

Bravos & blasts from Toronado & Barracuda owners!

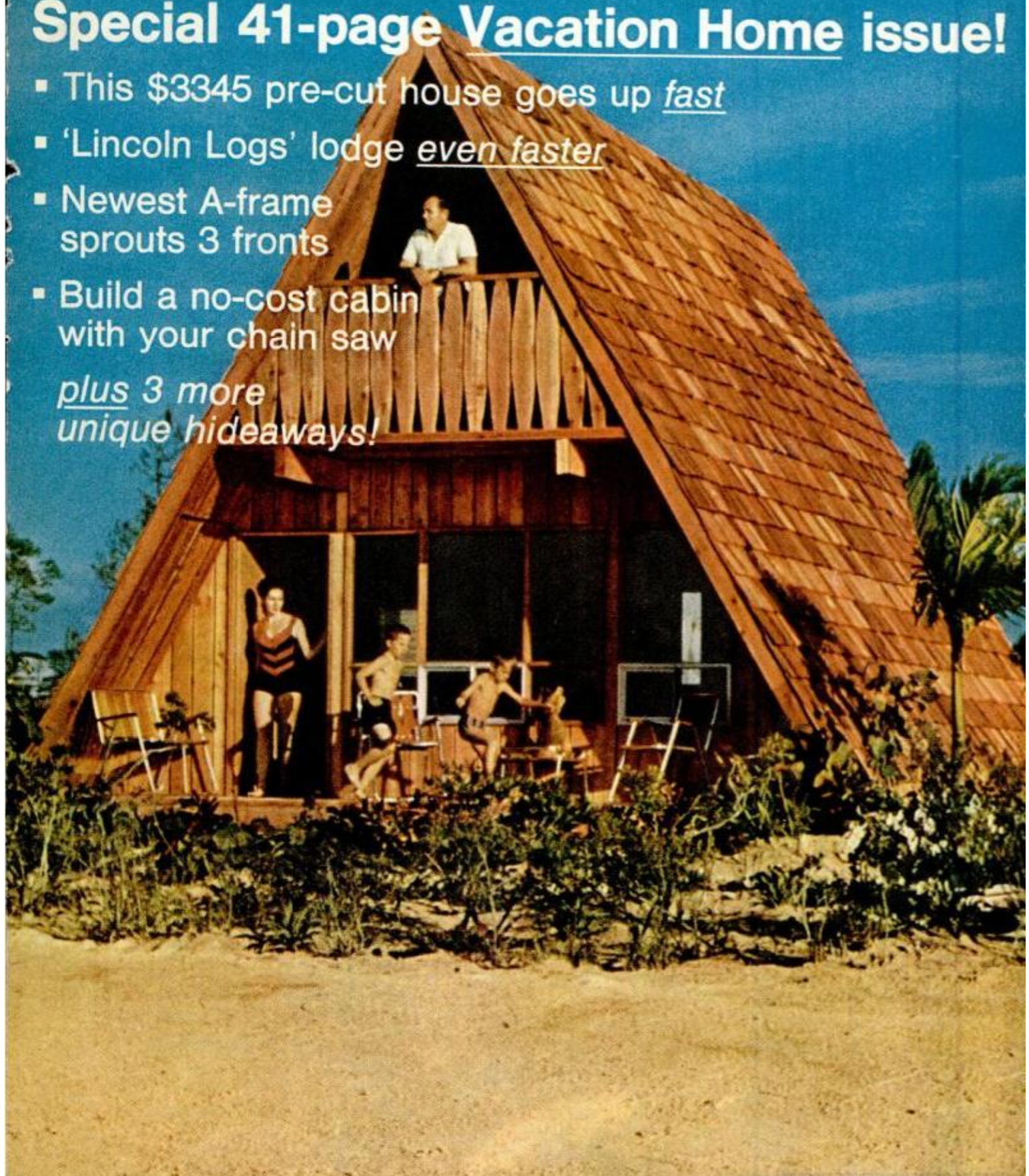
POPULAR MECHANICS

APR. 1966
35 CENTS

Special 41-page Vacation Home issue!

- This \$3345 pre-cut house goes up fast
- 'Lincoln Logs' lodge even faster
- Newest A-frame sprouts 3 fronts
- Build a no-cost cabin with your chain saw

plus 3 more
unique hideaways!





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DIVISION OF OUTBOARD MARINE CORP.

**"It's also got the wildest name
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They call it a Chevelle SS 396."**



**"I'm
glad
there's
a cage
between
us."**

This new Chevelle SS 396 wasn't named after anything you'll find in a zoo.

It was named for what it is—a no-compromise road machine powered by nothing less than a 396-cubic-inch Turbo-Jet V8.

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Special flat-cornering suspension and wide-base wheels with red-stripe nylon tires are also standard.

Sure, the thought of sticking some wild-sounding name on this car crossed our minds. But once you've spent a little time behind the wheel we think you'll understand why we decided against it.

Anything we could dream up just sounded a little tame.

The mean-looking one is a Chevelle SS 396 Sport Coupe. It comes with eight new standard safety features, including outside rear-view mirror (always use it before passing).

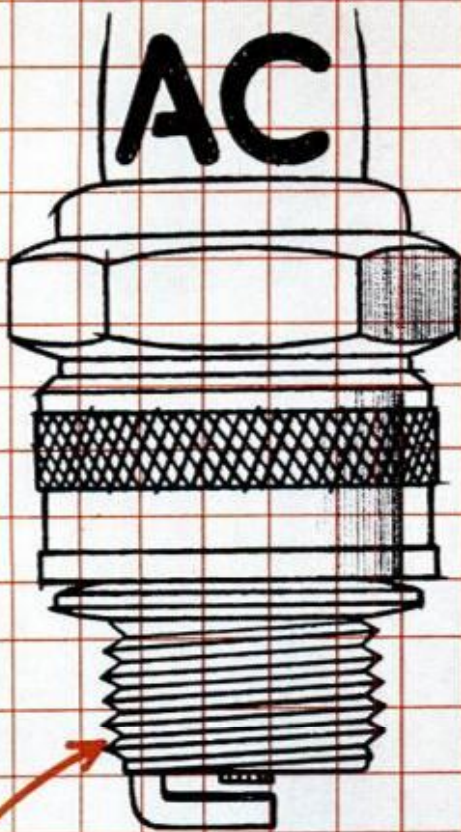
This One



SRQZ-D4F-QYGQ



From an AC Engineer's notebook:



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Rolled threads are strong and smooth... to eliminate binding and help assure proper installation.



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AC SPARK PLUG DIVISION



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Easy-to-assemble kit for seashore or ski slopes
- 130 THREE-GABLE A-FRAME WEEKENDER**
Three merging A-frames become a pleasing Y-shape for extra space
- 134 THREE SNOW, SUN AND FUN HIDEAWAYS**
A vacation home for as little as \$2500
- 138 MAN-SIZE 'LINCOLN LOG' KIT**
Interlocking, factory-milled logs go together like a toy building set
- 140 RUSTIC STORAGE SHELTER**
Build a no-cost cabin with your chain saw
- 154 MAKE ROOM FOR SUMMER**
Three ways to create a patio by using space next to your garage

FEATURES OF SPECIAL INTEREST

- 52 Feedback from the Owners: Barracuda
- 84 The New '007' Is a Computer
- 88 Bravos and Blasts from Toronado Owners
- 102 Brace Yourself for the Next Disaster
- 106 Tips on Buying a Fishing Motor
- 112 New Skins for Anything and Everything
- 116 For Homeowners: New Materials and Techniques
- 122 Here's How to Get that Hideaway Homesite
- 188 Rotate to Better Television Viewing

FOR THE SHOP CRAFTSMAN

- 140 Build this Rustic Storage Shelter (File Flag)
- 148 Chain Saw Revives Totem Pole Art
- 150 Chain Saw Speeds Rustic Log Projects
- 154 Make Room for Summer (File Flag)
- 162 PM's Sporty Suburba-Car (File Flag)
- 170 The Ins and Outs of Electric Starting
- 176 Double-Duty Sander-Setup (File Flag)
- 180 What You Should Know About Wheel Alignment, Part II (File Flag)

REGULAR DEPARTMENTS

- | | |
|---------------------------------------|----------------------------------|
| <u>6 Letters to the Editor</u> | <u>34 News from the Military</u> |
| <u>10 Aviation Jetstream</u> | <u>50 Homeowners' Clinic</u> |
| <u>12 Science Worldwide</u> | <u>83 Editor's Page</u> |
| <u>14 New Inventions</u> | <u>120 New for Your Home</u> |
| <u>20 Career Barometer</u> | <u>160 Tips from Readers</u> |
| <u>24 Spotlight on the Cyclone GT</u> | <u>173 Outboard Clinic</u> |
| <u>28 What's New Outdoors</u> | <u>174 Solving Home Problems</u> |
| <u>30 Detroit Listening Post</u> | <u>186 Automobile Clinic</u> |

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LETTERS

TO THE EDITOR

Likes the Tester

I've just finished reading your January issue and had to write to say how much I enjoyed *Make a Continuity Tester* (page 189). In my business I have to do a lot of testing, and most of my testers are expensive. The two shown in *PM* are inexpensive and will work very well.

Norwalk, Conn.

JOSEPH BECK

Now That You Mention It . . .

We are wondering why our firm, Weil-McLain, was not mentioned in the manufacturers' directory following *Hot New Ideas in Home Heaters* (page 110, Nov. *PM*) since we supplied equipment photographs and background material.

Weil-McLain Co.

J. M. GOODALL

Michigan City, Ind.

Adv. Mgr.

Mainly because a proofreader didn't notice the blank spot where your name should've been. W-M's electric boiler appeared on page 111 and hot-water heating valance on page 112.

Tadpole Special

We're very proud of the Tadpole Special that my son's father-in-law built for our grandson, Tommy Swadley, who was just three weeks old when this picture was taken. The grandfather, William



McGinnis, used the plans of the Back-
(Please turn to page 8)

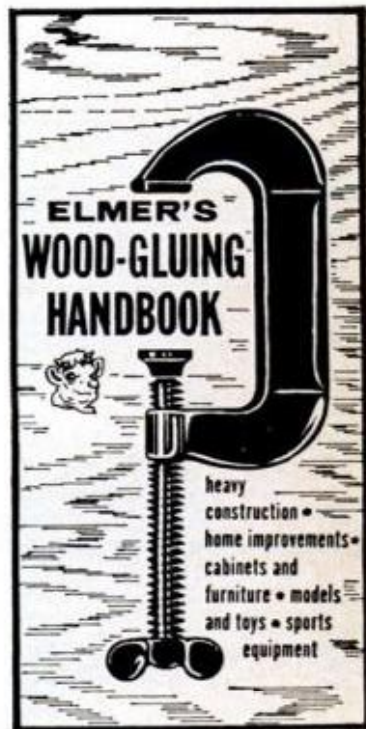
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It tells you how to match the right glue to the type of job and the kind of material...so that you get a perfect bond every time. It gives you scores of tips to make gluing faster and easier. It's yours if you'll just send a stamped, self-addressed envelope to: The Borden Chemical Company, Dept. M-1, 350 Madison Avenue, New York, N.Y. 10017.



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342

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LETTERS continued

yard & Birdbath R.R. (page 118, Aug. 1965 PM). Our grandson will have many years of pleasure from the little train, thanks to your fine magazine.
Columbus, Ohio MRS. BETTY SWADLEY

Balanced Driver

I liked the looks of your *Scout-Car* (page 138, Aug. 1963 PM) and my son is about the age of the boy on your cover—so I built it.



It was lots of work to build, but as you can see, Carl Jr. finds it's fun to drive.
Winchester, Mass. CARL F. DEFILIPPO

Tempest in a Tempest

As owner of a new Tempest Six I, I felt Jim Dunne's report on the *Tempest Overhead-Cam Six* (page 110, Feb. PM) fell short of what I hoped for.

I wasn't always sure of which Six engine was on the car he tested; the writer was obsessed with comparing the Six with the V8; he mentions that rear vision through the mirror is poor but fails to mention that *all* rear vision is poor; and yes, engine accessibility is good, but only on a stripped-down car. Try finding a distributor on one with airconditioning!
Pawhuska, Okla. DONALD F. STURM

Jim says: "Horsepower of the test car (165) is spelled out in the second sentence of the story. Contrary to having an 'obsession with comparing it to a V8,' I wrote 'don't compare it to a V8.' All rear vision is not poor; that rear window is at least four feet wide and more than a foot high. I did completely overlook the fact that airconditioning would ruin engine accessibility, though I do not recommend airconditioning with the 165-hp engine."

THE EDITORS

an example of the profits for you in electrical appliance repair

**THIS WAS REPAIRED
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WITH \$1500 PROFIT!**

Here's an example of the profits you can realize through NRI training in electrical appliance repair. With NRI training, you'd know how to check this air conditioner for leaks and recharge with freon.

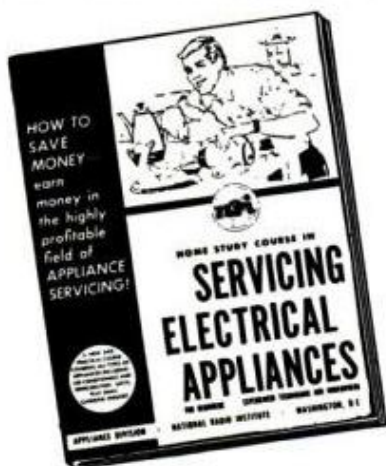
In this case, freon cost 50¢. As an Appliance repairman, you add 40% markup on parts or materials supplied. So you charge, in this case, 70¢ for the freon, \$10 for two hours labor, \$5 for a service call . . . for a total of \$15.20 profit on a \$15.70 repair.

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BY KEVIN V. BROWN **AVIATION** JETSTREAM

Plastic airplanes are still trying to get off the ground.

At least one American manufacturer of light planes has built and flown an experimental model of a single-engine plastic plane and then let it die a natural death. It just didn't work out.

Our man in Paris tells us that a French manufacturer is currently engaged in building a plastic airplane, but there's no word on when it might be ready, or whether it might be introduced here.

And recently another American company, this one a manufacturer of very large airplanes, said that building plastic airplanes was altogether feasible.

The advantages are attractive. Plastic airplanes, according to the recent study, would be "superior in strength and performance to an identical design of conventional riveted metal construction."

Also, they would be free from corrosion, have greater resistance to damage and allow easier shaping of contours with fewer small assemblies and fewer parts. That is, they'd be cheaper to make and maintain.

So where are they? The American studies are just that for the time being and, unless the French version takes wings, we'll just have to mark time waiting for this latest wonder of modern chemistry.

Heads-up displays allow a pilot of English jets to stare straight ahead through the windshield and still "read" his instrument panel without ever moving his eyes.

Similar to the old gunsight display systems, in which images were projected on a transparent screen set at a 45° angle in front of the pilot, symbols in the form of lines and dots can tell a pilot his air speed, altitude, angle of attack and attitude, among other things.

And, with a computer, the system can even preplan a flight, telling a pilot when to turn, when to level off and so on.

Bird scarers have gone electronic. In Wellington, New Zealand, where the new Mangere International Airport is preparing to open for overseas traffic, a radio-controlled "hawk plane" is zooming over the runways in tests to see whether it has any effect on birds. So far, it has scared away sea gulls with satisfactory results. The airport is scheduled to open late this year.



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Let LUCITE turn you loose.



Better Things for Better Living
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Материал, защищенный авторским правом

BY JOHN F. PEARSON
SCIENCE
WORLDWIDE

More than earthquakes shake the ground. You do—and so does everyone else. And engineers at Westinghouse Electric have taken advantage of that fact in developing an automatic alarm system for protecting property.

Sensitive transducers are buried in a strip around the perimeter of the property. They convert pressure changes to electrical signals that, in turn, trigger an alarm. Thus an intruder, in walking or crawling over the protective strip, generates tiny earth tremors that are immediately picked up by the transducers.

Carrots and celery can kill you—if you eat 10 times your weight in them at a single sitting. This was disclosed by a University of California chemist who announced that he had extracted a previously unknown poison—he has named it carotatoxin—from the two vegetables. In pure form, carotatoxin paralyzes an animal's nervous system. But four pounds of carrots will yield no more than two milligrams of the stuff.

Tiny hogs—about one-third the weight of the normal animal—are being bred by the Department of Agriculture for use in research. Hogs are good test animals because their food requirements and digestive systems are similar to those of humans. They're susceptible to the same diseases and even suffer from peptic ulcers, as do humans. Miniature hogs are easier to handle, less expensive to keep and require smaller doses of experimental drugs than their big brothers.

India's first radio telescope has gone into operation at Kalyan, about 60 miles north of Bombay. Used exclusively to study the sun's radio waves, it differs from other solar radio telescopes in that it can scan the sun more rapidly, making it especially valuable in observing various phenomena that occur at the time of large solar eruptions.

X-ray film may become more expensive in future years, and may even be rationed in some instances, warns Dr. Robert A. Wilson of the University of Texas. That's because world supplies of silver are being used faster than new silver is being produced. Key substance in X-ray film is silver halide.

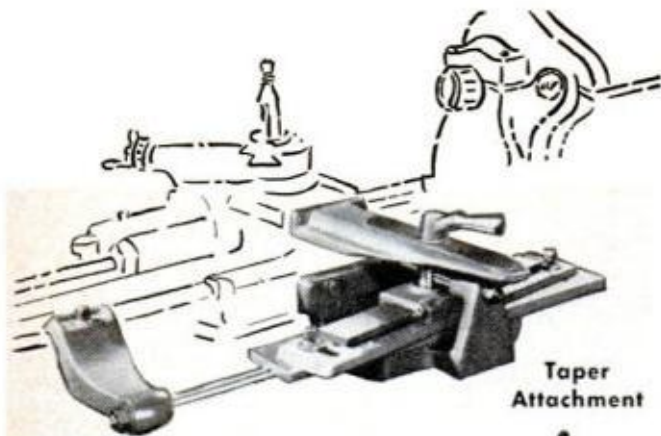
Valuable book for tape fans. A 326-page illustrated survey of techniques and new developments in tape recording has been published by NASA. Called simply "Magnetic Tape Recording," it includes a chapter on tape systems used in satellites. To get a copy, write the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Cost is \$1.25.

An electrical barrier to protect swimmers from sharks is being tested in South Africa's St. Lucia Bay. It consists of two electrodes in cable form, secured to the sea bed and connected to a generator on land. Sharks and most other fish are known to swim towards the positive pole when they enter an electrical field, drawn by involuntary muscular contractions. In this setup the positive pole is in deep water, where swimmers are not likely to be.

Anesthesia can be induced in patients simply by clamping two electrodes to the head and passing a constant current between them, according to medical scientists in South Africa. Unconsciousness results immediately and lasts for as long as the current flows. The scientists say the patient feels no pain and awakens immediately when the current is switched off. There are said to be no adverse after-effects.

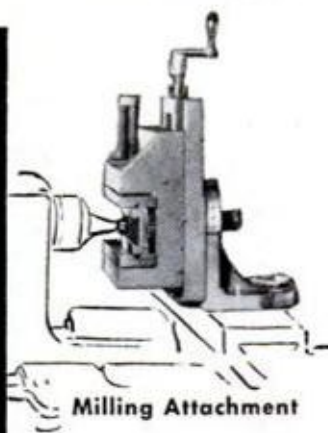
And yet another approach to acne. A dermatologist in Indiana reports that a diet low in salt appears to have a beneficial effect. Acne lesions on 30 teen-age patients began to clear within two weeks after the start of the low-salt diet. In most cases the lesions disappeared within two months. Judging by such results, this is one diet not to be taken with a grain of salt.

Blue is best for chickens. That's the conclusion you can draw from tests done by a team of researchers at the University of Vermont. They put day-old chicks in blue, red, orange, yellow, green and violet compartments, keeping them there for three weeks. At the end of that time the chicks in blue had gained the most weight. Those enclosed in a red cubicle fared the worst. The "blue" birds also showed some increase in hormone production.



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FROM THE PATENT OFFICE **NEW INVENTIONS**

BY M. J. PEDERSEN

Man may soon breathe water like fish. A man-made gill with a membrane that extracts the oxygen dissolved in water, for inhalation by humans, also purifies exhaled breath by disposing of the carbon dioxide. Waldemar A. Ayres of Rutherford, N.J., who received patent 3,228,394, demonstrated the efficacy of his invention by breathing underwater for more than an hour, using his equipment exclusively.

Shelling crayfish so that the edible portions—particularly the tasty tidbits called scampi—are removed in one piece is a simple matter. Patent 3,220,049, awarded John Martin of Fleetwood, England, provides for pressurized air or liquid to eject the flesh from the shell while the tail of the crustacean is held.

Daylight photography of Venus and other celestial bodies—heretofore impossible—is made possible by means of a system for amplifying very low light levels. Known as "cat eye," the method operates on principles similar to those of television. When used with a 10-inch refracting telescope, the "cat eye" permits very short photographic exposures during daylight or darkness. Radames K.G. Gebel of Dayton, Ohio, earned patent 3,217,099.

Toe-saver. A safety plate for use on rotary lawn mowers promises to reduce the toe-casualty statistics in future springs and summers. A metal shield, mounted on the mower casement, prevents the accidental insertion of feet into the path of the rotary blades. Patent 3,212,245 was awarded Leonard A. Miskiewicz of Pittsburgh.

Simulated nerves. An analog computer that duplicates the behavior of living nerve cells received patent 3,218,475 for Frederick F. Hiltz, Johns Hopkins University Applied Physics Laboratory in Silver Spring, Md. A series of electrical components duplicates individual neurons; an electrical impulse applied to the components simulates neuron excitation. With the computer, scientists will study the transmission of messages in the nervous system, in the hope of clarifying at least part of the mystery surrounding neuron activity.

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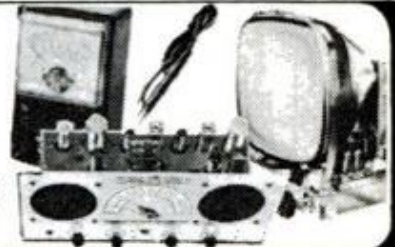
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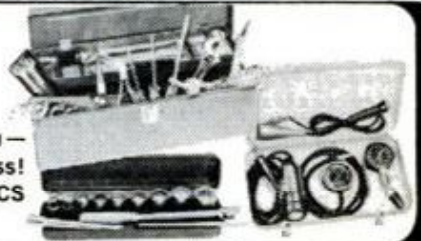
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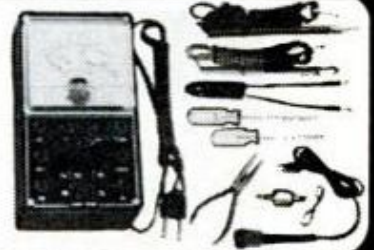


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Commercial Art
Commercial Cartooning
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Show Card Writing
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Marketing
Marketing Research
Modern Executive Management
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Office Management
Programming for Digital Computers
Programming the IBM 1401 Computer
Purchasing Agent
Retail Business Management
Retail & Local Advertising
Retail Merchandising
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Systems and Procedures Analysis

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Chemical Engineering Unit Operations
Chemical Laboratory Tech.
Chemical Process Operator
Elements of Nuclear Energy
General Chemistry
Instrumental Laboratory Analysis

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Construction Engineering
Highway Engineering
Principles of Surveying
Reading Highway Blueprints
Sanitary Engineering
Sewage Plant Operator

Structural Engineering
Surveying and Mapping
Water Works Operator
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Design Drafting
Drafting Technology
Electrical Drafting
Electrical Engineering Drafting
Electronic Drafting
Introductory Mechanical Drafting
Mechanical Drafting
Pressure Vessel and Tank Print Reading
Sheet Metal Layout for Air Conditioning
Structural Drafting

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Electrical Appliance Servicing
Electrical Contractor
Electrical Engineering (Power option or Electronic option)
Electrical Engineering Tech.
Electrical Instrument Tech.
Industrial Electrical Tech.
Power Line Design and Construction
Power Plant Operator (Hydro or Steam Option)
Practical Electrician
Practical Lineman
Reading Electrical Blueprints

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Electrical Mechanical
Industrial Management for Engineers

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Modern Elementary Statistics

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Industrial Engineering
Industrial Instrumentation
Machine Design
Mechanical Engineering
Quality Control
Safety Engineering Tech.
Tool Design
Value Analysis

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Oil Field Technology
Petroleum Production
Petroleum Production Engineering
Petroleum Refinery Oper.
Pipeline Engineering

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Air Conditioning Maint.
Domestic Heating with Oil & Gas
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Heating
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Plumbing
Plumbing & Heating
Practical Plumbing
Refrigeration
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Paper Making
Pulp Making
Pulp & Paper Engineering
Pulp & Paper Making

SALESMANSHIP
Creative Salesmanship
Real Estate Salesmanship
Sales Management
Salesmanship

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Clerk-Typist
Commercial
Legal Secretary
Medical Secretary
Professional Secretary
Shorthand
Stenographic
Typewriting

SHOP PRACTICE
Drill Operator
Foundry Practice
Industrial Metallurgy
Lathe Operator
Machine Shop Inspection
Machine Shop Practice
Machine Shop Practice & Toolmaking
Metallurgical Engineering Technology
Milling Machine Operator
Multicraft Maintenance Mechanic
Practical Millwrighting
Reading Shop Prints
Rigging
Tool Engineering Techn'gy
Tool Grinder
Toolmaking
Turret Lathe Operator
Welding Engineering Tech.

STEAM AND DIESEL POWER
Boiler Inspector
Industrial Building Engineer
Power Plant Engineering
Stationary Diesel Engines
Stationary Fireman
Stationary Steam Eng.

TEXTILES
Carding
Carding and Spinning
Dyeing & Finishing
Loom Fixing Spinning
Textile Designing
Textile Technology
Textile Mill Supervisor
Warping and Weaving

TRAFFIC
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Railway Rate Clerk
Traffic Management

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Electronic Fundamentals
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CAREER BAROMETER

BY CREIGHTON PEET

EVERY TIME A WASHER stops washing or a refrigerator stops cooling or a vacuum stops cleaning, the rapidly-growing household appliance service business gets another job. And every year some 2500 new men are needed in this specialized work which not only pays a fair basic wage but also offers good opportunities for advancement—as well as chances for profitable commissions from sales of new equipment. In all, there are now some 250,000 such servicemen in the United States.

High school graduates who have successfully completed courses in physics or basic electricity, and general math, are eligible for training as appliance servicemen. Of course, a man entering this work should have a feeling for mechanics, a working knowledge of tools and an ability to improvise when necessary. And, since appliances are growing more sophisticated, some understanding of electronics is helpful.

Very important, too, are neatness, good appearance, good manners, tact and an ability to be pleasant even if you are jammed down in a corner of somebody's kitchen trying to extract a circuit panel from a sick washer. Out on the job you represent the outfit you work for. In some cases the manufacturer, and the lady of the house, will remember whether you are surly or accommodating the next time a repair job comes up. Finally, you should be able to drive a small truck and know your town's street layout.

Appliance servicemen work in one of five setups. Many are in independent repair shops owned and operated by servicemen. The possibility of owning your own business, in time, appeals to many. Second, a number are employed by appliance dealers, department stores and other sales outlets. Third, some work for gas and electric utilities; fourth, thousands represent appliance makers; fifth,

(Please turn to page 23)

JOB TITLE	CURRENT NATIONAL		STATES WITH HIGHEST DEMAND						
	DEMAND	3-MONTH TREND							
Chemists, Biological	13	Demand halved	N.J. 4	Pa. 1	Ky. 1	Ohio 3	Wis. 2		
Chemists, Organic	49	Some drop	N.J. 8	R.I. 4	Pa. 4	Ala. 11	Ohio 5		
Chemists, Inorganic	8	Unchanged	Conn. 2	Md. 1	N.C. 1	Ohio 1	Calif. 1		
Engineers, Metall.	43	Some decline	N.Y. 4	D.C. 6	Pa. 6	Ohio 3	Calif. 10		
Engineers, Civil	448	Very good increase	Conn. 33	D.C. 67	N.C. 25	Ohio 49	Calif. 58		
Engrs. Elect. & Electron.	1053	Good increase	Conn. 47	N.Y. 80	D.C. 46	Fla. 136	Calif. 323		
Engineers, Industrial	532	Very big increase	N.Y. 40	Pa. 44	Fla. 30	Ohio 59	Calif. 73		
Engineers, Mechanical	1510	Very big increase	N.J. 76	Pa. 98	Fla. 117	Ill. 72	Calif. 278		
Engineers, Aero.	632	Good increase	Pa. 71	Ohio 45	Mo. 60	Calif. 320	Wash. 120		
Engineers, Mining	11	Some increase	D.C. 4	Pa. 1	Fla. 1	La. 1	Calif. 2		
Natural Scientists	132	Good increase	N.Y. 7	D.C. 26	Pa. 11	Calif. 5	Wash. 53		
Draftsmen, Architectural	119	Very good increase	N.Y. 13	Mich. 8	Ohio 21	Calif. 18	Wash. 10		
Draftsmen, Electrical	134	Very good increase	Mass. 9	Pa. 28	Ohio 8	Mo. 20	Calif. 42		
Draftsmen, Mechanical	390	Good increase	Pa. 59	Va. 38	Ohio 65	Minn. 35	Calif. 38		
Draftsmen, all other	387	Very good increase	Conn. 38	Pa. 38	Mo. 42	Calif. 80	Wash. 37		
Tool Designers	148	Big increase	Conn. 6	Ill. 13	Kans. 50	Calif. 20	Wash. 30		
Lab. Tech. & Assistants	107	Slight drop	N.Y. 22	Md. 8	Va. 14	Ill. 7	Tex. 6		
Sports Instr. & Officials	57	Down by two-thirds	N.Y. 7	Mich. 4	Colo. 18	Wyo. 4	Calif. 13		
Surveyors	13	Big drop	Conn. 1	N.C. 1	Ill. 3	Ind. 1	Minn. 1		
Techs. Eng'g & Phys. Sci.	594	Very good increase	Ala. 97	Fla. 43	Ohio 41	Calif. 116	Wash. 183		
Tool Planners	53	Demand up 500%	N.Y. 3	Ohio 22	Ind. 7	Iowa 1	Kans. 20		
Systems Engineers	32	Good increase	N.Y. 6	Ohio 2	Kans. 10	Mo. 10	Calif. 2		
Programmers	341	Some increase	N.J. 23	D.C. 17	Ohio 22	Calif. 116	Wash. 80		
Systems Analysts	58	Small decrease	N.Y. 5	D.C. 12	Ohio 4	Calif. 16	Wash. 8		
Inspectors Pub. Service	11	Half as much demand	Wis. 3	Calif. 1	Nev. 1	Wash. 6	—		

PM's Career Barometer Chart, above, gives the actual number of men currently needed for specific jobs. "Current Demand" figures are true as of our closing date. Check this chart each month and it will tell you where your talents are needed, and how badly. For names of actual employers represented by these listings, contact the state employment agency in the cap-

ital city of the state indicated. Mention that you saw this in **POPULAR MECHANICS**.

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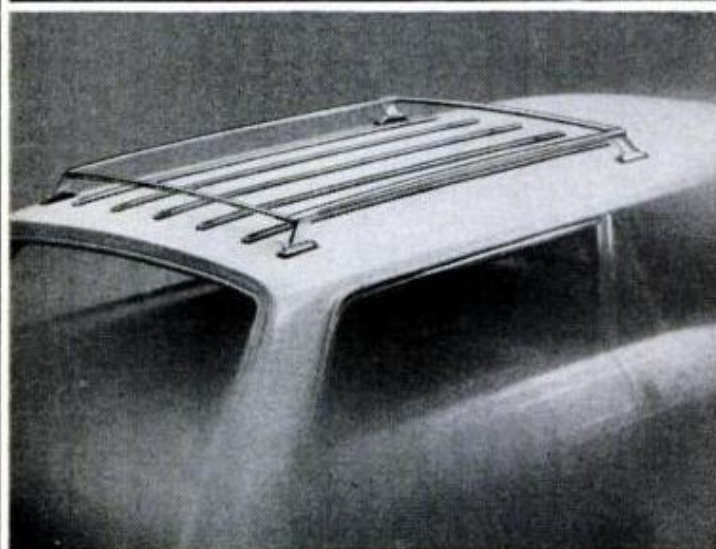


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ger almost two weeks, have earned $\frac{3}{5}$ its cost already."

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"My Rug Deterger does faster, more efficient, better job than any other method."

J. M. ROGERS, California
"Worked 7 hours yesterday, earned \$85.56. Part-time last week netted \$103.70."

VON SCHRADER METHOD, Texas
"Machine arrived and am impressed with it, its efficient work and the carpet after cleaning. I believe anyone can prosper associated with you."

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"Everybody so well pleased they get me more jobs. It's a wonderful machine. Just what you told me."

VON SCHRADER MFG. CO.

CAREER BAROMETER

(Continued from page 20)

a rising number work for firms which service coin-operated laundry machines.

Pay varies greatly from job to job and city to city, averaging around \$3 an hour. But there is often overtime, plus the chance of a commission when a piece of equipment is sold. Many men get paid vacations, sick leave, health insurance and even retirement pensions.

Appliance servicemen are usually hired as helpers and acquire skills through on-the-job training in repair shops. But nearly every manufacturer conducts free classes in product repair and servicing. To discover where these classes are held, consult a dealer handling a make of appliances in which you want to specialize. Such training is going on almost constantly in every city of any size. You will probably move along faster if you get this basic information *before* you apply for a job with a service outfit.

The ability to diagnose the troubles of an airconditioner or a dishwasher and then make the proper repairs or replacement is not learned immediately, and the boss won't send out a man until he has worked for some time in the shop rebuilding equipment under supervision. Here, new men often find they lack certain essential schooling. The best ones take correspondence courses in physics or basic electricity to improve skills.

It may be anywhere from six to 12 months before a trainee is given the responsibility of a service truck, an expensive stock of appliance parts and tools, and sent out on a call. The boss wants to be sure that the man will make a good impression and instill confidence. The washer may be working this week, but in a couple of months the airconditioner may give trouble and the shop would like to have this job, too. In short, the serviceman is part salesman. If he finds that the lady has an inefficient, out-of-date refrigerator, he can drop a few words about the advantages of the new models, and thus pave the way for a visit from a salesman. And if there's a sale, he'll cut in on the commission.

Appliance servicemen can win promotions in several ways. They can become foremen or assistant service managers. Or they may, in time, branch out and open up their own shops. Servicemen who work for appliance manufacturers may move up into higher paying jobs in factories or as appliance salesmen.

With a growing population and continued prosperity, the number of appliances in service will reach new highs.

Brand new leader in value and features!

MARKSMAN

Pencil Soldering Iron

by *Weller*

- Extremely light in weight.
- Highly efficient.
- Stainless steel barrel has long reach.
- Maximum tip temperature is 750°F.
- 1/8" diameter tip is replaceable—gets into tight places.
- Screwdriver, chisel and cone shaped tips available.
- Handle remains cool, resists breakage.

Get a MARKSMAN Pencil Soldering Iron or complete kit at your hobby or hardware dealer.

MARKSMAN IRON with screwdriver tip and cord in vinyl pouch. Model SP-23. \$2.98 list.

MARKSMAN KIT with iron; screwdriver, cone and chisel type tips; soldering aid and solder. Model SP-23K. \$4.44 list.

WELLER ELECTRIC CORP., Easton, Pa.
WORLD LEADER IN SOLDERING TECHNOLOGY

Spotlight on Comet's Cyclone GT

By Jim Dunne



A tropical storm hits the streets

DRIVING A HIGH PERFORMANCE Comet Cyclone GT is like owning a fast gun in Dodge City. Every hot dog in town has to test your speed.

This car goes and with good reason. It was built that way. From the big 390-cu.-in. engine that puts out 335 hp to the special high rear end ratios and the unique fiberglass hood, the GT was designed to dig out with authority. And oh, how well those designers succeeded!

Mercury engineers put a super heavy-duty suspension system in all the GTs by increasing spring rates and beefing up shock absorbers. As a result they have an extra firm ride and take a corner flat, with little sway or lean. Front spring rates were increased almost 25 percent while the rear end was stiffened nearly 50 percent. Special cornering is improved by a rubber-cushioned, link-type sway bar.



DIGGING OUT FULL BORE for our cameras, the GT veered to the left. Differential lock would help

The *PM* test car I picked up from Mercury engineering in Dearborn was equipped with a four-speed manual transmission, manual steering and manual brakes—a stripped-for-action package.

In moving traffic this Comet will get you in the best driving lane *right now*. Response is immediate and near-violent. And almost invariably in traffic, drivers in other high-performance cars will cruise alongside and invite a contest. The frequency with which you find yourself next to a Chevelle SS or high-performance Dodge, squatting on its cheater slicks, keeps you aware of what you're driving. The word is out on this new Comet; the big boys are anxious to test its speed.

For our traffic test the car was equipped with a 4.11:1 rear differential. Engine rpm is extra high with this ratio,

(Please turn to page 26)



HEAVY-DUTY SUSPENSION, designed specially for the GT, keeps the Comet on the road in most maneuvers

TUNE UP ELECTRONICALLY ANY CAR EVER MADE...

domestic or foreign; compact or limousine; 4 cylinder, 6 cylinder or 8 cylinder; 6 volt or 12 volt.

With New
Improved
Model BT-162

DWELL TACHOMETER



NOTE:
GIANT 6½"
METER FOR
EASY,
ACCURATE
READINGS

At last a streamlined instrument designed to provide the most important services for "tuning up" any and every car ever made from a Model A Ford up to and including the current automatic transmission cars produced today.

The Model BT-162 includes the very latest design Dwell Meter, working in conjunction with a dual range Tachometer and incorporating all modern improvements in circuitry design.

Assure easy starts, optimum performance and maximum gas economy with Model BT-162.

The Model BT-162 will perform the services specified below in addition to many other tasks too numerous to mention:

- Assure precise adjustments of points that are slightly worn or pitted.
- Indicate the most effective point setting without removing the distributor cap.
- Indicate the correct settings for external adjustment type distributors. (A feeler gauge cannot be used for making correct adjustments on this type of distributor since many manufacturers' specifications do not list the point gap in inches. They list only the dwell angle in degrees.)
- Insure maximum gas economy and quiet engine running. Read the exact RPM while the engine is in neutral position. Then adjust the carburetor in conformity with the car manufacturer's recommendations.
- To locate a "miss" you need only disconnect or "short" the spark plugs one at a time with the Model BT-162 switched to the Tachometer position.
- Cars with automatic transmissions function efficiently only if the fluid pressures are correctly maintained and since manufacturer's instructions always refer to RPM, the Model BT-162 (or an equivalent tachometer) is required to properly service automatic transmissions.

The Model BT-162 is the most complete unit in its price range ever produced. It comes absolutely complete, ready to use. Only

\$29⁹⁵

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Try it for 10 days before you buy. If completely satisfied then send \$5.00 and pay the balance at the rate of \$5.00 per month until the total price of \$29.95 (plus small P.P. and budget charge) is paid. If not completely satisfied, return to us, no explanation necessary.

ACCURATE INSTRUMENT CO., INC.
Dept. D-448 911 Faile St., Bronx, N.Y. 10474

Please rush me one Model BT-162. If satisfactory I agree to pay \$5.00 within 10 days and balance at rate of \$5.00 per month until total price of \$29.95 (plus small P.P. and budget charge) is paid. If not satisfactory, I may return for cancellation of account.

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Address _____

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Save Money! Check here and enclose \$29.95 with this coupon and we will pay all shipping charges. You still retain the privilege of returning after 10 day trial for full refund.



GOOD DEAL! No more fatiguing pull back with Simplicity Supermatic Roticul® rotary tiller! Just shift into reverse with exclusive Full-Power Reverse Gear Control! Rugged 4 horsepower tackles and tames toughest soil ... breaks up sod smoothly, gently with self-sharpening tines, scientific spading action. Perfectly balanced for all-day handling ease ... automatic safety stop when controls are released.

GOOD DEALER! Your Simplicity dealer is proud to stand behind America's No. 1 sodbusters — including thrifty 3 hp Roticul with most Supermatic features ... versatile 7¼ hp Model "W" 2-wheel tractor. Other Simplicity work-savers: Landlord 101 and Broadmoor riding tractors, 3 Wonder-Boy riding mowers.



Simplicity Manufacturing Company, Inc.
6634 Spring St., Port Washington, Wis. 53074

SPOTLIGHT ON COMET'S CYCLONE

(Continued from page 24)

and shifting is a real art if you want the car to move smoothly. Icy streets will literally put this machinery out of action. It happened to me. When the roads get slippery. Pull over and wait for a thaw. The combination of high-ratio rear end and 335-hp engine doesn't lend itself to low-friction surfaces.

But when conditions are right, the GT moves better than most high performance cars. Through the quarter-mile traps it topped 100 mph in two runs, averaging 100.5. Elapsed time (ET) averaged 14.31 seconds, faster even than Detroit's three hottest engines we tested earlier (page 100, Jan. '66 PM). For all recorded tests the Comet was equipped with the standard 3.25:1 rear end. Fuel economy, at a steady 40 mph and using the lower rear end ratio, was 17 mpg.

I found the secret to Comet GT's brilliant acceleration runs is its ability to get away quickly. Those first few seconds are all-important—0-30 was done in 3.1 seconds, again faster than the three monster-engine cars tested earlier. Outstanding power to weight ratio is this car's asset.

Recording the 0-60 time was a hairy experience, to say the least. We came up with 6.8 seconds ET in tests that were as much guesswork as scientific.

The 60-mph mark was reached just after the shift from first to second gear. Our Comet GT was veering to one side, spinning its wheels—maneuvers that made our recorders next to useless.

One feature I liked best was the quietness of engine tappets. Comet engineering people say this is due to the hydraulic valve lifters. New developments allow fluid to bleed down quickly and permit hydraulic valves to close at high rpm, something not possible before. Now the hydraulics work nearly as well as solid lifters. The engine also has heavier-duty valve springs and heavier damper springs to speed up valve action.

With all that weight up front, the Comet has an extra slow-manual-steering ratio: 29-to-1, five turns lock-to-lock. ★★

Engine: 390 cu. in. V8, 4-bbl. carb.

Horsepower: 335 at 4800 rpm

Torque: 427 at 3200 rpm

Compression ratio: 10.5:1

Tires: 7.75 x 14 Goodyear

Transmission: 4-speed manual

Performance times:

0-30: 3.1 seconds

0-60: 6.8 seconds

¼ mile: 14.31 seconds, 100.5 mph

Rear axle ratio: 3.25 to 1

Top speed: 130-135 mph

List price of test car: \$3168

All latex house paints are the same. Right?

Wrong.

Dutch Boy Latex House Paint makes the difference.

Different because of experience. Dutch Boy has experience in manufacturing exterior paints since colonial days. Dutch Boy Latex House Paint represents the sum total of this experience. The Dutch Boy label is your guarantee of the finest latex house paint, the finest results.

Different because Dutch Boy's exclusive formulation means unexcelled durability, outstanding color retention, resistance to chalking. Whites stay bright—won't yellow—and non-fade colors stay fresh, beautiful, clean.

Different because of Dutch Boy PBL (Penetrating Bonding Liquid). When you have to paint over a chalky painted surface, you do not have to scrub off the old chalk first or use a primer coat. Simply

add PBL to Dutch Boy Latex House Paint.

Different because it's guaranteed! Dutch Boy Latex House Paint with PBL added is guaranteed against peeling from a sound previously painted surface for a period of five years from date of purchase. Guarantee covers replacement of material.

Different because Dutch Boy is a pure 100% acrylic latex house paint. Only a pure 100% acrylic latex can give you all of the advantages of latex house paint—superior durability, maximum color retention, resistance to chalking, peeling, blistering. Exterior latex paint has to be 100% acrylic latex to be the best . . . that's Dutch Boy.

See your Dutch Boy Dealer soon. He's listed in the Yellow Pages.



Dutch Boy Paints . . . more years to the gallon.

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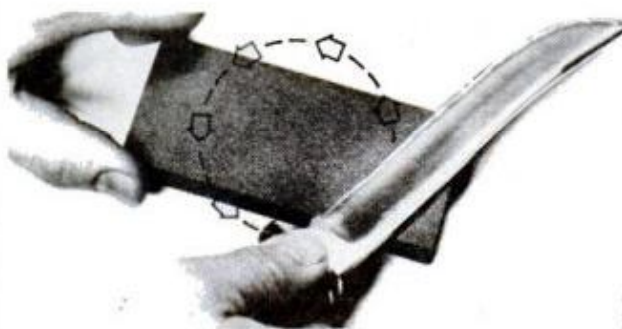
PLASTIC WOOD

Handles like putty—hardens into wood!

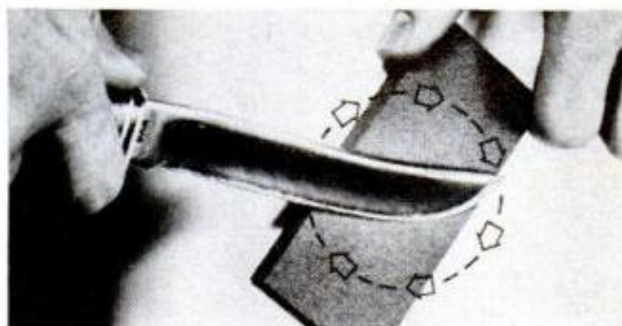
WHAT'S NEW **OUTDOORS** BY STUART JAMES

Astounding how complicated a simple thing can be if you don't know anything about it. Like sharpening a knife. I had always believed that there was some mystique about getting the proper edge on a blade, an assumption helped along by a lot of well-meant misinformation, so I went to an expert, a maker of fine hunting knives, A.C. Buck, to get the straight dope. It's a simple process.

Using a medium grit or a fairly soft stone, get it liberally saturated with cutting oil before you start. Then you lay the knife blade in a slightly diagonal position across the stone. Raise the back of the blade about 1/8th inch and start a

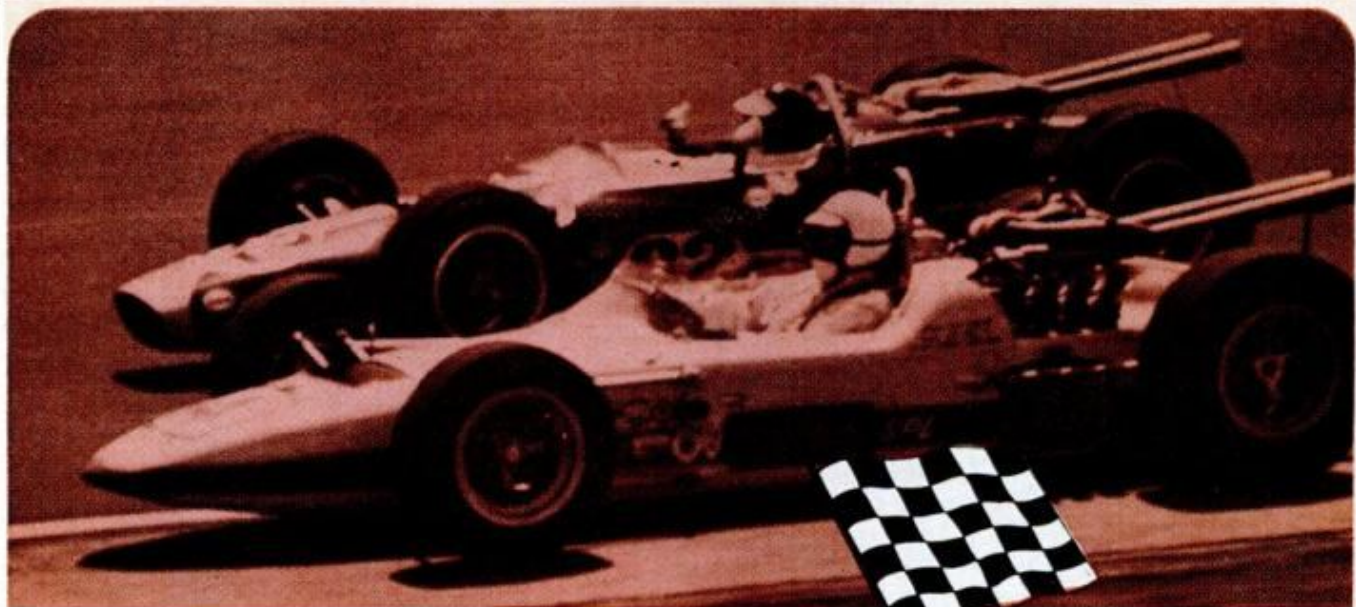


circle with the accent cutting into the stone. Beginning at the heel, use four or five small overlapping circles, working to the point to complete the side. Work carefully across the entire surface of the stone, and use plenty of oil to keep the stone moist. Turn the blade over and repeat by starting the circles from the opposite end of the stone. To test the blade,



touch the edge of your thumbnail. If it grips right in and does not slide, you're getting the desired edge.

That's all there is to it. Buck, incidentally, has written an intriguing booklet called, "Knife Know-How," and if you'd like a copy, drop me a card and I'll see that you receive one.



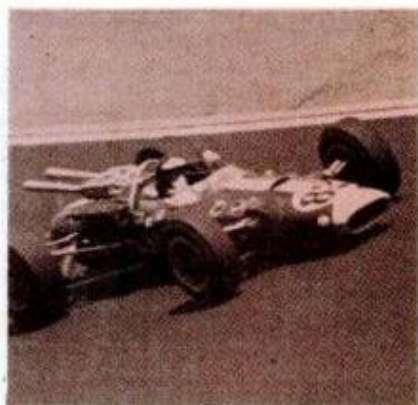
**16 STRAIGHT WINS
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PISTON RINGS AT THE
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No other piston rings made match the win record of Perfect Circle at Indianapolis. In 31 of the last 37 years, Perfect Circle helped give "500" winners the extra margin of full power performance it takes to enter victory lane. And the PC piston rings used by these

champions were not specially made for racing. They were standard sets—the same kind you can install! What's more, every qualifier in last year's "500" also used Perfect Circle Valve Seals. So take a tip from the experts. When you re-ring, insist on Perfect Circle.

PERFECT CIRCLE



DETROIT LISTENING POST

BY JIM DUNNE

Coming this month—American Motors' new V8. For the first time, the small-car American model line will break away from exclusive use of six-cylinder power. The new engine, a modern, thin-wall casting design of 290 cu. in. and 200-plus hp, will change the American from a docile, economy king into a street bomb with an impressive power-to-weight ratio of 12.5 to 1. The new V8 will be available throughout the model lineup. Five main bearings will be used in the crankshaft design for rigidity and smoothness of power. American Motors' current 287 cu.-in. engine will be phased out as production of the new engine is stepped up.

Smog-producing exhaust emissions can be reduced, engineers found, by a simple redesign of the combustion chamber. A double-hemisphere shape—one hemisphere in the piston top, one in the engine head—is best for reducing smog emissions. The pot-in-the-piston type of combustion chamber, with large surface area, is the worst. It all has to do with the amount of raw, unspent gasoline that an engine feeds out through the exhaust. General Motors engineers discovered that the fuel mixture next to the combustion chamber walls won't burn. So, the more wall surface, the more unburned fuel exhausted. Other factors affect smog too, including compression ratios. But look for that double-hemispherical design as a first step in smog-free engines.

Light-sensitive glass samples on display cars—most auto show visitors have seen them but don't expect them to show up in the family sedan for a long time. Actually, we may not have so long to wait for this wonder glass that darkens automatically when struck by the sun's rays. As the new fastback craze sweeps the industry, buyers are complaining about solar heat coming in those big back windows. Look for this self-shading glass to be used here first, and later in air-conditioned cars. Chrysler and Ford have come a long way with it.

"Oils never wear out, so all you have to do is keep changing filters." While that saying may have been true, it's a fact that modern oils do wear out, especially new super-life, long-distance types. Chemical additives that break down and need to be replaced are in such oils to improve viscosity, guard against engine wear, fight oxidants, disperse detergents, stop foaming and halt rust. Engineers at Ford claim that the super-long-life oils (with the most additives) are best for your car, being twice as effective as regular-grade, multi-viscosity (10w30) oils for the extended protection needed with today's 6000-mile oil changes. Ford researchers also say that long-life oils need a 6000-mile filter to remain effective, recommend depth-type, cotton-filled filters over paper-element types.

More models to choose from, yearly styling changeovers, better body fits, better quality. That's what we'll have when "N/C tooling" hits Detroit. Biggest bottleneck in bringing out a new car is the time needed to build new tools; trimmed, auto-makers could give the public faster action than ever. Detroit's excited about progress made with numerical control machines, and with good reason. N/C tooling means computers can cut lead time by months, eliminating tedious hand drawings, computations, die-making, clay model buildup. Once it takes over, a car-styling revolution will be possible. That man hammering fenders into place at the end of the production line will be obsolete. Ford, Chrysler and GM are adapting N/C equipment to automaking as rapidly as they can; already have used the art to develop in short time the parts of some cars now on the road.

Door handles will be door handles again and no longer mistaken for ashtrays in many of New York's new taxicabs, according to Dodge Division, with a simple remedy.

(Please turn to page 33)

Win \$100, enter the Pliobond "Stickup"

Send us the most interesting use of the month for Pliobond® and we'll send you back \$100.

Some hints. Pliobond is a rubber-based adhesive. It can seal and coat. Joins wood to metal to glass to cloth to rubber. Virtually anything to anything.

Forms a tough flexible bond that resists impact, oil, oxygen, water, many solvents and chemicals. Actually grows stronger with age.

Still stuck? Pliobond can mend, waterproof, insulate, or reinforce just about anything around the home, or cars, in workshops.

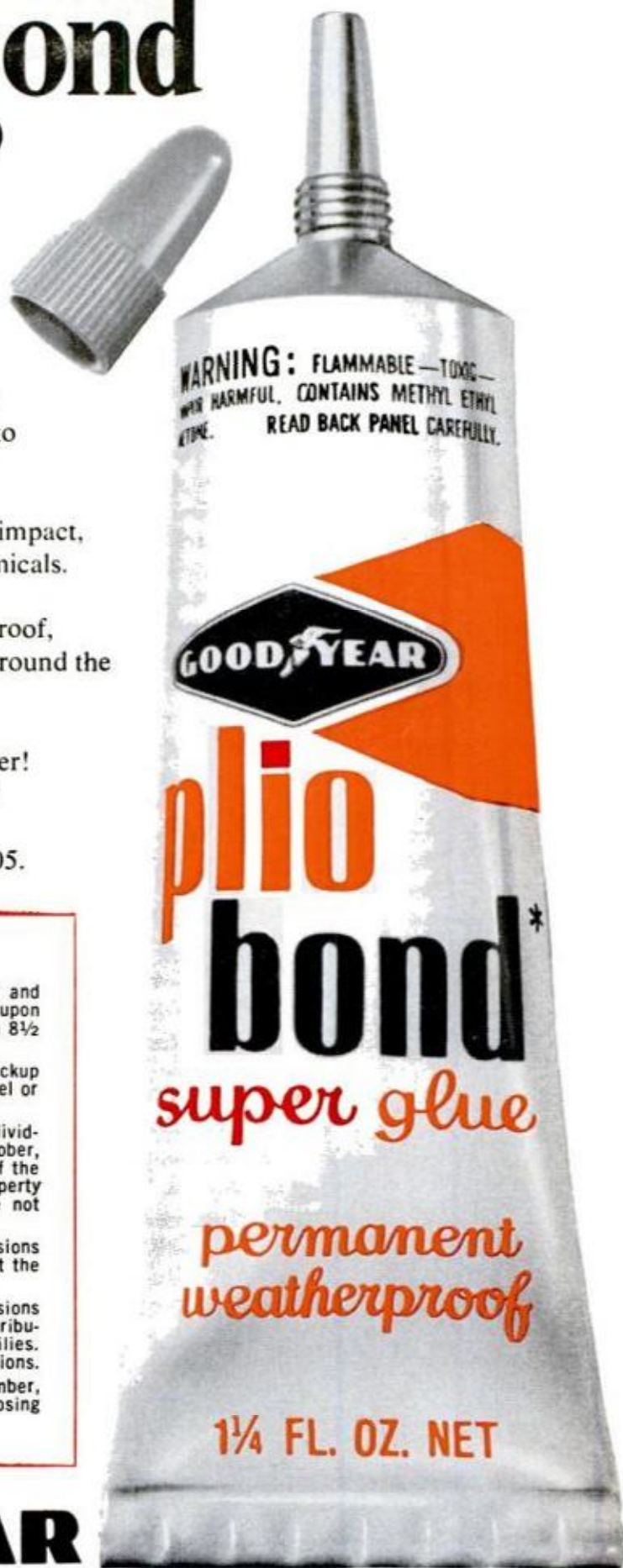
You take it from there. Send us a brief description of your use—it could be a winner!

Top tip received by last day of month of issue wins \$100. Pliobond Stickup Contest, P.O. Box 9115, Akron, Ohio 44305.

PLIOBOND "STICKUP" CONTEST RULES

1. Describe in 50 words, or less, an interesting and unique use for Pliobond adhesives. Use an entry coupon from your local store, or plain paper no larger than 8½ x 11 to enter.
2. Send as many entries as you like to Pliobond Stickup Contest, P.O. Box 9115, Akron, Ohio 44305. Send label or other evidence of purchase with each entry.
3. \$100 awards limited to one for each contest. Individual contests run in April, May, June, September, October, 1966. Entries must be postmarked by the last day of the contest in which you enter. All entries become property of The Goodyear Tire & Rubber Company and are not returnable.
4. Entries will be judged by Goodyear and the decisions of Goodyear will be final relating to questions about the contest and winners.
5. Contest open to everyone in the U.S. and possessions and Canada, except employees of Goodyear, the distributors of Pliobond adhesives and their immediate families. Contest subject to Federal and State Local Regulations.
6. All winners will be notified no later than November, 1966. List of winners will be sent on request enclosing self-addressed stamped envelope.

GOODYEAR



Do you have any idea how to win this prize?



Send it in!

Enter the Schenley "Household-Hints" Contest

Got an idea? Any do-it-yourself trick, time-saver or money-saving idea can be a winner. Any idea you may have to make household and workshop jobs a little easier. Every month Schenley Distillers will offer five prizes like these:

1st PRIZE: DE WALT RADIAL ARM SAW

2nd Prize: Ansco Camera Kit

3rd Prize: Melnor Lawn Sprinkler and Reel

4th Prize: Wen Power Hand Saw

5th Prize: Wen Power Hand Saw

Send in your ideas today to the Schenley "Household-Hints" Contest, Contest Manager, Room 1303A, 10 E. 40th Street, N.Y.C. Entries must be postmarked no later than midnight, April 30, 1966 to be judged in this month's contest. All ideas submitted become the property of Schenley Distillers Co., and all decisions of judges are final. Offer not made to minors or residents of states where illegal.

Here's a helpful Schenley tip for home bartenders:

When serving drinks that call for fruit or fruit juice—be sure to slice or squeeze just before using. Fruit and juices go stale, even under refrigeration.



BLENDING WHISKEY, 86 PROOF, 65% GRAIN NEUTRAL SPIRITS. ©SCHENLEY DIST. CO., N.Y.C.

DETROIT LISTENING POST

(Continued from page 30)

Last month, I mentioned that the new safety handles in the cabs bear "Door Handle" signs so passengers won't accidentally open doors. Dodge tells me the cabs are not usually equipped with ashtrays and that's where the confusion starts. Remedy: put the ashtrays back in. They're being installed on all new cabs and, hopefully, no more trouble should occur. That's what the man said.

Indianapolis race tires are getting wider, lower, and soon your car will receive the same treatment. Firestone just announced its new "Super Sports Wide Oval" passenger-car tire with a two-inch wider tread than conventional tires. Look for other versions of super-wide-tread tires this year. They are said to provide better traction, softer ride and longer tire life.

Cadillac's front-drive car will not be another Riviera-Toronado look-alike, because Caddie refuses to go along with the modern trend toward fastback styling. Instead, its 1967 front drive will have conventional, but modern, notchback styling, even though it will share the same basic

body shell as Toronado and Riviera. All may be built in a common assembly plant.

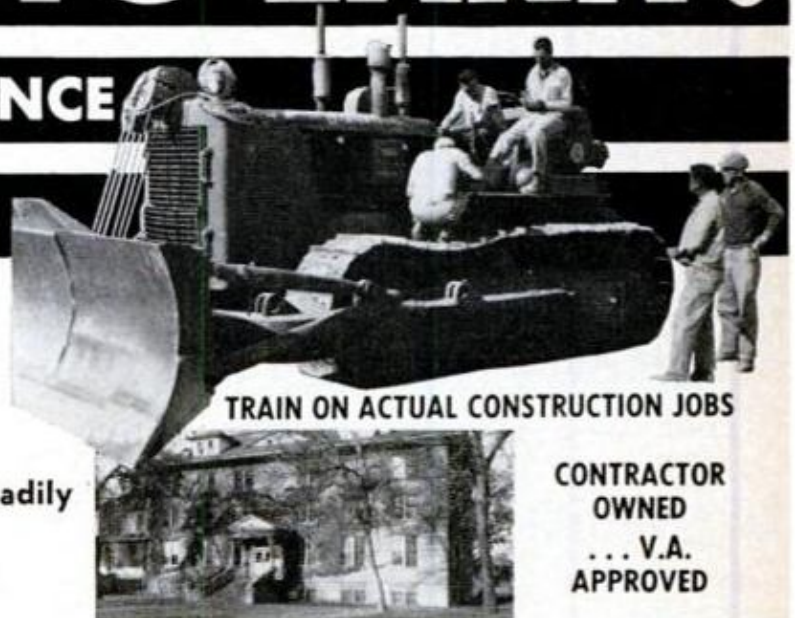
A peek at some sporty '67s. I happened to make a rare preview comparison of the 1967 Mustang and Mercury's 1967½ Cougar model this winter. Both cars were on a Detroit freeway test run. The new Mustang has an all-new sheet-metal skin, but is hard to tell from current models at first glance. It looks squatter, more rounded, with fender lines sloping off from the body. Taillights are larger, but retain their current shape. Roof line of the two-door hardtop is almost identical. Mustang's grille will use more bright metal, but the familiar boxed-in steed will remain. Cougar looks nothing like Mustang; the shape is entirely different, and it's definitely bigger. It will have sequential turn signals, just like T-Bird, and disappearing headlights, too. Cougar's grille will be split in the middle by a sheet-metal overhang from the hood (like 1964 Pontiacs). Overall styling is similar to the '67 T-Bird (page 32, Jan. 1966 PM), with a wedge-shaped line starting at front of the fenders. These widen out vertically until they reach the back of the "C" pillar where they taper off abruptly to the back of the short rear deck. More on this later.

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NEWS FROM THE MILITARY

BY WILLIAM R. KREH

A new gas mask developed by the Army permits the wearer to drink or to administer artificial respiration without taking it off. Accessories make it possible for him to drink from a canteen through a tube and administer a method of mouth-to-mouth resuscitation.

A machine gun that fires standard .22-cal. long ammunition at the rate of 2000 rounds a minute is being studied by the Army. Developed by David Williams, inventor of the World War II carbine, the new gun weighs less than nine pounds and is only 20 inches long. Because of its small caliber, the machine gun can be fired indefinitely with no appreciable rise in heat and its rate of fire is faster than any gun of its size and type.

An airborne blockhouse for the Minuteman ICBM is being developed for the Air Force. The flying control system will be carried aboard a modified KC-135 to provide an alternate launch system to

back up the underground control centers. As with the underground system, the airborne one will require simultaneous action by two men at separate consoles in the same aircraft before a missile can be fired. The idea is to increase the Air Force's ability to get the ICBMs off in case of a surprise attack.

A trained porpoise is saving money for the Navy. Tuffy, the dolphin that was used as a messenger to carry mail and equipment to Navy divers in the recent Sealab experiment, is now locating missile launchers after they fall into the sea near the Point Mugu, Calif., Pacific Missile Range. Murky water and shifting mud on the ocean bottom made it impossible for Navy divers to locate the \$4700 launchers in the past. But by training the porpoise to respond to the noise of a \$2.95 buzzer and then attaching one of the buzzers to the launcher before it's fired, divers now merely have to follow Tuffy to find and salvage the equipment for use again.

Common chicken wire was used by Air Force communications experts recently to solve serious radar signal interference problems at two European air bases. They erected fences of the wire to shield strong signal reflection areas.

CHECK RUST & CORROSION

around your house . . .



Derusto the Beautiful way to stop rust

DERUSTO PROTECTIVE COATING . . . a heavy duty—semi-gloss coating that actually penetrates and locks itself to metal surfaces. Primes, finishes, beautifies and protects. **DERUSTO** . . . the product with the built-in primer in an array of beautiful colors. **DERUSTO GALV-A-GRIP** . . . stops cracking, peeling and chipping on gutters and downspouts. Requires no etching or weathering. Primes, finishes, beautifies and protects. **DERUSTO GALV-A-GRIP** . . . the product with the built-in grip. Available in WHITE, Red, Gray and Green.



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Sears

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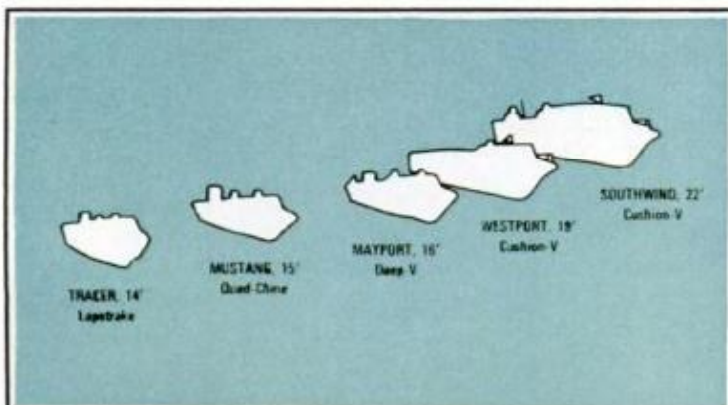
All These Home Lubricants are Available at Sears

Sears has a household lubricant designed for everything from a sticky zipper to a squeaky bike. Come in today to your nearest Sears, Roebuck and Co. store and select the lubricants you need.

