

FEBRUARY 1985 \$1.50

# Popular Mechanics

**FIRST LOOK:**  
New Toyota  
Mid-Engine  
Sports Car



## ARMY'S DEADLY 'FLYING TANKS'

**WOODWORKING**  
Use Your Jointer  
Like A Master  
Craftsman

**COMING:  
DIGITAL TV**  
You'll Get  
Sharper  
Pictures  
Plus Great  
Stereo Sound

**965,000-MILE REPORT**

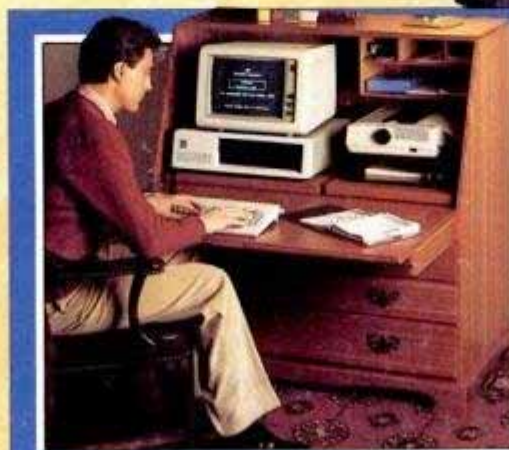
**GM's LUXURY  
FLAGSHIPS**  
Owners Praise Pep  
Of Buick, Olds,  
Caddy

**PM's WATER  
SPORTSTER**  
Full Of Custom Ideas  
For Your Small Boat

**PM JOINS WORLD'S  
FASTEST MECHANICS**  
Gas And Tire Change  
In Just 12 Seconds!



Hughes Apache  
Roars In On A Ground-  
Support Mission



**PLANS INSIDE**  
**Build Our  
Computer Desk**  
Classic  
Chippendale  
Secretary Design  
Has Space For  
All Peripherals



**For smokers who prefer  
the convenience of five more cigarettes per pack.**



**Now, famous Marlboro Red  
and Marlboro Lights are also available in  
a convenient new 25's pack.**

# New Marlboro 25's

This One

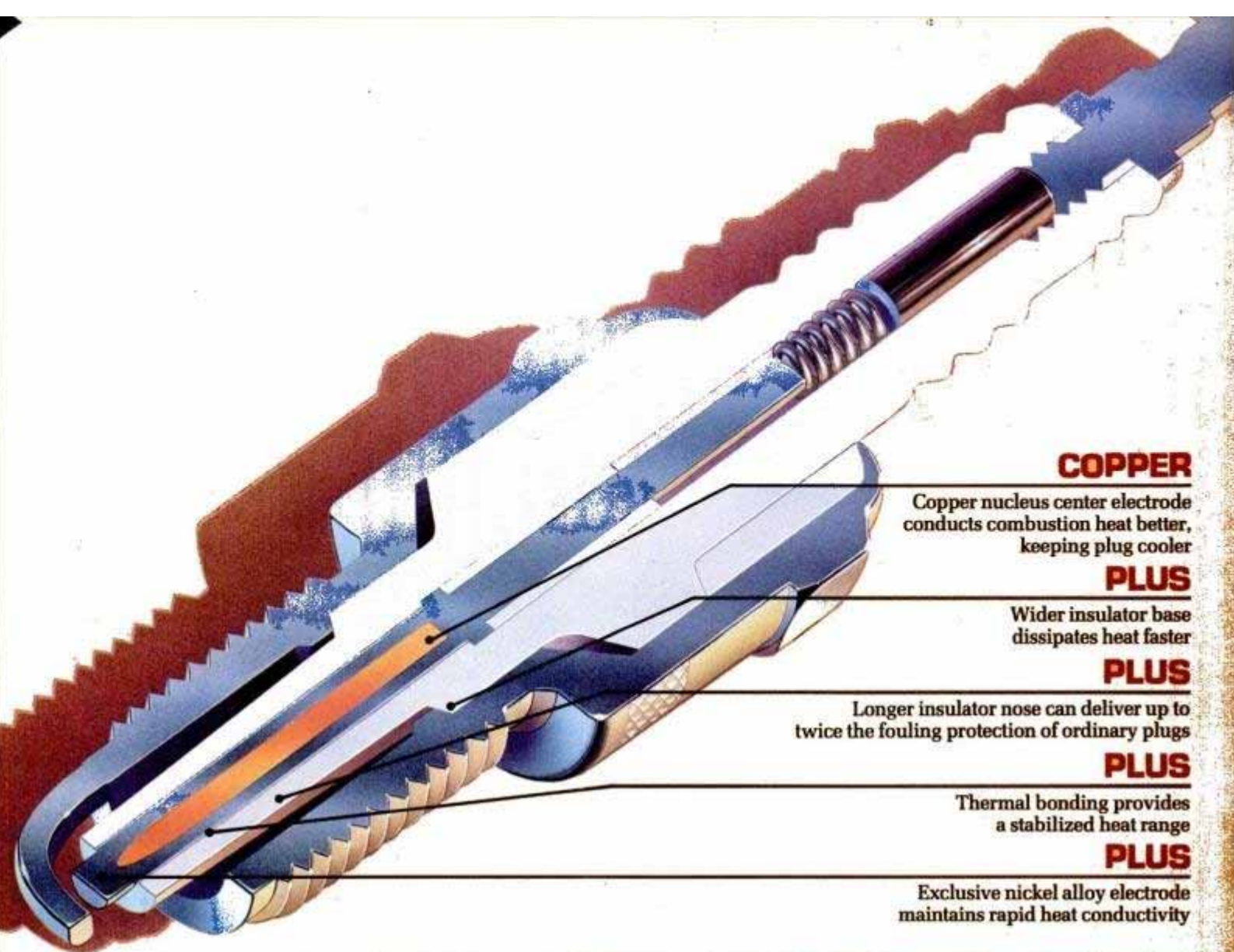


CXFA-XL8-QD3W

Not available in some areas. © Philip Morris Inc. 1995

Lights: 11 mg "tar," 0.7 mg nicotine—Kings: 17 mg "tar,"  
1.1 mg nicotine av. per cigarette, by FTC method.

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.



**COPPER**

Copper nucleus center electrode conducts combustion heat better, keeping plug cooler

**PLUS**

Wider insulator base dissipates heat faster

**PLUS**

Longer insulator nose can deliver up to twice the fouling protection of ordinary plugs

**PLUS**

Thermal bonding provides a stabilized heat range

**PLUS**

Exclusive nickel alloy electrode maintains rapid heat conductivity

# We almost called it Copper Plus Plus Plus Plus.

With very good reason. We added more than copper to our spark plug. We added the plus. In fact, we added several.

These design improvements, in conjunction with copper, allowed us to lengthen the spark plug's insulator nose. Which resulted in vastly improved fouling protection.

The combined effect of all our

improvements produced a spark plug that delivers surer starts and superior performance in stop-and-go driving.

It also produced another feature unique to Copper Plus®—we're so confident that Copper Plus will make your engine run better, we've equipped it with a Performance Guarantee.\*

Copper Plus. A plug by any other name just wouldn't be a Champion.

\*Offer expires December 31, 1985. Aviation and industrial plugs excepted.



**NOTHING  
SPARKS  
LIKE A  
CHAMPION**

©1984 Champion Spark Plug Company  
Toledo, OH 43661-0001

**COPPER PLUS** THE PLUS IS PREMIUM PERFORMANCE.



### ON THE COVER

Swooping down on a hapless quarry, the fearsome-looking Hughes Apache is typical of a tough, new breed of helicopter gunships that are designed to stop the enemy's mightiest tanks. Read how they could turn the tide of battle in the exciting story on page 86.

—PM painting by Ed Valigursky



### 90 Making & breaking snow



### 97 Classic car replica



### 104 Clocks from kits



### 72 Modular dome home



### 77 World's fastest mechanics



### 80 PM's Water Sportster

## AUTOMOBILES AND BIKES

<b>Imports And Motorsports</b>	<b>10</b>
<b>The PM Garage</b>	<b>20</b>
<b>Car Clinic</b>	<b>28</b>
<b>Detroit Listening Post</b>	<b>40</b>
<b>Saturday Mechanic:</b>	<b>47</b>

How to solve cold-start problems

<b>Fuel Systems</b>	<b>52</b>
---------------------	-----------

In 100 years, we've learned that the most important trick is to vaporize fuel efficiently

<b>GM C-Cars</b>	<b>62</b>
------------------	-----------

We surveyed owners of C-cars from all three GM divisions

<b>Olympic Camera Car</b>	<b>72</b>
<b>World's Fastest Mechanics</b>	<b>77</b>

PM joins a pit crew at the Talladega 500

<b>Toyota's New MR2</b>	<b>89</b>
-------------------------	-----------

It's odd in appearance, but dazzling to drive

<b>Coachbuilder's Tour de Force</b>	<b>97</b>
-------------------------------------	-----------

Classic replica of a classic 1924 Hispano Suiza

<b>Cimarron V6</b>	<b>148</b>
--------------------	------------

Caddy's J-car can finally compete with Audi and BMW

<b>Chevy Spectrum</b>	<b>162</b>
-----------------------	------------

It's the low end of the price and performance spectrum

## SHOP AND CRAFTS

<b>The PM Workbench</b>	<b>12</b>
<b>Workshop Minicourse</b>	<b>38</b>

Using a heat gun

<b>Blanket Chest</b>	<b>98</b>
----------------------	-----------

It was originally built by Abe Lincoln's father in 1845

<b>Using The Jointer</b>	<b>100</b>
--------------------------	------------

Get the most out of this versatile woodworking tool

<b>4 Clocks From Kits</b>	<b>104</b>
---------------------------	------------

These handsome timepieces are easy to build

<b>Classic Computer Desk</b>	<b>106</b>
------------------------------	------------

This traditional secretary desk hides the components of a modern home computer

<b>A Super Square</b>	<b>152</b>
<b>Hints</b>	<b>154, 157, 161</b>
<b>A Compact Lathe</b>	<b>155</b>

## ELECTRONICS, RADIO AND TV

<b>PM Electronics Monitor</b>	<b>24</b>
<b>Saving Microchips</b>	<b>74</b>
<b>Hi-Fi For Eyes And Ears</b>	<b>82</b>

Here come the third-generation TV sets

## SCIENCE AND ENGINEERING

<b>Science Worldwide</b>	<b>16</b>
<b>Dome Home</b>	<b>72</b>
<b>Energy On 'Trees'</b>	<b>72</b>
<b>Ultrasound Device</b>	

<b>Spots Plaque</b>	<b>72</b>
<b>Fast Solar Car</b>	<b>73</b>
<b>Seagoing Oil Rig</b>	<b>73</b>
<b>Craft Files Like A Plane</b>	<b>74</b>
<b>Riding In A Spaceship</b>	<b>74</b>
<b>Molotov Cocktail Glass</b>	<b>75</b>
<b>The Greatest Telescope</b>	<b>84</b>

Linking radiotelescopes around the globe will show us worlds never before seen

<b>Studying Snow</b>	<b>90</b>
----------------------	-----------

We're learning how to clone snow, predict avalanches and make snow clouds

## AVIATION

<b>Giant Bomber Gets Green Light</b>	<b>75</b>
<b>Plane For Polar Research</b>	<b>75</b>
<b>Uncrashable Crop Duster</b>	<b>75</b>
<b>Boeing's Mystery Jetliner</b>	<b>75</b>
<b>Helicopters Shoot Back</b>	<b>86</b>

<b>The new breed of tankbusters are designed to fight back</b>	
--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

--	--

INTERNATIONAL EDITIONS:  
CARIBBEAN, MEXICO,  
SOUTHERN HEMISPHERE

POPULAR MECHANICS (ISSN 0032-4558) is published monthly by The Hearst Corporation, 224 West 57th Street, New York, N.Y. 10019, U.S.A. Subscription prices: United States and possessions, \$11.97 for one year; \$21.97 for two years. Canada and all other countries, add \$16.00 for each year. Second-class postage paid at New York, N.Y. and additional mailing offices. Authorized second class mailing-in-Canada privileges by Canada Post, Windsor, Ont. Registered as second-class matter at the Post Office at Mexico D.F., Mexico, June 20, 1950. © 1984 by The Hearst Corporation. All rights reserved. Printed in U.S.A.

POSTMASTER: Please send address changes to Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350.

SUBSCRIPTION SERVICE: Popular Mechanics Magazine will, upon receipt from its reader of a complete new or renewal subscription order, undertake fulfillment of that order so as to provide the first-copy delivery either to the Postal Service or alternate carriers within six to twelve weeks. If for some reason this cannot be done, you will be promptly notified of the issue date that will begin your subscription, with a request for any further instructions you may have concerning your order. Please address all such orders to us at Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350. • Should you have any problem with your subscription, please write Joan Harris, Customer Service Department, Popular Mechanics, P.O. Box 10064, Des Moines, Iowa 50350 or call toll-free 1-800-247-5470; Iowa residents call 1-800-532-1272. Please enclose your mailing label when writing to us or renewing your subscription. • Renewal orders must be received at least eight weeks prior to expiration to assure continued service.

Use this address for subscription orders & inquiries. POPULAR MECHANICS, P.O. Box 10064, Des Moines, Iowa 50350. POSTMASTER: Please send address changes to this address.

# YOUR BEST PLANER BUY. PERIOD.

## Popular Mechanics

**Editor-in-Chief:** John A. Linkletter  
**Executive Editor:** Joe Oldham  
**Managing Editor:** Bill Hartford  
**Graphics Director:** Bryan Canniff

**Special Editorial Features:** Sheldon M. Gallager, editor

**Automotive:** Wade A. Hoyt, SAE, editor; Norman S. Mayersohn, assistant; Michael Lamm (West Coast); Daniel Charles Ross (Detroit)

**Home and Shop:** Steven Willson, editor; Penelope Spangler, Home Improvement editor; Joseph Truini, Shop and Tools editor; Arthur Rooze, associate editor

**Electronics:** Stephen A. Booth, editor

**Boating, Outdoors and Travel:** Ray Hill, editor

**Science:** Dennis Eskow, editor

**Editorial Production:** Peter Francesconi, chief; John Bostonian Jr., art; Rebecca Harth, David Meyer, assistants

**Design Director:** Ira Herrick

**Art:** John Johaneck, director; Alan Andresen, Ann Bennett, associate art directors

**Editorial offices:** 224 West 57th St., New York, N.Y. 10019. We cannot be responsible for loss of unsolicited queries, manuscripts, or photos. For return, they must be accompanied by adequate postage.

**Reader Service Department:** John Ginsberg, manager; 224 West 57th St., New York, N.Y. 10019; (212) 262-4292

**Advertising Director:** Floyd Sembler

**Advertising Offices:**

**New York:** 224 West 57th St., New York, N.Y. 10019; (212) 262-8824

**Chicago:** 1 South Wacker Drive, Chicago, Ill. 60606; (312) 984-5190

**Detroit:** 377 Fisher Rd., Grosse Pointe, Mich. 48230; (313) 881-3520

**Cleveland:** PDC Building, 3659 Green Rd., Cleveland, Ohio 44122; (216) 292-7334

**Los Angeles:** 460 East Carson Plaza Dr., Carson, Calif. 90746; (213) 532-8101

**Director of Marketing:** Edward Vaquero

**Production Manager:** Lori Ellwood

**Advertising Production:** Patricia Woods; (212) 262-4800

**Classified Sales Manager:** Sophie Gronowicz; (212) 262-4825

Published by The Hearst Corporation

**President:** Frank A. Bennack Jr.

**Chairman:** Randolph A. Hearst

**President, Magazines Division:** Gilbert C. Maurer

**Publisher, Popular Mechanics:** Daniel J. Coleman

**Publishing Consultant:** Richard E. Deerns

POPULAR MECHANICS IS PUBLISHED MONTHLY by the Hearst Corporation, 959 Eighth Avenue, New York, N.Y. 10019, U.S.A. Frank A. Bennack Jr., President; Randolph A. Hearst, Chairman; Harvey L. Lipton, Vice President and Secretary; Hearst Magazines Division: Gilbert C. Maurer, President; K. Robert Brink, Executive Vice President and General Manager; George J. Green, Executive Vice President; Raymond J. Petersen, Executive Vice President; Thomas J. Hughes, Vice President and Resident Controller; William S. Campbell, Vice President, Director of Circulation; Daniel J. Coleman, Vice President for Popular Mechanics.

AS A SERVICE TO READERS, Popular Mechanics publishes newsworthy products, techniques and scientific and technological developments. Due to possible variance in the quality and condition of materials and workmanship, Popular Mechanics cannot assume responsibility for proper application of techniques or proper and safe functioning of manufactured products or reader-built projects resulting from plans published in this magazine.

Introducing the Shopsmith® Professional Planer... a result of dynamic growth in planer design for the home woodworker. Its enhanced quality, improved reliability, increased performance and lifetime durability serve as the industry standard. You can buy bigger planers at higher prices and get more machine than you'll ever need. And you can buy smaller planers at lower prices and get reduced, inadequate performance.

But the Shopsmith Professional Planer is designed for the home woodworker who demands quality precision. This advancement in technology gives you:

- **12" x 4" Throat Capacity** — big enough to handle large boards.



## The Shopsmith Professional Planer

Performance engineered for the serious home woodworker.

- Feature for feature the most competitively priced planer available.

We're making a bold claim. We'll even admit we may be bragging... a little. But we're telling you a simple statement of fact. The Shopsmith Professional Planer is your best planer buy.



We know you're serious about wood-working, and so are we. That's why you need to know about The Shopsmith Professional Planer. Complete and return the coupon to Shopsmith and we'll immediately send detailed product information by return mail. In addition, you'll receive a FREE subscription to HANDS ON, The Home Workshop Magazine.

In addition, you'll receive a FREE subscription to HANDS ON, The Home Workshop Magazine.

- **Variable Feed Rate** — allows feed rate of 7-20 feet per minute.
- **110 Volt, 15 Amp** — eliminates costly shop rewiring. Planers with this capability usually require 220 volts.
- **Portability** — light weight makes unit easy to move. Frees up floor space when planer is not in use.
- **28" Long Table** — one piece, precision ground cast iron table is longest in industry.



- **High Grip Feed Rollers** — serrated steel infeed roller and non-marring rubber outfeed roller provide maximum grip and excellent surface quality.



### Shopsmith Inc.

The Home Workshop Company  
6640 Poe Avenue  
Dayton, Ohio 45414-2591

©Shopsmith, Inc., 1984  
Shopsmith® is a registered trademark of Shopsmith, Inc.  
Quality woodworking tools made in the U.S.A.

**YES!** Please send detailed product information about The Shopsmith Professional Planer and include additional information on determining my best planer buy. Also enroll me for a FREE subscription to HANDS ON. I understand I am under no obligation. Dept. 511T

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

I am currently receiving product information from Shopsmith.

Dept. 511U



# EDITOR'S NOTES

**C**ar cruising on Saturday night is as American as apple pie, we all know. Now, reports Mike Lamm, West Coast editor, it's as Japanese as sushi. While in Japan to drive the new Toyota MR2 (*Its Beauty Is Under The Skin*, page 89), Mike stayed one Saturday night in a Kyoto hotel. "Pretty soon," he said, "the scene on the main drag outside looked like a 1950s graffiti night in Modesto. But instead of '55 Chevis and '32 Fords, these guys were driving BMWs, Porsches and Mercedes (they love German cars), late-model Vettes, Camaros and Firebirds (they also love American cars), Ferraris, Panteras and every conceivable kind of Japanese mini. All were tricked out with wild wheels, humungus spoilers and paint jobs that would turn George Barris green. Just before midnight the cops cordoned off the street, and that was that. No fuss. The crowd went home as instructed. Not like Livermore, Calif., near my hometown. The city dads there recently outlawed cruising, whereupon the kids wrecked several drive-ins, smashed windows and tossed bottles. Japan's different." ... **The French have a helicopter** much like the Hughes Apache (cover), reports PM's Shel Gallagher. The Aerospatiale Dauphin, which he saw at the big Farnborough air show, is just one of the awesome new breed in *Now Helicopters Shoot Back* (page 86). ... **Our auto department's Norman Mayersohn** was the choice for the pit crew in *PM Joins The World's Fastest Mechanics* (page 77) at the Talladega 500 in Alabama. Norman joined the Johnny Hayes NASCAR racing team as gas man on Phil Parsons's Skoal Bandit. ... **Did you suggest PM's next custom project** be a boat when you entered our Ford Ranger contest? See if *PM's Water Sportster* (page 80) fits your dream. ... **We have another February special** this year: *Thomas Lincoln's Blanket Chest* (page 98). Thomas, the President's father, was a skilled furniture maker. You'll find all the instructions for making the chest yourself.



Gallagher in front of a Dauphin at Farnborough near London, England ... Lamm in the Toyota MR2 on a Japanese racetrack ... Mayersohn deep in watermelon (with driver Benny Parsons) at the Talladega 500 ...



... and back home, Graphics Director Bryan Canniff suffers through a photo session.



Blanket coverage in the Lincoln home.

*John A. Lillenton*

**True Value**  
HARDWARE STORES®

**TOOL VALUE OF THE MONTH**



**359**

**Master MECHANIC® 4-Way Self-Storing Screwdriver**

Fits the 4 most popular Phillips & slotted screw head sizes! Hurry. Offer good from Jan. 10 only while supplies last at participating True Value Hardware Stores. 999411



**HARDWARE VALUE OF THE MONTH**

**888**

**ELECTRIPAK™ Multiple Outlet Center**

Six 15-amp, 125V grounded receptacles with push-to-reset circuit breaker. Act fast! Offer good from Jan. 20 only while supplies last at participating True Value Hardware Stores. MOC-6C

CHARGE IT at participating True Value Hardware Stores. For store nearest you, see "Hardware" in the Yellow Pages.



# America's best-selling pickups: Ford.

Big Ford Pickups are America's best sellers year after year.\* '85 power choices for the full-size F-Series include high-torque V-8's big as 7.5L and mighty 6.9L diesel.

For '85, Ford puts real power in the hands of America's pickup owners. Power that means quick response, easy hauling, extra work output—and extra fun.

You get a choice of five engines, including husky 6.9L diesel—the most powerful in any pickup. Ford's 5.8L High Output V-8 with 4-barrel carb



gives you 45 more horsepower than Chevy's mid-size V-8! And every Ford engine from standard 4.9L Six up leads its nearest competitor's in load-moving torque.

### Big Ford Payloads.

The trend today is to use pickups for bigger, harder hauls. Ford has the power you need. And the payload—up to 5,730 lb. worth. Plus the

ability to tow trailer loads big as 12,500 lb. when properly equipped.

Nobody else gives you so many pickups to pick from. Roomy Regular Cab models. Exclusive SuperCab with folding rear bench seat



option. Or 4-door Crew Cab, now with single or dual rear wheels.

### Built Ford tough.

These big Fords all come with 2-wheel drive. Or as 4x4's with unique

independent front suspension.

And they all come tough—Ford tough, from exclusive Twin-I-Beam up front to galvanized double-wall box in back.

### Best-Built American Trucks.

At Ford, Quality is Job 1. A 1984 survey established that Ford makes the best-built American trucks. This is based on an average of problems reported by owners in the prior six months on 1981-1983 models designed and built in the U.S.

### Lifetime Service Guarantee.

As part of Ford Motor Company's commitment to your total satisfaction, participating Ford Dealers stand behind their work, in writing, with a Lifetime Service Guarantee. No other car companies' dealers, foreign or domestic, offer this kind of security. Nobody. See your participating Ford Dealer for details.

\*Based on final 1984 MY manufacturers' reported retail deliveries.  
†Optional; not available in California or with manual transmission. Horsepower based on SAE Standard J1349.



"My Ford Pickup & Me."



**FORD PICKUP**  
**AMERICA'S TRUCK** **BUILT FORD TOUGH**





Get together - Buckle up!

# LETTERS TO THE EDITOR



## Smart gun rack

Thought you might like to see a photo (right) of the gun rack I made from the plans in your February '82 issue (*Build This 'Oil-Proof' Gun Rack*, page 110). I am very pleased with the results and like the feature of hanging the guns upside down with their barrels slanting downward to prevent lubricating oil from seeping into the wood stocks. It's a clever idea.

CHARLES L. JOHNSON, M.D.  
BUTTE, MONT.

*Thanks for the photo. For others who may be interested, photocopies of the plans are available for \$1 postpaid from Popular Mechanics, Box 1014, Radio City Station, New York, N.Y. 10101.*



PM's "upside-down" gun rack built by reader Johnson. It keeps wood stocks oil-free.

## Unfreezing a fridge

I'd like to add a suggestion to your advice on what to do about a refrigerator that gets so cold it freezes food (*Appliance Clinic*, page 24, Oct. '84). I have been doing refrigeration work for many years and have never seen a weak compressor freeze anything. If the compressor runs long enough to freeze food, it runs long enough to activate the cold control thermostat and shut off the compressor.

I believe you're more likely to find that the thermostat is defective, not the compressor.

GEORGE DERBY  
CHICAGO

## Hot topic

Your article *Efficient, New Home-Heating Systems* (page 162, Oct. '84) was informative and well written. As with many new technologies, however, thought should be given to potential problems that may arise. Some condensing furnances have had corrosion problems in their heat exchangers caused, some manufacturers believe, by household pollutants in the air supply. For this reason, some makers specify installing an outside source of combustion air.

Those considering the purchase of such a furnace should look for a warranty on the heat exchanger and combustion chamber that's at least as good as that offered on conventional top-of-the-line heating systems.

JOSEPH T. PONESSA, Ph.D.  
EXTENSION ENERGY SPECIALIST  
RUTGERS UNIVERSITY  
NEW BRUNSWICK, N.J.

## Only in some cases

I was shocked to see you say that radon gas is emitted by home insulation (*Best New Homes Under The Sun*, page 80, Sept. '84). Radon gas comes from decaying uranium, traces of which are found in earth, stone and concrete.

LAURENCE R. STAINS  
ALLENTOWN, PA.

*It's true that ordinary insulation does not emit radon gas, but we were referring specifically to the Impact 2000 home in which thick stone and concrete are used extensively to store heat and provide insulation. It is these materials, as you point out, that are possible sources of radon gas.*

PM

## It would have been big

I was delighted by your story on the return of three-wheeled cars (*3-Wheelers Are Back!*, page 91, Oct. '84). Three-wheelers are both fun and practical—and I speak from experience. I own the No. 1 Davis prototype.

One minor correction: You said the big seven-passenger Davis sedan was the intended production model. This never existed as anything more than a mockup. It was the four-passenger version that Davis hoped to produce.

WALTER E. WRAY, PRESIDENT  
DAVIS 3-WHEEL CLUB OF AMERICA  
ARGYLE, WIS.

## Nonstop vs. non-refueled

I enjoyed your story on the Voyager's forthcoming attempt to fly around the world nonstop (*Soon: First Nonstop Flight Around The World*, page 87, Oct. '84). It was misleading, however. There have been nonstop flights around the world in the past, one by a USAF B-29 in 1949 and another by a group of USAF B-52s in 1957.

These planes did require inflight refueling, of course, so your story should have said "First nonstop, non-refueled flight around the world."

DAVID R. UJANE  
LITTLETON, COLO.

*The title was shortened to improve readability, but the opening paragraph did say that the Voyager's global flight would be both nonstop and non-refu-*

*eled. The current nonstop, non-refueled record is 12,532 miles—half as far as the Voyager will have to go.*

It was a great story, but I just can't imagine how those two pilots—a man and woman yet—are going to exist together in such cramped quarters for a whole week. What about food, water and, er, calls of nature?

LARRY HOKE  
HOUSTON, TEX.

*While the Voyager's pilots have not revealed just what facilities they will have, it's reasonable to assume that they will cope with such needs in much the same way as our astronauts have been doing for years.*

## What price Liberty?

I very much enjoyed your article *Rebuilding National Treasures* (page 93, Nov. '84). You quoted the cost of restoring Miss Liberty as \$30 million, but the only figure I've seen is \$230 million—an amount that's hard to believe unless the Pentagon is doing the job. Which figure is correct?

F. H. PLANK  
HOUSTON, PA.

*They're both correct. The \$30 million figure applies only to the restoration of Miss Liberty. The \$230 million estimate includes a complete renovation of Ellis Island, a project still in the early planning stages.*

IGFA Class

10 kg

20 lb

225 meters/250 yards

reel-fill pak

**STREN  
CLASS**

*Line*

Meets IGFA Standards



# WORLD RECORD STRENGTH.

NEW STREN® CLASS LINE FOR LANDING RECORD FISH.

You won't break records with brute strength. That's why you need new Stren Class Line. Du Pont laser technology means line strength that meets IGFA standards. Precisely. Consistently. And no one else has it. We make Stren Class Line as strong as each IGFA

category will let us. Any stronger, it would be disqualified. And new Stren Class Line combines that unique precision with the amazing, balanced performance and toughness of famous premium-quality Stren. So fill your best reel with new Stren Class Line.

Come rewrite the record book with us.



# IMPORTS & MOTORSPORTS



## The long and the short of Mazda's new B2000



Cab Plus (above) joins short-bed (left) and long-bed pickups.

Hardly anyone keeps 'em down on the farm anymore. With the introduction of Mazda's new B2000, the suburbanization of the pickup is complete. If we're going to treat pickups like cars and use them on paved roads, then Mazda is going to design them for a smooth ride and never mind about hauling hay. Choice of powerplant was easy: The B2000 uses the FE-type, ohc Four, the smooth, strong, quiet engine that was developed for the 626 (see *Driving The '83 Mazda 626*, page 66, Dec. '82). All Mazda had to do was drop it into the B2000 for '86. The hard part was arriving at the right balance of handling and ride comfort for the pickup chassis. They hit it just right, refining the basic

ladder chassis to the nth degree—as we found out in a test drive at the company's Miyoshi test track recently. The first step was increasing wheelbase and track. By adding four more inches of track front and rear, you get better roll resistance so softer springs and shocks can be used for ride comfort. A new mounting system for the cab on the chassis cuts NHV significantly (that's noise, vibration and harshness to automotive chassis engineers). Suspension geometry and bushing work aid comfort further, and a more rigid steering system caps off the improvements made on the new model. Put a passenger-car interior in the cab and it all adds up to one easy rider.

## Sporty Subaru

Hot on the heels of the redesigned '85 Sedan and Wagon comes a four-wheel-drive wedge to give Subaru a sports car in its model lineup. We haven't seen the

coupe in its sheet metal yet, but have had a look at Subaru's development sketches, one of which is shown here. This driving machine looks like a real road huggar.

Subaru's next four-wheel-drive will be a sports car.



## Hundred-horse GTI

The GTI. VW's hot Golf, is here. Since the GTI shares the two-door Golf body, you know how it's been improved over its Rabbit ancestor (see *Driving VW's 1985 Golf And Jetta*, page 156, Dec. '84). But you haven't heard about the other changes that make this second-generation GTI more exciting.

Start under the hood: The 1.8-liter sohc Four has been tweaked for 100 hp (vs. 85 for the Golf) without adding a turbo or a fistful of valves. Intake valves are larger, pistons are designed for the 10.0:1 compression ratio and a new KE-Jetronic f.i. system keeps the beat with electronic ignition and a knock sensor. Excellent combustion efficiency powers the 2,200-pound GTI to 116-mph top speed with under 10-second 0-to-60 times. When you want to throttle back, fifth gear has a numerically lower final drive for low-rev cruising. Stopping power is assured by the new model's four-wheel discs and high-g cornering has been made easy with the reworked suspension.



GTI gives you \$9,000 worth of driving fun.

All that is hidden underneath the hood and chassis of this hot addition—what hits the "I" with this GT is its first-class sports styling.

## Speed weeks

February is the fastest month—especially if you're lucky enough to be in Florida for the start of the motorsports season. This year's Daytona 24 Hours runs on Feb. 2 and 3, and NASCAR's 27th annual Daytona will have the racers on the road again on the 17th. That's where you'll see the fastest stockers and the world's fastest mechanics, the same speedy wrenches PM joined at Talladega (see story on page 77) just to see how it's done. **PM**

# CAMEL LIGHTS

It's a whole new world.



Today's  
Camel Lights,  
unexpectedly mild.

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

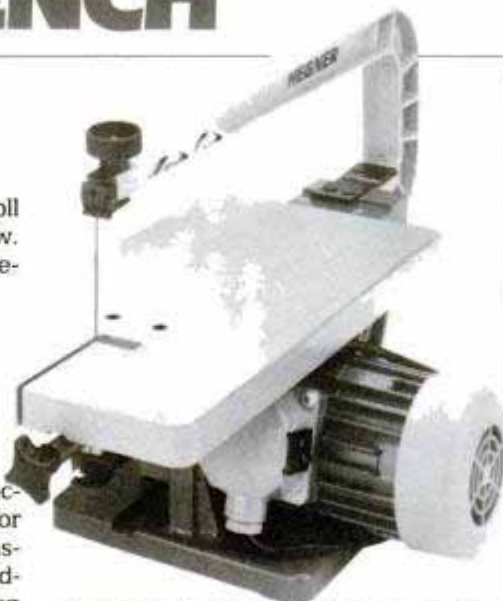
# THE PM WORKBENCH



## Super scroll saw at a super price

Hegner, well-known maker of scroll saws, has a new Multimax-1 scroll saw. Like the three Hegner saws that preceded it, the Multimax-1 is a finely engineered tool featuring the patented Hegner blade suspension system. But, unlike the other Hegner saws which cost as much as \$1,900, the Multimax-1 is \$430.

The saw's oversized 80-watt induction motor powers a 5-in. blade for intricate cuts in wood, metal and plastics. Other features include a 45° adjustable worktable and a 14-in.-deep throat. For details, contact AMI Ltd., Box 312, New Castle, Del. 19720.—J.T.



Full-featured scroll saw offers top performance at a popular price. A 5/16-in. blade stroke at 1,660 rpm delivers smooth cuts.

## Orbital-scrolling saw

Skil offers a versatile new sabre saw that has both orbital blade action and scrolling capabilities. The orbital action moves the blade into the workpiece on the upward cutting stroke and backs it away on the down stroke. This produces faster, cleaner cuts with less blade wear. The auto-scrolling feature is used when cutting tight curves and intricate scroll work.



Multispeed sabre saw features automatic scrolling (above), and settings for orbital blade action.

The saw's 3.2-amp motor delivers 1/3 hp and 3,200 strokes per minute. The scroll saw also has a handy blade storage compartment and a built-in wrench holder.

The Vari-Orbit scroll saw (Model

4395) is available at hardware stores and home centers for about \$55. For additional information, contact Skil Corp., 4801 West Peterson Ave., Chicago, Ill. 60646.—A.R.

## Perfect plugs

For the serious woodworker, Garrett Wade, located at 161 Ave. of the Americas, New York, N.Y. 10013, offers a five-piece set of precision dowel and plug cutters. You can make your own perfectly round dowels and plugs up to 2 1/4 in. long.

The professional-quality cutters have 1/2-in.-dia. shanks for use in a drill press. The cutters come in 3/8-, 1/2-, 5/8-, 3/4- and 1-in.-dia. sizes and range in price from \$47.85 to \$64.95 each. For details, contact Garrett Wade.—J.T.



Cut perfectly round dowels and plugs with high-quality cutters. Upon completion, the cutter automatically ejects the dowel.

## A thoroughbred workhorse

Black & Decker's Workmate 85 is its lowest-priced floor unit Workmate. Like other Workmates, the Model 85 combines the clamping capabilities of a vise with the utility of a portable worktable. It stands 29 3/4 in. high and collapses to 6 in. wide. The jaws open 4 in. wide and have swivel pegs to hold 10 1/2-in.-wide items. The Model 85 is \$35 at home centers. For details, contact Black & Decker, Accessory Div., 500 Hanover Pike, Md. 21074.—P.S.



The 18-pound Workmate 85 is the newest floor model in this versatile tool line.

## Back-to-basics catalog

Flipping through the pages of Lehman's *Non-Electric Catalog* is like stepping back in time. It contains over 400 non-electric items such as appliances, lamps, heaters, kerosene-powered refrigerators and a century's worth of hard-to-find hand tools. For a catalog, send \$2 to Lehman Hardware, Box 41-PM, Kidron, Ohio 44636.—J.T.



The *Non-Electric Catalog* is an incomparable source of unique and rare tools, appliances and lighting fixtures.

If you've come across a new product with some special features, let us know about it. Write to PM Workbench, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019.

