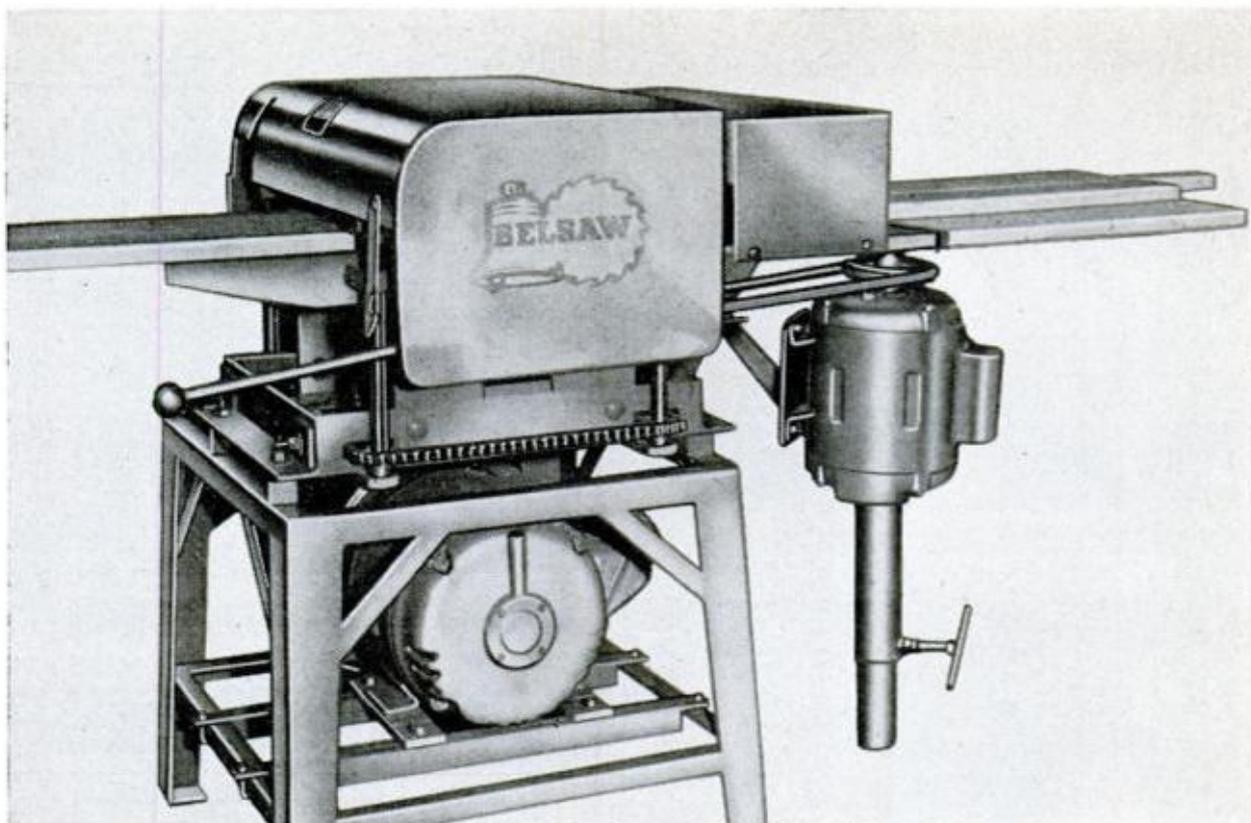


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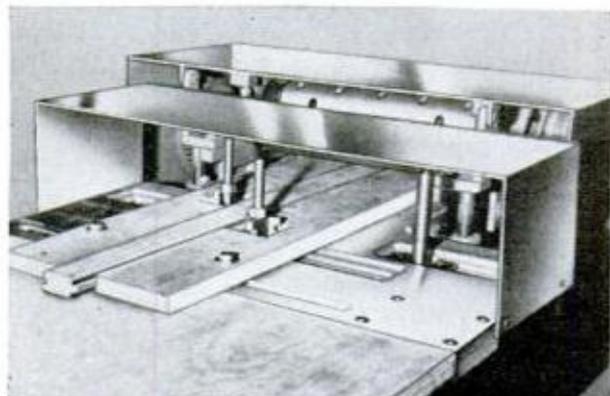
Model GO-2245-S