Prices Subject to Local Variation

- 3-Piece Lubrication Kits . . .79c
- Dripless Penetrating Oil . . .29c
- Fan and V-Belt Dressing . . .39c
- Graphite Penetrating Oil . . .39c
- Fine Household Oil29c
- Light-duty Household Oil.25c
- Shaver and Clipper Oil . . .29c
- Instant Lock Defroster29c
- Dry White Lubricant19c
- Penetrating Graphite Oil . . .25c
- Dry Powdered Graphite . . .19c
- All-Purpose White Grease 49c
- Silicone Grease Stick29c
- Gear Case Tool Lubricant .69c
- Rust Preventive Spray59c
- Silicone Spray Lubricant . . .99c
- Light Electric Motor Oil . . .49c
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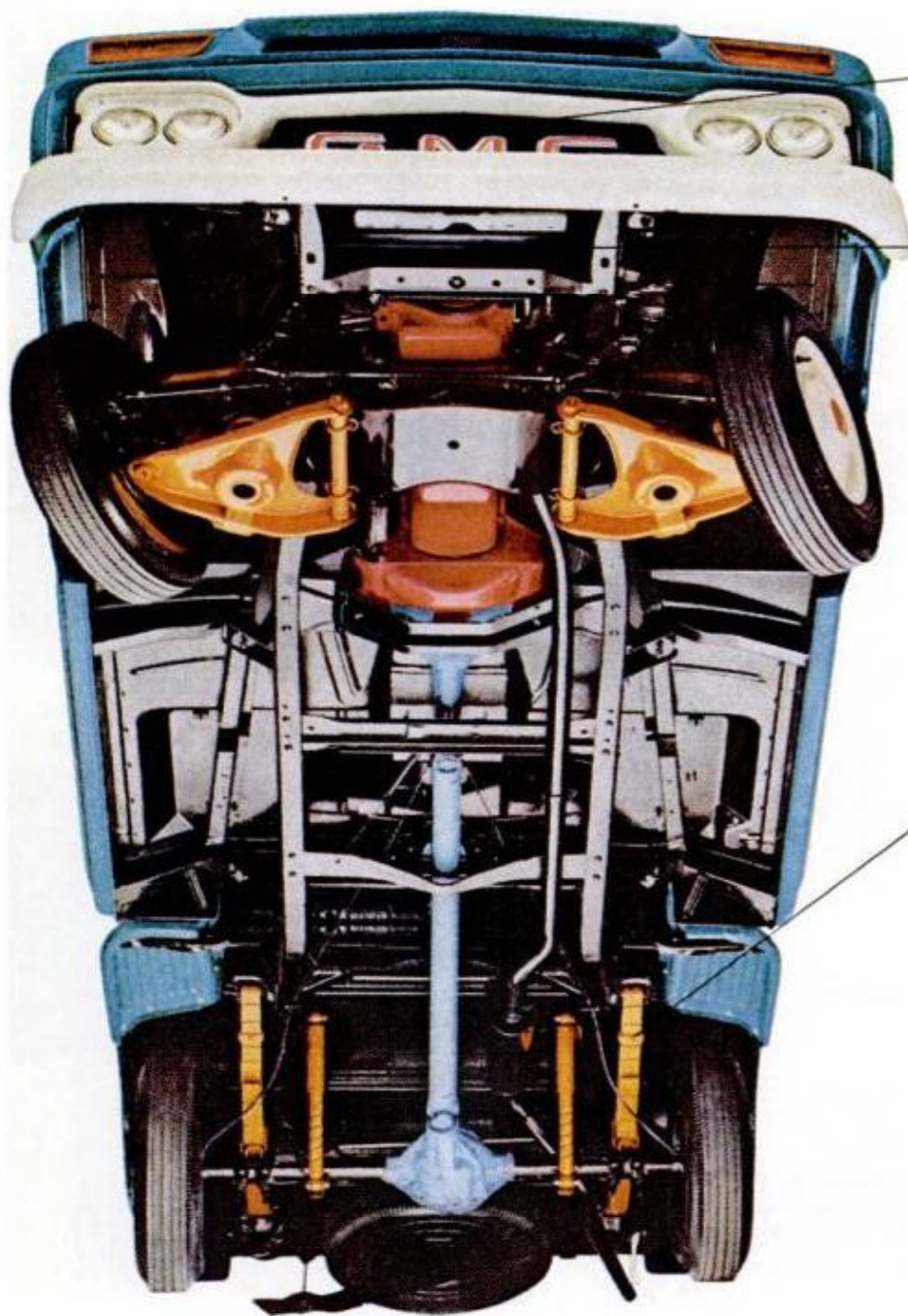


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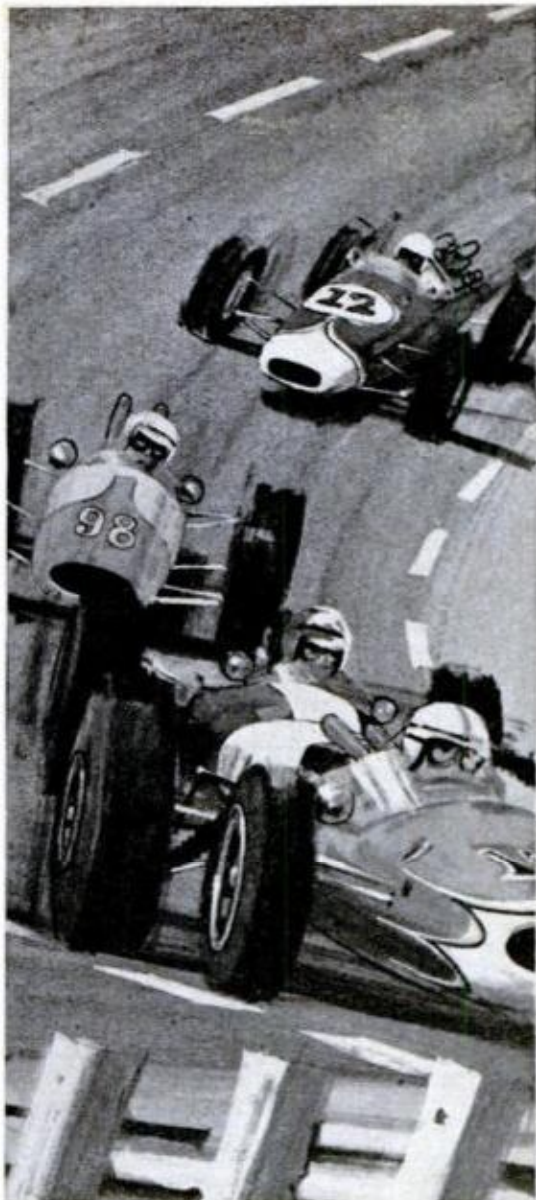
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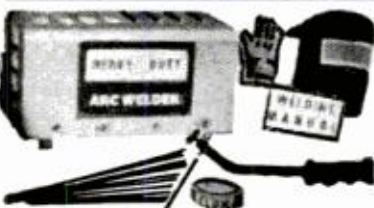
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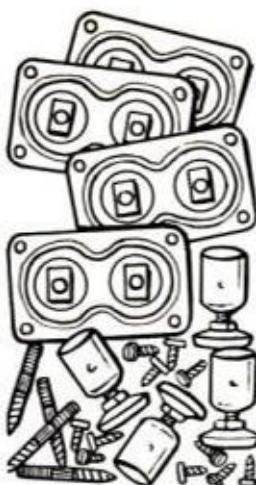
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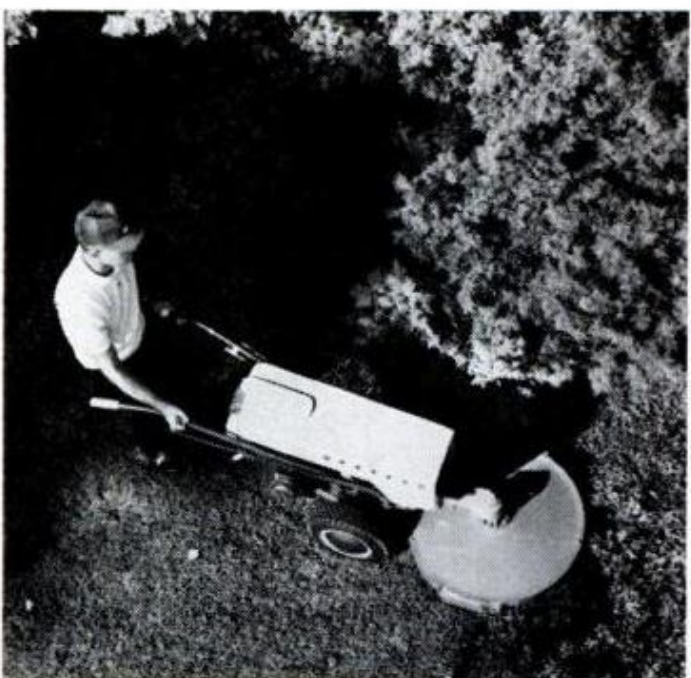
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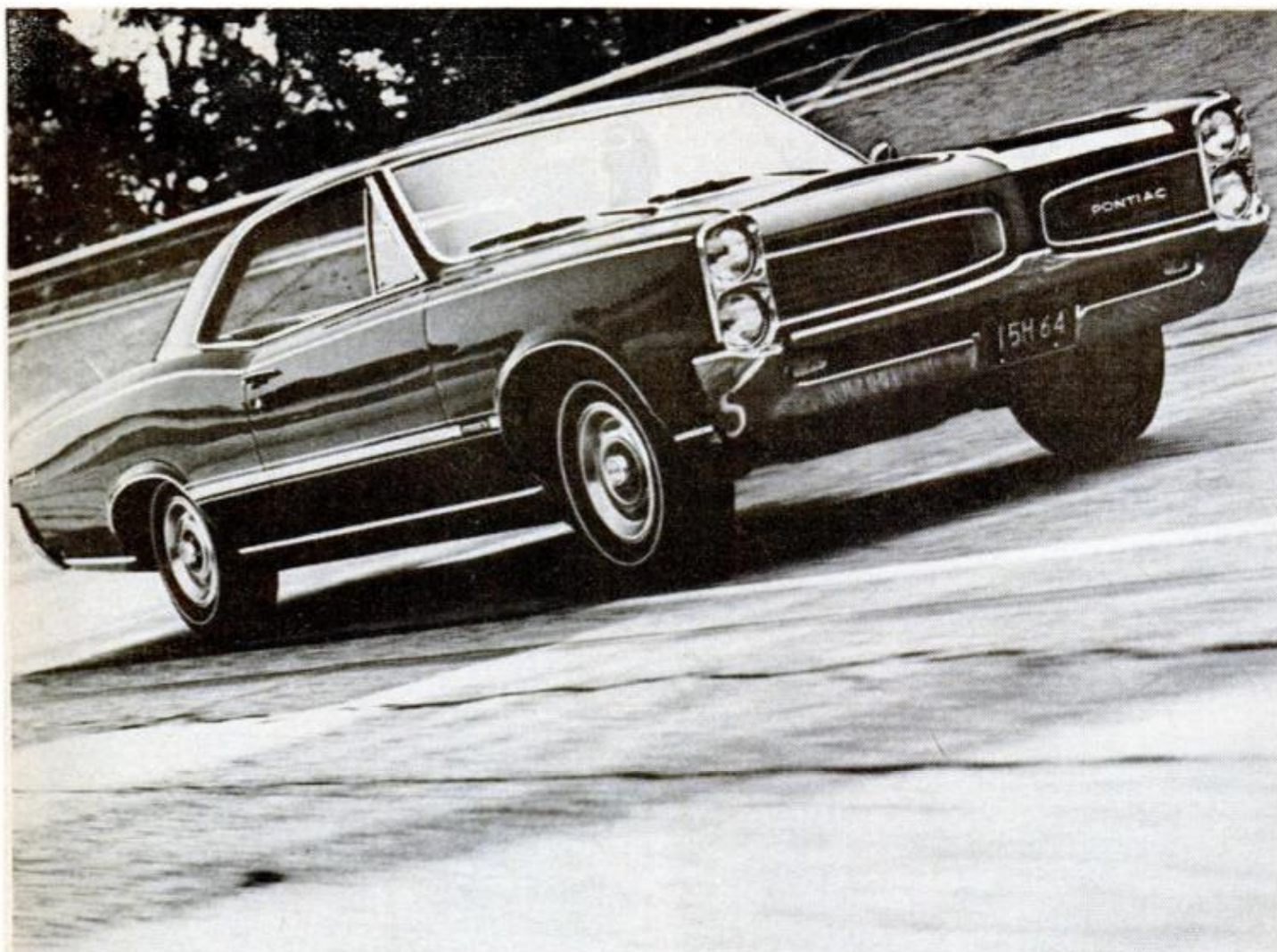
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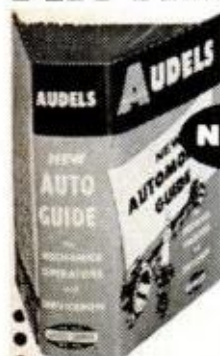


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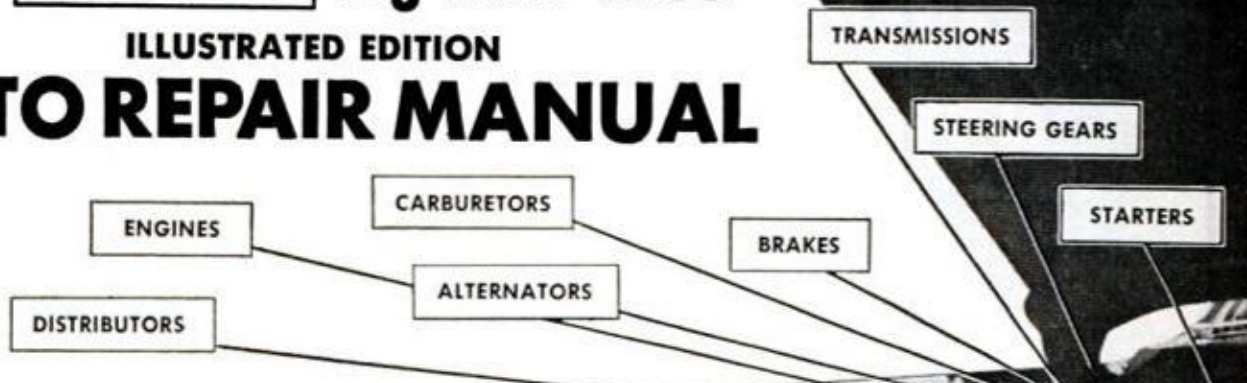
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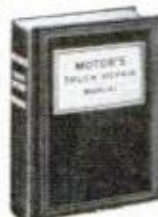
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QUESTIONS ANSWERED

HOMEOWNERS' CLINIC

BY W. CLYDE LAMMEY

Fixing Leaky Gutters

Certain areas of my galvanized steel gutters are beginning to spring leaks (and leak springs). Rust holes have appeared in half a dozen spots. I've tried daubing caulking compound over the holes, but they still leak. For the most part the gutters are in pretty good condition. I sure don't want to replace the whole system. Just tell me how to plug the leaks that have already developed.
—B.M., Ohio.

Okay. But while you're plugging the leaks that already exist, keep an eye out for other areas in the early stages of corrosion and fix them too. Here's the general procedure:

Clear the gutters of all debris and wash them clean. Wire-brush the already corroded areas, as well as spots that show any signs of corrosion. Use sandpaper to thoroughly rid these areas of rust. Now spread asphalt over and all around the leaking and suspicious areas. Where the leaks exist, lay a piece of burlap or thin aluminum sheeting over the asphalt and press it into place; and be sure to cut it large enough to amply overlap the patched hole. Finish by spreading another coat of asphalt over the entire area. I also suggest you check your gutters to see if they are sloped and draining properly.

Scraped-Away Paint Leaves Shadow

Recently I scraped away a paint blister that had popped up on an interior wall. After sanding, I covered the area with two coats of good paint, but those craggy, unsightly edges of paint that formed the base of the blister are still obvious; they throw a shadow that can be noticed from across the room. How the devil do professional painters beat this problem?
—T.Y., Mont.

Filling or hiding the indentations which remain after paint has been scraped away can be done in different ways, depending on the condition of the wall and thickness of the paint, or depth of the indentation. Where the paint ridge is very thin, feathering it down with

sandpaper should be all that's necessary.

I would recommend the application of a thin mix of spackle over an indentation framed by a thick edge of paint. This can be tricky, as the patch must be perfectly smooth and flat and be precisely flush all 'round with the surface of the old paint.

In the case of oil-base paints, a third technique can be used. This calls for the application of a product known as an "amalgamator" which, when brushed on the ridge formed by the old paint, softens it sufficiently to permit it to be brushed out and smoothed.

To Sweep a Chimney

The unlined chimney of our house is coated with the soot of generations past. However, I want to make it usable again and intend to repaint and cap it. But first I want to clean it. It's about 25 ft. high and there's no cleanout. How do I go about the job?—H.D., Iowa.

If I were you, the first thing I'd do is install a cleanout door near the lower end of the flue to facilitate the removal of soot. The next step is to go up on the roof and lower a 20-ft. length of medium-weight chain down the chimney. Then start swinging the chain around in the flue with a whipping motion. It's hard work, but it will knock that soot out of every niche and cranny of the chimney. When finished, open the cleanout door and haul the soot away.

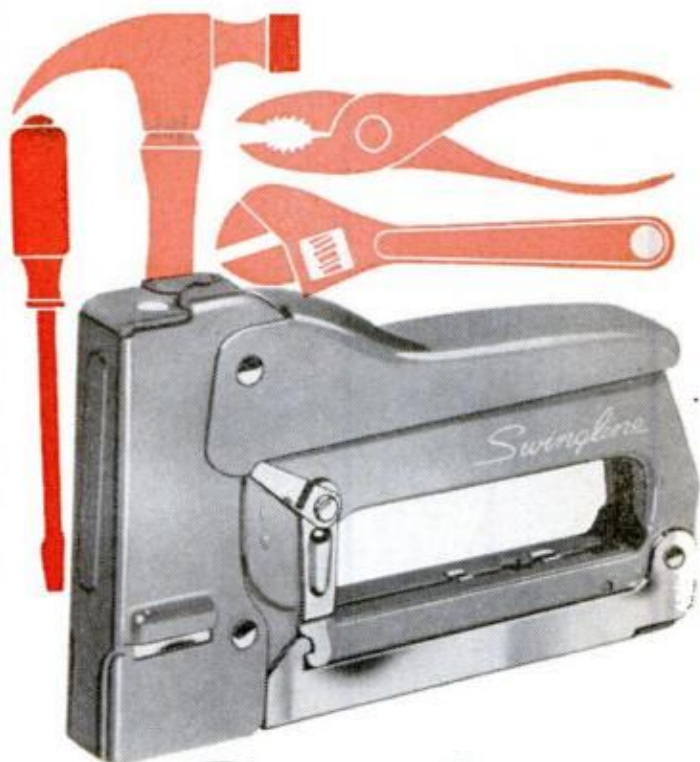
Those Sweating Panes Again

I have an old home where the window panes sweat in cold weather. The water runs down the glass and onto the wood frames, staining the paint a dirty brown. How can I remove these stains? Especially, what can I do to eliminate the problem which has been causing this condition?—D.L., Vt.

The discoloration caused by the water is simply a type of mildew caused by moisture, combined with a variety of impurities in the water. A liquid detergent such as *Lestoil* should remove these stains with little difficulty; even a few drops of ammonia should do the trick, though it will tend to dull a high-gloss paint.

I presume you do not have storm windows. Their installation will probably eliminate this problem. If you decide to use storm windows of the older wood-frame type, seal them at the edges with weatherstripping, then install them with turnbuttons rather than hangers.

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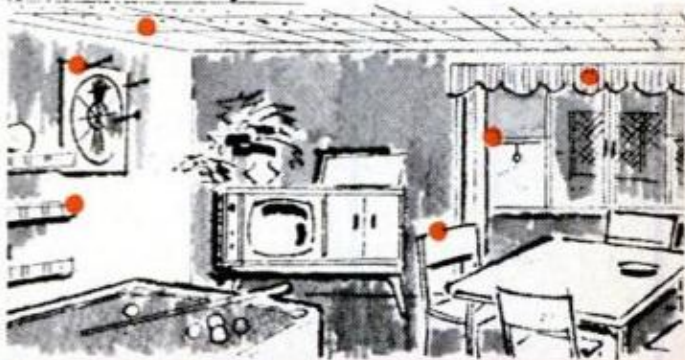
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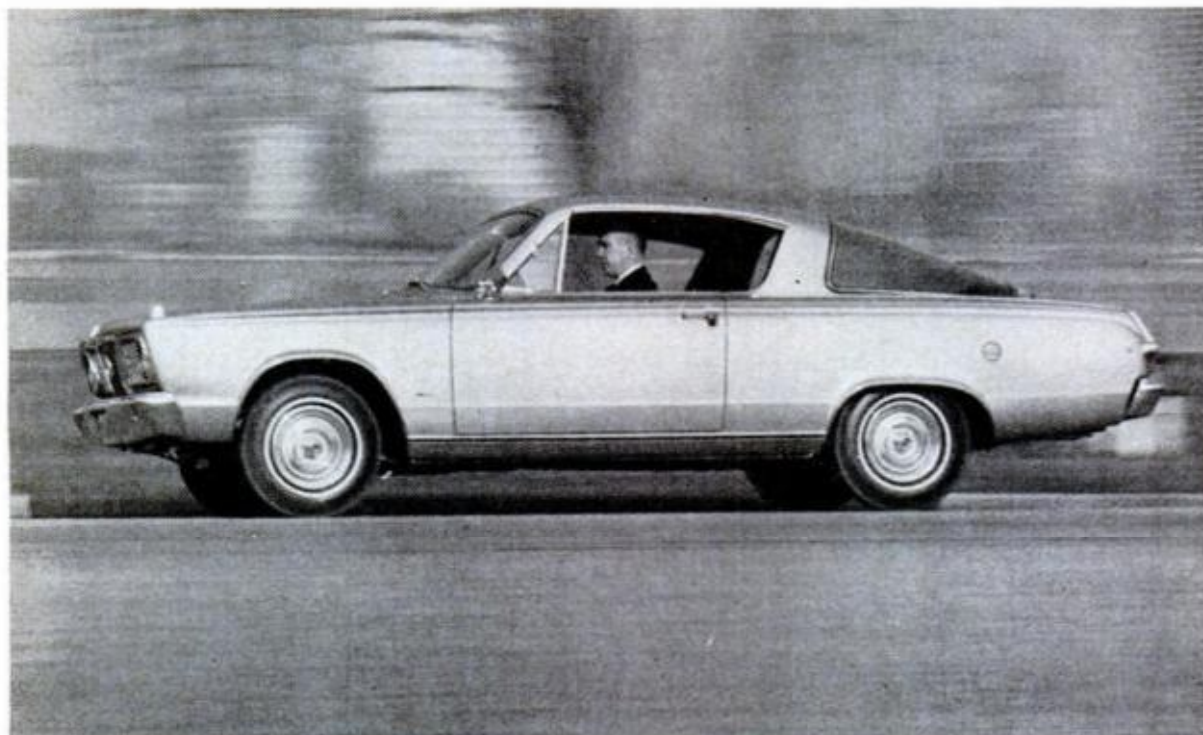


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Owners size up their Barracudas

With 1,154,000 driving miles under their belts, Barracuda owners rave about handling, style, performance and fold-down rear seats... . . . squawk noisily about the rattles, traction, loose nuts and bolts. However, more than 16 percent found nothing wrong at all



BARRACUDA OWNERS SAY more care should be taken in assembly; rated workmanship, rattles from rear seat highest among squawks. But way this hybrid compact handles and looks drew highest praise

By Jim Dunne, *PM Detroit Automotive Editor* (Boldface comments by the author)

HANDLING, STYLE AND PERFORMANCE—in that order—are the three best-liked features of the 1966 Barracuda. Poor workmanship, rear-seat rattles, and air, dust and water leaks bring most complaints.

That's what our survey of 1966 Barracuda owners shows. Owners questioned in every part of the country had run up over 1,154,000 miles of everyday driving on their 1966 models.

Handling was named by 52.5 percent of the owners as the best feature. Many with the Formula S package were especially pleased with handling.

Poor workmanship, rattles and noise from the rear seat of the car drew 17.1 percent of the total number of complaints. However, it is significant that over 16 percent of the owners found nothing wrong with the car at all.

Air, dust and water leaks were named so frequently as bad features that they were moved from the "workmanship" category into a separate group. Over 14 percent of owners with complaints told us about body leaks.

Gas economy averaged 17.4 miles per gallon and was "acceptable" to 80 percent of the Barracuda owners. Here's how it stacked up:

18.6 miles per gallon with the 145-hp engine,
17.9 miles per gallon with the 180-hp engine,
16.1 miles per gallon with the 235-hp engine.

(Please turn to page 58)

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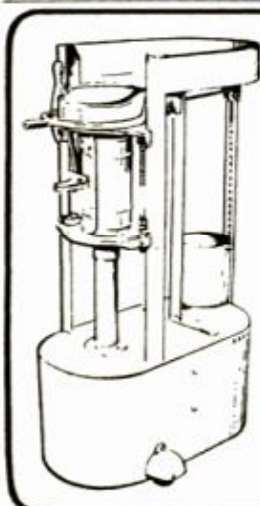
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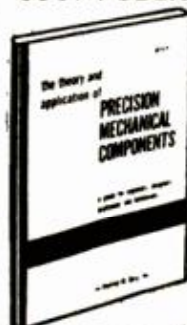
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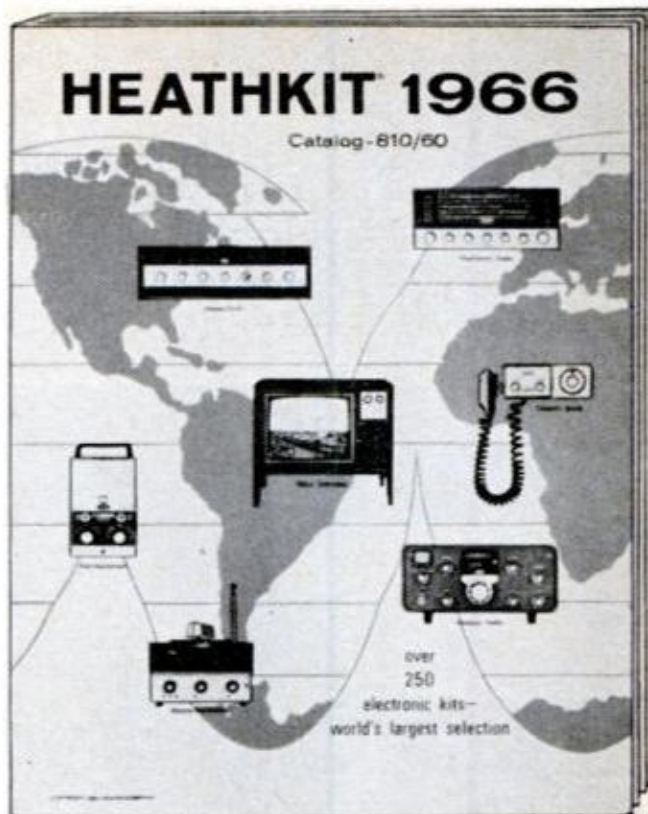
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Barracuda's fold-down rear seat was used by 94.8 percent of the owners and 87.6 percent liked the large rear window. Power steering was ordered with 80 percent of the cars while 20 percent had power brakes.

Styling was cited by 39.9 percent of the owners as a good feature, making it the second best-liked. Right behind in third place was the power, performance and pickup group, for which 36 percent of the owners voted as an attractive feature.



FASTBACK STYLING leaves rear-seat headroom, but rear window fogs up, is hard to keep clean

Barracuda Pros

Here's what Barracuda owners had to say about those top three features (handling, style, performance) of their new car:

"Handles with power steering like a toy. A pleasure to drive."—New Jersey manager.

"The car has excellent stability on fast turns; not affected by cross winds. It's easy handling, has a firm ride."—Iowa bus driver.

"I consider Barracuda one of the smartest looking, most practical cars on the road, combining sporty looks with wagon convenience."—Wisconsin minister.

► **That huge rear window was one of the big reasons "appearance" ranked so high with many owners. It's spectacular.**

"The fastback styling gives it a sleek look."—Massachusetts sailor.

(Please turn to page 60)



OPTIONAL HEAVY SUSPENSION, 235-hp V8 make Barracuda sure-handling, quick and responsive

Barracuda Gripes

Here's how the brickbats flew at the top three complaint targets (poor workmanship, rear seat rattles, air and water leaks):

"Grommets missing out of the fire-wall, parts missing out of the power steering unit, doors and windows fit poorly."—California teacher.

"Outside paint stripe peeling off."—Illinois supervisor.

"Radio speaker fell out. Right front-turn signal has never worked. Right door 'way out of alignment."—Illinois mechanic.

► **The Barracuda dealer service shop could use him.**

"Glue residue was left on the window trim and there was poor installation of the headliner. Poor fit of side windows."—Texas technician.

"A little more care should be taken
(Please turn to page 60)

“File away your spark plug troubles,” says Jim Clark, 1965 Indianapolis 500 winner.

“Anyone with some knowledge of motorcars is aware that spark plugs—or sparking plugs as we call them in Britain—need periodic cleaning and regapping to perform efficiently. What many people overlook is that a judicious bit of filing may be in order at the same time.

“As plugs wear, their electrodes become rounded and require higher voltage to fire. Missing can result, robbing you of power and economy. Filing the electrodes so their edges are sharp again and adjusting the gap to correct spacing with parallel surfaces restores performance.

“With sparking action occurring as often as 300 times per minute under extreme heat of combustion, the best

electrodes will eventually erode beyond a point where they can be corrected by servicing. When this happens, I recommend you install a new set of Autolite spark plugs. All Autolite spark plugs have special nickel-chrome alloy electrodes for greater resistance to high combustion temperatures, corrosion and spark erosion. And Autolite makes its passenger-car plugs with the same copper and glass seals used in Autolite racing spark plugs that helped me win the Indy 500. Some companies don't because it costs a bit more, but Autolite thinks the extra protection is worth it. So do I.”

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AUTOLITE



Barracuda Pros

(Continued from page 58)

"People notice things out of the ordinary. I sense that people envy me and my car."—Colorado printer.

► **He's probably got a big window in his personal fastback.**

"I am positive that no other car in its class is so quick."—Ohio railroader.

"It is good in a drag, and it is good in a top end run, too."—Texas student.

"For the size of the six-cylinder motor it has good pickup."—Michigan professor.

Next three of the top ten "raves" are based on the car's versatility. That fold-down rear seat was singled out by 21.3 percent for special praise. Passenger room (16.1 percent) and cargo space (11.5 percent) are fifth and sixth. Some bouquets:

"The fold-down back seat offers an observatory platform for my young son. Keeps him quiet and occupied while in the car."—Maryland consultant.

"It gives you a good excuse to lie down and look at the stars with your best girl."—Connecticut technician.

► **No comment.**

"Fold-down rear seat allows room for children to sleep, play. Safer too, because of only two doors."—Connecticut teacher.

► **Only owner to mention safety in this connection.**

(Please turn to page 62)

Barracuda Gripes

(Continued from page 58)

when assembling the car. I had to go around and tighten all nuts and bolts myself."—Pennsylvania sailor.

"The bar that holds the back seat back is metal on metal. The passenger seat rig is also metal on metal. Both rattle."—Montana teacher.

► **Right. Rear-seat rattles are caused by a uniquely stupid, penny-saving design. A bar attached to the back of the rear seat hooks in place when the seat back is upright. Bar and hook form a metal-to-metal attachment point. That's the cause of all the racket.**

"Air leaks through the wing windows. I've been back four times to get them fixed and it still leaks air."—Maryland consultant.

"Weatherstripping on left and right windows does not fit snug with smaller windows in back, thus allowing rain and cold to come in."—California supervisor.

"Water rushes in through the vents when the heater is turned on."—North Carolina superintendent.

► **In real cold weather maybe it converts to a useful snow blower.**

Next in order of grumbles come traction trouble (11.1 percent), oil leaks (10.2 percent), shift console position (7.7 percent). Most owners who talked about trac-

(Please turn to page 62)

Summary of Barracuda Owners' Reports

Excellent . . . 60.6% Good 35.1% Fair 3.9% Poor 3.5%

Best-liked features:

Handling	52.5%
Styling	39.9
Power, performance	36.0
Fold-down rear seat	21.3
Passenger compartment room	16.1
Cargo space	11.5
Seats	9.8
Parking	9.4
Size	9.4
Ride	9.4

Specific complaints:

None	16.0
Workmanship	17.1
Rattles, noises from rear seat	17.1
Air, dust, water leaks	14.1
Traction	11.1
Oil leaks	10.2
Center shift console	7.7
Foggy, frosty rear window	7.3
Loose front seats	7.3
Wind noise	6.8
Transmission trouble	6.0

Best-liked exterior features:

Overall style	31.3
Fender turn-light indicators	29.7
Fastback roof	17.2
Rear window	11.7

Least-liked exterior features:

Valiant grille	31.5%
Paint finish, especially stripe	8.5
Rear window	8.5
Front-end styling	7.9

Best-liked interior features:

Dashboard, instrument panel	31.3
Fold-down rear seat	28.7
Bucket seats	24.3
Console	11.6
Cargo space	10.1

Least-liked interior features:

Rear seat legroom	11.5
Size of glove compartment	8.4
Cigarette lighter location	7.9
Console	7.9
Rear window	7.9

Average miles per gallon:

City driving	15.7
Long trips	19.0
Overall	17.4

Mileage opinion:

Better than expected	22.8
As expected	52.1
Not as good	19.2

What influenced purchase most?

Styling	55.2
Interior versatility	30.5

Price, trade-in	24.7%
Warranty	16.1
Test drive	15.8
Chrysler name	14.7
Size	12.5

Consider another car?

Yes 64.8

Other make considered:

Mustang	34.4
Chevrolet	18.3
Plymouth	13.3
Valiant	8.3
Ford	8.3

Is Barracuda only family car?

No 55.2

Other cars owned:

Chrysler	17.7
Plymouth	15.8
Chevrolet	14.6
Valiant	10.8
Dodge	9.5
Ford	7.6

How is dealer service?

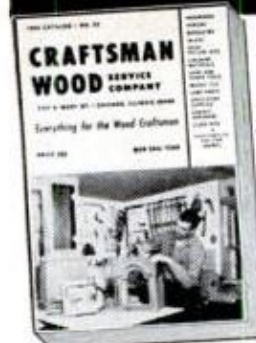
Excellent	55.4
Average	35.4
Poor	9.2

Would you buy Barracuda again?

Yes 91.4

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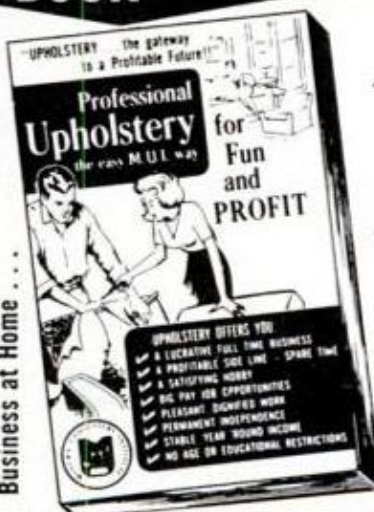
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Barracuda Pros

(Continued from page 60)

"I like the compact design with adequate headroom."—California social worker.

► It does have good headroom, even in the back seat.

"This car has more space than a regular sedan; yet it's not as clumsy as a station wagon."—Michigan professor. Some complained that bulky items had to be loaded from the doors.

► They're right. The trunk opening is too small.

"It's a two-door, yet I have room for my family (myself, wife and four children; oldest boy is 6 ft. 2 in. tall). Very comfortable on trips, even with the six of us."—Indiana plumber.

"It's a sporty car and also has almost as much cargo space as a wagon."—Arizona salesman.

"Lots of cargo room. A plus is the sleeping room for trips."—Oklahoma technician.

Barracuda's front seats (9.8 percent like best), ease of parking (9.4 percent), outside dimensions (9.4 percent), and ride (9.4 percent) round out the ten best-liked features of the car. Lots of praise, but not enough to make the top ten, went to the turn signal trouble flashers located out on the fenders. Only one owner preferred the conventional location on the instrument panel. Sample comments:

"The bucket seats in front are comfortable and rear set leg-room is ample."—California student.

"Very compact and easy to park on the street."—New Jersey baker.

► Car looks much longer than it really is on its 188-inch Valiant chassis.

"The ride is a lot more than you expect from a small car."—Ohio foreman.

Barracuda Gripes

(Continued from page 60)

tion complained that the rear end was too light. Owners who had a three-speed manual transmission complained that the shift lever could not be floor-mounted like the four-speed. Others said the console interfered with shifting. Here are some of their squawks:

"Rear end is too light for 273 cu. in. motor even with sure grip rear axle. Con-

dition is very prominent on wet pavement."—Missouri teacher.

"Skids too easily in sharp curves—regular tires have poor adhesion."—Massachusetts teacher.

► **Factory should recommend much larger tires for the V8 models. Power-to-weight ratio on Barracuda's equipped with this powerplant is the big reason for traction loss.**

"Car developed an oil leak caused by a faulty main bearing."—Indiana retired.

"Engine head was loose causing oil leakage, but this was easily fixed."—Georgia student.

"The shifting boot binds in the console, making reverse hard to find."—New Hampshire machinist.

► **Check your linkage on this gearbox. Sometimes that's the trouble.**

"The misfit console hindered proper gear shifting until it was removed and reset 3 inches from designed position."—Illinois airman.

Last four gripes of the big ten were rear window problems (7.3 percent), loose front seats (7.3 percent), wind noise (6.8 percent), and transmission trouble (6 percent). Here are the blasts:

"It's just about impossible to scrape the ice off the back window on cold winter mornings. It is too big and curved."—Connecticut contract specialist.

"In snow it's murder to get clear. Heater and dehumidifier are inadequate."—Illinois pharmacist.

"Rear window is difficult to clean from inside, and it lets in too much heat from the sun."—New Jersey housewife.

► **Barracuda owners may like that big rear window, but it does have drawbacks. A rear window wiper and special defroster unit are a must for comfort and safety. Even after the car is running for some time, the window fogs up. Detroit has the technology to heat the window electrically and make it of polarized material to cut hot solar rays. Maybe next year's model will have what you need.**

"The bucket seats bounce when no one is sitting in them on a bumpy road"—Ohio railroader.

"Bucket seats very uncomfortable. Seat springs make noise."—Texas engineer.

"Wind noise around vent window is excessive; they should pay more attention to proper fit."—Missouri student.

"Burned out transmission (automatic) at only 1400 miles."—Michigan machinist.

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SECRETS! Secrets! Mail order success revealed by internationally famous expert who discovered how to make home business fortunes. Beginners: Get free copy "How to Make Money in Mail Order." Discloses free advertising, profitable products, everything! No obligation. Write Mallico, 1554 Sepulveda, Dept. =704, Los Angeles 90025.

RAISE Rabbits on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

LEARN Landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. MC-46, 11826 San Vicente Blvd., Los Angeles, Calif. 90049.

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HUGE Profits! Mail order importing. Free information. ITIS-PM-4, Box 454, Hollywood, Calif. 90028.

MAKE \$32 From 49¢ piece vinyl. PMA-1934 Edgeland, Louisville, Ky. 40204.

BUILD Profitable home mail order. Instruction manual. \$2.00. BMP4PM1, St. Peters, Mo. 63376.

BIG Profits raising large fishworms. Information free. Blevins Farm-1, Stevenson, Alabama.

OPERATE Debt Re-finance Service. A.D.C.S., 1222 Pioneer Bldg., St. Paul, Minn. 55101.

FREE Report: "609 Unusual, Successful Businesses!" Box 51-PO, Des Plaines, Illinois 60017.

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WRITE Letters that sell, persuade, get jobs. Mailorder expert tells how. Sends samples. Write ElJay, 615 South Alexandria, Los Angeles, California.

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USED Metal molds for casting yard ornaments. Dorrance, 18772 5th, Bloomington, Calif. 92318.

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HOW And where to get capital loans, cash to start a business. Free details. National Counselor, Harlingen 17, Texas.

FREE Booklet: "Guide To Mail Order." Bradley, 502 N.E. Brazee, Portland, Oregon 97212.

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\$1000.00 MONTHLY Possible in collection agency. Continental Credit, 1004 Grand, Des Moines, Iowa.

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HOME Mailorder course. Brand new 1966 publication. Details free. R. Morrison, 345 Centre St., Jamaica Plain, Mass. 02130.

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AMAZING Successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, WP-528, 333 North Michigan, Chicago 60601.

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LEARN The secrets of repairing junk batteries. "Fabulous Profits" at home. Details. The Batteryman, P.O. Box 416, Palm Desert, Calif.

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EARN \$240.00 a month at home, spare time, doing only two \$5.00 invisible mending jobs a day. Big money paid for service that makes cuts, tears disappear from fabrics. Steady demand. Details free. Fabricon, 1532 Howard, Chicago 26, Ill.

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EARN \$240.00 A month at home, spare time, doing only two \$5.00 invisible mending jobs a day. Big money paid for service that makes cuts, tears disappear from fabrics. Steady demand. Details free. Fabricon, 1586 Howard, Chicago 26, Ill.

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CHEMICALS And apparatus for industrial, analytical, and private laboratories. Catalog 35¢. Dept. M-50, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N.Y.

CHEMICALS Apparatus, Biology. Catalog 25¢. Mid-States Scientific, 7053 N. Clark, Chicago, Ill.

SEARCHING For economically priced chemicals and apparatus? Gifts with catalogue, 25¢. Starr Scientific, Manitowoc, Wisconsin 54220.

CONTACT Explosive. Explodes with touch of feather. Handled safely wet. Powerful. Ideal for jokes. Applies like paint. Made from household chemicals. Results guaranteed. Complete instruction for making both kinds only \$1.00. Franks Scientific Company, P.O. Box 156, Martelle, Iowa 52305.

TECHNICAL Chemicals apparatus catalogue, 20¢. MB Box 1922, Phila., Pa. 19105.

FIREWORKS—Bombshells, firecrackers, fountains. Display and commercial catalogue, 50¢. American Fireworks, Hickory Lane, Fairfield, Connecticut.

SKYROCKETS. Fireworks—Easy instructions: 28 varieties—rockets (thrust 25x weight), geysers, chemical whistles, aerial displays \$1.00; 65 formulas: best propellants, colors, smoke, fuses, contact explosives, \$1.00. Sentec, 433-X3 Ellis, San Francisco.

FIRECRACKERS Exploding fireworks, complete instruction, easy home manufacturing, \$1.00. Mailmart, Soquel, Calif.

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You've got to drive it to believe it. See your 'Jeep' dealer. Check the Yellow Pages.

EDITOR'S PAGE

A PM special issue—or even a big home workshop project—often begins more than a year before it sees print. Last November's Suburba-Car crawled out of the "idea" woodwork three years ago!

Plans for this issue's housing section began to roll last Spring. Then, our major feature ground to a shuddering halt for a variety of reasons beyond our control. Result: right after Christmas, we found ourselves without a cover story—six weeks from deadline. For a while it got pretty lively around the shop. Our editorial director, Walt Fischman, un-



earthed the slick A-frame feature on the cover in Vancouver, British Columbia! But we needed "summer" scenery. So we decided to erect it in the Bahamas. While Walt arranged, via Miami, for a schooner to ferry the kit to the islands, his secretary, Millie Pedersen, and Boat Editor Art Mikesell were tracking the freight car it inhabited across the country by phone—nudging it out of sidings, prodding it through switchyards and badgering anyone who made the mistake of answering their calls. In a "happening" unique in the annals of freight forwarding, Walt, house and schooner all converged on Miami the same day. Walt takes up the story from there—on page 90.

The "computer cops" described in James Berry's story on page 84, may sound pretty formidable. But don't worry too hard. Computers still are capable of remarkable goofs. Recently, Mike Royko, a columnist for the Chicago Daily News, turned up a letter written via computer to a lady customer of a Chicago department store. The note told her in cross language that she must do something about her neglected bill. "The amount due," it said, tersely, "is \$0.00."

The lady, who said she'd had three such letters from the computer, admitted that the machine was right. "I don't deny that I owe them nothing," she told Mike, "but how do I send it to them?"

After checking the store's collection department, Mike concluded that computers with nothing to do might continue "sitting there idling, glowing, beeping" and sending out bills to *anybody*, for \$0.00. Computers and their keepers, he says, are not to be trusted yet. "There's more than a loose tube involved when a computer starts sending out demands for \$0.00." He has a point. —R. F. Dempewolff

Department of utter fascination: Not long ago it came to our notice that a number of small research facilities are sporting what appears to be an expensive instrument called a "Deposit Thickness Monitor." The delicate electronic gadget is used to measure the thickness of thin films such as superconductors, lens coatings and so on. Upon investigating one of these "instruments," we discovered that it wasn't a DTM at all. It was cardboard. The owner explained that he couldn't afford the real thing, but the paper model provided by the manufacturer looked "real good" on the shelf and helped his "image." A fast note to the Sloan Instrument Corp. of Santa Barbara, Calif., brought us a knockdown kit of the cardboard replica, which our model expert,



George Blow, put together as shown. A friendly letter from Walter Miller, the company's ad manager, explained that the kit was not intended for the general public, but could be had "for the writing" by bonafide technicians in the vacuum deposition field. "All others must enclose 50 cents," he explained, "to cover profit."

PARKED NEAR THE ENTRANCE TO A BUSY NEW YORK CITY bridge, the two radio patrolmen had a clear view of the cars funneling onto the approach ramps. One of the officers spoke into the police radio, reading off the license numbers of cars chosen at random. One of the numbers belonged to a '52 Chevy.

Six miles away, a UNIVAC computer clicked quietly as it swiftly matched numbers against the 110,000 licenses of stolen cars and traffic violators stored in its memory bank. Suddenly, a bell clanged—and the operator of the computer grabbed his radio mike. By the time he started speaking, the machine had typed out the license number, name of lawful owner and engine number of a car stolen two weeks before. The car: a '52 Chevy.

THE NEW '007' IS A

Electronic brains are spotting stolen cars, identifying criminals



SUSPICIOUS CAR IS SPOTTED BY CRUISING PENNSYLVANIA STATE TROOPER. Instead of stopping motorist, he radios the nearest substation requesting a license check. Meanwhile, he keeps tailing vehicle



A QUICK MEMORY SEARCH—AND THE COMPUTER HAS ANSWER: STOLEN CAR. Then it teletypes message

Eighteen seconds after the auto had entered the bridge traffic, a team of patrolmen swung into action at the other end. Slowing the exiting cars, they flagged the Chevy to one side. A search showed they'd scored a bull's-eye. The driver, an admitted drug addict with a record of 16 arrests, was charged with auto theft as well as possession of stolen goods and credit card forgery. (The actual arrest is shown on page 86.)

This thief, picked up last August, is one of a growing number of law-breakers corralled by computer. Though electronic brains are relative newcomers to police work, they've already proved their value. They've been on the job in Chicago since 1961 and today play a part in 95 percent of all police operations. In 1964, when the national crime rate rose 13 percent, Chicago's dropped

COMPUTER

By JAMES R. BERRY

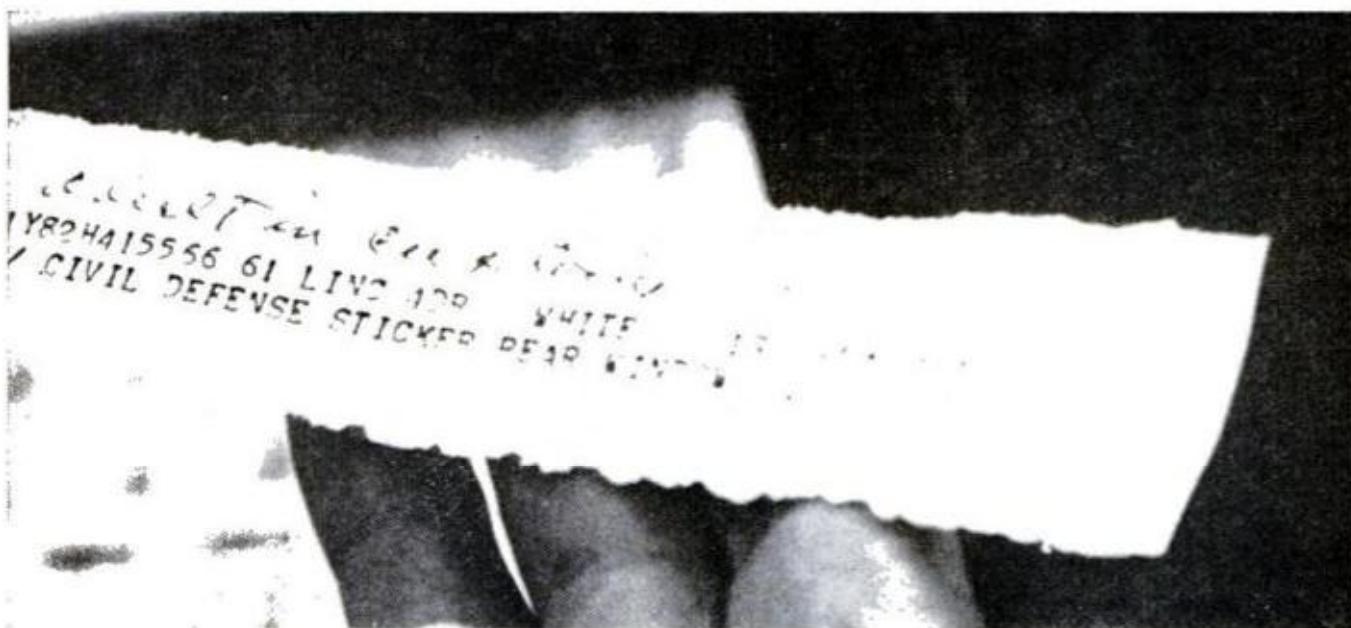
from skimpy clues—even predicting where crimes are apt to occur



SERGEANT AT SUBSTATION teletypes message to communications center in Harrisburg, state capital



LICENSE CHECK is made by big Harrisburg computer, which handles 3000 messages daily



to substation, where sergeant radios trooper to make arrest. Entire operation has taken but a few minutes
APRIL 1966



STATIONED AT BRIDGE APPROACH, New York cops radio license numbers to computer office



RADIO ALERT from computer operator warns officers at other end of span: stolen car on the way!



ACTUAL ARREST of criminal is shown. Not only was automobile stolen, but was loaded with loot



CALLED OPERATION CORRAL, the five-month test of computer setup netted some 3000 wanted cars

3 percent; in 1965, 12 percent. Similar results have been obtained in St. Louis. In 1965, the first year of a computerized setup for checking suspicious cars, auto theft in St. Louis dropped. At the same time, the national trend was on the rise.

One of the most important ways computers are helping fight crime is by breaking a traditional law-enforcement bottleneck: identification. Electronic brains give an assist to eyewitnesses by narrowing the number of pictures they have to view.

Here's how the system worked in a Baltimore burglary case. Two men jumped a night guard in an electronics plant, and blindfolded and bound him. They loaded a truck with instruments and tools. Before the blindfold was put on, however, the guard got a glimpse of one of the men. Ordinarily, the guard would have had to inspect 200 or more photos of men fitting the general description. But in this case the computer was called in.

All it had to go on were a few key physical details. Within minutes the machine had scanned its memory bank, rejected thousands of felons not fitting the description, and printed out file numbers of those left: 27 veteran burglars. Given only 27 photos, the guard spotted the thief within minutes. Arrested, the man confessed and named his accomplice.

Spotting a criminal by his *modus operandi* (MO), or working habits, is another important police weapon. "Criminals repeat habits just like other people," explains Robert J. Lally, chief of the Baltimore County Police Bureau. "Often you can make an identification just by MO. But only a computer can keep track of all the details."

Police in Detroit, for example, list scores of characteristic habits along with a felon's description. Everything from disguises he's fond of to his speech patterns are included.

One thug is now serving a long prison term because of the effectiveness of this system. Late one night about a year ago, the criminal entered a suburban Detroit bar and ordered a bottle of beer, naming a particular brand. At closing time, he pulled a gun from his belt, locked the owner in a rest room and rifled the register. The proprietor was so shaken by the ordeal that his description was practically useless. But the detectives had three working habits to go on.

At the Detroit police computer center, they programmed a search for a stick-up man fitting the barkeep's hazy description, and who also was in the habit of keeping his gun in his belt, forcing victims into rest rooms and drinking a particular brand of beer. In almost nothing flat, the computer singled out a criminal with just those characteristics. It wasn't long before he was behind bars.

Perhaps the most important way that computers will aid in identification is in correctly matching fingerprints. Today, a print found at a crime scene doesn't, by itself, readily lead to the crook who put it there. In the average city, it would take an army of clerks years to find the matching print among the hundreds of thousands on file.

Computers, of course, can make such a search feasible. In New York City, the fingerprints of thousands of known criminals have been translated into computer language and stored in a computer memory bank. The system, a pioneering effort, has worked.

But the job of transcribing thousands, even millions, of prints has stopped most cities. So law-enforcement experts are pinning their hope on systems now under development by several private companies. These systems have a light pencil or optical scanner linked to a computer. All the operator will have to do is run the scanner over a fingerprint and the computer will itself "read" the print and compare

it with others in its memory bank. The New York State Identification and Intelligence System expects to have such a set-up in operation by next year.

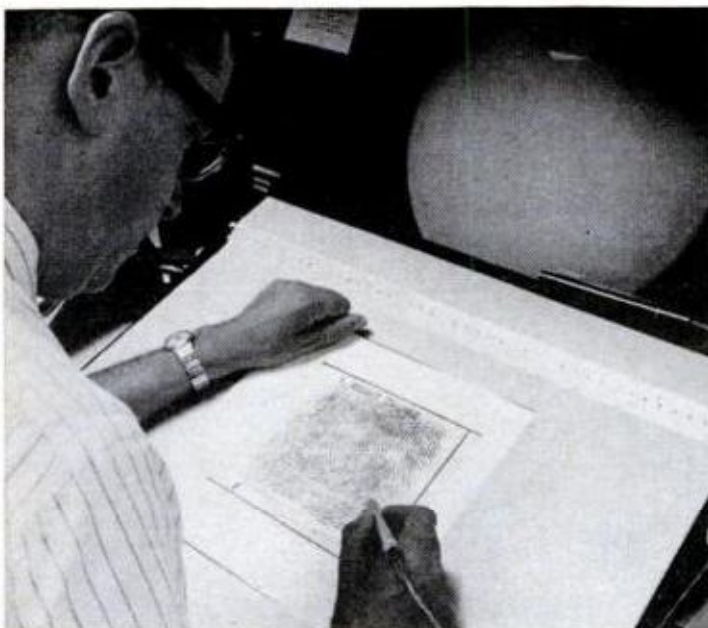
Swiftly identifying law-breakers is only one way computers are battling crime. Another, equally important, way is predicting when and where criminals are likely to strike next.

Ideally, a city's lawmen should immediately spot a local or general crime rise, then send in added patrols to the affected area. In practice, this means cataloguing the time, place, and type of thousands of daily crimes, then matching the frequency of each kind against the norm for every police district for the previous day, week and month. It's a superhuman task, and hardly a police department in the country even tries. Unless it has a computer, of course.

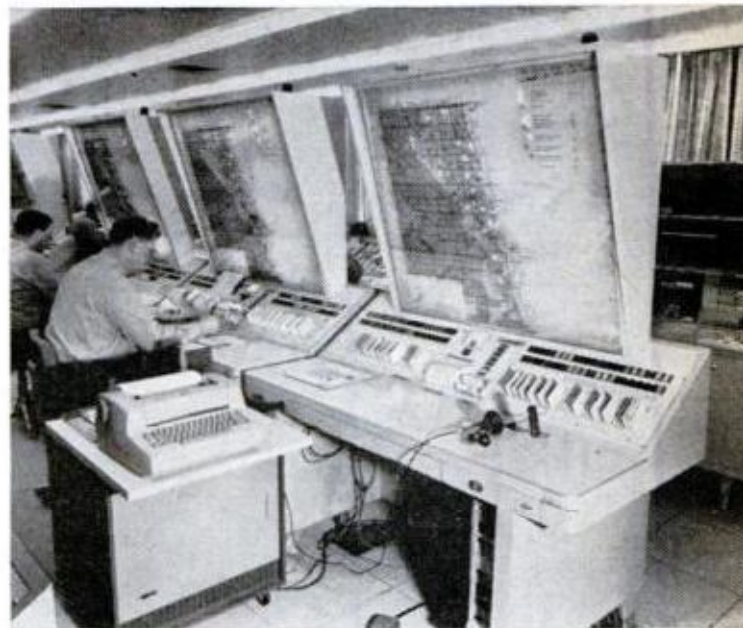
In Chicago, the electronic sleuths spew out a cumulative daily, weekly and monthly report that barely gives felons breathing time before a squad is hunting them down. Last spring, two armed robbers pulled five stick-ups on the city's subway platforms in three weeks. By the fifth heist, computers had alerted officials that subway robberies on Friday evenings, when they all took place, had shot way up in a particular district. Conclusion: a team of crooks was zeroing in on subway riders.

But that's not all the computer told. It

(Please turn to page 222)



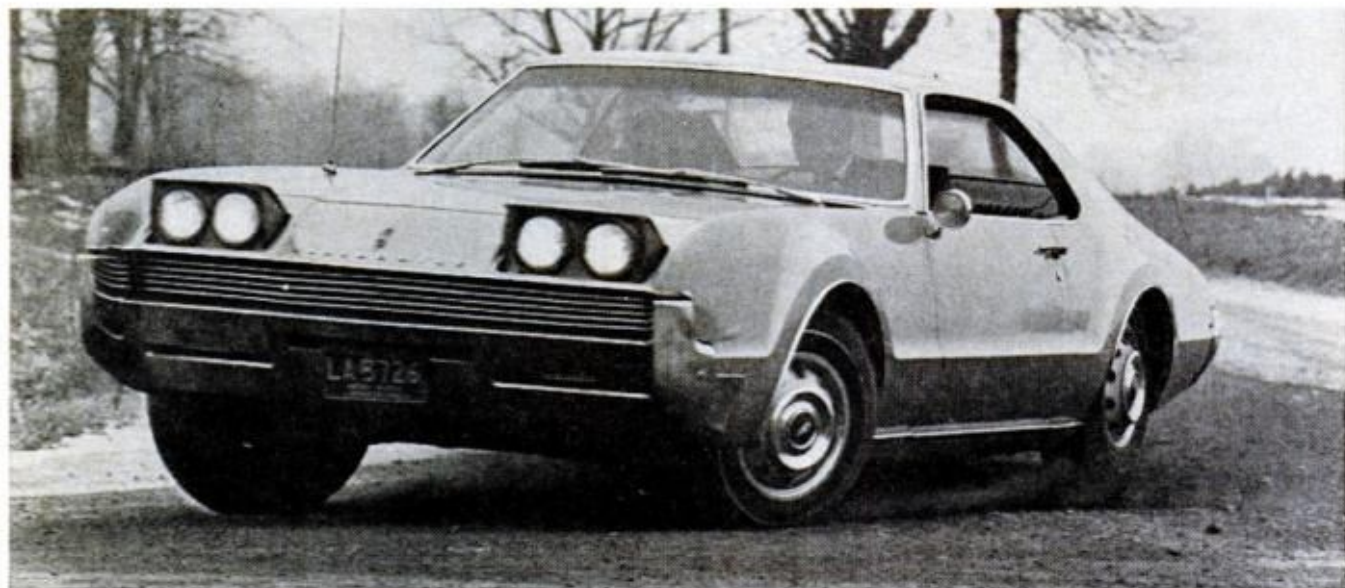
BREAKTHROUGH IN FINGERPRINT identification will come—next year, say experts—when a print can be "read" by scanning device hooked up to computer



BUSY NERVE CENTER of Chicago's computer network has drastically cut time in which police respond to an alert. Result: cut in Windy City crime rate

Toronado: Owners' report

After 1,143,373 miles of driving, Toronado owners rave about front drive, handling, style, roominess—and 95% would buy another



MASSIVE FRONT END and long hood were two reasons Toronado owners rated styling as best feature. Hard ride results from balancing heavy front end against the much lighter load on rear wheels

By Jim Dunne, *PM Detroit Automotive Editor* (Boldface comments by the author)

OLDS' FRONT-DRIVE TORONADO has won so many "Car of the Year" awards, it should retire the title. From the time this car was first talked about in Detroit speculation, it has been hailed as a giant step forward in American car design. All kinds of claims have been made for the different way Toronado handles rides and drives. It is said to be the car of the future.

But the one real test for any new car is in the owners' hands. That's why we are pleased to bring you comments on the Toronado by the owners themselves. Speaking from 1,143,373 miles of the toughest kind of driving, they found the new semi-fastback styling as the car's most-liked feature. Rattles and squeaks, especially from the instrument panel, rated most complaints.

Since no single styling feature was singled out for special comment, it was apparent the appeal was in overall exterior design. Over 54 percent of the

Toronado Pros

Owners were ecstatic about the style.

"When I drive the Toronado, people look at the car now instead of me," a Virginia lawyer's wife complained with obvious good humor.

"Exterior appearance is a great ego builder. Continuous source of attention everywhere, especially from young people."—Massachusetts social worker.

"I like the style—gives me an '007' feeling."—New Jersey housewife.

"It's a stopper. Everyone stops in amazement."—Ohio administrator.

Toronado's handling and roadability brought these comments:

"Handles like a sports car; rides like a limousine."—Connecticut retired.

"I have never felt so safe as I do driv-

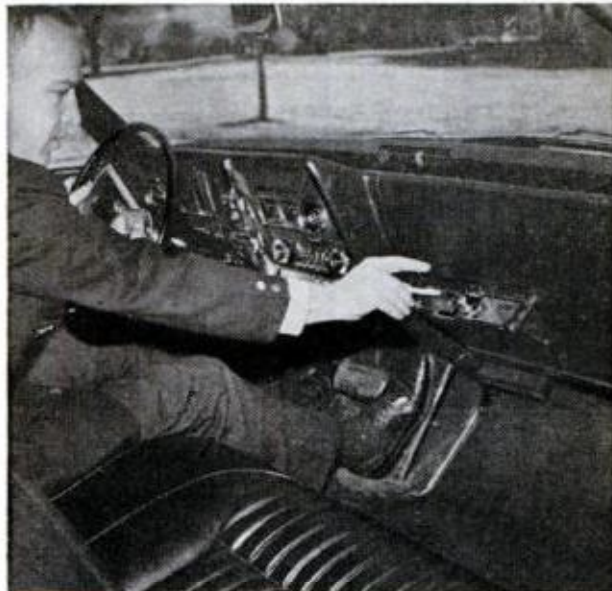
(Please turn to page 204)

on 1966's newest car

... but they squawk about squeaks and rattles, cold engine starts, huge, heavy doors, awkward shape of trunk space, quality control



SINGLE FRONT WINDOW is boost to visibility, but ventilation system no match for old vent windows



ASHTRAY LOCATION on sweptback dash is irritating to smokers; hard to reach with seat belt fastened

owners raved about it. The unique handling of front drive was praised in 45.2 percent of the reports; 22.2 percent voted for stability and roadability.

Rattles and strange noises were lumped together by 16.4 percent of owners listing bothersome features. Next in line on the gripe list were hard ride and ashtray location. This brings up the old story of soft ride and poor handling vs. firm ride and good handling. In this case, more buyers are impressed by the good handling than those bothered by the firm ride. We could have told Olds the ashtray location wouldn't do (*Coast to Coast in a Toronado*, page 76, Dec. '65 PM). It's too far to stretch to flick your cigaret.

Strangely, few Toronado owners said anything special about gas mileage. The average for trips was 14.6 mpg; for city driving, 11.3 and overall, an even 13. Most owners reported mileage was as high as expected; 38 percent, even better! Here are direct comments on what it's like to drive a Toronado:

Toronado Gripes

Here are the brickbats, starting with the top three:

"More body and dash rattles than Cadillacs I have driven." Missouri physician.

"The damn thing is too noisy."—California teamster.

► **What was it one service manager said? Turn your radio up?**

"I like a little softer ride, especially

for town driving."—Wisconsin accountant.

"Somewhat stiff over bumps. Rear end seems too light."—New York physician.

"Hard riding of rear wheels seems to say they need more weight."—Indiana mechanic.

"Ashtray hard to reach with seat belt in use."—South Carolina photographer.

(Please turn to page 205)

Holiday house built for fun

It's an easy-to-assemble kit for seashore or ski slopes; will cost you \$3,345; a professional can erect it in 60 man-hours; a handy craftsman with a few friends won't take much longer

BY WALTER I. FISCHMAN

Vacation houses are booming! Hideaways nestling by the shore... budget chalets tucked into the mountains... charming year-round cottages hidden in the woods. The stuff that dreams are made of.

Dreams? Today, the dream of a vacation home is coming true for millions of families. In every vacation area throughout the country wild and wonderful homes are popping up in a kaleidoscope of styles and sizes that share some enticing basic features: they're relatively inexpensive, easy to maintain and can be used the whole year 'round. But most of all they're fun to live in. And they're answering a burgeoning yen of Americans for a place to go and "get away" and *enjoy* themselves.

Biggest news in the field is the phenomenal popularity of the A-frame house, a dramatic and efficient design packing maximum comfort, usable

(Text continued on page 97)

BAHAMA BOUND. Shown here is part of the package of precut sections of the Aintree A-frame on a Miami dock prior to shipping



PUTTING IN FOUNDATION. Careful positioning, perfect leveling are essential. Precut houses don't allow for any variance



CREDITS

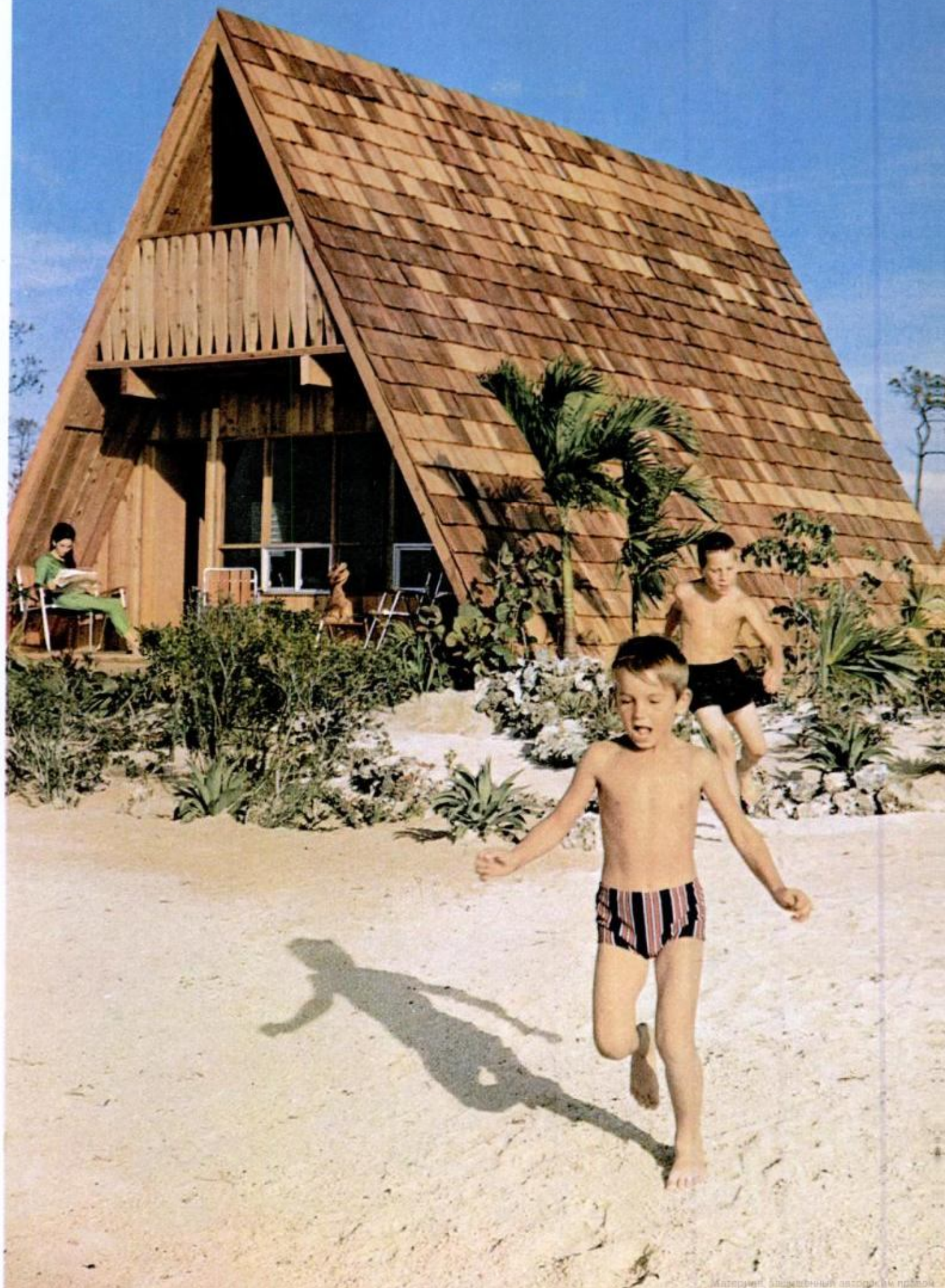
House: Lindal Cedar Homes Ltd., P. O. Box 37, New Westminster, B.C., Canada

Builder: Eugene Estes, Freeport, Grand Bahama Island, Bahamas

Landscaping and planting: Lucaya Nurseries, Freeport, Grand Bahama Island, Bahamas

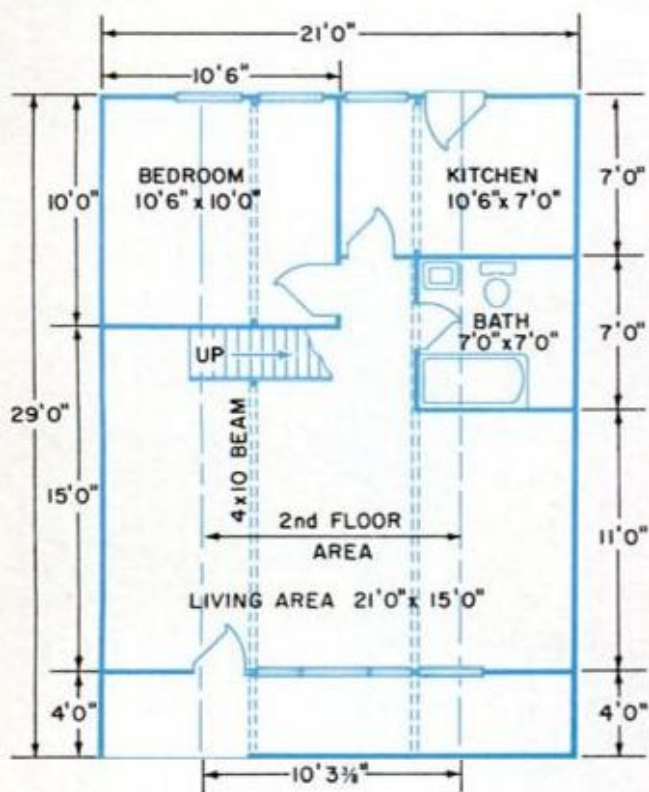
Furniture and accessories: The Mercantile Group, Freeport, Grand Bahama Island, Bahamas

Grading and bulldozing: Freecon, Grand Bahama Island, Bahamas





THE LIGHT AT THE BOTTOM OF THE STAIRS — it's there and everywhere else in this airy A-frame fronting Hawksbill Creek, Grand Bahama's gateway to the sea



WITH FRAMES SPACED, in place, concrete for 24 pilings is poured. Pilings support foundation beams, which go in place when concrete dries



DINING AREA – snuggled in one of the roomy coves forming the flanks of the overall 15x21-ft. living area – is lent articulation by overhead cedar beam



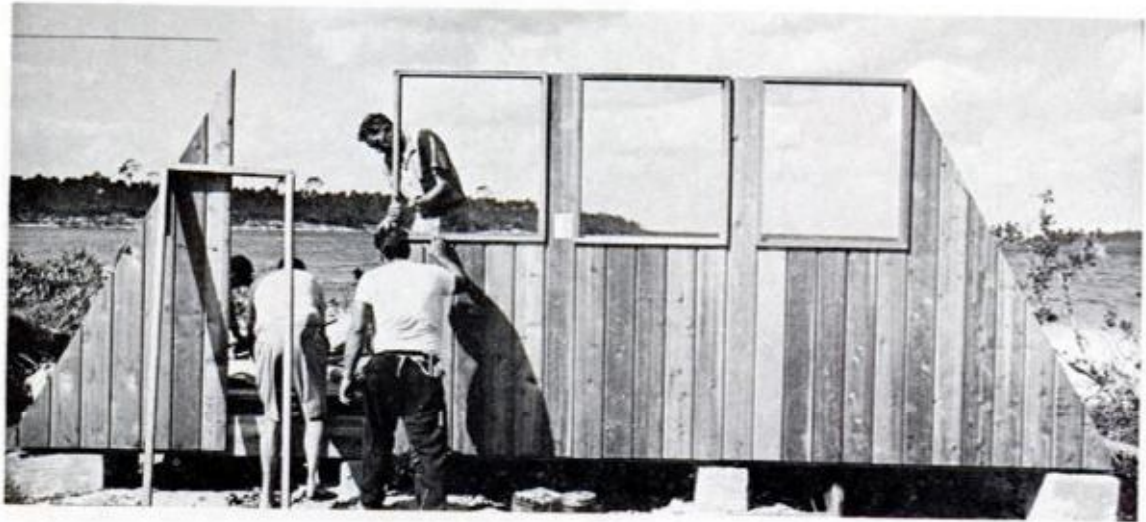
FOUNDATION BEAMS of 4x8-in. cedar or fir laminate are installed lengthwise on each of four rows of pilings. Owner Taughten (with pretty assistant) lends a hand nailing down flooring, while builder (left) prepares first module of front wall for assembly



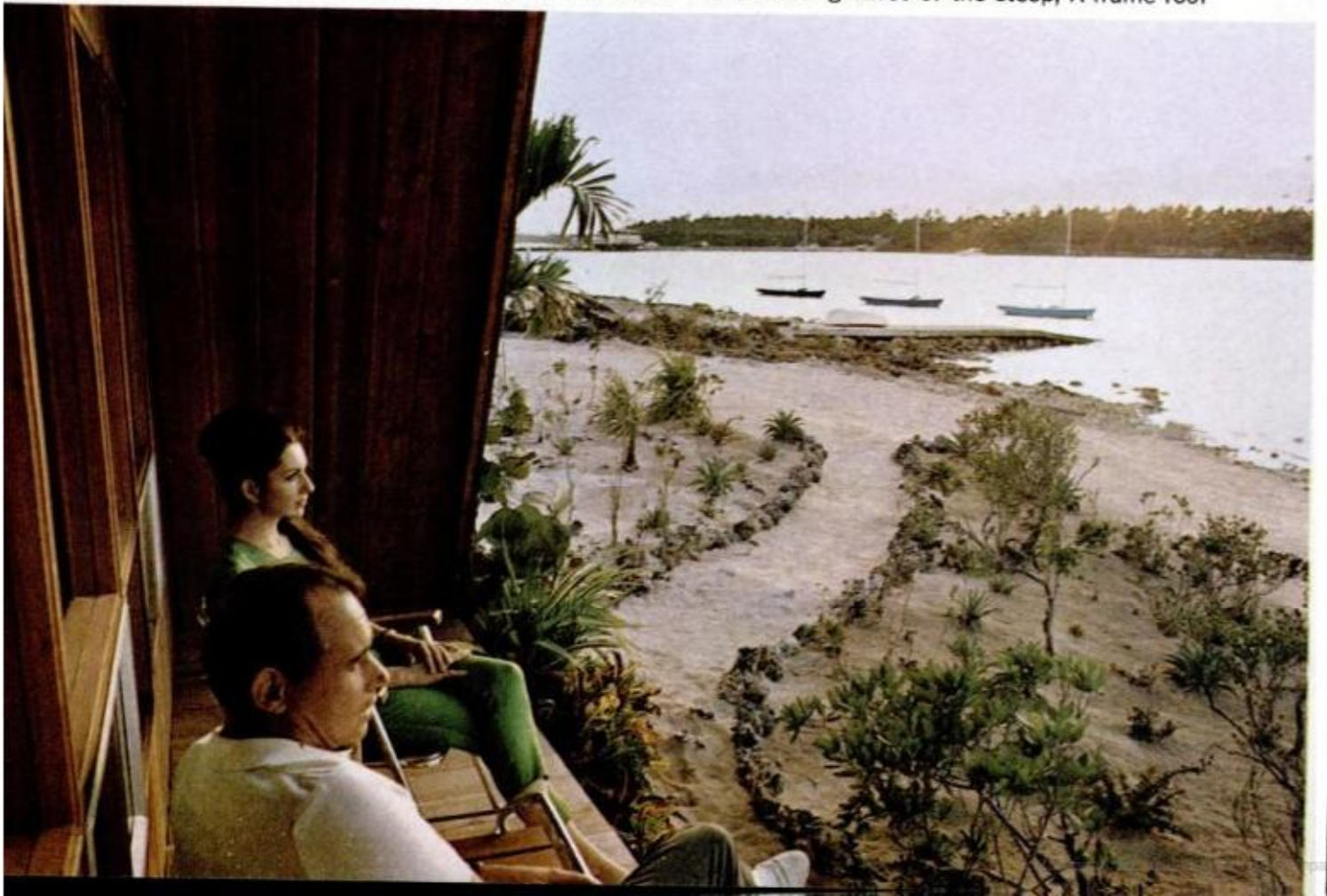
HERE'S A VIEW looking into the house. Hall leads past bathroom to bedroom and

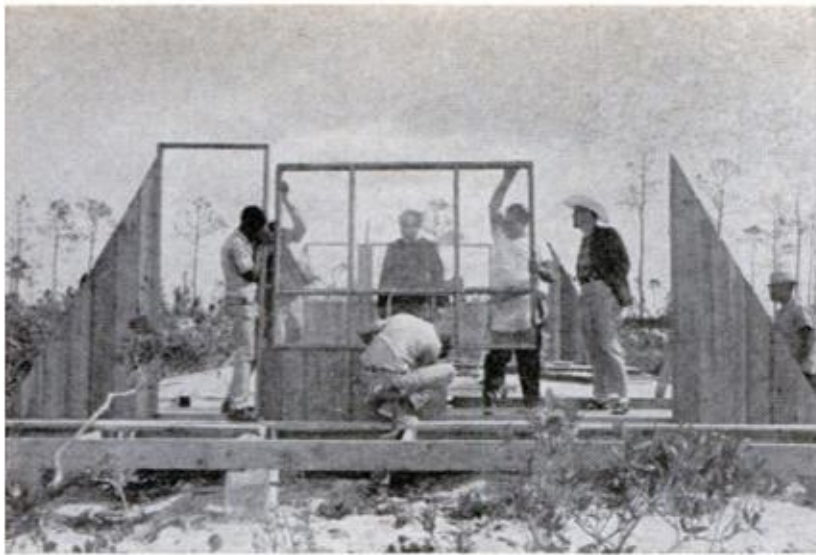


kitchen at the rear. Stairway leads to one or two-bedroom area on second floor



THE 4x21-FT. CEDAR DECK across the front of the house is really a porch, because it lies wholly under the sheltering eaves of the steep, A-frame roof





CONSTRUCTION PICKS UP SPEED as front and rear walls go into place. Prefitted front window frames drop in like eels down a slide; the door frame snugs them minutes later. The windowy back wall goes up next as Taughten and cowboy-hatted Walt Fischman—PM's editorial chief—pick up some pointers on house raising. Next on the agenda is the erection of the partitioning modules which enclose the bathroom and form part of the kitchen, hallway and living-area walls. With all first-floor walls in place (except, of course, the side "walls" formed by the A-frame's roof), the crew will soon be ready to go aloft to install the second-floor bedroom area of the house



(Continued from page 90)

living space and unusual eye-appeal into a minimum number of square feet. And the clincher is you can almost put them up in a few lunch hours.