# THE EXPERIENCE LASTS A LIFETIME.

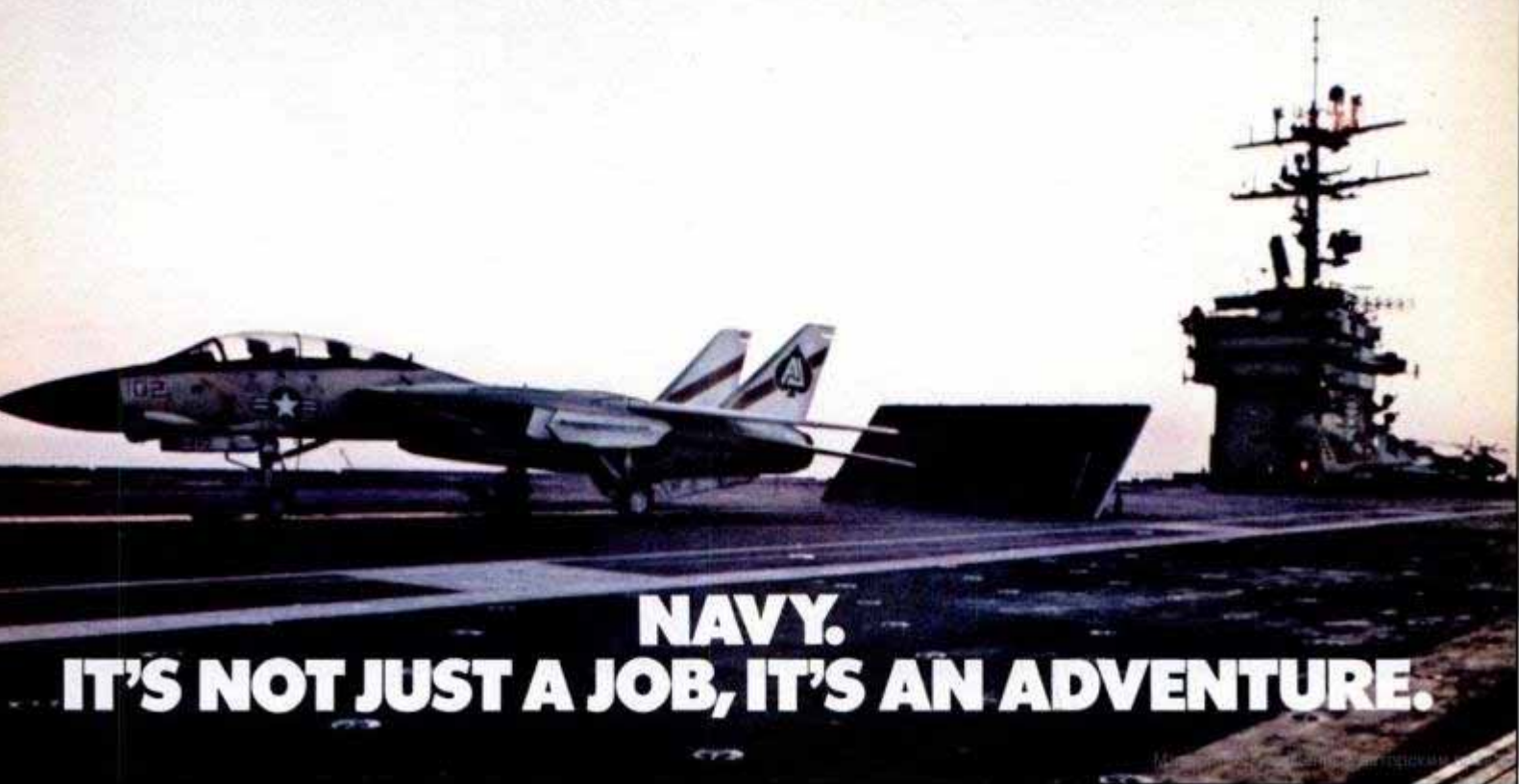


Things happen fast in the Navy. And with more than sixty career fields to choose from, you get a choice that will give you a headstart on the rest of your life.

From the beginning you get training and on-the-job experience with some of the most advanced equipment in the world. And travel that will take you places you've only dreamed of. Hong Kong. Naples. Bangkok. Rio de Janeiro.

But, whether you're seeing the world in a guided missile cruiser, a nuclear submarine or on one of the world's largest aircraft carriers, you'll be seeing your future develop today.

Get a start on your tomorrow today. See your local recruiter or call toll-free 800-827-NAVY.



**NAVY.**  
**IT'S NOT JUST A JOB, IT'S AN ADVENTURE.**

# ALL OUTDOORS



## Jeep thrills

Twenty-five hundred miles is a good chunk of outdoors to cover, especially when much of it is off-road. But that's what PM rolled up recently in the American Motors' Moosehead-to-Mardi Gras run. We competed against teams from six car-enthusiast and off-road magazines in a test of fuel economy and miles covered over a route of our own choosing from Montreal to New Orleans. We had six days to make the trip, and the scoring system awarded bonus points for miles covered on dirt roads and no roads. AMC supplied the seven Jeep Cherokees, all equipped with the new-for-'85 Renault-built 2.1-liter turbodiesel. The winning team went after the fuel economy prize with a vengeance and managed to squeeze out a 41.9 mpg average for the trip. The *Popular Mechanics* vehicle, piloted by Detroit Editor Dan Ross and contributor Cliff Gromer, certainly was the most



PM's Cherokee bombs through the boonies in AMC's Moosehead-to-Mardi Gras run.

high-tech of the lot, as we had installed a Northstar Loran C navigation system. Designed for water navigation, the system functioned just fine on land, giving us our position in longitude and latitude continuously updated to 1/100th°, ground speed, distance to selected co-

ordinates and estimated time of arrival. With the Northstar Loran's help, and maybe a little from AMC on-board observer John McCandless, we came in ahead of all the car-enthusiast and off-road magazine teams except one. We'll beat them next time.

## A gathering of eagles

All you bald eagle watchers will be glad to learn that the numbers of our national bird have now stabilized after years of decline. A survey conducted by the National Wildlife Management Institute earlier this year showed 11,819 bald eagles in 42 of the continental states, up from the 10,903 living U.S. symbols that were counted last year in the same states.

## Fueling easy

Tired of lifting a heavy, 5-gallon gas can to fuel up your ultralight, snowmobile, tractor or kerosene heater? Ultra-Fill uses a bicycle tire hand pump to rapidly transfer fuel from its 6.5-gallon fuel can via a 7-foot-long hose to the tank filler.

The unit sells for \$54.95, plus \$5 shipping, from Ultra-Flight Supplies, Box 3043, Lexington, Ohio 44904.

**Bicycle pump attachment helps you fuel up without lifting 5-gallon gas cans.**



## Watercycle

Do you love the water, but don't know how to row, paddle, sail or operate an



You'll never be up the creek without a pedal in this 5-mph, foot-powered watercycle.

engine? Does the prospect of tipping or getting wet in a small boat leave you cold? Don't give up hope. You still can enjoy Harken-Vanguard's Waterbug watercycle. You pedal this egg-shaped craft using a low-friction gearbox that drives a high-lift prop. Steer with hand levers that operate the rudder. You'll do a steady speed of 5 mph regardless of wind and water conditions, thanks to hydrodynamic efficiency. Lead ballast prevents tipping, air chambers prevent sinking and a plexiglass cover keeps you dry. List price: \$2,995. Write to Freedom Yachts International, 49 America's Cup Ave., Newport, R.I., 02840, or call (401) 847-7475.

## Silencers

High performance marine engines can get pretty loud and annoying when operating in marinas and close to shore. A new silencing system, which works on any through-transom exhaust system, eliminates throbbing eardrums and those nasty looks.

The system includes two silencers, two actuators and a compressor that works off the boat's battery. The whole system retails for \$825. An adapter required by some models is \$185 extra. The silencers take about three hours to

retrofit. They mount externally, protrude about 8 inches and can incorporate rubber flappers. They're made by Kaama Marine Engineering, 936 Sunset Dr., Costa Mesa, Calif., 92627. **PM**



Silencing system for high performance marine engines makes you socially acceptable.



# SOUND ADVICE: TURN ON EQUALIZER V AND TUNE UP YOUR NEW GM VAN.

Nothing harmonizes with the new Chevy Astro and GMC Safari vans quite as well as a Delco Equalizer V Music System – an exceptional option available on exceptional new vehicles.

The Equalizer V system – speakers, receiver and graphic

equalizer – is designed into the vans on the drawing board. So it's tuned to their unique acoustical environments.

Up to six Delco Sound™ speakers, specially designed to take the show on the road, give the music concert-hall dimension.

Equalizer V's Electronically Tuned Receiver (ETR™) is engineered for drift-free reception. And a new auto-reverse cassette player, with music search and repeat, doubles your musical options.

The system's graphic equalizer lets you conduct a quintet of bass, midrange and treble controls to score the music to your individual taste.



*Equalizer V*

The sum of the parts tunes up your van in a whole new way. Give Equalizer V an audition when you test drive the new Chevy Astro or GMC Safari. Hear how Delco Electronics tunes up with the art of music... through the science of sound.



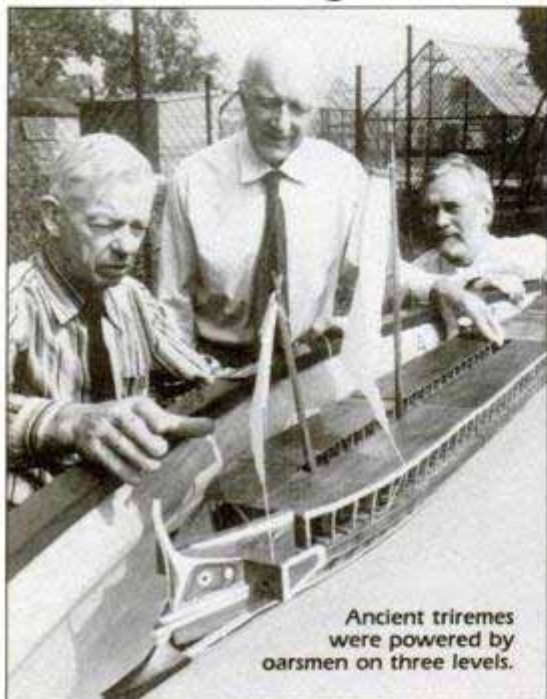
**Delco Electronics**

A DIVISION OF GENERAL MOTORS

BRINGING YOU *THE ART OF MUSIC* THROUGH THE SCIENCE OF SOUND.



## An ancient legend resurfaces



Ancient triremes were powered by oarsmen on three levels.

Homer and other ancient Greek poets wrote of a legendary ship called a "trireme." The 120-ft.-long wooden vessels were powered by 170 oarsmen on three levels. The trireme's main task was to ram enemy ships at high speed. The last recorded sighting of a trireme was over 1,500 years ago. But British naval architect John Coates, researcher John Morrison and Grindlay's Bank director Frank Welsh (left to right in photo) have teamed up to reconstruct the vessel. Studying pieces of salvaged hulls and looking over archaeological records, they built a model. With help from the Greek government, a full-scale model will be tried out with a full crew in 1986. Pull!

## Bear with us

A new species of bear may have been discovered in Nepal. Daniel Taylor-Ide and Robert L. Flemming—doing research for the Woodlands Institute—examined skulls of the decomposed bodies of bear-like creatures. Native legends talk about a small bear that lives in trees in the Nepalese highlands.

## Laser's new wavelength

The shorter the wavelength of a beam of light, the smaller the space it can enter. Lawrence Livermore National Laboratory says its researchers have produced laser light at the shortest wavelengths yet—about four-billionths of an inch. The laser light, whose wavelength puts it into the "soft X-ray" class, is reflected from the vaporized gases of two metals: selenium and yttrium. At wavelengths five to 10 times shorter than those of commercial lasers, the researchers hope to measure submicroscopic surfaces.

## Message from Moscow

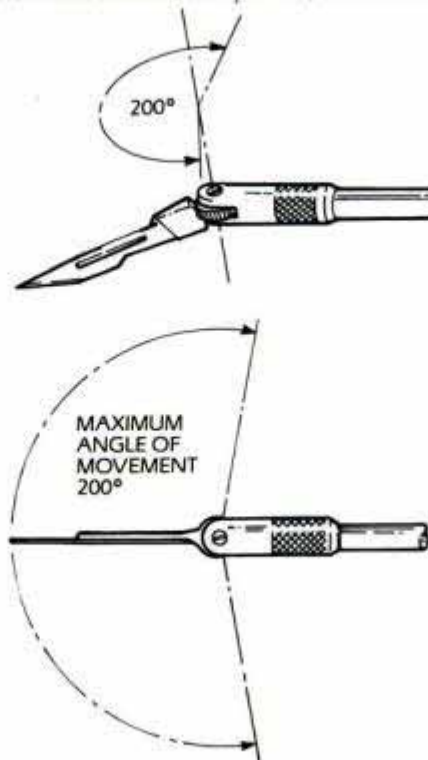
A Soviet paper read at a recent Baltimore conference on nuclear war suggests that no human life could survive a global atomic episode. I wrote to Vladimir Aleksandrov at the Soviet Academy of Sciences in Moscow to ask how his team came to that conclusion. His reply:

"We used a computer climate model consisting of . . . three-dimensional models of the atmosphere and active ocean which mimics the main forces responsible for climate change. Winds carry nuclear pollutants around and across the globe . . . gravitation and precipitation (rain or snow) 'fall it out.'"

Smoke and dust in his model then cool the Earth's surface temperature. Within a year, after the bombs have gone off, Earth would experience "very strong, long-term temperature drops which start in days within the war hemisphere and in some weeks in non-war zones." The freeze and drought that follow, he says, would render human life impossible. The American model for nuclear winter predicts very few survivors. The Soviet model predicts that no one could survive the aftermath of a nuclear war.

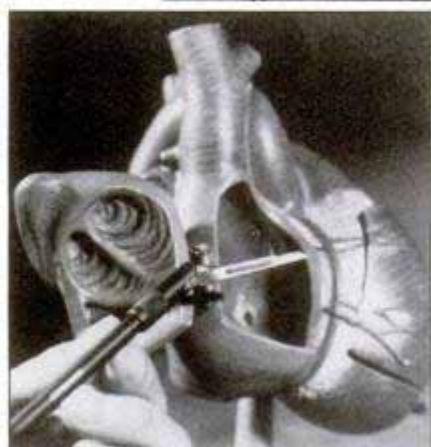
## Tool with heart

The mitral valve of a human heart is hidden behind muscle tissue and is difficult to reach during surgery. But a new Mitral Valvotomy Knife, which was



invented by British surgeon Kenneth Reid, places the cutting edge of a scalpel on a joint. That joint locks a milled wheel carrying the blade against a chisel edge as the surgeon tightens the screw.

Depending upon how the scalpel is held, it can move 200° side to side or up and down, which would revolutionize heart-valve surgery. **PM**



Revolutionary scalpel can get behind the heart muscle. The scalpel's pivoting action is 200° up, down and sideways.

Train for the Fastest Growing Job Skill in America

# Only NRI teaches you to service and repair all computers as you build your own 16-bit IBM-compatible micro

As computers move into offices and homes by the millions, the demand for trained computer service technicians surges forward. The Department of Labor estimates that computer service jobs will actually *double* in the next ten years—a faster growth than any other occupation.

## Total System Training

As an NRI student, you'll get total hands-on training as you actually build your own Sanyo MBC-550-2 computer from the keyboard up. Only a person who knows *all* the underlying fundamentals can cope with *all* the significant brands of computers. And as an NRI graduate, you'll possess the up-to-the-minute combination of theory and practical experience that will lead you to success on the job.

You learn at your own convenience, in your own home, at your own comfortable pace. Without classroom pressures, without rigid night-school schedules, without wasted time. Your own personal NRI instructor and NRI's complete technical staff will answer your questions, give you guidance and special help whenever you may need it.

## The Exciting Sanyo MBC-550-2—Yours To Keep

Critics hail the new Sanyo as the "most intriguing" of all the IBM-PC compatible computers. It uses the same 8088 microprocessor as the IBM-PC and the MS/DOS operating system. So, you'll be able to choose thousands of off-the-shelf software programs to run on your completed Sanyo.

As you build the Sanyo from the keyboard up, you'll perform demonstrations and experiments that will give you a total mastery of computer operations and servicing techniques. You'll do programming in BASIC language. You'll prepare interfaces for peripherals such as printers and joysticks. Using utility programs, you'll check out 8088 functioning. NRI's easy step-by-step directions will guide you all the way right into one of today's fastest growing fields as a computer service technician. And the entire



NRI is the only home study school that trains you as you assemble a top-brand micro-computer. After building your own logic probe, you'll assemble the "intelligent" keyboard...

Your NRI Course Includes a Sanyo MBC-550-2 Computer with 128K RAM, Monitor, Disk Drive, and "Intelligent" Keyboard; The NRI Discovery Lab<sup>®</sup>, Teaching Circuit Design and Operations; a Digital Multimeter; Bundled Spread Sheet and Word Processing Software Worth \$1500 at Retail—and More.

system, including all the bundled software and extensive data manuals, is yours to keep as part of your training.

## 100-Page Free Catalog Tells More

Send the postage-paid reply card today for NRI's big 100-page color catalog, which gives you all the facts about NRI training in Microcomputers, Robotics, Data Communications, TV/Video/Audio Servicing, and other growing high-tech career fields. If the card is missing write to NRI at the address below.

... then install the computer power supply, checking all the circuits and connections with NRI's Digital Multimeter. From there you'll move on to install the disk drive and monitor.



**NRI** SCHOOLS

McGraw-Hill Continuing Education Center

3939 Wisconsin Avenue, NW  
Washington, DC 20016

We'll Give You Tomorrow.

IBM is a Registered Trademark of International Business Machine Corporation.

# THE PM GARAGE



## Gotcha covered

VersaCover does everything but make your pickup fly. It consists of two reinforced, double-hinged ABS white plastic panels. These ordinarily fit over your pickup bed to form a sealed, waterproof cover, but you can also set them up vertically to become stake walls on either side of the bed. Then, if you want, you can stretch an optional VersaTent canvas camper shell over the upright panels.

It's no trick to open each panel from the side for access into the bed. Self-positioning struts hold both panels at any desired height.

Using common hand tools, you can easily install pre-sized VersaCovers on most domestic and imported pickups. The panels lift off completely, too.

Prices range from \$454 to \$554, and the VersaTent costs an additional \$79. Phone (800) 228-3541 nationwide or (800) 521-2133 in California. Or write to R.K. Hather, VersaCover, Dept. PM, 6000 Joan Pl., San Luis Obispo, Calif. 93401.—M.L.

Handy VersaCover installs easily to give your pickup truck a multiple personality: stand-up stake sides, a sealed and secure tonneau cover or, with an optional tent package, a no-frills weekend camping sleeper.



## Cantilevered carrier

Can't see out the back of your S-10 Blazer or S-15 Jimmy? Is that bulky spare tire blocking your view and taking up valuable space on or alongside your cargo deck? You've probably



Spare rack leaves tailgate operation normal.

thought about those swingaway spare carriers, but here's a new twist—a hinged tire mount that lets you open the rear gate normally, without the "double door" effect. A torsion bar hidden underneath the vehicle counterbalances the weight of the tire, and the mount is engineered so it doesn't stress the tailgate skin. The vehicle's frame and bumper do the heavy work.

You can open and close the gate and rear window without interference. The Tafco carrier is even compatible with a Class I trailer hitch.

The Tafco spare-tire carrier retails for \$129.95. To find your nearest local distributor, you should call (800) 328-3189. The manufacturer is Tafco Equipment Co., which is located at Dept. PM, Highway 16-W, Blue Earth, Minn. 56013.—M.L.

## Abrasive, but flexible

The toughest part of any engine rebuild for me is all the cleanup of small components. Baked-on carbon won't come off with a solvent wash, but it will loosen with the abrasive materials sold by the E.C. Mitchell Co. Flexible abra-



Abrasive cords scour hard-to-reach grooves.

sive cords and tapes can be used by hand or with small power tools to clean inaccessible holes, slots and grooves. Prices start at \$10 per spool. Contact Mitchell Co., 88-90 Boston St., Middletown, Mass. 01949.—N.S.M.

## Super Glue gel



Gel glue stays put while repairs are made.

The new generation of instant adhesives can be lifesavers around my shop, but I find them too runny for some jobs. Loctite's answer to this sticky problem is Duro Quick Gel Super Glue. This formulation comes out of the tube slightly gooey, so it'll stay in place while you join together or repair nonporous materials. This super gel is available for \$2.19 per tube at auto parts and accessory stores.—W.H.



# In Japan, where high-tech electronics are a way of life, they pay \$714.93 for an American-made radar detector

(You can get the same one for considerably less)

**E**ven we were a little surprised. All we did was build the best radar detector we knew how. We shipped our first ESCORT in 1978, and since then we've shipped over 600,000. Along the way the ESCORT has earned quite a reputation—among its owners, and also in several automotive magazines.

#### Credentials

Over the past five years, *Car and Driver* magazine has performed four radar detector comparison tests. Escort has been rated number one in each. Their most recent test concluded "The Escort radar detector is clearly the leader in the field in value, customer service, and performance..." We think that's quite an endorsement.

#### Our Responsibility

One of the reasons for our reputation is our attention to detail. If we don't feel we can do something very well, we simply won't do it. That's why we sell Escorts direct from the factory to you. Not only can we assure the quality of the ESCORT, but we can also make sure that the salesperson you speak to is knowledgeable. And if an ESCORT ever needs service, it will be done quickly. And it will be done right.

#### 50 States Only

And that's the reason we don't presently sell ESCORTs outside of the United States. Even in the countries that use identical radar (Japan and Australia, to name two) we know that we couldn't provide the kind of customer service that ESCORT owners expect. So we pass up the additional sales rather than risk our reputation.

#### "Dear Sir..."

So we'll admit we were surprised when a letter from one of our customers included an advertisement from a Japanese automotive magazine. The ad pictured an ESCORT, and the price was 158,000 yen. Our customer was kind enough to convert that to U.S. dollars. Using that day's rate of exchange, an American-made ESCORT was worth \$714.93 in Japan. Further translation revealed the phrase "The real thing is here!" and warned against imitations.



This 1/2 page ad was a total surprise.

#### Econ 101

Needless to say, we were flattered. We knew that ESCORT had an impressive reputation, but we never expected to see it "boot-legged" into other countries and sold at such a premium. But the laws of supply and demand are not so easy to ignore. When there is a strong need for a product, there is an equally strong incentive for an enterprising capitalist to fill that need. And apparently, that's just what happened.

#### Easy Access

Of course, it's easy for you to get an ESCORT—just call us toll-free or write us at the address below. The price is the same as it's been for the last five years: \$245. Quite a deal for what the Japanese must think is the best radar detector in the world.

#### Try ESCORT at no risk

Take the first 30 days with ESCORT as a test. If you're not completely satisfied return it for a full refund. You can't lose.

ESCORT is also backed with a one year warranty on both parts and labor. ESCORT \$245 (Ohio res. add \$13.48 tax)

**TOLL FREE..... 800-543-1608**  
**IN OHIO..... 800-582-2696**



By mail send to address below. Credit cards, money orders, bank checks, certified checks, wire transfers processed immediately. Personal or company checks require 18 days.

## ESCORT®

**RADAR WARNING RECEIVER**

Cincinnati Microwave  
Department 100-068-A02  
One Microwave Plaza  
Cincinnati, Ohio 45296-0100



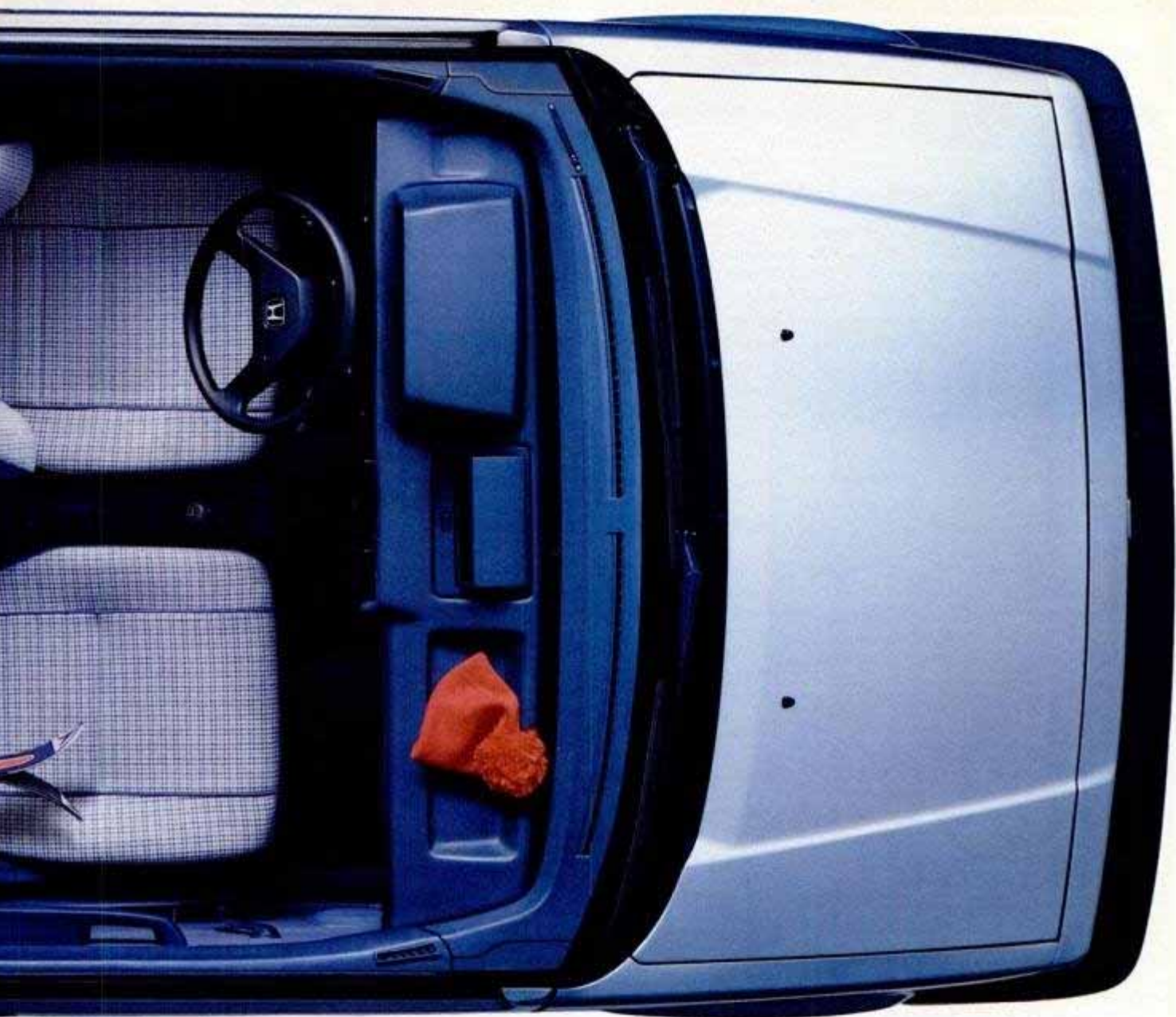
# Folds flat for



We'd like to show you how to fold a Honda Civic Wagon. Just like it is here.

Watch. Pop out one rear seat cushion. Fold both rear seats down. Then recline the front passenger seat.

Very clever, this wagon. Practical too.



# easy storage.

You're looking at a seven-foot stretch of flat storage space. It's long enough for skis or fishing poles or surfboards.

In all, there are ten different ways to fold a Civic Wagon. And there's more. A Civic Wagon has front-wheel drive.

It has front and rear stabilizer bars. So handling is surprisingly crisp. Agile. You might even say flat out fun.

**HONDA**

The Civic Wagon

# PM ELECTRONICS MONITOR



## More AM stereo broadcasts and equipment on tap

Next month makes three years since the Federal Communications Commission (FCC) gave AM radio stations the go-ahead to broadcast in stereo. Now, at long last, broadcasters and electronics manufacturers are making good on AM stereo's promise to deliver high-fidelity radio to homes and cars located as much as 10 times beyond the range of FM stations.

At this writing, about 10 percent of approximately 4,500 AM stations have converted to stereo, and about a dozen more do so each month. At least 12 electronics manufacturers have begun shipping AM stereo receivers, mostly for automobile installation.

Why so suddenly? Or, why so late? No matter how you ask the question, the answer lies in the chicken-and-egg situation the FCC laid Mar. 4, 1982.

At that time, the commissioners declined to select a single AM stereo transmission system from among the four competing and incompatible systems proposed. So, rather than engage in a format war, radio makers decided to wait until broadcasters expressed a preference. Unfortunately, few of the nation's broadcasters were willing to risk investing in any one system, not knowing which way the rest of the industry might jump.

It was the automotive industry that finally broke the deadlock when Chrysler, Ford and General Motors last year opted for the Motorola C-QUAM system of AM stereo transmission. (The other system choices hail from Harris Corp., Kahn-Hazeltine and Magnavox.)

From the beginning, it was believed that AM stereo's foremost application would be in the car, where FM suffers from short-range and terrain-related reception problems. Because Detroit's Big Three dominate car radio sales, broadcasters and aftermarket brands now have their cue.

Today, there are stations broadcasting AM stereo in just about every state. At press time, Motorola was leading the sweeps with about 180, and signing up new stations at the rate of 10 a month. Runners-up Harris and Kahn-Hazeltine claim about 90 stations each, but only Sansui and Sony build radios that can receive them. These are sophisticated and expensive units designed to operate with any AM stereo system.

Avoiding such expense are Pioneer, Jensen, Marantz, Sherwood, Concord, Kraco and Sparkomatic, which now join Chrysler, Ford and GM in offering car radios designed for the Motorola system. These units vary in features and range in price from \$150 to \$300. All have pushbutton electronic tuning. Eventually, manufacturers plan to offer less-costly manual tuning models.

With the leading brands now selling AM stereo, it's certain that every manufacturer will offer the option soon. The same competitive pressures exist in broadcasting, so if there's one AM stereo station in your area, it's likely there'll be more before long. Rest assured that your existing monaural AM radio will continue receiving broadcasts just fine—though not in stereo. **PM**

## Commercial-Free TV—For Your VCR

If you're building a library of film classics taped from TV, or creating a home cinema centered on your video and audio equipment, two accessories now on the market can make the jobs simpler and the results more rewarding. One screens unwanted commercials while you're recording from TV; the other extracts theater-like sound from video cassettes and video discs.

The first component, Vidicraft's CCU-120 Commercial Cutter and Event Timer, is designed to detect commercial interruptions during TV broadcasts, and instruct your VCR to cease recording until the regular program resumes. It's a useful accessory, particularly for those times when you're away from home and you have programmed your VCR to record an important show in your absence. Not only do you conserve tape (by packing up to 90 minutes more programming on a six-hour cassette), but you've also got the peace of mind that comes from knowing that heavy advertising won't cause your machine to

run out of tape before the program comes to an end.

Vidicraft explains that the CCU-120 works by detecting changes in audio and video signals that denote the switch from program to commercial. Once it has recognized the sales pitch (98 percent of the time, according to Vidicraft), the CCU-120 commands your VCR to rewind to the commercial's beginning, and resume recording only when the real show begins. When using the device, you bypass your VCR's internal timer; the CCU-120 more than compensates by letting you program 12 events over nine weeks. It costs \$399, and works best and most economically in the slowest recording speeds (Beta III; SLP for VHS).

Meanwhile, new from Phoenix Systems is the P-250 surround-sound processor, which replaces the P-25 featured in last April's PM (*Super Sound That Surrounds You*, page 48). The \$250 add-on is available as a kit (\$180) for do-it-yourselfers.



Vidicraft's CCU-120 detects the commercial breaks in TV programs and instructs your VCR to ignore them. The \$399 unit also functions as 12-event, nine-week timer.



Phoenix System's new P-250 (\$250) decodes Dolby surround-sound effects from video tapes and discs, for theater-like acoustics. It's also available in kit form for \$180.



# Tufoil®

## YOU'VE HEARD ABOUT IT... YOU'VE READ ABOUT IT...IT WORKS!

**Easier cold weather starting, better fuel economy,  
better performance, and longer engine life.**

For more than 20 years lubrication experts have been wrestling with the problem of finding a way to combine PTFE, commonly known as Teflon® or Fluon®, with motor oil to reduce friction. Finally a breakthrough was achieved. The result was a product that is changing the way people think about lubrication — TUFOIL® for ENGINES. TUFOIL®, added to your favorite motor oil is better at reducing wear, increasing power, improving fuel economy, and enhancing overall performance than any engine lubricant you can buy. Much better!

Furthermore, TUFOIL® will improve the efficiency and performance of standard transmissions and differentials by reducing their internal friction.

At the suggested list price of \$12.95, a little TUFOIL® goes a long way and pays for itself many times over. Next time you change your oil, really change it! Add TUFOIL®.

### Users everywhere praise TUFOIL — you will, too!

"There are lots of slick oils on the market but we've found one that does what it promises... TUFOIL works. It stayed in dispersion and cut the fuel bill 10%."

Popular Mechanics Magazine, January 1982

"With \$25,000 engines generating in excess of 3000 HP, you don't take chances. Tufoil... I wouldn't run without it."

AL SEGRINI, Owner/Driver, National Champion/Brut Faberge/Top Fuel Funnycar

"Lubrication engineer Franklin Reick succeeded where everyone else had failed... TUFOIL is a unique, different, but safe kind of Teflon/oil additive."

Motor Age Magazine, April, 1982

### Accept no substitutes!

Many have tried to combine PTFE or TFE in motor oil. Only TUFOIL has succeeded. In all other products the PTFE will settle out of dispersion and coagulate. Such products instruct, "SHAKE WELL BEFORE USING". Many suggest engine flushes and extended idling time after addition. None of this is necessary

with TUFOIL. TUFOIL is easy to use! Just add TUFOIL during oil and filter changes.

With numerous U.S. and international patents, TUFOIL is the only recognized, stable combination of PTFE and motor oil. TUFOIL is patented, insured and guaranteed!

### How TUFOIL Works

TUFOIL coats all the moving parts of engines with micro-miniature particles of PTFE, the slipperiest substance known to science. This coating minimizes friction well beyond the capabilities of any other lubricant.

Only in the patented TUFOIL process the PTFE particles are given a uniformly negative charge which causes them to repel each other so that they remain in dispersion. This dispersion serves two very important values. One, it prevents the particles from forming clumps which can clog oil lines and oil filters. Two, it keeps surplus PTFE particles suspended in crankcase oil ready to replace any particles dislodged from metal surfaces by the action of the engine's moving parts. This is accomplished by means of a chemical agent which causes the dispersed particles to seek out and continually coat metal surfaces as they become exposed.

TUFOIL is Reg. TM of Fluoramics, Inc.  
Teflon is Reg. TM of Dupont  
Fluon is Reg. TM of ICI Americas, Inc.

\*U.S. Patents No. 3,933,656; 4,127,491, &  
4,224,173. Other U.S. and Int'l Patents Pending.

call: 1-800-852-7800  
For Product Information

SPECIAL PRICE \$9.99



**Satisfaction Guaranteed  
or Your Money Back**

Get new Tufoil at a special price of only \$9.99 per 8 oz. bottle, plus \$1.50 shipping and handling in the continental U.S. Call 1-800-852-7800 for easy ordering through your Mastercard or Visa. In Mass. call 1-617-762-1984. Or just complete the coupon below and forward with payment. Please allow 3 weeks for delivery.

Please ship \_\_\_\_\_ bottles of Tufoil® at the special price of \$9.99 per 8 oz. bottle. (Mass. residents add 5% sales tax.) Case and gallon quantities available on request.

Enclosed is my  Check for \$ \_\_\_\_\_  Money order for \$ \_\_\_\_\_

Charge to my  Mastercard  Visa Amount \$ \_\_\_\_\_

Account No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Please send more information. My self-addressed stamped envelope is enclosed.

**RC Technology, Inc. 451 Walpole Street, Norwood, MA 02062**

Name \_\_\_\_\_ Tel: \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

# HOMEOWNERS' CLINIC



## Patching spalled concrete

*The concrete floor in my garage has areas that flake away as I sweep it, and the rough stones are protruding. I've tried using liquid sealers, including vinyl cement, but they don't hold. Can you help with this problem?—Edward Lull, Clarendon, Ill.*

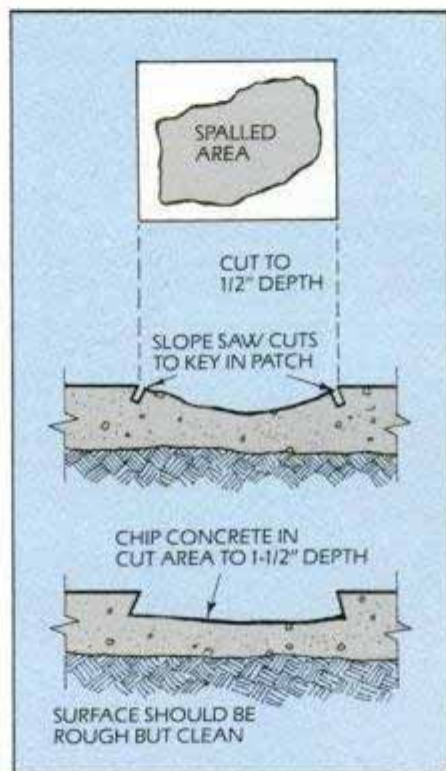
Spalled sections on a concrete garage slab are generally caused by de-icing salts dripping from the car. There are a number of materials for patching. If epoxy or polymer patches have not held, chances are you didn't prepare the surface properly. The area to be patched should be roughened by sand-blasting or chipping to about 12 in. beyond the spall.

The area should be clean and dry. Remove oil and grease, loose concrete and dust. Make sure there is no moisture rising through the concrete (see *Homeowners' Clinic*, page 72, July '84, for moisture test). Since epoxy products vary, follow the manufacturer's directions (see also *Problem Concrete: Answers to Most-Asked Questions About Patching*, page 112, June '83).

Depending on the size of the spalled area, it may be more economical to use a concrete mix. However, this will require more surface preparation since concrete cannot be "feathered" out like epoxy. The edges of the area to be patched must be undercut to hold the mix in place. The procedure outlined below for patching a floor is from the American Concrete Institute's booklet *Slabs On Grade*. The booklet is available from ACI, Box 19150, Redford Station, Detroit, Mich. 48219, for \$6.95.

1. Using a circular saw with masonry (silicon-carbide) blade, make a rectangle of outward-angled, 1/2-in.-deep cuts around the spalled area.
2. Wearing goggles, chip concrete within the saw-cut area to about 1 1/2 in. deep using a cold chisel. Chipped surface should be rough but clean.
3. Dampen area with water, cover with wet burlap and allow it to stand for several hours.
4. Mix concrete for patch in the same proportions as the slab. If you don't know the mix of the original concrete, use a ratio of 5.5 gallons of water per 94-pound bag of cement. Let the mix stand several minutes before placing it in the patch.
5. Remove excess water from the

6. Compact concrete into the patch, overfilling slightly.
7. After a few minutes, level it to match the surrounding surface, then finish to the required texture.
8. Keep the patch damp for 3 days.



To prepare a spalled area of floor for a concrete patch, first saw-cut around the area to a 1/2-in. depth; angle the cuts outward. Then, chip out the concrete within the cuts to 1 1/2-in. depth using a cold chisel.