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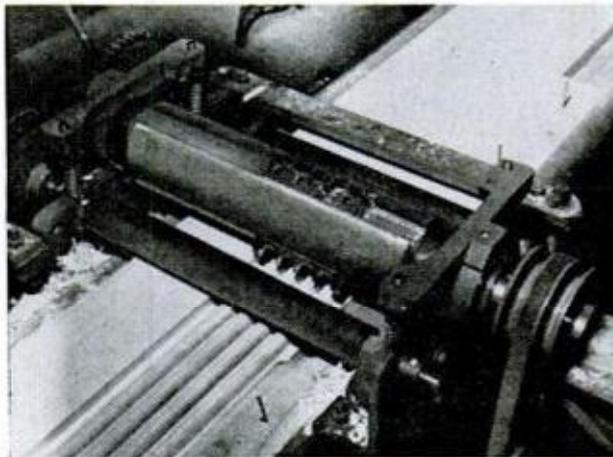


THREE-IN-ONE machine for small shops is driven by two motors, works on face and two edges of the stock



VERTICAL MATCHING SPINDLES work both edges simultaneously. Spindles are driven by separate motors

MULTIPLE BEAD MOLDING being cut on face of stock. Uncut portion of stock is planed in same operation



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You also can set up the machine to plane and mold one face and match two edges in one pass, or you can mold one face and both edges in one pass. The matching cutter heads are driven by a separate motor mounted vertically as in the photo above, the matching setup being shown in the center photo. In the lower photo, wide stock is being face-molded and planed in one pass. In addition, you can run multiple pieces such as three or more window stops in one pass of a single piece of stock. Machine requires a 3-hp. motor to drive the 12 $\frac{1}{4}$ -in. planer head and a 2-hp. motor handles the two matching heads. Feed rate is 22 ft. per minute; planer-head speed, 4000 r.p.m.; spindle speeds, 6000 r.p.m. Priced at \$499.50 less motors by Belsaw Mach. Co., 315 Westport Rd., Kansas City 11, Mo.

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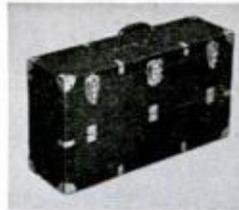
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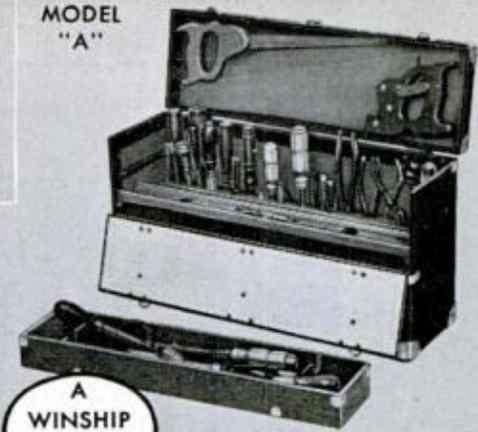
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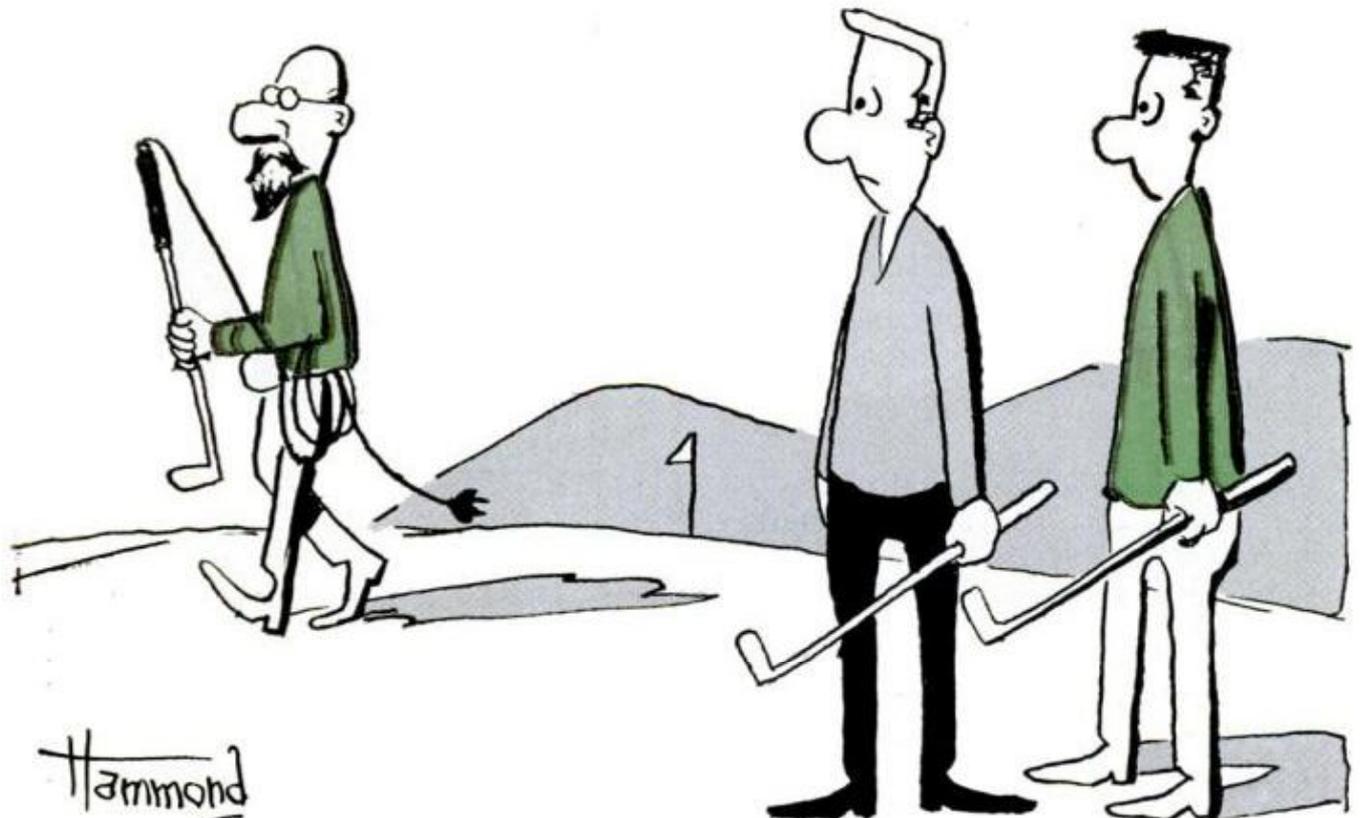