PM chose the beautifully rustic "A" shown here because of a design innovation that enlarges the living space and strengthens the structure. A product of Lindal Cedar Homes Ltd., New Westminster, B. C., Canada, the Aintree A-frame's roof, though steep, is not nearly as steep as conventional A-frames. This means that the second floor becomes a truly usable area that can be divided into a couple of bedrooms, or serve as a bunk room for a raft of kids or guests.

Freeport, on the island of Grand Bahama, was the site chosen for our A-frame. A relatively deserted isle until a few years ago, this long, slender strip of land has today become one of the most popular vacation spots in the world. A scant 50-mile plane hop from Miami, it is a gem set in crystal-clear waters and ringed with endless miles of white sand beaches shining in the sun. Most enticing of all for homeowners who build or buy here, there are no income, property or real estate taxes. Could there be a happier place for a vacation home? We thought not.

PM's vacation house comes as a pre-cut kit, usually delivered by truck (ours came by schooner). Floorboards, joists, rafters and wall sections are all pre-trimmed to proper size and identified to facilitate construction. Any moderately experienced home craftsman who will follow the spelled-out step-by-step instructions that come with the house can put it up with a helper in less than two weeks. The manufacturer claims the job can be done in 60 man-hours (well, maybe by a gung-ho guy who cut his teeth on

(Please turn to page 206)

SURFBOARD For Sand and Sea

Just tote this fiberglass board to the beach and you're set to zip down sand dunes and waves

IT'S JUST AS EASY to ride down the slope of a sand dune as it is to ride the crest of a wave with a new lightweight fiberglass "surfer."

But if you're more disposed toward winter sports than to beach activities, you'll find the novel skimmer just as useful on a snow-covered slope as it is on water or sand.

The multi-use surfer is really a thesis that was done by a UCLA student in his industrial design studies. Steven Nelson elected to create a family fun item, and the versatile surfer is the result.

Skeg for sea

The board is five feet, eight inches long and weighs between 12 and 13 pounds. Runners on the bottom make it usable on sand and snow while an aluminum skeg (see photo at bottom of this page) is attached to the bottom when the board is to be used in water.

It really doesn't take much skill to use the fiberglass board, so it's an easy bit of equipment to take along for family fun at the beach. Two adults or three youngsters can pile on for a quick trip down a sand dune or a snowy slope. And riders can elect to stand on it, sit down for the ride or just belly-flop onto it in the happy-go-lucky manner of the Flexible-Flyer crowd.

Happy addition

The photographs on these two pages were taken during "clinical" testing of the new board, and if there's any conclusion to be drawn, it's simply that the fiberglass surfer looks like a happy addition to any sports-minded family's kit of outdoor equipment.—*M. J. Pedersen*



AN ALUMINUM SKEG (or fin) is attached to the bottom of the surfer for use in water. Runners enable it to be used both on snow and on sand





LIGHTWEIGHT AND INEXPENSIVE, the multi-functional surfer is the happy result of a UCLA student's thesis. His objective: to provide a "family fun item"



SKIMMING DOWN A SAND DUNE in a standing position is a test of a rider's balancing ability, though the sport requires little skill for enjoyment

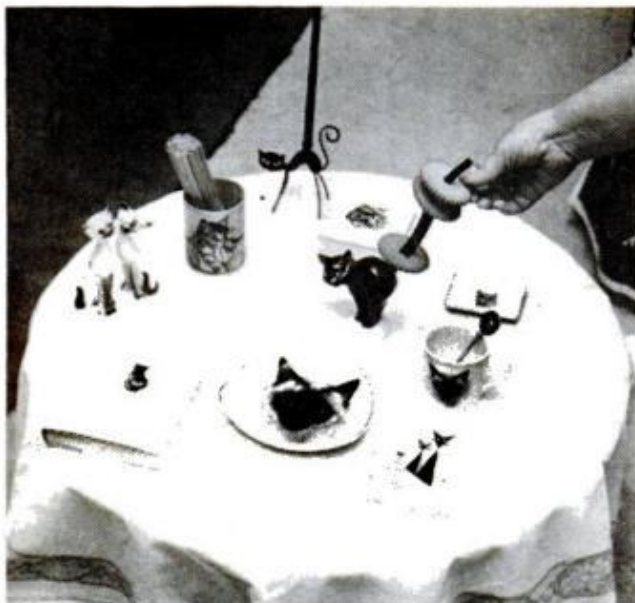
RIDERS MAY DOUBLE UP for a quick schuss on the fiberglass surfer. The belly flop position is also a favorite way to ride it both on land and in the sea



RIDING THE WAVES to shore, swimmers lie in belly flop position on the buoyant boards. It's a good way to cool off before another go at the sand dunes



What's New, Pussycat?



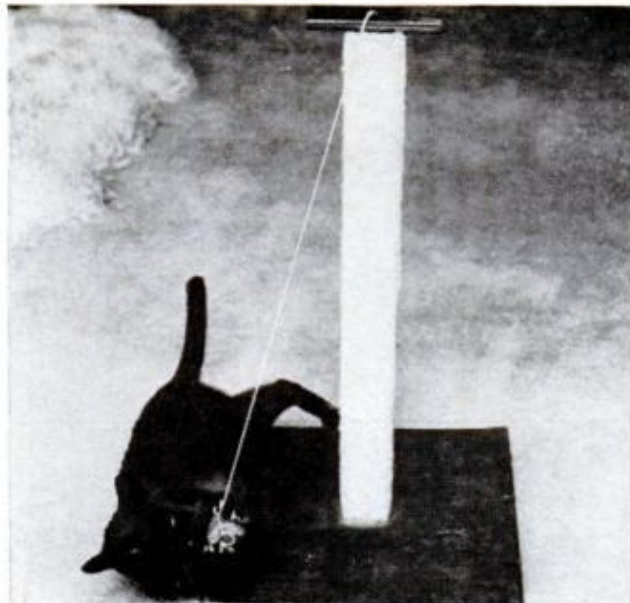
PUSSYCAT BOUTIQUE in Bedford, England, caters exclusively to cat lovers who delight in lavishing on their pets the best earthly comforts money can buy

FOR THE CAT who has everything, there's still hope of turning up a novel gift for pet or mistress. And if the cat couldn't care less, you can be sure any ailurophile worthy of the name will.

Dorothy Silkstone, a breeder of champion cats, realized that cat lovers have long been a neglected lot. Though many pet shops stock a variety of items of dubious value to cats, hardly any cater to the fancies of their owners.



KITTY'S WET NURSE may supplement the mother cat's feedings, which aren't always sufficient if stretched over a large litter of growing and hungry kittens



A HOUSE IS NOT A HOME without a scratching post, as any cat will tell you. Ideally, such a gadget should have carpet padding and a toy mouse attached

And so, she set about remedying this deplorable situation. Electric blankets, toy tunnels, greeting cards, books, headscarves and jackets, hot water and feeding bottles—all are neatly displayed in her Pussy Cat Boutique in Bedford, England, where cat lovers may browse.

Freely admitting she finds many of the items silly, she says, however, "It is far better to spoil a cat in this way than to overfeed him."—*M. J. Pedersen*



SNUG AS A BUG, this Burmese cat is obviously all set for the night in his very own electric blanket. Surely not even a mouse could arouse this cool cat



Breath of fresh air. By eliminating compressed-air tanks strapped to the backs of divers, a new power-driven compressor, which floats on the surface and delivers air at the rate of 2.35 cu. ft. per minute or more to 25-foot depth, allows more freedom of action in underwater exploration. Made by Evinrude Motors, Milwaukee, Wis.



Well, isn't this a blast! Made for John Philip Sousa himself in 1892, this bass tuba is still reputed to be the biggest horn in the world. Six feet high, it weighs 112 pounds and is so large its new owner (shown blowing it) bought a special van to transport it to playing engagements.



Sky pilot. One jungle missionary solved the problem of getting to and from far-flung missions by designing his own jungle airplane. His twin-engine **Evangel 4500** has STOL characteristics, and its high wings can avoid stumps while rugged landing gear absorbs rough treatment on jungle runways. The doors are wide enough for stretcher cases. The plane was paid for by donations.



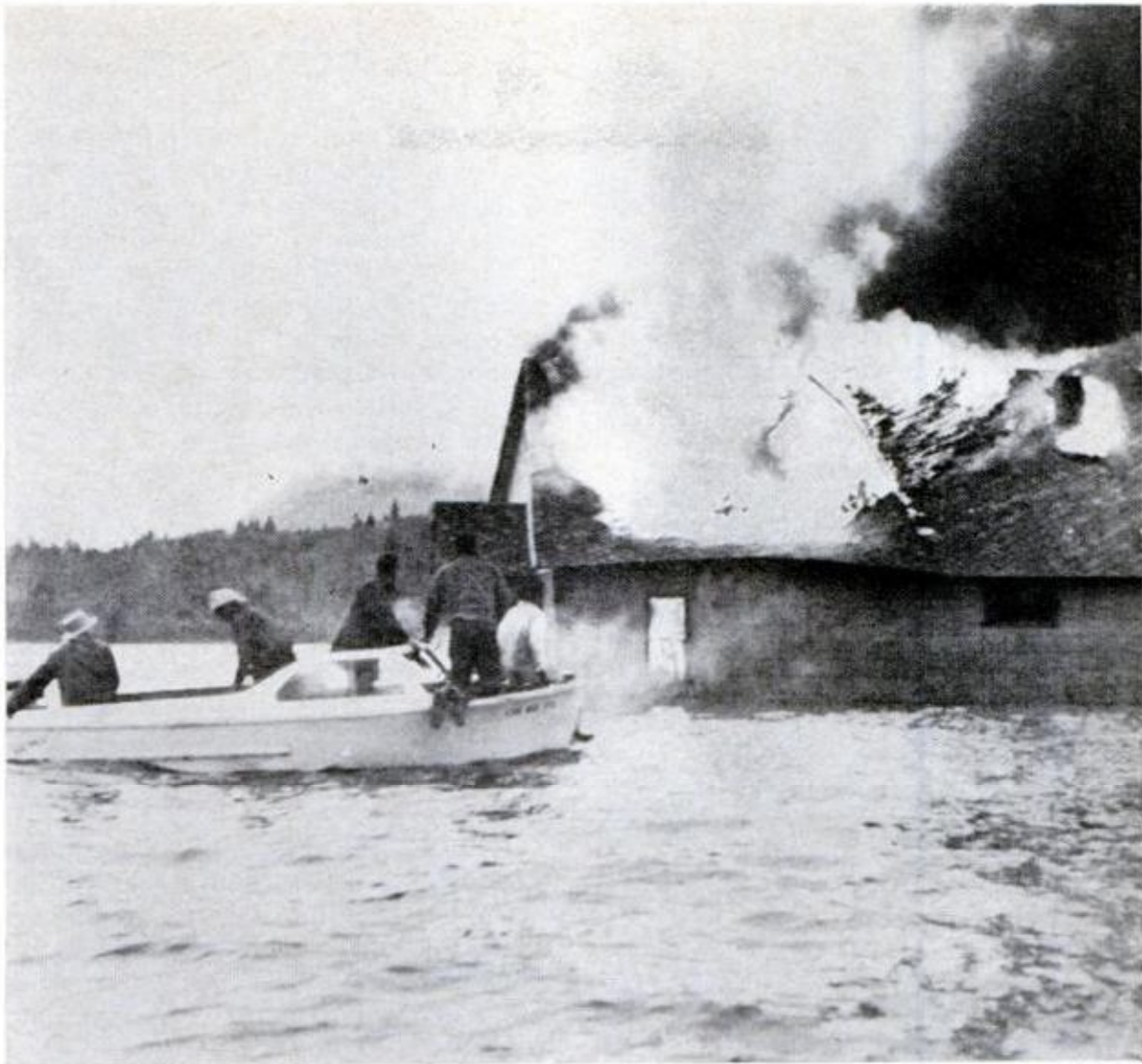
Floods! Power Failures! Hurricanes! Earthquakes! You're not immune, but you can protect your home and family. Follow this man as he lives through a flood and pick up some tips on how to prepare for emergencies in your area.

BY DICK BARNEY

IN BATTLING FLOODS, you become an experienced old hand after just one. The apprenticeship is short and wet, with little warning.

It happened to me in Oregon City, Ore. in mid-December, 1964. Nature telegraphed her punch nine days in advance, but no one read the signs correctly. We were all too busy getting ready for Christmas.

One morning I opened our camera store in Oregon City's new \$2 billion shopping center to discover the water pipes were frozen. It was bitterly cold, the coldest Oregon December since 1879.



OREGON FLOODS brought double trouble to one man whose home caught fire. New York blackout (left) caught millions of city dwellers without light or power, almost paralyzing the metropolis

The intense freeze continued for several days, accompanied by very heavy snow. The low temperatures produced a deep, hard-frozen ground crust throughout the entire Willamette River watershed. The heavy snow accumulated.

This old-fashioned cold-and-snowy weather continued until a heavy tropical rain-storm swept up out of the Pacific. The thermometer soared into the sixties, and suddenly it was spring. Heavy, pelting rain pounded the area in one long, continuous storm. Earmuffs and mittens went into storage and umbrellas and boots came back.

We weren't immediately aware of it, but we now had a disaster situation on our hands.

The frozen ground would not absorb either the melting snow or the fresh heavy rains. In fact, the hard surface served as an ideal runoff chute and all through the Willamette watershed, creeks, gullies and streams were suddenly filled to overflowing, and became swollen, rushing torrents. They poured into the Willamette.

Dave Bauman, official river forecaster at Portland, later said, "This sequence of meteorological events could not happen more than once in 200 years." Reports of



AUTHOR RETURNS to camera store as flood waters recede to begin long, laborious chores of cleanup



GENERATOR POWER turned fan to help dehumidify store. Dampness lingered long after flood had gone



STRANDED WOMAN typifies worst disaster situation, caught alone and unprepared. (She was rescued)



NEW YORK BLACKOUT forced doctors to operate by emergency light powered by one portable generator

the rapidly rising Willamette were being broadcast regularly now. We were all becoming conscious of a flood possibility, but not enough to make preparations.

Two days later, a friend called across, "They're flooding Penney's basement!"

By this time, the river was getting close to our level and I couldn't understand why the town's largest fire engine was standing in front of Penney's pumping muddy floodwater *into* instead of *out* of the basement.

I found out later. The river water was nearing four feet above the level of the basement floor. The basement hadn't flooded but there was considerable seepage, indicating water pressure outside.

The basement had been built in porous fill material. Water rising through this fill surrounded the 100 by 200-foot concrete shell, which then was pretty much like a big boat. Engineers warned that either the floor would buckle under these conditions or, if it held, the whole basement would literally float, raising the building.

We had no basement in the camera store, but it was clear now that the flood wasn't stopping there. We went home with uneasy feelings.

At 4:00 a.m. next day, we checked the store again. Everything was still safe. I phoned for the latest forecast. The water then stood at two feet below the floor level of the store, according to the officials, and was expected to rise 12 inches in the next 12 hours.

We went back home and to bed. At 8:00 o'clock we returned to the store, prepared to decide whether or not we should move. The decision was easy to make. We found the parking lot already inundated. Instead of rising only four inches in four hours, the water had come up nearly two feet.

Steering by memory for the shallowest water, we drove across the parking lot. We stuffed cameras, projectors, gadget bags and film into a car and a pickup, and got them out through the lake in the parking lot. When we returned for a second load, the water had risen so that we could get to the store only by wading or by boat. That meant we couldn't move any more of our stock. We piled the remaining goods on high shelves and locked the door, not knowing where the water would stop.

The river rose to new heights, flooding areas that had never before been under water. And for anyone caught in the path

(Please turn to page 224)

Jet-powered sailplane

THE PROBLEM WITH GLIDERS, as all glider pilots know, is getting them off the ground. Once in the air you can start looking for currents. Most gliders are towed aloft by a powered airplane or by a towing rig. Some, however, have auxiliary engines, usually just little putt-putt affairs, that drive propellers.

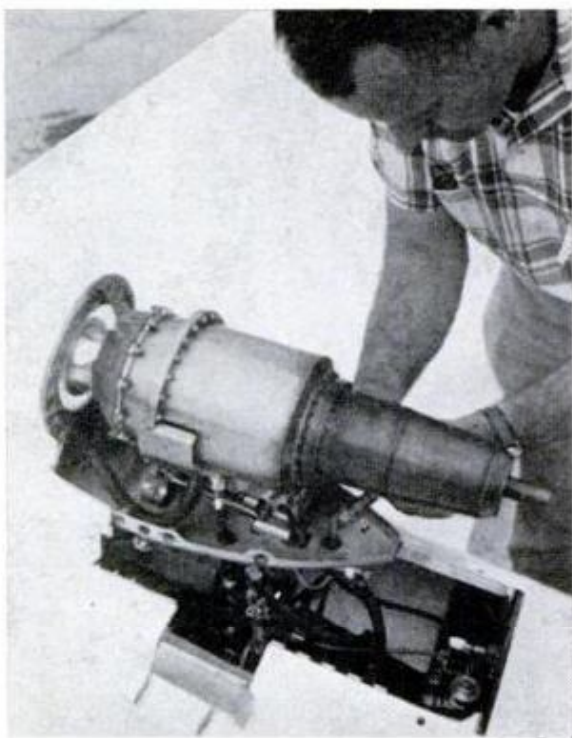
Now gliders have joined the jet age. A small jet engine, designed and built by West Coast manufacturer Max Dreher of Santa Monica, Calif., and mounted piggy-back on a standard sailplane (a Prue 215A), has boosted it to 1000 feet.

The tiny jet weighs 18 pounds but develops more than 50 pounds of thrust. It is controlled from the cockpit by a throttle mounted between the pilot's legs.

Later models will include an afterburner to boost thrust to 75 pounds and will be installed in the bodies on retractable mounts to reduce drag. Fuel supplies will also be increased to give the engine more burning time to allow it to climb to higher altitudes.



JET ENGINE is mounted piggyback on sailplane for initial test flights, boosting it to 1000 feet



BABY MAMBA, as engine is called, produces 50 pounds of thrust, yet weighs only 18 pounds. Its rpm can be controlled manually or automatically



THROTTLE CONTROL and engine gauge is mounted in cockpit between pilot's knees in test sailplane. Other instruments are standard gauges

TIPS ON BUYING A

Fishing motor

A man who 'would rather fish than do almost anything else' offers some down-to-earth advice on how to choose a motor to match your fishing.

By Pat Richards



TO BEGIN AT THE BEGINNING, just what is a fishing motor? Methods of fishing with an outboard motor vary, as do different fishermen's needs, boats, number of fishing friends, type of water and pocketbook. One man's kicker can be another man's pain on the transom.

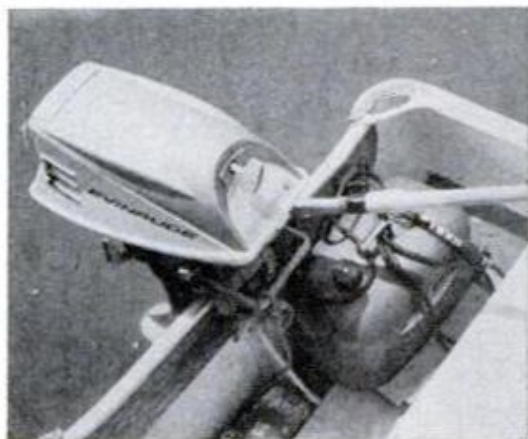
To simplify things, let's regard a "fishing outboard" as a motor large enough to move a fishing boat faster than oars, and small enough to be taken from the boat and carried in the trunk of an average car. That puts us in the bottom bracket of outboarding, with motors ranging from 1.5 to 30-plus hp.

Above 25 horses, the motor begins to become too much for the average operator to handle without remote controls, so we'll cut off there, despite the fact that a great many small-boat owners fish from craft powered with hundreds of horses. But in those cases, the motor is only used to get them to the spot; it is seldom employed in the actual fishing.

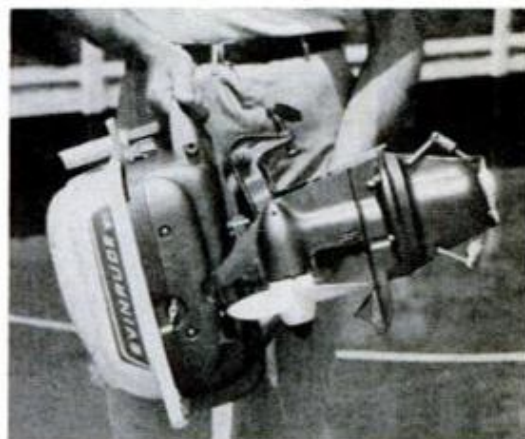
There are a dizzying number of horsepower ratings between 1½ and 25, but for convenience we oversimplify and put them into seven categories: 1½, 3-4, 4-6, 7½, 10, 15-18-20 and 28-33-35 hp.

Again, within these categories, the available motors break down into air-cooled and water-cooled models; types with and without gear shifts; units driven by water jets or airplane propellers; two-cycle and four-cycle internal combustion engines and electric motors. The horsepower on our chart ranges from about one third of a horse for 50 bucks to 18 horses, air-propeller-driven, for \$600. How can you pick the right one for *your* fishing?

What are your needs? The first thing to consider is your need for a motor. Some fishermen don't need them at all. Some waters don't



TILLER EXTENSION cobbled up from an old broomstick lets you run the motor from the center seat so the boat trims out better



FOLDING EVINRUDE 3 shrinks from 43 inches to 24 inches when the lower unit is tucked up next to the powerhead. And it's light, too



3 HP IS ENOUGH to push a canoe along at 10-12 mph, or run a 10-foot pram at 8-10 mph or so. It's small enough to pack away in the trunk easily, light enough to portage



ELECTRIC TROLLING motor is hard to beat for fishing, but it's much too little for long runs over open water. Paired with a bigger motor, it's perfect

even allow them; many restrict their size. If all you want is a "kicker" to substitute for oars on a light boat over short distances, you don't need many horses. On the other hand, if you fish big water and want to cover great distances with two or three friends in the boat, you'll need 15 to 35 horses.

In between are sizes for every compromise. Many fishermen find that motors under 5 hp don't get them across the lake fast enough; others find that motors much over 15 don't throttle back far enough for effective trolling. As a result, most fishermen find themselves using a compromise motor rated between 5 and 15 hp.

The boat, of course, has a lot to say about the motor you'll use. An eight-foot pram with one man aboard will almost fly with a 6. Three is plenty for it. An average 12 to 14-foot aluminum fishing boat will pass it with two men and a 10. A 6 or 7½ will usually do them nicely. A 16 to 18-footer will take three or four men and a load of equipment, and pass both with a 28 or 33. Ten or 15 horses is usually plenty.

If you own your own boat and plan to do most of your fishing from it, your best bet is to try the motor on your boat, with an average load, for both high-speed running and bottom-speed trolling. Your dealer will welcome a test-run challenge. If he doesn't, forget him and find another dealer who will.

If you *don't* own your own boat—a great many fishermen put their motors on rented boats—then portability becomes a major concern. A 3-hp motor won't drive the average rental boat very fast,



ELECTRIC STARTING is a luxury new to the small-motor field. McCulloch's 7½ and 9 are the only two motors offering it. Cost is roughly fifty bucks extra

but it's mighty easy on your back at 35 pounds and doesn't take much space in your car trunk.

A 5-6, at 40-45 pounds, is a pretty good load, especially with a six-gallon, 50-pound tank of fuel in the other hand. A 10, at 60 pounds, gets to be more than many men want to handle, especially in the tricky business of placing it on the transom of a loosely moored small boat. Few men can swing motors over 25 hp around alone. Most fishermen find that motors in the 4-7½-hp, 30 to 45-pound class are easiest to manage.

How many in the boat? How many people will be fishing with you is another consideration. If you go out alone, without heavy gear, a good 6 will almost plane an aluminum 12-foot boat at 12-15 mph. A 10 will run it to a dangerous 20 miles an hour. A 3, on the other hand, will take the same boat across the lake at a sedate 6 or 8 mph. Too slow? Faster than rowing, and easier!

The average two or three-man load will just about plane with a 10, at 12-15 mph. For three or four men and equipment, you'll need 15-18-20 horses to get the boat on its feet for a long run.

With smaller boats, it may not take much motor to move fairly fast. A 3 will slide a canoe along at 10-12 mph, and a 10-foot pram at 8-10, which is a pretty good speed.

How's the water? The kind of water you fish will make a difference in both boat and motor. On small ponds and lakes, or quiet streams, almost any combination will work nicely if you aren't in a hurry. But on big, tough lakes, likely to kick up a chop with a change of the wind,

you'll want enough motor to get you home—or at least ashore—through rough water.

With two or three men in an average rental fishing boat, that means a 6 may not be enough except for heading straight up-wind; a 7½ may not do it, either. In most cases, a 10 will handle that average load in almost anything but a major blow. A 15, well handled, will run a good-sized boat with three or four men through all but the toughest storm.

If you plan to fish a river, you'll want a motor that'll push your boat (or average rental boat) at a good speed against the current, unless you're planning to put in and fish downstream toward a take-out point.

So, again, if your 6 will push a 14-foot rental boat 10 mph with two aboard, and the river averages 12 mph, you'll never make it back upstream unless you pilot carefully through quieter water along the banks. Just remember that you may not always be able to find the quiet water you need in some rivers. And if you pull up under a dam to fish, you may want a lot of ready power to run out of trouble.

Style of fishing? The kind of fishing you do will affect your choice, too. A fly fisherman, still fisherman or shoreline caster may not use his motor for fishing at all—only to get his boat to the fishing spot. He can pick his motor easily by how fast he wants to get there.

The other extreme is the trolling fisherman, who may expect his motor to run



TODAY'S LARGER ENGINES run smoothly enough to satisfy many fishermen's trolling requirements, but others feel they still don't throttle back far enough

him at high speed for several miles, then idle all day long at one to four mph while he trolls behind the boat. He's a tough customer for dealers, because a motor under 10 hp may not get him there fast enough; a motor over 5 or 6 may not throttle back slow enough for his fishing. Happily, the last few years have seen the outboard reach a new high in efficiency and versatility, and most engines up to about 20 hp will troll slow enough for most fishermen—if they're kept in good shape. But most trolling engines are a compromise, anyway.

For most fishermen who want to move both fast and slow, the ideal answer is *two* engines—one 25-35 to get out there at top speed, then another, small as pos-

(Please turn to page 232)

Type of Motor	Weight	Cost	Uses
Electric, under ½, 2-speed	18-20	50-80	Canoes, prams, auxiliary for maneuvering
Electric, ½-¾, multi-speed	25-30	100-120	Same as above, small-boat trolling
1½ air cooled, no shift	18-28	100-130	Canoes, prams, small boats, auxiliary for trolling or maneuvering
3-4 air cooled, no shift	25-30	90-125	Large canoes, lighter boats, trolling
3-4 air cooled, jet lower unit	40	150	Same, less weed trouble
3-4 water cooled, no shift	35	175	Same, less noise
5-6 air cooled, no shift	45	100-125	Most fishing boats, trolling auxiliary on large runabouts and cruisers
5-6 air cooled, jet lower unit	50	270	Same, less weed trouble
5-6 water cooled, no shift	45	225	Same
5-6 water cooled, shift, tiller	50	260-270	Same, deluxe models, separate tanks begin
5-6 air cooled, air propeller	50-55	200-240	Much the same but faster, no lower unit; not very practical for trolling or slow use
7½ water cooled, shift, tiller	38	300	Much the same as deluxe 5-6; bit more powerful. Compact, weedless
10 air cooled, jet lower unit	55	370	Much like other 10s; more weedless
10 water cooled, shift, tiller	60	325-350	Most fishing boats, most uses
10 air cooled, air propeller	125	500	Biggest portable air-prop model
15-20 water cooled, shift, tiller, manual starting	70-80	400-425	Bigger fishing boats, running motor where auxiliary is used for slow speeds, trolling, maneuvers
28-33 water cooled, shift, tiller, manual starting	100-125	420-480	Biggest open fishing boat primary motor where auxiliary is to be used

It takes both hands, both feet
and even your teeth to be a...

Swinging fisherman

By Ken Warner

SLOWLY, QUIETLY STALKING shallows of Sarasota (Fla.) Bay, Bud Campbell watches for signs of mullet. His cast net is ready, one end in his teeth, the weighted edges bunched in both hands. When he sees the swirls and bubbles that announce a school of fish, he stops and plants his feet. His right hand crosses to his left, and then he makes an effortless throw. The eight-foot net sails out in a low, flat circle and lands on target, as weights take it down to trap the fish.

Looks easy? Of course it is; throwing that 15 pounds of wet string is every



GETTING THE SWING of fishing with a net is tricky, but this expert can hurl his 12-foot net 35 yards



FIRST STEP is to shake out the folds and remove all twists. This 12-foot circular net is pulled from the center like lifting a parachute



SECOND STEP is to drape the upper two thirds of the net in two folds, holding it entirely in the left hand so that all weights hang free



THIRD STEP has one edge of the rim held in the teeth and the right hand lifting the outer edge, spreading out the folds and taking a good grip



READY TO THROW, the right hand is brought back, the net is thrown, released by both hands, and at the slightest tug, it is released from teeth

bit as simple as playing the piano while wearing mittens that are tied together.

"It's purely a matter of practice," says Bud Campbell, an addict of the sport that is growing in popularity in Florida's coastal waters. "The exciting thing about it is that you combine fishing and hunting when you use a cast net. You have to stalk the fish and then catch them with your own skill."

Mullet are fast swimmers and they spook easily, so getting within throwing range—about 35 feet—requires stealth and a knowledge of the fish habitat.

A cast net for mullet is a circle with a six to ten-foot radius. A good net is made by hand and has up to 20,000 knots. The perimeter is weighted with lead, usually eight to ten pounds.

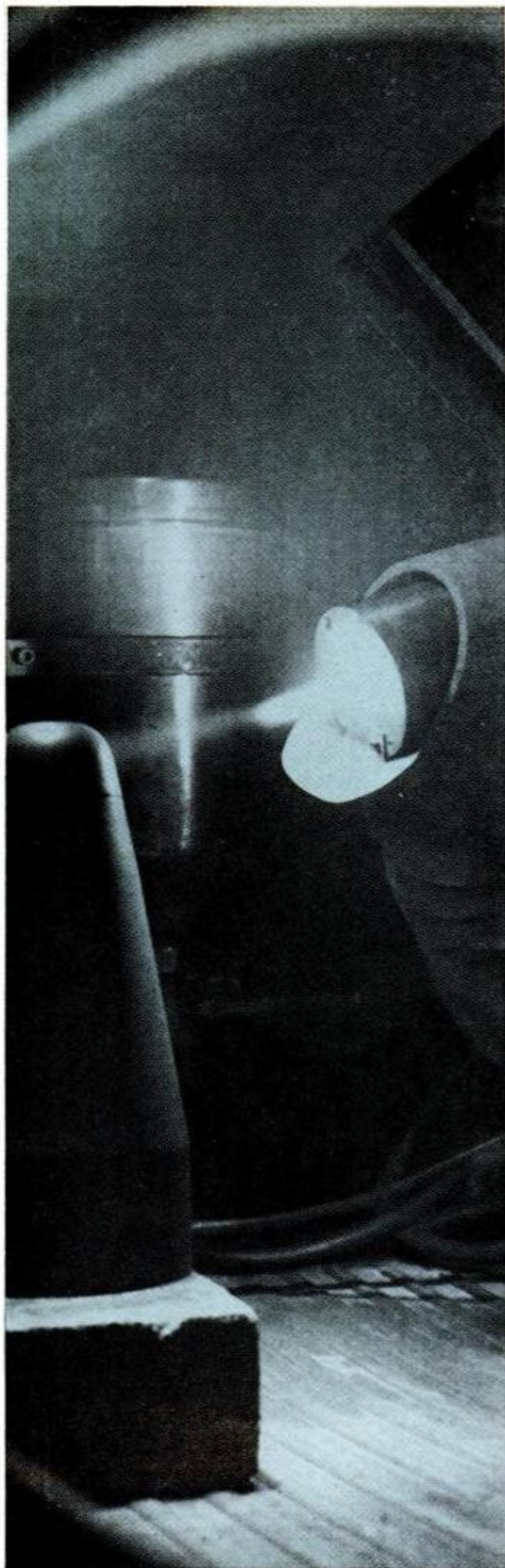
Once you get the hang of it, this sport can net you a lot of fish. Bud Campbell has snared as many as 18 in one throw, and his all-time record, with a friend, is 130 fish in one morning.

New skins for anything and everything

Searing plasma guns, crackling electrostatic guns, solids that act like liquids—they're putting tough skins on everything from steel guard rails to auto dashboards and toy pistols.

By ROBERT GANNON

SUN-HOT PLASMA JET is used by researcher to spray powder onto piece of tungsten. Any material that can be made into a powder can be applied with jet





APRIL 1966

SUPERFICIALLY, THE PROCESS in the Wisconsin washing machine factory doesn't appear unusual in any way. Bare-metal tub rings swing from a smoothly moving conveyer. At one point they plop into a vat of bubbling vinyl and emerge coated with shiny plastic.

But on close inspection you spot it: Though the vinyl in the tub looks molten, it isn't even warm. It's a "solid fluid," and the coat is put on by the *fluidized bed process*—just one of a dozen fascinating methods newly developed to enclose products in protective skins.

Used to be that things were painted or galvanized or maybe even electroplated. Today a toy revolver may be *vacuum-metalized* with shiny aluminum; a piece of cloth may get a grease-protective finish by *glow discharge*; a valve might be sheathed by *sputtering technique* or *electrostatic spraying*—terms brand new only a few years ago.

Fluidized bed coating, the method used to cover washing machine parts with plastic, was developed in 1953 in Germany. But only in the '60s has it hit big. Now, suddenly, it is being used to sheath everything in plastic from refrigerator shelves to steel wire, from tool handles to furniture. If you have an electric dishwasher, chances are three to one the vinyl was applied to the rack in a fluidized bed.

Air is secret ingredient

The "fluid" itself is strange-looking stuff. In Reading, Pa., a few weeks ago, Allyn Bengtson, sales manager of coating resins for Polymer Corp., showed me a tub of the material in one of the company's labs. The fluid bubbled like sluggish oatmeal mush or maybe lava. It even seemed to smoke.

"Stick your hand in," suggested Bengtson. I hesitated, then touched the surface. Room temperature. I swirled my hand around in the stuff, then let it dribble through my fingers. It felt like a very dusty liquid. Actually, the fine powder of vinyl was kept "molten" by a gentle mist of air pumped through tiny holes in a plate in the container's bottom. Stop the air and the dust settles to an inert mass; turn on the air and it lifts, fluidized.

To demonstrate the coating technique, Bengtson heated a soap dish to 585° F. Holding it with wire, he lowered the dish into the powder for four seconds. That

113

temperature is higher than the melting point of vinyl, so when particles touched the metal they fused and stuck to the surface. Lifted from the bed, the tacky vinyl encasement cooled to a glossy jacket.

Lots of advantage to such a treatment. The surface is even—no drips. The process is quick, clean, relatively cheap and simple. Further, just about anything can be coated that can be heated a few hundred degrees. Some 450 U.S. and Canadian companies are now using fluidized beds.

In a tiny demonstration lab in Palisades Park, N.J., Edward F. Miller, head of U.S. operations for the French electronics company, Sames, Inc., shows off another method of wrapping an item in a protective coat of plastic. He revs up an air compressor, points a foot-long, science-fictiony gun at a pipe flange dangling in a box, pulls the trigger, and cuts loose with a puff of pink, powdered vinyl. The flange seems to draw the dust toward it. Quickly, the flange is covered with dust.

The flange *did* draw the powder to itself. In this electrostatic spraying technique, a high-voltage negative charge is given the particles as they leave the gun nozzle. They repel each other, but find their way and cling to any electrically grounded object in front of them—in this case, the flange.

Even works with paper

Just about any powder can be applied, says Miller, so long as it is relatively non-conducting: most plastics, talc, metallic oxides, ceramics. "If the particles were conductive, a current would flow between them and the grounded object, and they would drop off," he explains. The thing being coated, on the other hand, must be slightly conductive. "If it were an insulator incapable of being grounded, there would be very little attraction," Paper and wood ordinarily are sufficiently conductive, he says.

"Now, although the particles are attracted to the conducting surface, they are repelled by one another—up to the point where the coating is so thick an [insulating] barrier is raised," he says. "The particles seek out any thinly coated or uncovered areas. So you can get an extremely uniform, pigmented coating from 10 mils or more all the way down to one mil." (A mil is one thousandth of an inch.)



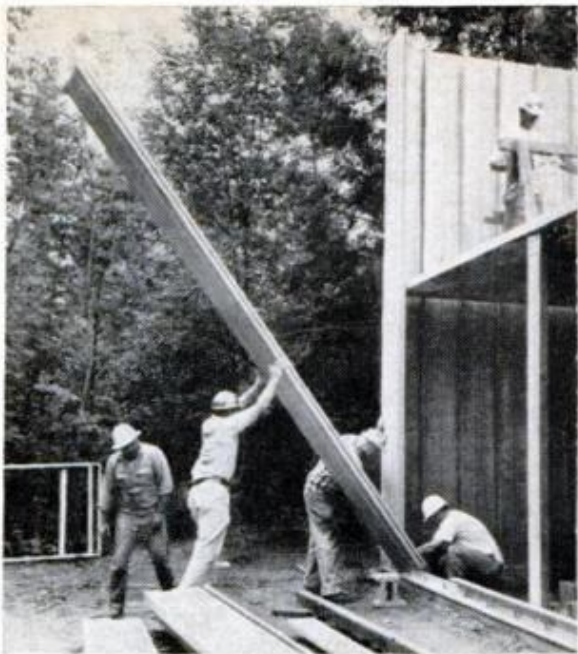
METALIZING OF TOY TRUMPETS is done in vacuum chamber. Coating material is heated to gas and is deposited, atom by atom, on surfaces of toys



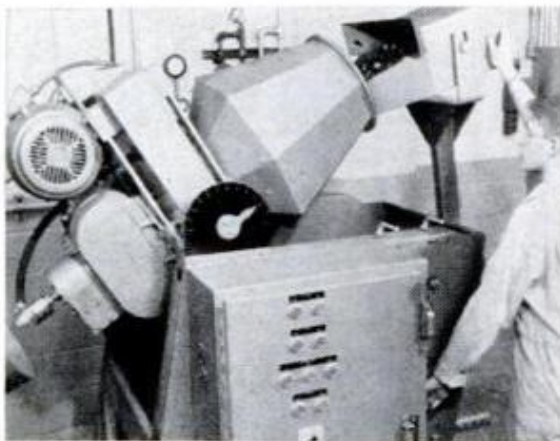
PLASTIC IS BONDED to metal before dashboard sections are stamped out, giving them built-in finish and eliminating need for final spraying



MOVING CARTS create a vacuum inside TV tubes, allowing aluminum vapor to become bonded to the glass. The operation is completely automatic



NO PAINTBRUSH NEEDED for this house of aluminum-coated steel panels. Samples of this siding show no damage after 20 years' air exposure



INSIDE BARREL small metal parts are "hammered" by bouncing glass beads until they have a burrished finish. Process is called peen plating

APRIL 1966

Eventually the particles lose their charge and fall off. But long before that the item has been popped into an oven for a quick baking.

Since Sames came to this country in 1962, "a few score" machines have been sold, are now coating such things as wire screening, shovels, and drainpipe leaf gratings. One scuba equipment maker sticks the gun's nozzle inside air tanks to apply an internal layer of protective plastics. A dozen other U.S. firms are working on their own dry powder electrostatic spray equipment.

The charge that the Sames machine puts onto the powder is impressive: 90,000 volts. "But it's perfectly safe," said Miller, "because it puts out only 200 micro-amperes." With a curious smile he swung the gun toward me. A four-inch spark crackled to my hand. It hurt.

Protecting pipe insides

Another method of applying a coating of powder has been perfected by International Protected Metals, Inc. (IPM) of South Plainfield, N.J. It's called Metplast, and it solves a difficult problem: putting protective coatings on the *inside* of metal pipe. (Metal alone corrodes; plastic pipe won't handle high pressures or hot fluids.)

IPM turns the trick by spinning a heated pipe, then blasting a "slug" of powdered primer, glass filler and plastic inside the pipe, and sucking it back out again. Where the powder touches the hot metal, it sticks, the centrifuging action spreading it nice and even, like paint swirled in a milk bottle. The company doesn't like to talk in detail about the primer, except to say that one of the noble gases (helium, argon, neon) is used to promote molecular bonds between metal and resin.

The very first test for the new process—in a South African gold mine—was a dilly. In this deep mine, the waters were so corrosive that to prolong pipe life, steel pipe was rotated a quarter turn at the end of each eight-hour shift. Average life still was under two weeks.

Metplast-bonded pipe was tried as a substitute. It lasted for seven months, and would have held on longer if the *outside* surface hadn't corroded through. That was in 1959. Today, IPM pipe is being used in many places, including chemical

(Please turn to page 210)

NEW ...for home owners who DO

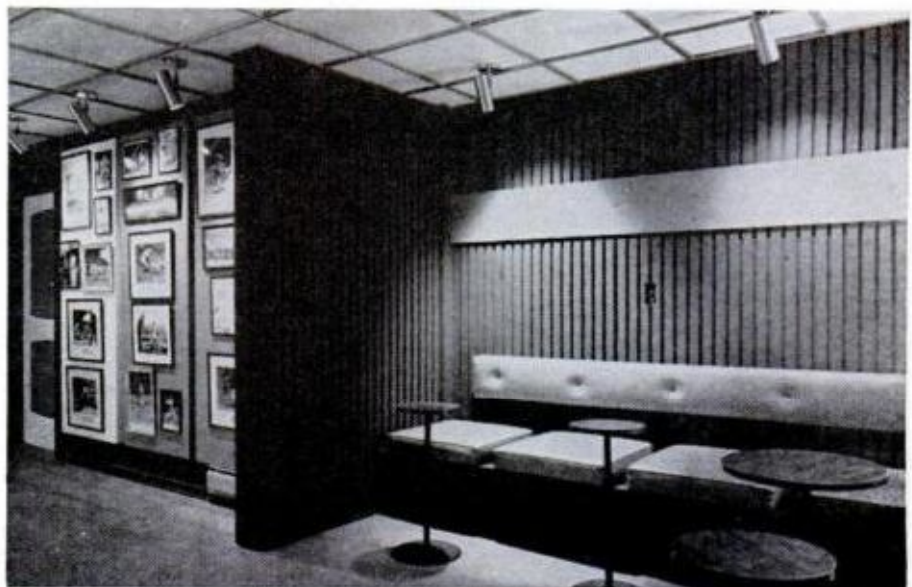
Tack-up masonry, translucent wood and 'goeey nails' are among the new materials and techniques that do-it-yourselfers will use around the house this year.

By Richard W. Howe

APPLICATION of a brand-new "self-healing" steel siding is done with conventional carpenter tools, plus a power shear and caulking gun. Trim is first installed around windows, doors and along undersill of the roof line. Then corner posts are nailed in position. The first (lower) course is then attached to the house with zinc-coated nails. Succeeding courses interlock with course below



UNIQUE REDWOOD ceiling system is installed by first hanging 10-ft.-long redwood main runners with hanger straps which clip onto runners. Wall runners are then nailed between main runner ends. The 2-ft.-long cross runners are next snapped into place. Alignment is checked, and leveling done by sighting along bottom of runners. Then 2x2-ft. ceiling boards are placed between grids



HOMEOWNERS WHO TACKLE their own home-improvement jobs this year can look forward to a fascinating array of brand-new materials, including everything from self-mending steel house siding to stairs you can build with a wrench. Better and faster installation techniques are built into the packages to help the do-it-yourselfer. And as labor costs rise, more and more homeowners are joining this booming fraternity.

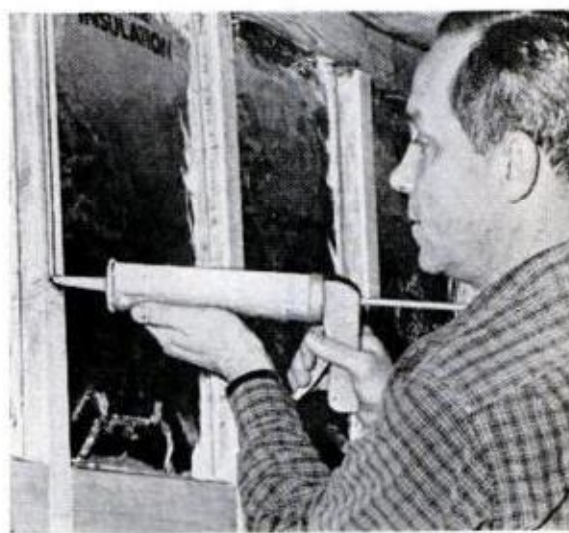
Space limitations don't allow a wide screen picture of *all* the products in 1966's new building products "horn of plenty," unhappily. But we'll try to determine

those that should excite the greatest interest in the average homeowner because of their potential.

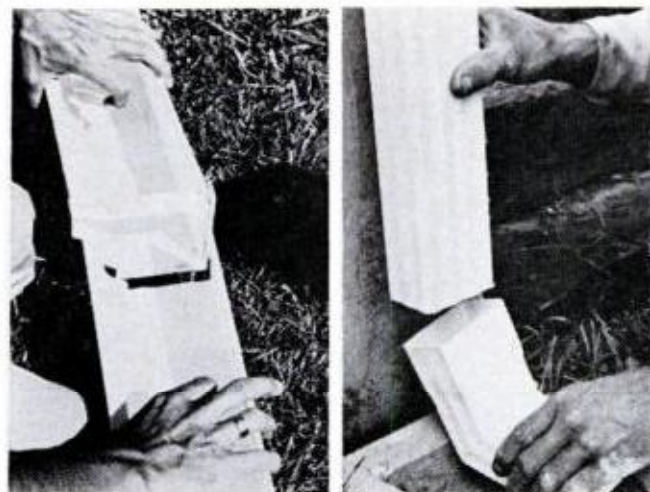
One of the most curious new materials to hit the market is the aforementioned steel siding that "heals" itself when "wounded." A product of *Alumisteel Corp.*, Hammond, Ind., the galvanized steel has a zinc coating as its healing agent and for corrosion protection. If the siding is cut, scratched or gouged, the zinc goes to work to cover the "wound" by electrolytic action. Dent-resistant, the siding will hold up against hailstorms, bumps from kids' bikes and other abuses. It is available in



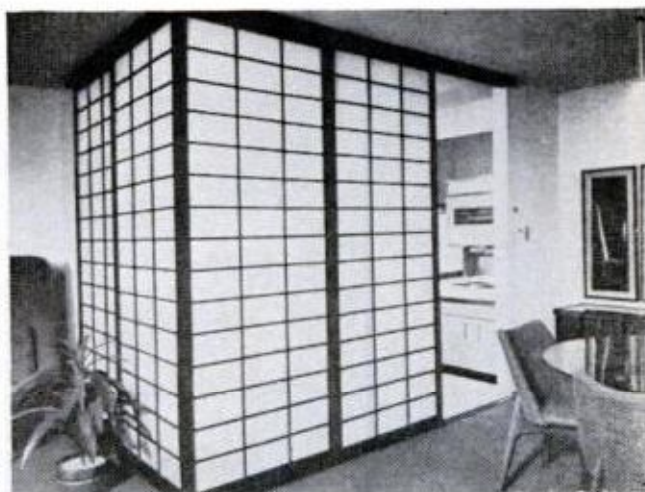
HANDY, FAST FASTENING TOOL will nail furring strips—or almost anything—to hard masonry surfaces nearly as easily as you'd drive a nail into wood



GREAT BONDING STRENGTH of a brand new super panel adhesive makes it stick like "goeey nails" for fastening panels to furring strips



NEW VINYL GUTTER sections (left), in 5-inch width, are joined to connector with special adhesive. The downspout end (right) is force-fitted to downspout



KITCHEN ENCLOSURE is one of many uses of decorative fiberglass sheeting. Translucent material also makes unique room dividers, screens, light-up walls



TECHNIQUE FOR A NEW FAD. One method for making colored blocks is given in text. Here's another: level concrete ½ in. from top of form; then add . . .



. . . **TOPPING MIXTURE** of 8 lbs. pigment, one 94-lb. bag of cement, 200 lbs. of sand, 5 gal. of water. Make a stiff mix and cast. Trowel and finish surface

12½-ft. lengths and 8-in. widths and in a variety of factory-applied colors. It can be installed with ordinary carpentry tools, a power shear and caulking gun.

This year, get artistic! You can create your own decorative interior paneling, movable screens and indirect lighting with *Polyplastex Decorative Fiberglass* sheeting, available by the yard through retail lumberyards and department stores.

The translucent material, embedding everything from delicate grasses to stars and butterflies in highly creative designs, is made of fiberglass mat coated with vinyl resin. You've seen some in airliners, commercial lampshades and screens of expensive breeds, and other applications. But now it has "gone public" with a ven-

geance. It is made in 75-ft. rolls 48 in. wide and costs about 99 cents and up per running foot. It can be cut with scissors or a sharp blade, tacked or stapled to wood or hardboard or glued to metal or plastic with plastic cement.

It creates many unique effects. One of the most unusual, developed by Herb Riley, father of the company and inventor of the process (he also invented a mattress tufter among other unlikely but ravishingly successful things), is a paper-thin bamboo-like laminate embedded in the plastic to form wall panels. With lamps behind them, the walls glow warmly with light through fantastically beautiful patterns. With lights out, they become walls that appear to be solid wood



NEW BREED OF LIGHTS designed for outdoor yard, garden and house illumination requires only 12 volts of safe and sane power, no permanent installation work



PATTERN COMBINATIONS with a tricky, new parquet flooring are possible with individual slats which can be removed at installation



NAIL UP A "STONE" WALL? Why not! The "masonry" job is a simple one with this new nail-on fiberglass stone veneer panel



REALISM is achieved in panels by actually embedding crushed stone on the 12½ x 48½-in. surfaces. A finished accent wall of "stone" is example pictured above

that has been burnished to a velvet finish.

Unique interior-exterior material, made to simulate—with startling realism—everything from stone and brick masonry to hand-hewn shakes, is turning up from a couple of producers for the consumer. It's made to order for many remodeling jobs. One outfit is the *Cavrok Co.*, of Rockville, Conn. Another panel, called *Roxite*, is a product of *Terex Corp.* of America, Chicago.

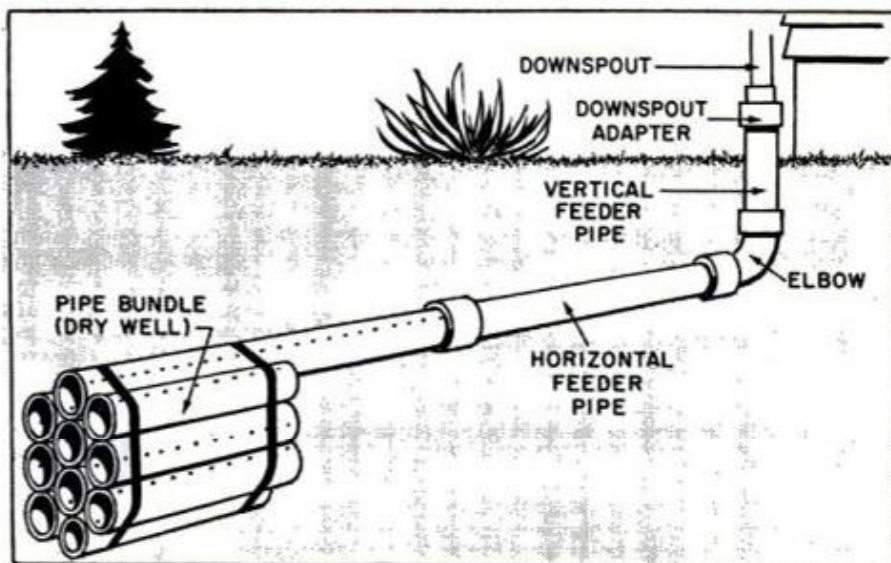
Now, you can *nail* up a "stone" or "brick" wall. The remarkable realism of these textures is achieved by crushed stone or, in some cases, brick and sand which is embedded in the material. *Cavrok's* panels are so genuine looking that, when a couple of real bricks are tucked

into a panel on purpose, only a few people out of dozens are able to find them. These panels come in 4x8-ft. size. *Roxite's* "stone masonry" in 12½x48½-in. panels.

These materials are ideal for accent walls in living rooms, studios, kitchens, family rooms, basements and attics. The larger sheets can be used as exterior siding as well. It's all lightweight—less than 1 lb. per sq. ft.—and makes for easy handling and installation. It won't sag, deform, shatter or crack and the only maintenance required is an occasional washing with soap and water.

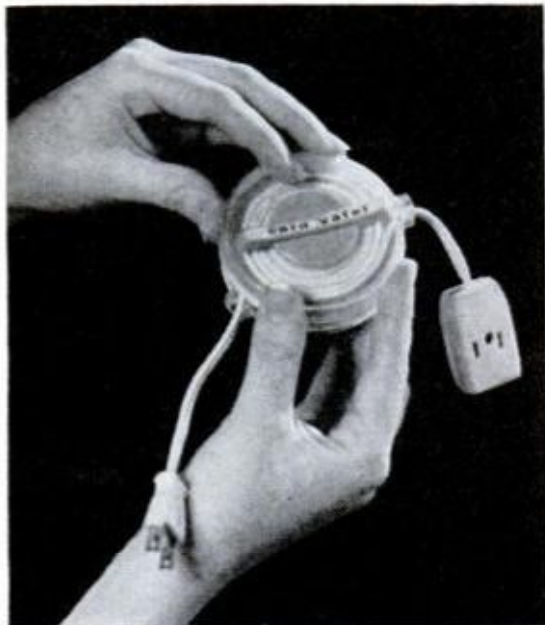
How are you fixed for dry wells? An item that has been out for several months, but a concept that will come as news to

(Please turn to page 198)

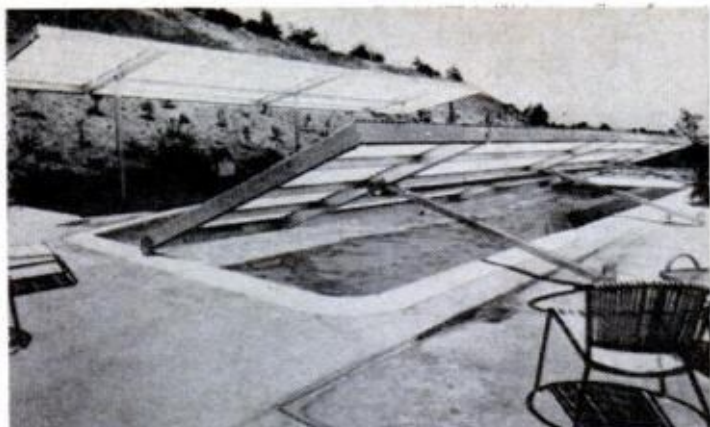


COMPLETE DRY WELL weighs only 28 lbs. in a simple but well-conceived all-plastic, pre-packaged dry-well unit for \$18.95. The unit boasts 100 percent water capacity as opposed to the 10 to 20 percent capacities of conventional dry wells. Average in-the-ground installation time is seldom more than two hours

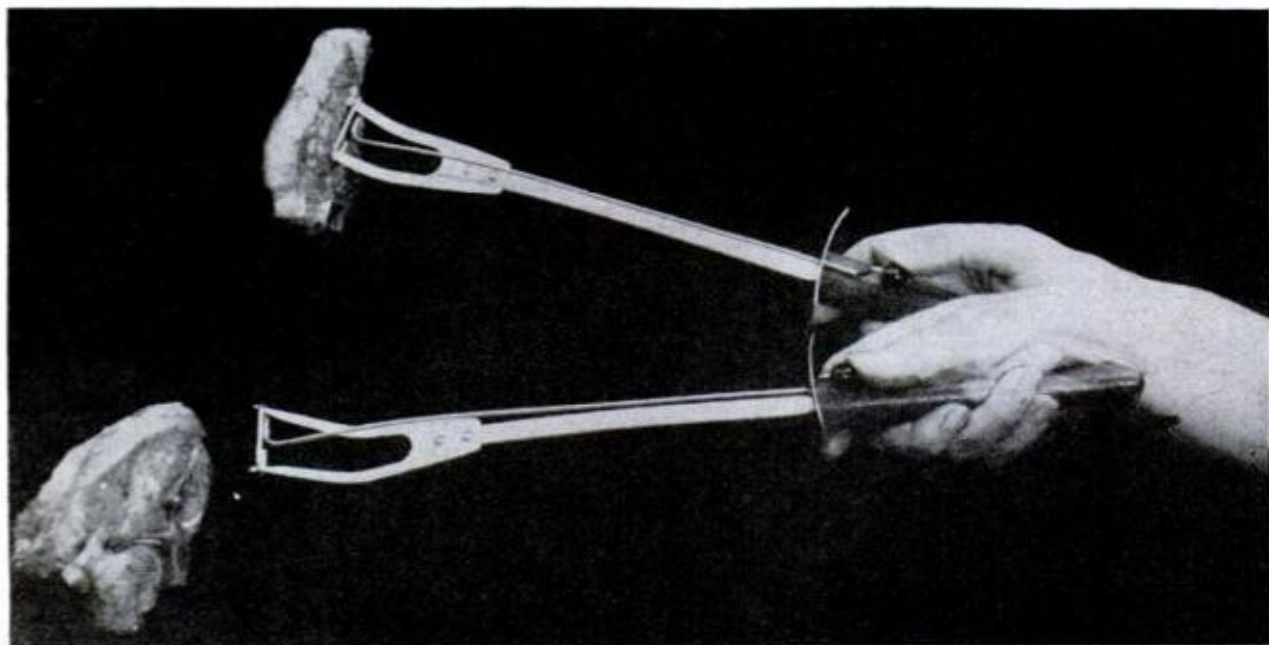
NEW FOR
YOUR HOME
 BY MARION MOREY



CORD SHORTENER stores up to eight feet of 110-volt cord in 3-inch-diameter unit. Both ends draw in or out simultaneously; 69 cents from Corva Ind., 2941 Noble Avenue North, Minneapolis, Minn.



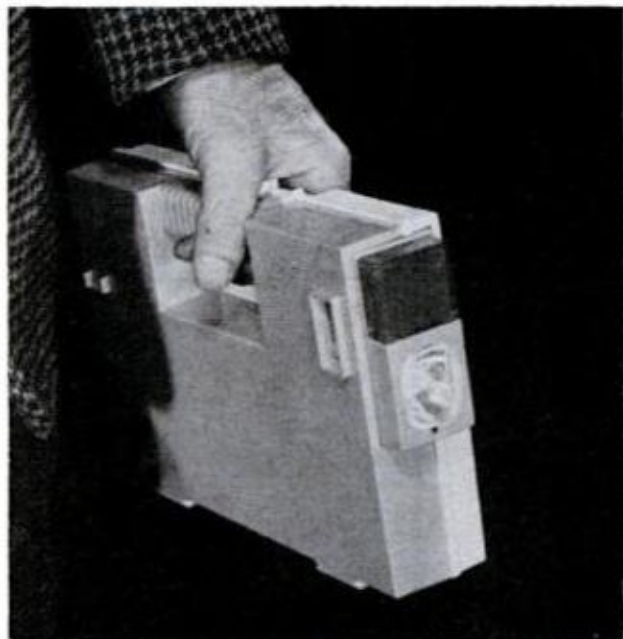
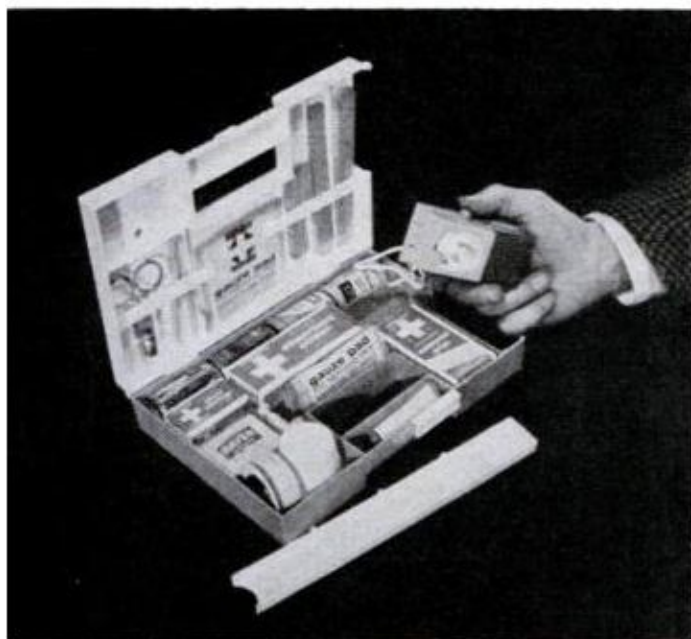
AUTOMATIC POOL COVER of two fiberglass panels forms tight cover. Flip of hydraulic switch swivels panels upright to shade poolside patios. Covers, in colors, start at \$1695. Liftomatic, 6445 Sepulveda Blvd., Van Nuys, Calif.



PUSHBUTTON FORK ejects steak or other barbecue fare with a simple one-hand operation. Merely push the button at the handle and off slides the meat for turning or serving. Up front of the solid walnut handle: stainless steel flat shank and heat guard. Black leather thong lets you hang \$1.98 fork conveniently. It's made by the Washburn Company, c/o Androck, Worcester, Mass.



TAPELESS RULE lets you measure floors, ceilings, pipe lengths, playing field boundaries and so forth just by rolling it over the area to be measured. Speedometer-type dial gives easy-to-read cumulative totals in feet and inches up to 1000 feet. Five seven-inch extension sections stretch handle to 44 inches. Price: \$24.95. Manufactured by U.S. Gear Corp. for Hammacher-Schlemmer, New York, N.Y. 10022.



PORTABLE FIRST-AID KIT brings to any emergency fifteen vital first aid items plus a dual-purpose light (both utility white and warning red). Four standard D batteries operate light. The high-impact styrene case—10½ by 7½ by 2¼ inches—has convenient built-in carrying handle. Priced at \$5.95 from American Safety Equipment Corp., 261 Madison Ave., New York, N.Y. 10016.

Here's how to get that **HIDEAWAY HOMESITE**



Homesteading and other federal land is still available and cheap, though it's not all roses. But a bargain spot for your vacation cabin is for sale or rent—if you're willing to hunt

By M. Rupert Cutler

Assistant Executive Director, The Wilderness Society

SUDDENLY, EVERYONE'S LOOKING for a remote little chunk of solitude where he can build a cabin and "stretch his spirit" periodically, far from job worries, crowds, noise and the polluted smell of the city. It's the Land Rush of '66, and the competition for a worthwhile spot of wild country is getting fierce.

Probably your land hunger has been whetted by ads such as: "Government land low as \$1 acre. 450,000,000 acres, 25 states. Send \$1 for catalog. . ."