## Replacing porch columns

*I own a fine old house built in 1880. Most of the house is still in original condition. The challenge I have is that the columns on my front porch are rotting and two of them need to be replaced. I have not been able to find anyone who will reproduce the original columns. Are you aware of any companies that custom-build columns if provided with sketches?—D. Linderman, Michigan City, Ind.*

I found a list of 12 such companies in the *Old House Journal*. Two of them are: Schwerd Manufacturing Co., 2215 McClure Ave., Pittsburgh, Pa. 15212, and Hartmann-Sanders Column Co.,

4340 Bankers Circle, Atlanta, Ga. 30360. Both provide free brochures.

Since you own an old house you may be interested in the *Old House Journal*. The *OHJ* is an excellent monthly publication dealing with restoration and maintenance of pre-1939 houses. The May 1984 issue has, among other interesting tidbits and information, an article titled *Shopping For Columns* that should answer all your questions.

A one-year subscription to the *OHJ* is \$18. Back issues can be purchased for \$2.50 each, postpaid. Write to The Old House Journal, 69A Seventh Ave., Brooklyn, N.Y. 11217.

## Copper plumbing corrosion

*For many years I've noticed a white powdery substance like corrosion around valves and some sweat fittings on my copper pipes. Also, the screws that hold the washers in the valves corrode away. I spoke to a person who claimed the corrosion might be caused by the ground wire—running between my main electrical box and the water line coming from the street—setting off some electrical chemical reaction. Is this true? What do you think I can do to stop the corrosion?—A. Nelson, Franklin Square, N.Y.*

The electrical ground connection is not causing the problem. It sounds as if you have slight leaks around the joints of those fittings and valves. Water oozes out of the pinhole openings in those joints and around the valve stems. It then evaporates and leaves behind the mineral deposits you see.

Usually, the deposits self-seal the leak. However, if the deposits get larger you will have to re-sweat the leaky fittings and repack the valves.

Your washer screws are deteriorating because of the chemical makeup of the water. Home treatment of the water to prevent this isn't practical. The screws should be replaced with monel screws, made of corrosion-resistant nickel-copper alloy, and available at plumbing supply stores. **PM**

*Do you have a home-maintenance or repair problem? Send it to Homeowners' Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. Letters cannot be answered individually, but problems of wide interest will be discussed in the column. For more home-repair and maintenance help, get PM's Home Care Guide, \$4.95 postpaid. Send your order(s) to Popular Mechanics, Box 1014, Radio City Station, New York, N.Y. 10101.*

# EVERY TIME YOU CHANGE THE BIT, YOU'VE GOT ANOTHER TOOL.



The remarkable device pictured below is a Dremel® Moto-Tool®. With its wide range of accessory bits, this compact power tool provides the kind of versatility you won't find in conventional tools. Not only will it handle a variety of tasks, it'll handle a variety of materials. You see, while ordinary power tools usually run at less than 3,000 RPM, the Dremel Moto-Tool is capable of a range of speeds up to 28,000 RPM. And because the Moto-Tool is so compact, you'll often find it'll do the job, where other tools won't even fit.

The Moto-Tool is available in several different models, including both adjustable and constant-speed versions. Each features a reliable motor, an assortment of useful accessories, and most models come with a rugged carrying case.

So if you want a versatile tool that does the work of many other tools, pick up a Moto-Tool. Once you do, you'll quickly see there's no other single tool like it.



# DREMEL®

Gets the job done bit by bit.



## A battery of questions

Does your "strange" file have in it what happened to me? Acid started leaking from the battery positive side terminal. Before I discovered the trouble, the acid had destroyed the battery carrier and inner fender, and leaked directly on two high-pressure lines feeding the air conditioner. The battery was about three years old when this happened. My questions are:

- Is this a common occurrence?
- Is damage the result of vibration or could it be a manufacturing defect even at this late stage in the battery's life?
- In light of my experience, are car owners better off with top-terminal rather than side-terminal batteries?

—Norm Zorn, Roanoke, Va.

Strange indeed, Norm. This is not a common occurrence. The most secure parts of a battery, whether it has side or top terminals, are the terminal areas. When acid leaks from a battery, it's usually because of a puncture in the case or a split between the cover and case. Often, this is the result of accidental damage done by someone working on the battery, or by the battery mount itself.

Acid penetration through a terminal area usually results from a defect in the battery. Therefore, although the battery is three years old, you should return it to the place where you bought it. Batteries should age more gracefully than this.

As for switching to a top-terminal battery, there are pitfalls. You either have to replace the cables, which is an added expense, or clip their ends and splice on new cable clamps to fit battery posts. Clamps are available at auto supply stores.

However, the point at which the end of the cable and new clamp meet will not be sealed, and there's a high risk of corrosion. If it were my choice, I'd stick to a side-terminal battery.

### Resuscitating a Rabbit

I found oil in the coolant of my 1984 VW Rabbit. The VW dealer can tell me why I'd find coolant in oil, but he's lost on this problem. Please help him and me.—George Rodriguez, Arlington, Texas

The oil cooler, which is probably

leaking, has proved to be a cause of oil-contaminated coolant with all VW models. Verify that it's damaged by removing the cooler, which is under the oil filter, and plugging one of its hose fittings.

Now you should immerse the part in water and apply low air pressure to the other hose fitting.

If water bubbles appear, indicating a bad oil cooler, flush the cooling system. Then, install a new oil cooler and a new oil filter. Be sure to replace the oil cooler seal, which sits between the oil cooler and oil filter.

### Water torture

My 1982 Honda Accord has a problem with water in the fuel system. I've purchased gasoline at several different service stations, but I can't get rid of the water. It causes the engine to hesitate and lurch on acceleration. Have you heard of this and can anything be done about it? I've

checked with the dealer several times, but he's no help.—Robert King, Haleiwa, Hawaii

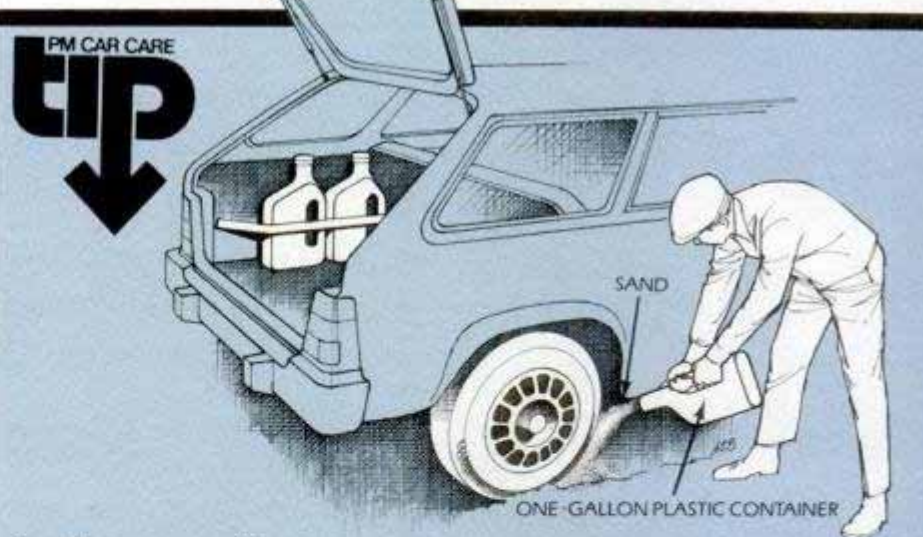
This is a tough one to pin down since you insist there's water in the fuel system and Honda says that even if there is, it wouldn't cause hesitation and lurching. According to the company, fuel tanks are constructed to hold several liters of water without affecting engine performance. If the water level exceeded the limit, the engine would quit running, since water would block the fuel-sending pickup screen.

Honda places blame for hesitation and lurch on two other reasons. One is pinching of the No. 11 vacuum line under the air cleaner. It provides a signal to the EGR valve. This problem is explained fully in Honda service bulletin 82-038.

The second reason—carburetor percolation—causes hesitation and lurch after starting a warm engine. This problem is the focus of Honda's service bulletin 82-014.

If checking these possibilities doesn't solve your problem, and you want to pursue the water-in-fuel business, then

*(Please turn to page 30)*



### Justice prevails

Here's a gem for winter driving sent to us by Howard M. Justice of Brookville, Ind. He suggests:

"Take gallon-size empty plastic containers that used to contain antifreeze, windshield washer fluid or some other product and fill them with dry sand. Screw their caps back on and place the containers in the trunk."

"The heavy weight increases traction when driving on snow and ice. Furthermore, you have sand readily available to spread under tires when traction is needed to get off a slippery spot."

Naturally, this only applies to rear-drive cars. And keep the weight over or in front of the axle, not way out back where it may lead to quirky handling.

# HOW TO SAVE MONEY WITH THE RIGHT MOTOR OIL

SAE 5W-30 COULD IMPROVE STARTING, FUEL ECONOMY AND ENGINE LIFE.

Many of today's new gasoline engines will start better in cold weather and use less fuel if they're protected with SAE 5W-30 motor oil. In fact, General Motors recommends 5W-30 for year round use in many of its current models. Your owner's manual will tell you if your car or truck is among them.

Even if it's not, a check of the manual will help you select the oil that's right for your engine, for your climate, for the way you drive. Understanding the language of motor oil is a big help, too.

**Read your oil container.** Look for the American Petroleum Institute (API) symbol. You'll find it on many containers of motor oil. It looks like this:



The presence of the API symbol means the product has been tested to meet some highly specific performance standards.

**The symbol says three things about the oil.** The letters at the top tell you if the oil quality is right for your engine.

An API letter code of "SF" means the oil is for gasoline engines. "CC" or "CD" means the oil is for use in diesel engines. Oils marked with a combination of letter codes, like "SF/CC" or "SF/CD," can be used in more than one type of engine.

**The center of the symbol describes the viscosity of the oil**—how easily it flows. The various grades are specified and numbered by the Society of Automotive Engineers (SAE). In general, the lower the number, the more easily an oil flows at a specified temperature. Oils with more than one SAE number are called multigrade oils, and contain additives to help them perform whether hot or cold.

With multigrade oils, a number followed by a "W" indicates how well the oil flows in cold weather. The lower the number, the more readily the oil will lubricate an engine during cold starts at low temperature. SAE 5W-30 oil, for example, will flow more easily when cold than SAE 10W-30.

The second or last number indicates a multigrade oil's lubricating properties at high temperatures. While this number can be as high as 40 or even 50, for most vehicles General Motors no longer recommends you use an oil this thick.

**The words "Energy Conserving" on an API symbol mean the oil may save you money.** Easy-flowing oils

reduce friction in your engine, so you'll use less gasoline to run it. "Energy Conserving" oils are generally multigrades, and the lower the viscosity rating, the better the fuel economy.

These guidelines apply equally to synthetic and conventional oils. So pick a motor oil that meets the recommendations in your owner's manual, and follow the oil-change schedule. You'll be sure your engine is getting the right oil, you could be saving money, and you'll be helping conserve valuable natural resources. And that's good for you, for GM, and for everybody.

*This advertisement is part of our continuing effort to give customers useful information about their cars and trucks and the company that builds them.*



Chevrolet • Pontiac  
Oldsmobile • Buick  
Cadillac • GMC Truck

## CAR CLINIC

(Continued from page 28)

drain the fuel tank and blow out fuel lines to see what happens.

### In a lather

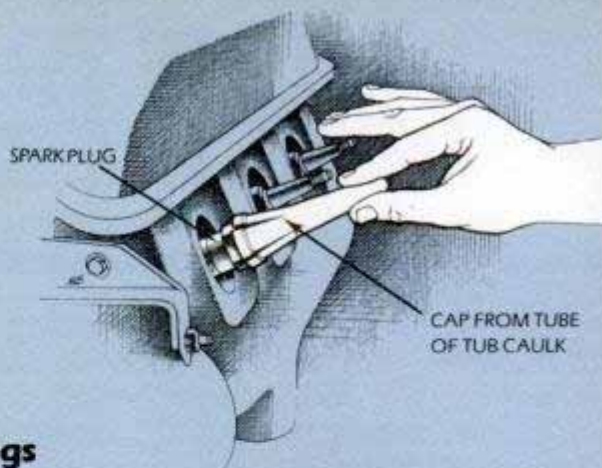
Whenever I look at the oil on the automatic transaxle dipstick of my 1982 Buick Skylark 2.8-liter engine, it's foamy. I've been going back and forth with GM about this since I bought the car. The dealer replaced the transaxle with a new one, but a short time afterward foam reappeared. The dealer is at a loss, and the GM area representative hasn't been helpful. Can you help?—Edward Wajda, Westfield, Mass.

Your car's not unique. Foaming is characteristic of the THM 125C automatic transaxle in 1982 Skylarks, Cavaliers, Celebritys, Centurys, Cimarrons, Citations, Cutlass Cieras, Firenzas, Omegas, Phoenix, Skyhawks, J2000s and 6000s.

Foaming occurs because pressure on oil becomes excessive as oil is pumped through the narrow passage of the valve body. The only problem that transaxle oil foaming causes is an inaccurate indication on the dipstick. It will not cause damage to an automobile if you're using the correct transmission fluid—DEXRON II.

### SERVICE TIPS

- Is the hatch of your 1982-84 Pontiac Firebird or Chevy Camaro hard to close? That's because you're working against a large volume of air inside the car. Opening a door or window a bit will avoid muscular strain.
- Chrysler has found the reason for corrosion of sheet metal near the maintenance-free battery of its 1979-'84 rear-wheel-drive vans and wagons. Water from rain, road splash and car washing is leaking into the battery through the vent holes, causing overflow thrown out in the form of acid. A shield (part No. 4335558) to block water from vent holes is now sold by dealers.
- There's a new head gasket (part No. E53Z-6051-A) for the 2.3-liter HSC engine of a 1984 Tempo/Topaz if the one now on your car is leaking oil or coolant. TSB 84-16-15 tells FoMoCo service departments the proper way to install it.
- Stick to your guns if you believe your 1984 Honda Civic has too much bounce up front while driving between 35 and 40 mph on a smooth road. Honda has issued TSB 84-037 that tells dealers to replace the left engine mount and the front mount of the transmission if bounce is indeed excessive.
- If you'd like to get rid of a shudder from a 1982 Datsun 200SX when going in reverse at low speed with your foot held lightly to the brake pedal, have a rear wheel bearing shim (part No. 38154-25660) installed.



### Tricky way to start sparkplugs in their sockets

Elmer Promnitz of St. Charles, Mo., has arthritis in his hands, which makes it difficult to do many simple auto maintenance jobs—one involving sparkplugs. Elmer found it hard to start new plugs into their holes without crossing threads, something even those without arthritis may find hard to do since plug holes are often deeply recessed. Elmer came up with this idea to solve his problem, and it may

help you with yours:

Buy a tube of tub caulk. Slit its flexible plastic cap on each side (see illustration) so you can get the cap over a new sparkplug. This extends your reach and makes it easier to get the sparkplug started correctly. Once the plug is started properly in the threads, pull off the cap and attach your socket wrench and extension to tighten the plug in its socket.

To eliminate foaming, first make sure the transaxle isn't overfilled. Then, have the dealer install newly designed parts. These are a manual valve (part No. 8643316) and an auxiliary valve body (No. 8643326).

If foaming continues, the only way to get an accurate reading is to check transaxle oil level when the transaxle is warm and the engine is running. If the level falls between the FULL and ADD marks, you're safe. When it gets to the ADD mark, add fluid until the level reaches the midway point.

### Whistling a sad tune

*I like my 1984 Honda Prelude except for one annoying problem: a low whistle between 35 and 45 mph. At 55 to 65 mph, it becomes a high piercing whistle. The Honda service department says, "It's in the fuel system, and there's nothing we can do about it." That's hard to believe. Help!—Murray L. Totty, St. Petersburg, Fla.*

This sounds like a wind noise. The dealer is probably confusing it with a noise made by these cars that, until now, has been unsolvable. That noise, more a moan than a whistle, is caused by the two-way valve that controls the amount of vapor sent from the fuel evaporation system's charcoal canister to the fuel tank. A new, quiet valve has been designed and is now available to owners of moaning cars through Honda dealers. The two-way valve noise is heard at low speeds, at idle, and some-

times even after the engine has been turned off, but not at 55 to 65 mph. That's why I say it sounds like wind noise. Suggest that your dealer tackle the problem from this angle.

### Lucky John

*What can you tell me about the Ford FS-6 air-conditioning compressor? Mine is leaking oil, although it has had new seals.—John Fuqua, Salvisa, Ky.*

You're in luck, John. Arriving almost simultaneously with your letter was Technical Service Bulletin (TSB) 84-19, which addresses the problem. You and other Ford/Mercury owners having FS-6 compressors in their cars will be happy to know that a redesigned seal is available now from the manufacturer to keep oil where it belongs. Have your dealer make repairs using the Compressor Head and Valve Plate Kit (part No. E4VY-19E580-A).

If your vehicle no longer is covered by warranty, talk to your Ford zone representative, who can be contacted through a dealer or directly (look in the owner's manual for the address). The zone rep may extend the warranty as a show of good faith, since oil flinging past the front shaft seal has been a problem with this compressor. **PM**

### DO YOU HAVE A CAR PROBLEM?

Just ask Mort about it. Send your question to the Car Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. While letters cannot be answered individually, problems that are of general interest will be discussed in the column.



# YOU WIND UP WISHING IT WERE MORE THAN ONE WEEKEND A MONTH.

You might find yourself in a chopper, cruising the treetops at 90 miles per hour.  
Or doing something more down to earth, like repairing an electronic circuit.

What you won't find yourself doing is getting bored. Because this isn't ordinary part-time work. It's the Army Reserve.

You'll get valuable skill training. Then one weekend a month, and two weeks each summer, you'll put that training to good use, while receiving good pay and benefits.

But maybe most importantly, you'll come away with a feeling deep down that you were challenged and came through. And that doesn't disappear when Monday rolls around.

See your local Army Reserve recruiter about serving near your home. Or call toll free 1-800-USA-ARMY.

**ARMY RESERVE.  
BE ALL YOU CAN BE.**

# APPLIANCE CLINIC



## Balky dishwasher door gasket

*I have a Sears dishwasher, model No. 587-71231, serial No. 117.2840867. I purchased a new door gasket from Sears and after double-checking to see that it was properly installed, I find I can't latch the door. The new gasket is plastic and hard. Nothing in the directions shows any adjustment to the door itself. What am I doing wrong?—Fred Thursby, Sound Beach, N.Y.*

I checked the installation instructions for your door gasket. Apparently the

instruction sheet has been updated since you made your purchase and now includes a note which deals with your problem. The note states that after installing the new door gasket, it may be difficult to close the door.

To soften and set the gasket, loosen the two screws that attach the lock striker hook to the top center of the tub flange; close the door and operate in "wash" with hot water for five or six minutes. Then retighten the screws.

## Moldy door seal

*I purchased a Frigidaire refrigerator in February of 1983, model No. FPC119VMLO, serial No. 20AK5153. The problem I'm experiencing is that the door seals have been collecting mold. They must be washed every other day to control this problem.*

*We live in California and the humidity is low. I've checked the manual, and maintain the settings as it recommends. Can you help?—Sally Hartmann, Fountain Valley, Calif.*

It sounds as if the mold may have been formed by some sort of food residue on the door gasket that was accidentally spilled on the gasket surface. Another possible explanation is that the mold may be the result of wet insulation in the door.

A third possible cause: The heating element that goes around the inside front of the refrigerator may be inoperative. When this happens, moisture has a tendency to form in the area of the door gasket due to the cooler surface temperature of the cabinet.

By simply washing the door gasket you can't destroy the mold, and in a short time it reappears. To get rid of the mold, sterilize the gasket surfaces with a bathroom mildew remover such as Dow Bathroom Cleaner or Lysol brand disinfectant, and scrub in the crevices with a soft bristle brush. Remove all the residue, then be sure to rinse thoroughly with clear water to avoid any chemical reaction between the gasket and cleanser.

If, after you have thoroughly cleaned the gasket, you still find the mold reappearing, my advice is to call your local Frigidaire serviceman to check the cabinet heater and door insulation.

## Dryer starting trouble

*I have a Maytag dryer, model No. DE806, serial No. 608442F9. Frequently, I have trouble starting it on the perma-press cycle. The regular dry cycle seems to start promptly. I must hold the starting knob in until the dryer runs for a while and then release the knob or the machine will shut off. Can the problem be the electronic control? Your help will be appreciated.—Nancy K. Schmauder, Tacoma, Wash.*

What you probably have is a faulty control switch. This is the long rectangular switch behind the control dial. The switch is part No. 3-2528 and costs about \$20. Replacement parts for your dryer can be purchased from any Maytag parts dealer or appliance parts distributor.

To get at the switch, unplug the dryer from its power source; remove the control panel cover, which is held in place with two Phillips-head screws. This will give you access to the control switch, which is held to the control panel with two screws.

Once the mounting screws have been removed, first lift and then turn the switch 90° to remove the hairpin clip which connects the switch to a solenoid. Then, lift the switch itself up and out of the panel.

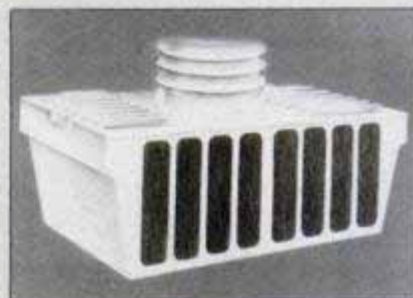
Place the new switch alongside the defective switch; remove one wire at a time and connect it to the corresponding terminal of the new switch. The wires are color-coded to the terminals on the switch.

Once all the wires have been transferred, again tilt the switch to connect the hairpin clip. Then, replace the securing screws for the control switch and replace the cover.

## Filtering device for dryer

*Tenants just moved into my rental unit. They have an electric dryer, but there are no vent holes in the wall and it's almost impossible to put one in where they want the dryer. They say a friend bought a filtering device that keeps the humidity out of the house. Would you know anything about this device and does it do what is claimed?—Gerard Charette, Biddeford, Me.*

I know of no device that can be put on a dryer that will remove all the moisture released during the drying cycle and prevent it from getting into the house. On an average, the amount of moisture released into



For clothes dryers that can't be vented externally, Deflect-O's water-filled trap exhausts lint-free air into room.

the air from one load of clothes is between one pint and one quart, depending on the amount of moisture that has been extracted by the washer. The only real way to prevent moisture buildup in the house is to vent the dryer outside.

There are two products available at appliance parts stores or large hardware outlets to trap dryer lint. These devices attach to exhaust duct tubing when it is impractical to vent the dryer outside.

The makers, Deflect-O Corp., 7035 East 86 St., Box 50057, Indianapolis, Ind. 46250, and Rapro/P.G. Ascco Corp., 1903 Polymer Drive West, Chattanooga, Tenn. 37421, suggest you open a window or door to avoid excessive moisture. **PM**

*If you have a problem with any appliance, send your question, along with the model and serial numbers, to Appliance Clinic, Popular Mechanics, 224 West 57th St., New York, N.Y. 10019. Sorry, but letters cannot be answered individually. Problems of wide interest will be discussed in this column.*





# Get in on the PROFITS in SMALL ENGINE service and repair

## Start your own money



**BEAT INFLATION!**

Cash in on the huge demand for small engine repair.

Work part time, full time right at home - we help you every step of the way.

## making business!

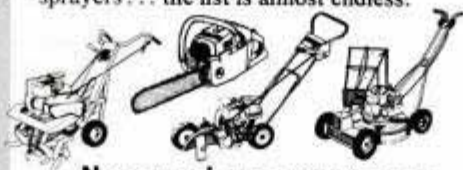
In just a short time, you can be ready to join one of the fastest growing industries in America... an industry where qualified men are making from \$25.00 to \$30.00 per hour... and that's just for labor. Parts, engines and accessories add even more to the profits.



Because the small engine industry has grown so quickly, an acute shortage of qualified Small Engine Professionals exists throughout the country. In fact, it's not unusual for a good small engine man to be three to four weeks behind in the summer and at least a week behind in the winter. When you see how many small engines are in use today, it's easy to understand why qualified men command such high prices — as much as \$49.95 for a simple tune-up that takes less than an hour!

**65-million small engines are in service today!**

That's right — there are over sixty-five million 2-cycle and 4-cycle small engines in service across the U.S.A. That's the official count from the Engine Service Assn., and new engines are being built at a rate of one-million per month! With fully accredited and approved Foley-Belsaw training, you can soon have the skill and knowledge to make top money servicing these engines. Home-owners and businessmen will seek you out and pay you well to service and repair their lawnmowers, tillers, edgers, power rakes, garden tractors, chain saws, mini-bikes, go-carts, snowmobiles, generators, snowblowers, paint sprayers... the list is almost endless.



**No experience necessary.**

You don't need to be a 'born mechanic' or have prior experience. If you can read, you can master this profitable trade right at home, in your sparetime, without missing a single paycheck. Lessons are fully illustrated — so clear you can't go wrong.

**You receive trade secrets and business plans.**

We guide you every step of the way, including tested and proven instructions on how to get business, what to charge, how to get free advertising, where to get supplies wholesale... all the "tricks of the trade"... all the inside facts you need to assure success right from the start.

**Increased Income**

"I've had about 8 years experience repairing small engines... but repairs were only minor... until I started the Foley-Belsaw Course."



Walter H. Strick Campbell, California

With our famous 'learn-by-doing' training method, you get practical 'hands-on' experience with specialized tools and equipment that you'll receive with your training *plus* a brand-new 4 HP engine — all yours to keep!

**SEND FOR FREE FACTS!**

You risk nothing by accepting this offer to find out how Foley-Belsaw training can give you the skills you need to increase your income in a high-profit, recession-proof business of your own.

Just fill in and mail coupon below (or send postcard) to receive full information and details by return mail. **DO IT TODAY!**

**You get all this Professional equipment with your course, PLUS 4 H.P. Engine... ALL YOURS TO KEEP... All at NO EXTRA COST.**



**Send TODAY for this fact-filled FREE BOOKLET!**



Tells how you quickly train to be your own boss in a profitable Sparetime or Fulltime business of your own **PLUS** complete details on our **30-Day NO RISK Trial Offer!**



**FOLEY-BELSAW INSTITUTE of SMALL ENGINE REPAIR**  
50626 Field Bldg., Kansas City, MO. 64111

**There is NO OBLIGATION and NO SALESMAN Will Call—ever!**

**FOLEY-BELSAW INSTITUTE, 50626 FIELD BUILDING KANSAS CITY, MISSOURI 64111**



**YES**, please send me the FREE booklet that gives full details about starting my own business in Small Engine Repair. I understand there is no obligation and that no salesman will call.

Name \_\_\_\_\_

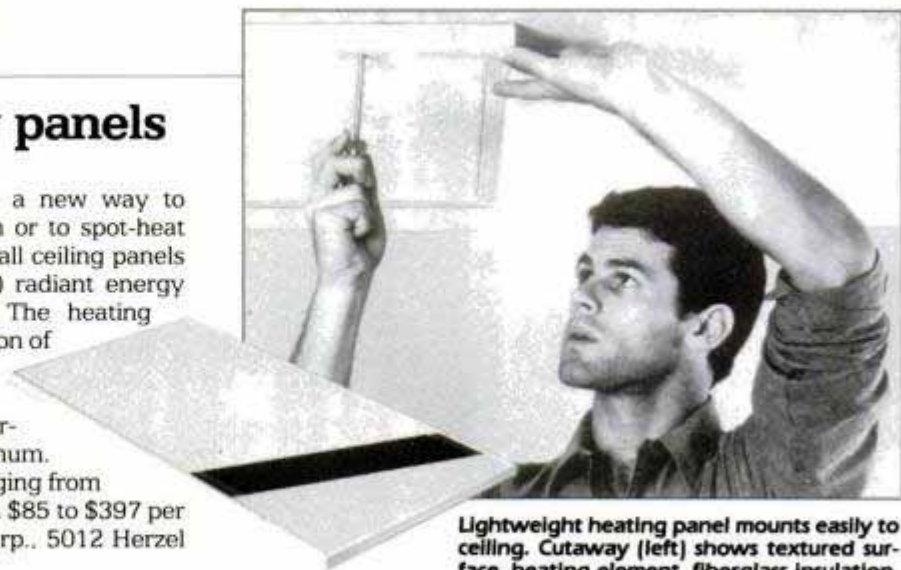
Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

## Radiant-heat ceiling panels

Energy-Kote radiant heating panels are a new way to supplement your present heating system or to spot-heat small, uninsulated areas. The easy-to-install ceiling panels convert electricity into infrared (thermal) radiant energy without costly plumbing or ductwork. The heating element consists of a micro-thin composition of lamellar graphite and a copper conductor laminated between Mylar polyester film. The 1-in.-thick panel is backed with fiberglass insulation and is framed in aluminum. Available in standard voltages in sizes ranging from 2 × 2 ft. to 4 × 8 ft., the prices range from \$85 to \$397 per panel. For details, contact TVI Energy Corp., 5012 Herzel Pl., Beltsville, Md. 20705.



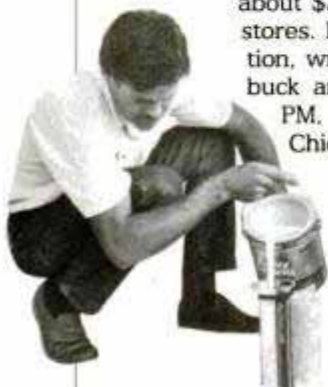
Lightweight heating panel mounts easily to ceiling. Cutaway (left) shows textured surface, heating element, fiberglass insulation.

## Rapid paint-rolling



Here's a way to roll paint without having to dip into the paint tray every few strokes. Sears offers the E-Z roller, (Model No. 11828) which has a built-in reservoir that holds up to 1/5 gallon of paint and feeds it automatically, via a transfer roller, to the 8-in. roller. All parts are washable and the handle has two locking positions for wall or ceiling application. The threaded handle accommodates an extension pole.

The roller is available for about \$20 at larger Sears stores. For more information, write to Sears, Roebuck and Co., Box 703-PM, Sears Tower, Chicago, Ill. 60684.



The reservoir in Sears' E-Z roller holds enough paint to cover an 8 × 10-ft. area.

## Easy-to-install alarm

AMF Paragon has developed an electronic alarm that sounds a piercing siren for intruders, or can be set to just chime for visitors. The battery-operated Door Guard (\$30) installs on a door or window frame without electrical wiring. A magnet positioned opposite the unit triggers the alarm when the magnetic field is broken. A personal three-digit code silences the alarm. It's available at hardware stores and home centers. Write AMF Paragon, 606 Parkway Blvd., Two Rivers, Wis. 54241.



## Toggle dimmer switch

Here's a new way to set mood lighting without using the standard rheostat dial-type switch. Intelectron's toggle dimmer switch slowly brightens lights as you raise the toggle from the off position. Available at hardware stores and home centers in standard single-pole (\$8) and three-way (\$9). It's from Intelectron, 1275 A St., Hayward, Calif. 94541. Include \$2 for postage.



## Lock-in-place pipe

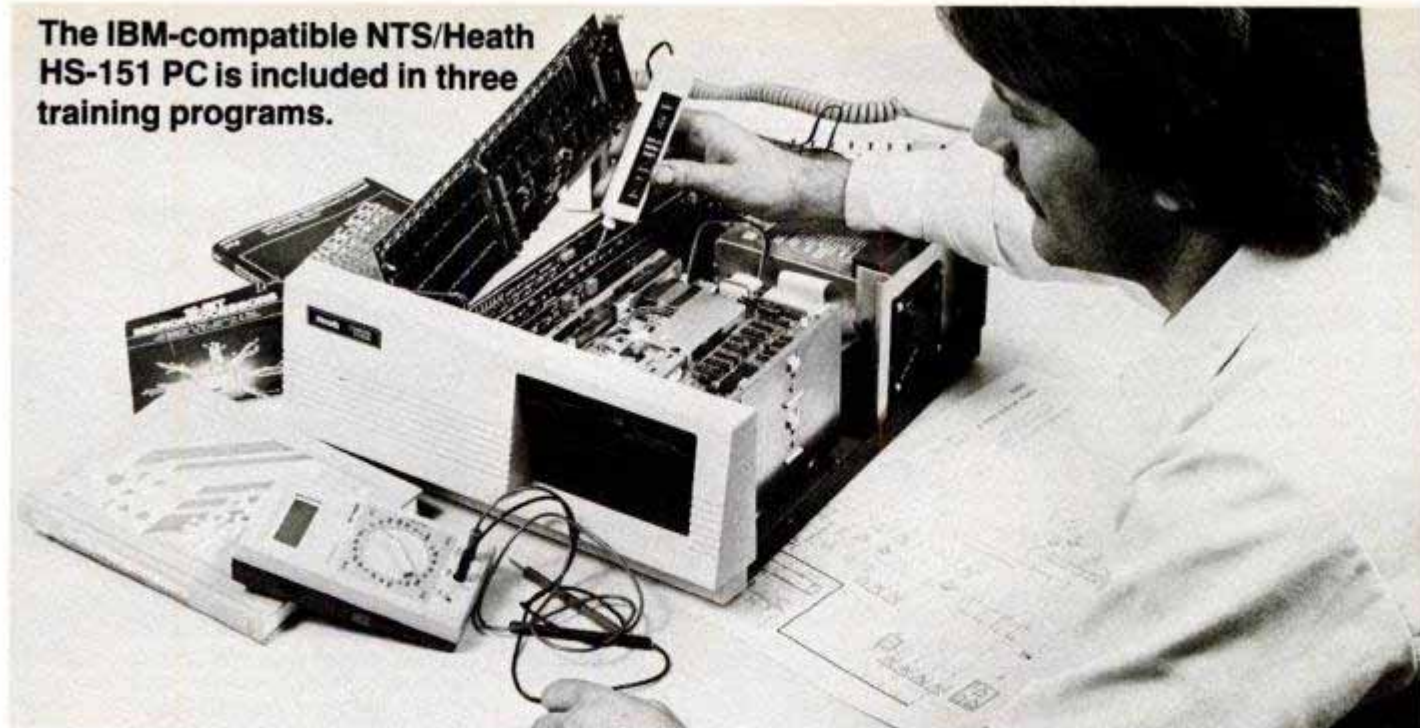
Flexible drain pipes have made do-it-yourself plumbing repairs easier. One example of these pipes is Chicago Specialty's Form-n-Fit flexible tubing system. The polypropylene tubing bends to accommodate offsets up to 4 in. and the accordion folds lock into place without kinking. Since the tube can be compressed or expanded, there's no need to cut to length. The tubing can stand up to hot water, chemical drain cleaners and any type of household cleaning chemical.



The tubing is available in a variety of shapes at hardware stores and home centers. Prices range from \$6.40 to \$8. For more information, write to Chicago Specialty, 7500 Gross Point Rd., Skokie, Ill. 60077.

PM

The IBM-compatible NTS/Heath HS-151 PC is included in three training programs.



# IF YOU WANT TO GET INTO PC SERVICING YOU HAVE TO GET INTO A MICROCOMPUTER

## Learn PC Servicing By Building Your Own NTS/HEATH HS-151 Desk-Top Computer

NTS Intronic home training gets you right down into the heart of computer circuitry. Learn how microprocessors function, how they operate and are used to solve problems. Your program includes a wide variety of tests and projects you perform as you build your own PC, circuit board by circuit board unit by unit.

## The NTS/HEATH 16-Bit HS-151

This remarkable desk-top PC is the most powerful and versatile ever offered in any home study course. Advanced features include:

- 128 KB RAM user memory, expandable to 640 KB. This power translates into high speed operation,

- Two video outputs provide connections for either a color or monochrome video display monitor.
- 16-Bit 8088 microprocessor runs most IBM and MS-DOS software.
- 4 open slots provide for expansion, will accept most peripheral boards designed for IBM PC.

Your NTS training course will teach you how to program on this powerful PC using lessons, texts and diagrams showing you how to make full use of its remarkable capabilities.



## NTS Offers Many Additional Courses in Electronics, and other fields:

**Robotics:** Build the NTS/Heath Hero 1 Robot as you learn robotic programming.

**Video Technology:** Build the NTS/Heath System 3 advanced Color TV as you learn circuit diagnostics.

**TV and Radio Servicing:** A specialized course featuring training in both analog and digital test equipment. Learn servicing of monochrome and color TV receivers.

NTS also offers courses in Auto Mechanics, Air Conditioning/Solar Heating, Home Appliances.

*If card is missing, write direct to the address below and specify the course in which you are interested. A FREE color catalog will be sent to you by return mail.*

**NTS NATIONAL TECHNICAL SCHOOLS**

TECHNICAL TRADE TRAINING SINCE 1905  
Resident and Home-Study Schools

4000 So. Figueroa St., Los Angeles, CA 90037

IBM is a Registered Trademark of International Business Machines Corp. MS is a Registered trademark of Microsoft Corp.

# WORKSHOP MINICOURSE



## Using a heat gun

Heat frequently is required for doing certain jobs around the home and shop and all too often the source used is an open-flame propane torch. This method does create some problems because the direct flame can prove too hot for many tasks, which could either harm the surface or create a real fire hazard.

The ideal alternative is to use a flameless heat gun. This useful tool delivers a concentrated flow of super-hot air in temperature ranges from 300° to 1,000° F., depending on the make and model. For standard applications, a flameless heat gun capable of delivering an air temperature of about 750° should be adequate.

Prices usually run between \$40 and \$80. The gun shown here, Gunlach's 500° to 750° F. model, sells for about \$75. It has an adjustable baffle on one side of the motor that controls the air flow and thus the intensity of the heat. Black & Decker offers a 730° to 833° F. model for about \$40 and a Sears 800° to 1,000° F. model goes for about \$70.

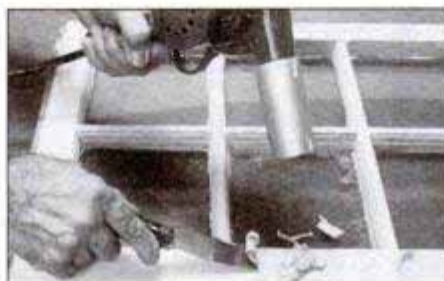
Worthwhile features to look for are self-standing capability and a three po-

sition—OFF, COOL, HOT—power switch. The COOL position is used before the gun is switched off to prolong heater element life. It is also used to cool off heated work surfaces.