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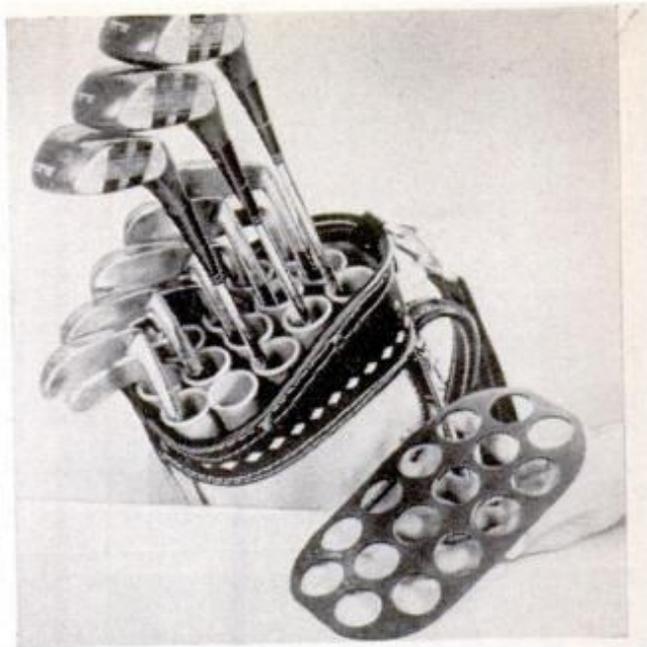
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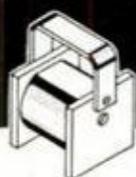
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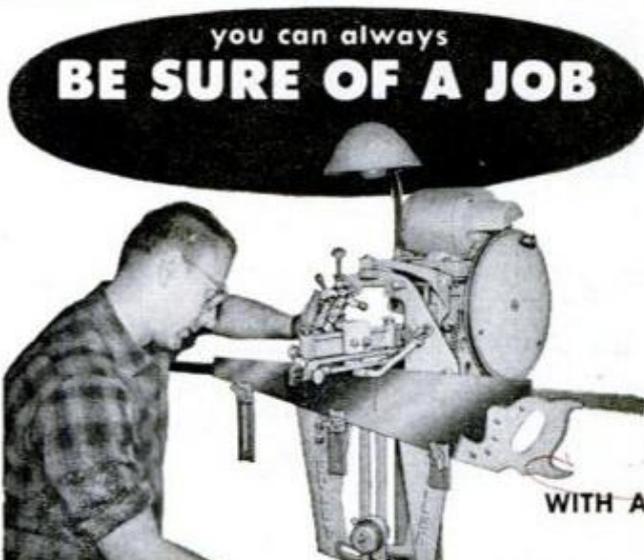
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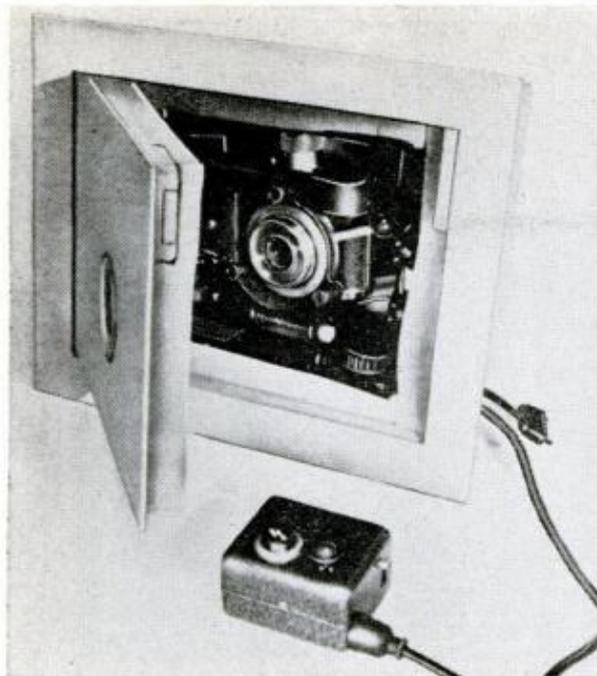