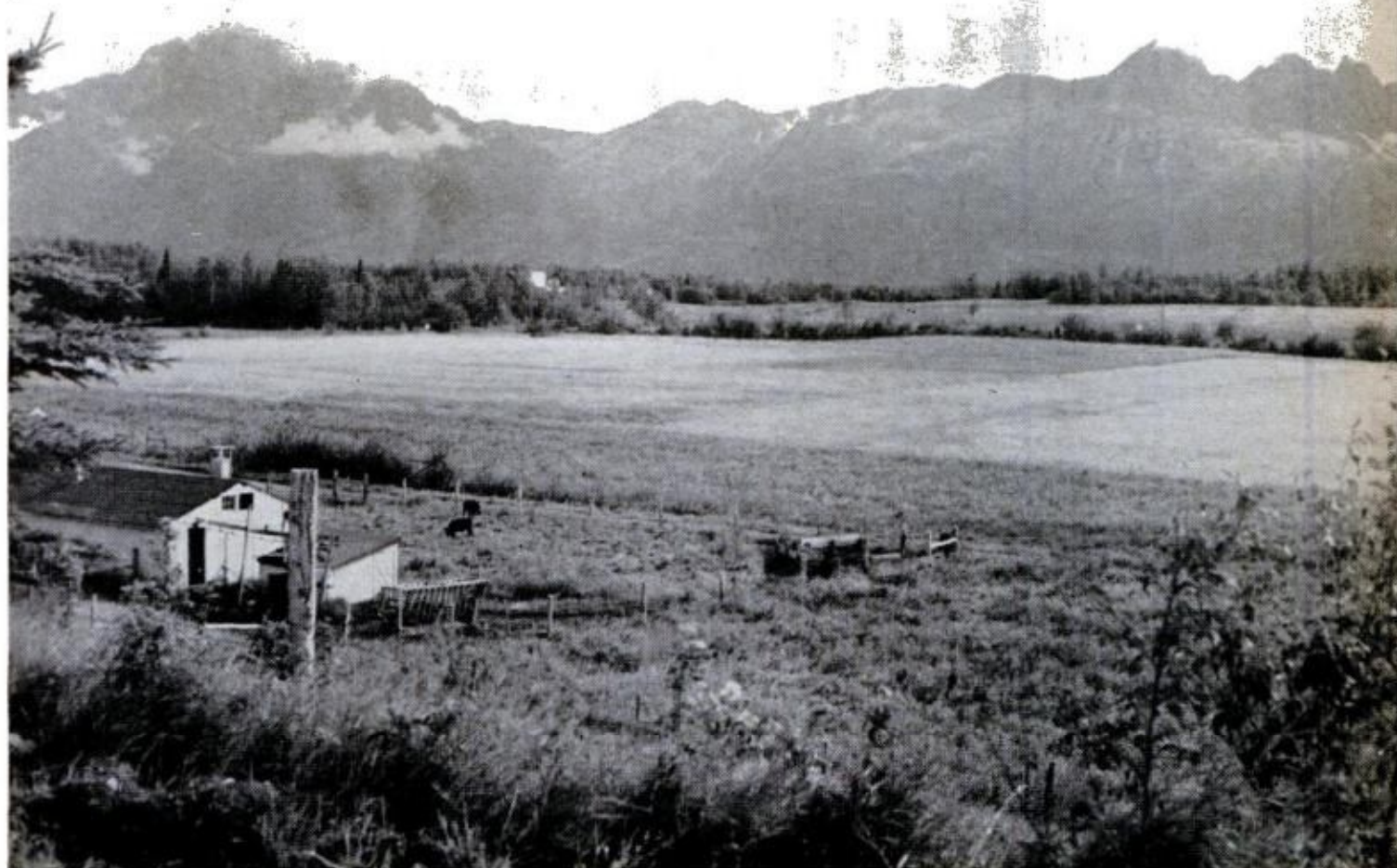
In only one respect do such ads approach the truth: Incredibly, the federal government still owns *one-third* of the nation's total land area. Some 465 million acres (over 725,000 square miles!) cur-

rently are classified as "public domain."

Your chances of buying an attractive parcel of government land are growing slimmer—but they still exist. You can buy government land, but not as dirt cheap as the ads indicate; and it may take some time, effort, expense and travel to find anything suitable. It *can* be done, though, and fairly inexpensively. Here are some tips that may help.

During your search, keep in mind two things:

- The U.S. Government, contrary to the implications in some advertisements, is not anxious to dispose of most of its real estate. As a matter of fact, plans call for *more* Federal land, not less, for *more*



ALASKA IS THE MECCA for low-cost homesite seekers; there is still plenty of land available. Five acres cost \$22.50, but you have to build a house and live on it five months of the year for three years

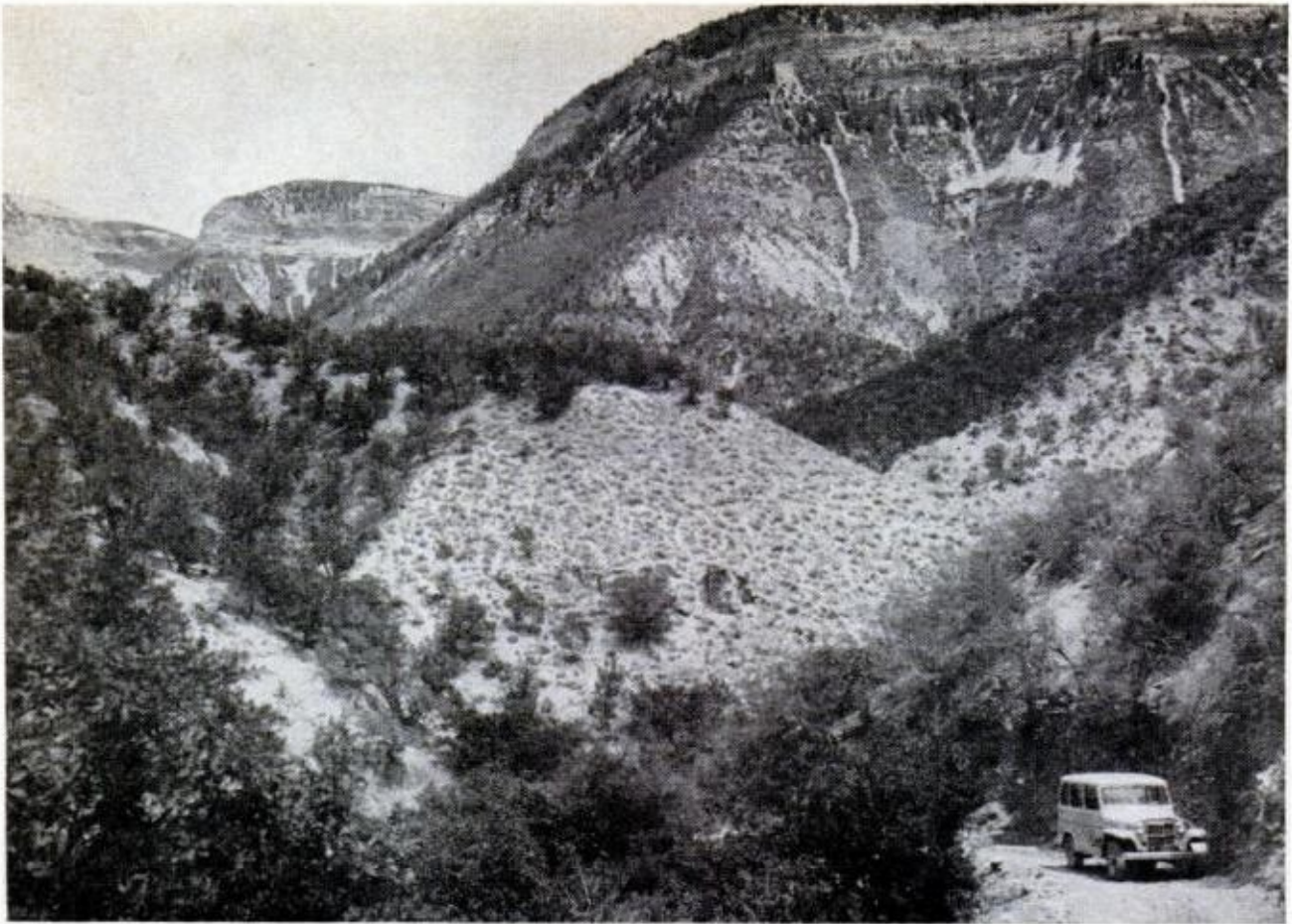
public campgrounds, for *more* open recreation facilities to accommodate an ever-increasing urban population working ever-shorter hours and getting more vacation time. You thus are competing with your own government for the most desirable land.

- It's virtually impossible to get federal land *free*. It's quite true that some 270 million acres of our public domain were given to over 1½ million successful homesteaders. But there's very little land left that comes under homesteading laws. Some people will try homesteading, though. Two years ago, 52-year-old Rufus Choate transplanted his family from Montana to an island in the Aleutians. There, with a 20-year lease from the government on 268,000 acres, he is trying to raise sheep and cattle despite violent weather and the depredations of packs of wild dogs. In Alaska, 408 homesteads were approved that year; in other states, only six.

However, the government *does* sell



MODERN DESIGN sometimes gives way to more practical aspects in the Alaskan wilderness. This small, rustic cabin of native materials is built on stout poles as protection against vicious grizzly bears and mountain lions that generally roam the area



WESTERN LAND IS STILL AVAILABLE under the Small Tract Act of 1938, but it is usually in extremely remote areas and the individual must track down the available parcels and make a competitive bid



NATIONAL FOREST HOMESITES are generally excellent buys. They are usually in ideal locations, like this cabin beside a stocked trout stream in the California redwood country

small parcels of land, spotted here and there across the country; you can set your sights on finding one of these parcels that will fit your needs precisely. In your search, you'll find yourself dealing with one or more of the following agencies:

1. If you want western land, you'll probably deal with the Bureau of Land Management.

BLM's Land Offices (in 11 western states and Alaska) frequently hold public auctions at which tracts of up to five acres are sold to the highest bidder. Some 55,000 small tracts have been sold by BLM since 1955. Most are used strictly as vacation sites because they're arid, rocky, rough or mountainous. Folks from as far away as Chicago and Pittsburgh have built summer homes on a 300-acre BLM subdivision near Dillon Reservoir west of Denver; and BLM land around Magic Reservoir in southern Idaho is popular with folks who roll



SEE IT BEFORE YOU BUY is a rule of thumb for anyone interested in purchasing public land. More often than not, it is up for sale because no government agency wants it, usually barren desert land

house trailers there during the summer.

Prices for parcels (up to five acres) vary with demand and quality, ranging from a few hundred to thousands of dollars.

But many tracts offered by the government are hundreds of miles from civilization, devoid of any water supply and a day's ride by burro from the nearest road. *Don't bid on a BLM parcel without seeing it first. And don't put your trust and your cash in the hands of a private land locator.* A California man who bought a "current list" from a land locator traveled hundreds of miles to look at a tract and found that the land had been in state ownership for many years. And a Montana rancher discovered by personal visit that the tract he had selected from purchased literature was part of a military reservation in South Dakota.

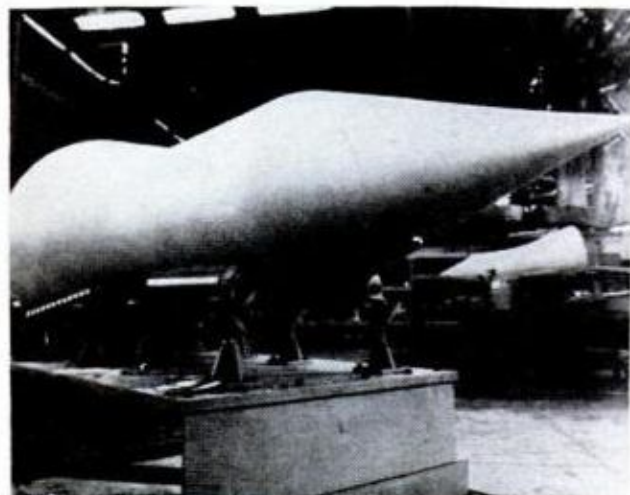
Today's best deal in terms of
[\(Please turn to page 214\)](#)



SEARCHING FOR LAND can be arduous and time consuming, but once you find the right place, you can experience the satisfaction the owner of this A-frame home will be feeling



There's no lack of fresh air for the operator of this one-man helicopter, designed and built by Vincent Seremet of Copenhagen. The 15-hp engine powering the machine was taken from a scooter. Seremet believes that the helicopter can be mass-produced for about \$1200, and that it will be used by military and firefighting personnel.



Looking like a giant top, the needle-nosed Avco Mark 11A re-entry vehicle is part of the Minuteman II weapon system. Streamlined and covered with an ablative material, the vehicle can withstand speeds of 15,000 mph and temperatures in excess of 12,000° F. Recently the Minuteman II was fired from California to Eniwetok lagoon.



Sticky fingers. A lifting force of 400 pounds can be applied to ferrous metal products with a magnetic handle that's being made in Austria.



TV SPY IN THE SKY

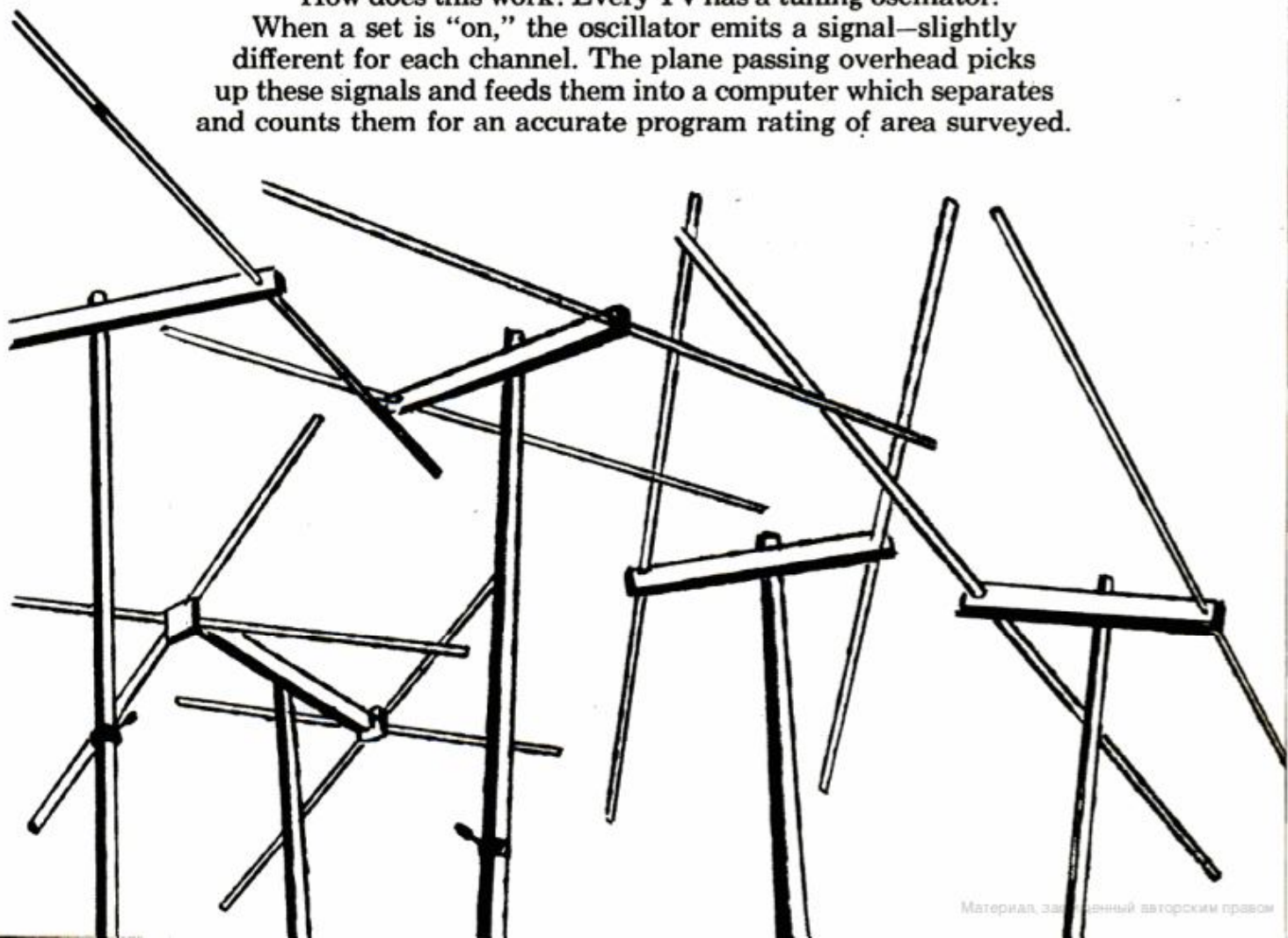
By Stanley Roberts

"What are you watching on TV?" No one needs to ask you now; they can tell from a plane.

When you select the channel of your choice you'll be telling the TV world which shows you like best — or least.

Airborne Television Audit can count 1000 TV sets a second while it cruises along at 160 mph 1500 feet over the housetops. During a half-hour show it checks a 45-square-mile area.

How does this work? Every TV has a tuning oscillator. When a set is "on," the oscillator emits a signal—slightly different for each channel. The plane passing overhead picks up these signals and feeds them into a computer which separates and counts them for an accurate program rating of area surveyed.





Expandable space antenna. No bigger than a briefcase when put into orbit, the antenna is said to be able to mushroom to a diameter of more than 60 feet. Made by Electro-Optical Systems, Pasadena, Calif., it's designed to reflect high-frequency signals. The antenna unfurls by means of the elastic energy created when its fiberglass frame is compressed.



Illegal load. New model Saviem trucks from France stacked four-high make an unusual display at their debut showing. Low truck on the pyramid is a 235-hp diesel rated to carry almost 20 tons, the limit for this vehicle on French roads. Each unit has a useful payload of almost twice its own weight. Loaded, the smallest truck weighs 3.85 tons.



Clothing fascinators. Photo-sensitive cloth called Tura can be printed the same way as any photographic paper and then used as cushion covers, chair backs or curtains. Made in West Germany, it sells in packs of 10 sheets (from 5 by 7 inches to 20 by 24 inches) or in rolls. Other uses include wall murals, lampshades or book bindings.

5 FUN-PACKED

Vacation homes



Three-gable, A-frame weekender

Sprouting three merging A-frames, this unique "alphabet" design becomes a pleasing Y-shape to make it an outstanding development in A-frame architecture.

Three unique snow or sun hideaways

Typical of 21 exciting contemporary designs by Robert Englebrecht, noted New York architect, these three free-swinging plans are in tune with today's relaxed living and easy maintenance.

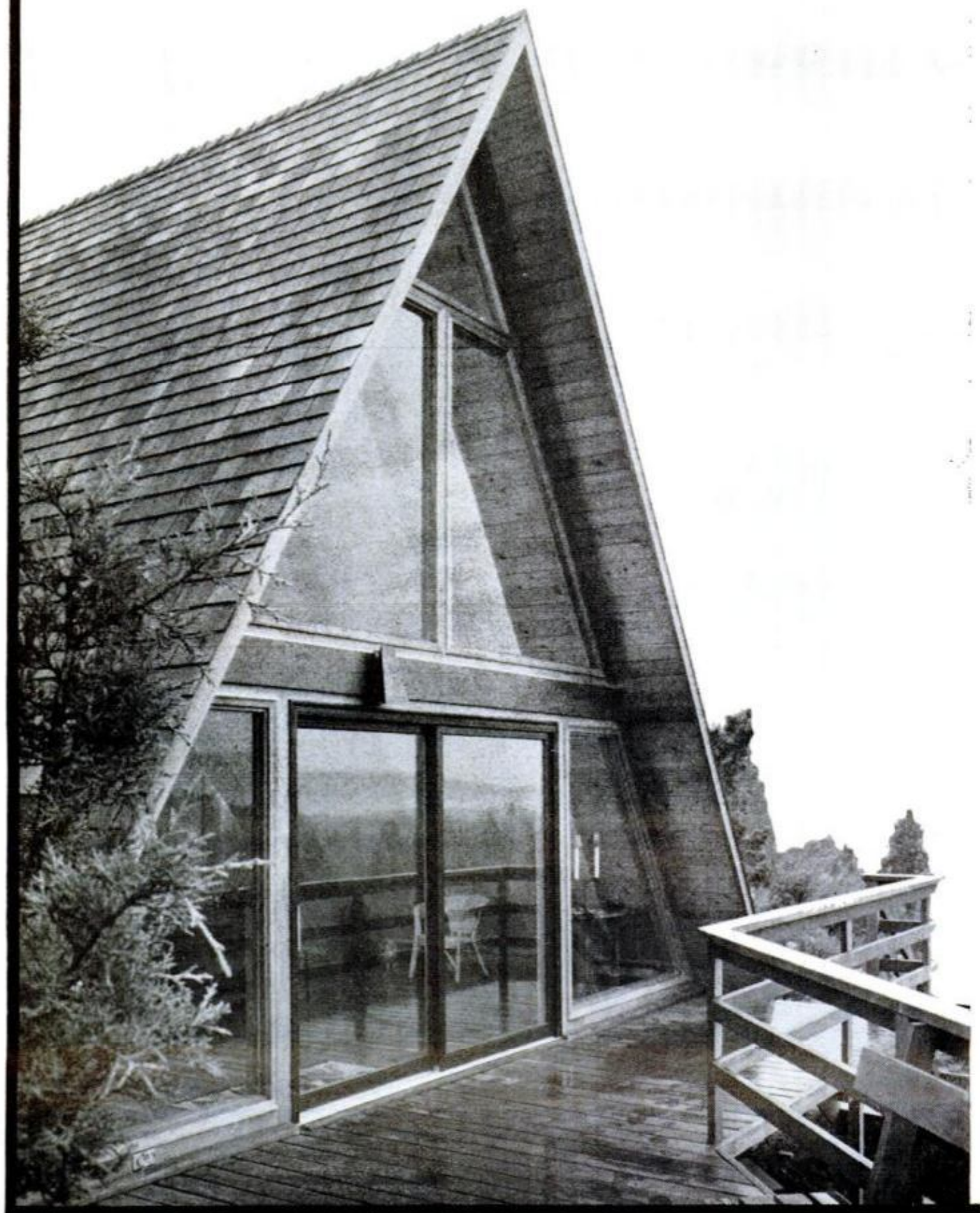
Man-size "Lincoln Log" kit

Interlocking, factory-milled logs of white cedar go together like a toy building set. Complete kit is custom-made to owner's specifications.

PLUS 14 pages on using a chain saw to create unusual accessories for your yard: a rustic storage shelter . . . log furniture for your garden . . . even a decorative totem pole!

Three-gable A-frame weekender

For a large family or a lot of friends, here's an A-frame with space



WHAT TWO LETTERS of the alphabet will save money and add space?

This was the riddle that designer Ralph Rittenour of Portland, Ore. had to solve when he planned a weekend vacation house for a client in Bend, Ore.

Added to this riddle was the client's dislike for the obvious answer to the first—the A-frame. Its tent-like appearance was too austere. And besides that, the conventional A-frame simply could not accommodate the client's space requirements.

But Rittenour could not dismiss the advantages of the A-frame. The house was to be built on a hilltop overlooking a pine-studded canyon, and the shape of the A-frame was ideally suited to blend with the topographical setting.

Tackling the matter of aesthetics, he broke up the unappealing "tent-like" lines by reaching back to post-victorian construction and resurrecting the gable, a space-saver that has been largely ignored in modern architecture. And to maintain the symmetry on the exterior while adding to the interior spaciousness, he butted three gables together in the shape of a "Y."

By approaching the problem from both ends of the alphabet, Rittenour was able to offer his client the modest cost of the A-frame and 2500 square feet of living space.

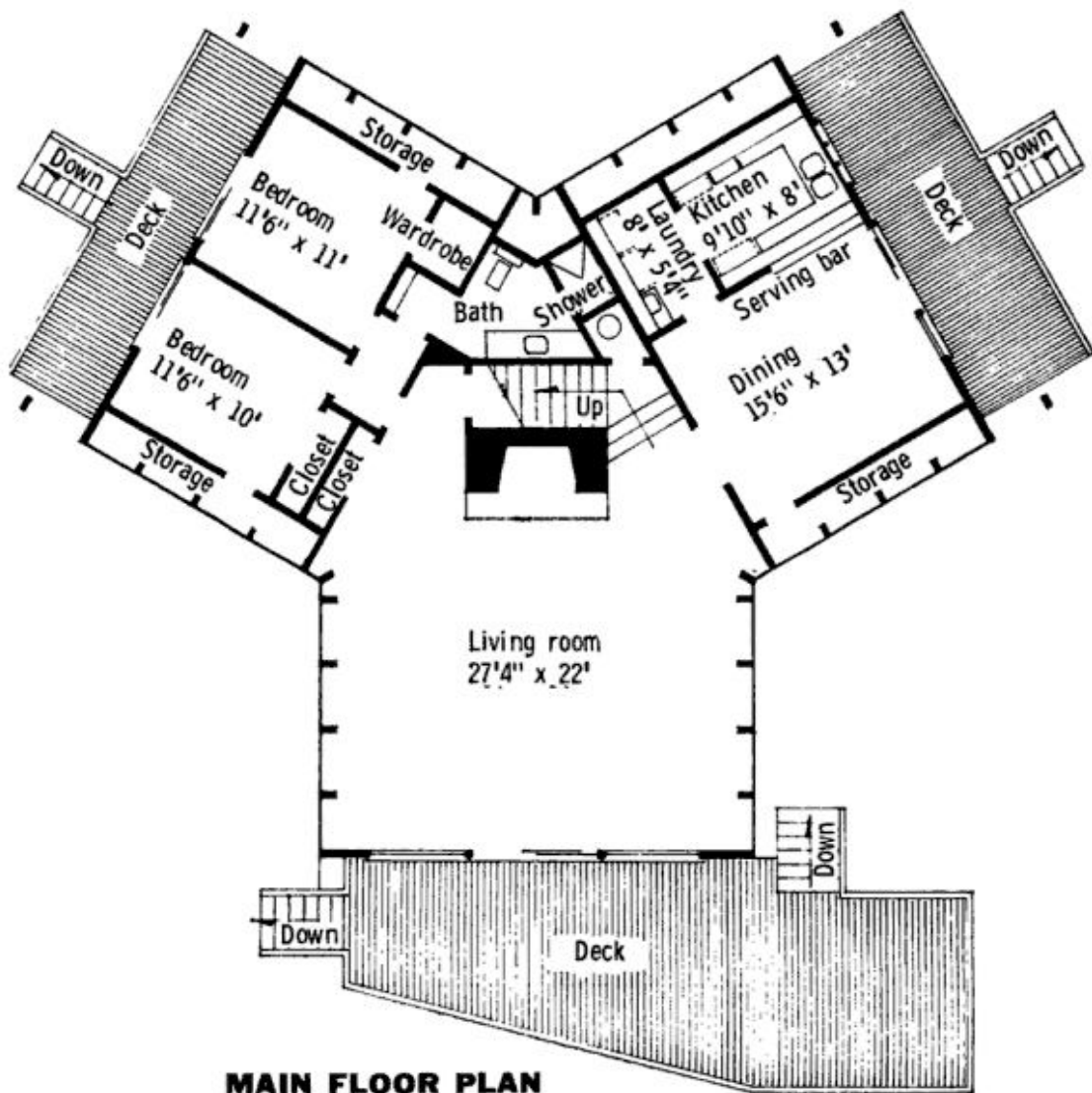
Where most conventional A-frames are divided in half with kitchen and bath downstairs and a balcony for sleeping, Rittenour found he could devote a full gable of his "Y" shape to the living room (27 feet 4 inches by 22 feet) open from floor to ceiling. With a completely glass front opening onto a large deck that overlooks the canyon, the effect is one of vast space. A huge fireplace of



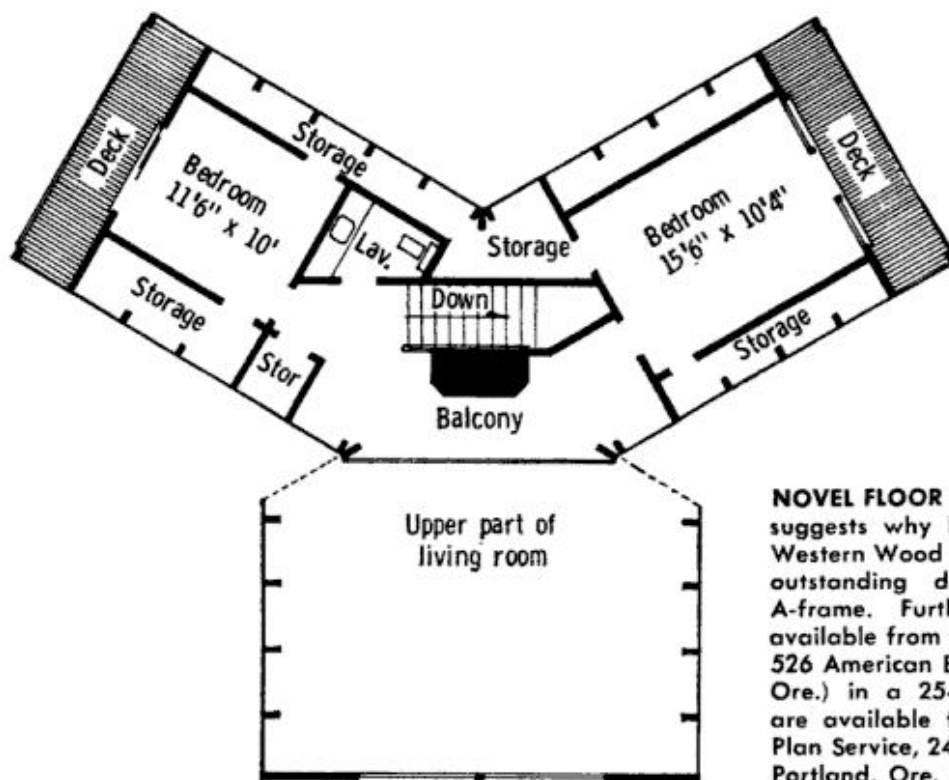
BLENDING WITH THE LANDSCAPE, the three-gabled A-frame is ideally suited to the rugged Northwest. The unique design offers 2500 sq. ft. of floor area on two floors



UPSTAIRS BALCONY surrounds chimney of the fireplace, with bedrooms to right and left. Twin downstairs bedrooms are to the left, and dining area is on the right



MAIN FLOOR PLAN



SECOND FLOOR PLAN

NOVEL FLOOR PLAN of both stories suggests why house was cited by Western Wood Products Assn. as an outstanding development in the A-frame. Further information is available from that organization (at 526 American Bank Bldg., Portland, Ore.) in a 25-cent booklet. Plans are available from Home Building Plan Service, 2454 N.E. Sandy Blvd., Portland, Ore. 97232.



UNOBSTRUCTED HEIGHT of the living room with glass front and large deck adds to the spaciousness

native fieldstone dominates the juncture of the three sections, and open areas on either side add to the living room's spaciousness. The gable to the right of the fireplace contains a dining area (15½ by 13 feet) and the kitchen (9 feet 10 inches by 8 feet) and these are separated by a serving bar. The inside end of the kitchen is a compact laundry with automatic washer and dryer.

Leading off a short hallway to the left of the fireplace, the downstairs of the third gable contains two 11-foot 6-inch by 11-foot 11-inch-long bedrooms, plus storage space and closets. The furnace for a forced-air heating system may be placed in one of the closets or under the house.

A stairway rises behind the fireplace to a balcony that embraces the stone chimney and looks down onto the living room. Behind the stairway, on the ground level, is a bathroom complete with a shower stall.

Opening off the upstairs balcony, above the kitchen/dining area is a good-sized master bedroom. And to the left of the balcony is a storage room and lavatory and a bedroom similar to those downstairs.

Each bedroom has sliding glass doors that open onto a small deck. Entry to the house is through a glass door to the dining room, which opens onto the parking area and driveway.

To maintain the casual feeling of the vacation retreat and also blend the structure into the rugged pine country, Rittenour chose to build it completely of native western woods. The support beams are solid Douglas fir. The decking for the roof is 2 by 6 Douglas fir. Since the house was to be used the year round, and there is considerable snow in the winter, the roof decking was covered with 1-in. rigid insulation and topped with western red cedar shingles.

An innovation in the construction is that instead of using hardwood, the flooring throughout the house is 1 by 4 ponderosa pine. The interior paneling is also ponderosa pine throughout. The exterior decking is spaced 2 by 6 western hemlock.

A masterpiece of simplicity, this house can be built easily at a cost that's modest for a four-bedroom structure. Storage space has been built into every nook and cranny to eliminate the clutter that would slow down your departure after a perfect weekend. ★ ★ ★

3 SNOW, SUN AND FUN hideaways

THE OLD DAYS of shuttering and battening down the hatches on the vacation cabin have gone the way of the dodo. This is the era of the year-round vacation home. Modern materials, designs and construction methods have placed these homes within buying reach of modest budgets. Now anyone can have his own weekend retreat for as little as \$2500.

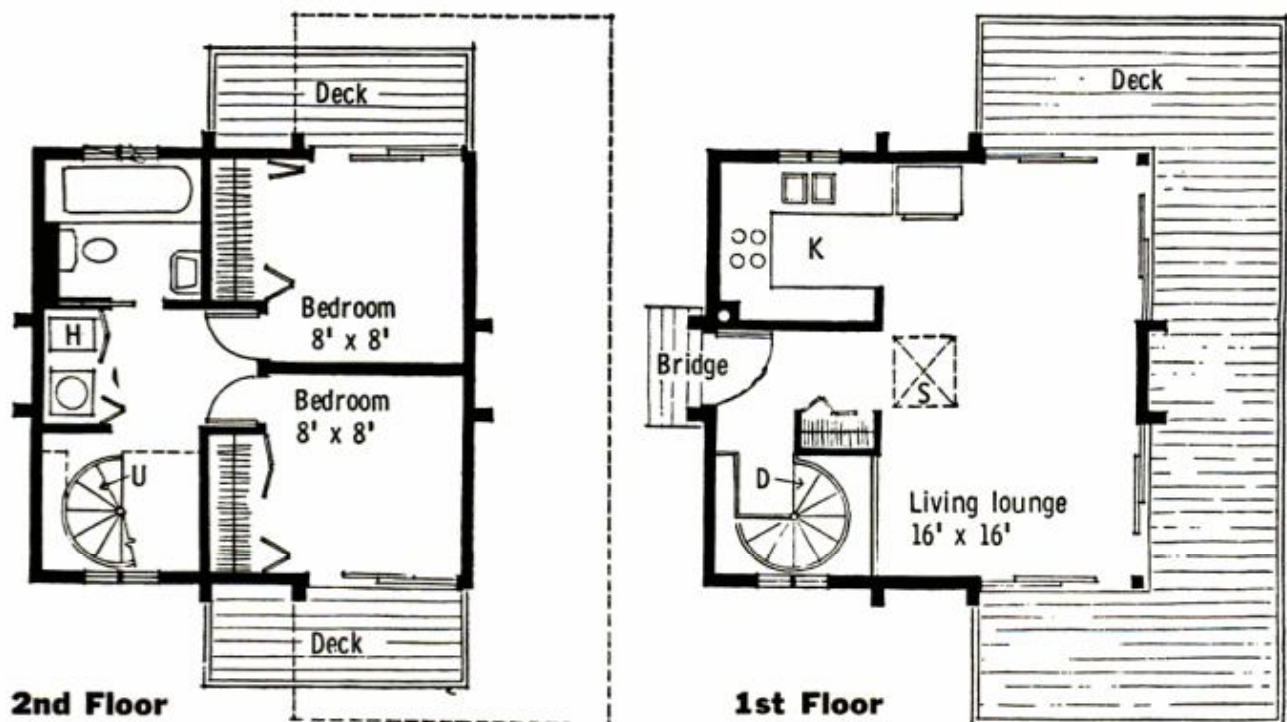
Today you can buy a shell that goes up on your lot in a day, and finish it at your leisure. There's another design that can be put up and taken down when you decide to move. You can have a geodesic dome or an A-frame or a squat rancher. You can have one built over a stream, or a ski cabin with an indoor pool.

The three exciting vacation-home designs presented here are from 21 originals designed for Simpson Timber Co. by the architectural firm of Robert Martin Engelbrecht, A.I.A., of New York City. All are year-rounders, yet each is distinctly different.

The *Olympic* is an aerie built on stilts, aesthetically and commandingly "at home" on a mountainside where an unimpeded view is offered from three sides of the house.

The *Engelframe Saranac* takes its name from its creator, architect Bob Engelbrecht, who used the geometry of the isosceles trapezoid to combine strength, beauty and simplicity in this vacation house. Like the *Olympic*, the *Saranac* can be erected on uneven terrain by varying the lengths of the supporting structural members as required.

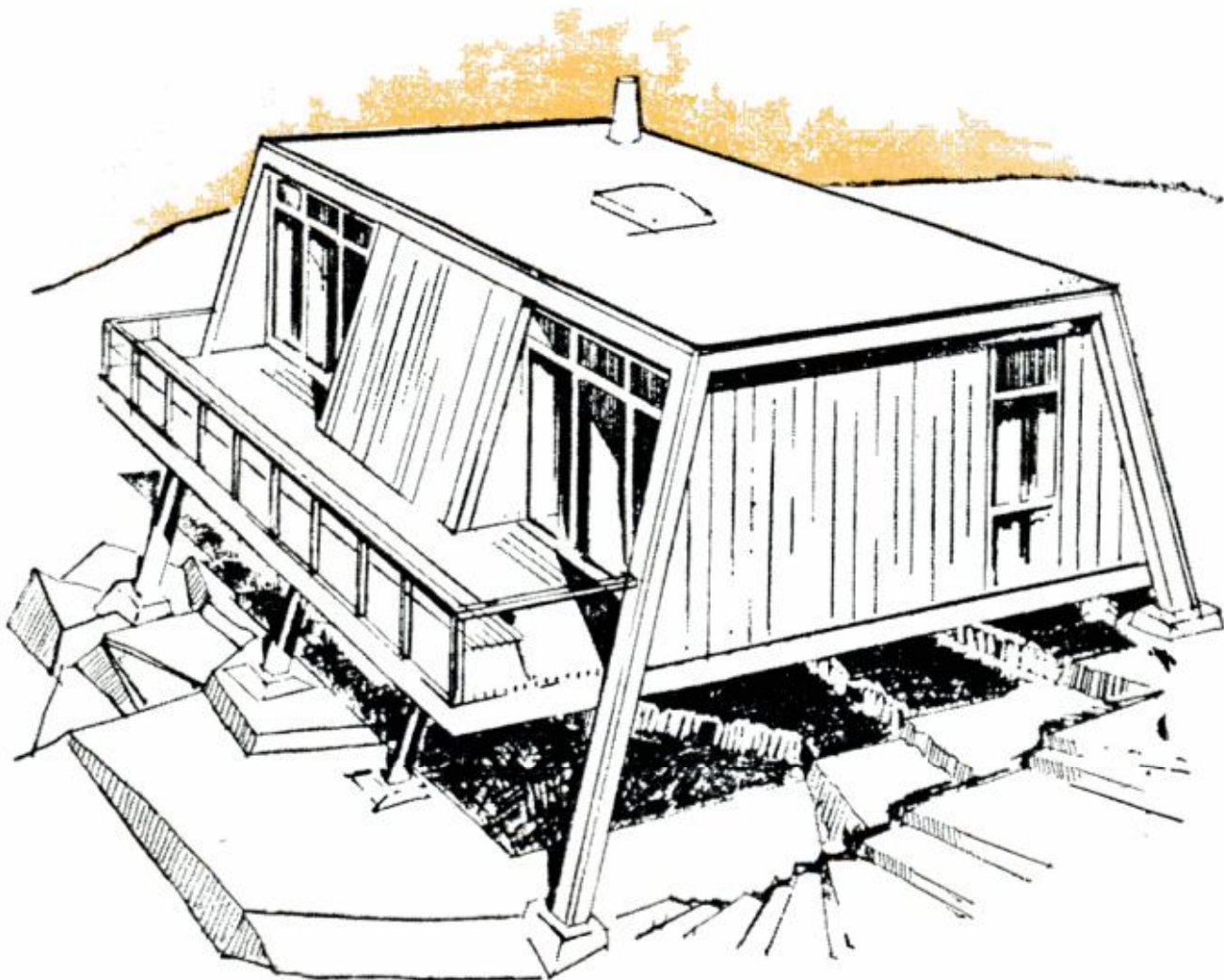
The utility and symmetry of the square is highlighted by the design of the *Tidewater*, another vacation home adaptable to virtually any site. This one features a spacious deck surrounding a compact living area, creating the effect of an open





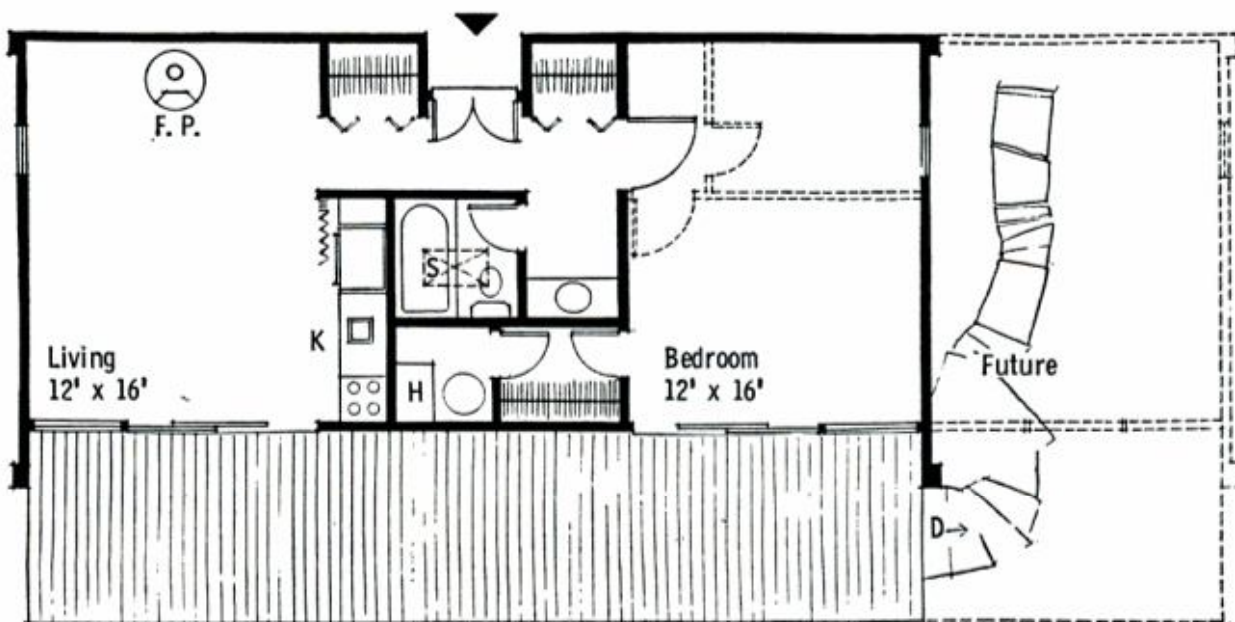
1

PICK YOUR MOUNTAIN, THEN BUILD. This eagle's-nest of a house—the *Olympic*—is supported by eight strong pillars. A footbridge leads to the entrance. The living lounge and a spacious wrap-around deck comprise the upper level. The two bedrooms, bath and utility area on the lower level are reached via a spiral staircase



2

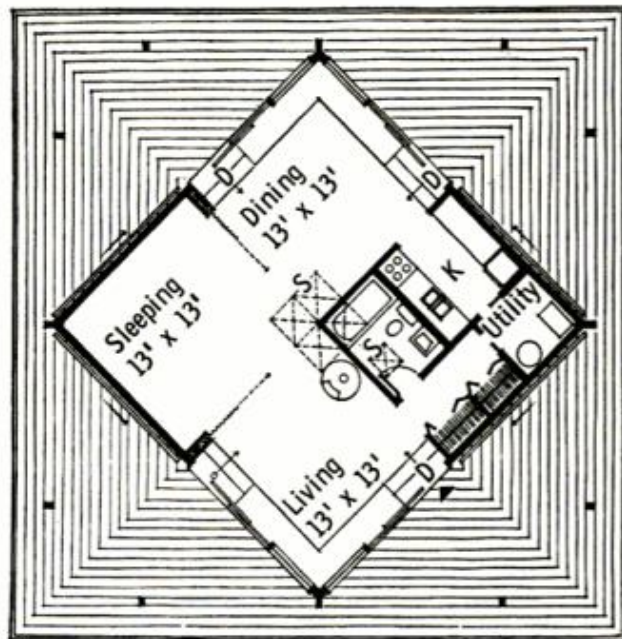
SEASIDE, LAKESIDE, RIVERSIDE, HILLSIDE—*Engelframe Saranac* can be locked into place just about anywhere. A single-story structure, it can be built as a one- or two-bedroom house. Its simplicity of design would facilitate building an addition onto the house as indicated in the plan. A main feature of this hideaway is the full-length redwood deck which encourages casual indoor-outdoor living. The glass walls and doors flanking the center section of the house permit taking full advantage of daylight, moonlight and view



pavilion. But if you think this covered deck deprives the house of light—you're wrong. Sunlight and starlight flood into the house through a cluster of skywindows centered in the high, peaked roof.

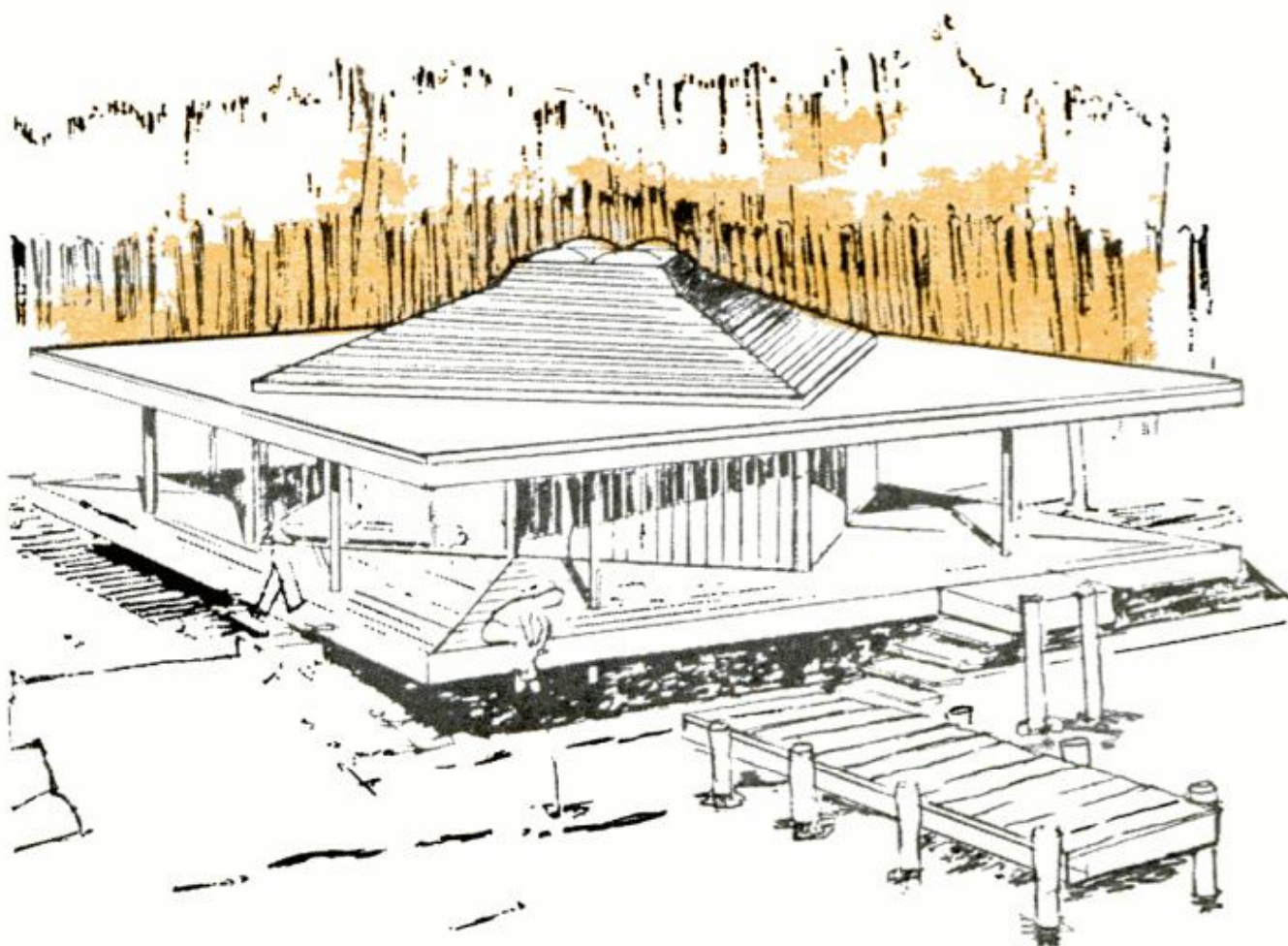
Remember, while these are but a sampling of vacation-home designs created by *one* architectural firm, they point up the imaginative strides that are being taken in this field. Today's buyer selects his vacation home from hundreds of styles, sizes and prices. Plainly, the day of the "voting booth" cabin has passed into history.

Blueprints for these homes are available from Vacation Homes, c/o Building Products Guide, 175 S. San Antonio Rd., Los Altos, Calif. 94022. ★★★



3

WHEN BEING SQUARE IS IN. You'd definitely be *in* with the In Crowd if you brought them to this square retreat. The *Tidewater* vacation home, like the *Saranac*, is designed to go anywhere. Different areas of the roof-covered deck surrounding the living quarters are in shade and sun throughout the day. Daylight floods into the house through a cluster of skywindows centered in the peaked roof. A unique feature of the house is that you step down into the living area from the deck. The corner window seats convert into bunks



Man-size 'Lincoln Log' kit

FOR TRADITION, BEAUTY, RUSTICITY AND EASY LIVIN'—nothing, but nothing beats a log home. Boyne Falls Log Homes, Boyne Falls, Mich., will precut, prefinish and make on-site delivery of exactly the white cedar log home (or cabin) you want. Thanks to the precut logs, which are splined and grooved both vertically and horizontally, these homes are easily constructed in much the same manner your boy builds a house with his set of *Lincoln Logs*.

The natural, rugged appearance of the exterior of these logs is in marked contrast to the finished interior sides, which create a handsome cedar-plank effect. In addition, white cedar is one of the best insulating woods known to man, surpassed only by cork. The logs are specially treated to resist fungus, insects and



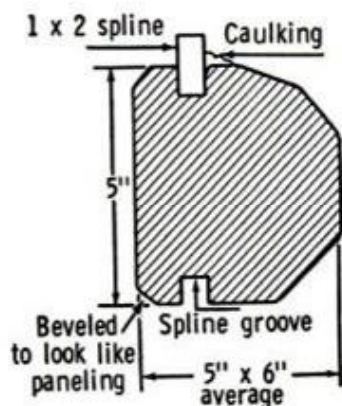
COMPLETED LOG CABIN measures 28x36 ft., with 15-ft. ceiling peak. All materials are precut, prefinished



THERE'S SPACIOUSNESS TO SPARE in the 18x20-ft. living room. Exposed purlins and fieldstone fireplace (built by owner) accentuate rustic aura. Note finished faces of interior log walls



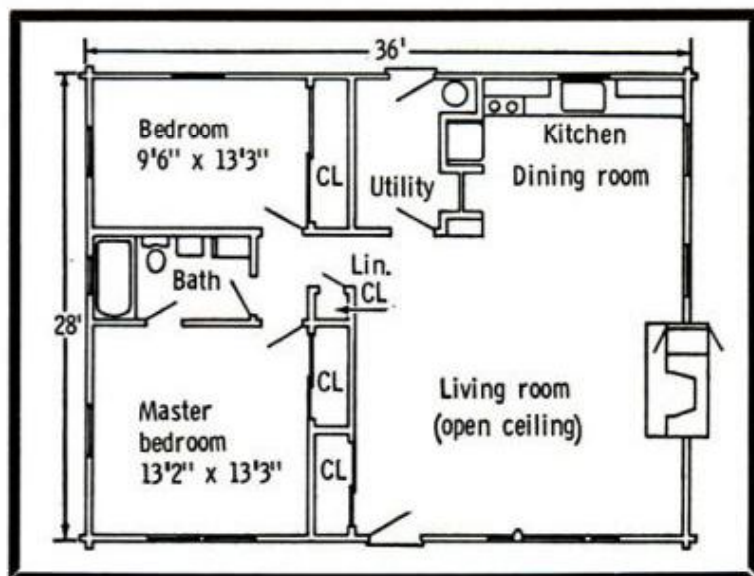
FIREPLACE INNOVATION is outside log-bin door permitting stocking wood in bin without hauling it through house



LOGS are splined and grooved vertically and horizontally and interlocked with doors and windows. Logs' thickness and caulking at all joints assures full weatherproofing of homes



PLENTY OF ROOM HERE to cook and serve with ease. By the way, the company will make up a home from your own plans, or will adapt one of its plans to your needs at no extra cost



rodents, and no painting of either the interior or exterior walls is ever required.

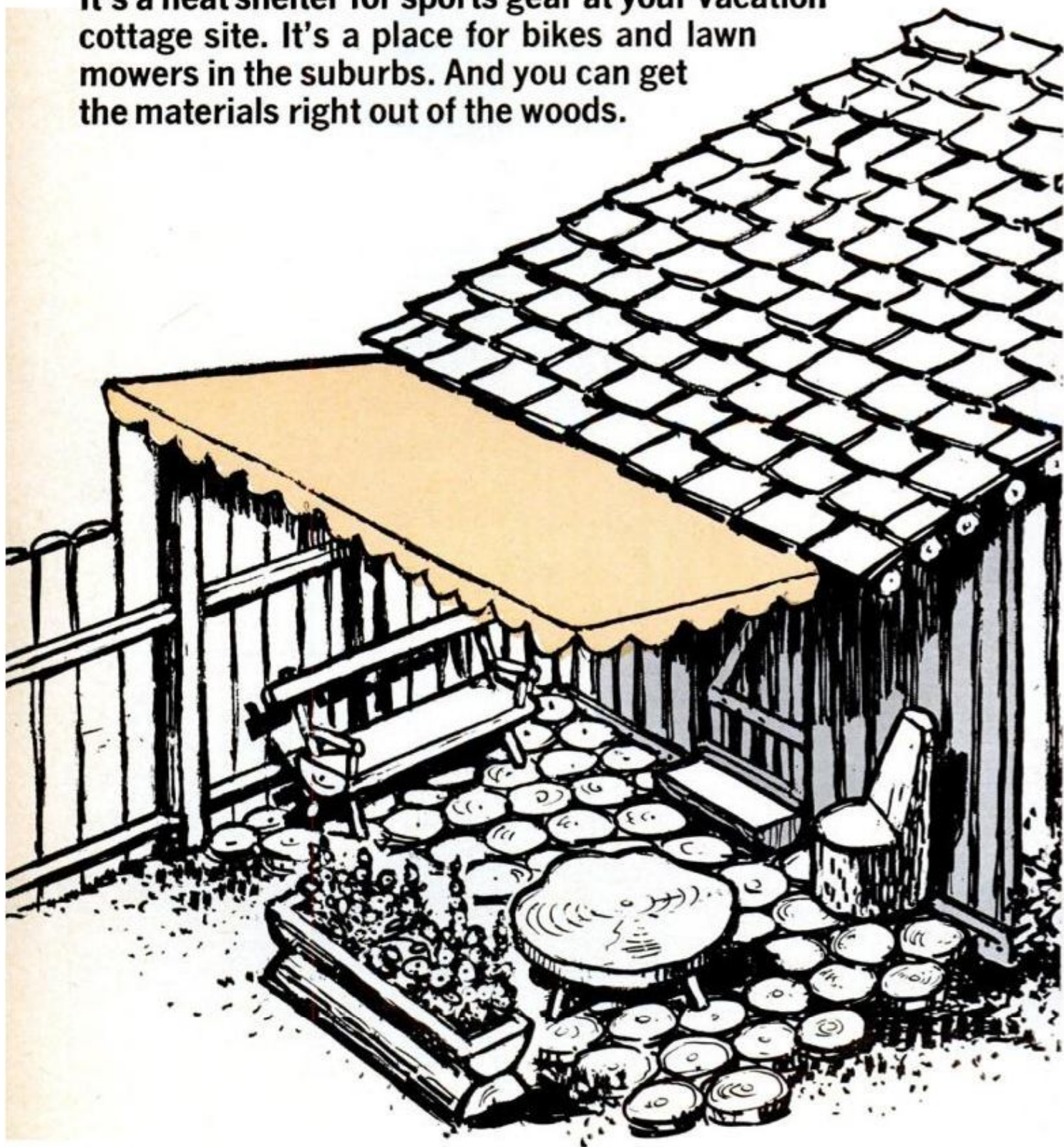
These homes come complete with all wall materials, floor joists, subfloor, oak or maple finish floor, windows and window frames, doors and door frames, partition, tie logs, and trusses where needed; purlin supports, plates, shingles, felt paper, furring strips, two layers of roof sheeting, trim, hardware, shutters, caulking and caulking gun, flashing, and window and door casings. Of course, complete illustrated plans and instructions for erecting the house are also included.

With the use of white cedar logs in this type of horizontal construction (you can also order these homes with vertical-log construction), you get what the manufacturer describes as a "home that breathes" and provides a more uniform distribution of heat. Some of the features claimed include: a 30 percent saving on building costs; a 50 percent saving (or more) on heating costs; and a 60 to 70 percent saving on maintenance costs.

The two-bedroom home shown here belongs to Bill Barr of Putnam County, N.Y. It arrived by truck last Thanksgiving Day, and a three-man crew from the factory had it up by Dec. 5—just nine days later. Total cost, exclusive of plumbing and wiring, was about \$11,500. You can pay less—or more—depending on whether you want a one-room hunter's cabin or a Swiss chalet A-frame sleeping 14. In any case, a log home is one you'll never tire of, and these are the real McCoy. ★ ★ ★

A Chain Saw Is All You Need ***Rustic Storage***

It's a neat shelter for sports gear at your vacation cottage site. It's a place for bikes and lawn mowers in the suburbs. And you can get the materials right out of the woods.



to Build This **Shelter**



IF YOU'VE BEEN PUTTING OFF building a storage shelter at your vacation cottage site—or in the back yard—because lumber is expensive, take a look at *PM's* rustic storage shelter. You start simply by felling a few trees, assuming your property is heavily wooded.

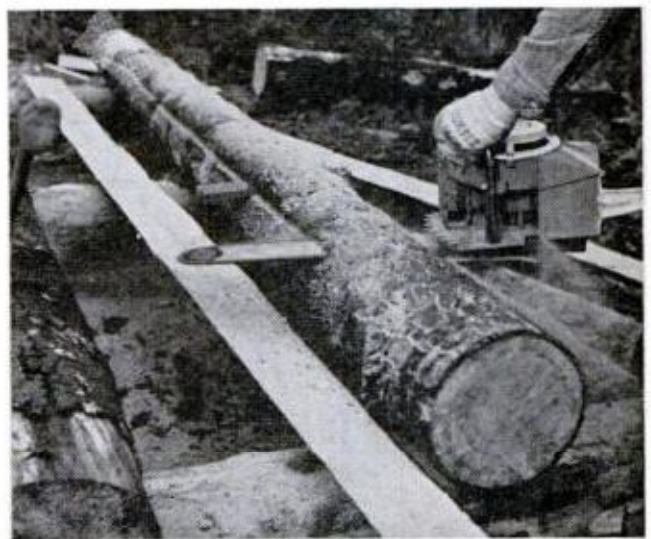
Made of virgin logs throughout, this all-weather shack can serve as a playhouse or garden-tool storage shelter in the suburbs. Or, at a vacation spot, you can store outboards and other sports gear in it—or even use it as a fishing and hunting cabin. In fact, the construction techniques outlined here could be adapted to a full-size vacation cabin. All cuts are made with a chain saw.

Even if you're already among the two million chain-saw owners you may be surprised to learn that the tool can be used for precise notching, mortising and ripping. It isn't limited to coarse cutting.

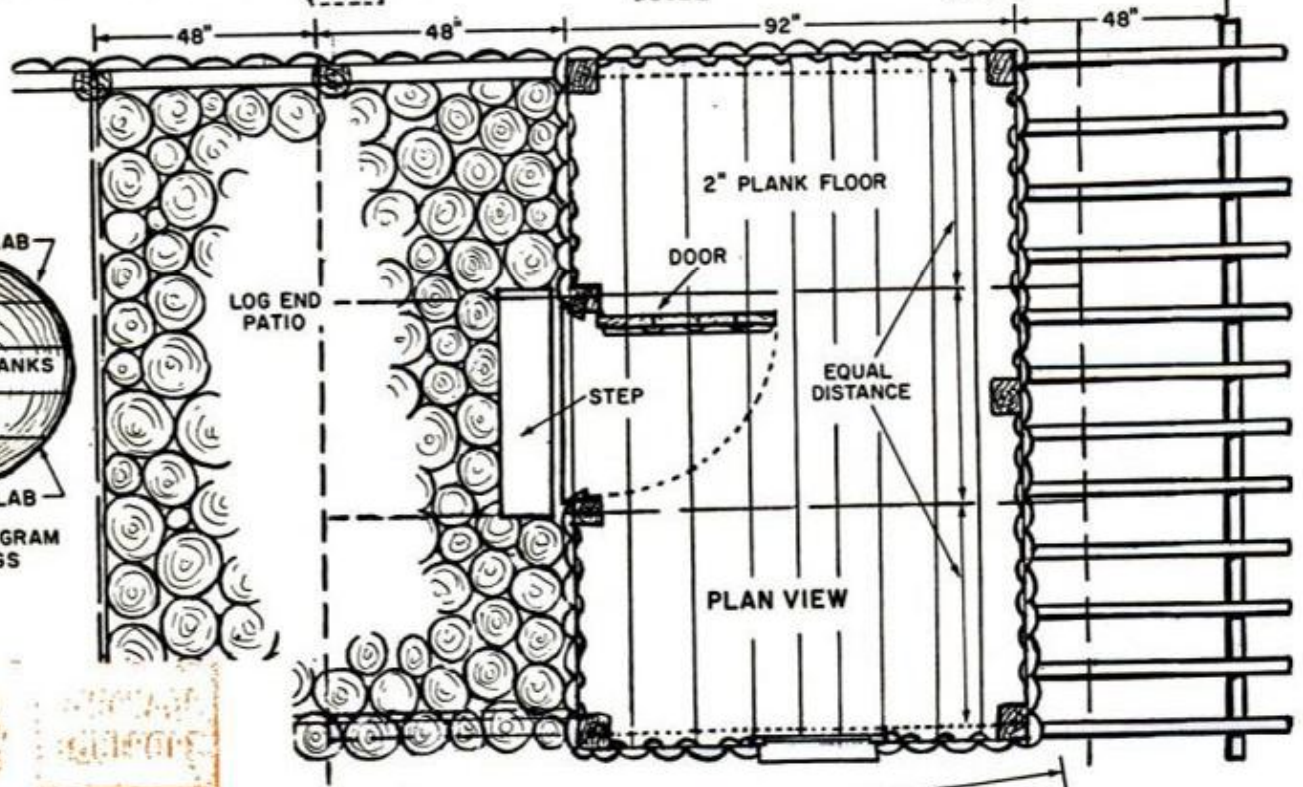
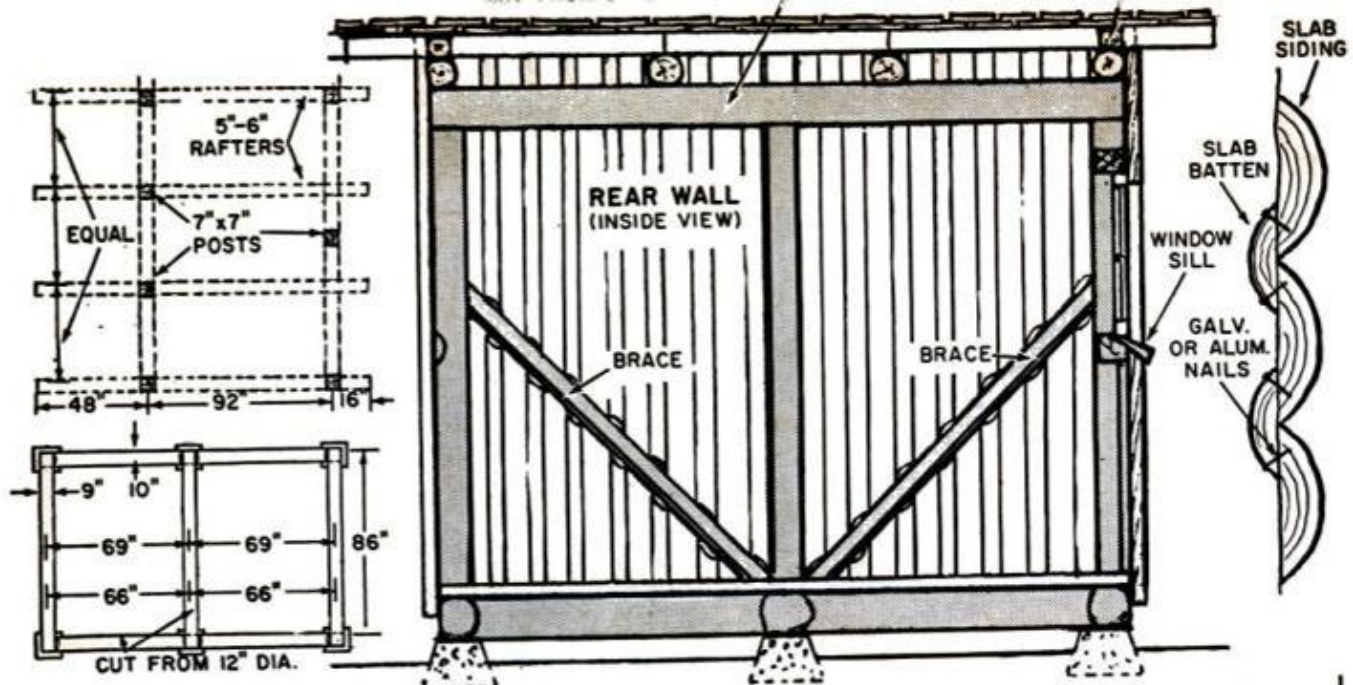
We asked *PM's* design consultant, Franklyn Jacoby, to create a cabin that could be built with a chain saw. Then we arranged with Omark Industries, Inc., designer and manufacturer of saw chains, to have it built, taking the step-by-step photos on the following pages.

Before you build, a few notes about chain-saw handling:

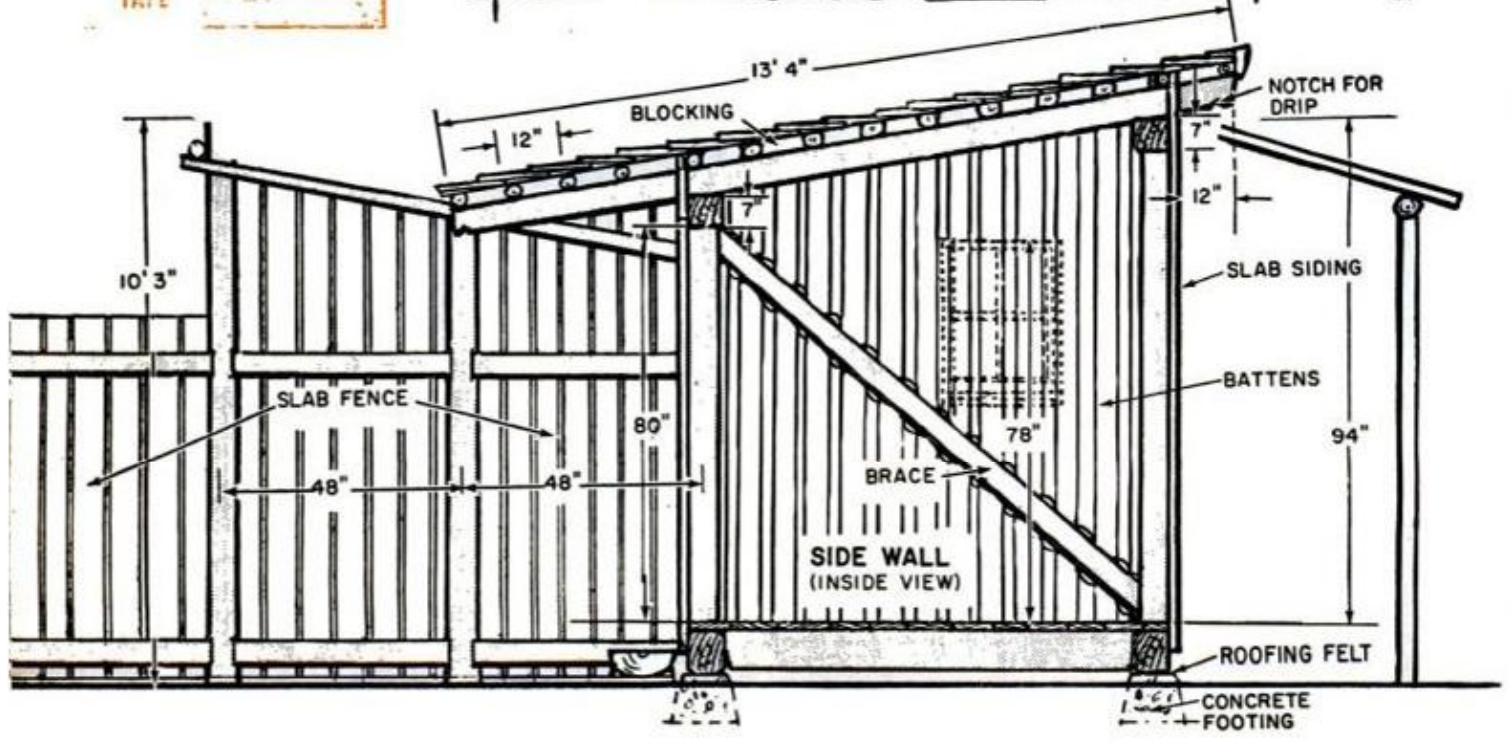
Hold the saw firmly to take advantage of its designed-in balance. Keep the blade straight (at right angles to the axis of the log). Use wedges in the saw kerf to keep from pinching the blade. Use tape for marking cuts and squaring. Be sure the saw chain is sharp. In ripping and notching logs, rest their ends on other logs to raise them about 10 in. above the ground.