Shown here are a few uses for this handy tool. Other practical applications include defrosting freezers, thawing frozen locks, accelerating the setting time of epoxy adhesives and resin auto body fillers, drying damp surfaces prior to painting or finishing, and welding sheet plastics.—Rosario Capotosto



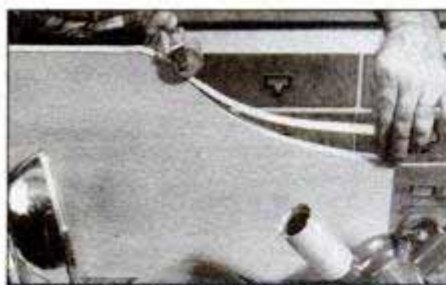
Acrylic plastic up to 1/4 in. thick can be bent using a heat gun. Choose metal tubing of proper diameter and direct heat at bend.



To remove old paint or varnish with a heat gun, aim nozzle at surface and hold in place until paint starts to blister. Then, scrape to bare wood using a stiff-blade scraper.



To remove hardened glazing putty, first soften with heat then peel off with putty knife. This prevents damage to wood caused by chipping out with a chisel.



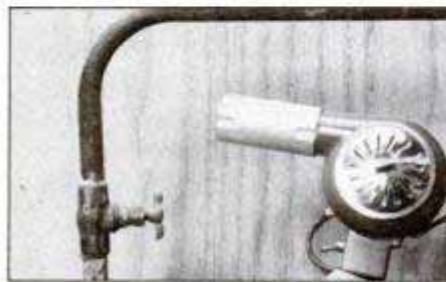
A clothing iron works well for applying veneer tape to straight plywood edges. But for curved edges, a heat gun works better. Just heat strip in place and roll onto edge.



To apply plastic laminate to a small radius curve, first glue the strip to the straight part of edge. Then apply heat to the area of the bend just before making the turn.



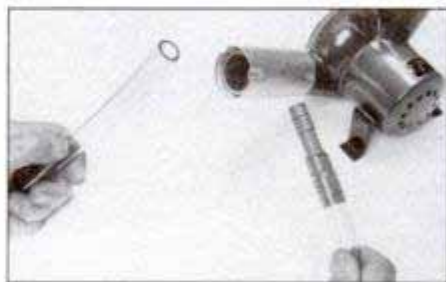
A damaged vinyl floor tile can be removed without harming surrounding tiles. Direct hot air at one corner until adhesive softens. Work putty knife under edge.



Heat gun easily thaws frozen copper plumbing pipes, but avoid aiming the nozzle directly at soldered joints. Prolonged exposure at close range could soften the solder.



If a piece of stranded nylon rope has come unraveled at one end, cut the loose strands back to a solid section. Then, heat with the gun until the nylon melts together.



To join thick-walled plastic tubing to a friction fitting, first soften tubing ends with gun. Dip fitting into soapy water—before inserting—to reduce friction between two.



# Dodge makes history with America's only 5 year/50,000 mile warranty for trucks.

## Announcing a major challenge to Ford and Chevy.

Think about this. A truck warranty just as tough, just as long-lasting as the one you'll find on every passenger car Chrysler builds. Five long years or 50,000 miles, whichever comes first. At no extra cost.\*

Nobody, you'd figure, would have the courage to put that kind of long-term guarantee behind a vehicle that takes the beating a truck does.

Nobody, except Dodge, America's fastest growing truck manufacturer. Our light truck

sales have increased a remarkable 133%, comparing the '84 model year to the '81 model year.

And for 1985, we're backing every truck we build with the same 5/50 warranty.

Every two- and four-wheel-drive pickup and Ramcharger. Every van, wagon, even our revolutionary Dodge Mini Ram Vans and Caravans. No exceptions... right up to our dual rear-wheel 10,100 lb. GVW Ram 350.

We're giving America engine and powertrain coverage that's more than twice as long as our competition. And long-term outer body rust-through protection they can't even come close to.

So Dodge issues the ultimate challenge. All truck companies talk tough. Ford. Chevy. The imports. But here's the difference:

At Dodge, we're not afraid to put our money where our mouth is.

\*Limited warranty on powertrain and outer body rust-through. Excludes imports, fleets & leases; deductible applies. Ask for details.

BUCKLE UP FOR SAFETY.

AMERICA'S BEST BACKED TRUCKS



DIVISION OF CHRYSLER CORPORATION

# DETROIT LISTENING POST



## 1986 Ford and Mercury preview

Shown here are the 1986 Mercury Sable sedan and Ford Taurus station wagon. Jack Telnack, Ford's chief design executive in North America, and several of his designers asked our opinion of the cars in a limited showing.

The Panther-series cars look like the Audi 5000S at first, but we agree with Telnack that the cars are in fact the next aerodynamic step in that design philosophy. Sable boasts an ultramodern six-seater interior of 118.4 cu. ft., with full electronic instrumentation in high-line models. Their flush glass, underbody smoothness and integrated front/rear polycarbonate bumpers help provide a slick 0.29 drag coefficient for Sable, 0.32 for stablemate Ford Taurus and a neat 0.34 for the Taurus wagon. The cars are fwd with four-wheel independent suspension. After a three-month production overlap, the Mercury Sable sedan and Ford Taurus sedan and wagon will replace the full-size Grand Marquis and LTD/Crown Victoria lines.

Mercury Sable will sub for Marquis.



Observed on the design house wall: sketches of the Sable SHO Program, suggesting a *stunning* high-performance (SHO = super-high-performance) version with specific graphics, front air dam, side skirts, rear spoiler, Goodyear P225/50VR16 rubber and a 3.0-liter dohc Six under a power-bulge hood. The sketch referred to a Yamaha engine, and offered "Marauder" and "Interceptor" as model names for the future Mercury and Ford hotrods.



Aerodynamic front-drive Sable/Taurus sedans (top) will replace big rwd Mercury and Ford. Taurus will come as a wagon, too.

## 1986 Delta 88

Spy photography is tricky business, especially when the weather is cold and rainy. Sometimes you get the bear—and sometimes the bear gets you.

This time we got the bear. I shot this picture of the '86 GM B-body virtually moments before we went to press, so information on it is only sketchy at present. Careful analysis discloses an Oldsmobile badge on the decklid, suggesting that we've caught the first picture anywhere of the Delta 88 replacement.

Immediately noticeable is that overall length is significantly shorter than

the '85 Delta 88 (inset), and the front end is slightly more aerodynamic. The greenhouse is greatly improved for better visibility all around. Height is shorter, though the car carries traditional Olds styling cues in the familiar doors and taller but clearly Oldsmobile taillight treatment. The front-drive platform is shared with the Buick LeSabre, but this two-door roofline is sportier than the four-door version.

The V8s will likely be supplanted by Sixes, with a diesel option.

Other current B-bodied cars are the Chevy Impala/Caprice, Pontiac Parisienne and the Buick LeSabre.

## New car guide

In 1985, buying a new car is more complicated than ever. Just taking into account motor car models built in the United States, there are about 290 vehicles from which to choose. Yes, many cars from one line may be merely badge-engineered versions of vehicles in a sister division's lineup, but the sheer impossibility of digesting a mountain of models, options, engine and transmission choices begs help.

Now, there's a bit of help. The Automotive Information Council has published a pamphlet called *New Car Buying Tips*, a pocket-sized, step-by-step guide. Send a stamped, self-addressed envelope to AIC New Car Buying Tips, 29200 Southfield Rd., Suite 111, Southfield, Mich. 48076.

## Ear to the ground

**Hyundai saddles up:** Hyundai Motor Corp. will have a principal office in Detroit when it begins importing up to 150,000 of its Korean minicars, perhaps as early as 1985. Hyundai currently sells the Pony in Canada.

**CAFE, anyone?** Ford will completely [Please turn to page 42](#)



Delta 88 is two-door version of '86 fwd B-car (Buick four-door shown in DLP, page 44, Dec. '84). Inset shows current model.



# OWN A MOVIE FOR LESS THAN THE PRICE OF A BLANK TAPE. JUST \$4.95 WITH MEMBERSHIP



In the CBS Video Club, there's no membership fee. And you don't have to buy a lot of movies.

Just two more within the next year. The

## 40 TOP HITS TO CHOOSE FROM

TITLE	SELECTION NUMBER
TOOTSIE*	1509042
SUPERMAN III*	6040092
WARGAMES*	0828002
NATIONAL LAMPOON'S VACATION*	6039022
STAR WARS*	0564162
DIRTY HARRY*	6017082
CADDYSHACK*	6023022
CASABLANCA	0507082
RISKY BUSINESS*	6033082
DUMBO*	5251052
THE WAY WE WERE*	1529002
ON GOLDEN POND	0523082
THE BIG CHILL*	1527022
THE MAGNIFICENT SEVEN*	0534212
YOU ONLY LIVE TWICE*	0710192
THE BLACK HOLE*	5283072
KRAMER VS. KRAMER*	1503182
KING KONG (ORIGINAL)	5502022
JANE FONDA'S WORKOUT CHALLENGE	5260042
OCTOPUSSY*	0856052
STAR 80*	6041082
NEVER SAY NEVER AGAIN*	6042072
TRON*	5263012
SPLASH*	5304022
THE LONGEST DAY*	0577032
STRIPES*	1513082
ROMANCING THE STONE*	0894092
THE AFRICAN QUEEN	0511022
PORKY'S*	0775112
FUNNY GIRL*	1511002
ALL THE RIGHT MOVES*	0881042
EDUCATING RITA*	1593012
STIR CRAZY*	1594002
NEVER CRY WOLF*	5305012
ADVENTURES OF ROBIN HOOD*	0526392
THE COMANCHEROS	0762242
TWO OF A KIND*	0877002
CHRISTINE*	1580062
THE MAN WHO LOVED WOMEN*	1624042
ROOSTER COGBURN	1018082

\* ALSO AVAILABLE ON CED DISC

movies you order will be mailed and billed at regular Club prices, which currently range from \$39.95 to \$79.95 for cassettes and \$19.95 to \$39.95 for discs—plus shipping and handling. Extra-long films and specials may cost a bit more.

Choose from the best too. *The Big Chill*, *Splash*, *Stir Crazy* and more.

### BONUS PLAN—SAVE 50%

After buying two movies at Club prices in the next year, you can cancel. Or stay with us and save even more under our current Bonus Plan. With each movie you buy, the plan currently allows you to help yourself to another movie of equal value or less at 50% off.

About every four weeks (up to 13 times a year) we send you our **CBS Video Club Program**, reviewing our Director's Selection plus many alternate movies.

### SHOP-BY-MAIL CONVENIENCE

If you want the Director's Selection, don't do a thing. It will arrive automatically. If you prefer an alternate title, or none at all, just return the card always provided by the date specified.

You'll have two full weeks to decide. And a toll-free number to call if you have any questions or service requests. (If you ever receive a tape that you had less than two weeks to consider, send it back at our expense.)

Join today and we'll send your movie for just \$4.95, along with details of how the Club works. If you're not satisfied, return everything within 10 days for a full, prompt refund—no further obligation. So clip the coupon now. It's a great deal.

For faster service, use your credit card and our toll-free number to order. **Call toll-free 1-800-457-0866** (in Indiana 1-800-742-1200). Or mail the coupon.

## Advance Bonus: SAVE UP TO \$50 MORE!

...by ordering a second movie right now. Any movie listed in this ad—yours for \$29.95 on videocassette, \$15.95 on disc. See coupon below.

## CBS VIDEO CLUB

1400 North Fruitridge Avenue, Terre Haute, Indiana 47811

**CBS VIDEO CLUB**  
Dept. 43X, P.O. Box 1111, Terre Haute, IN 47811

Yes, please enroll me in the CBS Video Club under the terms outlined in this advertisement. As a member, I need buy just two more movies within the next year.

Check one:  BETA  VHS  CED DISC

Send me movie # \_\_\_\_\_ for \$4.95.

My check is enclosed. Z54/Z56

Charge my introductory movie(s) and future Club purchases to: Z55/Z57

MasterCard  Diners Club

American Express  VISA

Account # \_\_\_\_\_

Expires \_\_\_\_\_

Signature \_\_\_\_\_

Also send movie # \_\_\_\_\_

as my Advance Bonus for \$ \_\_\_\_\_  
(\$29.95 or \$15.95 plus \$3.00 shipping and handling), which I'm adding to my payment above.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_

Note: CBS Video Club reserves the right to reject any application or cancel any membership. Offer limited to continental U.S. (excluding Alaska). Applicable sales tax added to all orders. CED Disc availability may become limited in the future.

## DETROIT LISTENING POST

(Continued from page 40)

restyle the EXP for '86 and revamp Escort/Lynx by 1988, according to Ford sources, to keep the cars viable sellers when Ford needs high-mileage credits in the future. Ford had planned to cancel EXP in 1986.

**Penske/Chevy/Indy:** Roger Penske, Chevrolet and England's Ilmor Engineering will design a brand new Indy 500 engine for use at the '86 race. The engine will be a 2.6-liter dohc V8. Chevy honcho Bob Burger said, "The project is an opportunity to test the transfer of high-performance technology to mainstream production engines." Also noted: Olds will provide a custom open-top Calais as pace car for the 69th Indy 500 this year.

**Stop, thief!** Chrysler sources say engine guys are working up a 160-hp turbo-Four police package for late-'86 debut in the Dodge 600 E-body. This prepares for the demise of the V8-powered M-body Gran Fury cop car.

**Jersey belts up:** The state of New Jersey joined New York State in enacting a mandatory seat belt usage law. New Jersey estimates a 70 percent compliance will save 9,100 lives a year.

**Does it fly?** Buick will assemble 1,000 special Golden Hawk LeSabres

for sale in Saudi Arabia. The car features a gold-plated luggage rack and "Golden Hawk" in Arabic on the flanks.

**2wd Cherokee:** AMC will sell at mid-'86 a two-wheel-drive Jeep Cherokee, primarily in the Sunbelt. Insiders say the unit will sell for as much as \$1,500 less than current 4wd models.

**Short drives:** The '85 Merkur XR4Ti is a lean, mean, cost-effective high-performance machine. At \$16,400 in the showroom and 31 mpg under hard use on the street, one could spend more money for less car.

We drove the '85 Chevy Celebrity Eurosport in station wagon trim, and found it quick, manageable and fun to drive. It's among the best-looking wagons made in Detroit.

The '85 Pontiac 6000 STE continues its assault on European touring-car buyers. New instrument graphics are obscured by the steering wheel, though, diminishing their utility.

**Book of the Month:** *IACOCCA. An Autobiography*, by Lee Iacocca with William Novak, 352 pages, \$17.95 (list), Bantam Books, 666 Fifth Ave., New York, N.Y. 10103. After the obligatory family and student history, Iacocca gets down to telling what made him—and ultimately Chrysler—the entities they are today. Chapter XI details his firing by Henry Ford. His remarks in the

"Straight Talk" chapters talk directly to the White House on how to make the nation as well off as Chrysler.

**Secondhand ponies:** California Highway Patrol's fleet of 5-liter Mustang pursuit cars has turned out to be quite a smart investment. Selling off cars that had been retired from service with 85,000 miles on the odometer, the CHPs netted an average return of \$4,520 on the original outlay of \$6,868. That's not all, though. The Mustang black and whites averaged 15 mpg in patrol service, 50 percent better than the large cruisers they replaced.

**Chill winds:** If you like the idea of Ford's high performance turbo Fours but can't warm up to an SVO Mustang, take a look at the new factory over-the-counter intercooler package. Developed by the SVO group, the air-to-air chiller will drop intake charge temperatures up to 125°F, and boost power output up to 10 percent. Kits exist for the T-Bird and Cougar, but we think it'll be most appreciated in the new Merkur. Order the Merkur kit from the SVO catalog under part No. M-6775-E231.

**Cray fishing:** Ford Motor Co. has followed GM's lead in acquiring a hyper-exotic Cray X-MP/11 super computer for use primarily in finite element analysis. The machine can perform 6 billion calculations per minute. **PM**



## PAY ONLY \$949.95 FOR THIS COMPLETE SATELLITE SYSTEM

BY DOING YOUR OWN INSTALLATION

THE WORLD'S FIRST COMPLETE SATELLITE  
SYSTEM MANUFACTURED FOR THE  
DO-IT-YOURSELFER

There is no need to pay hundreds of dollars more to have someone else install your satellite system when you can obtain professional results with the Valscot system. This satellite system is totally integrated and comes with simple, step-by-step instructions. The Valscot satellite system is not a kit, it is 100% complete, fully manufactured satellite system ready for you to install and enjoy after just a few hours hook-up time.

## TOP QUALITY, STATE OF THE ART SATELLITE SYSTEM

The Valscot satellite system includes the precision Ross 9 foot parabolic antenna (large enough to receive from all 17 U.S. satellites), the deluxe Ross receiver, a polarity control, and a high power, low noise, LNA. These components are manufactured and warranted for five years by Ross Electronics, Inc., a leading manufacturer in the satellite industry.

## STUDIO QUALITY PICTURES DIRECTLY FROM THE SATELLITES

Now you can have, right at your fingertips, all of the movies, sports, news, and music that other's have to pay for through cable subscription. All of that and much, much more; children's, adult, religious, ethnic, foreign and public programming. In all over 100 channels of more program variety than you have ever dreamed of.

## TUNE INTO THE FUTURE BY ORDERING YOUR VALSCOT SATELLITE SYSTEM NOW

You can join our list of satisfied customers by calling or mailing in your order, or send \$1.00 and receive our new brochure and catalog.

Call or mail all orders in to:



Valscot Enterprises

1-916-527-5960

P. O. Box O  
Red Bluff, CA 96080





**Start your own money making business!**

**Make up to \$26<sup>00</sup> an hour—  
even while learning!**

*Train FAST  
at home!*

*Get into this booming high-profit business that's  
Easy to learn—Easy to do—Easy on You!*

**Be  
Your  
Own  
Boss!**

Never before have money-making opportunities been so great for qualified Locksmiths. Now lucrative regular lock and key business has multiplied a thousandfold as millions seek more protection against zooming crime. Yet there's only one Locksmith for every 17,000 people!

**Start Collecting CASH PROFITS Right Away**

You're in "business" ready to earn \$10 to \$26.00 an hour a few days after you begin Foley-Belsaw's shortcut training. Take advantage of today's unprecedented opportunities in locksmithing for year-round EXTRA INCOME in spare time—or fulltime in a high-profit business of your own. Hundreds we've trained have done it. So can YOU! All tools plus professional Key Machine given you with course. These plus practice materials and equipment plus simple, illustrated lessons, plus expert supervision, plus business building guidance will enable you the KEEP THE MONEY COMING IN! Ideal for retirement—good jobs, too.

**SEND FOR EXCITING FACTS—No Obligation**

Discover what's in Locksmithing for you—how Foley-Belsaw's Master Locksmith-approved training can give you the skill you can depend on to EARN MORE—ENJOY LIFE MORE.

**No Extra Cost!** Included With Your Locksmith Training



**BURGLAR  
ALARM  
and SECURITY  
SYSTEMS**

training. Covers all phases of Burglar, Hold-Up and Fire Alarm servicing and installation. This valuable and timely instruction includes all special tools and supplies. ONLY Foley-Belsaw offers such extensive training in this rapidly expanding field as a part of your Locksmith training

**ADVANCED Locksmithing!**

How to change combinations, install and service Safe, Vault and Bank Safe-Deposit Box locks. You'll find it fascinating and highly profitable work.



# BE A LOCKSMITH!

**Hundreds of Foley-Belsaw trained men  
have succeeded in this fascinating  
and highly profitable field . . .**

*"Before enrolling I checked  
other courses and also asked  
for advice from several  
locksmiths in my area. They  
all said yours was tops  
and has the most  
versatile Key  
Machine.*

*"I always  
wanted to be in  
business for myself  
and now I am . . .  
thanks to  
Foley-Belsaw  
Institute.*

**David Fairbrother—Dave's Locksmith Service  
Milwaukee, Wisconsin 53209**



**30-DAY  
NO RISK  
TRIAL!**  
Send for  
details!

**THIS PRO KEY  
MACHINE IS  
YOURS TO KEEP!**

**FREE**

**Find out all about it! Send for FREE Facts TODAY!**

Just fill in and mail coupon below (or send postcard) to receive full information and details by return mail. **DO IT TODAY!**

*This Pro Key  
Machine can alone  
add up to \$200 a  
month to your income . . .  
and it won't cost you a penny  
extra with your training.*

**RUSH  
COUPON!**

**ALL SPECIAL TOOLS  
AND EQUIPMENT INCLUDED!**



**FOLEY-BELSAW INSTITUTE**  
10621 Field Bldg., Kansas City, Mo. 64111

**There is NO OBLIGATION and NO SALESMAN Will Call—ever!**

**RUSH COUPON TODAY  
FOR THIS FACT-FILLED**

**FREE  
BOOKLET!**

Tells how you quickly train to be your own boss in a profitable Sparetime or Fulltime business of your own PLUS complete details on our 30-Day NO RISK Trial Offer!



Send for your  
copy today!

**FOLEY-BELSAW INSTITUTE**  
10621 FIELD BUILDING  
KANSAS CITY, MISSOURI 64111



**YES**, please send me the FREE booklet that gives full details about starting my own business in Locksmithing. I understand there is no obligation and that no salesman will call.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_



*"I opened my own business, spare time, seven months after I enrolled and made a profit of \$329 for the first week."*  
**B. A. Deberry Littleton, Colorado**

*"No more hard, nasty work for me. Now I have my own business and with hardly any effort I average around \$50 a day. Thanks for my new start in life."*  
**Sam Walker Prichard, Alabama**



**... YOU Can Do It Too!**

# 30 Ways To Help You Qualify For A Job That Pays More Money!

## FREE CAREER FACTS ABOUT DIPLOMAS AND ASSOCIATE DEGREES

CAREER DIPLOMA High School	TWO-YEAR ASSOCIATE DEGREE Business Management	TWO-YEAR ASSOCIATE DEGREE Marketing Major	CAREER DIPLOMA Drafting	CAREER DIPLOMA Small Engine Repair	CAREER DIPLOMA Electronics Technician
CAREER DIPLOMA Bookkeeping	TWO-YEAR ASSOCIATE DEGREE Finance Major	TWO-YEAR ASSOCIATE DEGREE Accounting	CAREER DIPLOMA Air Conditioning & Refrigeration	CAREER DIPLOMA Veterinary Assistant	CAREER DIPLOMA Small Business Management
CAREER DIPLOMA Hotel/Restaurant Management	TWO-YEAR ASSOCIATE DEGREE Civil Engineering Technology	TWO-YEAR ASSOCIATE DEGREE Mechanical Engineering Technology	CAREER DIPLOMA Catering/Gourmet Cooking	CAREER DIPLOMA Diesel Mechanics	CAREER DIPLOMA Industrial Electronics Technician
CAREER DIPLOMA Basic Electronics	TWO-YEAR ASSOCIATE DEGREE Electrical Engineering Technology	TWO-YEAR ASSOCIATE DEGREE Electronics Technology	CAREER DIPLOMA Microcomputer Servicing Technician	CAREER DIPLOMA Electrician	CAREER DIPLOMA Gun Repair
CAREER DIPLOMA Microcomputer Repair	CAREER DIPLOMA Auto Mechanics	CAREER DIPLOMA Surveying & Mapping	CAREER DIPLOMA Wildlife/Forestry Conservation	CAREER DIPLOMA Art	CAREER DIPLOMA Computer Programming

Call toll-free or send for free facts and color brochure to find out what career training in the field of your choice might do for you—no obligation to buy anything now or ever. Now at home in your spare time, you can train for a money-making career... even get a 2 year degree if you want... to help you get a better job. Find out everything you need to know about any one of these 30 career programs—with no obligation to buy anything, now or ever, and no salesman will call you back. Just check the one program that interests you most. You will receive free facts, color brochure and information on employment opportunities in the field you choose. Call toll-free or mail the postage-paid reply card today and see how easy it is to train at home for a great new career or advancement on your present job.

### Open Book Exams... Adult Training

Your diploma or 2 year Associate degree is given to you for what you learn—not what you memorize. We send lessons and training material to your home. You decide when you are ready to take each "Open Book" exam. Then mail it to your instructor. Grades are returned to you with comments when needed to tell you how to correct your wrong answers. "Open Book" exams have proven so successful for adults, they are now used in many colleges. Our graduates tell us they like our method of independent study because it's so convenient and easy to do. You choose your own study hours in the privacy of your own home. You move ahead one step at a time, as fast or as slow as you want. And every Diploma or Associate Degree is fully accredited.

### An Ideal Way to Learn

You waste no time traveling to and from class. And you never have to miss a paycheck. Skilled instructors are ready to help you at any time.

You get the same high-quality training that ICS has been known for since 1891... the same kind of training program that's offered by giant companies to their employees... corporations like Union Carbide, International Paper, Bethlehem Steel, United States Steel, and hundreds more. And

note that if you wish, ICS will keep your employer informed of your progress if you feel it can help you toward a better job, or an increase in salary.

No one can promise success but if you want more security, more day-to-day satisfaction and more of a future, call toll-free or send for free facts and the color brochure of your choice. There is no obligation and no salesman will call you back.

### Could a Career Diploma Help You Earn \$25,000 to \$100,000 More in Your Lifetime?

Compare your present salary with the amount of money you could be making in any one of the careers listed here. Electricians average \$11.25 an hour, auto mechanics over \$8.00 an hour. And it's not only the money, but the fun of working in a job you like.

### Could a 2 Year Associate Degree Be Worth Thousands of Dollars to You?

A two-year degree that gives you an Associate in Specialized Business or in Specialized Technology could make a giant difference in your lifetime earnings compared to the average earnings of a high school graduate. Check the degree or career course you are most interested in and mail the postage-paid reply card today!



**CALL TOLL-FREE  
1-800-358-5858**

CALL ANYTIME—Operators to take your call  
24 hours a day, 7 days a week.

**OR MAIL POSTAGE-PAID CARD TODAY!**

Accredited Member  
National Home  
Study Council

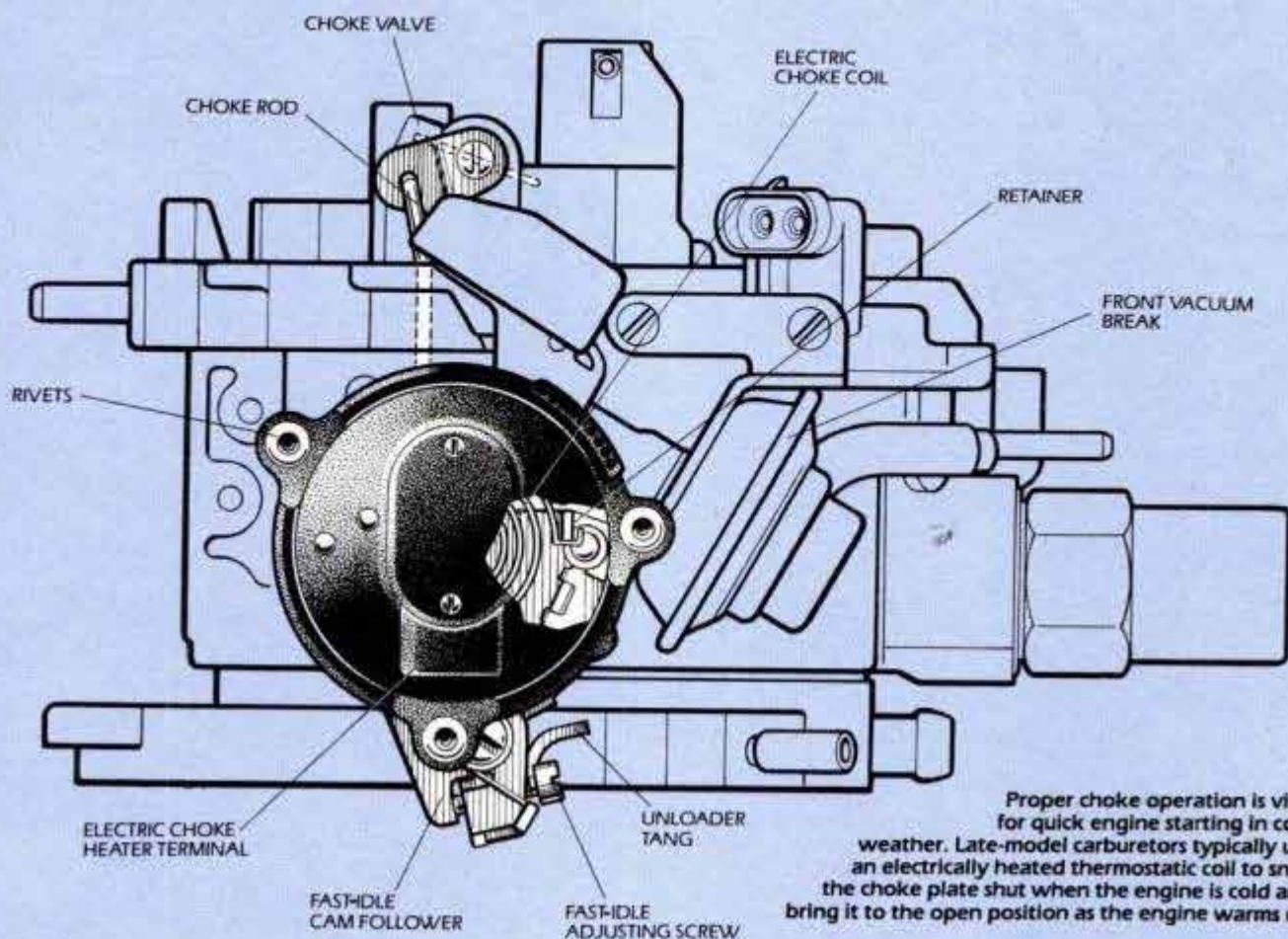


**No Obligation!  
No Salesman  
Will Call!**

**30 WAYS TO  
HELP YOU  
QUALIFY FOR  
A JOB THAT  
PAYS MORE  
MONEY!**

**MAIL  
POSTAGE-  
PAID REPLY  
CARD FOR  
FREE FACTS**

North American and International Correspondence Schools, Dept. PBS15  
Scranton, Pennsylvania 18515



Proper choke operation is vital for quick engine starting in cold weather. Late-model carburetors typically use an electrically heated thermostatic coil to snap the choke plate shut when the engine is cold and bring it to the open position as the engine warms up.

## HOW TO SOLVE COLD START PROBLEMS

BY PAUL STENQUIST; Illustrations by Fred Wolfe

**A**utomobiles and extreme cold don't go well together. As the temperature drops, the crankcase oil thickens, making the engine very hard to turn. The battery loses some of its energy. And the fuel puddles, rather than vaporizes.

Today's cars are equipped to overcome these difficulties, but only when everything is as it should be. The lubricant must be of the correct viscosity, the battery must be capable of holding a full charge, the engine must be in a good state of tune and the choke system (or fuel-injection control system) must be functioning properly.

But even if all these variables check

out okay, you might have trouble starting your car if you don't use the prescribed starting technique. Mechanics in cold weather cities tell us that the principal cause of cold-weather no-starts is driver error.

### Starting technique

If you don't use the proper cold-weather starting method on the first try, it will probably be too late on your second try because the battery quickly loses charge in low temperature and the plugs will be drenched with unvaporized gas. Most carbureted cars must be cold-started in the idle position after slowly pressing the accelerator to the

floor one, two or three times. Most fuel-injected cars are cold-started in the idle position without depressing the accelerator. But techniques vary for both types. Read your owner's manual.

If the correct starting technique won't fire the engine, you should look for the cause of the problem (rather than trying to alter your technique to compensate). Both cranking speed and cold-start adjustments are critical.

Cranking speed is affected by both battery charge and oil viscosity. If your oil is too thick, even a fully charged battery won't start your car. Most manufacturers now recommend 5W-30 motor oil for winter use. In some cases, a

10W-40 oil may be too heavy to allow adequate cranking speed. A straight 30- or 40-weight oil is definitely too heavy. Check your owner's manual for a specific cold weather recommendation. Many vehicle manufacturers list recommended engine oil on the basis of the coldest temperature expected.

A fully charged battery is essential when cold weather greatly increases the cranking system's burden. However, even a fully charged battery can't deliver voltage to the starter motor and ignition coil if an accumulation of crud has increased battery cable resistance.

A quick glance at your battery posts should tell you if corrosion is a problem. If the posts and terminals are covered with a powdery white or yellow substance, remove the terminals (negative first) and clean them and the battery with a small brush and a paste made from baking soda and water. If this treatment doesn't get them down to shiny metal, scrape the inside of the cable terminals and the outside of the battery posts with a small knife or a battery terminal cleaning brush. If the terminals are the type that bolt onto the cables, remove them and clean the connection area, or better yet, replace the cables with a set that have terminals molded to the ends of the cables.

### Hydrometer 'eye'

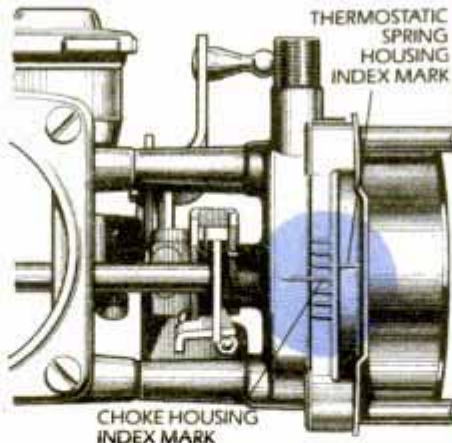
Check the charge level of most maintenance-free batteries by examining the hydrometer "eye." Normally, a dark eye means a drained battery, green is okay, clear or yellow indicates a defective battery.

For the battery to start your car, it must be able to produce at least 9.6 volts for 15 seconds while the engine is cranking (at a temperature of 70° F. or above). At zero to 18° below, it should produce about 8.5 volts, at 30° above zero, 9.1 volts.

Your battery will, of course, discharge if you crank your engine for 20 seconds or so in zero-degree weather. But it should be capable of providing enough juice for the 15-second first chance. If it won't, further battery/charging system troubleshooting and repair is called for.

If, on the other hand, the battery seems to take a charge and checks out okay with a hydrometer but the engine still cranks slowly, you may have starter motor or internal engine problems. Further diagnosis—checking starter amperage draw, or torque required to turn the engine—will be necessary.

If you discharged the battery by cranking the engine for a considerable time, you should remove it (negative



Choke closing tension can be adjusted by aligning the index marks to factory spec.

cable first), take it to a warm place and hook it up to a battery charger. Be careful when handling a battery. If you allow it to come in contact with your clothing, the acid will burn big holes in the fabric. Use old rags or a battery carrying strap to keep it well away from you. Discard any rags that have come into contact with the battery.

A 6- or 10-amp trickle charger will do a good job of charging batteries that have not been drained completely. A battery that still holds some charge may reach full charge in a few hours, but one that is almost fully discharged may require as much as 24 hours.

To determine when full charge has been reached, check a conventional battery with a hydrometer. To determine when a maintenance-free battery

is fully charged, check its hydrometer eye as described above. Some fully discharged maintenance-free batteries have to be charged for a long time with a high-amperage service station-type charger. Don't attempt to charge a maintenance-free battery that has a clear or yellow hydrometer eye.

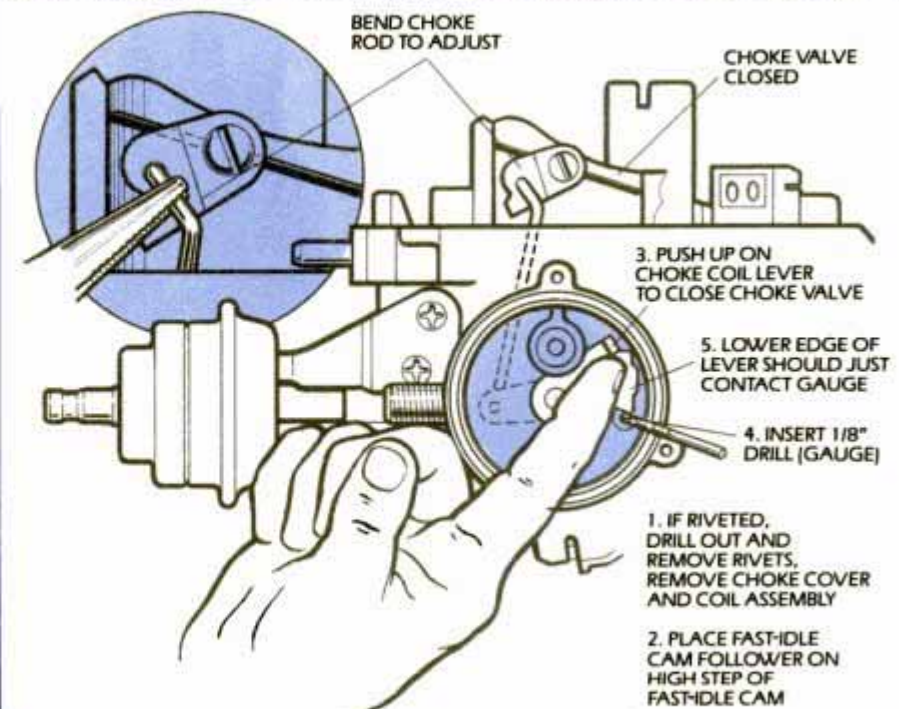
Jump-starting can also help to get you going in a pinch. But it's less effective than a recharge, as your battery will be left in a partly discharged condition if you don't drive the car for a few hours before shutting it off.