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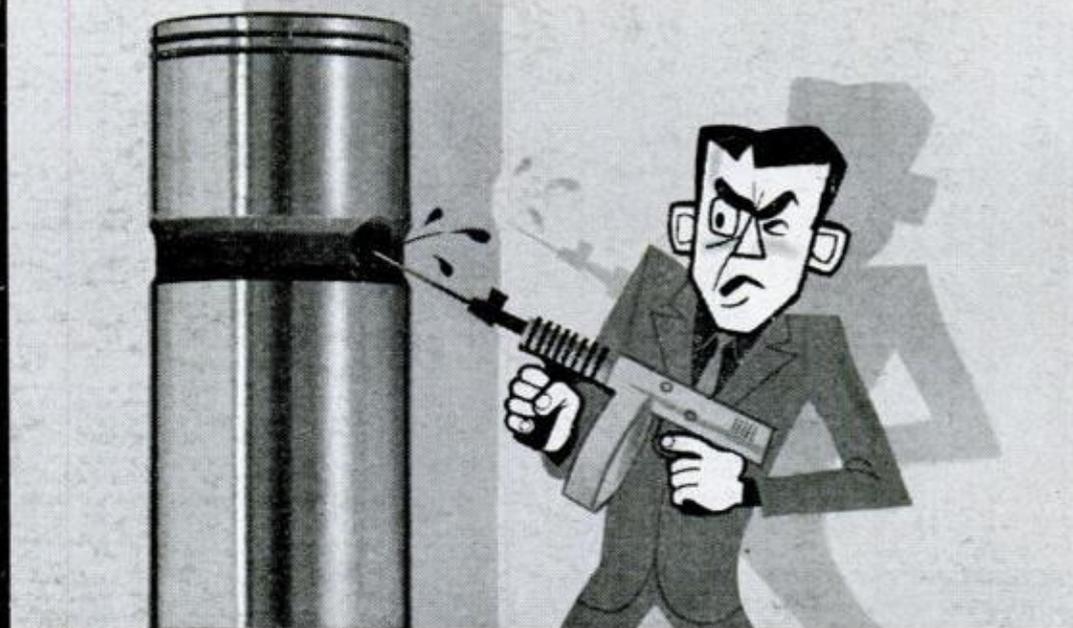
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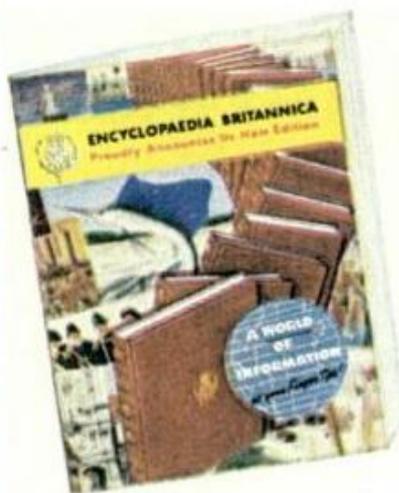
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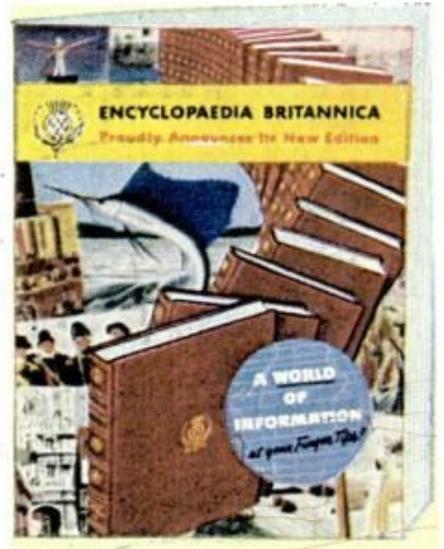
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how great
cigarettes
used to taste?
Luckies still do**



**Change to Luckies and get
some taste for a change**