DRIVE WEDGES in the kerf when ripping logs to keep saw from binding. Note use of board as guide



CUT, TOLD, TAPE





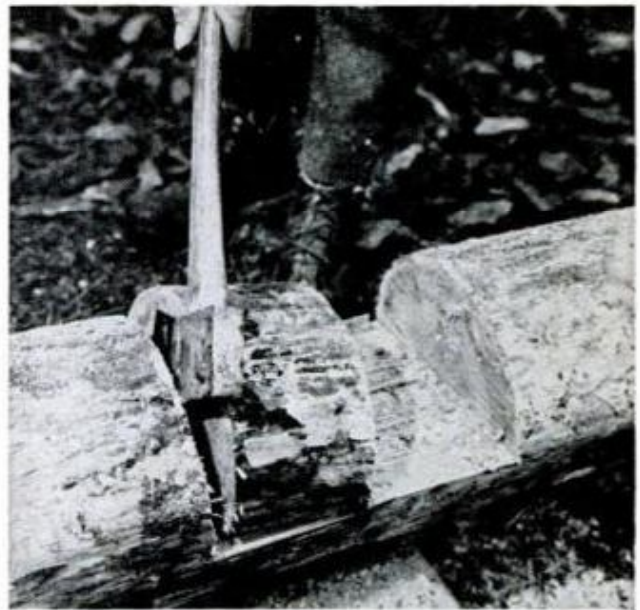
NOTCH ENDS of 10-inch foundation logs. Measure down 5 inches on end; draw line (with a level) 10 inches back from butt. At 10-inch mark, make cut halfway through log, then rip back



CROSS TIMBERS of foundation, also 10 inches in diameter, are notched for half-lapped corners. Secure timbers with 60d spikes, using two spikes at each joint. Note poured concrete piers



TO CUT MIDDLE NOTCHES, make three cuts five inches apart to a depth of five inches. The waste will be split out with an axe—one of the few other tools needed in this cabin project



MIDDLE NOTCH is cleaned out with an ax after you make the three chain-saw cuts. The use of large logs in the foundation reduces the number of cross timbers you'll need for strength



CROSS TIMBER, with its ends notched in the same way as the timbers in step 1, is rolled into place. Since foundation is low to ground, one man can handle the 10-inch logs without strain



COMPLETE FOUNDATION is now ready for floor slabs. Site of structure should be reasonably level ground with good drainage. Underbrush is cleared from site to reduce the hazard of fire



7. FLOOR SLABS are ripped from 10-inch logs. Here, special two-man attachment—an “Alaskan Mill”—is used to assure uniformity, though ripping can be done freehand if no helper is handy



8. TWO-INCH PLANKS ripped from timbers are laid on the foundation logs next. The outside (rounded) slabs left over from each timber in step 7 should be saved for use later as exterior siding



9. DRIVE SPIKES through floor slabs into foundation logs. Alternate the beveled edges of planks for tight fit, as shown in left photo. When flooring is in place, trim protruding ends flush with chain saw



10. CORNER POSTS go up next. Logs with an eight-inch butt diameter were used in this project. Two sides of each log were squared, and the slabs of excess material were saved for use as siding



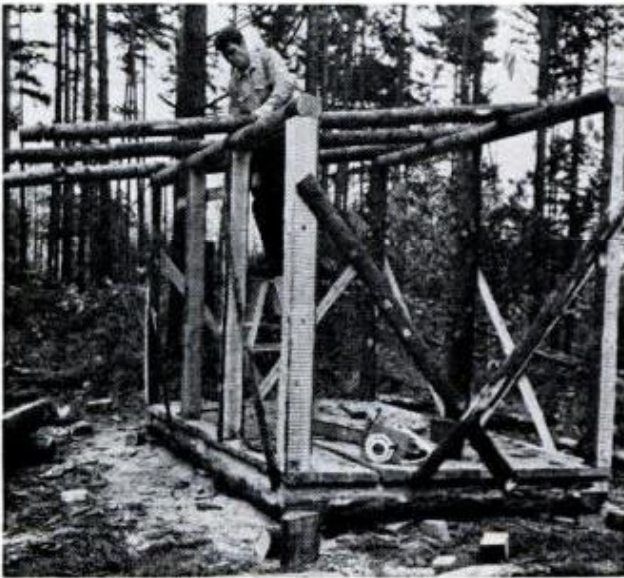
11. UPRIGHT POSTS are spiked to the floor with four 60d nails. After these posts are erected and squared, use siding slabs to brace them (as shown in step 10) till top plates are added



TOP PLATES are made of six-inch logs that are 11 feet, 8 inches long. Rip so they have a flat surface for nailing, then secure to the upright posts with two 60-penny spikes into each post



13. FOUR RAFTERS, 14 feet long and five inches in diameter, set atop the plates. The butt end of each goes toward high side of pitched roof, with inch-deep notches cut to fit the plates



GENERAL APPEARANCE of the rustic shelter, with its deep roof overhang for door awning, is now apparent. The temporary bracing in place until you set in permanent cross bracing



ON TOP OF RAFTERS go 15 purlins, 14 ft. long and about 3 in. in diameter. Nail one at top, one at bottom and at 11-in. intervals between. Timber, spiked across purlins, aligns ends



16. NOTCH THE PURLINS individually as you put them up to make them as level as possible. They will be the only base for the shakes that cover the roof, so set them as flat as possible



17. HORIZONTAL FRAMING MEMBERS placed across window wall rest in 1 x 3-in. notches in corner posts. Spike butted ends in place with 40d nails driven through posts from the outside



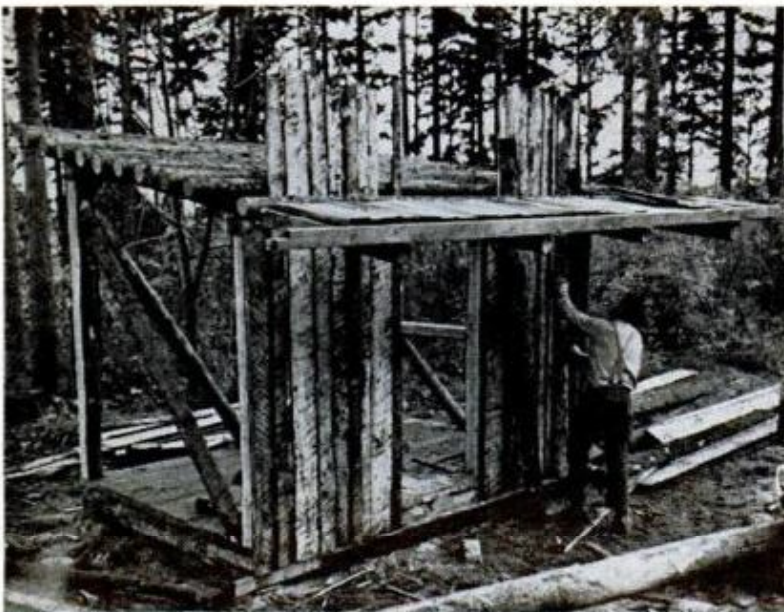
PERMANENT CROSS BRACING goes into place between the upright posts, as shown here on rear wall. Ends of the bracing logs should be cut at angle to fit upright and floor



SPIKE the base of each cross brace to the floor slabs and spike the top to the upright posts. Cross braces should be as close as possible to the thickness of the trimmed upright posts



SHAKES are laid across the purlins to form roof. Shakes were made for this roof by cutting cedar log into 25-inch bolts; wood mallet and shake froe then were used to split bolts into shakes



21. SIDING—much of it already on hand from squared-off logs—goes on vertically with 30d nails into cross framing. On front and rear walls, erect random lengths, then use chain saw to trim top ends

22. POSTS OF PATIO FENCE are only place in this plan where horizontal braces notch into both sides, but are sample of construction that would be required in larger cabin. Fence needs no battens





23. CUT WINDOW APERTURE after the siding is on. Window used in pilot model is a 28 by 30-inch nonmovable frame, though you can use any size by first adjusting framing height



24. FASTEN WINDOW SASH in place with nails driven into horizontal framing members, then caulked to make it weathertight. Note interior battens are already applied to cover gaps



25. DOORSTEP is a 12-inch log, four feet long, ripped in half and set in notched blocks for footing. The 35 patio blocks are four-inch sections sliced from large log and set on ground as paving



26. DOOR PLANKS are ripped from 10-in. log, and slabs form the cross braces. Fence is made of three 10-inch posts sunk in ground four feet apart. Braces, ripped from six-inch logs, are 3x6 in.

Chain Saw Revives Totem Pole Art

WOODCARVING has progressed from the pocket whittling knife to the lathe, but a new twist has been spawned in the Pacific Northwest.

A number of "woodcarvers" in Oregon, Washington and California have taken to the chain saw for the ancient Indian art of carving totem poles. They're doing so well at it that their products are virtually indistinguishable from the real thing, even to the chisel marks.

Formerly the handiwork of artisans in the Tulalip, Tlingit, Haida, Nootka and Kwakiutl tribes, totem poles had nearly vanished. Now, as with all modern technology, the chain-saw technique has out-

stripped the Indian artisan. By speeding production to ten times what the Indians could accomplish with hammer and chisel, power carvers have revived the art.

As these enterprising wood sculptors have found, any one adept at using a lightweight chain saw will find a ready market for these replicas of Indian art, both in commercial applications (motels, restaurants) and for home use in decorating yard and garden settings. And as an example of how one can make a chain saw quickly pay for itself by producing these primitive wood statues, a 12-footer was recently bought by a Portland hotel for a mere \$500!



and Down She Goes

OKAY! So that old tree in the back yard has got to go to make room for the new wing you're adding to the house. But before your pioneer blood starts churning you toward this primeval task, paste the following tree-felling rules in your cap:

1. Determine which way the tree will fall. This shouldn't be too tough; most trees "lean" in some obvious direction, though how it falls will depend much on the manner in which the tree is cut. If your tree has a tendency to lean toward the house—better think about securing a guy (cable) near the top and leading it to the family car perhaps to help pull it in the opposite direction when you're ready to yell "Timber!"

2. Use a chain saw, of course (axes went out with the last bankrupt logging company). Saw out a notch, about waist high, on the side the tree is going to fall. Cut the bottom of the notch parallel to the ground and about halfway through the tree. Cut the top of the notch at a 34° to 40° down-angle; then knock out the wedge.

3. To fell the tree, make a cut parallel to the ground on the back side of the trunk, about an inch above the bottom of the notch, to form a "hinge" and keep the tree from twisting. *Don't cut all the way through!* When the tree starts to sway, step back fast and let gravity take over. If it won't tumble, drive a wedge or two into the back cut to help it on its way. Finish by cutting the stump as close to the ground as possible. Just be careful not to dig the bar and chain into the dirt. Nothing dulls a saw faster.



START THE WEDGE CUT on the side you want the tree to fall. Make bottom cut of notch first

MAKE SECOND CUT (wedge cut) at about 35° slant after first cut is halfway through trunk

TO FELL TREE, make back cut slightly above bottom of wedge cut. Yell "Timber!" and run

Photos courtesy Wright Saw



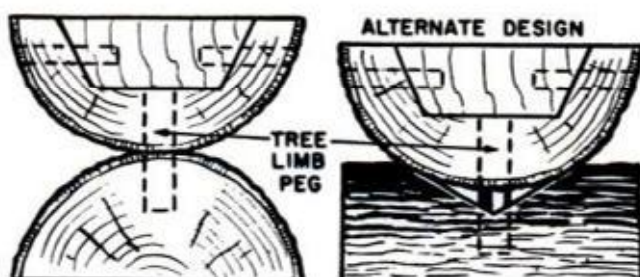
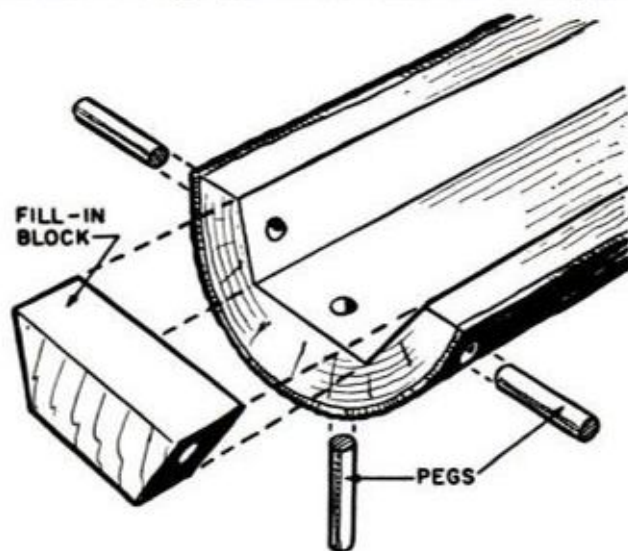
Chain Saw Speeds



YOU CAN "CARVE" rugged, eye-catching lawn furniture and garden accessories as easily as you'd slice roast beef with an electric carving knife. All it takes is a chain saw—a lightweight, like the one at left, is fine—and you can rent it from a tool agency or a lumber yard, if you don't think you'd find enough uses to warrant purchasing one. The ease with which these remarkable little machines slice through the toughest tree make an ax as obsolete as a stone thonged to a club. And you can manage cuts with them that would be impossible with any other portable saw.

That handsome planter on the next page is a case in point. If you don't mind torturing your saw, you *could* chop out the entire recess by means of plunge cuts, but we recommend the "open end" technique demonstrated in the bottom photos, and in the sketch below. The two log halves are locked together with a couple of pegs.

Like the planter, the furniture pieces shown in photographs on the following pages were specifically designed as chain-saw projects. They're all constructed from unmilled logs you'd have at hand if you



Rustic Log Projects



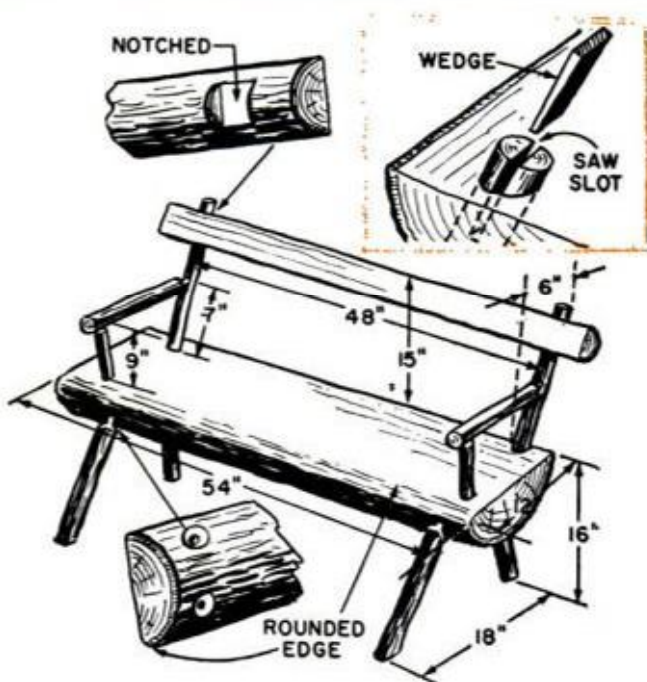
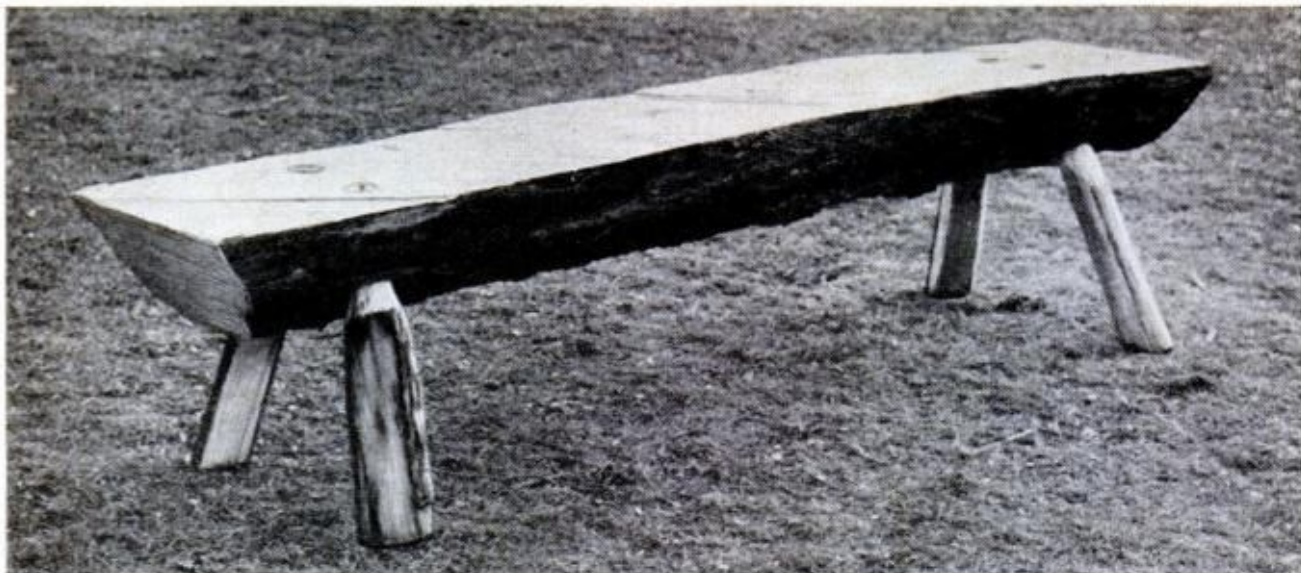
FULL-LENGTH CUTS, running parallel but canted inward, are made to consistent depth in halved log

APRIL 1966



STEEL WEDGE, driven into base line of trough, chips out waste between kerfs. Pegged blocks close ends

151



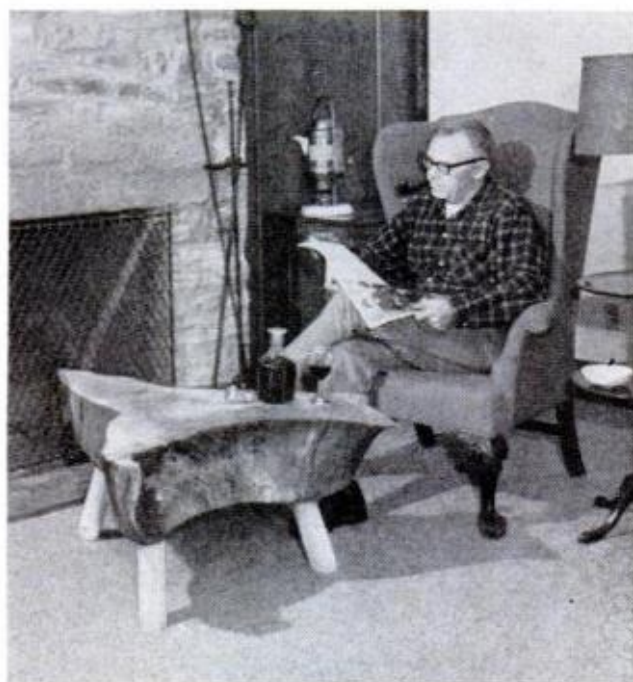
first used your saw to clear wooded property (see page 149 for tips on felling trees). If you have no large timber to take down, you could doubtless buy a few logs from a nearby saw mill—or else keep an eye peeled for any trees in the area that are marked for destruction.

Softwood logs are, of course, lighter to wrestle around and easier to work, but certain deciduous trunks have attractive bark and could be used for pieces that will not often be moved.

The diameter you choose depends on the project. The bench in the photo above was sliced from a 16-in. log and four leg sockets were drilled through at splaying angles. The legs are quarter sections of a 6-in. log, their socket ends tapered round with a drawknife and slotted to take a



GIANT AUGER BIT— $1\frac{3}{4}$ -in. dia.—bores 3-to-4-in. deep sockets in bottom face for driving in three legs



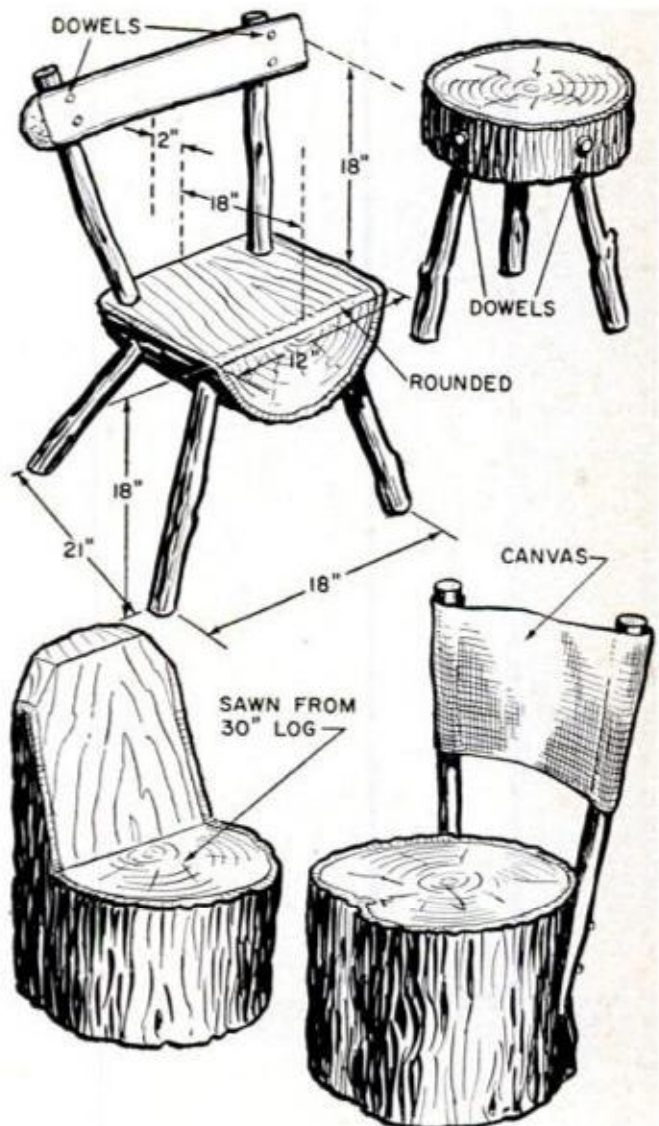
SLAB TRIPOD TABLE is at home in rustic indoor setting above, and in outdoor grouping on next page



locking wedge; this is dipped in waterproof glue and driven in after the leg is glued in place, then trimmed flush with the seat. A "settee" version of the bench (from a smaller log) is sketched at far left.

The canvas-back chair is nothing more than a section of 16-in. log with two lengths of sapling lagscrewed at one side. Over these is slipped a foot-wide canvas sleeve which can be tacked to keep it from slipping down. The one-piece chair is formed by two pairs of meeting cuts. Unless you have a log of at least a 20-in. diameter, this design is appropriate only for a child's perch, as in the photo above.

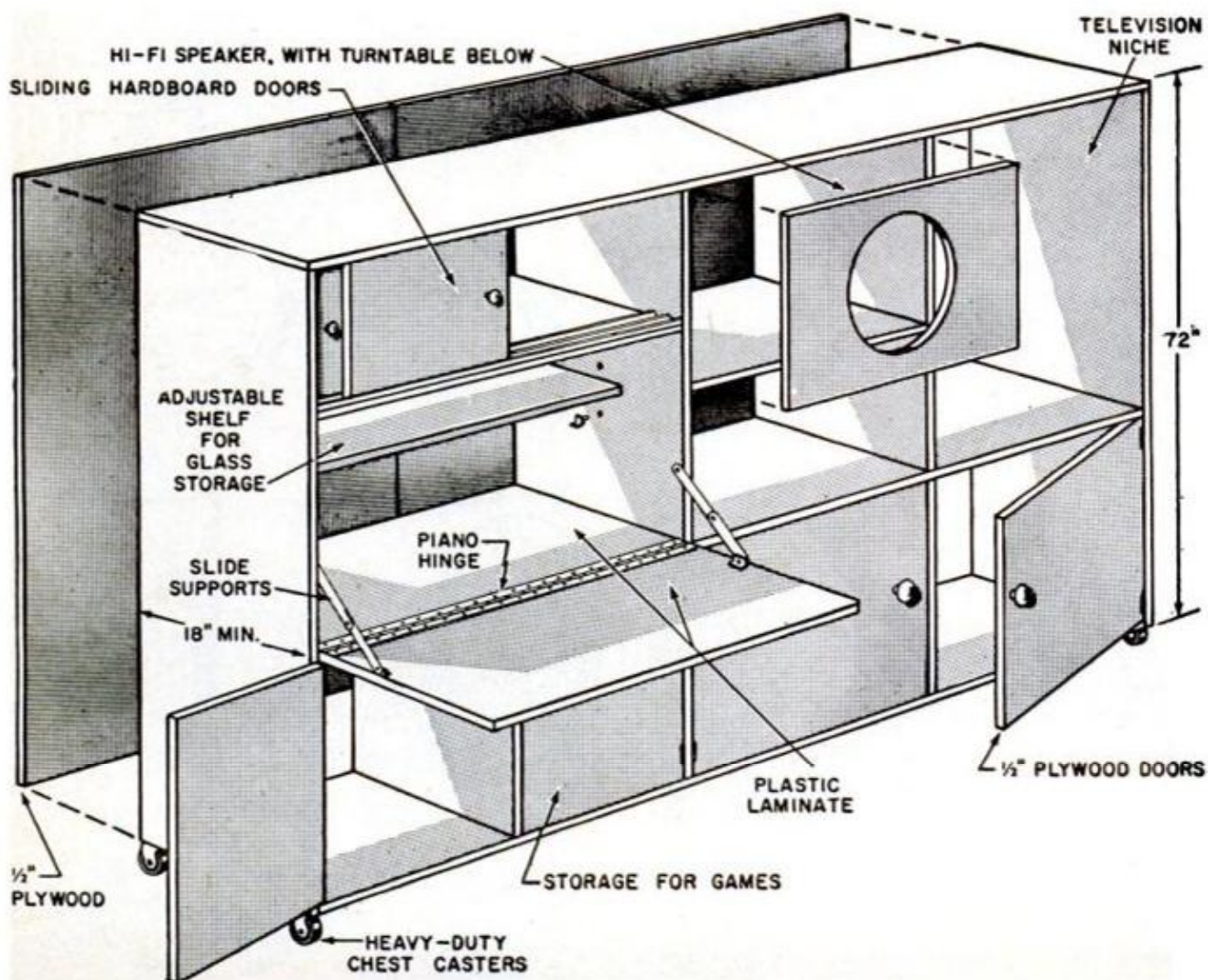
The simplest of all the projects is the table. Here the choice and cutting of the slab is all-important. Choose a section with an interesting shape (the slab shown was sliced from a crotch of ash) or make your parallel cuts at an angle across the log for a oval effect. The only treatment for the top surface, here, was a brisk sanding with a no-clog paper, followed by a liberal rubbing of linseed oil. For interior use, you may want to apply several coats of bar-top varnish—or even fiberglass—assuming the wood is properly cured. The legs may be wedged in their sockets like those of the bench; here, blind sockets were bored, so the wedges "bottomed" as the legs were driven in. ★★★

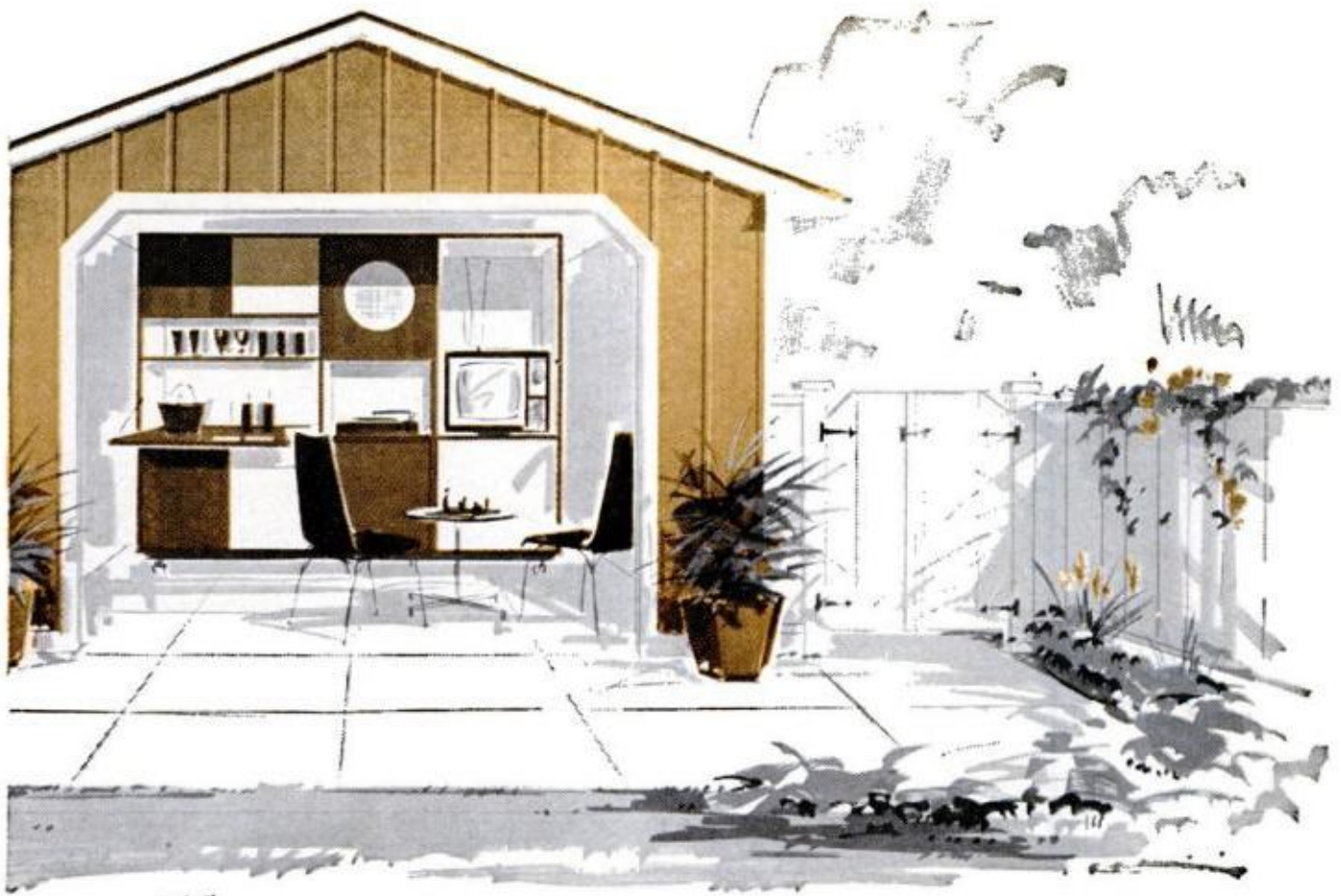


Make room for summer

(3 PATIO SUBSTITUTES)

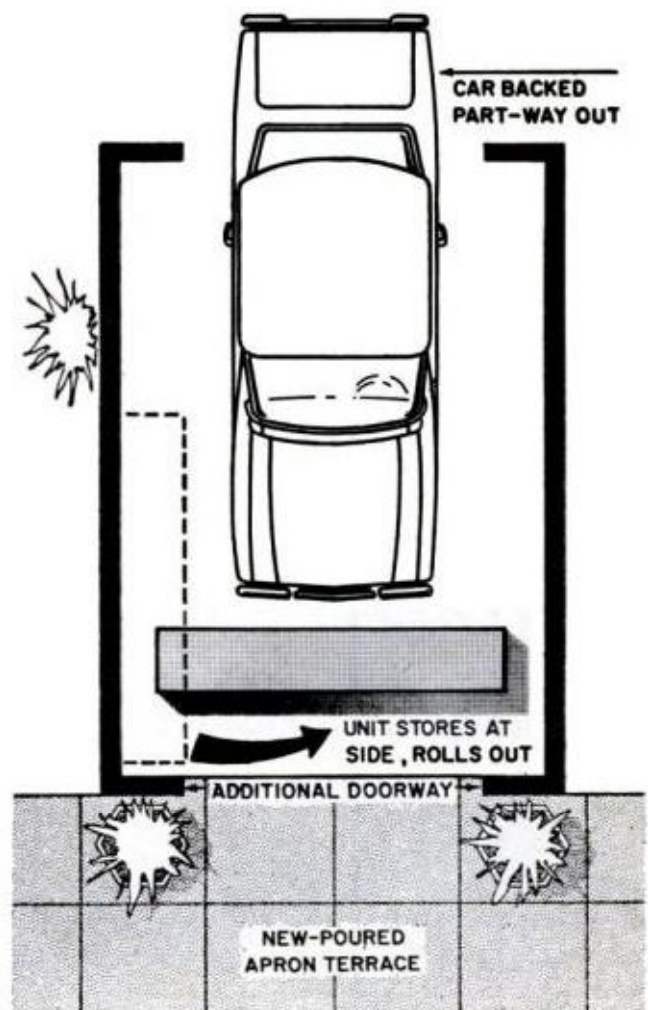
The Outdoor Living Season is just around the corner — and you're without a patio! Don't fret: here are three alternative ways to create a spot for sunning and long twilights by using space next to your garage.





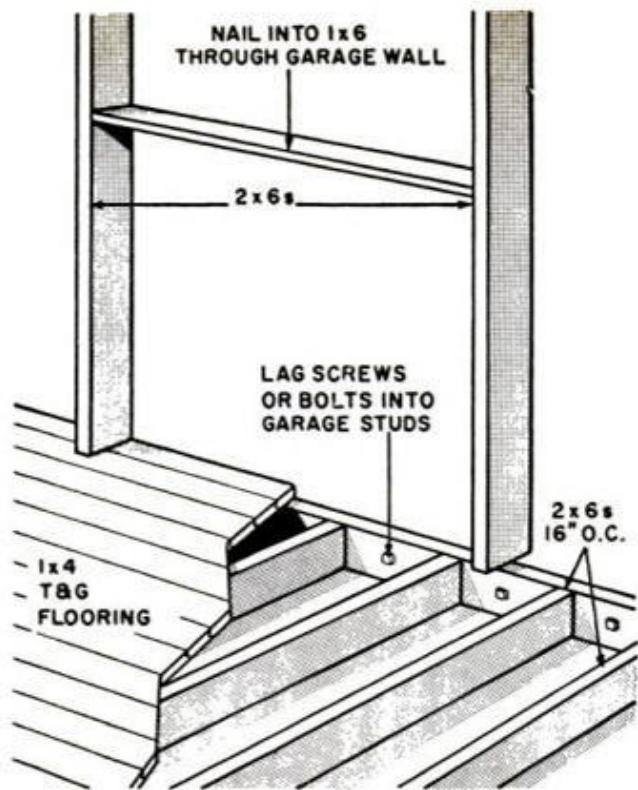
1 MAYBE YOU'VE ALWAYS thought your yard was just too cramped or exposed for a patio—or perhaps you've lacked a logical location for one. A paved area that's not tied to a house or garage often lacks privacy, and tends to "float away" from the normal living area. Yet many homes have no back or side entrance that would provide proper access to an "outdoor living room."

Here's an ingenious solution to all these problems—a patio adjacent to an existing one-car garage. Before you protest: "Mine has no space or access," look again. The plan is ideal for any garage that isn't backed up to a property line. You add an overhead door to the closed end, and pour a small concrete apron outside it. By raising both doors and backing the car part-way onto your drive (as at right) you create a combined space that's ample for entertaining—and even provides shelter from sudden showers. You adjust the depth of the indoor terrace by positioning the rolling storage wall. For evenings when mosquitoes attack, you could even provide screening on frames large enough to mask the doorway, creating a breeze-way niche for TV watching.



PRIVACY IS ASSURED if you add a low deck to the end or side of your garage that's most screened from neighboring views. As our architect's sketch (below) indicates, such an addition won't look tacked on if you apply a matching detail to the garage wall—in this case a simple H-frame that provides a shelf for plants. The railed deck is a cross between a patio and a porch. Air space beneath the floor is a barrier against dampness; ventilation prevents deterioration of the lumber and lets you combine unfinished 1½-in.-thick flooring of cedar or redwood with painted railing posts for a striking effect.

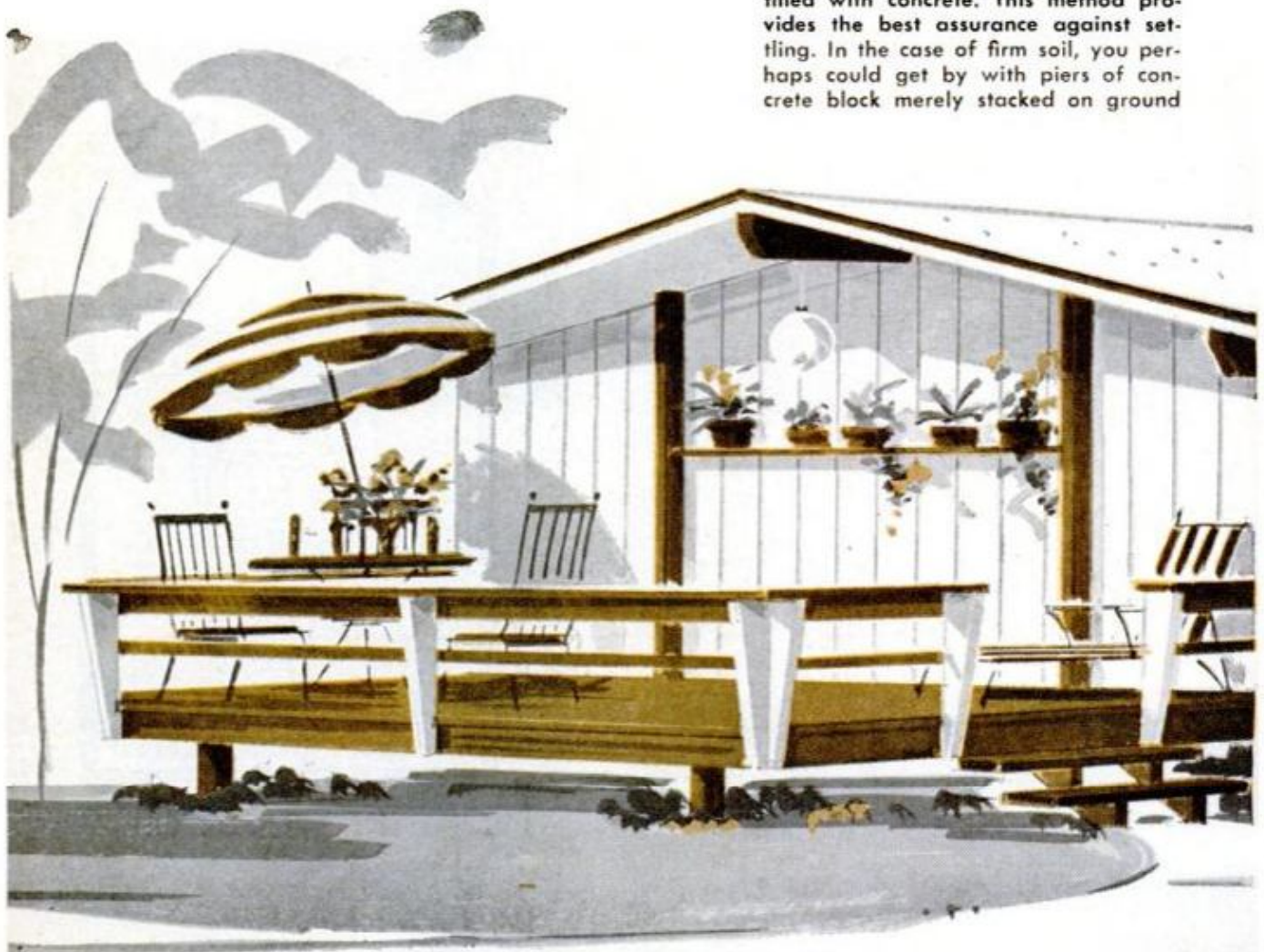
All exposed decks should be pitched slightly to encourage rapid runoff. Another treatment would be to use square-edged planks rather than tongue-and-groove flooring, and leave ¼-in. gaps between them for drainage.

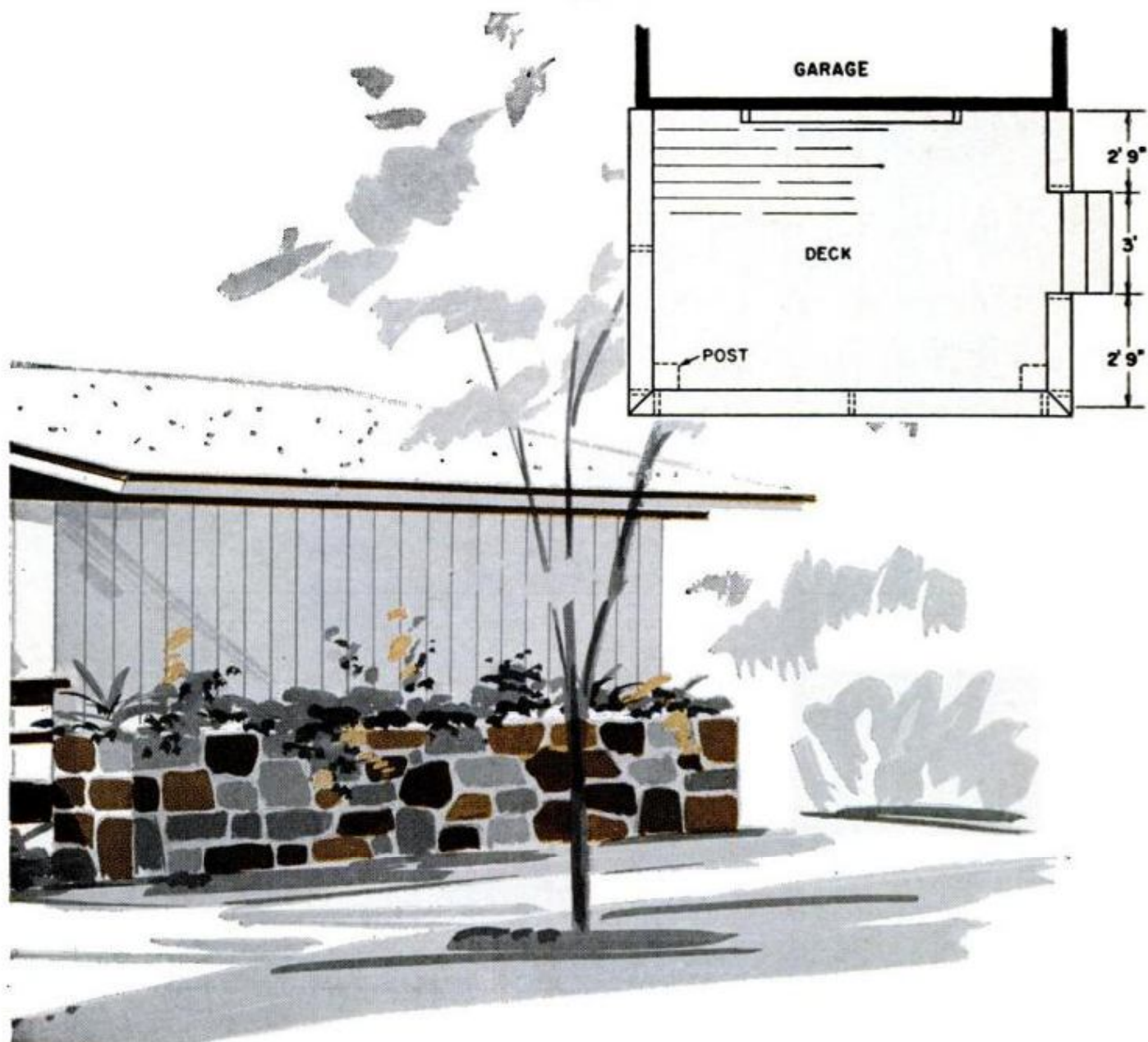
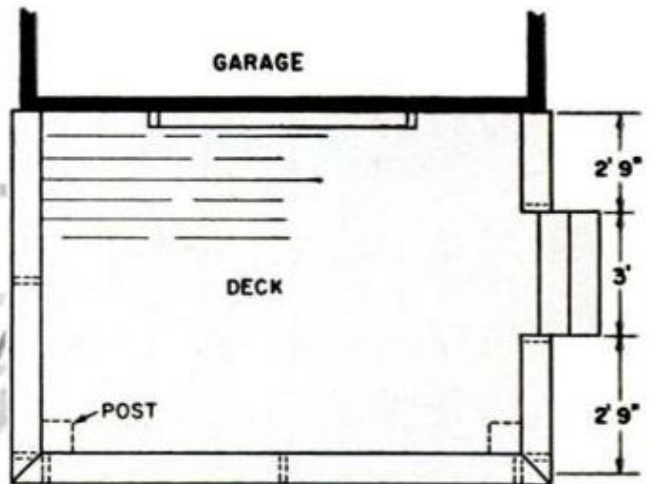
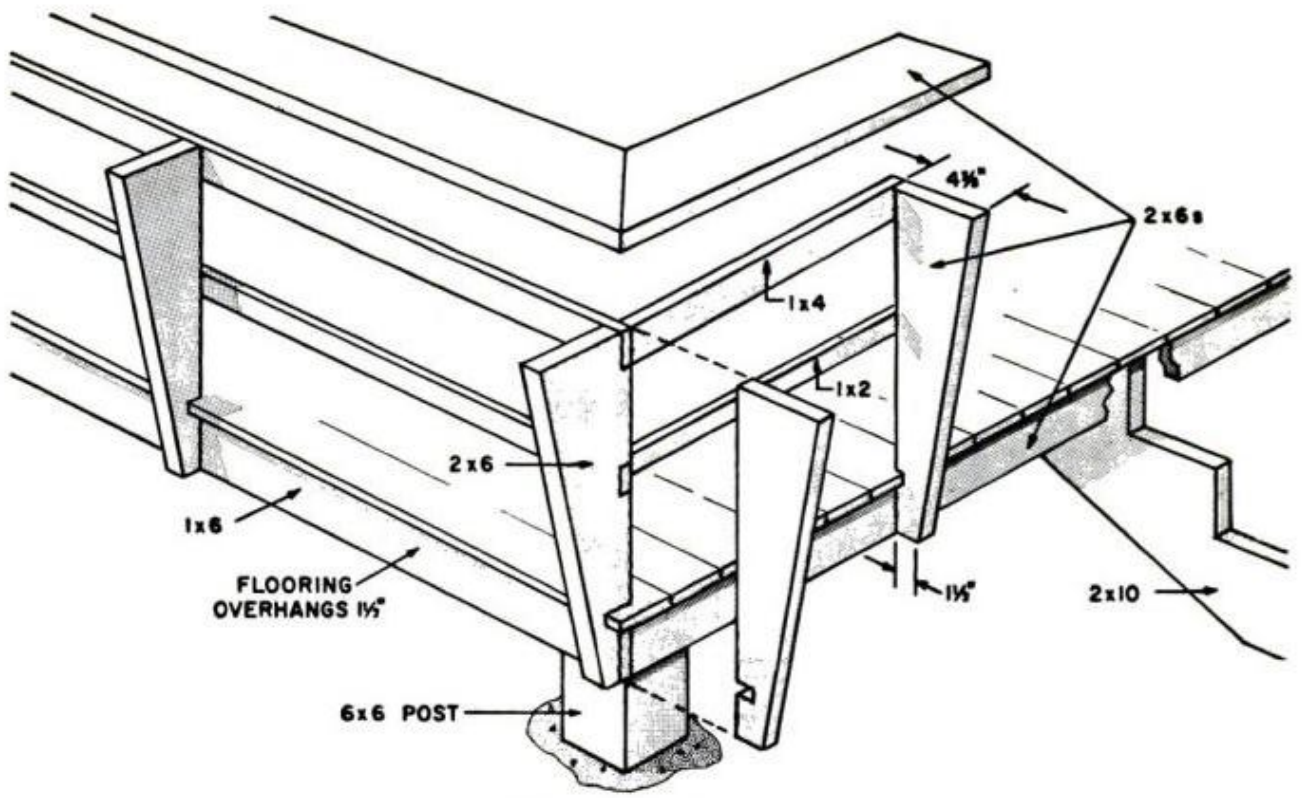


CUT,
FOLD,
TAPE

**PATIO
HIDEAWAYS**

DECK FRAMING rests on piers of 6 x 6-in. posts set 18 in. deep in holes filled with concrete. This method provides the best assurance against settling. In the case of firm soil, you perhaps could get by with piers of concrete block merely stacked on ground

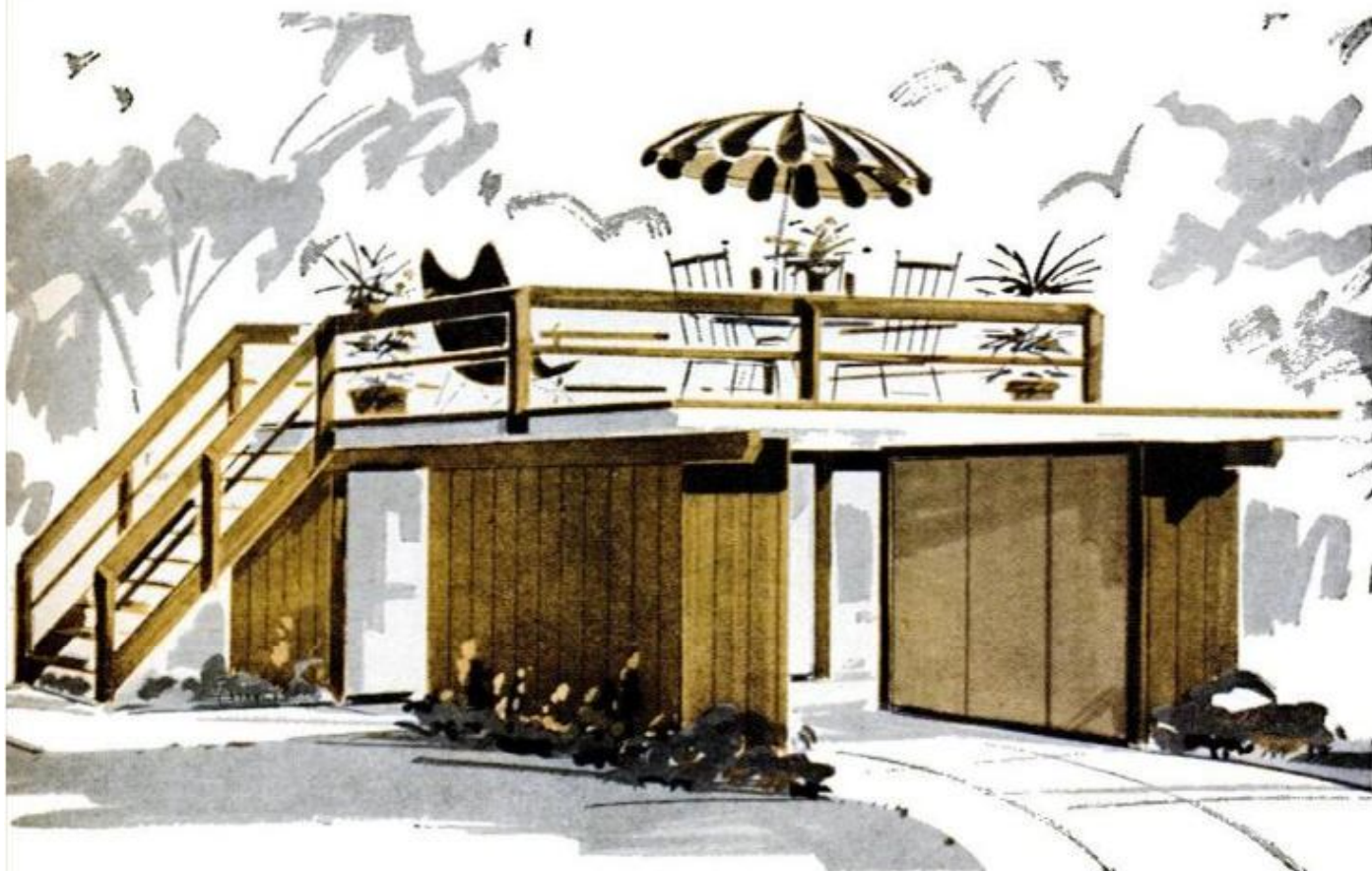
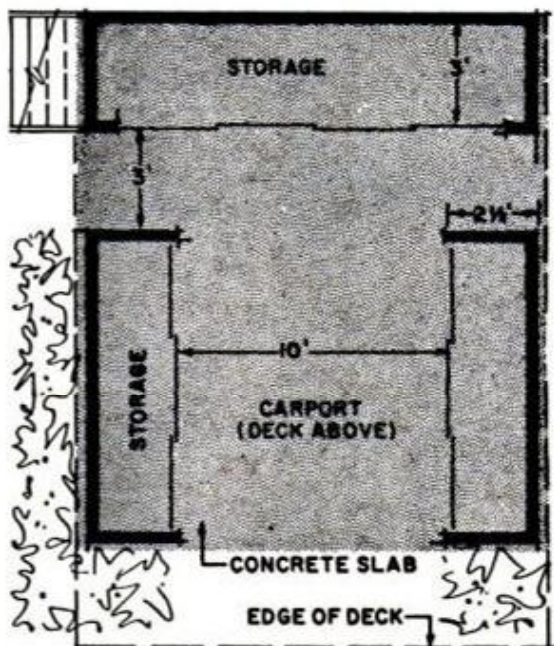
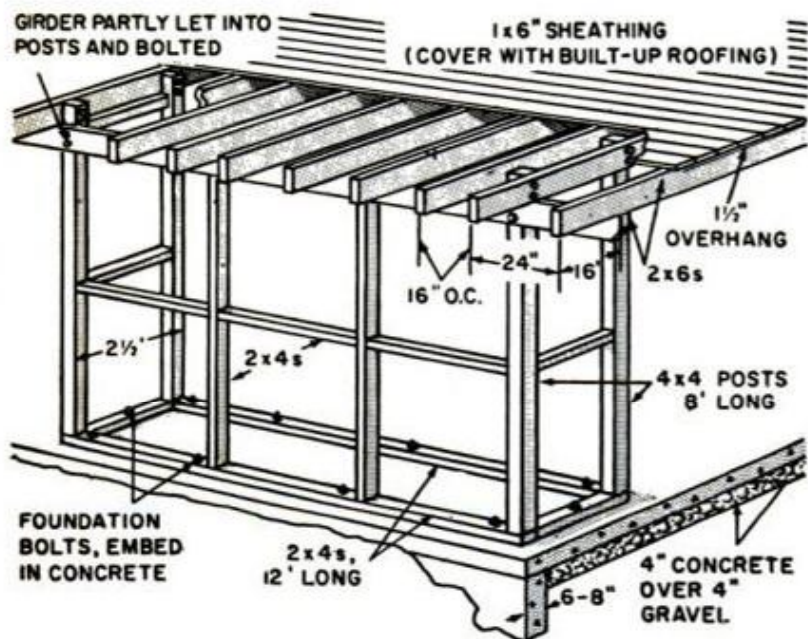




3 NO GARAGE? Then you've an ideal opportunity to create a shelter for your car, storage for yard tools and sports equipment—and an elevated sun deck, in one fell swoop. Here's a no-space patio substitute, ideal for small, exposed yards. The three storage "walls" lift you enough above the eye level of passersby to create a sense of privacy—especially for sun-bathing.

You start with a poured slab, with or without the footing shown, depending on

local climate and building codes. The total area should be adjusted to the size of your car—15 x 18 ft. would be the minimum. A recommended pitch for drainage of this slab is $\frac{1}{8}$ in. per 18 in.—the length of an average level. The deck boards should be covered with built-up roofing—three layers of 15-lb. asphalt felt laid with asphalt cement over a first layer of 55-lb. roofing felt nailed with 2-in. laps at all edges. The deck, too, should have enough pitch to prevent puddling. ★★★

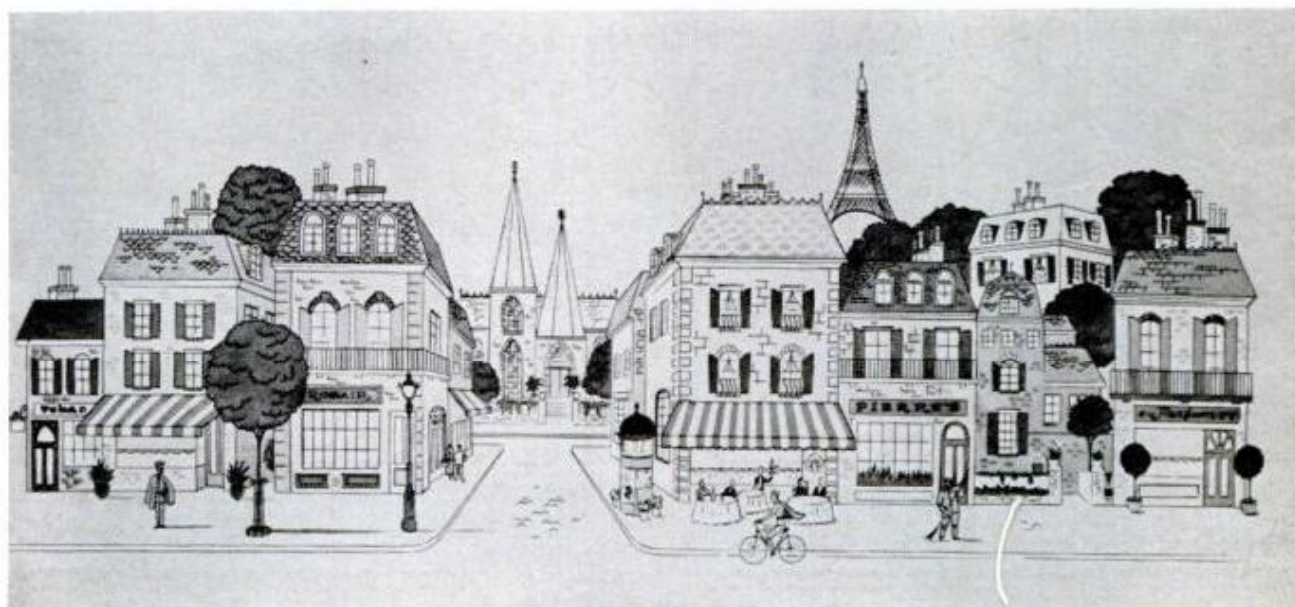
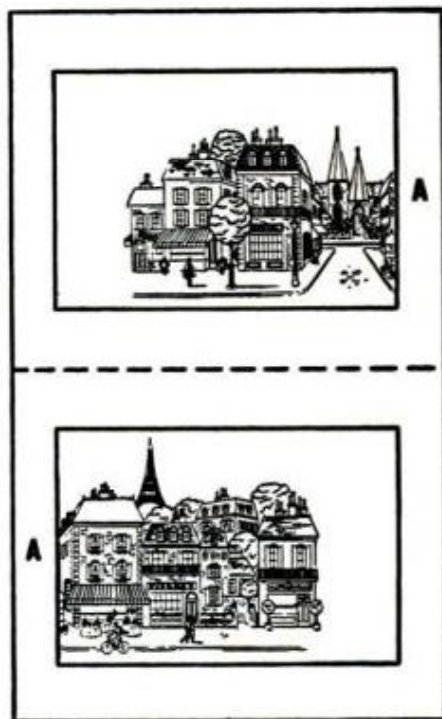


Project the design on a barren wall or trace from a full-size plan sheet. Add paint and you've got a permanent mural of great beauty

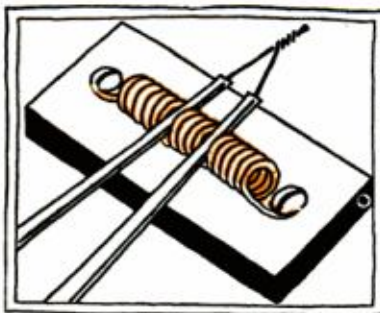


MICHELANGELO may not have enjoyed painting the ceiling of the Sistine Chapel, but *he* didn't have Project-a-Plans! By clipping the little sketches at the right, coating them with vegetable oil, and mounting them in 35-mm cardboard mounts, you can use your slide projector to "blow them up" to fill your wall. The size is limited only by how far back you can set the projector, and if your wall isn't wide enough for the whole street scene, just leave off a house on each side.

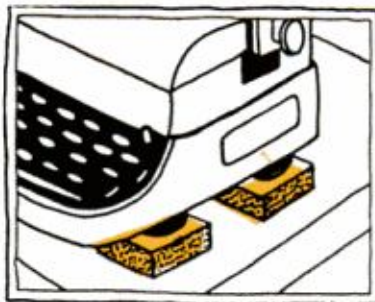
If you'd prefer to trace from a full-size 9-ft. pattern, you can order one for \$3 from Steve Ellingson, PM Pattern Dept., Box 2383, Van Nuys, Calif. Ask for Plan 379; it comes with a full-color version of the reproduction below, which you can use as a guide in applying washable casein paint. Other full-size patterns—including the scrub pine above (#308, \$2)—are available from the same source in a paint-by-number form that tells you which color goes where. Paper patterns are usable where Project-a-Plans aren't, such as on the walls of a hall that's too narrow to accommodate a projector.



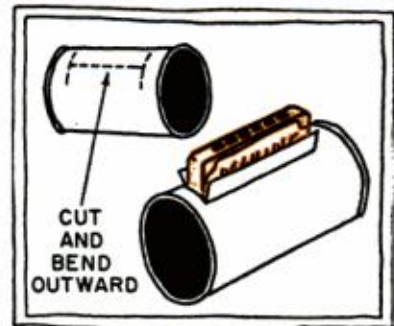
TIPS



HANDY CLAMP for holding ends of wires while you solder them can be made by attaching a coil spring to a scrap of wood

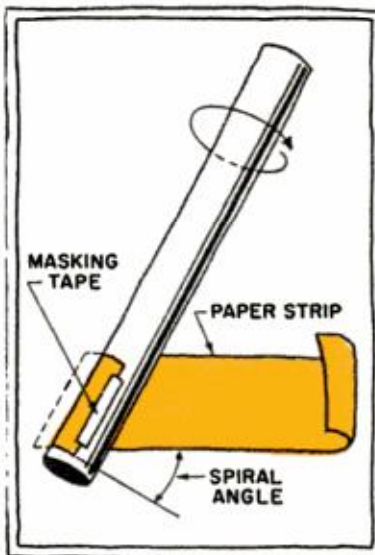


TO CUT DOWN the noise of a typewriter, saw four small pads from plastic foam packing and place one under each of the legs

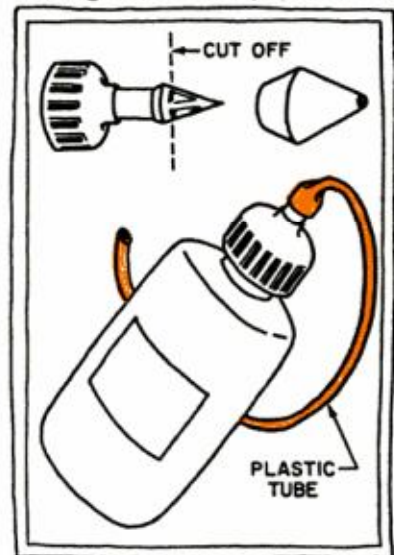


HARMONICA fitted to a soft-drink can as shown lets you produce a warble or tremolo, by moving hand over open can end

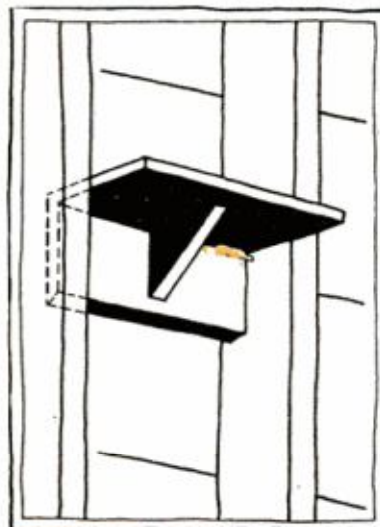
See reverse side



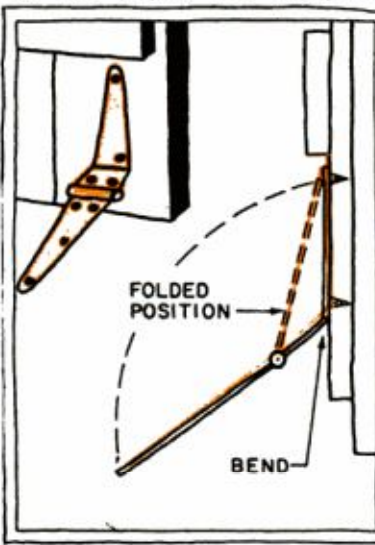
TO LAY OUT spiral line on cylinder for lathe work, wind a strip of paper around it and scribe a line along the edge of the paper. It's foolproof



TO MAKE A priming bottle for use with gas model engines, heat one end of a short plastic tube so you can fit it over the cut-off top of a plastic glue bottle



MOVABLE SHELF made to fit between studs rests on two nails driven into the studs. To move it, just lift the shelf out and drive nails in another spot

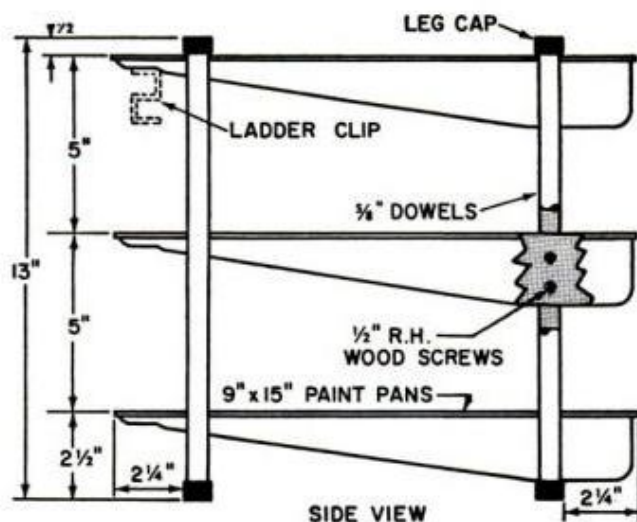


DOOR STOP to keep a shed door open is just a large strap hinge bent as shown and attached so one end touches ground at a 45° angle. It's foot-operated



COAT HOOKS driven into the studding of your garage are perfect for holding a hoe, rake, shovel or other garden tool. Two hooks are enough to hold tool

Bargain Desk Tray You Can Put Together in an Hour



HERE'S A SURE CURE for the problem of organizing all those bills, letters, magazines and other papers which litter the desk in your home office. Made from three roller paint trays, it's an economy model desk tray rack which costs only a fraction of what you would normally pay for the commercial equivalent. Total assembly time is about one hour.

Begin by removing the ladder clips from all the trays, cutting them off flush with the surface and then filing these cut edges smooth. Next, mark and drill holes in the sides of the trays for the mounting screws.

To make the three-tiered model shown here, cut $\frac{5}{8}$ -in. dowels to the length indicated and sand them smooth. For a two-tiered rack, simply make the legs 5 in. shorter. If you decide to leave the trays unpainted, give the legs a couple of coats of clear varnish before proceeding with the assembly.

The legs are attached to the trays with $\frac{1}{2}$ -in. round head wood screws. Once the rack is assembled, finish it in a color to harmonize with the surroundings. (A can of aerosol spray paint is ideal for the job.) Add the leg caps and the job is completed.—*Jack Wiley*

Improved Holder Simplifies Decorating Easter Eggs

Whether you go in for hand-painted Easter eggs or settle for decorating with commercial decals, you'll appreciate this handy accessory which allows you to hold and turn the egg without danger of finger smears. Just roll a sheet of reasonably heavy paper to form a cone and tape the end in place. If you're having an egg-decorating party, make a different color cone for each child.—*G. E. Hendrickson*

Easy-Starting Pipe Cleaner

If you have trouble pushing a pipe cleaner into that tiny hole in the pipe stem, try burning off at least an inch of the winding from one end of the cleaner. The bare wire core is much easier to fit into the hole yet won't damage the pipe. Try it out the next time you're cleaning your pipes.—*J. E. Lacombe*



Here's the Puddle Jumper PM'S SPORTY

Our November cover featured the ingenious chassis shown again at the bottom of the next page. It had been designed for us by students at the Illinois Institute of Technology, as our contribution to the "missing link in transportation"—a truly compact car that one or two people might use for suburban shopping and commuting. In that same issue, we announced a contest, inviting readers to submit designs for a body that would make best use of our chassis. The prize was the chassis itself, which would allow the winner to add the very body design he submitted. From 1262 entries, the contest judges picked the triple-version body design shown at the right. Since many contestants (as well as noncontestants) wrote us that even though they might not win, they'd still like to build the PM Suburba-Car, we herewith present complete plans for the chassis as you see it at the bottom of the next page. You take it from there in adding your own custom body—perhaps adapting the prize-winning designs here—or one of the others that figured in the final judging, as pictured on page 166 of this article.

BUILDING THE CHASSIS frame is a pure and simple welding job, only a few of the parts being a little tricky to fit and hold in place while you're pouring rod. In some instances dimensions of parts give only the rough sizes and angles as some filing and hand fitting is essential to get things square with the world before welding. Also, there's some latitude for exercise of your own ingenuity in making and assembling some of the parts. An example is the steering-gear assembly. The original is detailed, and testing has proved it to be serviceable and entirely safe for average use, but, of course, it can be bushed and otherwise elaborated if desired. Also, the inclination of the steering column and placement of the tilting seats have been purposely left to the desires of the individual builder.

Before welding the four members of the basic frame make sure that the assembly is square at the corners and true along the length. Keep in mind that in the assembly the rectangular frame is supported at an angle with the horizontal, its inclination being forward, but that the "bridge" supporting the rear deck rides

level. Elevation of the deck framing is determined by the fit and slant of the four supporting members, or legs, as in the exploded view. Once the basic rectangular frame has been assembled and the additional parts No. 30, 31, 32 and 33 have been welded in place, take special note of the placement of the remaining cross-members from No. 34 forward, also parts No. 12, which form the foot "well" when all cross members are in place. The full-length members are not dimensioned, as they must be cut, fitted and welded in place individually. Not shown is the fourth member from the front; it's directly over the front axle and is carried on two projections, or legs, made by welding two 2-in. lengths of tubing to parts No. 30. It's important when fitting and installing these members to see that they are at right angles to the lengthwise members and to make sure that all welds are sound, as rigidity and stability of the frame is largely dependent on these members. Welding of these parts completes the chassis frame.