### Finding the cause

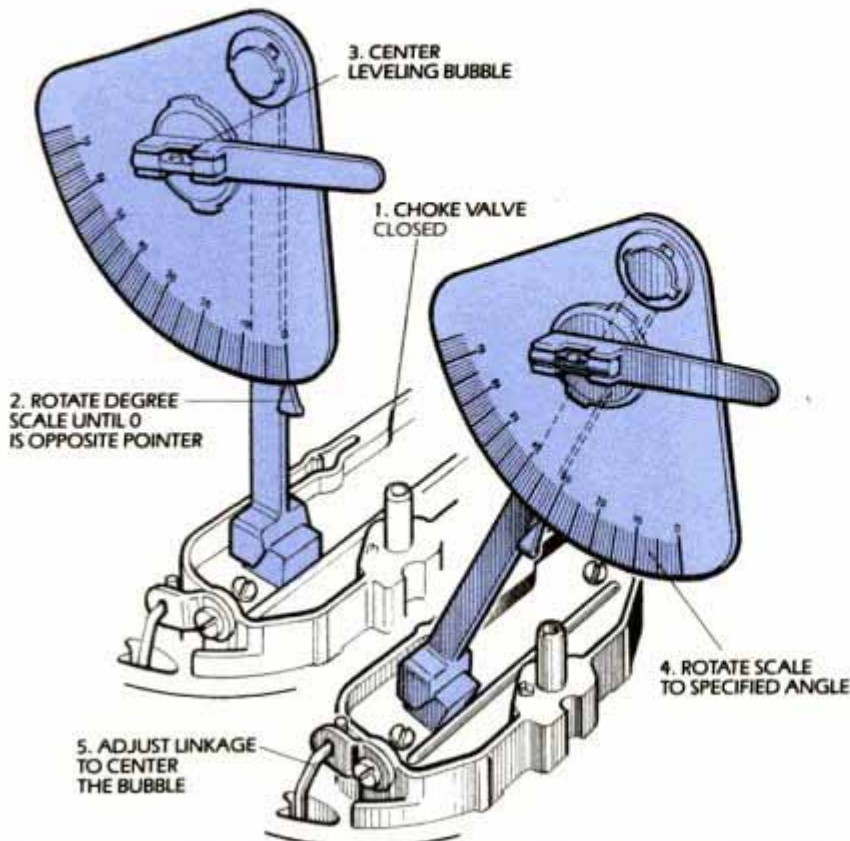
While your battery is recharging, you'll have to try to figure out why the car didn't start on your first attempt. If your engine cranked at an adequately fast pace and wouldn't fire in 15 seconds or so, you probably have a cold-start (choke) system malfunction, a tuneup-related problem (like spark-plugs, distributor cap, cables, filters) or a fuel line freeze-up.

Eliminate the possibility of fuel line freeze-up right away on carbureted cars. Remove your air cleaner or its top cover and climb up somewhere where you can see into the carb. Shine a flashlight directly into the carburetor barrels. Then hold the choke open (if it's already open you have a choke problem) and open the throttle.

You should see fuel squirt out of the accelerator pump nozzles when you open the throttle. If you don't, the fuel line is probably frozen. To thaw, let it sit



On carbs with fixed spring housings, the position of the choke valve lever must be gauged with a 1/8-in. drill. The setting is corrected by slightly bending linkage rod.



To adjust the vacuum break and fast-idle/choke relation angles on late-model GM carbs, use a choke-valve angle gauge as shown above. Auto parts stores carry the gauge.

for half a day or so in a warm place.

You can probably avoid fuel line freeze-up by using a fuel deicer. However, if your tank contains a lot of water (the cause of fuel line freeze), you may have to have it drained.

### Choke adjustment

While you're checking to see if fuel is available, pay attention to the operation of the choke plate or valve. Once you've determined that the accelerator pump nozzles squirt fuel, release the choke plate while holding the throttle open. The choke should snap to a closed or nearly closed position.

If it doesn't move smartly into position, the choke linkage may be jammed with crud and corrosion. Try cleaning the external linkage parts with carb cleaner and a small solvent brush.

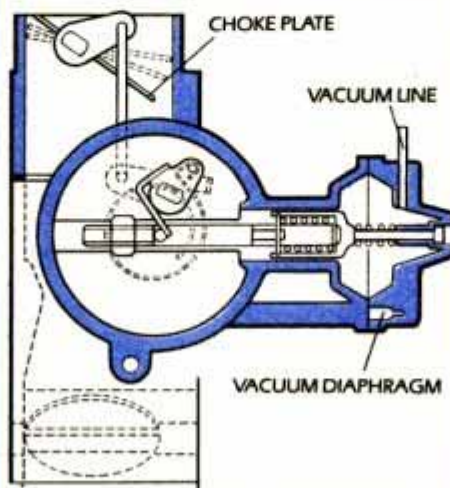
If the choke valve won't snap closed after cleaning the linkage, the malfunction must be corrected. It could be a simple misadjustment, but it's also possible that the thermostatic coil, which closes and opens the choke valve on most cars, is worn out.

On most cars the thermostatic coil is inside a housing attached to the side of the carburetor (see lead illustration). On early model cars, the housing is secured by three screws, but on late models it's held by rivets in order to

prevent tampering. To tamper (which you are allowed to do if you have to fix your choke), simply drill out the rivets. When reinstalling the housing, use self-tapping screws to retain it. These, with their special washers, can be purchased at an auto parts store.

The thermostatic coil within the housing holds the choke plate closed when the engine is cold. As the engine warms, the coil is heated and tension is released. Heat is usually provided by exhaust, an electric heater or both.

On some GM and Chrysler products



Holley-type carbs use a vacuum break to open the choke slightly after car's startup.

the thermostatic coil is located in a heat stove that mounts on the manifold and is connected to the choke plate with a linkage rod.

On cars with a carb-mounted thermostatic coil, choke adjustment usually is accomplished by turning the housing until a specified mark aligns with a pointer on the carb. However, on most late-model GM cars, the cover is installed in a specific position. Adjustment is accomplished by gauging the position of the choke valve lever with a drill bit or plug gauge. The adjustment is corrected by bending a linkage rod until the lever is in the correct position.

On most cars with intake manifold-mounted thermostatic coils, adjustment is made by bending the rod that joins the well to the choke plate lever.

In either case, a service manual is required. You'll find directions and specifications for most models in professional editions of general repair manuals. These books are available in most libraries. Of course, the complete factory service manual for your vehicle is the best source of information. It's available through your dealer's parts department. No serious Saturday Mechanic should be without the factory service manual for his or her car.

While a correct choke adjustment alone may be enough to get it started, the vehicle won't operate properly when cold if you don't make the other choke system adjustments. On most cars, these include choke vacuum break adjustment, fast-idle setting and a fast-idle/choke relation adjustment.

To complete some of these adjustments on 1978 and later GM cars, you'll need a choke valve angle gauge. This is available at auto parts stores.

For most procedures, the gauge is mounted on the choke plate by means of its magnetic base. The choke plate is then closed, and the tool's scale is rotated until 0 is opposite the gauge's pointer. The bubble level on the gauge is then adjusted until the bubble is centered. The scale is rotated to the angle specified for the particular procedure, after linkage rods or other components have been positioned according to the instructions. Check the position of the bubble. If it's off-center, an adjustment must be made. For most carbs, this is accomplished by bending a linkage rod.

Many cars equipped with Holley-type carburetors use a vacuum break device to open the choke slightly after startup. If this is incorrectly set, there will be an over-rich condition while the car warms up, and driveability will suffer. On Ford products, the adjust-

ment is checked by gauging the amount the choke opens when vacuum is applied to the diaphragm, and it can be reset to the shop manual specification with an adjustment screw on the diaphragm. Cars using remote-mounted vacuum breaks generally require slight bending of an adjustment rod to bring the choke plate angle back to spec.

Resetting the fast-idle speed is also required when any choke adjustment has been changed. On most carburetors, the fast-idle screw rests on a stepped fast-idle cam. Position the screw on the proper step as called for in the shop manual. Turn the screw left or right as required to match the rpm level called for by the maker.

### Other problems

If you found that choke and choke-system adjustments were okay, the cause of the cold no-start has not been determined. Although internal damage or other serious problems could be the cause, it may be the engine is simply in need of normal maintenance.

Check the sparkplugs. If the electrodes have eroded or have been fouled, the voltage available under cold-cranking conditions may not be enough to fire them. Clean and gap them if slightly worn or replace them.

If the plugs are wet with fuel, you probably flooded the engine trying to start it. This may be the case if your choke was misadjusted or stuck open. Dry the plugs completely. You'll have to get them into a warm place or spray them with plug cleaning solvent. Then, gap and reinstall them.

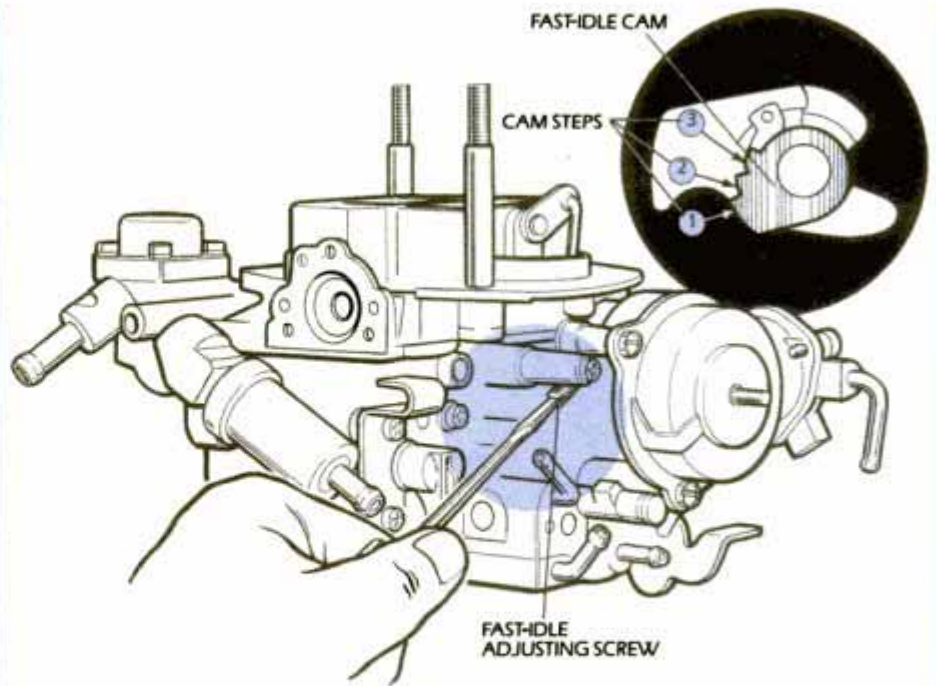
Other problems that might contribute to a no-start include a bad distributor cap, leaking ignition cables or coil tower, a defective coil and other types of ignition failure.

Check the January '85 *Saturday Mechanic* (page 65) on electronic ignition maintenance and diagnosis for more on ignition problems.

### Fuel-injected cars

Most late-model, fuel-injected cars have a cold-start system that is integrated with the engine's electronic control system. If cold no-start is a problem, the self-diagnostic trouble codes have to be checked in the vehicle service manual.

Some manufacturers provide additional checklists that should be consulted when a problem is evident but no trouble code has been set. For example, on cars with TBI, GM specifies 15 different items that should be checked when hard starting is experienced and



The fast-idle speed must be rechecked after any choke adjustment. Set the fast-idle screw on the proper step of the fast-idle cam, as is called for in the service manual.

no trouble codes are set. These include checking the fuel pump relay, throttle-position sensor, coolant-temperature sensor and fuel pump check valve.

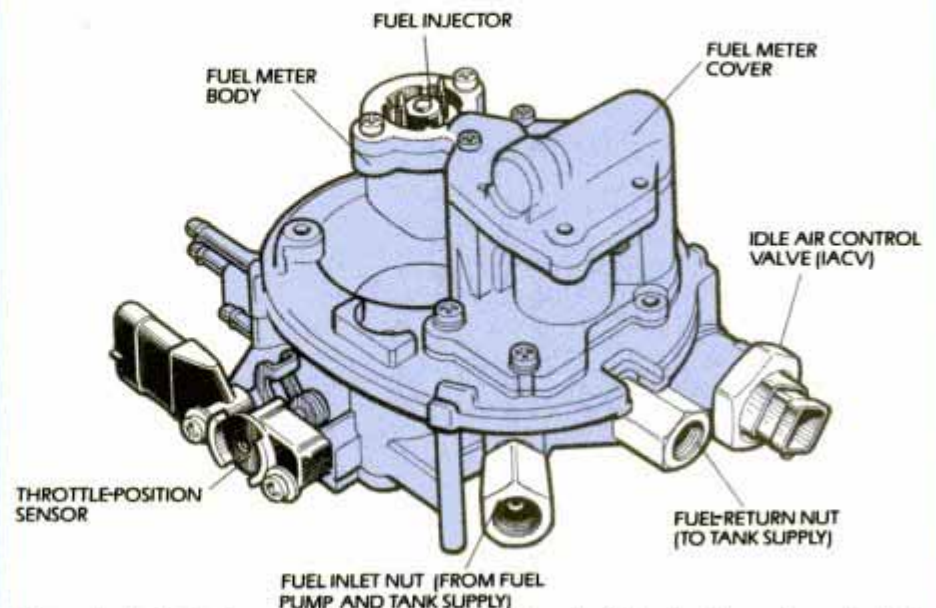
Imported cars equipped with Bosch L-Jetronic and K-Jetronic fuel injection systems have cold-start valves that provide extra fuel for initial startup. If this valve doesn't function properly, you won't be able to start the engine when the temperature drops.

In general, K-Jetronic cold-start valves are tested by removing the valve, holding it over a container and attaching a current supply to the valve

to see if it sprays. (Obviously, this can be dangerous. Don't attempt this test without a factory service manual.)

L-Jetronic cold-start valves are usually tested by hooking a special fuel system pressure gauge into the fuel-supply line. The valve is then activated, and the technician watches to see if pressure drops at the prescribed rate.

Of course, the cold-start valve isn't the only Bosch injection component that can cause a cold no-start problem. Fourteen items are listed as possible causes. A service manual is needed for most Bosch injection problems. **PM**



Electronic fuel-injection systems have no conventional choke, but they do use built-in electronic controls to provide a richer mixture for cold-weather starting.

# INFLATION TURNS SEAMLESS SPRAY INTO AMAZING PART-TIME MONEYSMAKER

## Good for \$25,000 a year and more...much more!

When George Singleton made \$4,154.65 on one order for Seamless Spray, he said it seemed like a miracle... making such Big Money with so little effort. But that's the remarkable track record of our SEAMLESS SPRAY... the process that makes old roofs like new again.

One new man after another has enjoyed the same BIG SELL thrill when they introduced Seamless Spray and closed sizable orders on the first call.

Like Joe Kimpel, a former welder, who was making \$1,000 a month. His first 5 weeks with Pace paid him \$2,799.69.

Bob Kronner, 55-year old former steel salesman, made one call, got his first Seamless Spray order, and made \$1,429.43.

How can this happen so easily for men with no experience in our business? It's all very logical.

If you've talked to a roofer lately, you know the incredible charges for putting on new roofs. For industrial buildings, shopping centers, motels, hospitals, schools, etc., prices have gone sky-high. With our process, we bypass the roof contractor. The commercial building owner uses our Seamless Spray to apply Pace Roof Renewal Sealant right over the old roof. The cost is so low, the proven results so satisfactory for such well-known firms like General Motors, American Airlines, Holiday Inns and hundreds more, there is virtually no sales resistance.

Pace ships Seamless Spray equipment on Free Loan. Your customer pays only for the Sealant. His own men apply it. It's as simple as that.

The field-tested sales kit we furnish you gives you all the know-how you need to get into this BIG SELL immediately. There's no waiting, no training needed. You don't waste your time on small, penny-ante business.

## YOU CONCENTRATE ON BIG SALES—BIG EARNINGS

That's how part-timer Jim Deveau earned a weekly check for \$2,760. (We think he'll go full-time now!) How Dave Lute, with 2 sales in 2 days, made over \$1,500. And how rookie Bob Shelhorn parlayed several roofs for one company into a \$1,433.78 paycheck!

And that's on just *one* of the inflation-beating Pace Products that keep you selling big on every call. Along with Seamless Spray, you'll make big sales and see big



**THIS BIG ROOF RENEWAL PAID GEORGE SINGLETON \$4,154.65**

profits with PARK-KING Blacktop Sealer, Liquid Metallic Siding, Concrete Plus and all our other 1-coaters that fill maintenance needs wherever you go.

**SEE HOW JUST 1 SALE A WEEK IS GOOD FOR \$25,000 A YEAR... AND MORE. ALL FACTS FREE WITH NO OBLIGATION**

Just mail this coupon. I'll mail you the impressive facts about Seamless Spray and all the rest of our amazing part-time moneymakers. You're under no obligation. No one will call on you. Everything comes to you by mail. Put this coupon in the mail today so you'll lose no time getting into this BIG SELL!

**INTERNATIONAL INQUIRIES INVITED!** We sell Pace in more than 60 countries. Interested in joining our successful team? Tell us about your business background. Pace Products, International, 112th & College Blvd., P.O. Box 12081, Overland Park, Kansas 66212 TWX 910/749/6628 Pace Intl.



Mike McIntosh, Vice President  
PACE PRODUCTS, INC., Dept. PM-285  
Quality Plaza, 112th & College Blvd.  
P.O. Box 10925, Overland Park, Ks. 66210

PLEASE RUSH BY MAIL all facts about Pace SEAMLESS SPRAY, the amazing part-time money maker that's good for \$25,000 a year ... and more. No obligation.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

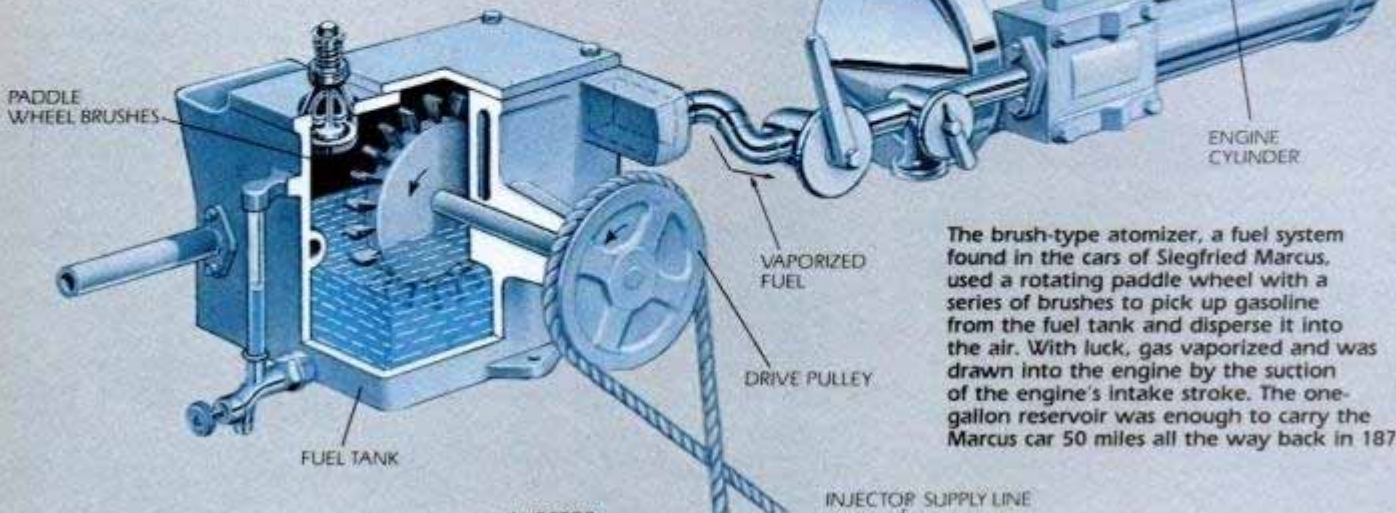
# FUEL SYSTEMS

## A CENTURY OF PROGRESS

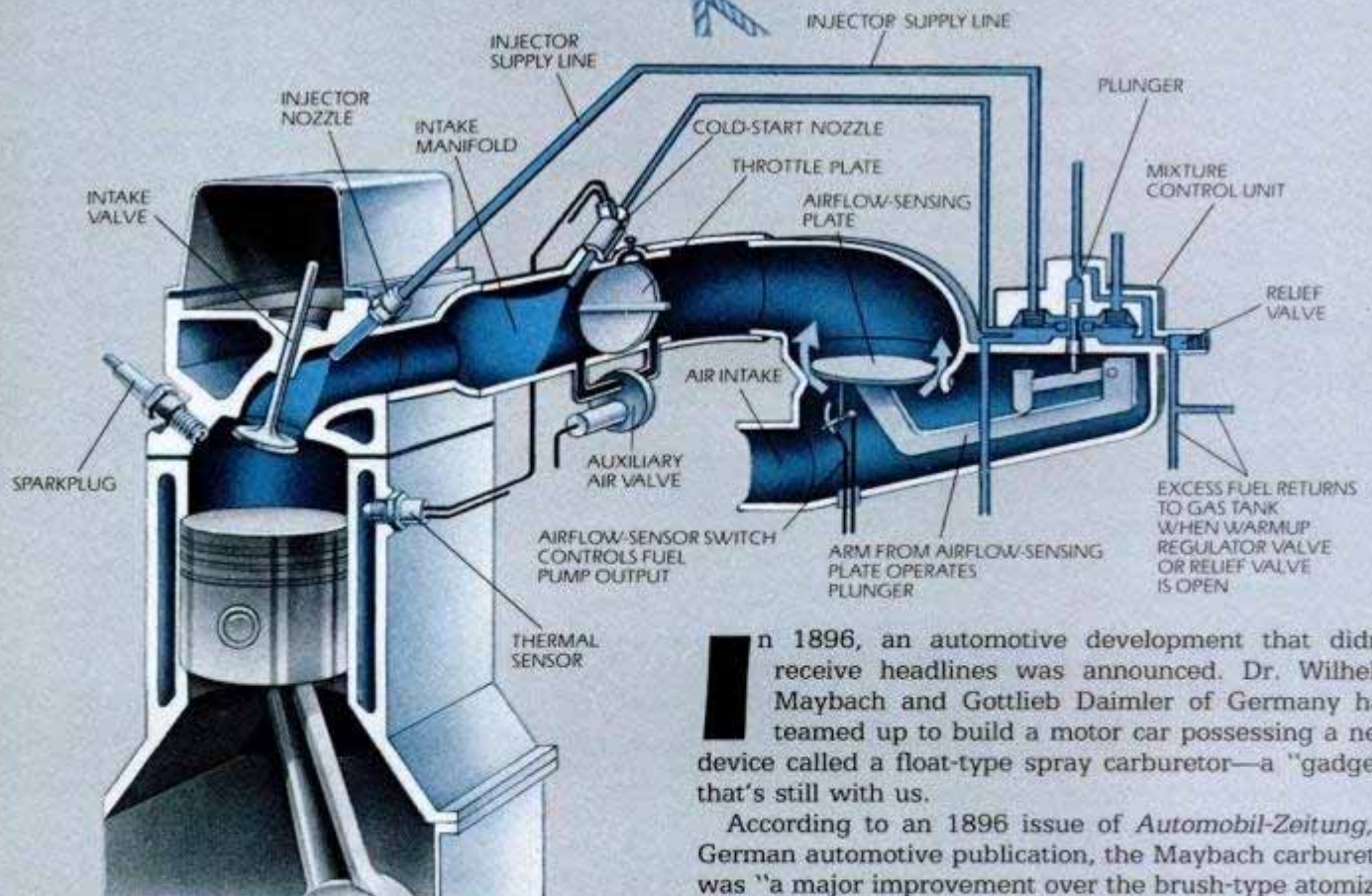
100  
YEARS

The trick is to vaporize gasoline efficiently.

BY MORT SCHULTZ; Illustrations by Pat Ruggero



The brush-type atomizer, a fuel system found in the cars of Siegfried Marcus, used a rotating paddle wheel with a series of brushes to pick up gasoline from the fuel tank and disperse it into the air. With luck, gas vaporized and was drawn into the engine by the suction of the engine's intake stroke. The one-gallon reservoir was enough to carry the Marcus car 50 miles all the way back in 1875.



The Bosch K-Jetronic fuel injection system is a straightforward continuous port injection setup. Mass of incoming air is read by airflow-sensing plate, which takes into account air temperature and density, eliminating complex electronic controls. The plate's movement signals the mixture control unit plunger, which in turn portions out the fuel that will enter the injector supply lines. The choke portion of a standard carburetor is replaced by a solenoid-controlled cold-start nozzle.

In 1896, an automotive development that didn't receive headlines was announced. Dr. Wilhelm Maybach and Gottlieb Daimler of Germany had teamed up to build a motor car possessing a new device called a float-type spray carburetor—a "gadget" that's still with us.

According to an 1896 issue of *Automobil-Zeitung*, a German automotive publication, the Maybach carburetor was "a major improvement over the brush-type atomizer and the wick carburetor."

The atomizer was the carburetion device used on the first motor car equipped with a gasoline engine, built by Siegfried Marcus in 1875. Between Marcus and Maybach, Dr. F.W. Lanchester, a British automotive pioneer, built motor cars that used wick carburetors.

The rotary-brush atomizer used by Marcus was an

[\(Please turn to page 56\)](#)



Many people live and die and never know how much power is locked deep inside their brains. **THEY'RE LOSERS. YOU CAN BE A WINNER.**

# How Much Do You Know About Subliminal Stimulation?

**Read This Notice and You'll See How It Can Change Your Life.**

Take fifteen seconds to read and answer three questions:

- 1.** Why do 95 of 100 people who diet and finally get their weight down ultimately put most of the weight back on?
- 2.** Why can't most people remember names and phone numbers? Their brains have plenty of capacity.
- 3.** Why do people who should be self-confident in business and sex lose confidence for no good reason?



## Subliminal Problem-Solvers Can Stay With You Longer—and You Can "Replenish" Them

Fat people think of themselves as fat. Those with poor memories think no one can remember a thousand phone numbers. Individuals without self-confidence give up instead of improving.

Some folks spend many hundreds of dollars undergoing hypnosis to solve the problems they don't (and can't) have the willpower to handle. Hypnosis alone is short range. Soon most of these people slip back.

That's where *Subliminal Stimulation* has challenged the established opinions of prominent psychologists.

Can *Subliminal Stimulation* re-direct hunger pangs so they actually disappear? Many who once were skeptical say it can.

Can *Subliminal Stimulation* give you superior mental strength and powers? Ask those who have tried it.

Can *Subliminal Stimulation* add sexual confidence that shows up in performance? Many satisfied husbands and wives say it can.

## What It Is and How It Works

Scientists only now are beginning to understand and appreciate the power of the human mind.

Through advanced electronics, we can embed messages in the pleasant sound of ocean waves. Your conscious mind probably can't hear them, but your *subconscious* does. You don't have to sit and listen, or even pay particular attention.

The messages are locked in your brain. Your own mind obeys its own commands. You gain confidence because you tell yourself you're confident. You lose weight because your brain says you don't want to eat.

You *quickly* can train your mind so you'll fall asleep quicker and deeper; be more assertive; unleash more mental energy; worry less; and solve personal problems (see list of cassette topics, below).

It's fun, it's harmless, it's the *new* way to learn

without work. You'll be among the first to benefit from *Subliminal Stimulation*—the self-help technique of tomorrow.

## Subliminal Messages on Cassettes—Play Them, Loan Them to a Friend, Use Them Over and Over Again to Refresh and Rebuild Mental Strength

This is a completely natural learning technique. No one but you is involved, although couples often play them together. You don't have to learn anything special, do anything special... just play the tapes; your own brain does it all.

- Each beneficial message is embedded within the pleasant sound of ocean waves—a soothing background to whatever you may be doing. Go about your regular activities. You'll "hear" the message even without realizing it.
- These are standard audio cassettes. Play them at home, in your car, anywhere.
- No surprises. The introduction on each tape lets you know the exact wording of the subliminal messages.
- On the reverse side of each tape is a separate, audible hypnotic session. Play this relaxing "reinforcement" tape as you go to sleep at night.

## READ THIS ABSOLUTE MONEY-BACK GUARANTEE

Keep and use any tapes for two full months. If at any time during this trial period you decide you don't want them or they aren't working for you, send them back and we'll refund every cent you paid. We'll even add \$2 to pay for shipping them back to us. This guarantee is absolute, and it's here in writing as proof: the tapes will help add to your peace of mind and personal happiness or we don't want your money.

RUSH the *Subliminal Stimulation* cassettes checked below, at the special introductory price of \$11.95 each. I also get one FREE cassette for each three I buy, so if I have indicated four, I pay for only three; if I have indicated eight, I pay for only six.

- |                              |                                    |                               |  |
|------------------------------|------------------------------------|-------------------------------|--|
| <input type="checkbox"/> 102 | <b>MEMORY IMPROVEMENT</b>          | <input type="checkbox"/> 106  | <b>UNLIMITED MENTAL POWER</b>          |
| <input type="checkbox"/> 104 | <b>PINPOINT CONCENTRATION</b>      | <input type="checkbox"/> 316  | <b>SELF-ESTEEM:</b>                    |
| <input type="checkbox"/> 303 | <b>DYNAMIC SELF-CONFIDENCE:</b>    | <input type="checkbox"/> 203  | <b>Feel Good About Yourself!</b>       |
|                              | <b>Overcoming Shyness</b>          | <input type="checkbox"/> 309  | <b>STOP SMOKING</b>                    |
| <input type="checkbox"/> 202 | <b>WEIGHT LOSS</b>                 | <input type="checkbox"/> 105  | <b>MAGNETIC PERSONALITY</b>            |
| <input type="checkbox"/> 318 | <b>INCREASE PERSONAL POWER</b>     | <input type="checkbox"/> 507  | <b>BETTER STUDY AND EXAMS</b>          |
| <input type="checkbox"/> 101 | <b>READ FASTER</b>                 | <input type="checkbox"/> 304  | <b>PROSPERITY: Financial Success</b>   |
| <input type="checkbox"/> 214 | <b>ENJOYING EXERCISE</b>           | <input type="checkbox"/> 320  | <b>DECISIVENESS:</b>                   |
|                              | <b>Have Fun Getting In Shape</b>   | <input type="checkbox"/> 206  | <b>Stop Procrastinating!</b>           |
| <input type="checkbox"/> 310 | <b>STRESS RELIEF</b>               | <input type="checkbox"/> 208  | <b>WINNING SELF-IMAGE</b>              |
| <input type="checkbox"/> 502 | <b>SUPER SALES POWER</b>           | <input type="checkbox"/> 306  | <b>RESTFUL SLEEP: No More Insomnia</b> |
| <input type="checkbox"/> 509 | <b>STOP WASTING TIME</b>           | <input type="checkbox"/> 301  | <b>SLIM THINKING</b>                   |
| <input type="checkbox"/> 508 | <b>SUCCESS NOW! Get Ahead Fast</b> | <input type="checkbox"/> 602  | <b>FREE YOURSELF FROM WORRY</b>        |
| <input type="checkbox"/> 211 | <b>HEALTHY EATING:</b>             | <input type="checkbox"/> 315  | <b>HIGH-ENERGY &amp; ENTHUSIASM</b>    |
|                              | <b>Staying Off Junk Foods</b>      | <input type="checkbox"/> 302  | <b>RUNNING: More Endurance,</b>        |
| <input type="checkbox"/> 317 | <b>SELF-ASSERTIVENESS</b>          | <input type="checkbox"/> 411  | <b>More Enjoyment!</b>                 |
| <input type="checkbox"/> 402 | <b>IMPROVING RELATIONSHIPS</b>     | <input type="checkbox"/> 401  | <b>THINK POSITIVE!</b>                 |
|                              |                                    | <input type="checkbox"/> 9001 | <b>CREATIVE PROBLEM SOLVING</b>        |
|                              |                                    |                               | <b>MORE ENJOYMENT IN SEX</b>           |
|                              |                                    |                               | <b>ATTRACT LOVE/Make Contact</b>       |
|                              |                                    |                               | <b>PANASONIC SLIMLINE</b>              |
|                              |                                    |                               | <b>CASSETTE RECORDER \$39.95</b>       |

**SAVE!**

## SPECIAL INTRODUCTORY OFFER (Order Before March 12, 1985)

- \$5.00 off every cassette  
Regular price ... \$16.95 each  
Limited offer ... \$11.95 each
- **FREE BONUS TAPES!**  
For each three you buy at the special low price order a fourth tape and get it **ABSOLUTELY FREE!**

**Don't Waste One More Day!**  
**Pick The Subliminal Tapes You Want**  
(You can't lose with our Money-Back Guarantee) and order by toll-free phone:  
**1-800-227-3800, extension 1146**  
or use the coupon below.

**If You Have a VISA Or MasterCard**  
Call right now for immediate shipment. Operators are on duty 24 hours a day:  
**1-800-227-3800, extension 1146**  
... or indicate which *Subliminal Stimulation* cassettes you want, each with our absolute two-month Guarantee, and mail the Coupon with payment or credit card information.

*Subliminal Stimulation* Cassette Tapes are available direct from **Advanced Learning Systems, Inc., 7236-D Owensmouth Ave., Dept. PM11, Canoga Park, CA 91303** ©1984 Advanced Learning Systems, Inc.

Hurry! The regular price of each cassette tape is \$16.95. You save \$5.00 each—your special price is \$11.95—if you order before March 12, 1985.

**SUBTOTAL** \_\_\_\_\_

California residents add 6½% sales tax \_\_\_\_\_

POSTAGE & HANDLING (Any size order) 2.00 \_\_\_\_\_

Outside USA—add \$1.00 per item (US Funds) \_\_\_\_\_

Cash  Check  Money Order **TOTAL** \_\_\_\_\_

VISA  MasterCard Exp. Date \_\_\_\_\_

Card Number \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

Mail to:  
**ADVANCED LEARNING SYSTEMS, INC.**  
7236-D Owensmouth Ave., Dept. PM11  
Canoga Park, CA 91303

# THE MAN

Pete Barrett. Journalist. Charter boat captain. Senior editor of *The Fisherman* magazine. Author of books and films on blue water game fishing.

"I love fishing 'em all. Marlin, mako shark, sailfish. From the Atlantic's offshore canyons to the Florida Keys."

For his work, Pete relies on an unsinkable center console rig. And the uncompromising power of a sea-going legend. Mercury.<sup>®</sup>



# THE MERC

Pete heads out for blue water with twin Black Max® V-6's behind him. Engines like Mercury's new 175, with the industry's leading corrosion

protection built in. "I run my Mercs in saltwater year-round, and corrosion isn't a problem.

"These engines have a great power range. They're economical. But most important, they're dependable. It's a big ocean out there."

Small wonder why, when Pete Barrett heads a hundred miles offshore, he doesn't take chances. He takes his Mercs.

**PUT THE LEGEND BEHIND YOU**

**MERCURY  
OUTBOARDS**



**MERCURY**

# NOW RE-SIDE YOUR HOME FOR **LESS** THAN **PAINING!**



How much would it cost to have your home painted? And then in just a few years, you'd need to do it again. For less than this you can install your own siding with a Home Kit from Aluminum Industries (America's leading mail order siding company.)

Yes, you save as much as  $\frac{2}{3}$  the average cost of installed siding. And it's so easy—if you can drive a nail and cut on a straight line you can do it.

We send you a complete kit of vinyl, aluminum or steel siding—your choice of 22 colors—everything you need, right down to the nails and tools.

Easy-pay with an FHA Home Improvement Loan or our own interest-free \$7.00 a week plan.

### Make Big Money, Too

Once you've done your own home you're automatically qualified to be an Aluminum Industries dealer. When friends and neighbors admire your home and learn of the money you saved, just sign them up, making up to \$1,000 per order . . . even more if you install for them.

Send for exciting money-saving, money-making details without obligation. Mail coupon today. Easier yet, call toll-free 1-800-521-1234 right now.

**MAIL THIS  
COUPON**

or call 1-800-521-1234

ALUMINUM INDUSTRIES OF ARKANSAS, Dept. PM-25  
300 Phillips Rd., North Little Rock, AR 72117

Yes, rush me full details. No obligation, no salesman will call.

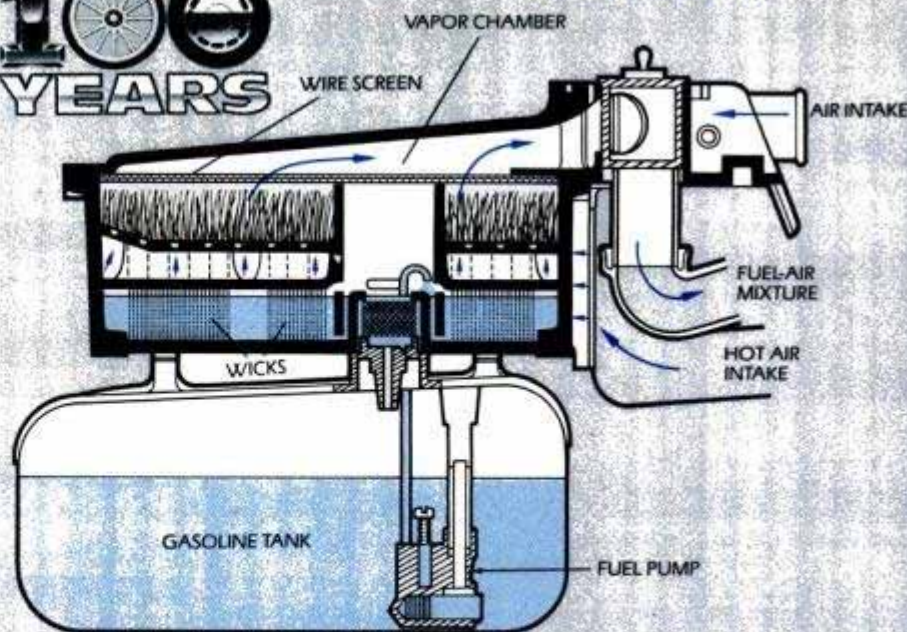
Print Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**100  
YEARS**

**FUEL SYSTEMS** (Continued from page 52)



In the F.W. Lanchester carburetor design, fuel from the tank is soaked up by wicks and carried to the engine by preheated intake air after passing through screen filter.

integrated fuel reservoir and feed unit. As the pulley-driven brush revolved, it picked gas out of the reservoir and threw it into the air. The suction effect created by the pistons drew the mixture into the engine.

Lanchester's wick carburetor improved on the atomizer. It consisted of several compartments. The bottom compartment held fuel. Wicks extending from a compartment above became saturated with fuel.

Getting vapors given off by the wicks to mix with air was achieved by drawing air into the compartment above the fuel storage area. The fuel/air vapors then flowed to the engine, passing first through wire mesh that served to filter out impurities. This was the world's first carburetor fuel filter.

**T**here's a fact about filtration you may find interesting. Until refining methods were improved (about 1910), cars came equipped with swatches of chamois. These were used by car owners to filter impurities from gas before pouring it into the fuel tank. Before drive-in stations, gas was sold by hardware and drug stores.

Maybach's float-type carburetor was, in retrospect, an invention of revolutionary proportions. Its survival for this many years tends to prove this. You probably know how it works: Gas from a fuel supply tank flows by gravity into the carburetor's float chamber or bowl. As gas fills the bowl, it causes a float (Maybach used a float made of sheet metal) to rise. When the float reaches a certain height, it forces a needle valve to close, which halts the flow of fuel to the engine.

The float allowed Maybach to attain a consistent flow of fuel to the engine. Unlike the atomizer and wick carburetors, the float carburetor lessened the tendency of engines to flood.

Maybach's carburetor possessed a second chamber called the mixing chamber. It was there that gas from the float chamber mixed with air. The mixture was drawn up into the engine as pistons dropping in the cylinders created a vacuum.

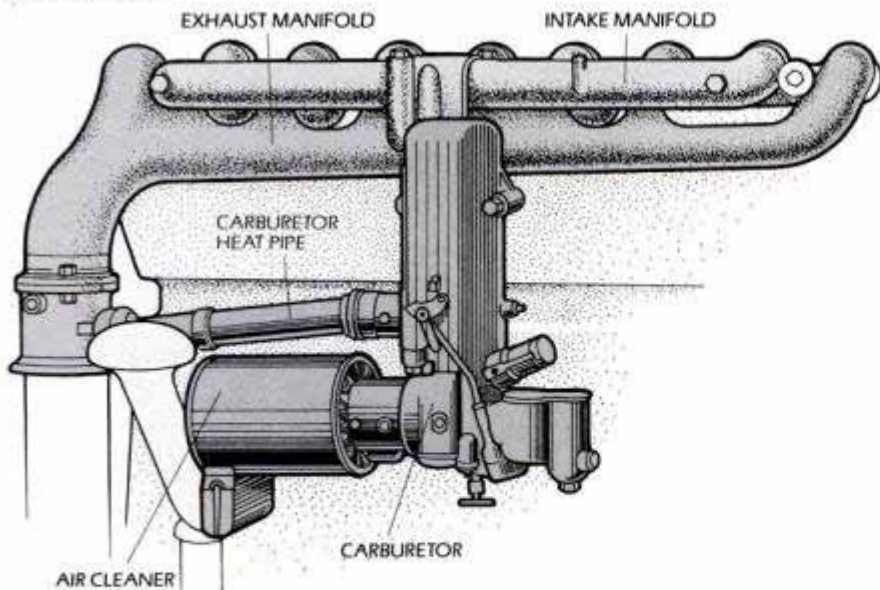
Note that the fuel mixture was drawn up into the engine. The Maybach carburetor was an updraft unit, an approach to carburetion that lasted until the late 1920s, when the first cam-operated mechanical fuel pump was invented. This invention permitted automakers to move fuel tanks to the rear of their cars and place carburetors high on the engine.

**B**etween the gravity-feed system and the advent of cam-operated fuel pumps, fuel was pushed from a rear-mounted tank to the carburetor by air pressure. This required large vacuum reservoirs between fuel tanks and carburetors. It's interesting to note what the 1928 edition of *The Modern Gasoline Automobile* had to say about a disadvantage of this system:

"The air pressure pump system often gives trouble, requiring a hand air pump near the driver in order to return to the garage."

Automakers had to put hand pumps in cars. When the automatic air pump system failed—which it often did—a driver would use the hand pump to feed fuel to the engine.

As we said, the Maybach float carbu-



Buick cars of the late 1920s got improved fuel vaporization and economy by using exhaust heat to warm the intake charge. The heat riser valve was driver-controlled.

retor was first used in a car built by Maybach and Daimler. This was before Daimler and Karl Benz joined forces to form the company that now builds Mercedes-Benz automobiles. Do you wonder why the cars are called Mercedes-Benz and not Daimler-Benz? When Daimler and Maybach were associated, they were financed by Emil Jellenik. In 1903, Daimler and Maybach manufactured a new car that they named after Jellenik's daughter, Mercedes. The Mercedes name went with Daimler when he joined Benz.

As automaking took off, so did road building and development of more powerful engines operated at varying speeds. Fuel-on-demand became a critical factor that the original Maybach design couldn't fulfill. Refinements came hot and heavy.

One of the earliest was through the efforts of two men—Butler of Great Britain and Venturi of Italy. They didn't know one another. In fact, they lived 100 years apart.

In the 1790s, Venturi discovered that by reducing the bore of a pipe, he was able to increase the velocity of fluid and get it to break (atomize) into smaller particles. Around 1900, Butler applied the Venturi principle to a float-type carburetor. He narrowed its throat (or venturi, as we call it now). Doing this allowed greater protection against engine flooding.

Improvements to the Maybach design between 1900 and the late 1920s led to the jet-compensated carburetor, which is still with us. This unit uses jet circuits, air bleeds, vacuum-operated economizer valves

and throttle-operated metering rods to attain the correct fuel/air ratios for various speeds and loads.

Other significant fuel-system developments were:

- The first dash-mounted gas gauge by Studebaker in 1914.
- The first carburetor air cleaner, introduced on the 1915 Packard Twin Six. The 1922 Rickenbacker used the first dry-type air cleaner.
- The first thermostatic automatic choke, which was introduced on the 1932 Oldsmobile. The design has remained basically the same to this day.
- The first four-barrel carburetor—by Buick in 1941.

**B**ack in 1910, Adams Farwell of Dubuque, Iowa, pioneered a noncarbureted fuel system called fuel injection, refined and adopted for diesel engines. But it wasn't until after World War II that thought was given to putting it on spark-ignited gasoline engines.

In 1949, *Automotive Digest* said, "Some automotive men feel that fuel injection for passenger automobiles is nearing the climax in experimentation and may soon make its bow to the driving public." What happened? Nothing—the carburetor remained king for another 35 years.

But as smaller engines and greater fuel mileage have become issues, fuel injection is, like so many other automotive inventions, an old development whose time has finally come. By 1986, practically all gasoline engines will have electronically operated fuel-injection systems instead of carburetors. Bye-bye, old friend—it's been fun. **PM**

**If it's worth starting, it's worth finishing with Minwax.**

In one easy step, Wood Finish by Minwax stains *and* seals. It penetrates deep into fibers to become an integral, breathing part of the wood, not just a surface film.

For extra durability, top with a coat of Polyurethane, Antique Oil or any protective finish by Minwax.

Discover the difference Minwax quality makes. Send for our *free* 22-page booklet, *Tips on Wood Finishing*. Minwax Co., Inc., Dept. PM25, Box 995, Clifton, NJ 07014.

**MINWAX**

America's favorite wood finish for 80 years.

\* Minwax is a registered trademark. © 1983 Minwax Company. All rights reserved.

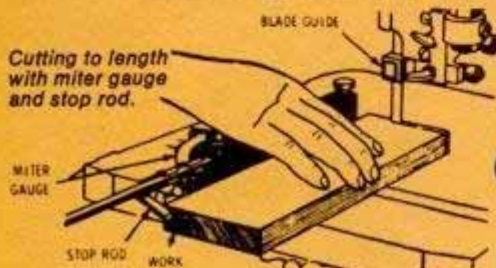
**Now you can build just about anything-  
with this superb 4-volume handyman's library**

**NEW!  
REVISED  
UPDATED  
EDITION**

Take this 4-volume

# CARPENTERS AND BUILDERS LIBRARY

**FOR ONLY \$39.95** Regular price \$39.95  
as your welcome to Popular Science Book Club



**FREE when you join**



As a new member of Popular Science Book Club, you get this handy shop tool FREE.

## How Popular Science Book Club Works

Just mail the attached postpaid card to get your \$39.95 4-VOLUME CARPENTERS AND BUILDERS LIBRARY. Send no money now. We'll bill you later for only \$3.95 plus delivery and handling.

Then, about every four weeks (14 times a year), you'll receive a Club bulletin describing the coming main selection and alternate books also available. In addition, up to 4 times a year, you may receive selected mailings on seasonal and annual products of special interest to the membership—many at giant bargains! If you want the main selection only, do nothing. It will be sent automatically. If you don't want the main selection, or want alternate books, or no books, simply indicate your wishes on the Instruction Form that comes with the bulletin and return it to us by the date shown. You will always have at least 10 days in which to do this, but in the unlikely event that you don't, and you receive an unwanted selection, you may return it at our expense.

After receiving your joining shipment, your only obligation is to buy just two more regular selections or alternates at regular Club prices in the next year. After that, membership may be cancelled at any time, by either you or the Club.

Club books are comparable in every way to the original publishers' editions, yet you may save up to 50% and sometimes more on many special bargains offered each year in the Club. To become eligible for these bargains, mail the card today!

AS A MEMBER OF POPULAR SCIENCE BOOK CLUB, you get to choose from hundreds of brand new, hard-to-find home handyman books every year. (Your only obligation is to buy just two of them!) You'll be offered valuable, money-saving books on all of your favorite do-it-yourself subjects: Home Repair & Improvement, Home Workshops, Basic & Advanced Woodworking, House Building, Remodeling, Insulation, Wiring, Plumbing, Masonry, Electronics, Appliance Repair, Car Repair, Furniture Building, Solar, Energy Savers, and much more. It's always your choice and there are many bargains to choose from!

Start off right now with the new revised edition of the 4-VOLUME CARPENTERS AND BUILDERS LIBRARY for just \$3.95. (Regular price: \$39.95!) Every page in this information-packed set brings you professional, easy-to-understand how-to you can really use *now!* Just look it up and see exactly how to do it yourself and do it right. Everything is spelled out clearly, easily, step by step!

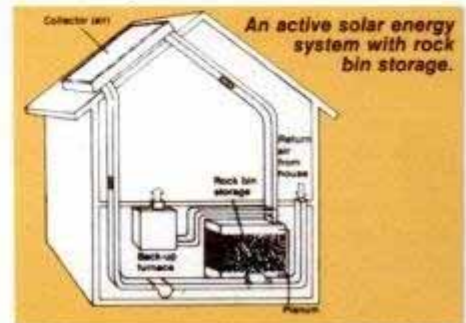
- ★ You get a complete how-to book on woods and woodworking tools, how to do all types of joinery and cabinetmaking techniques, how to do kitchen cabinet construction... *and more.*
- ★ You get a complete how-to book on all standard specs of every element in house construction, including how to read plans and make your own... how to lay out a home workshop... *and more.*
- ★ You get a complete how-to book on laying out the foundation, how to do concrete block construction, house framing, chimneys, fireplaces, porches, patios, insulation... *and more.*
- ★ You get a complete how-to book on every aspect of roofing, flooring, doors, windows, stairs, plus how to use stationary and portable power tools, plus tips on painting, maintenance, repairs, termite protection, solar energy systems... *and more.*



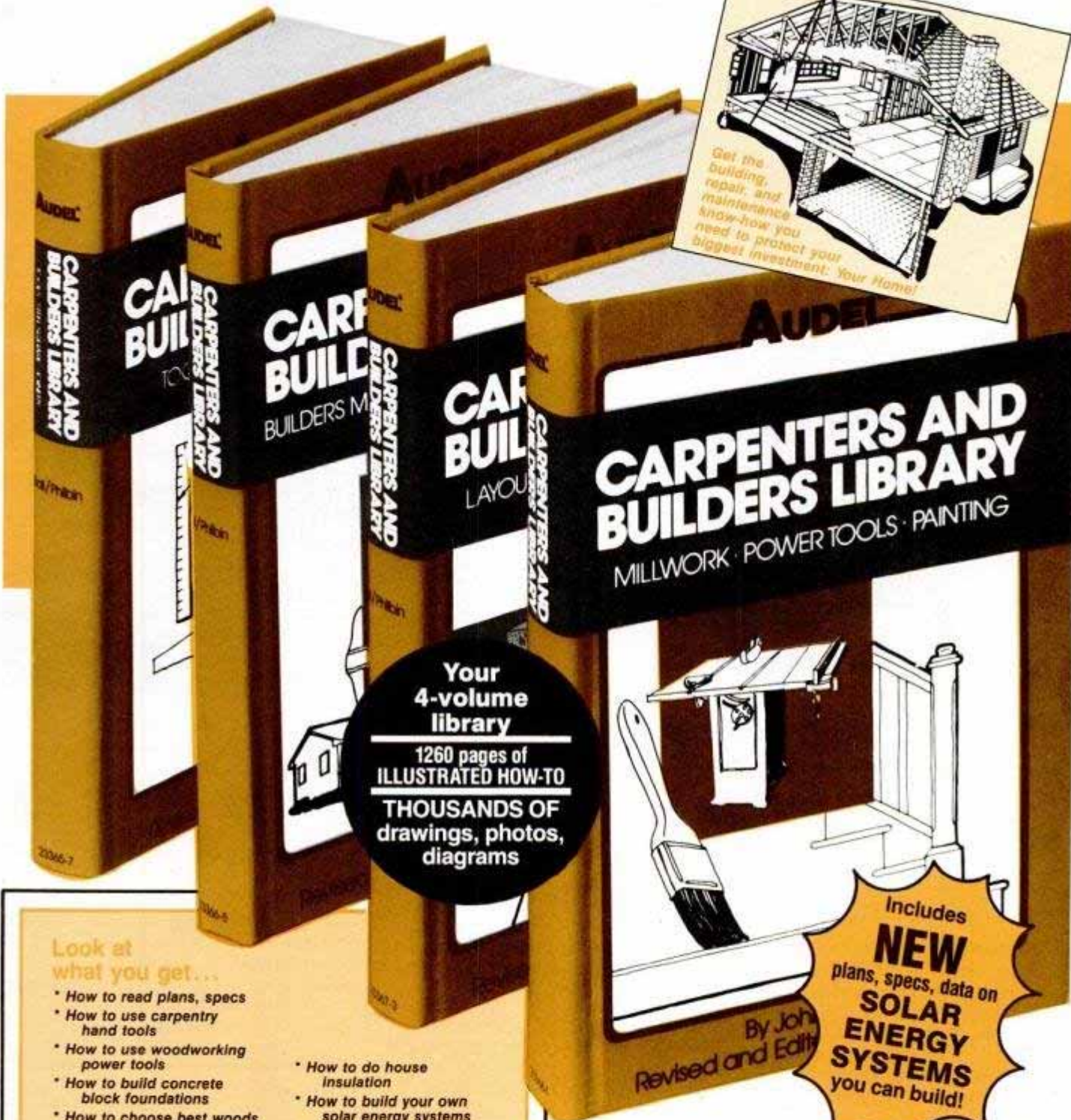
Learn what you can do to save money on home heating/cooling expense!

Yes, these superb \$39.95 books give you start-to-finish instructions on everything from reading a building plan to building a house (including the foundation), doing all the carpentry in it—and keeping the house in A-1 shape for a lifetime. Thousands of show-how illustrations make it all amazingly easy, even for a novice.

What's more, these handy books teach you scores of tricks and shortcuts used by carpenters for measuring, cutting, raising, fastening, finishing—for every technique and project! You get the quick and easy answers to just about every carpentry question you'll ever have. And you can save thousands of dollars in the years ahead. That's what Popular Science Book Club is all about. Mail the card today. There's no risk!



from a simple cabinet to an entire house-



Your 4-volume library  
 1260 pages of ILLUSTRATED HOW-TO  
 THOUSANDS OF drawings, photos, diagrams

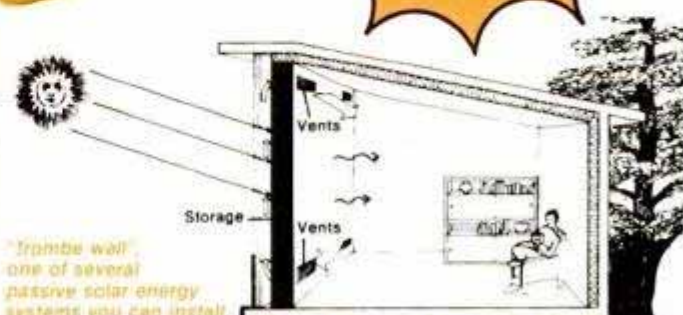
Look at what you get...

- How to read plans, specs
- How to use carpentry hand tools
- How to use woodworking power tools
- How to build concrete block foundations
- How to choose best woods, materials, fasteners
- How to plan and build roofing, flooring
- How to construct walls, doors, windows
- How to make joints
- How to build stairs
- How to build chimneys and fireplaces
- How to use builders' math, do surveying
- How to make kitchen cabinets, counters
- How to do cabinetmaking joinery
- How to build A-frame, 1- and 2-story houses
- How to plan a home workshop
- How to do house insulation
- How to build your own solar energy systems
- How to do wood pattern-making (for castings)
- How to do sheathing and siding
- How to do cornice construction
- How to plan termite protection
- How to do interior-exterior painting
- How to build girders and sills
- How to make concrete forms (and molds)
- How to sharpen saws
- How to build skylights
- How to do house maintenance and repair ...and much more.



By John  
 Revised and Edited

Includes NEW plans, specs, data on SOLAR ENERGY SYSTEMS you can build!



"Trombe wall", one of several passive solar energy systems you can install.

MAIL THE ATTACHED CARD OR WRITE TO:  
**Popular Science BOOK CLUB**  
 P.O. Box 2006, Latham, N.Y. 12111

# PM OWNERS REPORT: GM C-CARS



The Park Avenue, one of Buick's versions of the C-car, has a slicker grille than either the Olds or Cadillac models.

PHOTO BY BILL ASHE

We did a cross-check of the fwd, full-size models by surveying owners of C-cars from all three GM divisions.

BY MICHAEL LAMM  
West Coast Editor

**T**he 1985 fwd C-cars from GM went on sale last April. Traditionally, the C-cars are the large and elegant GM flagships: the Cadillac Coupe de Ville, Sedan de Ville and Fleetwood; the Buick Electra, Electra T Type and Park Avenue; and the Oldsmobile 98 Regency and 98 Regency Brougham. These cars have for decades shared chassis and sheet metal, and they continue to share them for 1985. Since they all have the same body shell, running gear, transaxles and other major components, the customer's main choices turn out to be engines, grilles, taillamps, trim and interior appointments.

Cadillac's fwd C-cars come standard with an aluminum V8 engine. The Buick and Olds carry 3.0- and 3.8-liter V6s, while all three offer the 4.3-liter diesel V6 optionally. As in the past, all three fwd C-cars are accessorized to the hilt, with the THM-440 automatic transaxle standard, as are considerable

"The Olds drives very easy. It takes curves without a problem."

—ILLINOIS MANAGER

"Everyone looks at my new Cadillac and many people ask about it."

—MICHIGAN SELF EMPLOYED

"We noticed an engine sound like a diesel in our '85 Coupe De Ville. The rest is a horror story."

—WEST VIRGINIA RETIREE

"The 1982 Buick Diesel I had was three times the 1985 Buick Limited."

—FLORIDA REAL ESTATE BROKER

"The Electra is the best looking Buick since the 50's."

—TEXAS ALUMINUM WORKER

power equipment and air conditioning.

Our *Owners Report* questionnaires went out to equal numbers of Cadillac, Buick and Olds fwd C-car owners and, when we compare the results, a number of interesting statistics pop out. First, all three of these new automobiles appeal to older buyers: more than 75 percent of our respondents were over 50. I'm not sure that's the age bracket GM aimed at, because C-car purchasers

have always been mature—*too* mature—and I think General Motors intended these new, more compact front-wheel-drive models to appeal to a younger crowd—people who cast eyes in the direction of the junior Mercedes, senior BMWs, smaller Lincolns and even Jaguars.

Second, we discovered that our Cadillac owners were generally more pleased with their cars' overall quality and mechanical reliability than those who'd purchased equivalent Buicks and Oldsmobiles. Cadillac's fwd C-cars, according to our respondents, were also

---

A NATIONWIDE SURVEY  
BASED ON 965,136  
OWNER-DRIVEN MILES

---

judged quieter and more comfortable.

Not surprising statistics, you might say, since Cadillacs cost more and are traditionally considered "better" than Buicks and Oldsmobiles. But that view hasn't always held in our surveys, especially since prestige-car owners tend to be more critical and demanding than those who buy "lesser" nameplates.

Third, Cadillac owners rated dealer

*(Please turn to page 64)*



COME ALIVE, COME AND DRIVE

**NISSAN**  
MAJOR MOTION



# THE 'MORE' TRUCK: \$5999\*

## 1985 NISSAN REGULAR BED.

Re-engineered in '85 to give you more pickup, not more pay-out.

• **More combined horsepower and torque** than any other leading standard, compact truck. Only Nissan has the twin-spark, crossflow, hemihead NAPS-Z engine pulling for you.

• **More payload** than Toyota, Chevy S-10 or Ford Ranger standard models: 1,460 pounds—almost  $\frac{3}{4}$  ton—a truck payload!

• **More corrosion resistance** in a new seamless, smooth-side strongbox. Double walls resist dents.

• **More value.** All standard: 5-speed transmission with overdrive; 3-across seating on a new full bench seat; steel-belted radials (full-size spare); black-out grille; front stabilizer bar; and lots more that explain the difference between just trucking and Major Motion.

No wonder more truckers have

been driving more Nissan-built trucks for more years than any other compact.

The "More" Truck, at Nissan's lowest sticker price. No other truck works so hard for so little pay.

**The best extended-service plan available:** up to 5 years/100,000 miles. Ask about Nissan's Security Plus at participating Datsun dealers.

\*Mfr's sug. retail price excluding title, tax, license and destination charges.



BELT YOURSELF



AT YOUR DATSUN DEALER

## OWNERS REPORT: GM C-CARS

(Continued from page 62)

service as better and more responsive than did our other interviewees. Here again, remember that people who drive Cadillacs expect more from their dealers, and apparently they're getting it.

Despite their satisfaction, fewer Cadillac owners said they'd buy another C-car (or even another GM product) next time. That seems to be because they aspire to even greater prestige and luxury, while owners of Buicks and Oldsmobiles might gladly "settle" for a Cadillac sometime in the future.

But let's see what individual fwd C-car owners actually had to say about their automobiles. A California attorney viewed his fwd Cadillac Sedan de Ville this way: "It's got the same engine as my 1982 rear-drive Fleetwood did, yet fwd and the lighter body help performance greatly, with a better ride, han-

dling, interior roominess and comfort. I see no logical reason to buy an import like BMW or Mercedes when the quality, workmanship and driveability of this car is so high."

An Iowa teacher said this about his Olds 98 Regency Brougham with the 3.8-liter V6: "I really enjoy driving this car because, with the fuel injection, it takes off like a shot. This 98 is a car of the future; never again will we see the 'tanks' of yesteryear." (Actually, Cadillac still produces its rear-drive C-cars, while Buick and Oldsmobile have dropped theirs.)

A Georgia architect: "I owned two Cadillacs previous to this Sedan de Ville and was well-pleased with both. On this new car, fwd was the enticing feature. The only thing I think they might improve is to make it look more like a Cadillac. Plenty of room inside, but the trunk isn't as big as I'm used to."

Here's a California retiree who

bought two fwd C-cars, a downsized Olds 98 Regency and a Cadillac Sedan de Ville: "Of the two cars, the Olds has more gadgets, like the [optional] voice monitor. The Olds, though, wasn't prepped as thoroughly as the Cadillac. When I took delivery of the Olds, the wheels needed alignment, one lighter didn't work, the turn-signal lever came off in my hand and the fuel pump in the tank made a loud humming noise. The Olds has great comfort but not nearly as good as Cadillac's. The Cad is also much quieter; better insulated."

A self-employed Floridian: "One thing that sold me on the 98 Regency Brougham is the fact that it came out six months ahead of all other 1985 models. Quality is superb. Sharper looking than the luxury Lincolns, Chryslers and those ugly foreign jobs. When you spend a lot of money like this, looks do count. Only problem is that the seats

(Please turn to page 66)

### SUMMARY OF 1985 GENERAL MOTORS C-CAR OWNERS REPORTS\*

	Buick	Olds	Cadillac	Workmanship opinion:			
Total miles driven.....	275,139	357,911	332,086	Excellent.....	44.6%	43.5%	53.2%
Average miles per gallon:				Good.....	41.9	44.7	39.2
With 3.0-liter V6				Average.....	13.5	10.6	3.8
In town.....	—	22.0	—	Poor.....	0.0	1.2	3.8
On the highway.....	—	27.8	—	Comfort opinion:			
With 3.8-liter V6				Front seats			
In town.....	20.0	20.2	—	Excellent.....	58.1%	51.1%	68.7%
On the highway.....	26.3	27.0	—	Good.....	35.1	44.6	26.5
With 4.1-liter gasoline V8				Average.....	6.8	4.3	3.6
In town.....	—	—	18.5	Poor.....	0.0	0.0	1.2
On the highway.....	—	—	25.1	Rear seats			
Engine choices:				Excellent.....	52.8%	39.8%	61.0
3.0-liter V6.....	1.5%	6.8%	—	Good.....	40.3	58.0	31.7
3.8-liter V6.....	98.5	93.2	—	Average.....	6.9	1.1	6.1
4.3-liter diesel V6.....	0.0	0.0	0.0	Poor.....	0.0	1.1	1.2
4.1-liter V8.....	0.0	0.0	100.0	Had any mechanical trouble?			
Series choices:				No.....	55.4%	48.9%	59.5%
Buick Park Avenue.....	82.4%	—	—	Yes.....	44.6	51.1	40.5
Buick Electra.....	17.6	—	—	What type of trouble?			
Buick Electra T Type.....	0.0	—	—	Electrical.....	21.2%	25.5%	11.8
Olds 98 Regency Brougham.....	—	52.2%	—	Transmission.....	21.2	12.8	14.7
Olds 98 Regency.....	—	47.8	—	Air conditioner.....	15.2	17.0	14.7
Cadillac Sedan de Ville.....	—	—	70.6%	Fuel pump.....	9.1	27.7	0.0
Cadillac Coupe de Ville.....	—	—	29.4	Cruise control.....	12.1	0.0	2.9
Cadillac Fleetwood.....	—	—	0.0	Power windows.....	6.1	8.5	14.7
Why did you choose this vehicle?				Dealer repairs satisfactory?			
Styling.....	39.7%	50.7%	35.7%	Yes.....	71.0%	62.8%	65.5%
Front-wheel drive.....	41.3	28.8	20.0	No.....	29.0	37.2	34.5
Roominess/size.....	15.9	24.7	31.4	Dealer service opinion:			
Past experience.....	15.9	19.2	18.6	Excellent.....	28.6%	29.5%	36.0%
Price/economy.....	—	19.2	12.9	Good.....	46.4	39.3	42.7
Handling/performance.....	15.9	—	12.9	Average.....	21.4	26.2	14.7
Specific likes:				Poor.....	3.6	4.9	6.7
Handling.....	45.6%	41.2%	30.0	Number of vehicles owned:			
Styling.....	36.8	37.6	40.0	This car only.....	29.3%	35.9%	37.8%
Riding qualities.....	33.8	24.7	40.0	Two cars.....	45.3	44.6	41.5
Economy.....	29.4	40.0	28.8	Three cars.....	13.3	16.3	8.5
Comfort.....	22.1	30.6	26.3	Four or more cars.....	12.0	3.3	12.1
Front-wheel drive.....	22.1	15.3	13.8	Makes of other cars owned:			
Specific dislikes:				Chevrolet.....	22.6%	30.5%	23.5%
No complaints.....	16.1%	12.3%	9.1%	Ford.....	24.5	5.1	15.7
Rough transmission shifts.....	5.4	5.5	20.0	Oldsmobile.....	13.2	22.0	17.6
Not silent enough.....	16.1	24.7	9.1	Buick.....	34.0	10.2	3.8
Trunk too small.....	7.1	6.8	9.1	Cadillac.....	5.8	6.8	23.5
Price too high.....	1.8	6.8	12.7	Pontiac.....	5.8	15.3	11.3
Poor riding qualities.....	5.4	8.2	1.8	Dodge.....	1.9	1.7	13.7
Glove box too small.....	5.4	6.8	0.0	Honda.....	5.8	6.8	3.8
Deck lid release unhandy.....	7.1	0.0	0.0	Would you buy another GM C-car?			
What changes would you like to see?				Yes.....	86.3%	75.6%	82.1%
No changes.....	32.1%	24.6%	33.8%	No.....	2.7	5.8	4.8
Less noise.....	7.1	15.9	3.1	Maybe.....	11.0	18.9	13.1
Smoother ride.....	7.1	1.4	0.0	Would you buy any GM car next time?			
Bigger glove box.....	3.6	10.1	0.0	Yes.....	96.0%	86.7%	88.0%
Smoother transmission.....	0.0	2.9	9.2	No.....	1.3	2.2	3.6
Softer seats.....	1.8	5.8	4.6	Maybe.....	2.7	11.1	8.4
How much did you pay for your car?				Age distribution of owners:			
Range.....	\$15,000-19,000	\$15,000-19,000	\$19,000-23,500	15-29 years.....	0.0%	1.1%	1.2%
Average.....	\$16,978	\$16,801	\$20,817	30-49 years.....	16.0	22.8	21.6
				50-plus.....	84.0	76.1	77.1

\*Percentages might not equal 100% due to rounding or insufficient data.

# Wealthy Man Wants to Give You His Wealth Secret Before It's Too Late!

Dear Friend,

My name is John Wright. Not too long ago I was flat broke. I was \$30,000 in debt. The bank repossessed my car because I couldn't keep up with the payments. And one day the landlord gave me an eviction notice because I hadn't paid the rent for three months. So we had to move out. My family and I stayed at my cousin's place for the rest of that month before I could manage to get another apartment. That was very embarrassing.

Things have changed now. I own four homes in southern California. The one I'm living in now is worth more than half a million dollars. I own several cars, among them a brand new Mercedes and a brand new Cadillac. And as of now, I have \$178,000 cash in certificate of deposits in just one of my bank accounts in Beverly Hills.

I'm not really trying to impress you with my wealth. All I'm trying to do here is to prove to you that if it wasn't because of that money secret I was lucky enough to find that day, I still would have been poor or may be even bankrupt. It was only through this amazing money secret that I could pull myself out of debt and become wealthy. Who knows what would have happened to my family and me.

Knowing about this secret changed my life completely. It brought me wealth, happiness, and most important of all peace of mind. This secret will change your life, too! It will give you everything you need and will solve all your money problems. Of course you don't have to take my word for it. You can try it for yourself. To see that you try this secret, I'm willing to give you \$20.00 in cash. (I'm giving my address at the bottom of this page.) I figure, if I spend \$20.00, I get your attention. And you will prove it to yourself that this amazing money secret will work for you, too!

You probably are asking yourself, why is he sharing his secret with me? My response is, "why not". First, I've already made enough money to retire for the rest of my life. Second, my secret is so unique that we won't be competing with each other. Third, nothing is more satisfying to me than sharing my secret only with those who realize a golden opportunity and get on it quickly.

This secret is incredibly simple. Anyone can use it. You can get started with practically no money at all and the risk is almost zero. You don't need special training or even a high school education. It doesn't matter how young or old you are and it will work for you at home or even while you are on vacation.

Let me tell you more about this fascinating money making secret:

## FAST MONEY

With this secret the money can roll in fast. In some cases you may be able to cash in literally overnight. If you can follow simple instructions you can get started in a single afternoon and it is possible to have spendable money in your hands the very next morning. In fact, this just might be the fastest legal way to make money that has ever been invented!

## ALMOST NO-RISK

This is a very safe way to get extra cash. It is practically risk free. It is not a dangerous gamble. Everything you do has already been tested and you can get started for less money than most people spend for a night on the town.

## "WORK" AT HOME

One of the nicest things about this whole idea is that you can do it at home in your spare time. You don't need equipment or an office. It doesn't matter where you live either. You can use this secret to make money if you live in a big city or on a farm or anywhere in between. A husband and wife team from New York used my secret, worked at home in their spare time, and made \$45,000 in one year.

## SIMPLE

This secret is simple. It would be hard to make a

mistake if you tried. You don't need a college degree or even a high school education. All you need is a little common sense and the ability to follow simple, easy, step-by-step instructions. I personally know a man from New England who used this secret and made \$2 million in just 3 years.

## AGE DOESN'T MATTER

You can use this secret to make money no matter how old or how young you may be. There is no physical labor involved and everything is so easy it can be done whether you're a teenager or 90 years old. I know one woman who is over 65 and is making all the money she needs with this secret.

## NO PERSONAL SELLING

When you use this secret to make money you never have to try to convince anybody of anything. This has nothing to do with door-to-door selling, telephone solicitation, real estate or anything else that involves personal contact.

## LEGAL AND HONEST

Everything about this idea is perfectly legal and honest. You will be proud of what you are doing and you will be providing a very valuable service.

## NO LONG HOURS

It will only take you two hours to learn how to use this secret. After that everything is almost automatic. After you get started you can probably do everything that is necessary in three hours per week.

I know you are skeptical. That simply shows your good business sense. Well, here is proof from people who have put this amazing secret into use and have gotten all the money they ever desired. Their names are not mentioned here in order to protect their privacy but I have full information and the actual proof of their success in my office.

## PROOF

- A woman from Oregon started out by using my secret method in its simplest form. She later reported that it had brought her \$14,000 in cash.
- A man from Rhode Island applied my secret and with the help of his family, made over \$40,000 in a year in his spare time.
- A man from California, who was broke at the time, tried my secret and made \$147,000.
- On the basis of my secret, a husband and wife team from Virginia grossed over \$100,000 cash in eleven months.
- A man from California made over \$265,000 in one year, with this incredible secret.
- I talked to a man from Ohio, who now lives in Santa Monica, CA. He said: "Thank you for sharing your secret... with this amazing, yet simple secret, I received \$220,000 in just two months."

As you can tell by now I have come across something pretty good. I believe I have discovered the sweetest little money-making secret you could ever imagine. Remember — I guarantee it.

Most of the time, it takes big money to make money. This is an exception. With this secret you can start in your spare time with almost nothing. But of course, you don't have to start small or stay small. You can go as fast and as far as you wish. The size of your profits is totally up to you. I can't guarantee how much you will make with this secret but I can tell you this — so far this amazing money producing secret makes the profits from most other ideas look like peanuts!

Now at last, I've completely explained this remarkable secret in a special money making plan. I call it "The Royal Road to Riches". Some call it a miracle. You'll probably call it "The Secret of Riches". You will learn everything you need to know step-by-step. So you too can put this amazing money

making secret to work for you and make all the money you need.

To prove that this secret will solve all your money problems, I'm not even asking you to send me money. Instead, postdate your check for a month and half from today. Obviously it is not actually money because it is not negotiable for 45 days. You can easily stop payment on it any time you want. I can't cash your check for 45 days before I know for sure that you are completely satisfied with my material.

## IMAGINE HOW YOUR WHOLE LIFE WILL CHANGE IF YOU USE THIS SECRET TO GET ALL THE MONEY YOU NEED!

- You won't have to worry about bills.
- You will be master of your own time and fate and nobody can boss you around.
- You will have more time to spend with your loved ones and you will be able to take care of them in emergencies.
- You can have the house you want, the car you want, the vacations you want.
- And most of all, you will finally have PEACE OF MIND!

If you need (or just want) more money, there are a lot of reasons why you should take advantage of this amazing secret. (And I can't think of a single reason why you shouldn't). It will probably solve all your money problems forever. In fact, I am so completely convinced that my powerful secret works money miracles, that I'm willing to give you the most unusual guarantee ever offered. That is, if it doesn't solve all your money problems, I'll return your original uncashed check, plus an extra twenty dollar cash bonus just for doing me (and yourself) the favor of giving the secret an honest try according to my simple instructions.

## \$20.00 FREE!

There is no way you can lose. You either solve all your money problems with this secret (in just 30 days) or you get your money back plus \$20.00 in cash FREE!

Do you realize what this means? You can put my simple secret into use. Be able to solve all your money problems. And if for any reason whatsoever you are not 100% satisfied after using the secret for 30 days, you may return my material. And then I will not only return your original UNCASHED CHECK, but I will also send you an extra \$20.00 cashiers check just for giving the secret an honest try according to the simple instructions.

**I GUARANTEE IT! I have given references, therefore, there is absolutely NO RISK ON YOUR PART.**

To order, simply write your name and address on a piece of paper. Enclose your postdated check or money order for \$12.95 and send it to:

**WRIGHT PUBLISHING COMPANY**  
Dept. 287  
3340 Ocean Park Blvd., Suite 3065  
Santa Monica, CA 90405

But the supply of my material is limited. So send in your order now while the supply lasts.

If you wish to charge it to your Visa or MasterCard — be sure to include your account number and expiration date. That's all there is to it. I'll send you my material right away by return mail, along with our unconditional guarantee.

## REFERENCES:

We belong to Los Angeles Chamber of Commerce, located at 404 South Bixel Street, Los Angeles, California 90017.

Our bank reference is: First Los Angeles Bank, Los Angeles, California 90067.