Comes then the assembly and installation of the front axle which is almost en-

You've Been Waiting For SUBURBA-CAR



UTILITY



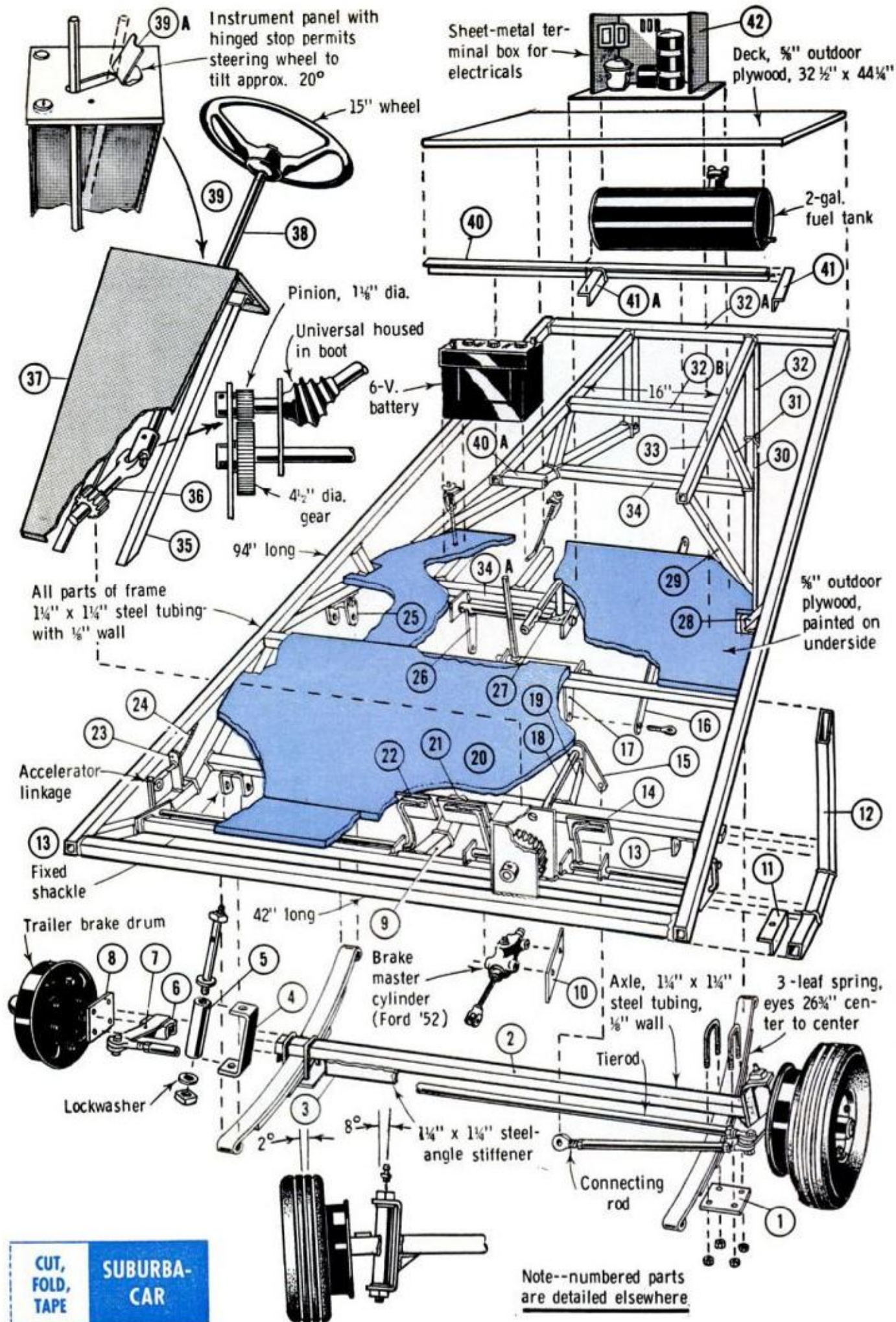
SPORT

WINNING DESIGN—actually three distinct body styles—demonstrates versatility of PM's chassis. It can become a practical little pick-up for hauling light, oversized items that won't fit in your family car . . . or a nifty little runabout . . . or a miniature station wagon. The winner was Norman K. Niemi, an instructor at the University of Cincinnati. Mr. Niemi is now the enthusiastic owner of the chassis (shown below in a test spin by IIT students). Names of 24 other finalists, whose entries were flown to Detroit for judging, are listed on page 166 with a few sample designs.



COMMUTER

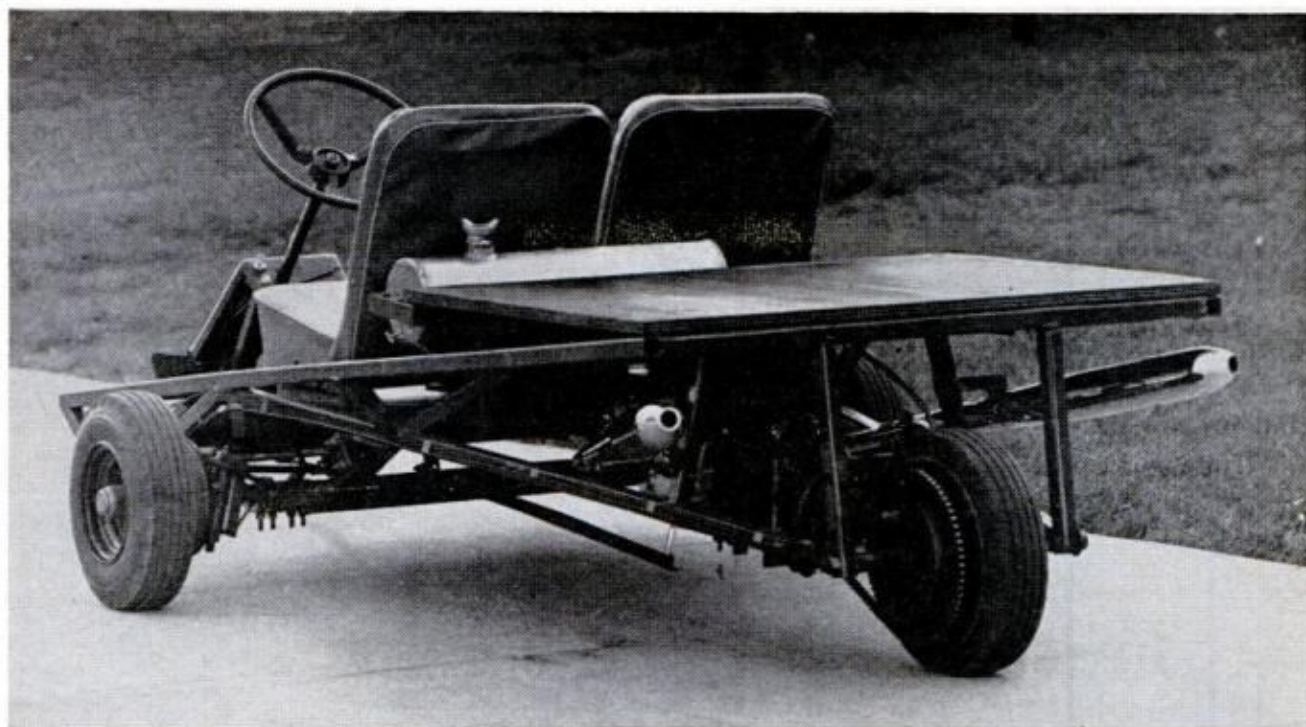




CUT, FOLD, TAPE

SUBURBA-CAR

Note--numbered parts are detailed elsewhere



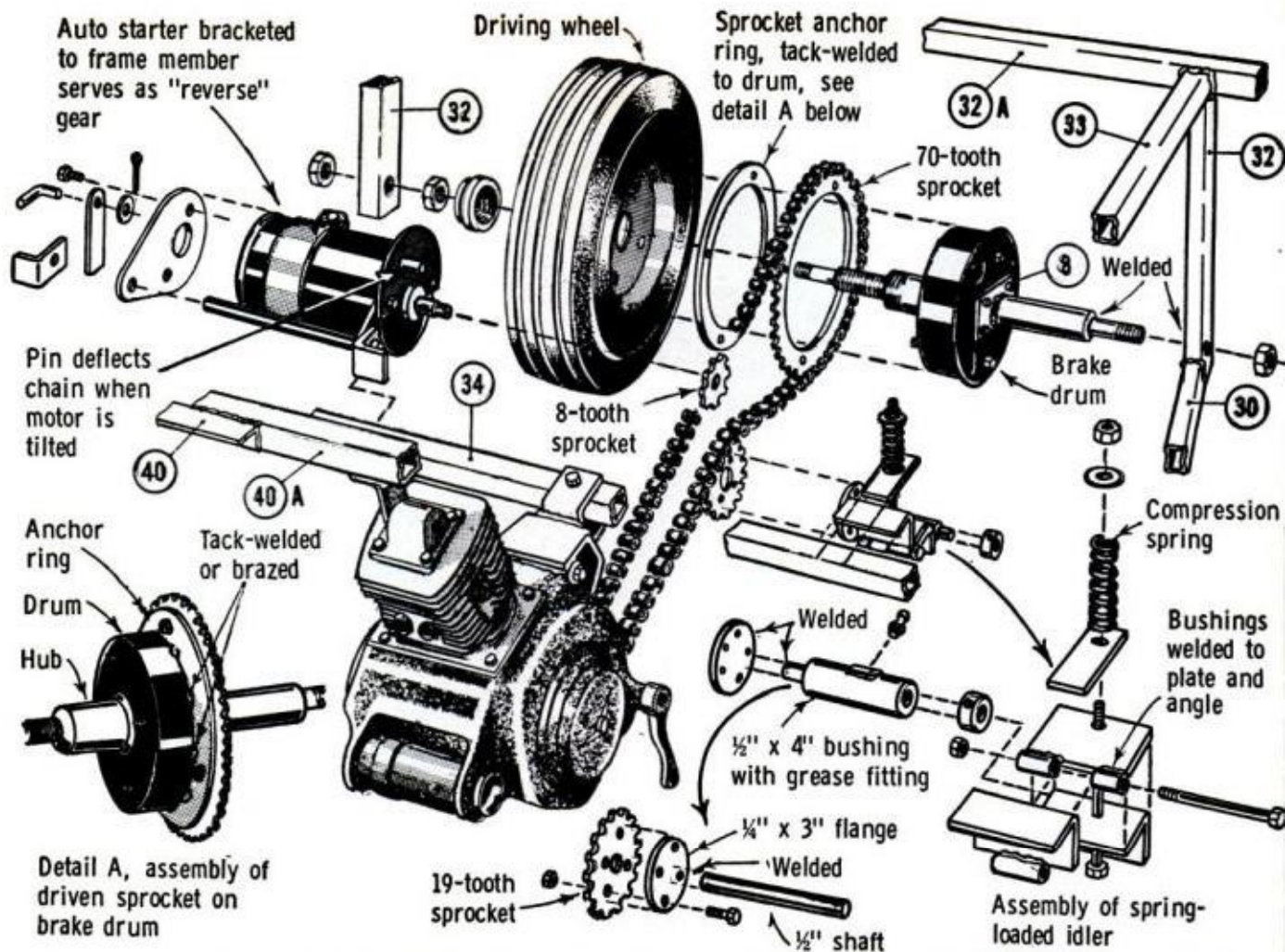
tirely unitized from stock materials and parts and is sprung to the frame with two under-slung 3-leaf springs. The fixed spring shackles, parts No. 13, are of the same thickness of material as the free shackles, but note they are a single piece and bent to a U-shape. The free shackles should have grease fittings installed.

The axle proper is a length of $1\frac{1}{4}$ -in. square steel tubing with the added rigidity of a steel angle welded to the lower face along the full length between the spring mounts. The kingpin yokes are stiffened with triangular braces welded to the yokes and axle. The kingpins are $\frac{3}{4}$ -in. bolts, each being counterbored and tapped for a grease fitting, the counterbore extending longitudinally about $1\frac{1}{2}$ in. to a hole drilled transversely at right angles to provide for passage of lubricant.

To get the assembly up on its wheels you next make and assemble the rear axle. Here the brake drum serves both for braking the car and as a mounting for the driven sprocket, the latter being bolted to an anchor ring which slips onto the drum and is either brazed or tack-welded in place. An alternative to the anchor ring is the brazing of four bolt lugs to the drum, spaced equidistantly. Of course, in this assembly care must be taken to assure that the ring (or lugs) is not only concentric with the drum, but that it turns true. Even a slight wobble may cause undue vibration of the chain at higher speeds. When assembled, the end of the sleeve carrying the plate bolted

to the brake drum is welded to upright No. 32. The weld takes the torque, or axle wrap, when the brake is applied.

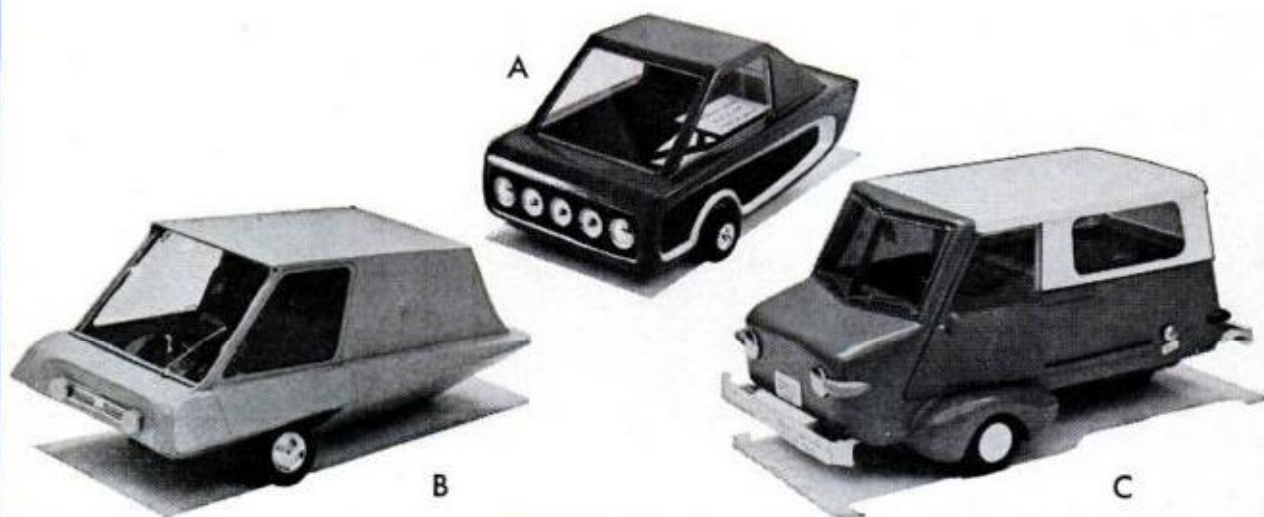
The engine, a Honda Twin Series 150, is bracketed to frame members No. 34 and 40A and care must be taken to assure that the supporting brackets are in the proper position so that the sprockets line up when the engine is installed. The drive chain is standard cycle chain, the slack being carried on a sprocket idler mounted on a pivoted, spring-loaded bracket. The engine is, of course, equipped with its own starter, generator and transmission built in, but the latter is not provided with reversing gear. To back the car, an auto starter fitted with an 8-tooth sprocket to engage the drive chain is pivoted to the frame just ahead of the drive wheel and is actuated and energized by means of the lever and linkage No. 26 and 27. To back the car, the driver lifts the L-shaped lever, No. 27, which raises the starter by means of the linkage, No. 26. The sprocket on the starter shaft engages the drive chain and, simultaneously, the driver presses the pushbutton switch in the end of the lever, thus energizing the starter. As the starter is raised the pin on the half-circular disk (bolted to the shaft end) deflects the drive chain downward at a point just ahead of the sprocket, thus preventing the latter from disengaging as the starter is energized. The exploded view of the assembly shows how the starter is pivoted. A $\frac{1}{4}$ -in. rod, threaded at the forward end and fitted with an adjustable yoke, permits

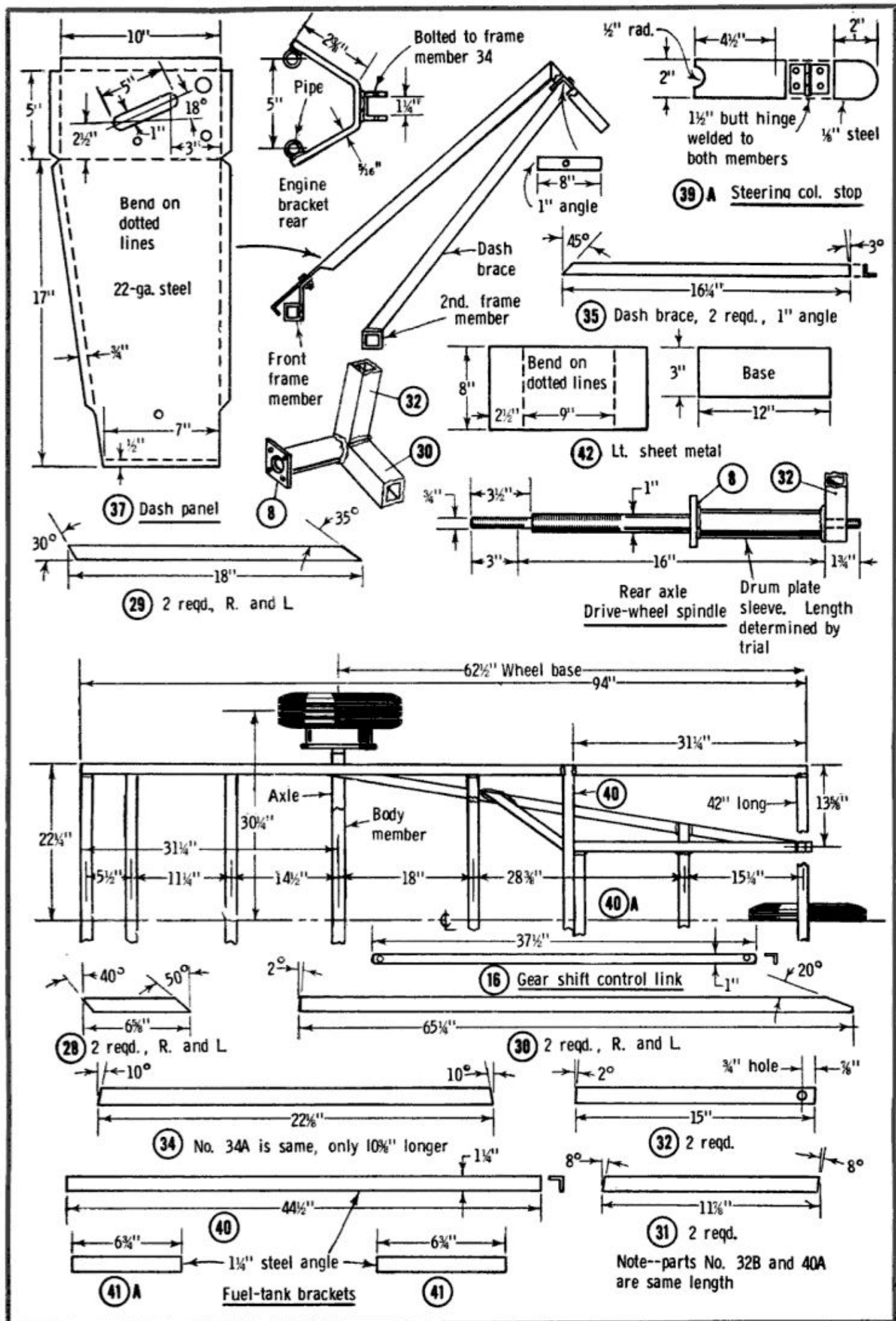


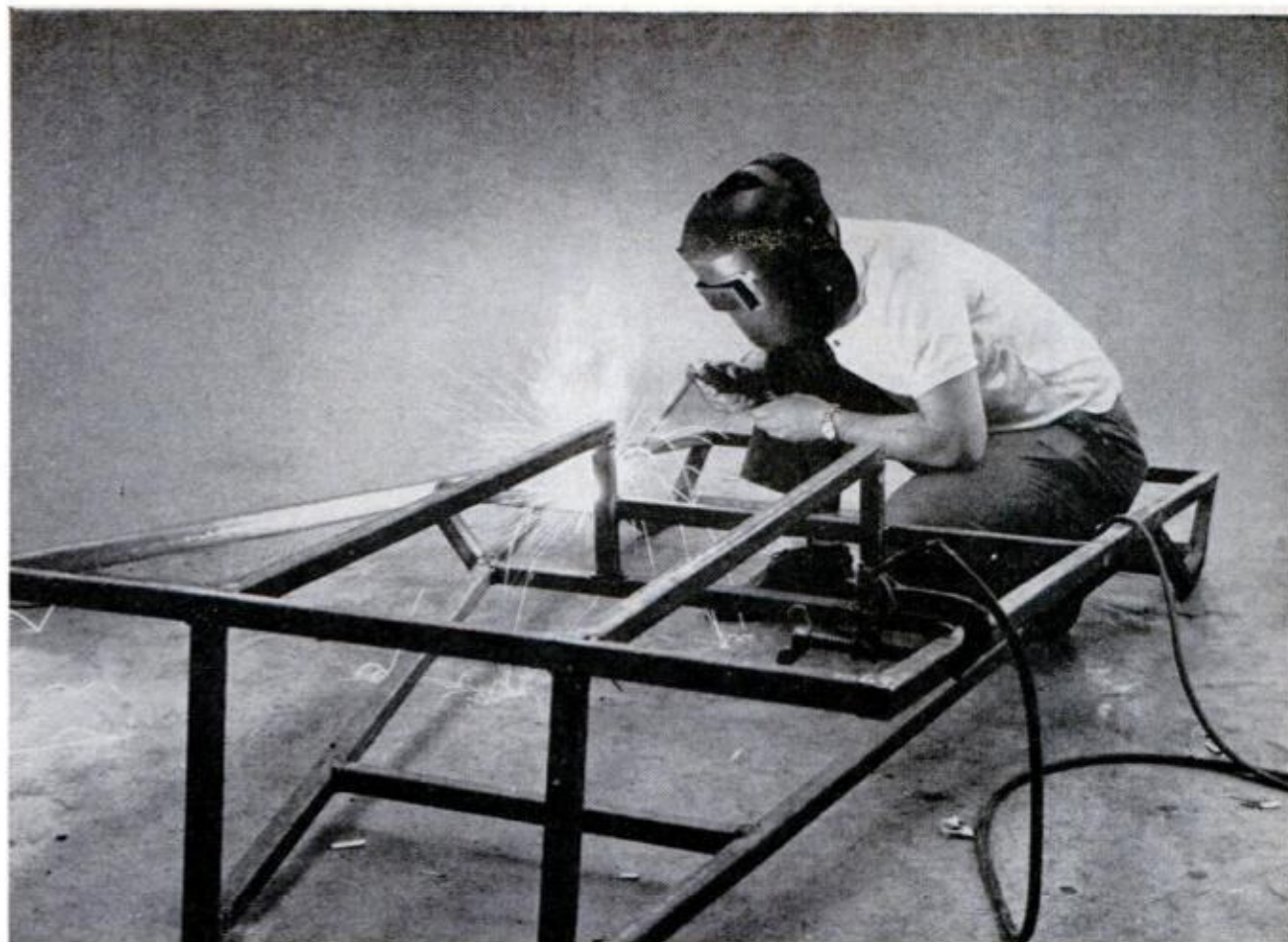
Other Finalists in Suburba-Car Contest

Don Audel, Spokane, Wash.
 Richard Caripolti, New Kensington, Pa.
 Nicholas Paul Casella, San Jose, Calif.
 Robert J. Dominick, Franklin, Mass.
 Art Dresser, Eastlake, Ohio (C)
 Richard H. Gillmore, Kalamazoo, Mich.
 David James, Waynesboro, Miss.
 Robert W. Jenny, Bellevue, Wis.
 E. Kay, Pierrefonds, Quebec, Canada
 Mike Kessler, Lakewood, Calif.
 Alva C. Kopatz, North Canton, Ohio
 Dean Kohlhepp, Miamisburg, Ohio

Ralph Losee, Hoffman Estates, Ill.
 Barry Malone, Jacksonville, Fla.
 Bill Marcyes, Bryantville, Mass.
 Arthur Marks, Canton, Ohio
 James W. Martin, Independence, Mo. (A)
 Charles Moldenhauer, Los Angeles, Calif.
 Orton Patch, Barre, Vt.
 Richard G. Raisch, Denver, Colo. (B)
 John Rapala, Elmhurst, Ill.
 Derrence Smaage, Milwaukee, Wis.
 Norman Tornheim, San Diego, Calif.
 K. Westerdale, Peoria, Ill.







CHASSIS FRAME OF SQUARE STEEL TUBING is complete welding job to assure maximum rigidity, strength

correct positioning of the starter. The starter shaft is shortened to about 1-in. projection and is either shouldered and threaded, or the sprocket attached by means of a hub and key or setscrew.

The brake master cylinder is actuated by the center pedal; the left pedal controls the clutch and the right is the accelerator, or gas pedal. Both the latter are similar in construction and assembly, as will be noted in the details. Both actuate the clutch and fuel feed through flexible cable controls, part No. 24, leading from the control arms back along the frame to the clutch and carburetor. The control cables should be attached with wrappings of adhesive tape, or better, by means of U-shaped metal clips fastened with screws turned into tapped holes in the frame members.

The gearshift lever is directly in front of the reverse lever, both being located midway between the seats. The shift linkage consists of the parts No. 16 and 17, the former connected to the shifter arm on the engine. The steering-gear housing is located between the brake and clutch pedals and is shown both in cutaway and exploded views, the housing being welded to the second cross member of the frame. It's

a relatively simple assembly but, of course, care must be taken to assure correct alignment of the pinion and gear and the shafting. The steering column passes through an angled slot in the instrument panel stop, part No. 39A. Lifting the stop permits the column and wheel to tilt approximately 20° , thus giving easy access to the driver's seat. Installation of the seats, fuel tank, floorboards, battery, rear deck and finally the electricals (according to the Honda manual) completes the chassis.

By careful scrounging in an automotive graveyard, you can come up with the parts specified, or adaptable substitutes. The prototype was built with the steering wheel from an old car, the fuel tank from a racing kart, and the bucket seats from a foreign car. All three wheels, including tires (4.80 by 16), brake drums, and leaf springs, were taken from a Gator boat trailer. It's a good idea to locate such parts before beginning construction; then if you substitute other parts for those specified, you can plan any minor modifications in the chassis that may be necessary.

Happy scrounging—and happy riding in your own Suburba-Car. ★ ★ ★

YOUR OUTBOARD MOTOR

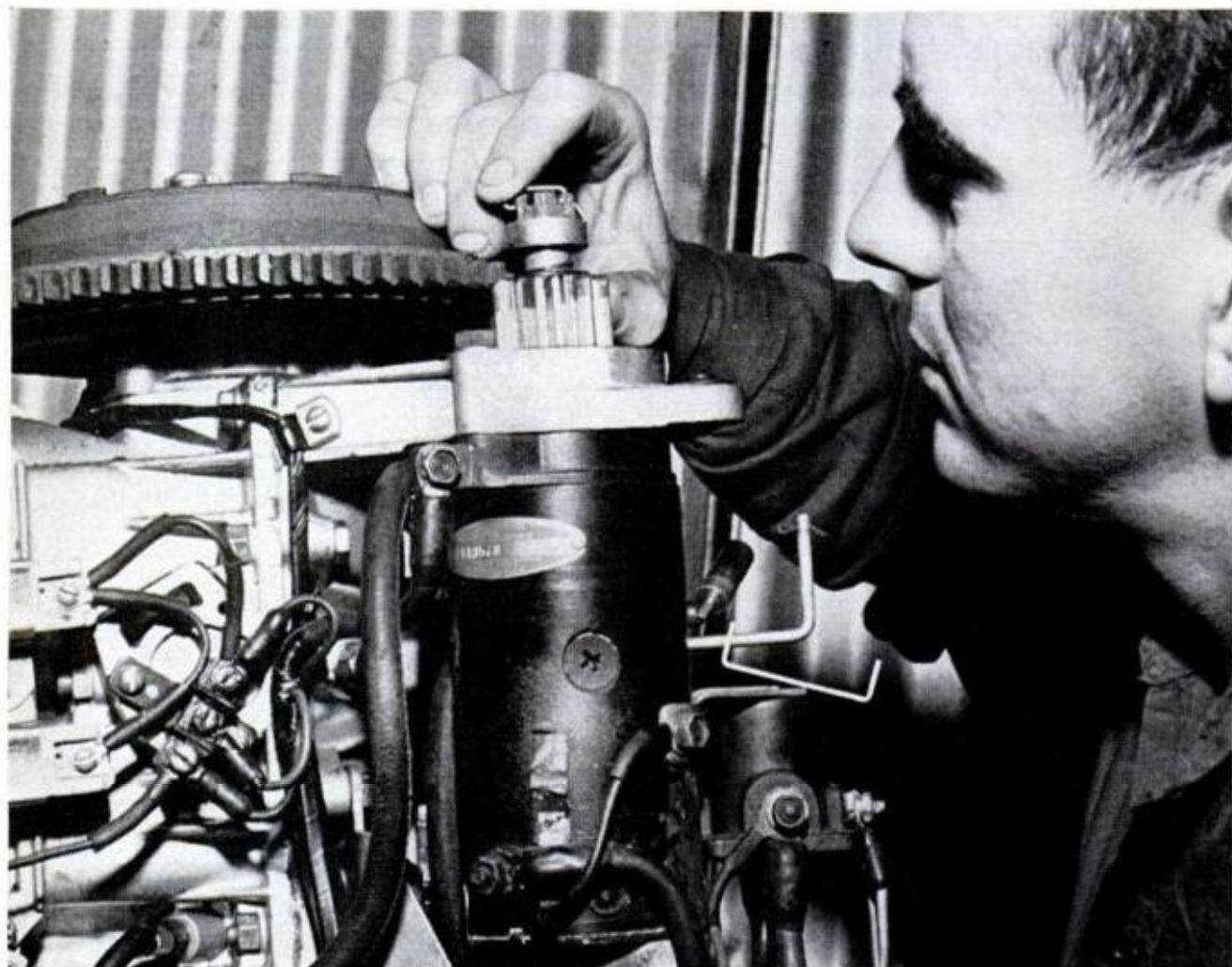
The In's and Out's of Electric Starting

If your electric starting system is acting up, chances are the starter itself isn't to blame. Knowing what *can* go wrong is half the battle.

By Henry B. Notrom

HERE'S JUST ONE big difference between your electric-starting outboard and the smaller manual-starting engine you probably traded in on it. With the manual starter, *you* provided the pull power needed to get the engine revving. With the electric-starting engine, the pull is provided by the starting circuit.

When you turn the ignition key, electricity is fed to the starter by the battery via the solenoid. The starter is nothing more than an electric motor which converts the electricity it receives to mechanical energy. The electricity spins and sends forward a shaft in the starter, at the end of which is a gear called the pinion drive.



This engages the flywheel, causing it to spin and start the engine. Once the engine starts, the pinion disengages, the starter comes to a peaceful halt and it lies at rest until needed again. It's as simple as that.

You go through the same thing every day of the week when you start your car. The setup is identical, and your outboard's electric starting system is as simple and as dependable as your car's.

In spite of this, however, trouble can develop in the starting circuit. There are generally only five possibilities to check out:

—The starter simply doesn't operate at all, and the engine won't start.

—The starter turns over, but does so too slowly to start the engine.

—The starter spins freely enough, but pinion doesn't engage the flywheel and the engine doesn't start.

—The pinion engages the flywheel, but it does so improperly, causing a growling and grinding and mashing of gears which sounds like things are falling apart. Maybe the engine starts, maybe it doesn't.

—The starter operates properly, the pinion engages the flywheel, the engine starts, but the pinion won't let go of the flywheel.

The cause of each of these troubles is cut-and-dried, and so is the remedy for each one. You'll find both listed in the troubleshooting chart on the following page. Pinpointing the exact trouble area may require some checking but this shouldn't prove difficult.

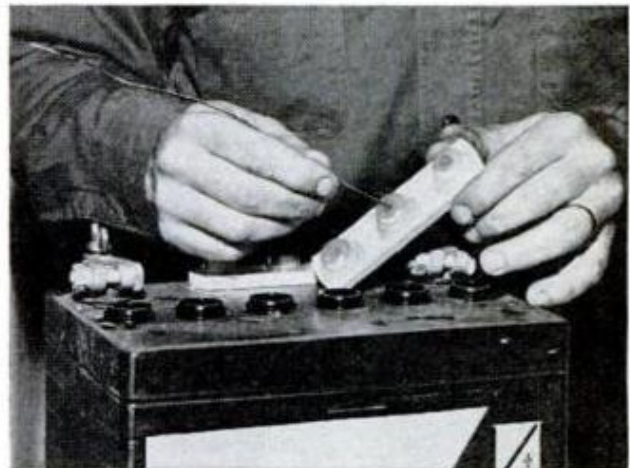
But before going into these troubleshooting tests, one obvious fact should be mentioned. The starter depends on the battery for electricity—that battery has to be kept clean, charged and filled to the proper level.

Not only that, but it has to be the correct battery or it will soon fail on you. By a correct battery, I mean one that will take the load. (Personally, I wouldn't use anything but a marine battery rated no lower than 70-ampere-hour capacity.)

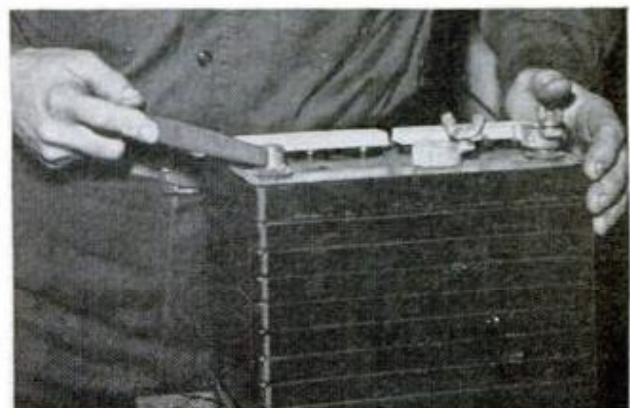
The importance of keeping a marine battery clean can't be overemphasized. Every three months or so, take the battery out of the boat and scrub it down with a mixture of baking soda and water, then rinse it well with clean water. Be careful not to let any of the baking soda mixture leak in through the vent caps



HYDROMETER TEST checks the overall condition of your battery plus the health of each individual cell. It's a troubleshooting must with all starters



BATTERY VENT CAPS provide an escape for gases built up inside the battery. Make sure they're free by passing a thin wire through the hole in each one



BATTERY POSTS must be kept free of dirt and corrosion or the resistance builds up and impedes good starting. One cleaning method is to file them

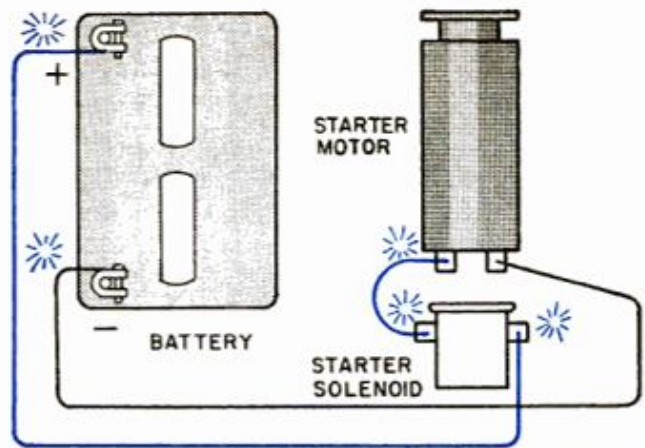
since it will neutralize the battery acid.

At the first signs of starter trouble, check for a poor connection and high resistance at the points indicated in the drawing at the right. Remove each connection and, using crocus cloth, coarse sandpaper or a file, clean the terminal and connection thoroughly. Then hook everything back tightly; try the starter.

If there's no improvement, a wire may have built up too much resistance, or the key switch could be bad. At this point, you could take the engine to a shop and have each cable checked for high resistance with a meter to isolate the bad one. If the cables aren't in too good shape generally, it might be wise to install new ones.

Other than the above, if the starter doesn't operate properly, the trouble can only be a bad solenoid (which is quite likely) or a defect in the starter. To check the solenoid, jump the *hot lead* terminals on both sides of the solenoid with a pair of pliers. If the starter now works, the trouble is in the solenoid. Replace it.

If it isn't the solenoid, then the starter



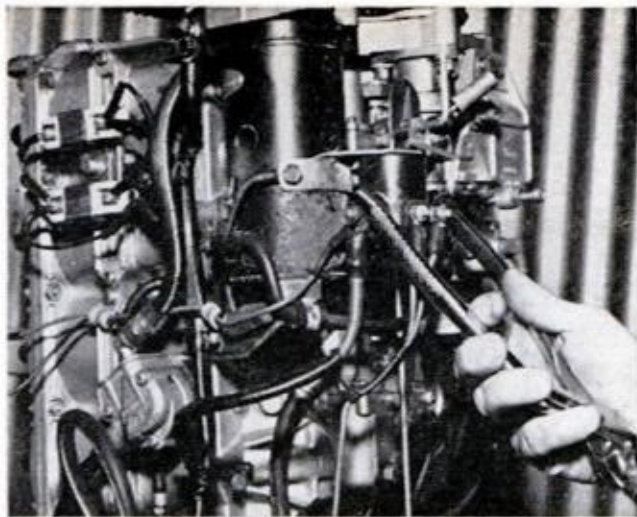
CRITICAL POINTS in an outboard starting system are those where resistance often builds up. These include terminals on the battery, solenoid and starter motor

has to be overhauled or replaced. Compare prices and you'll probably find that overhauling is the *least* economical.

In the case of a starter that spins too slowly (assuming the battery and connections are okay), test the starter pinion drive. Have someone hit the ignition while you watch the drive. It should spin up easily and engage the flywheel. If there's any friction hampering movement of the

Troubleshooting Electric Starting Circuits

Trouble	Cause	Remedy
Starter doesn't operate	Run-down battery	Check it out. Either charge it up, if it'll take a charge, or replace it.
	Poor battery terminal contact	Remove terminals, scrape 'em clean, tighten 'em up real good and lube them.
	Defective wiring or key switch	Check for resistance at critical points and repair or replace.
	Defective starter solenoid	Check it out and get it out, if bad.
Starter spins too slowly	Bugs in the electric end of the starter motor	Overhaul, if desired, or replace.
	Run-down battery or poor battery terminal contact	Ditto battery tip above.
	Poor contact at starter solenoid or starter motor	Check out terminals for corrosion and looseness.
Starter spins free, but doesn't engage flywheel	Starter pinion gear binding	Test by sight. If bad performance is seen, clean and oil the shaft. If still no good, overhaul starter, if desired, or replace.
	Bugs in the electric end of the starter motor	Like we said, overhaul if desired, but be ready to replace.
Pinion doesn't engage properly	Run-down battery, poor battery terminal contact, or poor contact at starter solenoid or starter motor	Ditto, ditto, ditto above.
	Dirty or corroded drive pinion shaft	Clean shaft off and oil it.
Starter keeps spinning after engine starts	Bugged-up pinion or flywheel gear	Usually caused by excessive wear of one or both parts, so replacements are called for.
	Sticking pinion gear drive	Oil it.
Starter keeps spinning after engine starts	Ignition switch not fully returning	Check to see if key returns to ON position from START. Switch will have to be replaced if it keeps acting up.
	Starter solenoid's had it	Replace it.
	Bugs in the wiring or key switch	Defective wires or switch—replacements called for.

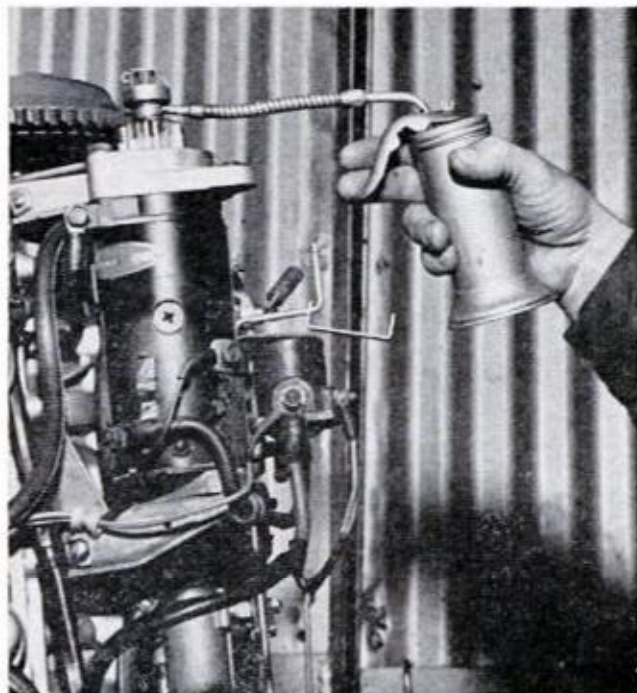


WHEN THE ENGINE doesn't start, you can test the solenoid by jumping the hot leads with a pair of pliers. If engine now starts, the solenoid is bad

pinion, clean off the pinion drive shaft and oil it. You can use any type of oil up to and including 30-weight. Never use grease—it hardens in cold weather and could cause that shaft to bind.

By the way, many newer model outboards have a shield over the pinion end of the starter to keep dirt out and oil in. Removing the shield to get at the pinion is rough. You probably won't have to, though, since all the shops I've visited claim they never have trouble with pinion drives binding when they're protected by a shield.

Finally, if the pinion gear and/or flywheel gear show any signs of worn or broken teeth, replacement's in order. ★ ★ ★



IF YOU FIND that the pinion drive shaft is binding or failing to move forward easily and smoothly, oil the shaft. Never use grease here; it might harden

OUTBOARD CLINIC

Q—My 35-hp Johnson is in trouble. When I hit the throttle, the motor will shift into neutral while the shift control stays in forward. Why, and what can I do about it?—M. S., Mass.

A—It sounds to me as if the forward gear is shot and/or the shift linkage beneath the power head is burned or worn out. What to do about it? Find out where the trouble lies and replace the faulty part(s).

Q—I've sheared shear pin after shear pin on my '59 Evinrude 18. When it happens, the prop has never struck an object or become entangled in seaweed. What are your thoughts?—A. J. L., N.Y.

A—When it keeps recurring like this, I'd sure suspect a worn shear pin hole in the shaft. If I'm right, the only way you're going to keep this from happening time and time again is to replace the shaft.

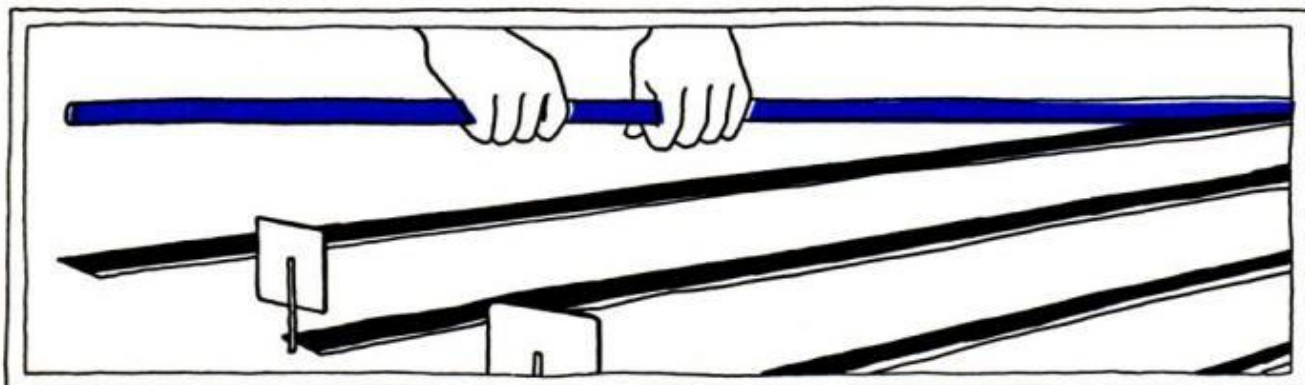
Q—My '57 15-hp Oliver's in good shape and runs fine at high speed. However, it won't idle. I cleaned the carburetor, so what now?—A. B., Pa.

A—Carburetor-wise, I would look for a dirty low-speed jet that you may have missed and also for a misadjusted float level. That float level adjustment should be 13/32 of an inch, measured from the farthest surface of the float to the gasket flange of the carburetor body.

If it doesn't straighten out, ignition's got to be your next step. Look for a weak magneto, bad points or a bad coil. By this time, that Oliver should be purring at idle like a kitten at a bowl of milk.

As a service to the readers of *POPULAR MECHANICS* in solving problems relating to their outboard engines, you are invited to submit your questions to this column. All questions will be answered, either in the column or by mail. Address Outboard Clinic, Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022 and enclose a 5-cent stamp.

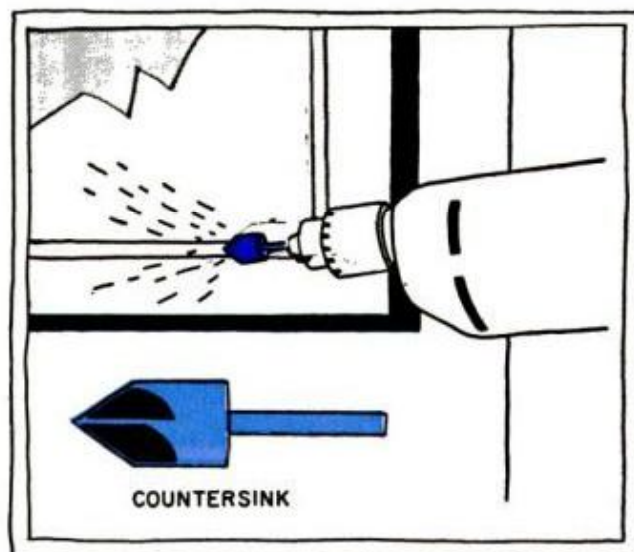
SOLVING HOME PROBLEMS



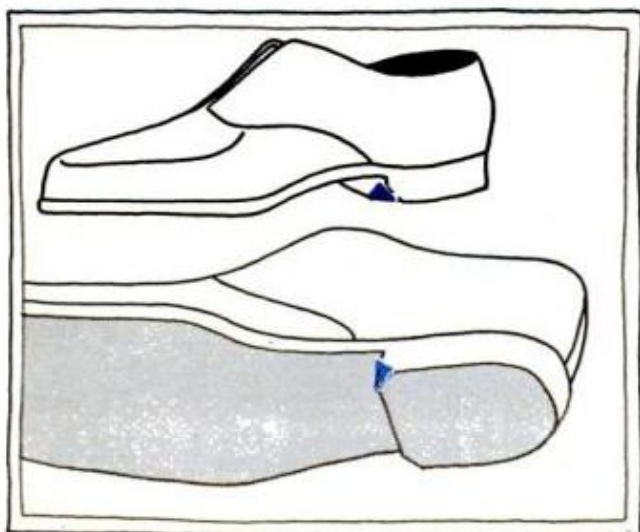
TO SAVE TIME and work when planting seed in fine soil, make the rows by pressing a length of pipe into the earth. The job goes quicker, and the shallow furrows will always be straight and of even depth



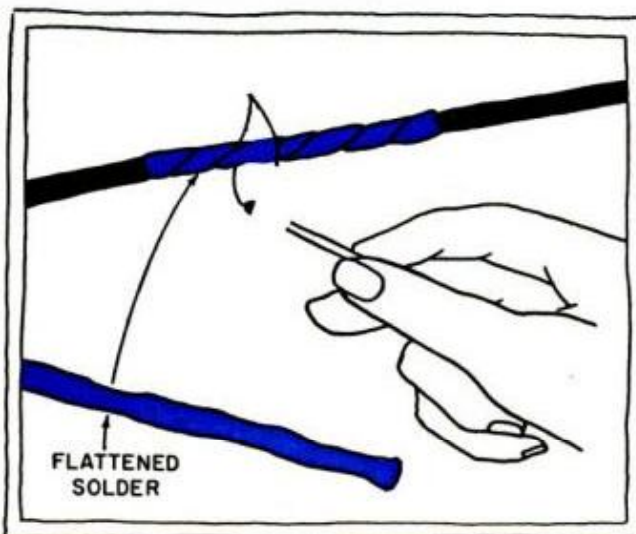
SPLASH GUARD for use with a drill-powered paint mixer can be made from a plastic coffee-can lid. The hole in the lid must be a snug fit on the shaft to wipe shaft clean as you work mixer up and down



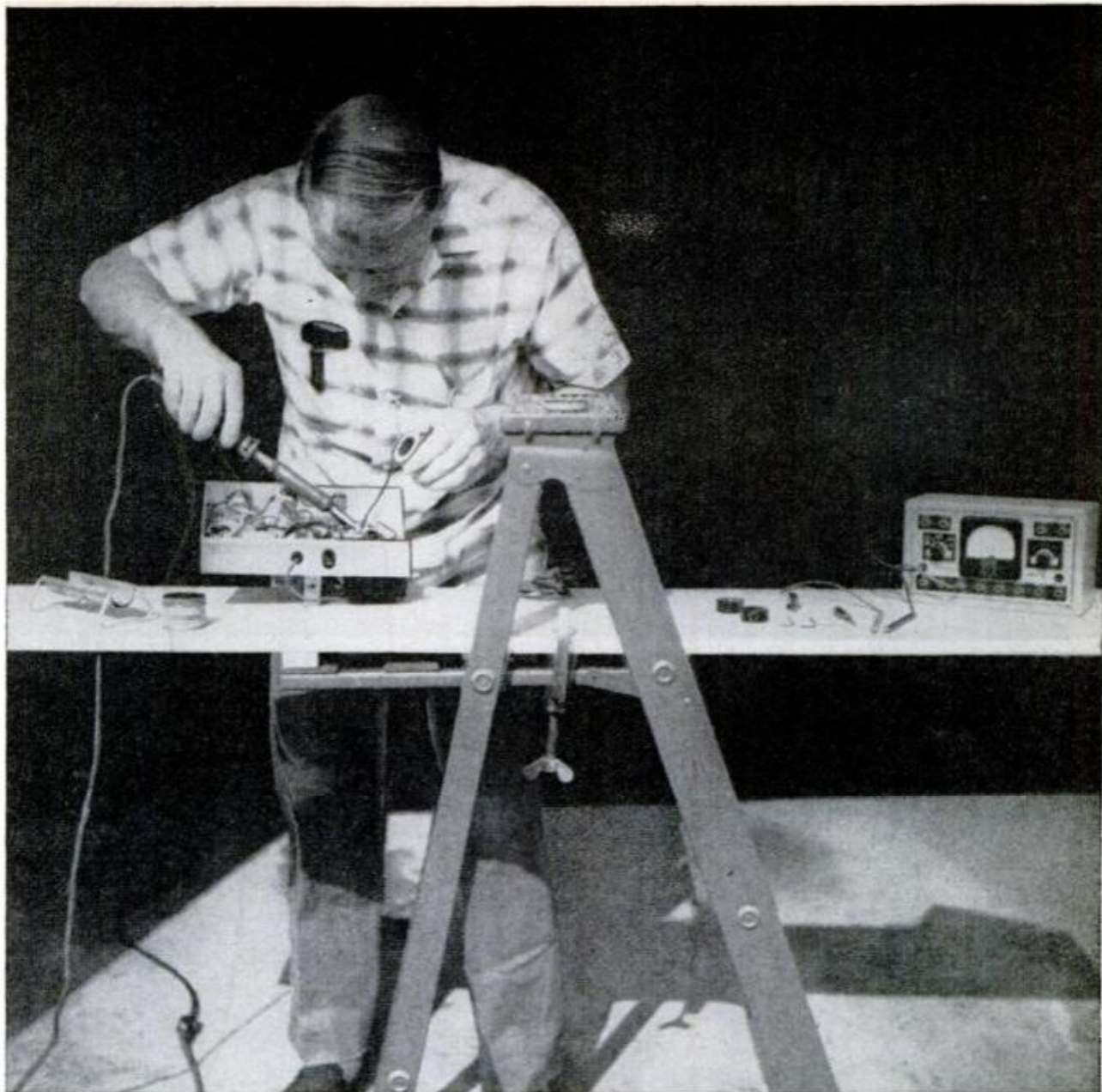
WHEN REPLACING a broken pane of glass, you can remove old hardened putty in no time by chucking a metal-cutting countersink in your drill. If necessary, carefully "dress" sash afterward with a wood chisel



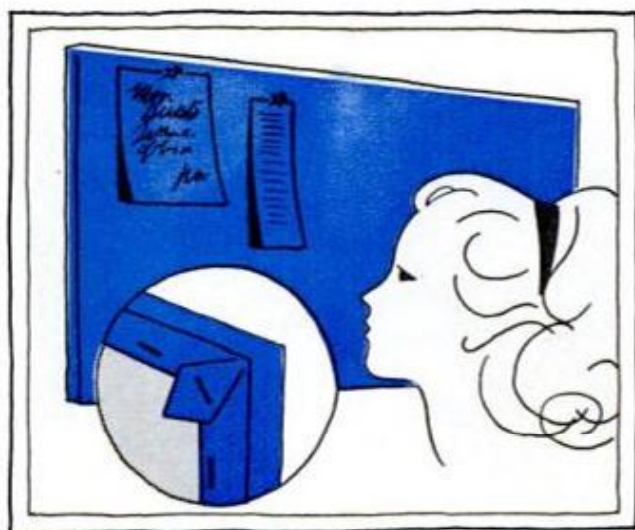
MANY TIMES the heels on a new pair of shoes will catch trouser cuffs when walking along. This won't happen if you take the time to bevel the sharp inside corners of the heels slightly with a file or knife



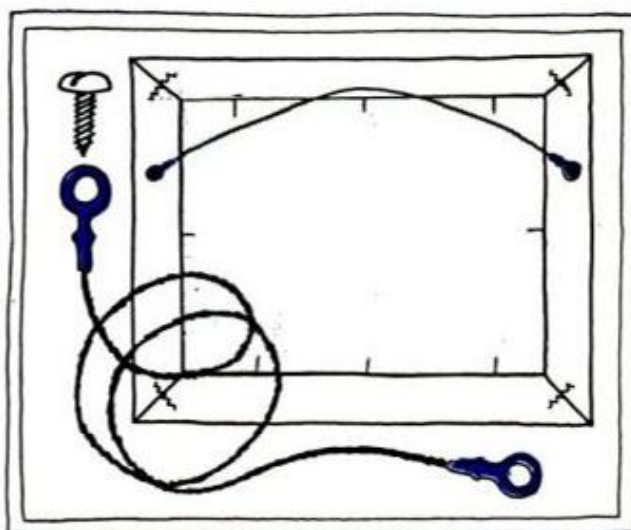
IF YOU DON'T have a soldering iron handy, you can still solder small wires by flattening a length of rosin-core solder to form a ribbon, wrapping this around joint and melting with a match or candle



ANY FOUR-FOOT STEPLADDER can be turned into a "quicke-bench" when working outside of your workshop. Simply slide a wide 1-in. board through the ladder so it rests on the step and the paint-bucket shelf and anchor in place with a C-clamp. To avoid the chance of tipping the bench by overloading one end, the board you use shouldn't be more than 6 ft. long. Makes a fine on-the-spot bench for light repair work



YOU CAN MAKE an attractive bulletin board for the kitchen or recreation room by cutting a piece of insulation board to the desired size and covering it with decorators' burlap. Staple will hold the fabric

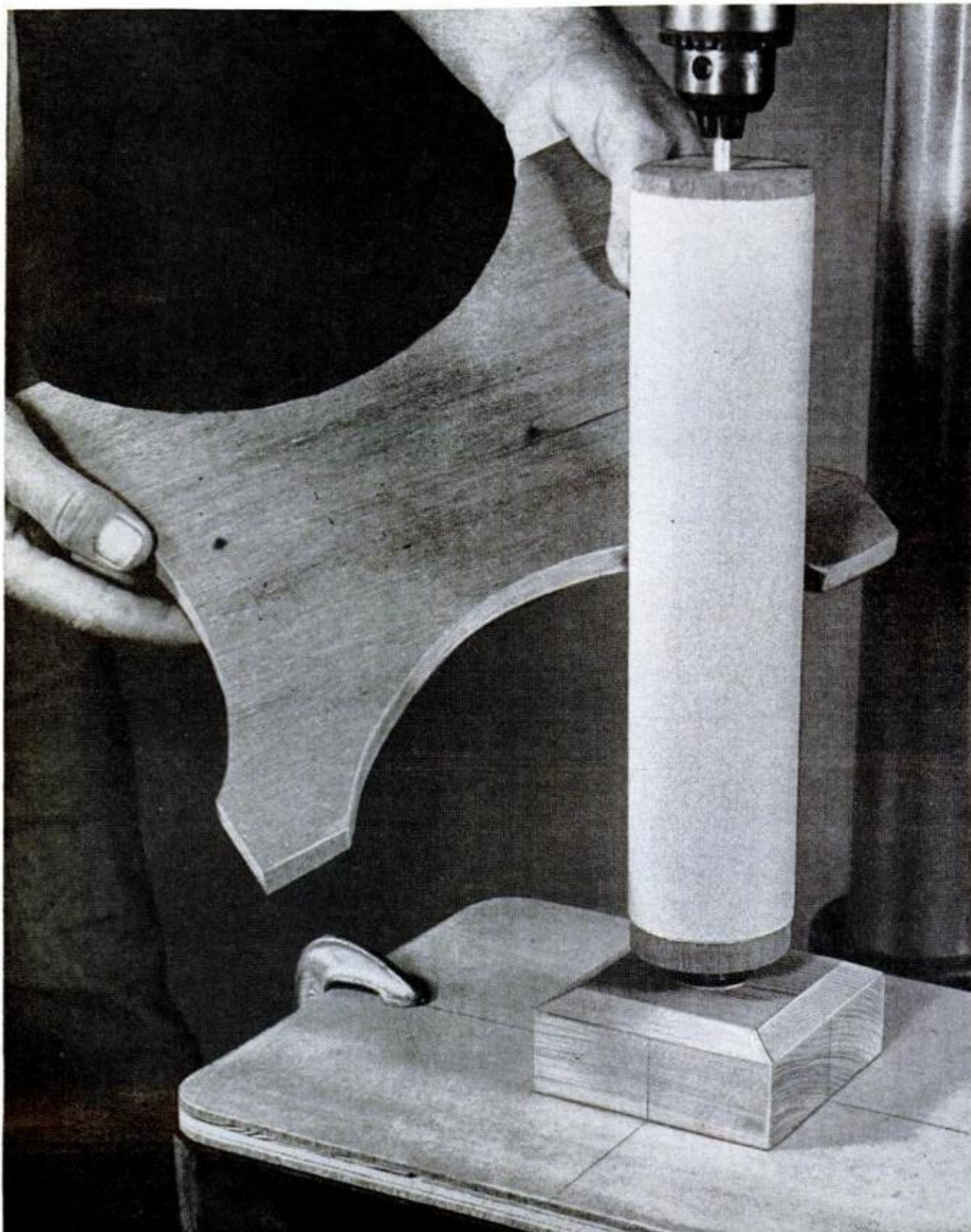


HANGING PICTURES so they lie flat against the wall is easy if you attach the wire to the frame with solderless-type terminals instead of screw eyes. Use small screws to attach the terminals to the frame

Double-Duty-Sander-Setup

Drill press handles sanding, polishing and drilling when you add this clamp-on table and ball-bearing lathe center

BY R. J. DE CRISTOFORO



A QUICK LOOK at the various photographs and drawings of this drum-sander setup will show that the jig can be used for a number of other jobs besides drum sanding. It will prove an excellent tool for concentric drilling, as well as for polishing, cutting and shaping bar stock when the latter is gripped in the jaws of the drill-press chuck.

The jig presented here is designed to fit a 15-in. floor-model drill press. You will have to revise the dimensions accordingly if the jig you construct is to be fitted to a smaller machine. The length of the sanding drum for example, may be excessive for a bench press, but this will simply require shortening the drum and then using standard sandpaper sheets which have been trimmed to fit.

Lay out the base to fit your drill-press table, then mount the lathe-center block after counterboring it for the center. Be sure that this hole is so bored that the center will fit tightly. Now drill the $\frac{3}{4}$ -in.

hole so the shank of the center can extend through the remainder of the block, through the base and through the drill-press table itself.

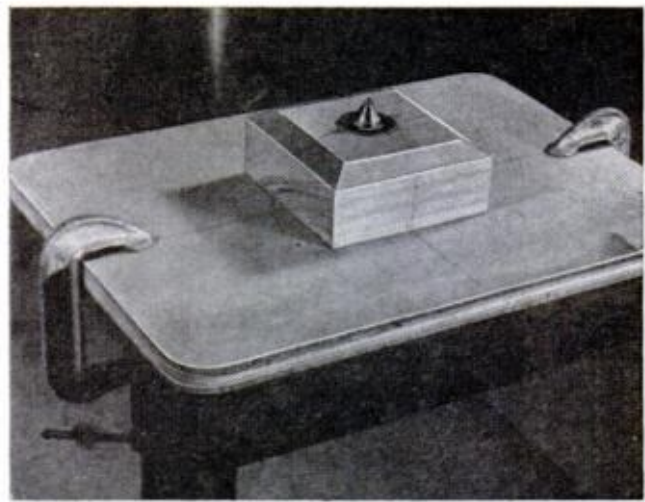
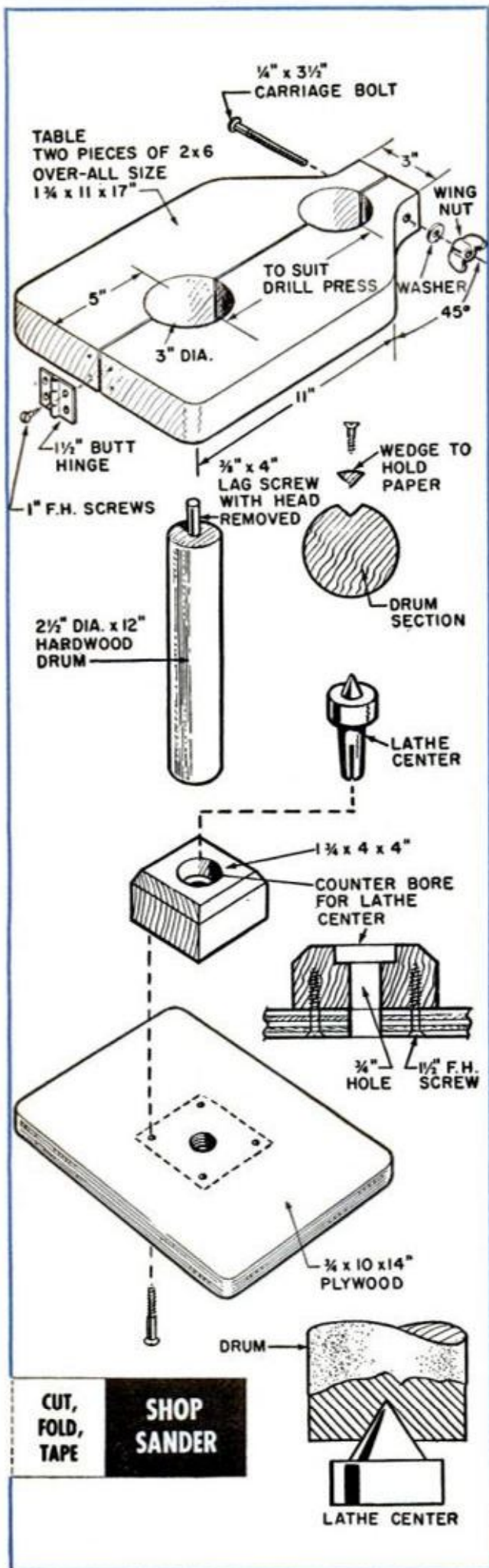
The drum can now be lathe-turned and then center-drilled at the top by using that part of the jig which has already been made. After the lag screw is in place, the drum can be trued-up, if necessary, by turning it in the drill press and working it into shape with sandpaper.

The V-cut in the drum (which also produces the wedge-shaped sandpaper lock) can be made on the table saw; just be careful to keep the drum from turning as you make the cuts. In fact, this part of the job can be eliminated if you use broad rubber bands to secure the sandpaper. Since these bands are easily moved, you will still be able to get full use from the sandpaper.

The drum-sander table is made from two pieces of 2x6-in. stock, hinged at the front end. The important dimension here



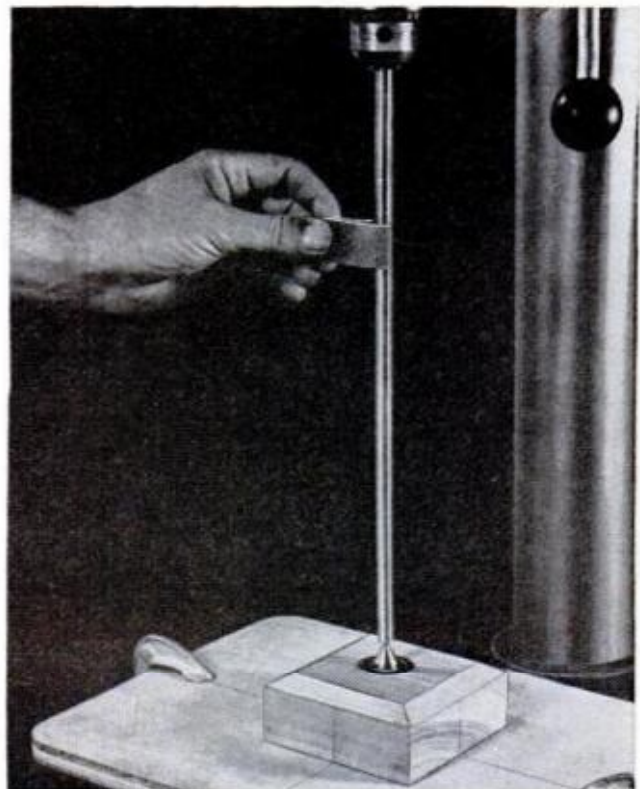
SQUARE EDGES ARE SHAPED accurately on this sander table, which is easily locked to the shaft of the drill press with a wingnut. The table can also be moved up and down to permit full use of sandpaper. And it can be used with a conventional drum sander which is gripped in the drill-press chuck only. Note hinge at left



BASE OF JIG clamps to drill-press table; move it till lathe center aligns with drill, then make the permanent alignment marks on base and table

is the distance from the center of the drum-sander hole to the center of the drill-press column hole. Some leeway is permitted here because the drum-sander hole is large enough to provide considerable clearance for the drum; but still aim for as much accuracy as possible.

Now clamp together the two pieces of stock for laying out the holes, then separate them and make the cutouts on the bandsaw. Finish the job by reclamping the two pieces, attaching the hinge and drilling for the lock screw. ★★★



CAREFULLY POSITION sander table, then use this set-up for polishing, cutting or shaping bar stock. It also makes an excellent rig for concentric drilling

Your Rotary Tiller Can Also Be Used to Dig Ditches

MORE AND MORE suburbanites are using power equipment to tend their lawns and gardens. One of these tools is the tiller-cultivator, used to destroy weeds by breaking up the soil around growing crops. But it also makes an excellent ditch-digger.

Say you want to lay a line of pipe. Make a pass with the cultivator over the ditch line, then go back and scoop out the loosened dirt with a shovel. Simply repeat this process until you've reached the required depth.—Gary Kertz



How Big Is a Greenhouse? Just as Small as You Like

HERE'S A TIP for getting your garden off to a fast start this spring. The secret lies in the use of sections of wire-imbedded plastic screen as miniature "greenhouses." This material is available in 36-in.-wide rolls from hardware stores. All that's required to make these little plant-protectors is to cut the required number

of 18-in. strips from the end of the roll, crease the strips lengthwise so they form an inverted V and then place them over the seeded rows. Heap soil along the outside base to keep wind and rain from knocking them over. There's no need to join the sections; simply overlap their ends about 2 in.—John Krill



What You Should Know About Wheel Alignment

PART 2

BY MORTON J. SCHULTZ

What's the meaning and importance of steering axis inclination and turning radius? How are wheels balanced to stop shimmy, vibration? Here's what the pros do about it



SPECIAL WHEEL GAUGE measures steering axis inclination. Projector (left) throws readings on a screen

THE FIVE FRONT-END ANGLES that determine correct wheel alignment might be augmented by a sixth: wheel balance. Though not considered part of alignment, balance is closely related because of its effect on tire wear and riding comfort.

Three of the five alignment angles—camber, caster and toe-in—were covered in Part 1 (page 186, March '66 PM). Now, let's continue with an examination of steering axis inclination, turning radius—and wheel balance.

Steering axis inclination. This refers to inward tilt of the kingpin or spindle support arm at the top of these units. It's a directional angle measured in degrees, showing how much the spindle support center line is tilted from true vertical.

Correct steering axis inclination is designed into a car to aid steering stability and to establish a pivot point about which the wheels can be turned easily. It is the *angle* that allows the wheels to return to a straight-ahead position when you remove your hands from the steering wheel on a turn.

Keep one thing in mind about proper steering axis inclination: you've either got it or you haven't, and if not, you *can't* get it by making adjustments. It gets out of kilter only if the spindle or spindle-support arm is bent or if there's excessive play in a ball joint.