©1981 Wright Publishing Company

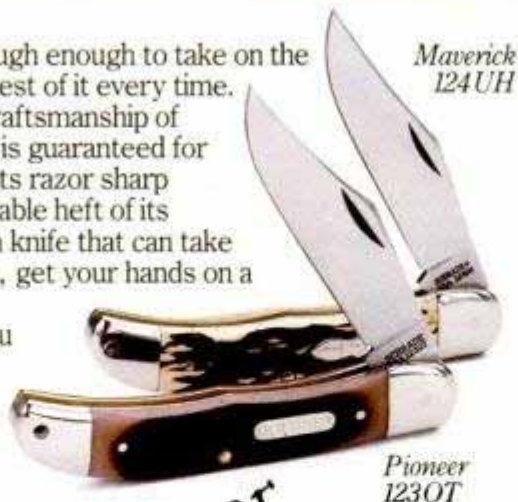
# AMERICA WORKS WITH SCHRADE.

Made in U.S.A.

Only a Schrade is tough enough to take on the worst, and get the best of it every time.

The quality and craftsmanship of every Schrade knife is guaranteed for life. From the tip of its razor sharp blade to the comfortable heft of its handle. If you need a knife that can take on the toughest jobs, get your hands on a Schrade.

It's as tough as you are, America. And, brother, you don't get any tougher than that.



Maverick  
124UH

Pioneer  
123OT



## SCHRADE CUTLERY

New!

Heavy Duty Pocketknives.

Uncle Henry Maverick-124UH. 4" closed. Rust resistant Schrade + Steel® blade. Guaranteed against loss for one full year.

Old Timer Pioneer-123OT. 4" closed. High carbon cutlery steel blade. "A knife like Gran'Dad's."

For your free Schrade Almanac, write Schrade Cutlery, 30 Canal St., Ellenville, N. Y. 12428.

## OWNERS REPORT: GM C-CARS

(Continued from page 64)

could be a little softer. Our '82 Electra had softer seats. In a Brougham, you expect soft seats. Some people are scared because these 'big' luxury cars are so small, but they really aren't. This '85 has almost as much room as our previous '84 98."

### Adjusting to new size

A few traditional C-car buyers, though, simply couldn't adjust to the new size. A 61-year-old North Carolina merchant confessed, "I've been driving Cadillacs since 1951, and this new one is a complete change. It doesn't drive or ride like a Cadillac. They took something away. The steering quickness doesn't have that smoothness I'm used to—it's not the same feel. I also like a longer wheelbase."

A Maryland retired personnel manager had this to say: "I have driven Cadillacs for 30 years now, I like their style and performance, and the mileage of this new car is excellent, however they're going to have to do something about the way the transmission jumps and jerks on hills or steep inclines. They'll have to smooth it out before I will buy another one."

In all, 20 percent of our Cadillac owners noted the automatic's rough shifts under power—about four times as many as in Buicks or Oldsmobiles. All three cars use the same THM-440 transaxles, but the Cadillac has a viscous clutch and different controls for the more powerful V8. Cadillac acknowledges owner complaints and has instructed its dealer service people on making adjustments.

An Illinois retiree commented: "If you don't mind risking a ticket, the Buick Park Avenue will cruise beautifully on the freeways all day long at 75 mph—no problems, no overheating, no vibration, no wind noise. I like the mileage, the performance, the ride, the air conditioner and the fast acceleration. I'm not too crazy about the jerky-shifting transmission, because about 45 mph it can't decide whether to go into overdrive or not, nor am I pleased with the digital touch controls. I have to take my eyes off the road to make changes."

And finally, these words from a retired Illinois Air Force officer: "My Electra blends revolutionary style with superb performance. At the price, it's competitive with any auto built, foreign or domestic. I feel that this vehicle is designed and constructed more like a tailormade suit than a production-line item. It has all the modern operational conveniences and comfort anyone could ask for. Indeed, it's the best competitor to date for anything on wheels, anywhere in the world."

PM

# PM PHOTO HINTS

## Chase darkroom chill



An aquarium heater immersed in a water jacket can maintain proper temperature for your processing chemicals. Use a 6-in.-deep pan to hold the water jacket, and mount the 8-in. heater so that 6 in. of the tube are immersed. Set the thermostat just below the desired temperature. Be sure to mask the amber operating light when film is being handled.—David W. Roberts

## Gesundheit!



Subjects can appear overexposed or washed out if shot at close range with a flash. Filter your light by fastening a white hankerchief over the lamp with a rubber band. For best results, experiment with the number of folds needed to achieve the softening effect you desire.—Bob Grewell

## Avoid the bends

To prevent prints from becoming dogeared in the mail, use oversized backing material and secure prints in the center by pasting envelope corners to the cardboard.



—A. Weber

# QUARTZ CLOCK MOVEMENT

**\$1.00**



Our Way of Saying ...

## WELCOME TO CLOCKMAKING!

Made in America, this Q80 quartz movement is our most popular series. It regularly sells for \$6.50 ... but now is just \$1.00!

That's much below our cost and includes shipping and handling. You'll also get two brass hands, our 72-page color catalog plus a "Clockmaking Ideas" pamphlet. This offer is so special that we request one-to-a-customer please. It's our way of introducing you to the wonderful do-it-yourself world of clockmaking!

# KLOCKIT

Limited Offer ... Call or Write Today!

Dept. PM25

P.O. BOX 629

LAKE GEVEVA, WI 53147

1-800-KLOCKIT



Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Credit Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

ATTENTION LOT OWNERS



## How your spare time can get you the home you want at a price you can afford!

Why wait? Your spare time can be worth \$1,000's toward a new home. Here's how: Curtis will design and frame your home, provide all finishing materials with step-by-step guidance. You handle the finishing ... either do-it-yourself or subcontract.

THE AFFORDABLE WAY TO OWN YOUR HOME

- Special credit arrangements for qualified buyers.
- Your lot may not have to be fully paid for.
- Build from our plans, your plans or the best of both.
- High quality construction and materials.

Send Coupon or Call for a FREE Catalog. There's a representative near you! Call Toll Free: 1-800-228-2323 or 612-542-4300

Send me your FREE Homes Catalog  
CURTIS HOMES, DEPT. PM-1  
2201 Florida Ave. So., Minneapolis, MN 55426  
(Please Print)

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone( ) \_\_\_\_\_

We own land.  
 Enclosed is \$1.00 for priority handling.

*Curtis Custom Homes*

(612) 542-4300  
Custom built on your lot.



# Discover the world's oldest hobby.

## Discover the most challenging, engrossing, relaxing hobby you'll ever experience.



Wouldn't you just love to build an historic ship model? A true-to-scale replica, decked out with gleaming brass fittings, polished walnut hull, delicate rigging — life-like in every detail? Well, now you can! And you don't have to be a skilled craftsman or a descendant of generations of shipwrights to do so.

Even if you've never built a model before, you can experience the relaxing pleasure and the pride of accomplishment that is offered by this fascinating hobby. You can build the two-masted schooner pictured here — an authentic replica of the *Swift*, a typical Virginia pilot boat that appeared shortly after the Revolution.

The secret is in our kit, especially designed for the first time modeler, with pre-cut parts that make assembly easy, and clear, large-scale plans and instructions that virtually take you by the hand and guide you every step of the way.

### *It really isn't hard*

You'll learn to true a hull, taper the planking, run lanyards through blocks and deadeyes. (And you'll learn what lanyards and blocks and deadeyes are!) You'll build her just like the original *Swift* was built. You'll fit frames to keel, fasten the planks to the hull, and lay the decking. You'll add deck furnishings, tiller, and rudder. Then you'll set the masts and rig her lines just as she stood at the turn of the century — almost *two* centuries ago.

Creative? And how! Overwhelming? Not a bit! But be prepared for hours of the most challenging, engrossing, relaxing fun you've ever had. And an astonishingly beautiful, museum quality ship model you can display with pride when completed.

### *Quality you can see and feel*

The materials in our kit may be better than those used in the original *Swift*. The keel section and frames are pre-cut plywood, ready for quick assembly. The *Swift's* hull is planked twice; once with thick, flexible lime-wood for strength, then overlaid again with planks of African walnut for lasting beauty.

You won't have to make the fittings — we've done that for you. Our kit contains ready-to-use blocks and deadeyes of rare, yellow boxwood. We include eyelets, bracers and belaying pins — over 70 parts of solid brass! Even the cabin door hinges are brass, as are the 250 miniature nails you'll use to fasten the planking to the hull and deck. And, since the original wooden *Swift* had no plastic parts, our kit doesn't either — *anywhere!*

### *An "Everything You'll Need" special offer, with FREE TOOLS and HANDBOOK*

We want to introduce you to this fascinating hobby, *now!* So we've made it easy for you to get started. Our special offer includes the *Swift* kit plus all the tools you'll need to build her: miniature pliers, hammer, knife, file, tweezers, sandpaper, glue, wood oil, and more. You'll also receive a free copy of "Ship Models from Kits," a 110 page beginner's guide. And we'll even give you a handsome wooden base and brass pedestals on which to display your finished model. You don't have to buy anything else.

The tools normally cost \$17.00; the book retails for \$8.95. But they're yours FREE



when you buy the *Swift* kit at its regular price of \$49.95 (plus \$5.00 insured delivery). We'll also include our full color catalog illustrating and offering the widest selection of fine wooden ship model kits, cannon kits, and miniature tools available anywhere. Models of frigates, brigantines, and other historic vessels you'll want to build after you finish your "apprenticeship".



For fastest service on credit card orders, call TOLL-FREE

**800-228-2028 ext. 68,**

24 hours/day.

In Nebraska, call 800-642-8300.

Or use the convenient coupon to send check or money order.

**Model Expo, Inc.**

23 Just Road, Fairfield, NJ 07007

### **OUR UNCONVENTIONAL GUARANTEES**

1. If less than delighted, you may return your purchase within 30 days for a full refund.
2. Should you break, damage, or lose a part during construction, we will replace it without charge.
3. Should you have any questions while building, call us. We have experienced, professional ship modelers standing by.





You'll get everything you need to build this handsome ship model: complete kit with pre-cut wooden parts, brass and other metal fittings, ship modeling tools, glue, sandpaper, wood oil, and a 110 page modeler's handbook.

**GREAT FOR GIFT GIVING**

The original Swift was used by the British consul to carry dispatches back and forth to England, and later formally taken into the British Navy. Our model measures 21" from the tip of her bowsprit to the end of her boom.



**SPECIAL OFFER FOR THOSE WHO HAVE NEVER BUILT A SHIP BEFORE!**

**Miniature Cannon Kit Bonus!**

Set of two solid brass cannon on walnut carriages to be mounted amidship. \$4.00 value, sent FREE with your order.



Dept. PM-25

Charge my credit card:

MasterCard  Visa  American Express

**Yes!** Please send me \_\_\_\_\_ kits of the *Swift* @ \$49.95, plus FREE tools, handbook, and cannons.

My check or money order is enclosed. (Please add \$5.00 for insured delivery. NJ residents must add 6% sales tax.)

Account No. \_\_\_\_\_  
 Exp. Date \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_ Zip \_\_\_\_\_

Mail to: **MODEL EXPO, INC.** 23 Just Road, Fairfield, NJ 07007

© Model Expo Inc. 1984



# PM PHOTOGRAPHY UPDATE

## Images of electronic future at Photokina fair

COLOGNE—More than 100,000 visitors make the pilgrimage to this West German cathedral town each October to see the latest camera equipment unveiled at the Photokina. But last year's "world's fair of photography" will be remembered for the first demonstrations of photography's electronic future.

PM attended the Photokina for this firsthand report, and no doubt about it, electronics now pervades nearly every aspect of photography. Here, today, are the tiny "chips" that make conventional cameras so smart. Just emerging is the 8-mm videotape camera as a possible successor to 8-mm film movies. And on tap for tomorrow are still-video imaging systems that will replace rolls of chemical film with magnetic diskettes.

Electronic still photography first gained attention nearly four years ago when Sony previewed its Mavica system—a camera that recorded still images on a small magnetic disk for display on a TV screen.

At the Photokina, Copal and Panasonic demonstrated prototype electronic still camera (ESC) systems, and Fuji introduced an electronic imaging product that will come onto the consumer market in Japan next month.

The Copal and Panasonic cameras use the now-standard Still Video Floppy to store 25 to 50 images on a 2-in.-dia. magnetic disk that rotates at 1,800 rpm. There's no danger from exposure to light, and because magnetic images can be erased, the floppy may be re-used indefinitely. No developing is required: The disk simply is inserted in a player and instantly viewed on TV. If desired, color prints may be made from the TV

Konica's half-frame 35-mm compacts are no bigger than a disc-film camera.

image, with color and contrast correction possible before printing.

So far, the resolution of ESC prints is not quite up to the quality of 35-mm film. The color prints Panasonic showed PM had a slight blue tinge, but were otherwise similar to prints made from instant-film cameras. Spokesmen for Panasonic and others agree that

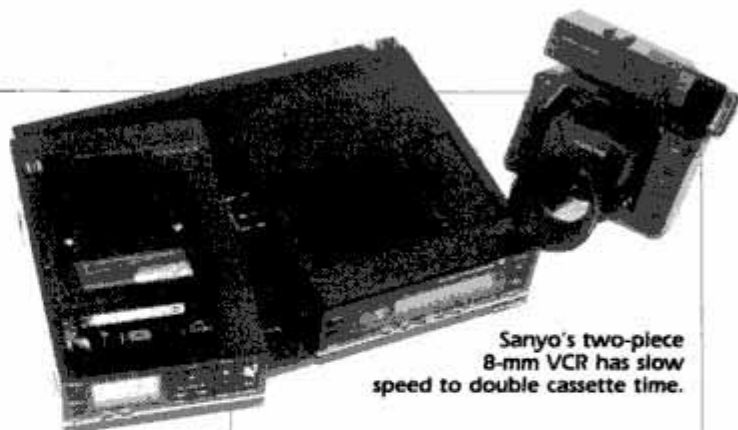


Prototype electronic still camera by Panasonic stores photos on magnetic disk (right).

further refinement is necessary before electronic still photography can match 35-mm film technology. Most companies contend that a marketable ESC product remains three to four years away.

In the meantime, Fuji will sell its Fujix TV-Photo System. There's no camera or printer involved—just a video-floppy player (\$210 in Japan) for projecting images on TV. Those images come from the customer's own film prints or slides. Fuji processing centers in Japan will transfer up to 50 exposures onto a disk for \$4 to \$8. Fuji

states that its TV-Photo system eliminates the need for slide projectors, screens and photo albums. The company doesn't expect to offer the TV-Photo



Sanyo's two-piece 8-mm VCR has slow speed to double cassette time.

service in the United States before 1986. Nor was Fuji able to give a U.S. delivery date for its 8-mm Fujix video camcorder, available next month in Japan for \$1,250.

Though previously seen at electronics shows, the new 8-mm video format made its debut to the photography world at Photokina. On hand with 8-mm products were Kodak, Polaroid, Fuji and Sanyo. Philips showed a prototype, and Sony might offer soon its own version of the 4 $\frac{1}{4}$ -pound camcorder it makes for Fuji. Recent innovations in 8-mm technology bode well for the format. Cassette recording time has been extended to 120 minutes from 90, and three-hour tapes are in development.

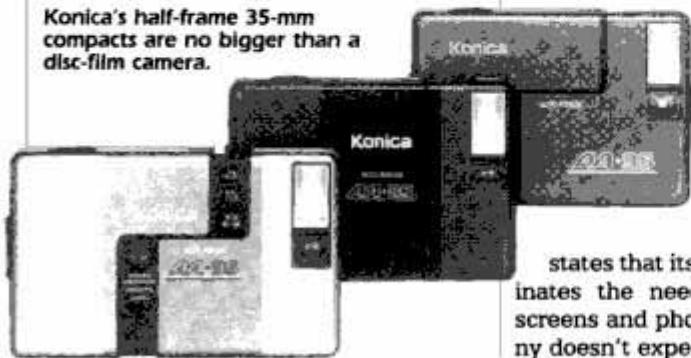
Sanyo, meanwhile, has introduced a portable 8-mm VCR with a second, slower recording speed that effectively doubles cassette time. The Sanyo deck arrives stateside this spring for about \$1,300.

If it seems as though electronics will make film photography obsolete, look again. At Photokina, Britain's Ilford demonstrated an experimental black-and-white film for 3-D hologram images. And, though color-film sensitivity now tops out at ASA 1600 for low-light and fast-action shooting, film companies say much more is possible.

Electronics, in fact, appears to open a new range of possibilities for film cameras. Microprocessors are at the heart of the new 35-mm SLR "program" cameras that adjust automatically.

Among the new models at Photokina was Chinon's CP-5S and Yashica's Contax 159 MM. Each offers an automatic program for fast, stop-action photography (high shutter speed), and another for creative composition (greater depth of field). Even staid Leica has embraced

(Please turn to page 146)





Caprice Classic

# The tradition gets better year after year.

Over the years, full-size Chevrolets like Caprice Classic have been moving more families than any other car of their kind.

Moving them in room. In comfort. Moving them dependably.

And in 1985, the Caprice tradition of value continues. With a new, electronically fuel-injected engine standard in both sedan and coupe. Further refinements to its legendary ride. And a contemporary, beautifully crafted instrument panel.

All of which shows that some traditions never change. They just get better every year.

And at your Chevrolet dealer's, financing or leasing your new Caprice is as easy as saying GMAC.



Let's get it together...buckle up.



# TODAY'S CHEVROLET

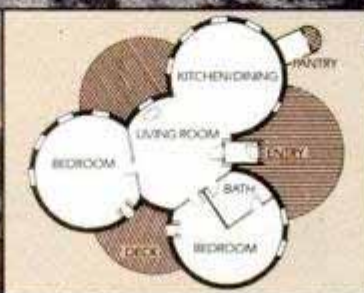
# TECHNOLOGY UPDATE

## ALTERNATIVES

### Dome, sweet dome

Designer Michael Jantzen believes the home of the future will be composed of several interlocking modular domes. He has built an experimental model in southern Illinois. Merging four domes in a "soap bubble cluster," Jantzen's house is superinsulated and computer monitored. To get superinsulation, he constructed one sheet-metal silo roof inside another, leaving 12 inches of space which he pumped full of cellulose. A concrete slab floor provides heat storage. Most of the windows are on the south side of the house. Wood decks are on three sides. Jantzen also designed interior furnishings to fit the home's curved walls. The house can be enlarged or made smaller by adding and removing modules.

COURTESY MICHAEL JANTZEN



Modular super-insulated home has three decks. Floorplan shows interconnecting points. Furniture (photo inset) is made to fit against curved walls at home.

### Olympic car gives TV a charge

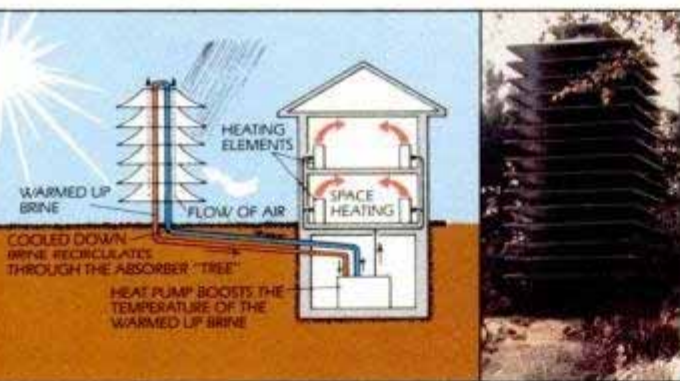
A new camera car that was developed for ABC TV coverage of the Los Angeles Olympics is revolutionizing sports coverage. The Uniq Turbo Electrek is a hybrid that runs on a 43-hp, battery-powered electric motor with a Chrysler 2.2 EFI turbo engine as backup. ABC used it to cover the marathon running event in which all internal-combustion vehicles were barred to prevent exhaust fumes from affecting runners. The 18-ft.-long steel frame and Kevlar body carries 3,000 pounds of camera equipment at speeds up to 60 mph for three hours. The vehicle can cover sports in domed stadiums.



ABC's hybrid car (top) carries 3,000 pounds of camera equipment (bottom) at up to 60 mph for three-hour runs.

### Energy now grows on trees

West Germany's Regitherm company has developed an alternative energy system that collects heat from the sun, wind and even rain. The "energy tree" is a multistory stack of reinforced polyester cones that absorb heat from the outdoor environment. Antifreeze is pumped through circulating pipes running up and down the "trunk." Heat radiated from the cones is absorbed by the antifreeze and carried to a heat pump in a house where forced air circulates heat. The system is expected to be on the market next year.



## MEDICAL



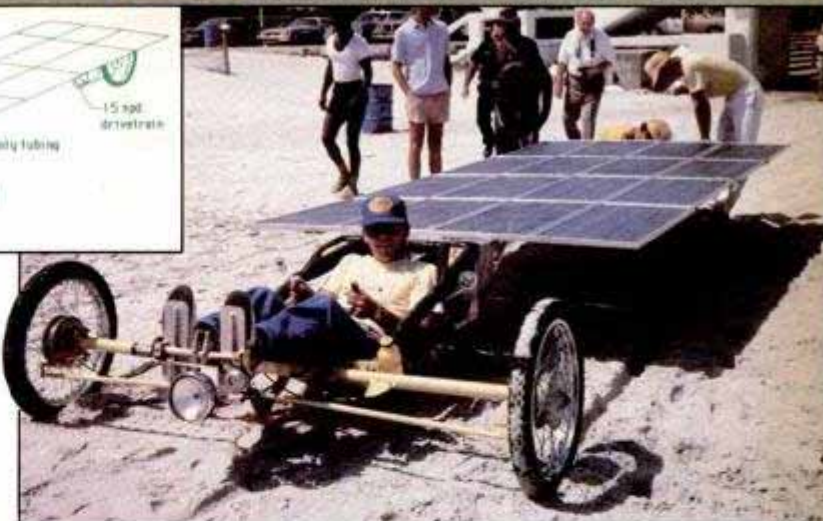
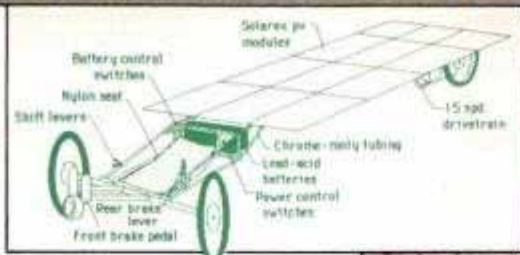
### Ultrasound mind and body

Many lives lost to strokes could be saved if doctors could detect a buildup of cholesterol plaque inside the main arteries leading from the heart to the brain. A new ultrasound device is being tested to help doctors spot plaque early. A sensor is attached to the patient's neck, producing ultrasound images of the inside of the suspect blood vessels. Radiologist Harry Zegel of St. Agnes Medical Center in Philadelphia says he now can view plaque in blood flowing through the artery.

**SOLAR**

**Sun car runs cross-country**

A team of engineers, educators and technicians from southwestern Missouri plans to break the speed record for a solar-powered car this summer—24 mph. They'll be using the \$5,000 TSAR Phoenix (TSAR stands for TransAmerica Solar Auto Run). Last summer, the Phoenix made the first successful solar-powered cross-country trip—2,300 miles from San Diego to Jacksonville, Fla. The three-wheeled vehicle, tested at the Crowder College Solar Lab, uses 16 Solarex photovoltaic modules that can generate 640 watts. With a cruise speed of 15 to 20 mph, the Phoenix made the cross-country trip in 45 days.



Three-wheeled car is powered by a 16-module solar array (inset).

**ENGINEERING**

**Seagoing oil rig gets around**

Most offshore oil rigs are fixed structures anchored to the sea floor. Now, a mammoth new rig being planned by Bethlehem Steel will be built like a boat hull that can be towed easily from one drilling site to another. Once it's in position, a huge central tower is lowered hydraulically until it touches bottom, then the floating platform is jacked up the tower until it stands about 40 feet above the water, well clear of violent wave forces in rough seas. To move the rig to another location, the process is simply reversed. The platform is lowered until it is again floating on the surface, then the tower is jacked up off the bottom and the rig is towed away.

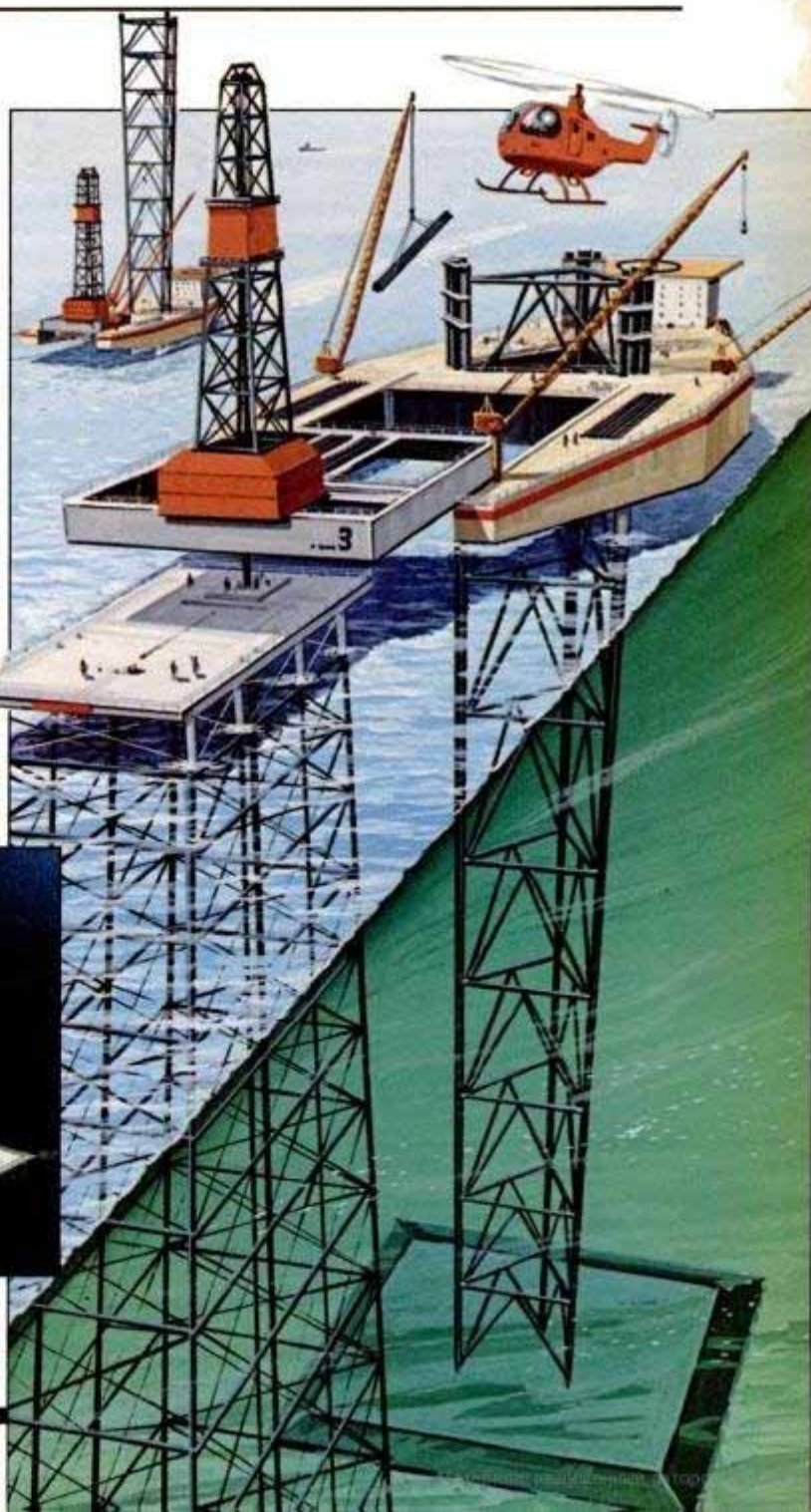
Called the Bethlehem 600, the new rig will be the tallest of its type in the world and will be capable of drilling in waters up to 600 feet deep—200 feet deeper than is possible with the largest jackup structures currently in operation. Its cantilevered platform, shaped like a giant horseshoe, is designed to permit the drilling derrick to be extended out over existing production wells, for drilling new wells or for servicing old ones. The derrick rides in a two-directional carriage enabling it to travel in and out along the horseshoe arms as well as crosswise between them. The derrick can thus drill anywhere within a 4,000-square-foot area of ocean bottom without the platform itself having to be moved.

Everything about the Bethlehem 600 is big. Its platform is larger than a football field, stands four stories high and accommodates 100 crewmen. The triangular support tower measures 110 feet on each side and is 762 feet tall. The massive base on which the tower rests is 300 feet long, 265 feet wide and 16 feet deep.

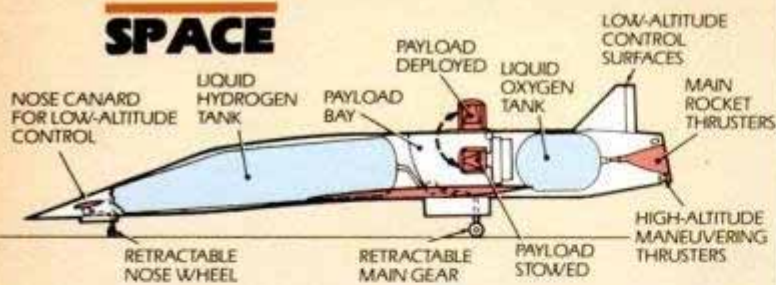
In its raised position during transit, the tower extends more than 700 feet in the air above the platform. To keep the rig from tipping over, the tower's base acts as a counterweight like the keel on a sailboat.



Existing three-legged jackup is limited to 200-foot depths. Proposed single-column design (right) will reach 600 feet.



## SPACE



Liquid fuel fills most of the needle-nose, stubby-wing HOTOL Model dwarfs U.S. Shuttle.

## Spacecraft flies like an airplane



The British may have come up with a stiff competitor to the U.S. Space Shuttle. It's a single-stage, unmanned, remotely piloted spacecraft able to take off and land like an airplane on runways no longer than those used by civilian jetliners. According to British Aerospace, originator of the concept, it could launch a satellite into orbit for half what the Shuttle costs.

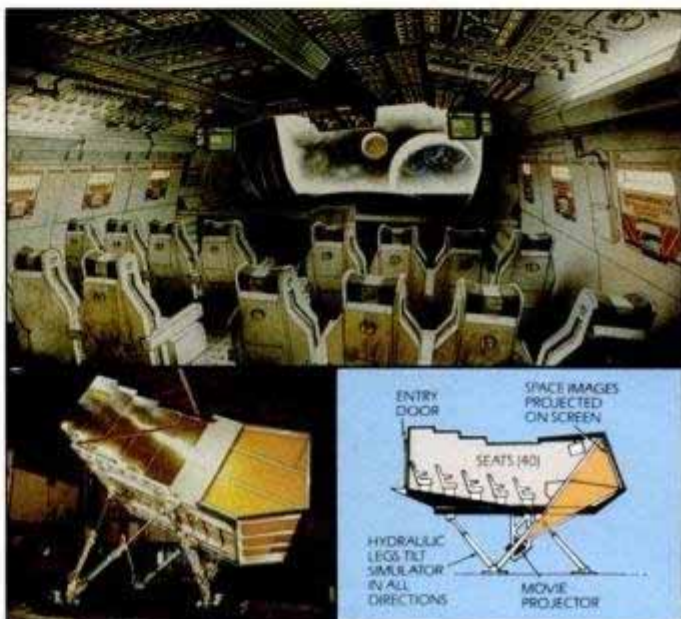
Called the HOTOL (for Horizontal Takeoff and Landing), it would use aerodynamic wing lift and air-breathing engines at low altitudes, then switch to liquid-fueled rockets once out in space. This hybrid scheme would provide sufficient lift and thrust without the need for the expensive and expendable booster rockets required on the two-stage Shuttle. But the Shuttle won't have to worry for a while. The HOTOL isn't scheduled for liftoff until sometime after the year 2000.

## ENTERTAINMENT

### Ride a spaceship to the stars

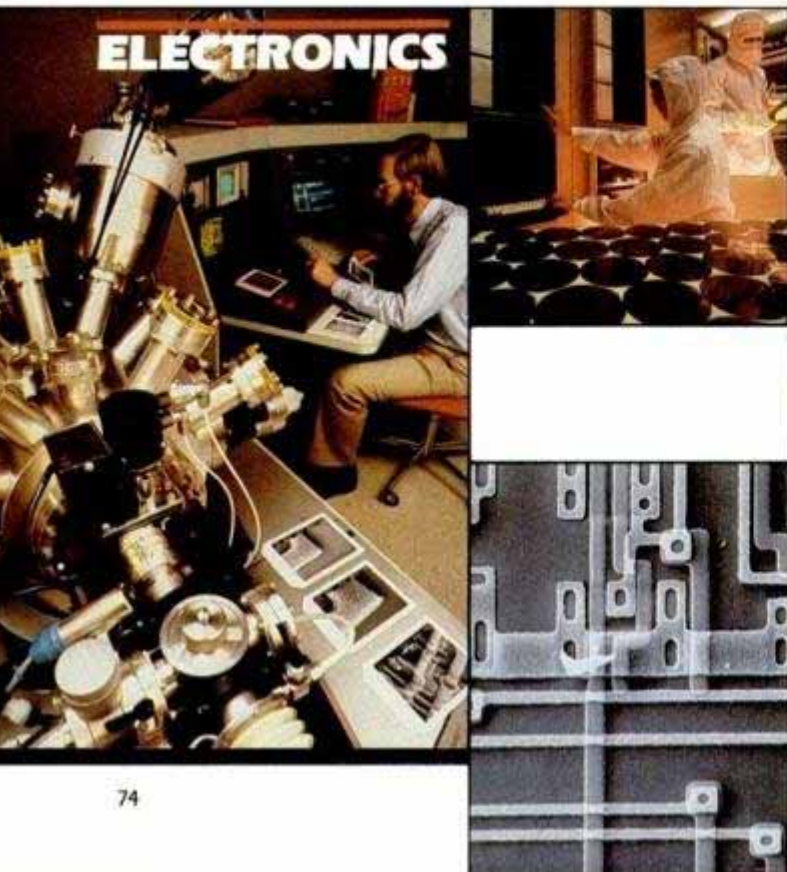
Would-be space travelers will soon tour the universe without leaving the ground. They'll blast off in a spaceship simulator designed to provide all the fun and thrills of a real journey to the stars. It consists of a 40-seat capsule mounted on telescoping hydraulic legs that allow it to roll and pitch as if in actual flight. During the 75-minute "voyage," passengers will watch the universe pass by as realistic scenes of planets, asteroids and space stations are projected on a giant screen.

The spaceship simulator was developed by Rediffusion Simulation Ltd., a prominent British maker of aircraft flight simulators. The first has been installed in Toronto's CN Tower.



Spaceship interior is shown at top. Hydraulic legs provide motion (lower left), while space scenes are projected on screen (right).

## ELECTRONICS



### Blue-chip systems save chips

The Pentagon was rocked by a scandal last year when it was discovered that hundreds of defective microchips had been installed in the weapons systems of strategic aircraft. During practice, a half-dozen aircraft failed to open their bomb hatches or fire their missiles. Now, Research Triangle Institute and General Electric have developed systems to inspect microchips for the submicroscopic dust believed responsible for the military chip failures.

Working at the Microelectronics Center of North Carolina, RTI scientists have developed a "super-clean" room where air filtration and chip handling systems keep dust down to fewer than 100 millionths-of-an-inch particles per cubic foot of air. That cuts dust by more than 25 percent. A vacuum-clean electron microscope is used to inspect individual chips at powers up to 6,400X. The microphoto (bottom left) shows a half-micron particle on one of the inspected chips. The particle is big enough to short-circuit memory. With the new system, manufacturers will be able to keep chips clean and pick out the bad apples before they are shipped to users.

Editor: Dennis Eskow  
 Contributors: Sheldon M. Gallager, Solange De Santis,  
 Robert F. Gallagher, Murat Soygenis, Art Boy,  
 Kathryn Brockman, Steve Eskow, Ida Beck

**MILITARY**



Mammoth B-1B bomber makes first public appearance in recent rollout (above). At right, prototype B-1A test-flies B-1B's avionics.



**Giant bomber gets green light**

It's been years in the making and many doubted that it would ever get off the ground. But now the mighty B-1B, America's first supersonic, long-range, intercontinental bomber, will soon get its wings. Congress has authorized funding for 100 of the craft to be built by Rockwell International by mid-1988.

Unlike earlier high-altitude bombers such as the B-52, the Mach 1.2, swing-wing B-1B is designed to attack at treetop level, using natural terrain features to mask it from enemy radar. Relying solely on its speed and ground-hugging ability to avoid detection, it carries no weapons for self-defense.



**New glass for Molotov cocktails**

The technician lighted the fuse on a bottle filled with gasoline and quickly hurled it at a pane of glass about 20 ft. in front of him. The bottle exploded on impact, spilling flames all over the glass. But when the fire died down, there was just a tiny hole and some charred cracks in the window. The glass was coated with a polyester laminate called ArmorCoat. The Defense Department is testing it now.



**Polar plane**

Most polar exploration aircraft must be fitted manually with skis for operating on snow and ice. Now, a clever new ski-and-wheel arrangement enables this West German Polar 2 to land on either paved runways or polar wastes at the flick of a switch. Slotted skis are hydraulically raised for wheel landings and lowered for snow landings. The Polar 2 is a modified version of Dornier's small 228-100 civilian airliner.



**Uncrashable crop duster**

Because crop dusters need to fly low and slow, "ag" pilots must constantly be wary of going into a stall from which it would be impossible to recover close to the ground. To lessen this danger, a new agricultural spray plane, called the Predator, is fitted with a stubby canard wing just behind the nose. At low airspeeds or high angles of attack, the canard is designed to stall out first, automatically lowering the nose to regain flying speed before the main wing can stall.

Flaps on the canard also improve low-speed control for greater safety, and the cockpit is set far back near the tail to provide maximum impact protection in the event of a crash landing. The Predator was designed by Burt Rutan, famous for his innovative canard-winged kit planes. It will be produced by the Advanced Technology Aircraft Co. of Hanford, Calif.



**Mystery jetliner**

When Airbus, a European maker of successful airliners, announced a downsized 150-seat, twin-jet A320 (page 98, Sept. '84), everyone wondered what Boeing would offer as competition.