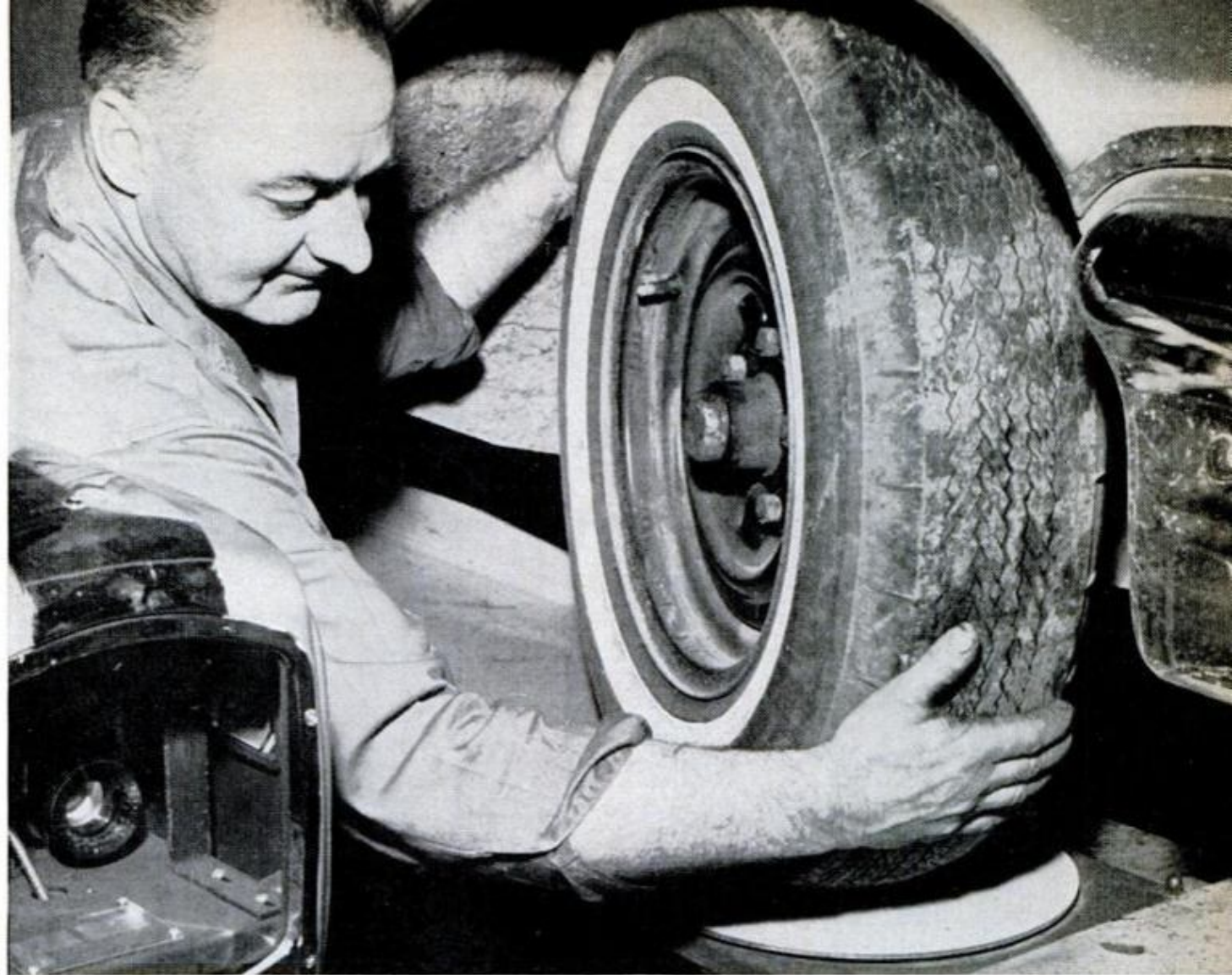
To check steering axis inclination, the wheel is turned *out* 20° and the bubble of the wheel-alignment gauge is leveled. Then the wheel is turned *in* 20° and locked. The degree of inclination is then read; it must conform to manufacturer's specifications.

Note, too, the relationship between camber angle and steering axis inclination: Together they are called the *included angle*. This means that if camber is off and cannot be adjusted to specification, chances are the problem lies with a faulty steering axis inclination.

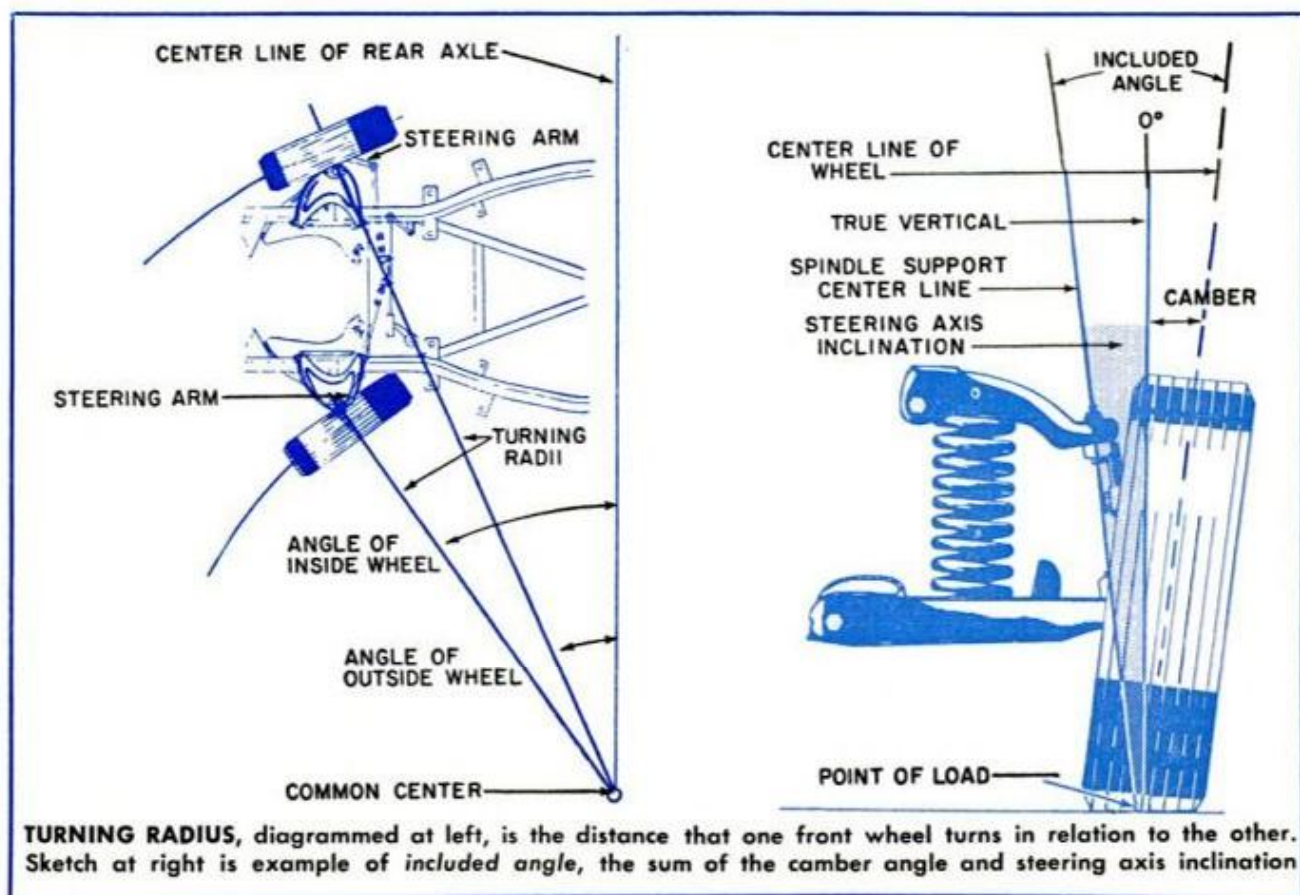
Turning radius. This term refers to toe-out on turns. The inner front wheel has a shorter turning radius than the outer wheel, creating a toe-out condition when the wheels are turned either right or left.

Turning radius is a tire-wearing angle measured in degrees. It's the amount one front wheel turns in relation to the other. Car manufacturers allow from 1° to 3½°

(Text continues on page 184)



TURNING RADIUS is checked by turning wheel out 20° , then in 20° on a turning disc that measures angles



WHEEL AND STEERING

PROBLEMS	CAUSES	CURES
Hard steering (indicated by tightness in steering system)	Low or uneven tire pressure	Inflate tires to proper pressure
	Steering gear or connections adjusted too tightly	Inspect steering system for binding with front wheels off floor. Adjust as necessary and lubricate
	Dry steering gear, kingpins, ball joints or tie rod ends	Insufficient or incorrect lubricant. Lubricate suspension and steering linkage as required
	Excessive caster	Check caster and adjust
	Steering knuckle or spindle bent	Replace with new parts
	Kingpin thrust bearings worn	Install new bearings
	Suspension arms bent or twisted	Check wheel alignment angles: camber, caster and steering axis inclination. Install new suspension arms, if needed
Front springs sagged	Check vehicle spring height. Sagged springs should be replaced—always in pairs	
Frame misaligned or broken	Check car tracking and frame alignment. Correct and repair frame	
Excessive play or looseness in steering system	Worn kingpins and bushings or ball joints	Install new kingpins and bushings or new ball joints
	Front wheel bearings incorrectly adjusted or worn	Adjust bearings or replace with new parts
	Steering gear adjusted too loosely or worn	Adjust or install new parts
	Loose steering gear mountings	Tighten steering gear to frame
	Pitman arm loose on cross shaft	Replace parts or tighten cross shaft nut
	Drag link too loose	Adjust or replace with new parts
Tie rod ends worn	Install new tie rod ends	
Erratic steering on application of brakes	Low or uneven tire pressure	Inflate 'em to proper pressure
	Brakes incorrectly or unevenly adjusted	Adjust brakes
	Oil or grease soaked brake lining	Replace brake lining and clean brake drum; find out why it happened
	Front wheel bearings incorrectly adjusted or worn	Adjust bearings or replace with new parts
	Front springs and/or shock absorbers weak	Replace with new springs and/or shocks
	Excessive caster	Check it and adjust
	Steering knuckle or spindle bent	Replace with new parts
	Spring "U" bolts broken or loose	Replace or retighten
Spring center bolt broken	Install new center bolt	
Pulls to one side	Low or uneven tire pressures	You know—inflate to proper pressure
	Brakes incorrectly or unevenly adjusted	Adjust 'em the right way
	Oil or grease-soaked brake lining	Replace the lining, clean the drum and find out why
	Incorrect or uneven caster	Check it and adjust
	Excessive unequal camber	Adjust the camber
	Toe-in or toe-out incorrect	Adjust tie-rod ends to make front wheels toe-in to specification
	Scuffed front tires	Rotate the tires
	Steering knuckle or spindle bent	Replace with a new knuckle or spindle
Spindle support arm bent	Replace with a new arm	

**CUT,
FOLD,
TAPE**

**WHEEL
BALANCE**

ALIGNMENT TROUBLESHOOTING

PROBLEMS	CAUSES	CURES
Pulls to one side (cont.)	<p>Front spring sagged</p> <p>Rear axle shifted</p> <p>Frame misaligned or broken</p>	<p>Check vehicle spring height and replace sagged springs with new ones</p> <p>Check for loose spring clips or broken center bolt. Measure from spring bolts (anchor end) to rear housing. This distance should be uniform on both sides of the car</p> <p>Check car tracking and frame alignment. Correct and repair frame</p>
Scuffed tires	<p>Tires improperly inflated</p> <p>Toe-in or toe-out incorrect</p> <p>Wheels or tires out of true</p> <p>Kingpin thrust bearings worn</p> <p>Incorrect toe-out on turns</p> <p>Front wheel bearings incorrectly adjusted or worn</p> <p>Suspension Arms bent or twisted</p> <p>Steering knuckle or spindle bent</p> <p>Excessive speed on turns</p>	<p>What, again?</p> <p>Adjust tie-rod ends to make front wheels toe-in to specification</p> <p>Check for wheel and tire wobble</p> <p>Install new bearings</p> <p>Check and adjust. If reading doesn't come to specs, check those steering arms</p> <p>Adjust bearings or replace with new parts</p> <p>Check wheel alignment angles: caster, camber and steering axle inclination. Install new suspension arms if needed</p> <p>Replace with new parts</p> <p>Slow down, pal</p>
Cupped tires	<p>Tires improperly inflated</p> <p>Wheels, tires or brake drums out of balance</p> <p>Dragging brakes</p> <p>Front wheel bearings incorrectly adjusted or worn</p> <p>Improper camber</p> <p>Steering knuckle or spindle bent</p> <p>Worn or loose tie-rod ends, drag link, kingpins, ball joints or steering gear</p>	<p>Yes, again</p> <p>Balance wheels and tires. Check for eccentric brake drums, wheels and tires and replace as necessary</p> <p>Adjust the brakes</p> <p>Adjust bearings or replace with new parts</p> <p>Check camber and adjust</p> <p>Replace with a new one, whichever it is</p> <p>Find out which and replace worn or loose part</p>
Front wheel shimmy	<p>Low or uneven tire pressure</p> <p>Steering connections incorrectly adjusted or worn</p> <p>Loose steering gear mountings</p> <p>Steering gear incorrectly adjusted</p> <p>Front wheel bearings incorrectly adjusted or worn</p> <p>Wheels, tires or brake drums out of balance</p> <p>Wheels or tires out of true</p> <p>Incorrect or uneven caster</p> <p>Dead or weak shocks</p> <p>Kingpin thrust bearings worn</p> <p>Toe-in incorrect</p> <p>Steering knuckle or spindle bent</p>	<p>Ditto</p> <p>Adjust or install new parts</p> <p>Tighten steering gear to frame</p> <p>Adjust it</p> <p>Adjust bearings or replace with new parts</p> <p>Balance wheels and tires. Check for eccentric brake drums, wheels and tires and replace as you find 'em</p> <p>Check for wheel and tire wobble</p> <p>Check and adjust</p> <p>Install new ones</p> <p>Install new bearings</p> <p>Adjust tie rods to make front wheels toe-in to spec</p> <p>Replace</p>
Front or rear wheel tramp	<p>Wheels, tires or brake drums out of balance</p> <p>Front springs weak</p> <p>Dead or weak shocks</p>	<p>Balance wheels and tires. Check for eccentric brake drums, wheels and tires and replace as necessary</p> <p>Replace with new ones</p> <p>Install a new pair</p>

(Continued on page 184)

WHEEL AND STEERING ALIGNMENT TROUBLESHOOTING (cont.)

PROBLEMS	CAUSES	CURES
Car has a tendency to wander	<p>Low or uneven tire pressure</p> <p>Loose steering gear mountings</p> <p>Steering gear or connections adjusted too loosely or worn</p> <p>Steering gear or connections adjusted too tightly</p> <p>Kingpin thrust bearings worn</p> <p>Front wheels toe-in too much or toe-out in straight ahead position</p> <p>Dry steering gear, kingpins, ball joints or tie-rod ends</p> <p>Incorrect caster</p> <p>Steering knuckle or spindle bent</p> <p>Rear axle shifted</p> <p>Stabilizer inoperative</p> <p>There's better tread on rear tires than on front</p>	<p>Ditto, ditto</p> <p>Tighten steering gear to frame</p> <p>Adjust or install new parts</p> <p>Inspect steering system for binding. Adjust as necessary and lubricate</p> <p>Install new bearings</p> <p>Adjust tie rods to make front wheels toe-in to spec</p> <p>Insufficient or incorrect lubricant. Lubricate suspension and steering linkage as required</p> <p>Check it and adjust</p> <p>Replace the one that's bad</p> <p>Check for loose spring clips or broken center bolt. Measure from spring bolt (anchor end) to rear housing. This distance should be uniform on both sides of the car</p> <p>Inspect grommets and links and replace worn parts</p> <p>Change tires around, putting ones with best tread on front</p>
Road shocks	<p>Low tire air pressure</p> <p>Steering gear or connections incorrectly adjusted</p> <p>Dead or weak shocks</p> <p>Front springs weak or sagged</p> <p>Wrong type or size of tires used</p> <p>Steering knuckle or spindle bent</p>	<p>Amen!</p> <p>Adjust</p> <p>Replace 'em</p> <p>Check vehicle spring height. Replace weak or sagged springs with new ones</p> <p>Install new tires of correct type and size</p> <p>Install new knuckle or spindle</p>

difference between turning angles of the inner and outer front wheels.

Proper turning radius allows the front tires to roll free on turns; thus it is dependent for its correctness on other important alignment angles.

Let's spell this out: *If the other alignment angles are okay, the turning radius will be correct unless the steering arm is bent. But, if the steering arm is bent, nothing will correct turning radius except a new steering arm.*

If turning radius is thrown off because of one or more of the other angles, tires will wear excessively on turns. One tip-off to this condition will be tire squeal on turns—even at slow speeds. Another clue is hard steering.

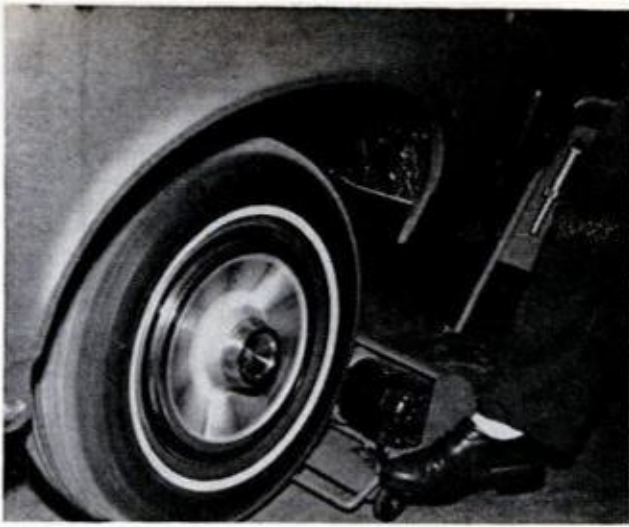
To check turning radius, the car is driven onto an alignment rack. The "inner" or "outer" wheel is then turned (whichever the specifications call for) to 20°

and the mechanic walks around the rack to the other wheel and checks the degree plate. Its reading *should* match the manufacturer's specifications for this test.

These specs vary from car to car. In most Buicks, for example, they call for a reading of 22½°, allowing a difference of 2½° between inner and outer wheels. In most Chryslers it'll be 21½° with an allowance of only 1½°. Fords, for the most part, must meet specifications of 23½°, a difference of 3½° being allowed.

At first you may not get your car's turning radius to meet the required specifications. In this case, go back and check out all other alignment angles. Make the necessary adjustments, then recheck the turning radius. If you still fail to get the correct reading, take a long hard look at the probable culprit—the steering arm.

Wheel balancing. Vibration and shimmy can often be traced to an unbalanced



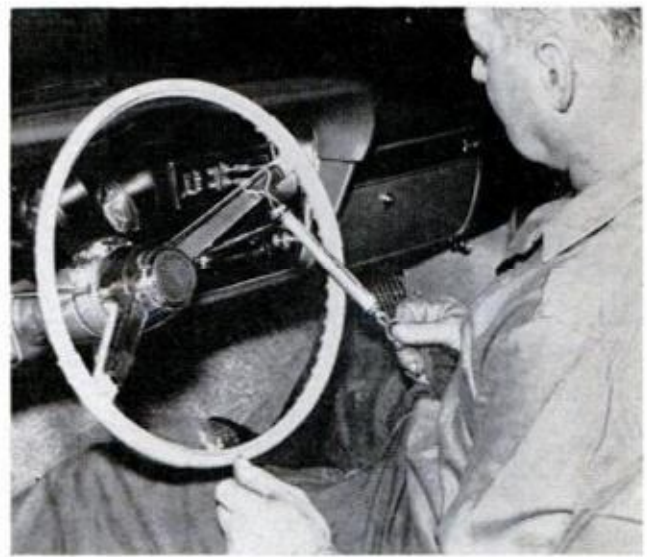
WITH WHEEL OFF FLOOR, a shimmy detector spins it. If shimmy is detected, wheel is unbalanced



WHEEL IS THEN TURNED on balancing machine to show if it's unbalanced *statically* or *dynamically*



WHEEL BALANCING consists of adding or removing weights to wheel. Weights range from $\frac{1}{4}$ to 16 oz.



SPECIAL SCALE shows amount of play in steering wheel and foot-pounds required to turn the wheel

wheel (or wheels). An unbalanced wheel vibrates and wobbles, puts excessive wear on suspension parts and tires and causes a car to be unstable under certain road conditions.

One type of wheel unbalance makes itself known by a vibrating, thumping noise that suggests you're rolling on square wheels. This condition, called *static unbalance*, causes a car to vibrate vertically. . .

Another type is referred to as *dynamic unbalance*. In this instance the wheel wobbles from side to side and the steering wheel shakes in your hands. Here the car vibrates horizontally.

A balanced wheel will unpredictably—and correctly—coast to rest at any point on its 360° perimeter, as it should. But suppose some portion of the wheel develops a "heavy spot"? Then this part of the wheel will always tend to "bottom" when the wheel is at rest. On the road, a

heavy spot will cause a wheel to hop and this, in turn, will set up vertical vibrations throughout the car. Such a wheel can be balanced by placing a weight equal to the heavy spot directly opposite it. This is called *static balancing*.

Dynamic unbalance occurs when there's more weight on one side of the vertical center plane of a wheel than on the other. Suppose, for example, you have a right front wheel that has an unbalanced mass on the outside of the sidewall. When the wheel reaches a particular speed and this mass is at a certain point in rotation, it exerts a force to the left, causing the wheel to move in that direction. As it keeps revolving, the wheel reaches another point where it attempts to return to its true axis . . . and so on. The result of this variable tendency is *wheel wobble*.

Here, again, weights are used to cor-

(Please turn to page 220)

SOLUTIONS FOR MECHANICAL HEADACHES

AUTOMOBILE CLINIC

BY MORT SCHULTZ

New-Car Oil Consumption

A number of letters recently have complained about excessive oil consumption of new cars. Pontiac has supplied its servicemen and dealers with complete instructions on how to cope with this problem, and they are applicable to practically any make of car. Here are some of the highlights taken directly from the Pontiac report:

"The car should have sufficient mileage to be considered 'broken in' to give the piston rings an opportunity to seat.

"Consideration must also be given to the type of conditions under which the car is driven. If it is operated in a high-performance manner, which includes wide-open throttle and the use of lower gears in the transmission for braking, oil consumption will be much greater . . .

"Before any major internal repairs are performed, the engine should be thoroughly inspected for any external oil leaks . . . the tailpipe or pipes should be checked for excessive oily deposits and also with the engine running for excessive blue smoke . . . It will be necessary to check all valve seals for leakage . . . The sparkplugs should also be checked for excessive oil fouling. If a fouled sparkplug is found and the cylinder in question does not require the replacement of the valve seal, it will be necessary to disassemble the engine to check for the mechanical causes of oil consumption.

"At this time, the piston or pistons involved should be inspected for oil return holes and proper piston ring installation, and the condition of the cylinder bore evaluated . . .

"If there are no external oil leaks or leaking valve seals, or inspection of the spark plugs shows it is not necessary to disassemble the engine, the servicing dealer should then conduct an oil-economy test. This should encompass a minimum of 500 miles of the owner's normal driving. Any and all oil should be added by the servicing dealer to determine to what extent the engine is using oil. Only after this test has been performed, and

it is determined that there is an oil-consumption problem, should the engine be disassembled for inspection of pistons and rings."

Parts for a Model T or Model A

I'm rejuvenating a 1928 Ford. It's in great shape now except for one thing: a rusted gas tank. The rust keeps plugging up the gas filter. I've flushed the tank out and put a 1-in. extension in the gas shutoff valve that extends up into the gas tank, but the problem persists. I've decided I need a new tank. But, where do I get one for a car this old?—Phil Checchio, Elkhart, Ind.

Here are a few leads, Phil.

Sears, Roebuck & Co. has a department that stocks and sells parts for old cars. You can check if it stocks the particular tank you need by calling the telephone catalog shopping number of the Sears store in your area.

I also have an old card in my file that lists one L. M. Gayle, McKee & Providence, Houston, Texas, as an outlet for Model-A and Model-T parts. I was unable to reach him at this writing but you might check it out.

Finally, there's an outfit on the West Coast—Polyprints, Inc., Box 3674, San Francisco, Calif.—which has put out a number of publications on these old cars. I believe these include restorer's manuals and spec sheets. They might be able to give you the names of some old-parts dealers.

Hope this information will help you in your search.

Bearing Quits Every 3000 Miles

I can't figure it. Every 3000 miles like clockwork I have to replace the bearing of the right rear wheel only of my '61 VW. I've gone so far as to replace the axle, even placing a washer to back up the bearing. No good. The bearing gets noisy after 3000 miles. Please, what's causing this trouble?—Arthur L. Swarzens, Brazil, Ind.

I'd say you have a damaged bearing

housing, Art. Better replace it with Part No. B-111501164C.

Wants Music to Drive By

Since I drive about five hours a day, I'd like music in the car, without the radio commercials. So I installed a battery-operated phonograph on a foam-rubber pad, but this doesn't work at all. The needle keeps jumping. How can I fix it so it'll work?—Irwin Goldenberg, Chicago.

Frankly, I'd advise you to get one of the units that plays *taped* music. These are also battery-powered. However there are record players for 45s designed especially for installation in cars. If this is the type you have, you should take it

back to the dealer and have him repair it. Lafayette Radio Electronics Corp., 111 Jericho Turnpike, Syosset, L.I., N.Y. sells both types in price ranges of \$70 to \$150.

A Salute to . . .

Clyde D. Courtney of Grafton W.Va., for his note telling us that the causes of hard automatic-transmission downshifting aren't always obvious. Clyde writes that his was shaking like a teenage twister until he found a hole in a vacuum line going from the carburetor to the transmission. It had worn through as it rubbed against the firewall behind the engine. Thanks, Clyde, I'm sure Auto Clinic readers will welcome the tip.

Service Tips

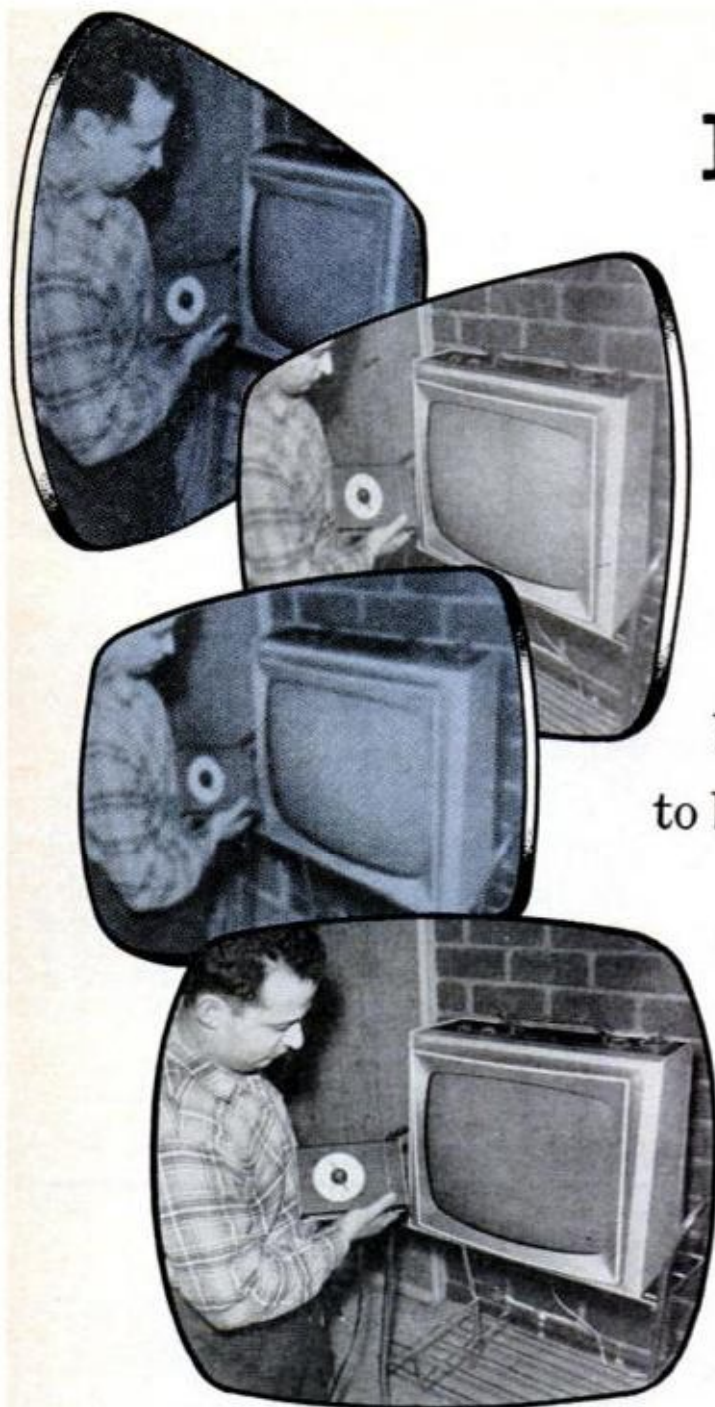
• **IF YOU GET A CRUNCH** or squeak in your '64 F-85 Olds when turning into a driveway, or on a dipping road, don't worry yet about an insufficiently lubed ball joint. In many cases, the trouble has been found to be improper torquing of the lower control arm bushing bolts. Torque 'em to 85 ft.-lb. with the weight of the car resting on the wheels.

• **DOES YOUR '64 or '65 CHEVY CORVETTE** have a leak coming from the rear axle fill plug? If so, chances are the rear axle fill plugs have been mixed. The '64 uses a straight thread plug with gasket; the '65, a dry seal with no gasket. Check 'em. The '65 plug, by the way, for posi-traction and standard rear axles has a flange. For proper sealing, torque plug to 20 ft.-lb.

Each month Auto Clinic answers your questions on car repair. For a personal reply, please enclose 25 cents in coin to cover mailing and handling. Address questions to Auto Clinic, Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022.

NEXT MONTH IN SHOP AND CRAFTS

- ★ **DETACHABLE PICKUP CAMPER.** PM's May issue will be of special interest to outdoorsmen. Camping enthusiasts won't want to miss the big, five-page article—complete with plans—on building a sturdy, smart-looking plywood-and-aluminum camper for a pickup truck. The camper provides full headroom, yet can be driven into any standard-size garage
- ★ **14-FT. CANOE FOR \$50.** Fishermen, hunters, campers and kids will go for this plywood canoe that combines low cost with simplicity of design and ease of construction (no ribs and no steam bending). Its good stability in the water makes it a safer boat than most for youngsters. It's a lightweight, too, and is easily transported on the roof of any car
- ★ **A DUCKY BOAT FOR DUCKS.** For those who like versatility and a good dash of the unusual in their boats, the May issue will carry complete plans for a really offbeat vehicle that's right at home on water—and on land. When water-borne, it's powered by an electric outboard. Pontoons provide flotation. Then a gasoline engine and four Terra-Tire wheels take over when it scrambles ashore. You've gotta see this one to believe it!
- ★ **BIG SHAKE-UP IN PAINTS.** Tired of stirring and stirring and stirring every time you break open a can of paint? Don't. The May issue will show you how to make your own paint mixer from a few sections of angle iron. It's powered by an old washing-machine motor. Any guy with a welding outfit can put this rugged labor-saver together for \$35 or less



Rotate to better television viewing

PM adds a rotator and booster to a TV antenna to bring in the out-of-town stations. It's great now to be able to turn on the set and find a sharp, clear picture from every station on the dial

By LARRY STECKLER

THERE I WAS with beautiful pictures on all seven very high frequency TV stations from New York City. Couldn't ask for better reception. And there were New York Giant football games on channel 3, new late-show movies on channel 8, plus some interesting early morning shows on channels 6 and 10. How could I get them all without cluttering the roof with a raft of antennas?

The solution seemed simple. Erect a rotator to turn the antenna to point to Philadelphia, Hartford or wherever else I desired. Tack on a booster to strengthen the signal from distant stations and I'd be able to watch anything.

First step was to take a look at what I was starting with. A beautiful 17-element log-periodic JFD antenna—very directional and highly sensitive. It was mounted atop a heavy-duty 10-foot galvanized steel mast fastened in place on the roof with a pair of chimney brackets. Okay so far. Good directional antenna. No sense adding a rotator without one. Solid brackets holding assembly in place, but guy wires will be needed to support added weight of rotator. Booster goes right on mast or antenna. Manually rotating the antenna showed I could get the

stations I wanted to watch without contending with snow and other interference.

First stop was at the local electronics supplier. Here I got a heavy-duty CDE rotator. The standard model wouldn't work for me as the antenna I was using had two support brackets. At the same time I got a JFD transistor booster, 100 feet of guy wire, 50 feet of 4-lead rotator cable, standoffs, eye hooks, guy wire fasteners, lightning arrestor for the rotator cable, a tube of silicone rubber in the form of bathtub sealer and a length of ground wire.

Back home again I assembled the rotator and connected it to its control box for an indoor test. Better to learn it doesn't work before putting it on the antenna mast. Everything checked out so it was up on the roof.

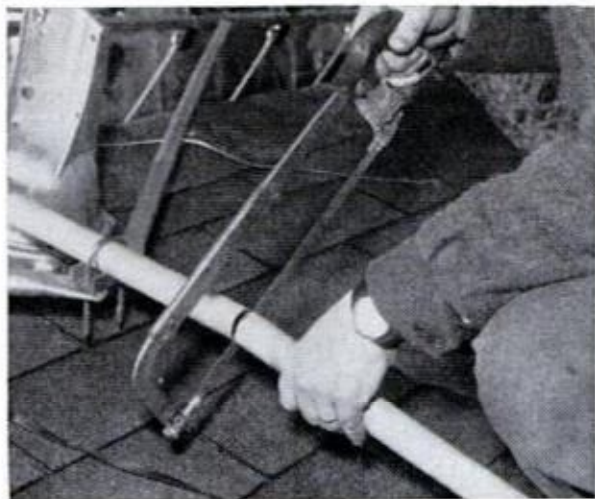
When working on rooftops there are some basic safety rules. *Never work alone!* If something goes wrong you wouldn't care to be stuck up there with no one to know about it. Second, be careful of any overhead wires. They may be hot, and if you brush that antenna or mast against them you might find yourself holding on to a dangerous dose of electricity. For handling a heavy antenna system, especially in windy weather, two men are a must if you expect to handle it safely. They get heavy and a bit of wind can throw a single installer way off balance to pull the antenna and mast right out of his hands. Ralph Claar, the *PM* photographer who shot the photos in this story was my assistant.

Once on the roof the first step was to take down the antenna. To do this I unfastened the clamps holding the mast to the mounting brackets and carefully laid the antenna down on the roof. Then I measured off the length of mast needed below the antenna to mount the rotator. With a hacksaw I cut off the remaining section of mast.

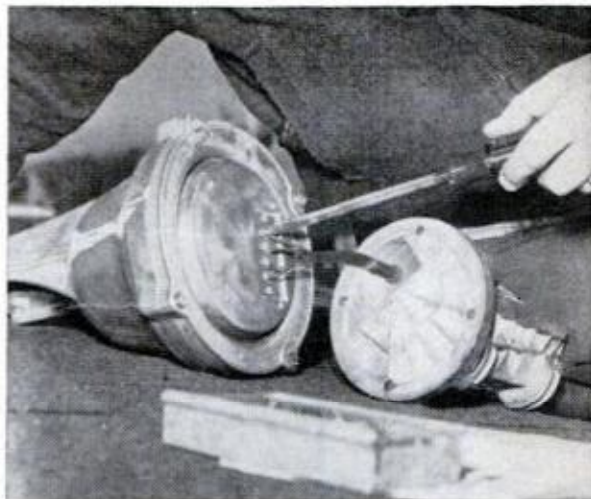
Next the rotator was firmly clamped into place on both mast sections. A little side note here. Most rotators come set in their fully counterclockwise position. If yours isn't set this way when you test the unit, do so before you install it.

When you erect the mast after the rotator is in place, make certain that the antenna does not point directly at any of the stations you intend to receive. This puts the proper antenna position for good reception in an adjustable sector of rotation and eliminates going from one extreme of rotation to the other to find the best tuning for that station.

While the antenna was down on the roof I also clamped the booster into place. It is designed to be mounted on either the mast or the antenna, just as long as it is kept close to the signal take-off terminals of the antenna. On this particular job it was simpler to put it on the mast, then cut the lead-in and connect both



CUT THE MAST after determining how much to leave to connect the rotator. Do this after the antenna is on the roof. It's much safer that way



CONNECT THE ROTATOR cable before mounting the rotator to the mast. Run the silver wire to terminal 1 so you'll be sure your wiring is right

Rotate your antenna

free ends to the booster as indicated by the instructions with the booster, and the mounting was complete. Power to this type of booster is fed through the lead-in wire so that no additional wiring to supply such power to the booster will be required.

The rotator control cable was installed next. It is a 4-wire flat cable that looks very much like the ordinary TV lead-in wire. The only really important points here are to keep it away from the lead-in wire as much as possible and to keep track of which wire in the cable goes to which terminal of the rotator.

There are four such terminals on the rotator—labeled 1, 2, 3, 4—and four corresponding terminals on the control box at your TV. One of the four wires in the cable is a silver color, the rest are copper colored. Use the silver wire as wire 1 and the others, in order, as 2, 3, and 4.

Lastly, before raising the antenna again, we attached the guy wires to the mast. It wasn't windy so I didn't have to fasten down the free end of the guys before mounting the antenna. If it had been, I would have tied down the guy facing into the wind first.

Normally, turnbuckles are used to take up guy slack. They are inexpensive and work well. Also available is the newer type fastener shown in the photos. With it you simply slide the free guy wire end through the body of the unit and pull it tight.

I finished mounting the antenna and rotator; then tightened up the guys evenly so the antenna stayed vertical. Tighten them as you would the lug nuts on a car wheel. First one, then the opposite one, and so on.

Before departing from the roof we took that tube of GE silicone rubber—it comes in black, white, clear and silver—and sealed up all the holes in the roof around the eye hooks for the guys. This stuff is easy to use and keeps rain from running down those holes into your house.

Next it was downstairs to finish the job of installing the rotator cable. Like TV lead-in, it should be run down the side of the house to an opening (window or door) near the TV. Just before the

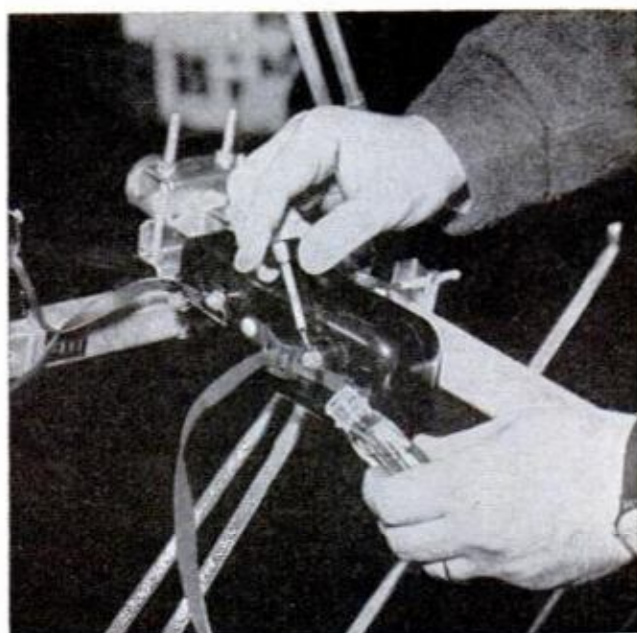
cable enters the house attach the lightning arrestor and run a ground wire to a copper ground rod driven into the ground. At the same time make sure the antenna mast and antenna lead-in are also grounded to this point; the antenna lead-in through it's own arrestor.

Run the cable inside the house and then connect it to the control box. When you're sure everything is all set, plug in the rotator and try it.

Now you're ready to hook up the booster power supply. Once this is done you



GUY WIRES go to a guy collar if rotator does not have provision for attaching guy wires, or if additional support is needed. We did both to show how



WEATHERPROOF BOOSTER connections to protect against corrosion that can reduce signal strength and ruin picture quality. Use Krylon spray or clear lacquer

can test your handwork. Turn everything on and tune your TV to channel 2. Rotate the antenna through its entire rotation and determine at what settings you get your stations. Do this for every TV station you can receive in your area.

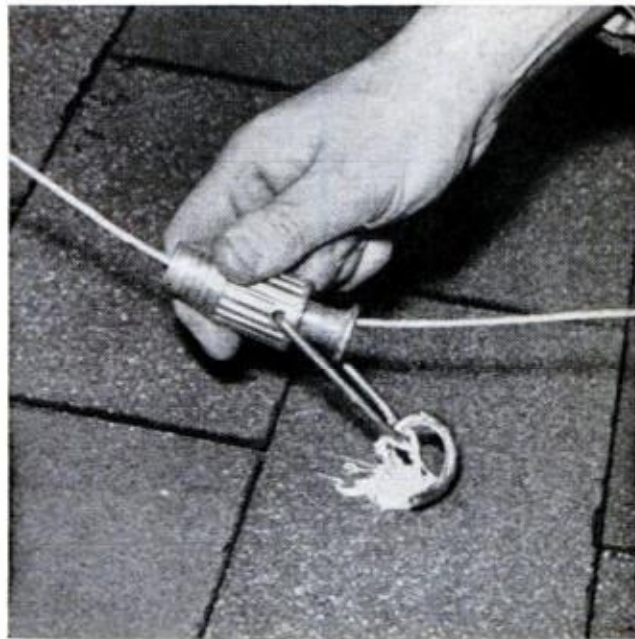
Mark the control box positions at which you get these stations best. From then on to tune in a particular station you simply activate the rotator till it points in the proper direction and turn on the TV. With some rotators you'll have to make a final adjustment while watching the program;

with others you'll find the rotator returns to exactly the same position for proper viewing each time.

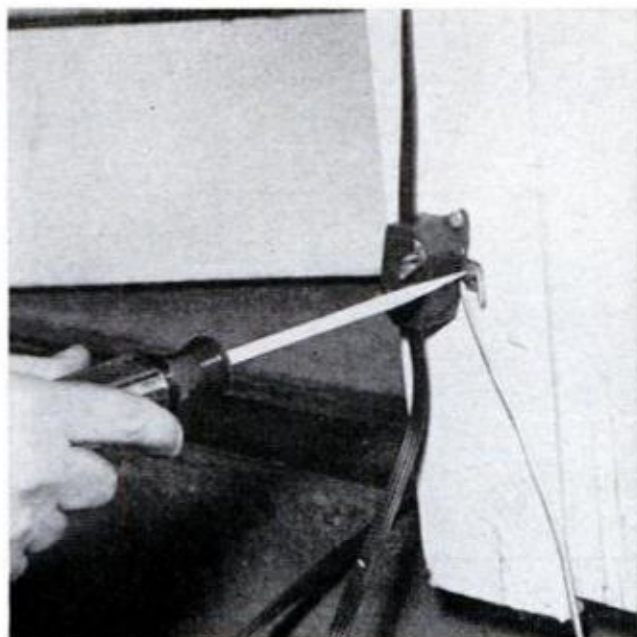
In my particular location, the New York stations came through too powerfully with the booster on and it had to be turned off while watching these stations. However, for the more distant channels the booster got rid of a lot of snow and made one otherwise unbearable station easy to view. I hope you have as much success with your new rotating antenna as I have had with mine. ★★★



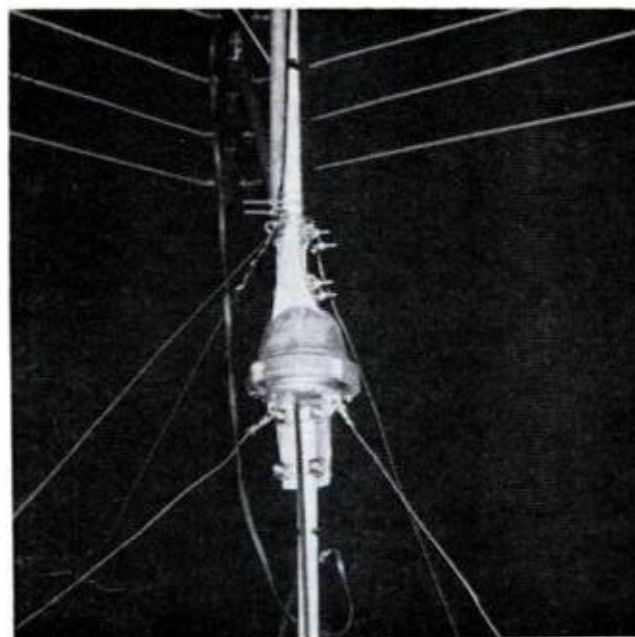
DAB OF SILICONE RUBBER seals holes around eye hooks. This is the easy way to prevent water leaks later. Takes only a moment, dries in about 12 hours



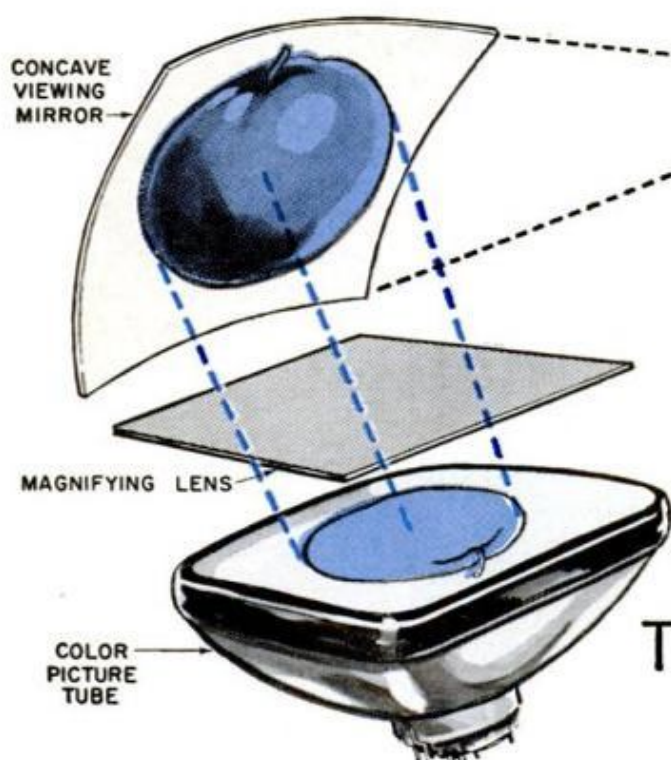
TIGHTEN GUY WIRE fast. Just pull it through this special fastener and it stays in place and just will not slip. No laborious turnbuckle adjustments are needed



LIGHTNING ARRESTOR for rotator cable is connected to ground post with a length of solid aluminum ground wire. Attach arrestor close to point cable enters house



ROTATOR READY TO USE and the mast and antenna back in place. Total job will take four to eight hours. Don't try to rush it or it will take even longer



3-D COLOR TV

They do it with a mirror!

By BOB GRANT

IMAGINE—you come home from work one night, sit back, relax, move over to the television set, lift the lid, push a button, return to your chair and watch color TV with the added dimension of *depth*.

The system called Tele-Depth uses a standard color TV chassis with the tube facing upward, but tilted approximately 14° from the vertical. A special plastic lens is positioned 3 inches above the tube, enlarging the picture. What appears on the lens is reflected to the viewer from a concave mirror in the lid of a specially

designed cabinet. This mirror, which also magnifies the picture, is positioned so that background objects appear farther away than those in the foreground.

The effect gained is that of looking out a window since the mirror mask is positioned to overlap the edges of the reflected picture. When not viewing a picture, close the lid and you have an attractive piece of furniture that doesn't stare back at you. Tele-Depth was developed by an ex-disc jockey named Jim Holt of Van Nuys, Calif.



COLOR PICTURE you see is reflected to your eyes from a special mirror in the tilt-up lid of TV cabinet



OPTICAL SYSTEM is uncovered by removing front cabinet panel. Plastic lens is above the color tube



America's
#1
pipe tobacco
cigarette

**Get a pocketful of great taste
and rich aroma. Pipe tobacco
in a filter cigarette.**

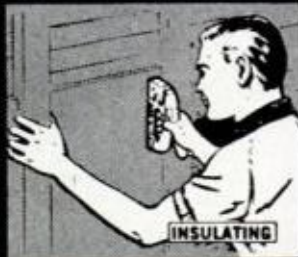
(You'll like 'em fine...and that's putting it mildly!)

ARROW

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WIRE/SCREEN
ATTACHMENT

75¢ Value

PLUS BONUS CERTIFICATE

Bonus Certificate packaged in each Special is worth 98¢ toward the purchase of an Arrow P-66 Plier-Type Stapler and box of 1,000 Staples. Simply mail the Bonus Certificate with \$1.00 to Arrow Fastener Company, Inc., to get this \$1.98 Stapler value by return mail.



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**This is a GM Original:
20,000 volts won't faze it.**

These General Motors distributor caps are twins. Identical twins. They distribute a 20,000-volt current from the rotor to your spark plugs.

And they both give the performance that's exactly right for car or truck.



**This is a GM Replacement:
20,000 volts won't faze it.**

It makes good sense to replace GM Originals with parts just like them. Go where you know they use the parts in the GM and United Delco packages.

Good service starts with good parts.

GENUINE GENERAL MOTORS PARTS



CHEVROLET • PONTIAC • OLDSMOBILE • BUICK • CADILLAC • GMC TRUCKS

United
Delco

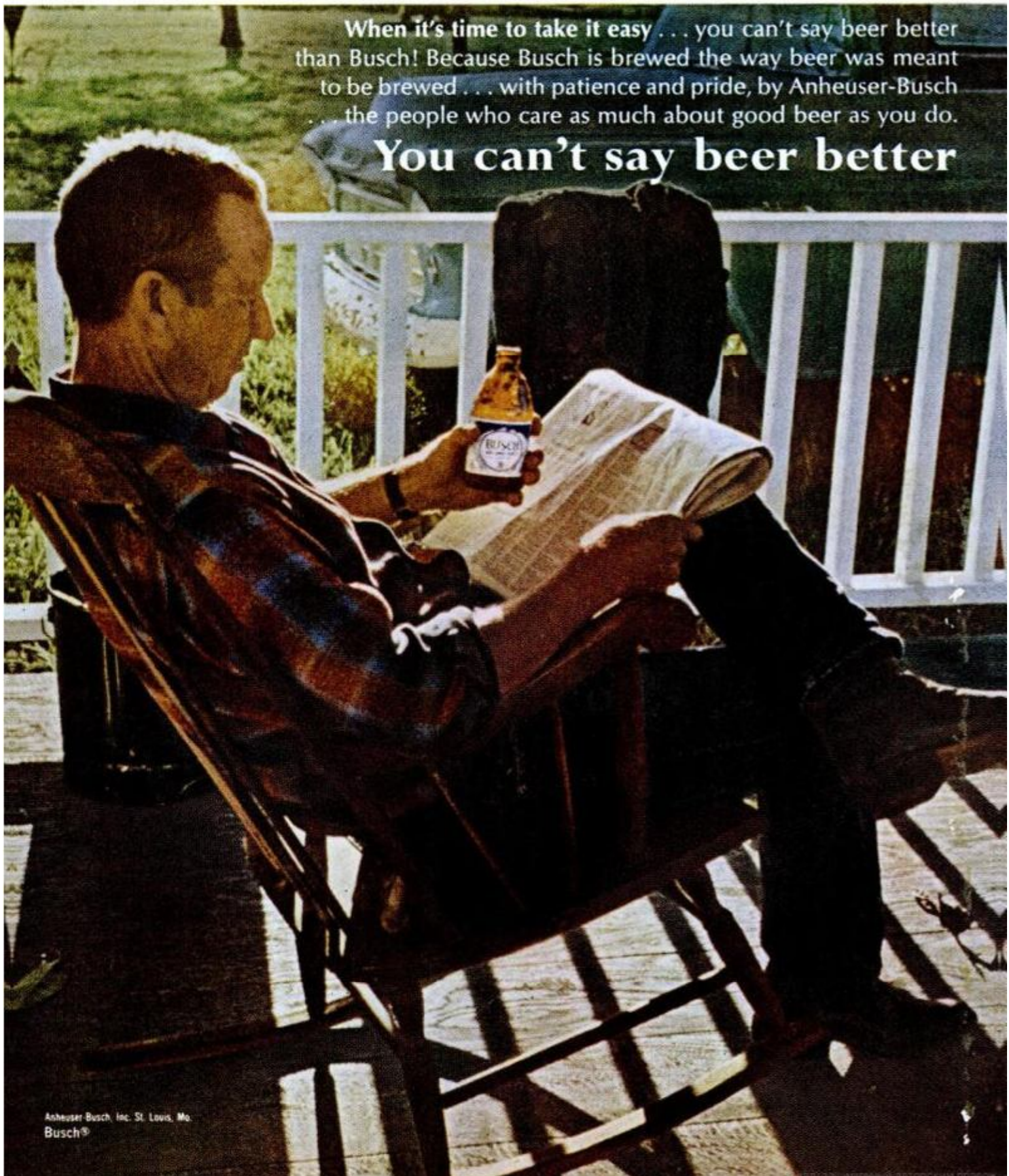




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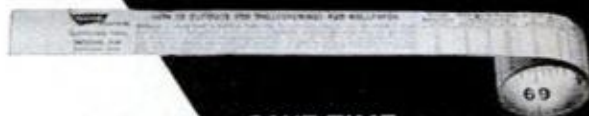
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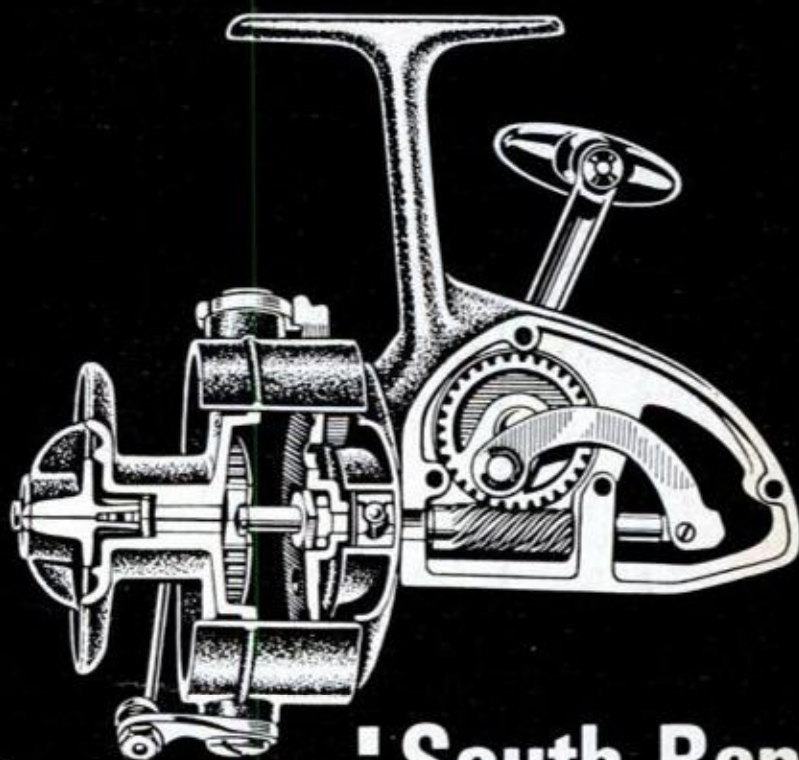


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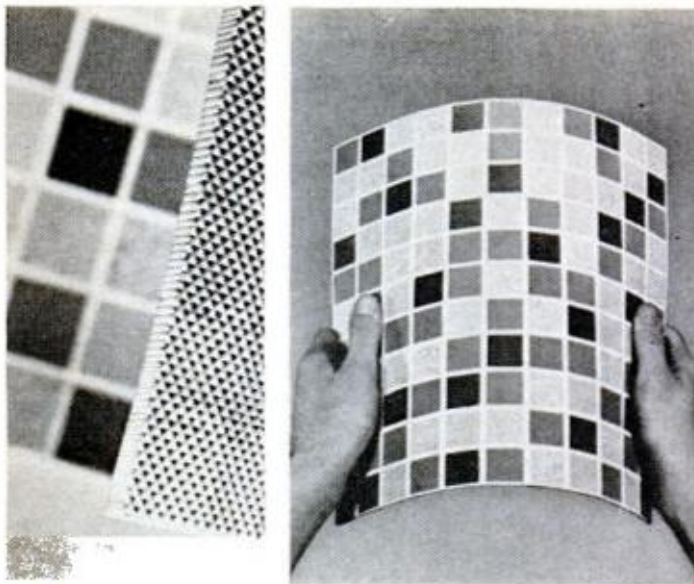
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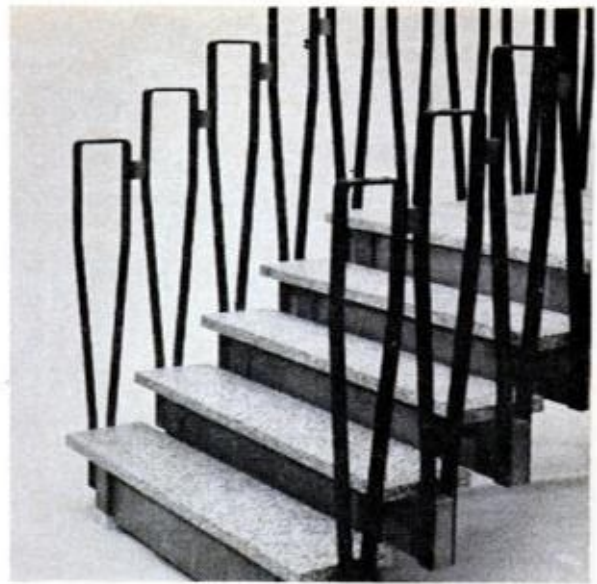
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HOME OWNERS WHO DO

(Continued from page 119)



DURABLE CERAMIC and resilient vinyl are combined in a new 132-tile sheet in various colors. Cushion backing contributes to foot comfort and absorbs sound



MODULAR STEEL STAIRWAY is assembled with wrench and screwdriver. Features include vertical posts instead of railings, terrazzo treads

most, is the Gering *Pre-Packaged Dry Well*. It weighs only 28 lbs. The unit is fabricated from 4-in. perforated and solid plastic, sewer drainpipe and fittings. All that's required to install the well is a trench and a hole in the ground for the pipe bundle. Then you simply attach the leader pipe to the downspout and backfill. Installation time is under two hours.

The big advantage of the packaged dry well is that it provides 100 percent water capacity, whereas a conventional dry well made up of rocks offers only 10 to 20 percent of its overall capacity for water. In many areas a dry well is a necessity, especially where basement flooding is a problem. This one can be bought for the surprisingly low cost of \$18.95.

An elegant suspended ceiling has been introduced by Simpson Timber Co., Seattle, Wash. The warmth and rich color of natural redwood creates a distinctive look for a new or remodeled ceiling. Exposed redwood grids from a 2-ft.-sq. module that will accommodate any standard ceiling board or decorative panel.

The system can be installed with as little as a 3-in. overhead clearance, or with as large a plenum area as desired. The redwood members are pre-cut; they fit together easily, requiring cutting and fitting only on the main longitudines. No special tools are needed for the installation.

The manufacturer claims to have one of the most effective ceiling treatments to control noise. It also provides lighting

flexibility, thermal insulation, instant accessibility to the plenum area above the ceiling, as well as a finished ceiling that will complement almost any architectural motif. When lighting is properly integrated into the system using translucent panels, the ceiling spreads a broad, soft-glowing canopy of light.

"How the heck do I nail furring to concrete without spending a year and a day on the job?"

This plaintive cry has long been heard through the wilds of suburbia. Though *PM* spotlighted the *DriveTool* a few issues ago, it's worth another mention here.

This fastening tool was developed for the home handyman by the Fastener Div. of United Shoe Machinery Corp. It sets either threaded *DriveStuds* or *DrivePins* into concrete, cement, cinder block, brick, mortar and even steel up to $\frac{3}{16}$ -in. thick. Typical applications include mounting pipe and electrical conduit clamps or attaching downspout brackets to the foundation. Any 16-oz. hammer can be used to drive the tool, although a two-pounder is recommended on jobs requiring many fasteners. The *DriveTool* lists for \$2.49 and is sold through hardware stores.

Another new fastening product has been introduced by Masonite Corp. for panel installations and related home-improvement projects. It is an easy-to-use cartridge adhesive called *Royalcote* and has great bonding strength that can be

(Please turn to page 200)



New '66 Mercury Comet has reserve strength for trailer towing. Rugged 289 or 390 cubic inch V-8's, available with all models.

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HOME OWNERS WHO DO

(Continued from page 198)

used to attach furring strips to basement walls. It's a gooey substitute for nails. Other applications include fastening underlayment, attaching stair treads, risers and thresholds and adding chair rails to walls. One tube is sufficient for installing four to six 4x8-ft. panels. A \$1.49 cartridge will fit any standard cartridge gun.

First plastic gutter and downspout made domestically, is a 5-in.-wide rigid vinyl system announced recently by Monsanto Co.'s Building Products Dept. (The company also makes a 4-in. system.) Fully maintenance-free, the new rain-carrying equipment is a completely integrated system of all-white, solid-vinyl components. The material never requires paint and will not chip, dent, rust or conduct electricity. It also resists buckling and warping under the weight of snow or ice. Weighing only 8 oz. per foot, the gutters and downspouts can be cut to any desired length with conventional tools and are easily installed.

Colored concrete blocks are now being produced by talented homeowners who tint their own, for patios and walks. For those planning to join their ranks, the following represents the latest—and least expensive—"sprinkle-on" coloring technique for this job:

First, get a good-quality pigment, then paint oil on the inside of your forms. Mix the concrete and pour it in the forms, leveling it with a board. Now, mix 8 lbs. of coloring with 8 lbs. of cement to cover 100 to 125 sq. ft. Sprinkle half of this mixture on the surface of the wet concrete and work it in with a wood float. When the excess water is gone, sprinkle the rest of the mixture on top and steel-trowel it into the surface, troweling in one direction so it won't streak. Allow the blocks to dry thoroughly before removing frames.

Outdoor lighting of homes has undergone dramatic advances in the low-voltage accent lights used for this purpose. One of the big outfits that has jumped into this market with both feet is International Register Co., Chicago. The company's all-weather *Intermatic Malibu Lights* provide homeowners with a highly flexible form of illumination for highlighting the garden, yard and special features of the house. The 12-volt sealed-beam lights require no expensive permanent installation

(Please turn to page 202)

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PERSONAL

name : _____
home address : _____
city : _____ state : _____ zip code : _____
phone : _____

EMPLOYMENT

currently at : _____ since : _____
position : _____ salary : _____
major responsibility : _____

TECHNICAL INTERESTS

major interests or specialties : _____

EDUCATION

bachelor's in : _____ school : _____ date rec'd : _____
master's in : _____ school : _____ date rec'd : _____
doctorate in : _____ school : _____ date rec'd : _____

BACKGROUND

previously employed by : _____ for how long : _____
major project assignments : _____

NOTE: If you run into space limitations on this page, please attach additional information.

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HOME OWNERS WHO DO

(Continued from page 200)

work or underground wiring, and a compact transformer supplies the low voltage by converting 110-volt housepower. The current is then carried by a plastic-coated cable which is laid along the ground.

In addition to the stunning effects that can be created by outdoor lighting, it introduces a safety factor to walks, steps and driveways and discourages prowlers.

Continuing demand for parquet flooring bespeaks an almost universal admiration for this most beautiful of floors. A leading manufacturer of parquet flooring, Harris Mfg. Co., of Johnson City, Tenn., offers a parquet—*BondWood*—that has everything: solid hardwood $\frac{7}{16}$ in. thick; square joints with no dirt-catching beveled edges; 19x19-in.-sq. units composed of 16 smaller units of 4 $\frac{3}{4}$ -in. squares, and a wide variety of woods, including oaks, maple, cherry and teak. *BondWood* is designed for installation over concrete or wood subfloors.

Ceramic tile embedded in vinyl is another unique new flooring material. This flexible, rugged stuff, made by the Amsterdam Co., New York, is called *Ceramolok* and contains 132 inch-square tiles per sheet. The material is flexible enough to be bent around columns and other irregularly shaped surfaces during application without affecting the vinyl matrix or loosening the ceramic tile inserts. A special adhesive is used to install it on virtually any type of subflooring, and no grouting or backing paper is required. The tile sheet comes in a wide range of colors, and has a sound-absorbing quality.

Build your stairs with a wrench! A bright and original modular steel staircase that assembles with a wrench and a screwdriver is among the more interesting structural kits now available to homeowners. The design is unique in that the traditional concept of a single, continuous railing has been discarded in favor of individual posts that connect one with the other, regardless of the riser height used. The steel treads are surfaced with a $\frac{1}{4}$ -in.-thick plastic terrazzo finish bonded on with plastic resins. Treads are available in 3, 4, 5 and 6-ft. lengths. If this one strikes your fancy, we suggest you write to Sales Engineering Dept., Steel Co. of Canada, Hamilton, Ont., Canada, for further information. ★ ★ ★

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Toronado Pros

(Continued from page 88)

ing this car."—Michigan trucker.

"Handles as easy at 100 mph as it does at 30."—Illinois financier.

► You're not driving that fast on the Outer Drive, are you?

"Almost impossible to induce a skid, even when deliberately gunned to spin drive wheels."—Ohio Realtor.

"Car performs as if it were glued to the road at high-speed turnpike driving."—New York executive.

Roominess and comfort of the interior ranked fourth among best-liked features, with about one-fifth of the owners saying so in different ways. Next in popularity were traction and flat floor. Traction is a category because so many named it specifically, instead of grouping it under handling. Flat floor is separate from roominess for the same reason.

"Seats are the most comfortable I have ever sat on."—Ohio salesman.

"There is truly room for six adults to ride comfortably. The center passenger, front and rear, is as comfortable as the rest."—New York manager.

► One of the big advantages that will force other makers to switch to a nice, old-fashioned flat door.

"I live in a snow belt but have not found it necessary to put on snow tires. Traction is far superior to rear drive."—New York self-employed.

(Please turn to page 205)

Toronado Gripes

(Continued from page 89)

"To reach ashtray I had to bend so far I couldn't see road."—Michigan housewife.

► Oldsmobile appears to have joined the war on smoking.

Next among the top ten gripes were rear vision, hard starting in the morning, workmanship and weight of the door—the latter two tied for sixth place:

"Difficult to park with short rear end and high back window."—New York clerk.

"Fastback design makes it difficult to gauge parking distance."—Ohio engineer.

"Fastback makes poor visibility when parking between two cars."—Minnesota transporter.

► Typical of modern fastbacks. Detroit needs to put more glass back there.

"Have trouble with cold engine choking or flooding."—Wisconsin supervisor.

"Hard to start first time in day."—New York airline pilot.

► I asked an Olds man about this and he said a simple carburetor adjustment would fix it. Okay, but couldn't this be done at the factory before delivery?

"Minor things in construction have been happening. Quality control must be poor: the door handle fell off, gas gauge does not work, parking brake does not release fully."—Indiana clergyman.

"Left door-handle strap pulled off."—Texas retired newspaperman.

"Large doors are hard to open on hills,"

(Please turn to page 205)

Summary of Toronado Owners' Reports

Excellent 83.5% Good 12.9% Fair 2.5% Poor 1.1%

Best-liked features

Styling	54.0%
Handling	45.2
Roadability	22.2
Roominess	20.4
Traction	17.9
Flat floor	14.0
Front-wheel drive	13.6
Quietness	11.5
Cornering	10.8
Power, ride	8.6
Specific complaints:	
None	23.6
Rattles and noise	16.4
Hard ride	14.6
Ashtray location	13.6
Rear vision	11.7
Hard starting in morning	9.4
Workmanship	8.5
Door weight	8.5
Door size	5.6
Trunk dimensions	5.6
Carburetor	5.5

Best-liked exterior feature:

Styling	61.3%
Long lines	22.6
Front-end styling	16.5
Headlights	13.7
Long hood	10.5
Least-liked exterior feature:	
Rear-end styling	28.9
Headlights	10.1
Rear vision	8.8
Best-liked interior feature:	
Flat floor	56.5
Dashboard, instrument panel	23.6
Seats	19.2
Roominess	14.8
Miles per gallon:	
City driving	11.3
Long trips	14.6
Overall	13.0
Mileage opinion:	
Better than expected	38.3
As expected	52.1
Not as good	9.6

What influenced purchase most?

Styling	63.1%
Front-wheel drive	54.5
Something different	24.5
Roominess	11.9
Handling	10.1
Oldsmobile name	9.7
Consider another car?	
Yes	46.6
Other makes considered:	
Buick	27.9
Oldsmobile	20.5
Cadillac	19.7
Thunderbird	14.8
Pontiac	11.5
Is Toronado only family car?	
Yes	30.9
How is dealer service?	
Excellent	65.5
Average	29.7
Poor	4.7
Would you buy Toronado again?	
Yes	95.3

Toronado Pros

(Continued from page 204)

"Two can sleep in the boot."—North Carolina motion picture producer.

► How's that again, Rip?

Front-wheel drive, quietness, cornering and power rounded out the top ten pros.

"I once owned a Cord and said I would own another front-wheel drive when built."—Nevada coin machine operator.

"This drive is so superior it can't be compared."—Florida contractor.

► Many owners noted that from a standing start it was almost impossible to spin the wheels. None complained of lack of power.

"I like noise-free operation and lack of vibration."—Massachusetts merchant.

► Absence of drive-train vibration has to be experienced to be appreciated.

"Corners like a dream; no tendency to wander."—Retired Californian.

► Almost time for you to retire from the circuits, isn't it, old buddy?

"Power is overwhelming, no matter the conditions."—Massachusetts jeweler.

► With 385 hp, Toronado is one of the world's highest-standard power cars.

Toronado Gripes

(Continued from page 204)

in parking lots, in a wind or in traffic."—Maryland director of public works.

► If you run out of gas in a hurricane, maybe you can sail on by opening the doors and running before the wind.

"Doors are heavy and doorchecks do not always hold them open. This allows door to close against a person getting in or out."—New York manager.

"The last three among the top ten complaints were door size (too big), trunk dimensions and carburetor trouble.

"Doors are very large, should have lock buttons at front."—Ohio engineer.

► Detroit, please note. A sound idea.

"To remove spare I have to get completely into trunk."—Pennsylvania expediter.

► He's right. That tire should be moved toward the rear.

"The necessity of crawling into a trunk with considerable depth to retrieve articles doesn't seem ladylike."—Ohio engineer's wife.

"Carburetor was not fully opened for full speed."—Tennessee attorney. ★★

Toronado Owners Say Front Drive Is 'In'

This Owners' Report for the 1966 Toronado is one of the most significant we will publish this year. As most car buffs know, Oldsmobile's competitors are watching closely. If the revolutionary front-drive system leads to added sales, more cars will adopt the design.

Already, Cadillac is secretly preparing its own front-drive car for 1967, using some Toronado components. Ford has fingered its Mercury line for front drive—if Toronado is successful. What Chrysler will do is anybody's guess. It has the turbine engine to support, but a front drive has been under study at Chrysler as long as at Ford or General Motors.

Oldsmobile increased the production of Toronado 20 percent at the start of the year and now expects to build 70,000 of the 1966 model. This alone stamps the car as successful. For further proof of its popularity, we asked Toronado owners some special questions to determine how acceptable the front-drive system really is.

Here are the answers to these questions, which were asked in addition to the usual queries appearing in the owners' summary:

Front-drive rating?

No trouble93.7%
Little trouble 5.3%
Major trouble 1.1%

How does front drive compare to conventional drive?

Better92.0%
No difference7.2%
Worse0.7%

Tire wear?

As expected67.5%
Better than expected28.6%
Excessive 3.9%

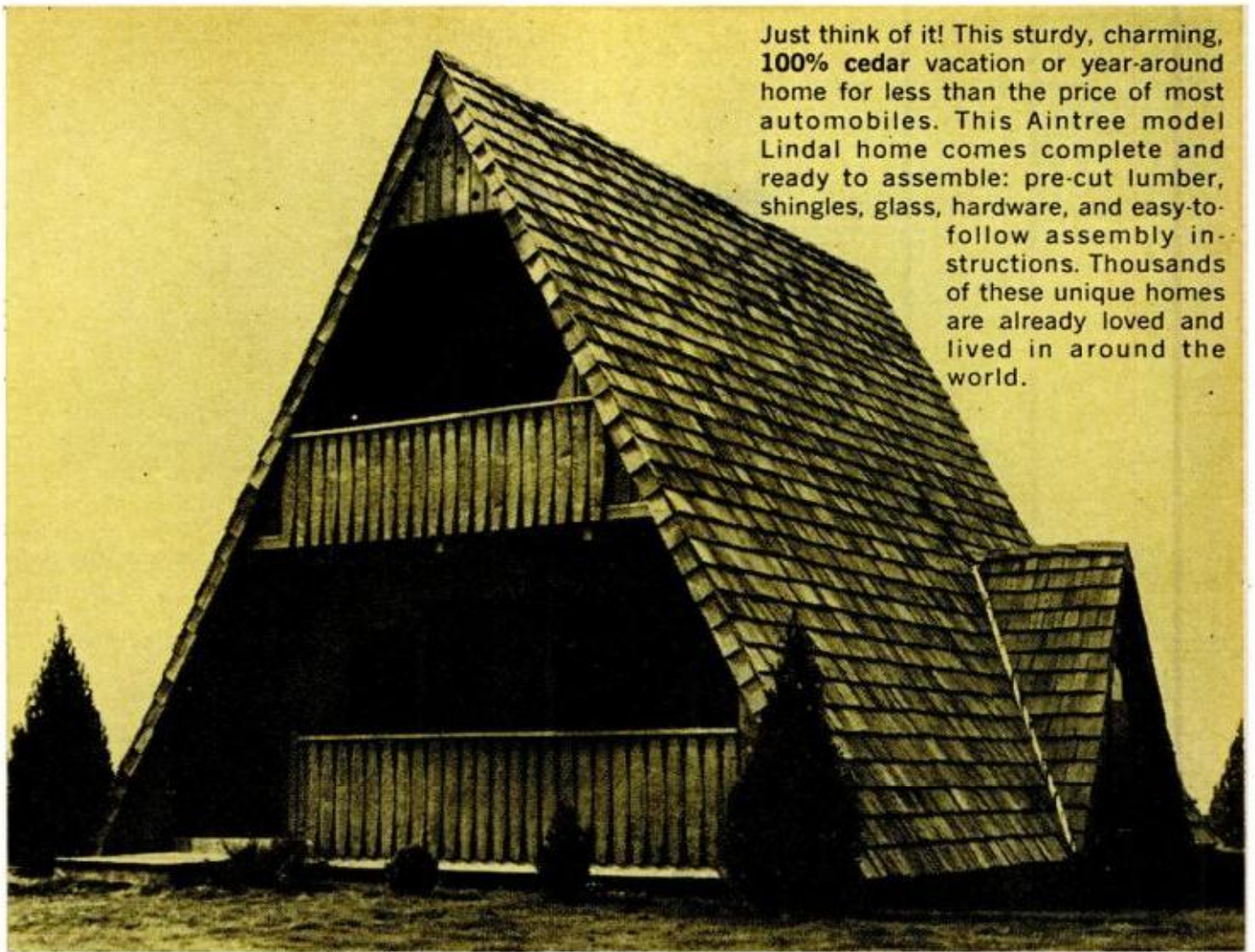
Would you buy Toronado again?

Yes 95.3%

Note the exceptionally high rating of people who will buy another Toronado. The dissenters (4.7 percent) are almost exactly the same ones who rated dealer service as poor, an interesting coincidence.

Also significant, among thousands of answers, not one owner reported defects in the chain-drive system!—a remarkable achievement by Olds engineers and their supplier.

Based on this report alone, there is little doubt front drive will be found on many more American cars in the near future.



Just think of it! This sturdy, charming, 100% cedar vacation or year-around home for less than the price of most automobiles. This Aintree model Lindal home comes complete and ready to assemble: pre-cut lumber, shingles, glass, hardware, and easy-to-follow assembly instructions. Thousands of these unique homes are already loved and lived in around the world.

Here is the leisure home you've read and dreamed about

... all for an amazing \$3,345 (\$350 down — \$53.75 a month)

ACT NOW—MOVE IN THIS SUMMER—SAVE ALL SHIPPING COSTS (up to \$600) IF YOUR ORDER IS RECEIVED BEFORE JUNE 1, 1966.

For further information—or to take advantage of any of these valuable options—write as soon as possible and give us your preference:

1. Immediate shipment of the Aintree A-frame home (similar to above) to the rail station of your choice—shipping charges prepaid:

- \$3,345 full cash price—or
- \$350 cash payment with order, balance in monthly installments of \$53.75 per month (please include employment, bank, and credit-reference information).

2. Lindal's DO-IT-YOURSELF PACKAGE ... for only \$35.00

Includes: three sets of construction blueprints—six sheets of detailed cutting drawings—ten sheets of step-by-step construction drawings—complete step-by-step assembly instructions. Everything you need in order to

build this lovely home from locally available materials is included. You receive full refund if you decide to have Lindal furnish this home to you instead of pre-cutting it yourself.

3. Lindal has 60 alternative home designs available to you—all of 100% cedar construction. Complete descriptive color booklet available for only \$1.00.

There is no substitute for the best in leisure homes. Lindal has them for you. Write today:



LINDAL CEDAR HOMES

9004 South 19th Street, Tacoma, Washington

FREE PLAN *How to Start* Your Own Business



Start a steady repeat CASH business in your basement or garage. Earn \$3 to \$6 an hour in your spare-time! Excellent profits in saw sharpening business! Automatic Foley Saw Filer, easy to operate, files combination saws, hand, band, and circular saws. No experience needed. H. C. Deibert wrote us: "Since I got my Foley Filer 5 years ago, I have averaged 4 1/2 saws each day since I started."

Every saw you sharpen brings you more customers. "I rented a two-car garage and have all the work I can do," writes Charles H. Smith.

FREE BOOK Shows How to Start

Fact filled booklet tells you how to start a sparetime business immediately; how to get new business, how to advertise. Rush coupon now; get "Money Making Facts" and details on Easy Payment Plan. No Salesman will call.

Send Coupon for FREE BOOK Money Making Facts

FOLEY MANUFACTURING CO.
416-6 Foley Bldg. Minneapolis 18, Minn.

Send FREE BOOK—"Money Making Facts",
and Time Payment Plan.

Name _____

Address _____



FREE

WINDOW PLANNING IDEAS

to help you make your home more beautiful, more valuable. Send today for new, full-color folder packed with illustrated ideas and a complete description of the Andersen Window line.

(Clip and mail today!)



- I plan to build. PM-46
 I plan to remodel a _____

Mr.
Mrs. _____

Address _____

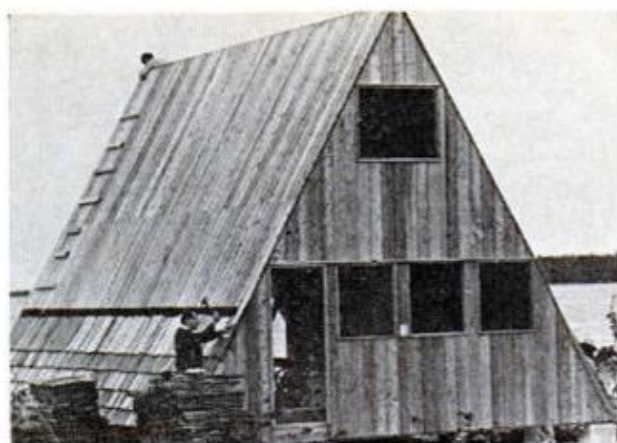
City _____

State _____

Andersen Windowalls
Andersen Corporation • Bayport, Minnesota

A-FRAME VACATION HOME

(Continued from page 206)



DAWN BREAKS on "the A-frame that went up overnight" as Taughten presses on with the shingling job. House was furnished and occupied the next day

against the accompanying materials list.

Perhaps the most important part of any precut house is the foundation. They just don't make allowances for off-level, out-of-square support platforms. It's fair to say that once you get this right, half the battle's won. That's right. Because one of the nice things about assembling a precut—and it was certainly true with our A-frame—is that the job becomes easier as it progresses. As with a puzzle, when the pieces get fewer, the "picture" begins to emerge, and—*whee!*—suddenly its done.

Next time you're down on Grand Bahama Isle trot over and take a look at the Big "A" on the beach. You can't miss it. It's red cedar and almost as pretty as the girls on the beach out front. ★★★

(For further information on this and other A-frame vacation homes, and for additional data on Freeport, Grand Bahama Island, write: A-Frame Vacation Home, Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022, enclosing 50 cents to cover mailing and handling.)

New Look at Sargasso Sea

The mysterious Sargasso Sea, home of a floating continent of seaweed, is being investigated by a group of Swedish and Danish scientists. A joint expedition left January 20 for the Sea.

The Danes are checking a belief that Scandinavian eels hatch their eggs among the tangled strands of weed. The optics of the Sea, which are affected by millions of brown algae called sargassum, are being investigated by the Swedish team.

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Oldest Child Unsure of Self

"Birth-order" psychology has been given an additional prop by a study conducted at the University of Connecticut. Working with 65 college women, psychologists Kenneth Ring, C. E. Lipinski and Dorothea Braginsky placed each woman in a room with two stooges. The stooges were instructed to act out different degrees of anxiety. Each woman was subsequently asked to rate her state of mind on an anxiety-calm scale and then to rate her confidence in that rating.

Results of the experiment indicated that firstborn children are less sure about how they really feel than are their younger brothers and sisters. Moreover, the firstborn is more influenced emotionally by the moods of others and tends to alter his state of mind accordingly—i.e., firstborn women approximated the level of emotion acted out by the stooges.

Why? The psychologists suggest that children second in line have less help

from parents in handling anxiety and therefore work out a better system for themselves.

Nicotine Dreams

Slumbering cats injected with small amounts of nicotine register unusually rapid brain waves, possibly indicating the occurrence of cat dreaming.

Dr. Edward F. Domino, the pharmacologist with the University of Michigan who conducted the cat experiment, is currently attempting to experiment similarly with humans. The significance of the study lies in evidence that nicotine—usually considered a depressant—may in fact cause excitation of the central nervous system. However, as Dr. Domino explained, wakefulness produced by the drug is followed by a slowing down, as the nerve endings become clogged with nicotine—in conformity with current theories on the nature of nicotine.

NEW SKINS

(Continued from page 115)

processing plants and oil refineries.

Another good steel protector is porcelain enamel—and today's P/E (as they say in the trade) bears little resemblance to the stuff Aunt Hazel's speckled coffee pot was made of. The coat is thinner, so thin it bends with the metal when struck, rarely chipping or cracking, main complaint of a generation ago.

Essentially, P/E is a thin layer of glass fused to metal, usually iron or steel. The raw material is applied by dipping or spraying, then cooked at somewhere between 980° and 1800° F. to fuse permanently with the base.

The material has been around from the early days of history (Cleopatra supposedly had jewelry of glass beads fused to copper) but it wasn't until the early '30s that the industry began to blossom. Right after World War II, the use of architectural P/E, particularly in siding, sprinted spectacularly. Examples of recent construction: curtain walls of P/E on Statler-Hilton hotels in Hartford, Conn., and Dallas, and orange roofs on Howard Johnson restaurants all over the place. And the Kennecott Copper Corp. Building in Salt Lake City protects its copper walls with transparent P/E.

From blackboards to rails

Though 65 percent of porcelain enamel still goes into appliances, the industry is pushing out in a variety of other areas. Most schoolroom blackboards being installed today are composed of easily erased matte surface P/E over steel (which attracts magnets)—and if you haven't been in school lately, they're green. GE's and Frigidaire's 900° F. self-cleaning ovens are lined with P/E. And along the Hutchinson River Parkway in New York a brilliant yellow P/E section of guard rail marks a dangerous curve. Been there for a year, but the only color change came from a black auto which left paint on the rail. Didn't damage the porcelain. Even in ultrathin sheets the porcelain enamel refuses to separate from the substrate. Reason is that during fusion the coating's metallic ions (wandering particles with an electric charge) merge with atoms in the base metal.

The same interaction between atoms of two different substances causes certain plastics to stick tightly to metal. And that's the main reason for the tremendous boom in vinyl-covered metal in the last decade. The stuff is great for manufacturers to work with: It sticks so tight the plastic is bonded to the steel before the product is

made. So when, say, an auto dashboard is stamped out, it's finished—no brushing or spraying on of a final coat. Someone figured that by using precoated coils of metal (some two miles long when unwound), companies save up to 75 percent in finishing costs, turn things out five times faster.

Marrying strips of metal and plastic is no trick at all. Typically, the steel is cleaned, etched and wet with a film of adhesive, then slid into an oven. It's pulled out, and, before cooling, a 4 to 20-mil coating of liquid vinyl is rolled onto it. The whole thing then zips between embossing rollers where texture is impressed. Then off to the fabricators it goes to be made into chair seats, factory siding, cabinets, office partitions, camera bodies, or whatever. Cost: about two and a half times that of steel alone. Advantages, according to the American Iron and Steel Institute: Finishes won't mar, chip, peel, discolor or be harmed by oxidation, perspiration, solvents, grease or alcohol.

An entirely different kind of protective sheathing method—this one depositing coats from swirling mists of molecules or atoms—goes under the general term *vapor coating*. Already scores of products are being vapor-coated—jet engine parts and party ribbon and Echo satellites—and according to those working in coatings, the strange world of vapor is certain to become increasingly important. Vapor coating can be broken down into a number of different procedures, but all of them accomplish something no other process, except electroplating, can do: coat an object atom by atom.

Vacuum evaporation is the process now being most widely used. When the overcoat material is metal (usually aluminum), those in the trade call the technique *metalizing*. The substrate can be almost any material. The object to be coated is placed in a vacuum chamber with the coating substance. When a vacuum is reached, the plating material is heated until it turns first to a liquid, then to a gas. It radiates throughout the vessel, then deposits itself, atom by atom, through condensation, on whatever's being coated.

Suppose you want to put a thin, impervious layer of aluminum on steel. You could buy aluminum foil, and by one means or another stick it on. But the thinnest foil you could find without pinholes in it is about 300 mils. (Cigarette package foil is about 250 mils thick, but it's full of holes.) "With evaporation, we can lay down a coating only a hundredth as thick as that," says Kenneth C. Taylor, manager, vacuum product development of

(Please turn to page 212)

If it can plane a 14-foot skiff, ghost down on a bass, spend its life in salt water and pack in a car trunk, it's a new Sea-Horse 9½

We built the Sea-Horse 9½ to be the best fishing engine in the world. Fishermen took it to sea, took it to heart, spread the good word. From the day of its introduction, it's been our best-selling motor. But not just to fishermen—to owners of all kinds of small craft. (Like skippers of medium sailboats!)

Just what *is* so special about this new 9½? The fact it weighs and carries like a 2-suiter—and

stows flat, too. The fact its downhill induction system wrings every ounce of oomph out of every drop of fuel. Plus the way it trolls and the fact its powerhead is so low you can cast over it sitting down. Now there's even a Well Kit for Sailboats (accessory) that makes the shift, throttle and starter immediately accessible at the top of the motor housing. All in all,

you couldn't meet a nicer buy.

There are 16 new Johnson models this year in 10 power classes to 100hp. For the right one for you, see your Johnson dealer. If his fame has yet to reach you, reach him through the Yellow Pages. P.S. Johnson makes a full line of Johnson Boats and the new Johnson Skee-Horse snowmobiles.

From 3 to 100hp, every '66 Johnson features:

- Famous 2-year warranty*
- Full corrosion protection
- 50 to 1 gas-oil mix

*For 24 months after purchase, Johnson Motors will replace, without cost to the original purchaser, any part of its manufacture which upon inspection proves to have failed in normal use due to faulty material or workmanship.

first in dependability

Johnson

Johnson Motors, 2175 Pershing Road, Waukegan, Ill. Division Outboard Marine Corporation.





Unretouched photo of Stren[®] and competitive premium monofilament being fished under similar conditions. "Stren" is on left, and its superior visibility is apparent. Which line could you fish best?

See why Du Pont "Stren" fluorescent line can make you a better fisherman!

"Stren" fluorescent monofilament fishing line is the one that's easiest for you to see. And that makes "Stren" the line easiest for you to fish.

The reason is the amazing fluorescence of "Stren". Instead of fading out against the background, "Stren" glows a brilliant blue. So you can track your line with greater accuracy as you work your lure or bait.

You see it... but fish miss it (opp. page)—no wonder "Stren" fluorescent can make you a better fisherman!



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY



U.S. PATENT NOS. 3,357,080 AND 3,363,189

NEW SKINS

(Continued from page 210)

Philadelphia's F. J. Stokes Corp., maker of metalizing machinery. "That's the big advantage of metalizing." A thin coat costs less over the long run, weighs less, and in some applications—coating micro-miniature electronic components, for instance—is essential.

A surprising number of things are being vacuum-metalized with aluminum today: gift wrapping ribbon of cellulose acetate, cheap jewelry, radio knobs, telescope mirrors, cap pistols, metallic yarn that looks like thin gold wire (used for sweaters and auto seats), and the Mylar film used on the Echo I satellite.

A good method of sheathing things with plastic is called glow discharge. It works on this order: 1. The object to be coated is placed in a vacuum, and a 300- to 1000-volt AC charge introduced; 2. an organic vapor, a monomer (a simple compound) is allowed to sizzle in; 3. the charge causes the vapor to ionize; it homes in on the surface of the object, which acts as a cathode; 4. the ionized monomer changes to a polymer (a complex arrangement of the elements in the simple monomer), cures and dries, all in one step. The result is an even coating of plastic with a thickness of from 1/2 to 24 microns (24 microns equal approximately one mil).

Skin of one molecule

Glow discharge coating was discovered 11 years ago by a physicist named John H. Coleman, president of a little Westbury, N.Y., outfit called Radiation Research Corp. "The company was trying to find a thinner film for capacitors," recalls J. Burchenal Ault, vice-president. "Somebody thought of trying an old laboratory curiosity called glow discharge. It worked. Well, when Coleman realized he had a new method of polymerization combined with electrostatic coating, he knew he really had something tremendous. What has developed is an extremely inexpensive system for putting an absolutely uniform coating of any thickness from one molecule up onto a piece of cloth or paper or steel, or even a bunch of particles."

"The potential of this whole thing is enormous," Ault says. "It'll be used to coat cans and paper bags and paint particles and brassieres—you name it. We're really beginning to move now."

The whole coating industry is beginning to move, and every time you turn around, another coating process pops up. Other examples:

- **Flame-spraying** of metals and plastics has been attracting industry's eye lately. The 3M Co., for instance, is pushing a one-part thermoset epoxy to be used in flame-spraying in the field. The worker points an elongated handgun at the thing to be coated—a newly welded pipe, for instance—and when he pulls the trigger, epoxy powder ejects through an oxygen propane flame. The resin shoots out as a molten liquid, but the flame dries and cures it in seconds.

- **Sputtering** methods depend on the ejection of atoms or molecules from a surface when it is bombarded with plasma (ionized gas) molecules. For example, in the PlasmaVac system of Consolidated Vacuum Corp. of Rochester, N.Y., a hot filament ionizes argon gas fed into a vacuum chamber. Then an electrical charge is shot through the gas to the coating material, which is blasted with so much energy it "sputters" away to deposit itself on the object to be coated, hanging nearby. Consolidated sees a future for this in the micro-electronic and optical fields.

Those new silver coins

- **Cladding** is the joining together of metals by pressure and heat. Good example is the "sandwich" of copper clad with copper-nickel alloy now used by the Treasury Department as a replacement for high-silver-content coins. Under a \$3 million contract, Du Pont is cladding currency by separating the metals to be joined by a few thousandths of an inch, then detonating an explosive atop them. When the sheets smack together, instantaneous high temperatures bond them in a joint strong as the metals themselves. Plates joined are several inches thick; then they're squeezed through rollers until they're down to coin thickness.

- **Peen plating** is the mechanical coating of a metal object by "cold welding" tiny particles of plating metal to its surface. In the process as developed by 3M Co., parts to be coated—fasteners, baseball shoe cleats, springs—are dropped into a horizontal barrel of dustlike (6 to 60 mils) glass beads and tumbled for a quarter hour or so while steam is pumped through. The beads pound against the surfaces until the pieces are shiny clean.

Then a quantity of metal powder—usually zinc, but occasionally cadmium, tin, or lead—along with a bond-promoting chemical, is dumped into the barrel, and for a half hour the metal powder is "hammered" onto the surface of the parts by those millions of glass beads. Washed, the parts have a burnished, satiny finish. According to 3M, the quality is as good as that resulting from electroplating. ★★

Photographed at Cypress Gardens by Buddy Gaines



Unretouched underwater photo of Stren[®] and competitive premium monofilament being fished under similar conditions. "Stren" is on left, and its low visibility is apparent. Which line do you think is most apt to hook your fish?

See why Du Pont "Stren" fluorescent line can make you a better fisherman!

"Stren" "blindfolds" the fish to everything but your lure or bait.

Where ordinary monofilaments "silhouette" against the light-blue water-sky background seen by the fish, "Stren" is a fluorescent blue itself, and thus blends into the background. Only "Stren" is both easy for you to see and hard for fish to see.

Should you pay more for "Stren" fluorescent? Obviously. You expect it to make you a better fisherman! E. I. du Pont de Nemours & Co. (Inc.), Rm. 2887 Wilmington, Del. 19898.



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY



U.S. PATENT NOS. 3057040 AND 3063189

HIDEAWAY HOMESITE

(Continued from page 125)

cost-per-acre for public-domain land may be in Alaska where for \$22.50 you can own five acres of land. Of course you have to build a "habitable house" on the land and live there at least five months a year for three years before you can obtain title. But other, more desirable and convenient land, is available.

How can you keep abreast of what's for sale by BLM? Notices of small-tract sales are published in the *Federal Register* (subscription \$15 per year, but you can find it in your library). For 60 cents a year (from Superintendent of Documents, Washington, D.C. 20402) you can subscribe to the Bureau's quarterly magazine, *Our Public Lands*, which features a "Public Sales Bulletin Board." Also, you can request the Land Office in a particular state to notify you whenever new sales are pending.

Site may have a home

2. Another bet is the General Services Administration, which disposes of federal land and buildings as surplus property. Here you have a chance not only of picking up a homesite, but a home. Recently, for example, GSA advertised for sale: "U.S. Coast Guard Quarters, Wyandotte, Mich., consisting of 0.191 acres of land improved with a two-story, two-unit duplex type residence and a combination two-car garage and boathouse. Each unit contains three bedrooms, bath, living room, kitchen and enclosed rear porch." Some layout!

Naturally, most of the property GSA offers is not suitable for a vacation home, but occasionally you may find a chunk of property that seems to be tailor-made for such use.

GSA sells property by sealed bid at public auction. Ask to be put on the mailing list maintained in the GSA region in which you are searching for a hideaway site.

3. Another agency to contact is the Farmers Home Administration, Department of Agriculture. FHA occasionally must acquire property (against its wishes) by mortgage foreclosure. Such tracts of rural land are offered for sale as surplus property and sold to the highest bidder.

As before, the bulk of this real estate is not suitable for use as a vacation homesite, but occasionally a parcel will be ideally located for your use and you can zero in on it.

4. The Forest Service, Department of Agriculture, might have just what you're

looking for—depending upon where you're looking. Today there are about 19,000 private summer homes standing in the national forests. In most cases, the land was leased to the homeowner for 20 years.

But the pressure now is on to get private homes out of the national forests. As a result, no national forest land is available in several states; your chance in those states is to buy a cabin from some one with an existing permit and have the permit reissued in your name. Local real estate agents can help you find willing sellers.

However, in the Service's Eastern Region, homesites are available in the Allegheny Forest in northwestern Pennsylvania; district rangers Gordon Roy (Marienville), Ralph Willard (Ridgway) and Clifford Reedy (Bradford) stand ready to show them to you.

Summer homesites are also available for lease near the south shore of Hungry Horse Reservoir and east of MacDonald Pass in Montana; in the Willamette Forest of western Oregon; and in scattered areas throughout Idaho, Nevada, Utah and, of course, Alaska.

5. Also in the business of leasing vacation-cabin sites is the National Park Service. Some sites are available near Lake Mead in Nevada and Coulee Dam in Washington.

6. Two Indian tribes are leasing cabin sites in their tribal lands. The White River Apache Tribe has lots available near Hawley Lake in Arizona, and the Menominee Indians are developing recreation lots along the Wolf River and Bass Lake in Wisconsin.

7. At least two state governments are selling vacation homesites. When it joined the Union, Texas retained its public lands, and sells some parcels occasionally. When Alaska gained statehood, it was granted 104 million acres of former public domain; a brochure describing your opportunities there is available.

Canadian bargains

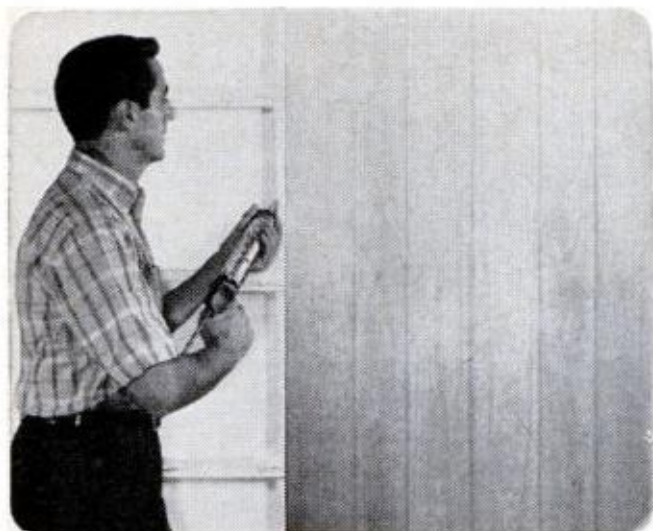
8. How about a place north of the border? In Canada, the federal government has jurisdiction only over "Crown lands" in the Yukon Territory and Northwest Territories. Such land is out of the reach of most Americans from the standpoint of distance.

However, the remainder of the Canadian public land is administered by the 10 provinces, and here you may see an opportunity if you live in a northern state and therefore have fairly easy access to sites across the border.

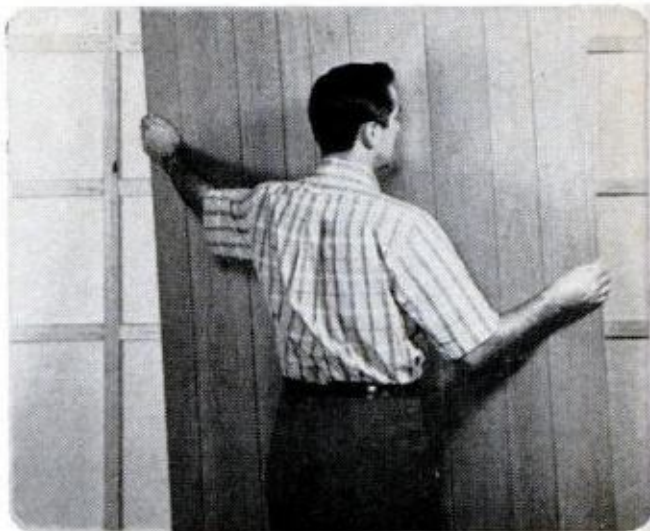
(Please turn to page 216)

New Nailless Royalcote Panel Application System

takes the hard work out of paneling a room



New Royalcote general-purpose adhesive quickly and permanently affixes Royalcote Panels in place. No unsightly nail holes. Apply with caulking gun over solid backing, furring strips, or studs.



Large, precision-cut Royalcote Panels are made to order for do-it-yourselfers. Easy to handle, easy to line up. They cover a wall in no time flat. Adhesive forms a permanent bond, dries quickly, yet allows adjustment.



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Royalcote Adhesive is ideal for dozens of weekend projects where a strong, dependable bond is needed (dog and bird houses, etc.), making the finished job neat and nailless.



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How much "cake"?

A pipe develops its flavor from its cake, but too much may actually crack the bowl. Never let the cake get thicker than a nickel; remove cake with a pipe reamer—a knife or sharp object may cut the briar.



A pipe! It's a great soother, a pleasant comforter.

BULWER-LYTTON



A product of Philip Morris Inc.

HIDEAWAY HOMESITE

(Continued from page 214)

New Brunswick leases campsite tracts of an acre or less for \$20 a year, and Manitoba has 100 by 150-foot summer home sites which can be rented for \$20 to \$30 a year. Newfoundland will give you a 25-year lease on a one-acre summer cottage site for \$10 per year if you erect an approved cottage. Quebec leases 132 by 198-foot summer cottage sites on lakes, rivers and small islands on a 10-year basis for a minimum yearly rental of \$35. Saskatchewan has land in the northern part of the province available for summer home sites on a lease or purchase basis, and the same situation exists in northern Alberta. British Columbia leases summer cottage sites with frontage on its lakes.

Private opportunities

Nothing here interests you? Then by all means don't give up. Focus on private land.

You may be able to pick up a private lot which borders on a public recreation area, and end up with the best of two worlds. That's what my father-in-law did. He bought a small house and lot within an hour's drive of Detroit, smack up against a 15,228-acre state recreation area. That wilderness might as well be his own private property, for all the time he spends on hunting and fishing excursions there.

Many farmers, attuned to the boom in recreation, are selling or leasing cabins and sites. For example, farmer Eldon E. Eastman of Route 3, Winfield, Kans., is renting cottages on a scenic bluff near a fishing lake for \$80 for six months or \$120 per year.

Even the big timber companies are capitalizing on the real estate boom. Weyerhaeuser has set aside 7000 acres in five of the western states for real estate development.

If you're of the opinion, like Thoreau, that much of the fun of buying your own place is in locating the perfect spot, take your time in finding a haven. Subscribe to a newspaper published in the vicinity where you'd like to buy and follow the classified ads. Visit the area and become acquainted with any local residents who might tip you off to a choice spot. Ask a reputable real estate agent to keep his eyes open for you.

One way or another, you'll find that perfect cabin site. Then one adventure will have reached its climax. Another—the designing and building of your own vacation cabin—will begin. ★★★

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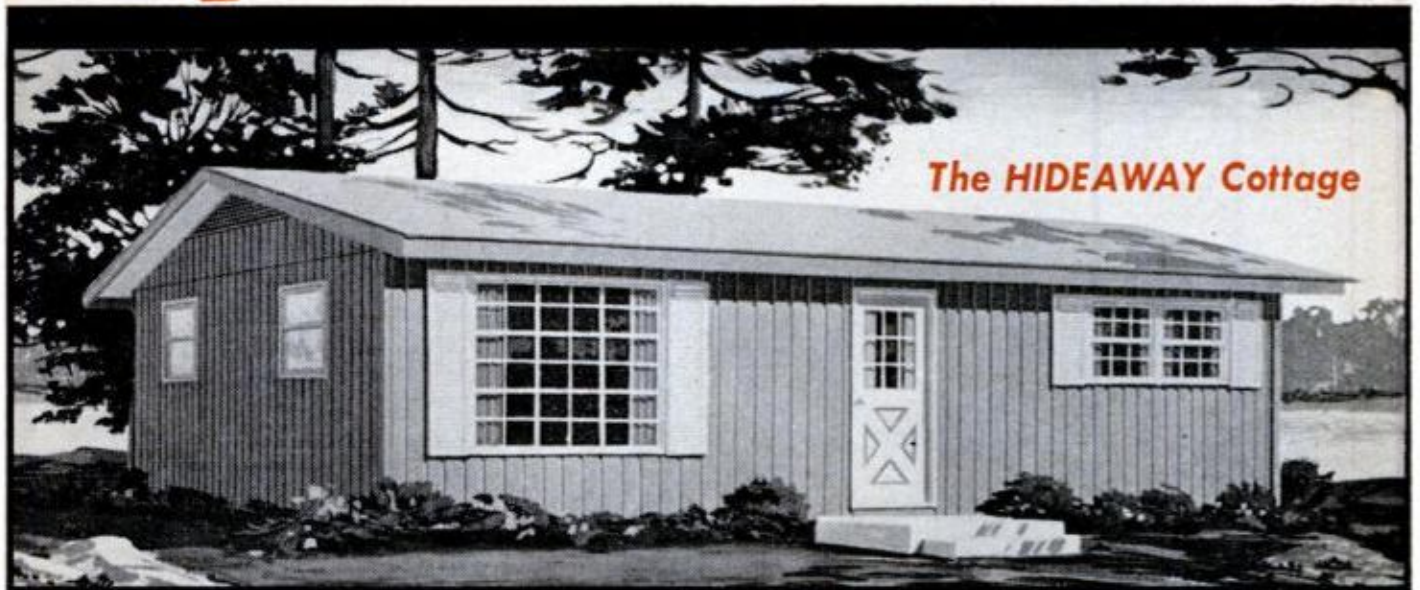
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The HIDEAWAY Cottage

WHO SAYS YOU CAN'T AFFORD A SECOND HOME COTTAGE? JIM WALTER SAYS YOU CAN...

Jim Walter has had this cottage designed to meet the pocket-book of fun loving American families everywhere. At this low cash price, most every family can afford to own their own private weekend cottage, far from the confining surroundings of small city lots . . . away from the confusion of city life! Escape the "Rat Race" to the boundless freedom of outdoor life! Costs so little, lasts for years.

Here's What You Get!

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Drive and remove screws
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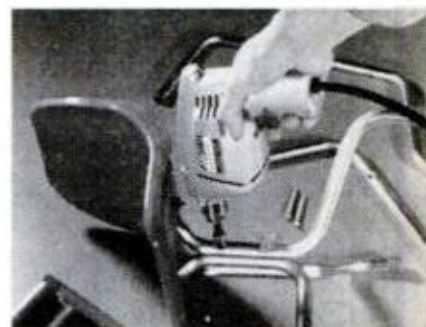
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*Lawn and garden tractor, that is.

THE MARK OF QUALITY IN LAWN AND GARDEN TRACTORS

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WHEEL ALIGNMENT

(Continued from page 185)

rect unbalance. To counteract a weight mass on the outside of the wheel, a corresponding weight is put at this same point on the *inside* of the wheel. However, in most cases a combination of unbalanced conditions affect the wheel. Thus, after rebalancing a wheel dynamically, test for and correct static unbalance also.

Although wheel balance is generally considered vital to front wheels (and it is), many causes of vibration go undetected by not checking rear wheels; these, too, can become unbalanced.

What causes a wheel (or wheels) to lose balance? Well, just as your car uses up grease from a lube job it uses up the balance each wheel originally possessed.

Normal driving conditions, normal tire wear and *abnormal* conditions such as bad brakes, tire underinflation, misaligned wheels and even rubbing of a tire against a curb when parking will throw wheels out of balance.

Time to check wheels

When should you have your wheels balanced? Here's the opinion of the Rubber Manufacturers Association:

"In changing over to a new set of tires, all wheels and tires should be balanced—including spares. Whenever wheels are changed front-to-rear, they should be rebalanced."

Steering. No matter how well alignment and balancing are done, a worn or poorly adjusted steering setup will cancel out the best of such corrective efforts.

A steering gear in good shape and properly adjusted is one that turns freely throughout its entire range of travel without binding, yet is free of play and looseness. Generally, then, here's what's required to put your steering in top shape:

1. Check parts for looseness and defects. Depending on the car, these parts will include kingpins, ball joints, drag links, tie-rod ends, idler arms, pitman arms, steering-gear cross shafts and steering-gear-to-frame alignment.

2. Check steering gear by looking for roughness in the worm and roller and for wear in the cross-shaft bushing.

3. Adjust the steering gear to conform to specifications in the manufacturer's service manual.

To help you sum up the major points on wheel alignment covered in this two-part article, we've included a troubleshooting chart on pages 182-184. It will serve as a handy reference when you're trying to pinpoint problems. ★ ★ ★

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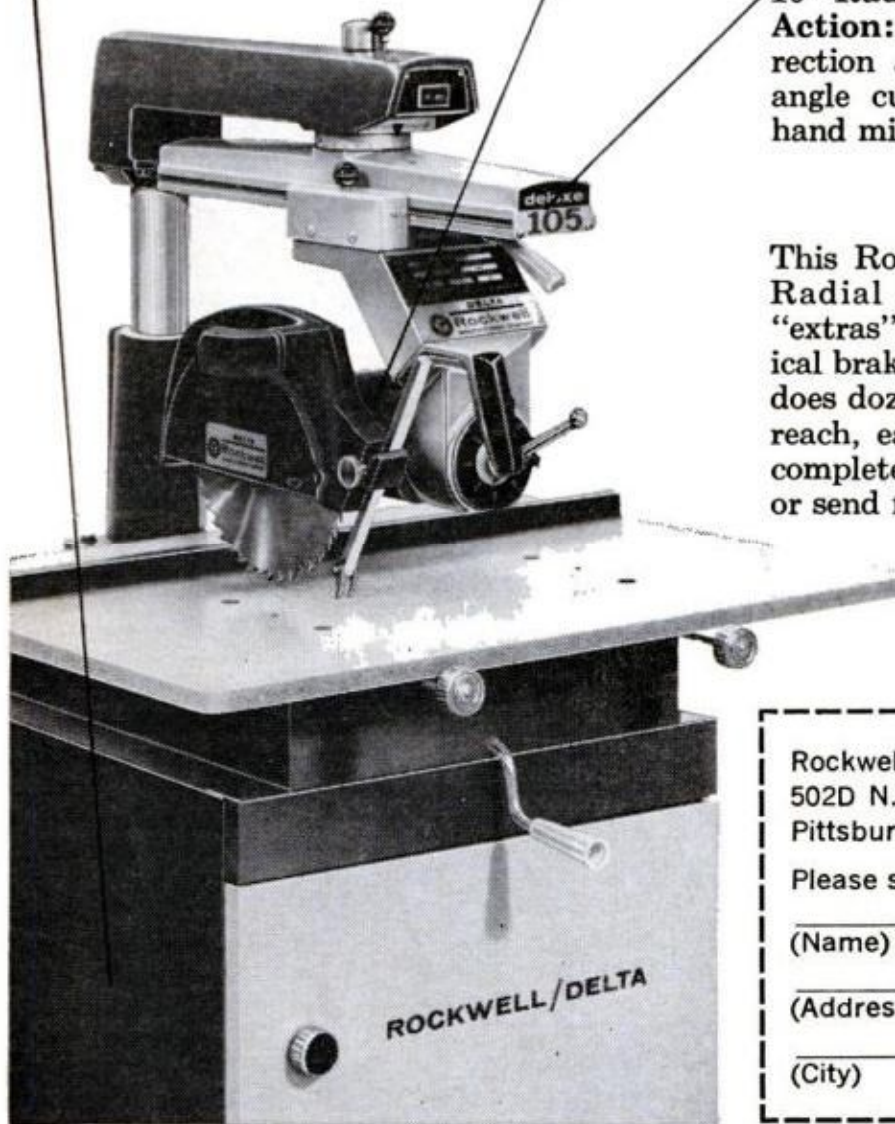


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NEW '007' IS A COMPUTER

(Continued from page 87)

also indicated that the thugs were hitting subway platforms progressively farther north with each job. The Friday following this analysis, a flying squad was assigned to train platforms in the path of the two-man crime wave. The pair was nabbed in the middle of another crime.

To date, only a handful of cities count heavily on the electronic cops. Reason is, setting up the first computer crime fighters took time, money and effort. But by now, the pace-setters have smoothly working systems that have amply shown the muscle that robot lawmen can bring against crime. Consequently, scores of city, county and state police agencies are scrambling to get computers on the job.

And, almost invariably, the first assignment they hand the machines is checking cars. According to a study made by the International Assn. of Chiefs of Police, cars are involved in from 60 to 90 percent of all reported crimes. So, by offering a quick, efficient way to match suspicious cars against a wanted list, computers put the single most important brake on crime.

"But computers aren't simply machines that do one job when you turn them on, like airconditioners," says Scott Hovey, director of the St. Louis Police Computer Center. "You can apply them to fit local needs."

In St. Louis, for example, the description, owner's name, and license number of all registered cars are on tape. When a patrol officer wants to stop a car for, say, a minor traffic violation, he routinely radios the computer center. Three or four minutes later he knows if the vehicle he's eyeing is reported stolen. He also knows the owner's name. If the car's driver has a different name—and can't produce the registration—the owner is called. "We're constantly recovering cars before anyone knows they're missing," says Hovey.

Other programs reduce the hazard of making a car check. In Chicago, the license numbers of vehicles belonging to thousands of convicted felons are fed into the computer's memory. On inquiry, a cop knows within a minute if he's dealing with a potentially armed criminal. In addition, Chicago puts on tape all stolen cars, numbers of drivers with suspended or revoked licenses, and even serial numbers of stolen auto parts.

State police are also starting to implement computer checks on cars. The California Highway Patrol used to send a bulletin listing stolen cars to all posts once a day. In practice, a thief could rob a car in one jurisdiction, cross into an-

other, and have 24 hours before police in the area even knew the vehicle was stolen. Then, last spring, California inaugurated a new car check program.

Today, the numbers of all stolen cars are immediately relayed to and from computer headquarters in Sacramento by teletypewriter. If a patrol officer anywhere in the state asks about a car that has just stopped for a traffic light, he'll have an answer before the light turns green. Five minutes after a car is reported stolen, its license number is on file.

Yet another way computers help cops is by shouldering administrative chores that, even at best, were nearly impossible tasks. Showing how to split up police manpower by crime load is one.

Twice a year, Chicago's computer analyzes the reported crimes and police service calls—some 700,000—by police district. Areas with a higher proportion of crime then pull in men from lower crime areas.

The computer even reveals what proportion of what kinds of crime hit each of the city's 15,000 square blocks so manpower can be equally distributed.

Tells all about prisoner

Keeping a minute-to-minute account of a prisoner's record is another administrative task the computer handles with ease. When booked in St. Louis, a prisoner's description, name, and date and time of arrest are put on tape. The computer then searches for other charges against the man. "If there's a warrant against him, or he's wanted by another state, the FBI, or any other law-enforcement agency that has contacted us, the computer will tell us right then," says Scott Hovey of the computer center.

When the prisoner is bailed out or moved to another station for questioning, his record is immediately updated. Finally, after 18 hours, the machine forwards a warning that either he be released or charged with a crime. A detective wanting to question the prisoner can learn in moments where the man is located, his arrest status, and how much time is left before he's due to go free.

All of the police officials interviewed for this report agreed that the computer was a vital law-enforcement element. Though there are still problems—the biggest is transcribing mountains of existing records onto tape—the lawman computer is here to stay. Criminals will just have to resign themselves to the fact that sooner or later they'll be fingered by a special agent who has transistors for nerves and a memory a mile long—and is capable of feats that would turn James Bond green with envy.

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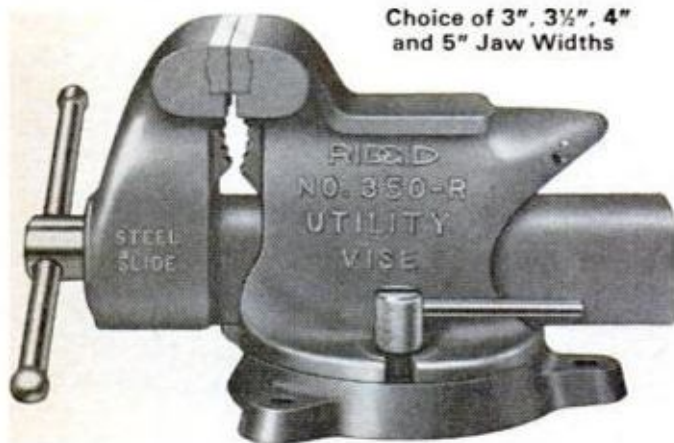
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DISASTER

(Continued from page 104)

of a driven-mad river, retreat is wisdom.

But when to retreat? As the situation grows critical, you hear a mixture of fact and rumor that could well start a panic. Your most reliable sources of information are the radio reports of official forecasts, but during an unusually severe flood, be sure to listen for frequent revisions.

Following our experience with the December flood, we planned a "when to move" decision maker. It was a graph on which the official readings at the nearest river gauge are charted when announced.

We put our new decision maker to a test in January, when the Willamette again went out of its banks.

We drew a red line across the graph to represent our floor level, and another for the parking lot, which was the low point on our "escape route." Then, every time a new reading came in, we plotted it on the graph. This line represented the actual height of the water. We plotted a second line, using the official forecast figures.

By projecting the flood-height line up to our escape-route line, we had our own personalized forecast. The effect of this device was to remove the panic element from the rumors; and there was joyful fascination as we watched the growing flood-level line flatten out on the chart and then curve downward. The chart told us the second crest had failed by five feet to reach our floor.

If radio and television reports give you gauge readings from a point well upstream, plot these, too, on another chart. The upstream changes, with some modification, will be swept with the current down to you. This second graph will tell you what you can expect.

The water finally receded from our camera-store floor after three days of the December flood. That's when the second phase of our flood education began.

When the water was about two inches deep, we discovered the silt. The flood-water brought it in and was trying to sneak off without it. Our first attack on this problem was to sweep like crazy with wide brooms. By keeping silt constantly stirred, we got rid of 90 percent of it.

To remove the remaining silt, we planned a washdown with a hose. But when we opened the faucet there was no water. The whole system had been turned off. Seems a National Guard "duck" patrolling the flood area had crossed the parking lot without benefit of a navigation chart to show the location of local reefs such as submerged fire hydrants and

(Please turn to page 226)

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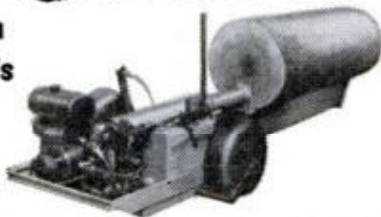
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DISASTER

(Continued from page 224)

water had to be turned off for repairs.

There was a lesson in this for all of us. Travel slowly in floodwater and stick to the areas you know.

So there was no water to finish desilting the floor. But there was water everywhere. It wasn't really clean water, but it was all over the parking lot. We doused the floor with buckets of it. We found we could do a lot of cleaning with a squeegee and less-than-clean water.

When the water finally left the store, we noted ominous signs of too much of it in the air. Condensation was trickling in rivulets down the windows. Flashbulb cartons were puffing up and coming unglued. We could expect nothing else in a soaked, unheated building. The furnace was dead. The electricity had been off for three days, and would be off four more.

We found three gasoline camp stoves and fired them up to heat the store. That helped in our comfort, but nothing was drying, even in the heat. The humidity was so high in the store that we wouldn't

have been surprised if it started raining.

We needed to exhaust the wet air. A 24-inch fan was available, but useless without electricity. We needed a gasoline-powered generator—but to find one that wasn't already doing emergency duty was a problem. After a lot of telephone calls, I finally got the use of a three-kilowatt unit. We had to mount the fan to blow out the top of the door, using a sheet of plywood in the lower part to separate the inbound and outbound air. The leftover generating capacity operated three smaller fans to dry corners, several lights, a couple of electric heaters and two hair dryers.

I had to drain and dry all the conduit and outlet boxes. A suction gun borrowed from a service station pulled out the water; the hair dryers finished the job. When electricity was restored, we were ready.

We learned much more about flood problems. We found there is a lot in common between a flood victim and a neophyte camper. Both work like dogs at tasks for which they have no experience or training; and if they're going to have much success, they both have to develop the ability to improvise. ★★★

How to Survive Any Disaster

General preparations:

- Have at least one good transistor radio.
- Several flashlights with spare bulbs.
- A supply of flashlight and radio batteries. Store them in the refrigerator.
- Thick, long-burning candles.
- A battery-operated or spring-driven clock.
- A supply of dry matches.
- A camper's stove with fuel supply.
- Battery or kerosene campers' lamps.
- A two-week supply of food, including a variety of canned foods (and can openers) such as meats, vegetables, fruits and, especially, fruit juices in case water runs out.
- Check sources of gas, electricity and water in your home, and know how and where to turn them off.
- Know how to disconnect all appliances including refrigerators, furnaces, airconditioners and sump pumps.
- Determine how to heat your home, or one room, if furnace became inoperable.
- Make a list of your household belongings for insurance purposes.
- During an emergency, boil water before using it if in doubt about it. Emergency sources are the hot-water tanks or the flush tank of the toilet.
- Be extremely careful with oil or kerosene heaters indoors. They are a new hazard.
- A cupful of antifreeze in toilet bowls, tanks and sink drains may prevent cracking in freezing weather.

Specific preparations:

In hurricanes—Put away or tie down loose items around the house. Board up windows and crisscross glass with adhesive tape. Stay inside during storm, and don't mistake the calm of the eye of the storm for the edge.

In tornadoes—Go to the basement and stay in the southwest corner. Close windows on the south and west sides of the house. Leave one open on the other sides. If all windows are closed, the sudden drop in pressure produced by tornadoes could literally cause an explosion. If driving in tornado conditions, or you see one, drive at right angles to it. Tornadoes usually travel from southwest to northeast. If on foot, head for depression, lie face down.

In floods—Move household goods to second floor or higher ground, if possible. If evacuation is advised, do so. It may mean your life.

In heavy snowstorms—Be prepared for isolation. Telephone communications may be cut off. Don't attempt to drive unless radio reports indicate roads are open. You may be stranded with no emergency facilities. If isolated at home and an illness arises, mark need for help in snow with colored cloth. Snowbound areas are usually patrolled by aircraft.

In any disaster—Keep your radios going for latest reports. Watch for fallen electric power lines, debris containing glass and jagged metal that can cut through shoes, loosened brick and cornice pieces that can fall from walls, or weak walls that can topple over. If you and your family are secure, look for other trapped or injured persons who may need help. Then start to clean up.

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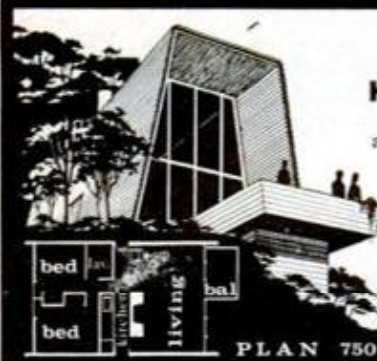




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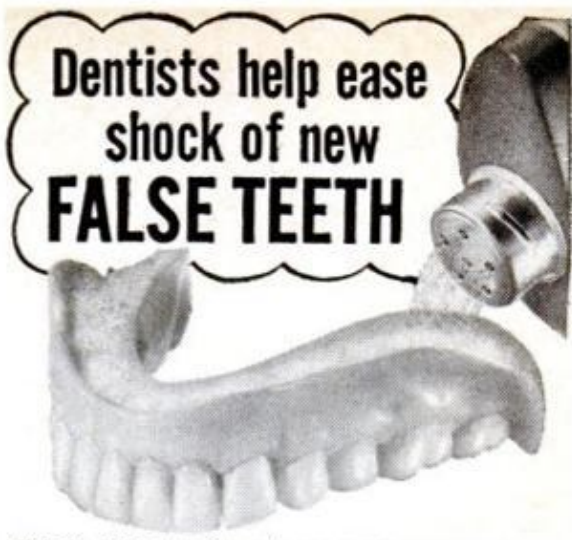
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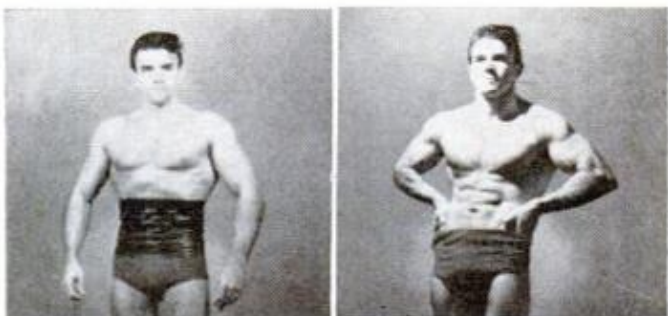


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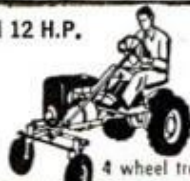
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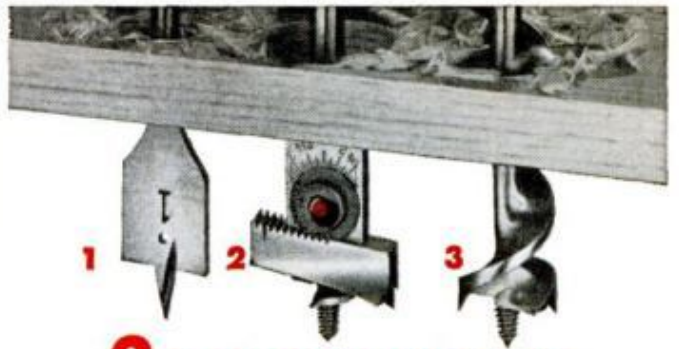
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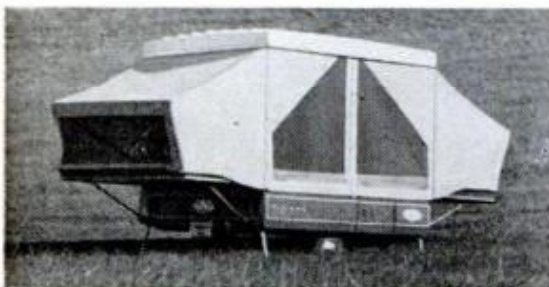
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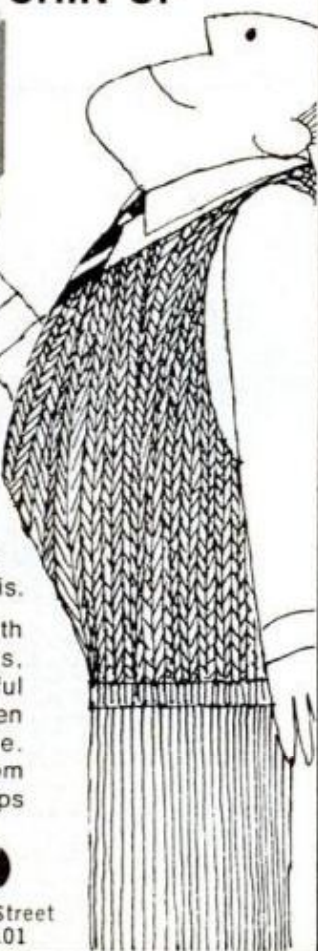
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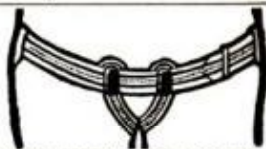


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All too often, humans who sit and stand pay the price of vertical posture. Sitting and standing combine with the force of gravity to produce extra pressure on veins and tissues in and around the rectal area. The result may be painful, itching or burning hemorrhoids.

The first thought of hemorrhoid sufferers is to relieve their pain and discomfort. However, of the products most often used for hemorrhoids, some contain no pain-killing agent at all...others have one too weak to provide necessary relief...and still others provide only lubrication.

Now at last there is a formulation which *concentrates on pain*. It actually has over 8 times more pain-killing power than the topical anesthetic most commonly used in hemorrhoid remedies. 8 times the power to ease the itching, pain, and burning of hemorrhoids.

The name of this product is Nupercainal. Nupercainal starts to work *on contact*. Provides *prolonged* relief from pain. Soothes and lubricates.

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Nupercainal is available without prescription at professional pharmacies everywhere. Ask for ointment or new suppositories with free pocket-pack. (Say New-per-cane-all.)

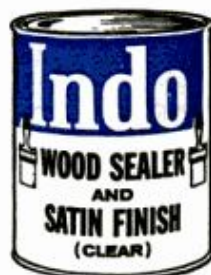
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231

TIPS ON FISHING MOTORS

(Continued from page 109)

sible, for trolling or maneuvering while fishing. Perhaps the perfect rig for that purpose is the one used by fishing guides on the Ozark lakes: a 16-to-18-foot aluminum boat with a planing hull, powered by a 35 or 40-hp motor and equipped with an auxiliary electric trolling motor. They dash across those big lakes at 25 mph, then glide in and out of the bays smooth as a canoe. The guide sits on the big motor and steers the electric with a foot while he fishes.

It's a beautiful rig, but expensive. You can sink \$500 in a big motor, another 100 in the electric, 250 in the boat, 50 in battery, connections and fittings—nearly a thousand bucks in your "perfect" rig.

A similar rig, which works almost as well, is what you get when you marry the little electric (or 1½, or 3) to your run-about or cruiser. With the fishing engine over the transom on a bracket, the bigger pleasure boats become fishing boats with the flick of a switch.

Second motor? Selecting an auxiliary motor—for trolling or maneuvering—is fairly easy. The electrics are inexpensive and quiet, but sometimes lack the power to move a bigger boat against wind or current. They are seldom enough for all-purpose work on any boat. The 1½s and 3s make more noise, and have much more power, yet may not go slowly enough to maneuver the boat for casting a shoreline.

The electric has the added problem of keeping a battery charged, but most will run through a day's fishing on a charge, especially the multispeed models. For occasional fishing from a big boat, equipped with a battery and alternator, the electric is simple enough, but it can run the battery down if you fish too long without running the big motor.

One advantage: If something goes wrong with the big motor, you have the smaller one to get home.

For the more modestly-financed anglers, of course, there must again be that compromise. Most end up with something between 5 and 15 horses, depending on the boat they use, the load and on whether they want speed or easy fishing.

Air-cooled motors in the 5-and-under bracket come about a hundred bucks cheaper than water-cooled models, but they're noisier and lack the little niceties. From sales figures over the years, most American fishermen seem willing to shell out for quieter operation.

For years, fishermen and manufacturers thought the answer was 7½—fast enough for most fishing boats and slow enough

for most trolling. The same engineering improvements, however, made the 10s no more expensive and almost as slow-trolling, so the 7½ has dropped out of the picture except for one manufacturer, McCulloch. All the old 12s and some of the 14s disappeared for the same reasons, plus the licensing regulations that begin with 10 horses (hence so many 9.5 and 9.8-hp models today).

McCulloch's two electric-start fishing motors—the 7½ and 9—are the only models in the small-motor field offering this luxury feature. It adds about 10 pounds to the motor (plus the necessity of carrying a battery) and roughly 50 bucks to the price, but once you've got the whole load in the boat it's mighty easy living to just push a button and hear the motor purr into life. Not much for portability, but fine if you don't mind the extra weight.

Feature and accessories. Whatever engine you choose, there are some options that may help you decide on your inevitable compromise.

For the man who wants a big motor to fish like a little one, the trolling plate still works, though it's going out of style with newer, smooth-trolling motors. A simple, flat, round plate (which can be cobbled out of a coffee-can lid), it fits on the propeller shaft behind the prop, spoiling its efficiency and slowing the boat in proportion to its diameter.


For the man who fishes alone, or who likes to stand while operating his motor, an extension tiller handle is great. It lets you stand or move around the boat, and you can keep the boat in trim by moving forward to a middle seat.

For any motor and any boat, a remote steering wheel with or without a gear-shift is a great convenience, especially through a long day's trolling. You can rig a simple steering tiller or wheel for very little, and just leave the throttle set at a good speed. With two motors, you can rig the bigger one with remote controls and mount the smaller one in a fixed position, using the dead, larger motor's lower unit to steer the boat like a rudder.

For some boats with high freeboard and/or a tall transom, a long-shaft motor works best. This is especially true where the motor is to be used on a pontoon or houseboat, or as a smaller, second motor on any big boat. The extension unit that's spliced in to make the long shaft is an optional extra; hence, it can be added if you find it advisable after a trial.

For the fisherman who does his work in weedy waters, there are several features that can help keep the lower unit from fouling. Simplest is the air propeller

(Please turn to page 234)

A black and white photograph of a woman's hand holding a paintbrush. The hand is positioned as if about to apply paint to a wooden surface. The brush is a wide, flat brush with a metal ferrule and a wooden handle. The background is a plain, light-colored wall.

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Special (item 1059) **\$69.95**

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5 3/4 hp.

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TIPS ON FISHING MOTORS

(Continued from page 232)

motor which drives the boat like an airboat or an airplane, with no lower unit in the water. It's noisy, but fast and, in some clogged waters, the only way to go.

Another system that can produce almost the same result is the "jet" lower unit built into a few models and available as an add-on for others. Jets use an enclosed axial-flow pump instead of an exposed prop and they reduce weed-fouling greatly. Problems are relative inefficiency at high speed and comparatively higher cost.

For fishing in average weedy water, a back-tilted lower unit common on most small engines does a good-enough job. One motor, the McCulloch 7 1/2, is available with a nearly-weedless lower unit as an inexpensive option and works well. One or two manufacturers are still making weed guards for outboards; these work fairly well, but the guard itself can catch and hold weeds, and it tends to reduce high-speed efficiency badly.

One of the oldest, and strangely still exclusive, fishing-motor features is the self-bailer—a little vacuum device that comes free with all McCulloch motors. It lies unobtrusively on the deck of your boat and quietly slurps up any water coming in contact. It's slower than bailing, but surer and effortless.

Fuel consumption is seldom a factor in selection of fishing motors; you'll have to work pretty hard to burn a six-gallon tank of fuel over a weekend of average fishing with a 6 or a 10. A 25 or 35, however, will gulp down two or three gallons an hour at full throttle, and on a long trip, fuel will be a problem unless you carry a couple of tanks.

For the fisherman who carries his motor and rents his boat, compactness becomes very important, and two major recent developments have been received with open arms by the rental-boat anglers:

First was the compact motor—a complete redesign job that placed the powerhead on a level with the motor mount, reducing motor length by several inches. Available on the McCulloch 7 1/2 and the Johnson and Evinrude 9 1/2s, it's one very good answer.

Newest is the Evinrude 3, which sports a simple solution: a folding lower unit. It swings upward toward the power unit on a hinge, like a jackknife blade, and cuts the overall length of the motor from 43 inches plus to less than 24 inches—small enough to fit in a knapsack.

On the other side of the option picture are the engines built oversized for really heavy duty. If you need a big auxiliary

for fishing from a houseboat or a large cruiser, they'll do the job. Best example is McCulloch's "Ox," the heavy-duty version of its 14. It costs \$150 more than the regular 14, but may be worth it if you expect a lot of heavy hauling from a middle-sized outboard. An "Ox" version of the 45 is available for really tough jobs.

Getting around the cost. Another important factor in your final decision will, of course, be the cost of the motor—or motors. The good ones are expensive enough to be a major purchase for a sportsman—a really big-ticket item. But there are some ways around that, alternatives that are much better than buying too little motor or the wrong model.

Taking advantage of the off season can save money on a motor, just as it can with an automobile. Buying this year's model as next year's make an appearance works in the same automotive way. The trade-in principle also holds true with motors; for that matter, buying a good used motor is better than having the wrong new one. The industry figures that the average life of a "utility-sized outboard" is 15 or 20 years, and if someone trades in a three-year-old, you may make a good deal on it.

Other ways around the price tag are to split the cost with regular fishing buddies, or run a "motor pool" with other fishermen who will agree to an alternate-weekend schedule.

If all else fails, remember that your outboard dealer will probably be able to stretch the tab over a period of time payments. If not, your bank certainly will; boating equipment loans are one of a bank's favorite types.

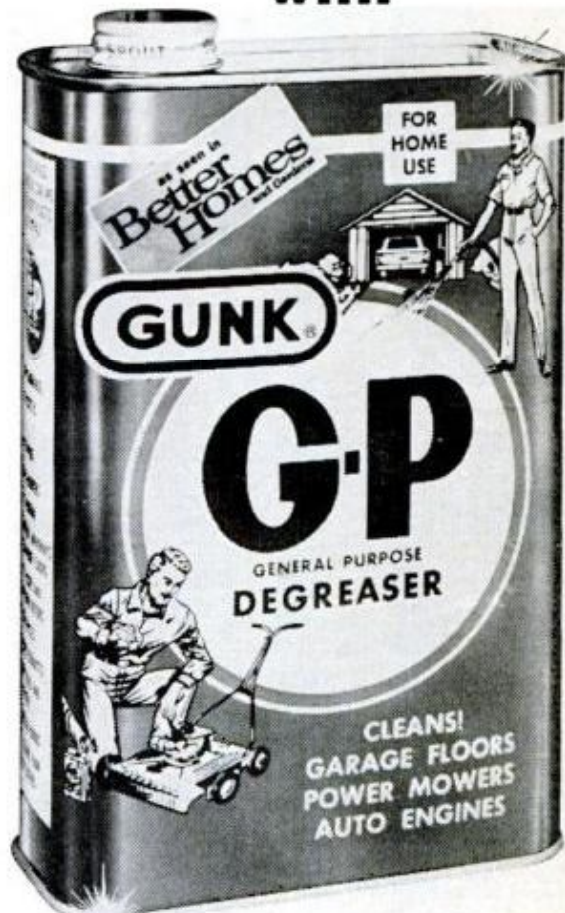
To sum up: Your choice of a fishing outboard will depend on many factors in your fishing—speed, load, space, weight, kind of fishing—and your budget for sport. You'll balance the pros and cons of the various kinds of motors against that.

The small engine's top speed may be too low; the big engine's lowest speed may be too fast. Air-cooled models may be too noisy; deluxe water-cooled ones too costly. A gearshift model may take your fancy, but not your banker's.

The separate fuel tank on bigger models can be an advantage in a good-sized boat or a disadvantage on a portage. The integral tank on a smaller motor can be convenient, but hard to fill, short on capacity, and leaky when it lies on its side in the trunk of your car. Jets and air-prop motors are fairly weed-free, but have their own disadvantages.

But with a little luck and a little shopping, you should end up with exactly the right motor. There is certainly one for every kind of man and sport. ★★

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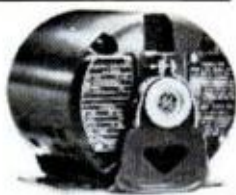
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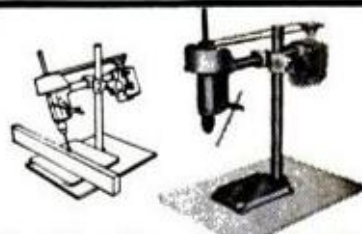
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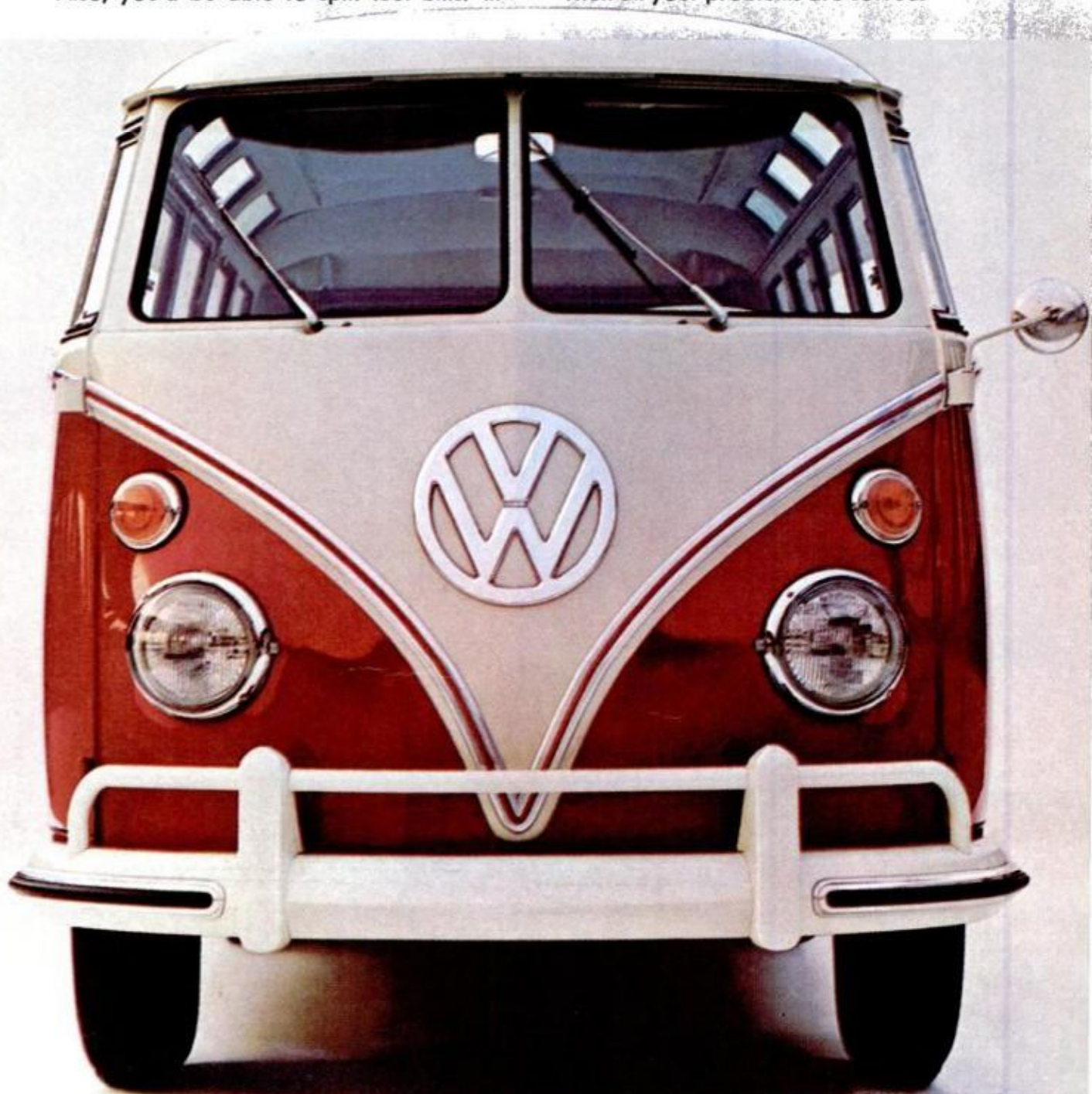
averages 23 mpg to begin with).

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