One answer could be the 7-7, an all-new 150-seat twin-jet under consideration by Boeing. The mysterious dash represents an as yet unspecified middle numeral. Since Boeing already has a 767, the new jetliner, if built, might just become the 777.

# New crush-proof box.



Also available  
in soft pack.

# MERIT

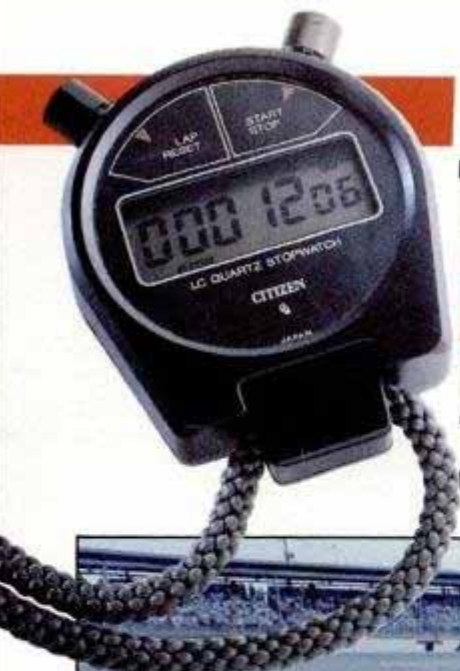
A world of flavor in a low tar.

Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

PM JOINS

Popular  
Mechanics

# THE WORLD'S FASTEST MECHANICS AT THE TALLADEGA 500



When the first yellow caution flag of the race comes out on lap 15, crew chief Larry Pollard makes an instant decision. 'Bring it on in for four tires and gas,' he orders Skoal Bandit team driver Phil Parsons. For the regular pit crew, it's just another Sunday service stop, but for me—signaling the jack man in the photo above—it's trial by fire.

BY NORMAN MAYERSOHN  
Assistant Auto Editor

**A**s temporary team gas catch man, there's plenty to remember: watch for the first gas can to empty, steady and pass it over to the handoff man, catch the overflow from the tank vent, signal the jack man when the refueling is complete. Slowing up the team would make me very unpopular with this otherwise friendly crew, all of whom take this high-stakes business quite seriously. So far, they've managed to hide any doubts about this magazine guy from New York City, and I'm determined not to make them regret letting me join the Johnny Hayes Racing Team at the Talladega 500.

The pit stop goes like clockwork—so fast, in fact, that I really can't tell what's

happening around me. Gas flows into the fuel cell, lug nuts fly, impact wrenches chatter away and all four tires get changed without a hitch. The speed at which it all happens is a surprise—particularly because I am standing in the middle of this whirlwind—coming after a week of slow-building anticipation and the casual pace of life in the hot sun of the Alabama countryside.

Earlier in the week, on tech inspection and practice days, I never would have guessed that the 25-second stop for four tires, 22 gallons of gas, a windshield washing and driver refreshment was possible. Slow moving and ample-bellied mechanics shuffled casually to set up shop in the open-air garages, stopping often for a friendly

## THE WORLD'S FASTEST MECHANICS



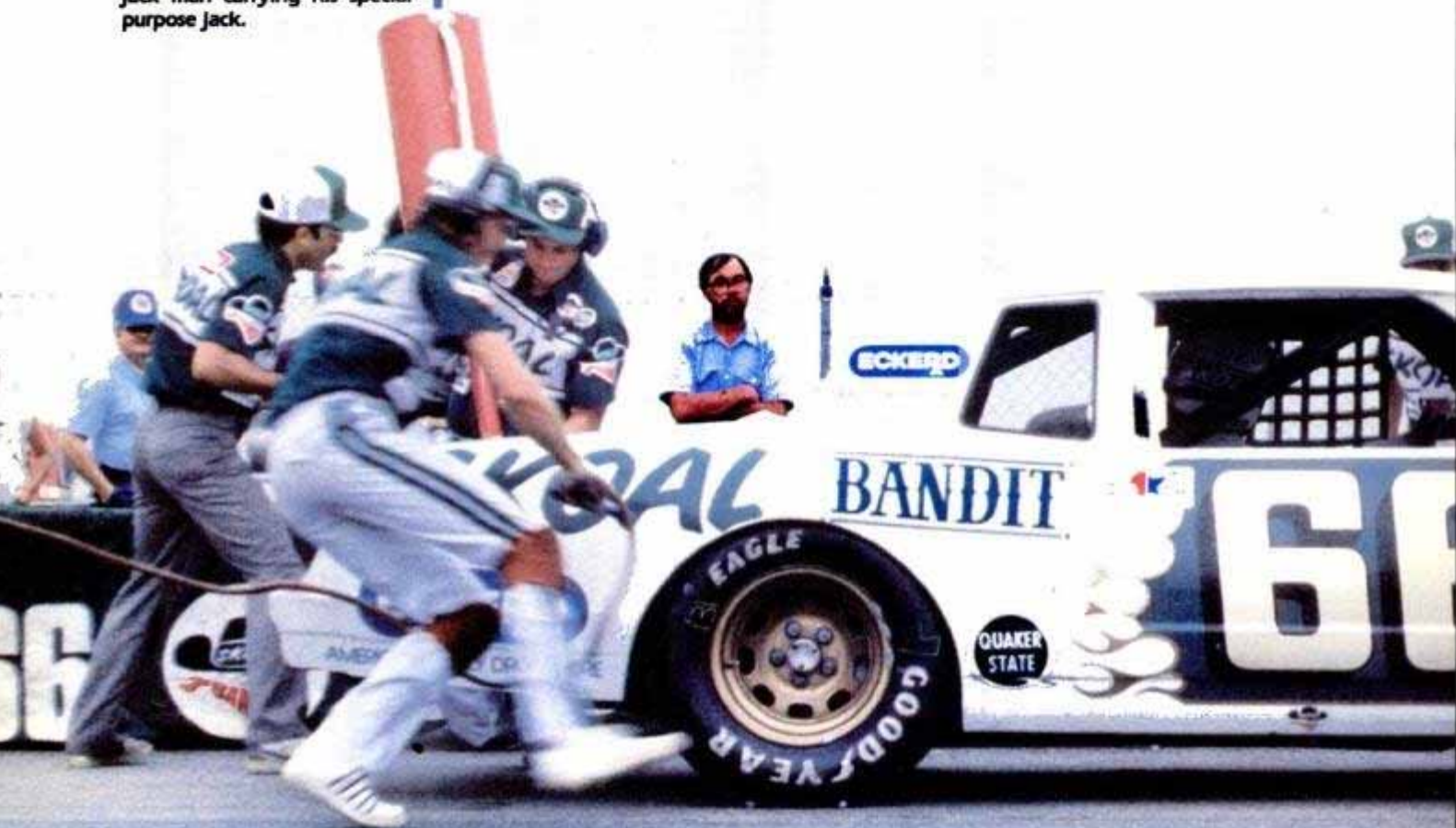
Over the wall and onto the battleground! When the car approaches, the crew leaps into action, one tire man to each wheel, and the jack man carrying his special-purpose jack.

how-do with the competing teams and to trade hometown news or a wad of chewing tobacco.

For the New Yorker, relieved to be worlds away from his desk and once again surrounded by the din of racing V8s, it's a puzzling situation: How could these snail-paced Southerners really shame the scientific pit row technicians of the Indy 500 and international Grand Prix circuits? On the first day of qualifying, their drawled speech is so syrupy that "it" turns into a three-syllable word; by race day they have all the

urgency of a Wall Street broker trying to clinch a deal 10 seconds before the closing bell.

Going into the race, I knew that there was plenty of sophistication beneath that veneer of country-boy simplicity. After all, it takes plenty of science to make a 3,700-pound Chevrolet Monte Carlo lap the Talladega trioval at 202 mph and keep it on the track for 500 miles. Sure, the engine builder will try to disarm you with an innocent



Jack man quickly locates lifting pad by painted arrow (right) and pumps away. Tire changers

spin off the lug nuts while the driver holds on the brakes. The tire carrier steadies fresh rubber at the front fender—stray tires in pit row can cost teams a cash fine!



Right side of the car is lifted in 10 strokes of the jack by using a special hydraulic pump section

(right). Tire carrier proceeds to rear, saving steps by jumping over the jack. Gravity-feed gas can drains 11 gallons into the tank as gas catch man monitors overflow.



Lug nuts fly and rear tire is removed as tire carrier hands off and helps position the new

wheel. Custom-built 30,000-rpm wrenches never stop spinning, but still grab lug nuts because hand grinding inside sockets (right) provides an engagement ramp.





"I don't rightly know" when you press for details of the camshaft specifications, but only a fool would believe that his 650-hp, 350-cu-in. V8 hasn't been strenuously developed on the dynamometer, and that the man doesn't know plenty about brake specific fuel consumption and abstract concepts like combustion chamber turbulence.

And only a fool would think that the minds of these wily racers would stop there. When Phil Parsons' number 66 comes off the 200-mph banking, strafing into the pit road at 100, using all the

brakes he can muster, a six-man attack force launches over the knee-high pit wall and transforms into a blur of action. The speed is part determination, and in this case, the result of applied science. The tools are specialized: specially built impact wrenches fired by pressurized nitrogen rather than moisture-laden compressed air; wheels prepared with lug nuts cemented in place to eliminate fumbling; turned-down wheel studs to allow quick thread starting; wheelless hydraulic jacks modified with lightweight magnesium side

plates and quick-acting pump units; self-sealing gas filler necks which require no cap; and reworked sockets to allow lug engagement without stopping the wrench. More exotic hardware, like built-in jacks and five-at-a-time lug wrenches are not allowed under NASCAR rules.

For the Johnny Hayes Racing/U.S. Tobacco team, preparation doesn't end with the tools, though. The pit crew itself is highly specialized (with the possible exception of the gas catch man

*(Please turn to page 122)*



Jack man lunges for the front wheel and gets the used tire out of the way while the fresh one

goes into place. Job is speeded up by pre-luging lug nuts to wheel with weather-strip cement (right). Driver gets a cool drink on a long-handled holder.



With wheels in place, lug tightening begins fast and furiously, while windshield man makes a

final wipe of the glass. Lug nuts are able to slide on studs easily (right), since the first few threads have been machined off and a hardened collar pinned in place.



When gas flow stops, gas man retracts can and steps back. Dry break filler automatically closes,

overflow exits from screened vent. When lug nuts are tight, jack man lowers car, signaling driver to leave. Total time for a two tire change stop: 12.6 seconds!



# PM'S WATER SPORTSTER

Our latest project fills the bill for water sports, family cruising and fishing.

PM photos by Frank Zagarino and Bill Ashe



**W**e admit we didn't expect it. When we asked you readers to submit entries for our Forest Ranger contest with ideas for our next project vehicle, we expected you all to suggest car and truck based projects. We were surprised to find several hundred of you urging us to do a boat project.

Reader Vern Cole of Vacaville, Calif., summed up the feelings of many hundreds of other readers: "...a nice economical fishing boat and trailer, set up and revamped with the type of practical and cosmetic changes you made on the Forest Ranger truck."

So here it is!

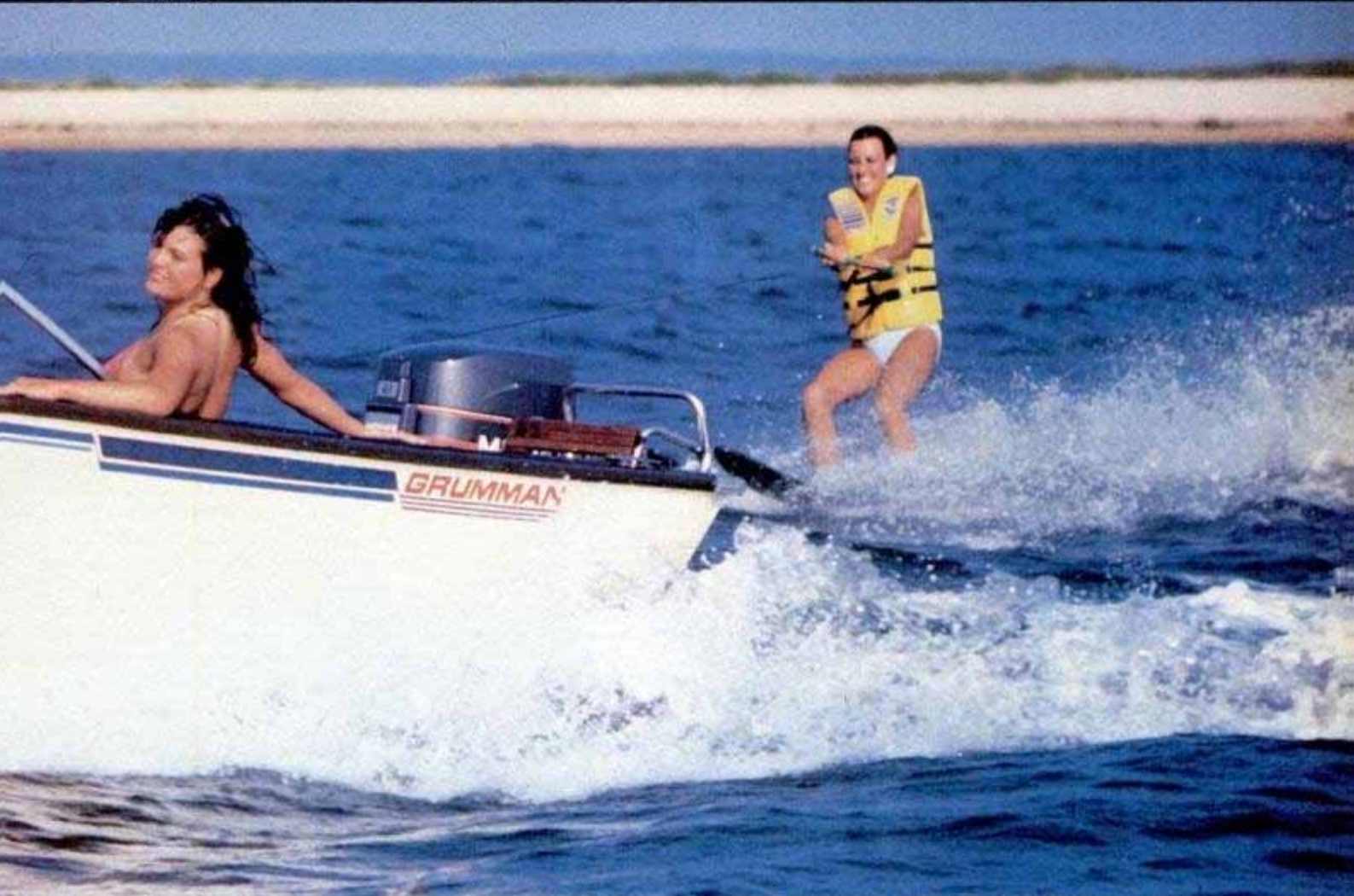
PM's Water Sportster is a small boat that fills big needs and hopefully has some good ideas you may want to incorporate into your own small boat. Overall, our boat is just 16 feet, 3 inches in length. But with 75 hp on tap anytime you want to ram down the throttle lever, it more than fills the needs of most

families who want a multi-use boat. Our Sportster can be used for water skiing and other water sports, has the comfort and room to make family or party cruising a real pleasure, and has the utility to make fishing a sport again instead of a chore. Plus, with that much power on tap and a convertible top, you have the push to outrun most weather back to a safe harbor and the protection you need if you don't make it.

We based our project on Grumman Boats' great little Skidaddle Ultrafisherman. Its aluminum hull means maintenance is almost nonexistent, and what is left is minimal and easy. Besides, the high-tech nature of an aluminum hull appealed to us.

The Grumman Skidaddle is the perfect choice for those who want to ski and picnic one day and fish the next. Walk-through windshields, stretch-out comfortable cushions up

*(Please turn to page 125)*



Top left to right, Grumman's optional convertible top affords emergency weather protection. Cruising for four is no problem with the Mariner 75 powerplant. Step-On swim platform is about the best we've seen. Left, Cybernet 2001 VHF-FM radiotelephone allows us to stay in touch. Aqua Meter Ensign tachometer monitors engine revs and Graduate depthsounder/fishfinder incorporates a speedometer and surface water temperature function.

# HI-FI FOR YOUR EYES AND EARS

Stereo sound's here. On the way is circuitry that sharpens pictures, corrects colors and exorcises ghosts. Here's how to judge TV's new image.

BY DAVID LANDER

In the beginning, there were vacuum tubes and black and white pictures. The '60s brought solid-state transistor circuitry and affordable color. Now, television's first and second generations are giving way to component monitors, monitor/receivers and high-resolution TV, and broadcasts have stereo sound. Digital circuitry improves imaging and gives new home sets screen within a screen, stop-action freeze frame and zoom focusing.

### The switch to digital

Digital signal processing in the form of tiny, microprocessor chips is on the verge of replacing the conventional analog circuitry that now converts broadcast waveforms into sight and sound. This application of computer technology to TV comes at a time when conventional methods are improving—and it's just a harbinger of things to come. Emerging beyond the digital horizon is High-Definition TV, which promises a wide, panoramic display and degree of clarity that rivals 70-mm movie film.

Digital television is the brainchild of ITT Intermetall of West Germany, and since 1983, about 50,000 sets have been sold in Europe and Japan. ITT's technology replaces the conventional TV's many wires and circuit boards with a handful of very large-scale integrated circuits similar to those employed in computers. The chips convert incoming video and audio signals to numerical values and store them in their computer memory for processing.

Once the signals become numbers, all manner of manipulation is possible. The most spectacular aspects of digital TV can be seen in the Toshiba CZ2094, a 20-inch color set just arriving in stores. These special effects include superimposing a smaller, second picture on the main TV screen image. You can use the "picture-in-picture" (PIP) inset (1/4 or 1/16 th the main screen size) to monitor what your VCR is recording

while you watch another broadcast program. The PIP also will freeze a frame from the main display for closer study. You can move the PIP to any corner of the screen. In future models from Toshiba and others, you'll be able to take portions of a freeze-frame and zoom-focus them to the full area of the screen.

While impressive, these effects do nothing to improve the basic TV image. But digital technology also can be used to correct colors, make ghosts more invisible and cancel distortion caused by outside interference (such as other electrical appliances or signal fluctuation caused by airplanes passing overhead). The chips can even be programmed to monitor the TV's operation, making internal adjustments to maintain consistent performance as parts age.

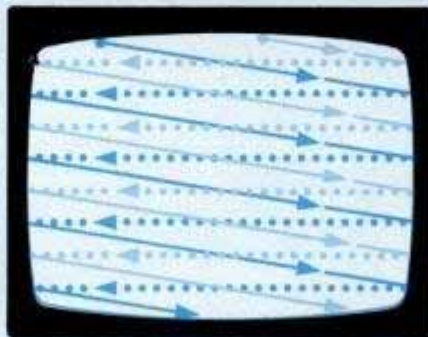
One of the more confusing designations applied to TV sets today is the term monitor. What makes it different from the conventional TV is its ability to route external video signals (from a

VCR, for example) directly to the screen via input jacks, bypassing the tuner (or RF) stage.

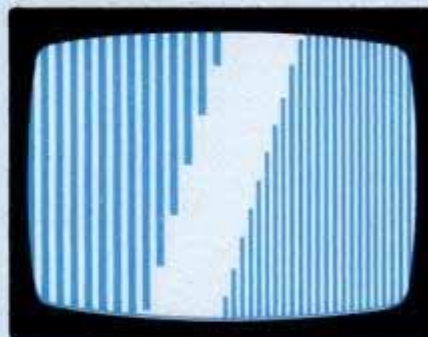
With a conventional TV, you'd have to connect the external source to the antenna terminals for reception through the tuner. This means the video signal must be converted to radio frequencies (RF). In effect, your VCR, videodisc player or computer broadcasts to the TV. Any conversion of signals adds distortion along the way, degrading the image somewhat. Direct connections via jacks avoid this. A true component monitor, in fact, houses only the TV screen and video circuitry. To receive broadcast TV, you'd have to add a separate component tuner. You'd also need an amplifier and loudspeakers to project sound. The newly coined term "monitor/receiver" describes a monitor (direct video inputs) with TV tuner, amp and speakers in one chassis.

Despite its high-tech connotation, the word monitor doesn't guarantee video resolution superior to the common TV.

### How TV Resolution Is Measured



Broadcast standards fix TV's vertical resolution (left) at 525 left-to-right lines running from top to bottom of screen. This 525-line frame is composed of two interlaced fields of 262½ lines each. Electron gun begins at top left corner of screen, zig-zags to create first field (dark blue) then races to top center to trace second field



(light blue) between lines of the first. Though vertical resolution is fixed, the TV's horizontal resolution (right) varies with tube quality. Some tubes have fewer lines (left side of screen), but more lines are used (right side) on better tubes. Conventional televisions have about 250 lines; monitors have 330 or more lines.



With Toshiba's new 20-inch digital TV, a viewer can place an inset of the picture from another source in any corner of the screen.

## Digital Processing Improves Picture



Digital signal processing offers a way to increase TV's vertical resolution without altering broadcast standards. Shown above is a computer graphic photographed from Sony 14-inch, high-resolution monitor now selling in Japan. Left side of image depicts TV in normal 525-line vertical scanning mode. Right side of

graphic shows effect of digital double-scanning—1,050 lines. Digital process interpolates missing information between each of 525 regular vertical scanning lines for higher definition and a flicker-free image. The horizontal resolution is identical for each side of the graphic: The Sony tube will project about 350 lines.

Image quality can vary, and you only have "high-resolution" TV when you've got good specs. In TV, as in hi-fi, some published specifications can't be used for comparison because different manufacturers make their measurements differently. The specs you *can* rely on for TV are overscan, horizontal resolution and vertical resolution.

### Overscan

Overscan is a design characteristic that causes some percentage of the picture area to be projected beyond the edges of a TV screen. It's meant to compensate for drops in electrical power, which cause the overall picture to shrink, and often frame the image area with a dark border. Thanks to hefty built-in power supplies, the best TVs need project only 5 or 6 percent of the

*(Please turn to page 134)*

# EARTH: THE GREATEST TELESCOPE

Linking together radio telescopes around the globe, we'll soon get a glimpse of worlds never before seen.

BY WILLIAM HOFFER  
*Illustrated by Dean Ellis*

Take a thousand normal galaxies, such as our Milky Way, compress them into a space as small as our solar system, and you have a cosmic engine capable of generating strange and wonderful energies. There are such structures in the far reaches of space. We call them quasars, or quasi-stellar radio sources, because in early photographs their images resembled those of stars. We are on the frontier of understanding these hot, massive heavenly objects. Yet the telescopes we have on hand are too weak to tell us all we want to know. The next piece of equipment to take us closer to the quasars will be the planet Earth itself.

For years, radio astronomers have been studying quasars using the best available equipment, and they have uncovered a great mystery. Take Quasar 3C273. Radio-wave "pictures" taken in July 1977 of this strange celestial object in the vicinity of the constellation Virgo showed a central core that had jettisoned a globule of fiery material off to one side. The width of the structure was 62 light-years—thousands of times greater than the distance from the Earth to the Sun. Later pictures showed it to be steadily growing. By July 1980 the mass measured 87 light-years across. It had expanded by a distance of 25 light-years in only

three Earth years, leading to the seemingly impossible conclusion that this cosmic wonder was expanding at a rate eight times faster than the speed of light!

The discovery spelled trouble for Einstein's relativity theory, which limits the speed of light. In fact, following the 1980 observation, several noted astronomers wondered if the theory of relativity had finally been toppled. Whatever the explanation, scientists need to study quasars in more detail.

"We want to look at the centers of galaxies," says Dr. Kurt Weiler of the National Science Foundation. He explains that galactic cores where quasars exist house "extremely compact engines that convert energy at a fantastic rate."

With the equipment available today, Weiler's hope is just a pipe dream. But a great, new age is dawning for astronomers. By 1987, man will begin to use the entire globe as a telescope, and the results are likely to provide grand insights into the structure of our universe.

Radio astronomy studies hold great promise. Many cosmic bodies emit radio waves in far greater profusion than light waves, and certain massive structures are totally invisible to optical telescopes. What's more, radiotelescopes are much less troubled by atmos-

pheric interference than are optical telescopes, and they can collect radio waves 24 hours a day. With advanced computer graphics, radio waves emitted by heavenly bodies can be translated into visual images that look like slightly blurred photos.

Radio astronomy is hampered by only one physical problem. Since radio waves are much longer than light waves, a radiotelescope requires a far bigger collection surface than an optical telescope to produce the same resolution. A radio dish would have to stretch across a 250-mile diameter to approach the capabilities of Mount Palomar's 200-inch optical telescope.

The solution was a technique called interferometry. When signals are compared between two or more radio dishes, the interference detected can be analyzed to fill in the gap between the dishes to approximate a picture as though received by a single dish spanning the distance between the two receivers. A two-dish system built at Cambridge University discovered the first evidence of rhythmic radio sources in the sky that came to be known as pulsars.

The success of the interferometry technique led, in 1967, to construction of the Very Large Array (VLA) outside of Socorro, N.M., where 27 radio dishes

are aligned in the shape of a Y. By observing continuously for a period of eight hours, radio astronomers utilize the rotation of the Earth to effectively close the arms of the Y to produce a single radio picture as though taken from a dish 15 miles in diameter.

Dreaming ever bigger dreams, astronomers realized that only the size and curvature of the Earth limited the scope of interferometry studies. International teams combined their efforts in a series of majestic experiments called Very Long Baseline Interferometry, tying together radiotelescopes

from Australia to the Crimea. The pictures were spectacular, revealing distant detail invisible even to the VLA.

But since some of the dishes were old, the equipment different and

coordination difficult, radio astronomy set as its next major goal the construction of a \$61.5 million telescope using interferometry.

Known as the Very Long Baseline Array (VLBA), the system will consist of 10 antennas, each 25 meters in diameter. Construction will be coordinated by the National Science Foundation.

"The VLBA should be able to see mass in orbit around a black hole, if a black hole really does exist," NSF's Weiler says. Thus, scientists hope to test relativity, and whether a black hole is merely theoretical.

This amazing radiotelescope system will produce images equivalent to those that could be obtained from a single dish 4,000 miles in diameter.

In the space age, the limits of technology expand to incredible dimensions. Plans are already on the drawing board for Quasat, an orbiting radio dish calibrated to fit into the VLBA system, which will approximate a telescope some 12,000 miles in diameter.

"Quasat may be only an intermediate step," says the visionary Dr. Weiler.

"It's far from reality, but we may eventually put a VLBA dish on the moon!"

**SINGLE DISH**  
3 MILLION LIGHT-YEARS ACROSS

**VERY LARGE ARRAY**  
300,000 LIGHT-YEARS ACROSS

**PROTOTYPE GLOBAL TELESCOPE**  
3 LIGHT-YEARS ACROSS

Radio "photos" of a single galaxy 3 million light-years wide got progressively more detailed (top to bottom) as more antennas were hooked together for "viewing." Overall view of the galaxy (top) was shot with one dish. Detail of central core (middle) was taken with an array of radio dishes. A prototype global radiotelescope using only four dishes took the bottom photo, which is a close-up detail 3 light-years wide.

**JULY 1977**



52 LIGHT-YEARS ACROSS

**MARCH 1978**



68 LIGHT-YEARS ACROSS

**JUNE 1979**



77 LIGHT-YEARS ACROSS

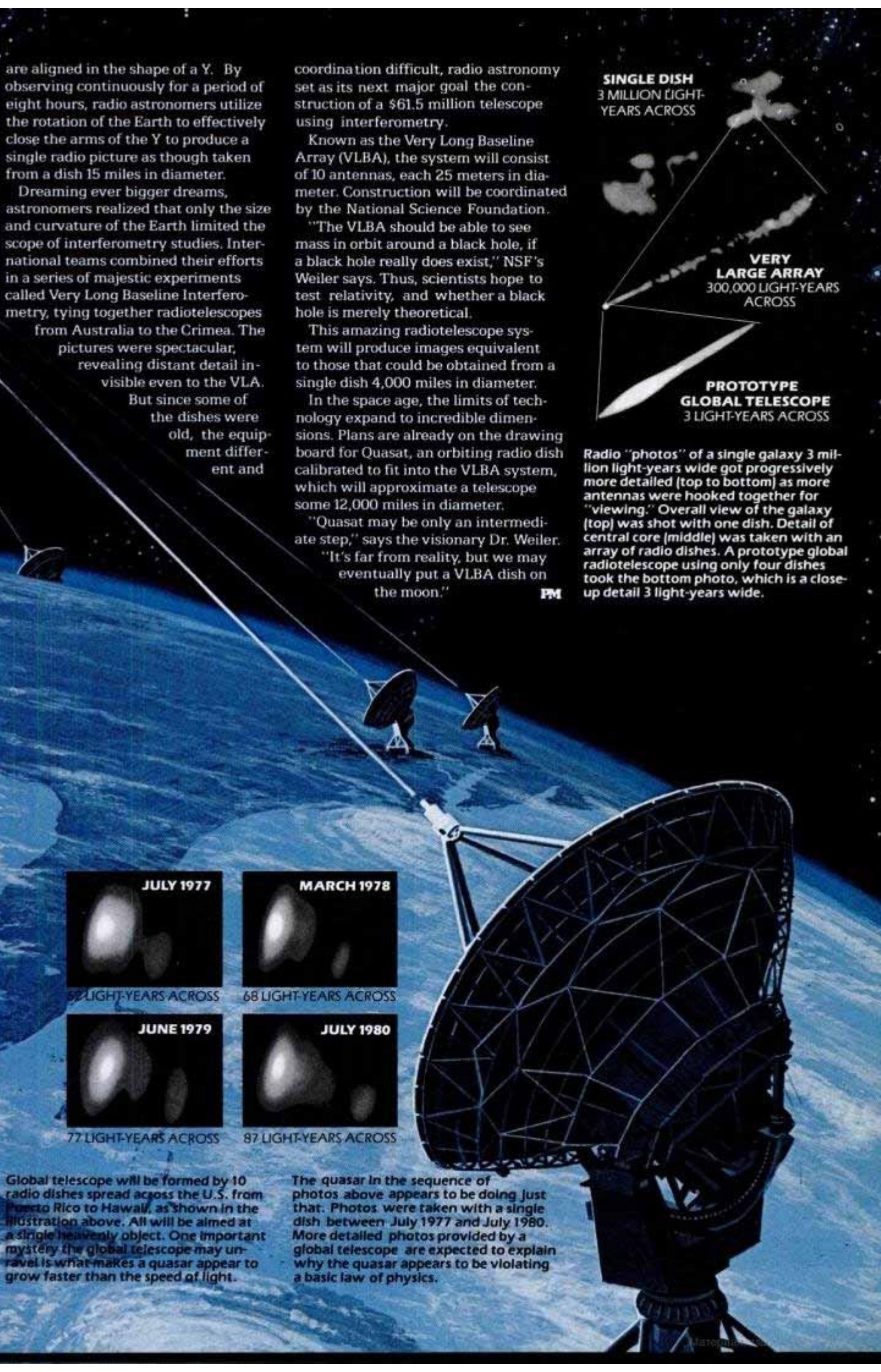
**JULY 1980**



87 LIGHT-YEARS ACROSS

Global telescope will be formed by 10 radio dishes spread across the U.S. from Puerto Rico to Hawaii, as shown in the illustration above. All will be aimed at a single heavenly object. One important mystery the global telescope may unravel is what makes a quasar appear to grow faster than the speed of light.

The quasar in the sequence of photos above appears to be doing just that. Photos were taken with a single dish between July 1977 and July 1980. More detailed photos provided by a global telescope are expected to explain why the quasar appears to be violating a basic law of physics.



# NO LONGER SITTING DUCKS:



Bristling with missiles and rockets, new Hughes AH-64 Apache is the deadliest attack helicopter ever made. In dive at left, it demonstrates its awesome agility.

## THE LOOK THAT KILLS

**W**hat you see is what you hit. With a new helmet-mounted gunsight developed by Honeywell, all a chopper pilot has to do is look at an enemy target and fire his cannon. The cannon instantly lines up on the target, automatically following his line of sight no matter which way he moves his head.

The heart of this remarkable system is a tiny, transparent eyepiece attached to the pilot's helmet so that it covers his right eye. The eyepiece is electronically coupled to a servo-driven optical scanner held in a movable gimbal mount in the aircraft's nose. The scanner, either a TV

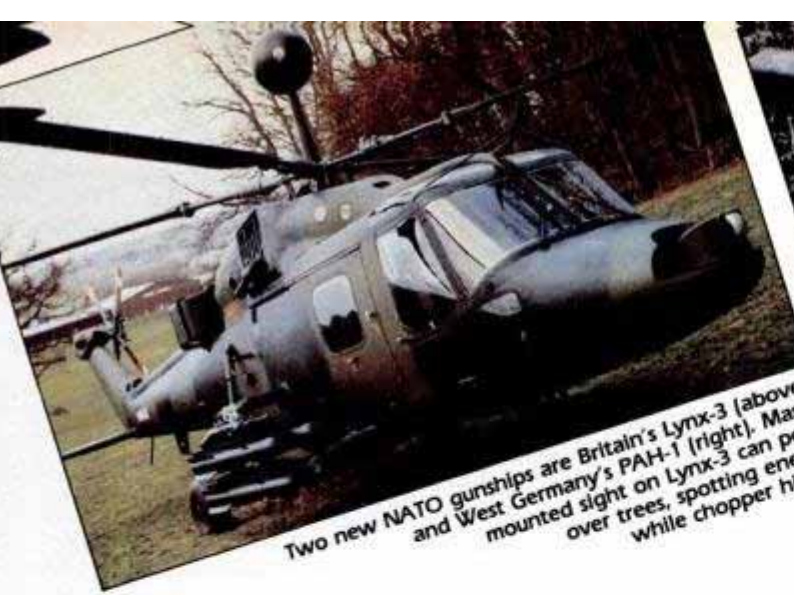
camera for daylight use or an infrared sensor for night vision, follows the movements of the pilot's head, looking wherever he looks. The cannon, located under the nose in a similar gimbal mount, is servo-slaved to the scanner so it points wherever the scanner is aimed.

What the pilot sees superimposed on the eyepiece is a brightly defined view of the terrain below, even in bad weather or darkness, making it easy to pick out a target that might otherwise be invisible. Also displayed in the eyepiece is vital flight information, such as heading, speed and altitude, so the pi-

lot can fly the craft without having to look down at his instruments. Because his view is through the eye of the scanner, rather than his own eyes alone, he can, in effect, see right through solid objects. He can look down at the floor and spot a target directly underneath just as if the bottom of the fuselage were transparent.

Called IHADSS (for Integrated Helmet And Display Sighting System), the Honeywell look-and-shoot sight was designed especially for the new Apache antitank gunship, but is also adaptable to other combat helicopters.—S.G.





Two new NATO gunships are Britain's Lynx-3 (above) and West Germany's PAH-1 (right). Mast-mounted sight on Lynx-3 can peer over trees, spotting enemy while chopper hides.



West Germany's PAH-1 carries six anti-tank missiles. A newer version, the PAH-2, will add air-to-air missiles.

# Now Helicopters Shoot Back

Our choppers took a beating in Vietnam.

Now this painful lesson is resulting in a deadly new breed of tank-busting gunships designed to fight back.

BY SHELDON M. GALLAGER  
AND MURRAY RUBENSTEIN

**A** weird apparition suddenly sweeps down over a mountain ridge at nearly 200 mph, belching flame from fanglike missile tubes as it zeroes in on a column of enemy battle tanks in the valley below. The tanks, caught by surprise, have no way of avoiding the withering assault.

This ferocious-looking, fire-breathing monster might be something out of a horror flick, but to American troops on some future battlefield it would be the prettiest sight around. It's the new Hughes AH-64 Apache, the toughest,

meanest, most awesome combat helicopter ever produced. At \$10 million apiece, it's also the most expensive. Bristling with missiles and rockets slung from outrigger arms, it typifies a new breed of fast, agile, hard-hitting helicopter gunships designed specifically to search out and destroy heavily armored vehicles on the ground and hostile helicopters in the air.

The need for such aerial tank killers was learned the hard way during the Vietnam War when the only combat helicopters then available were little

Even in darkness, pilot has clear image of target area, as shown in the simulated night scene below.



Target-spotting sight attaches to pilot's helmet so that it looks wherever he looks.



Apache's 30-mm nose cannon tracks target automatically, driven by a servo motor linked to pilot's helmet sight.



more than civilian models painted olive drab and fitted with a light-caliber machine gun. Lacking heavy weapons for self-defense and armored cockpits for crew protection, they were sitting ducks when exposed to enemy ground fire at low altitudes. Even a few well-placed rifle shots could bring them down. The famed Huey, a utility chopper pressed into military service, performed valiantly despite its limitations, but paid a heavy price. More than 5,000 were lost.

Not anymore. Today's helicopter gunships are counted on to provide our troops with a potent ground-support weapon in any land war to come. In the grim world of battlefield reality, NATO planners calculate that a single attack helicopter will deliver an average of 16 enemy kills before being itself destroyed or disabled. As cold-blooded as this may sound, it is nevertheless significant. It means that a relatively modest force of 600 gunships could account for nearly 10,000 enemy tanks, missile sites or other key targets—a number large enough, it is believed, to turn the tide of battle to NATO's favor.

In fact, a master battle plan, called Operation Deep



Versatile Sikorsky Black Hawk is both a potent tank killer and troopship. It carries 16 Hellfire missiles on outrigger pylons.

Strike, has already been drawn up by NATO and Pentagon strategists to offset the vast numerical superiority of Warsaw Pact forces. The plan is based on the assumption that current NATO forces could never hope to survive a full invasion thrust in a conventional head-to-head confrontation. Instead, it envisions a modern equivalent of the classic divide-and-conquer tactic. As the first enemy wave attacks, it is deliberately allowed to penetrate NATO lines with little resistance. Once inside the lines, the enemy is encircled, trapped and ultimately defeated.

Meanwhile, massive air strikes are launched deep inside enemy territory to attack and destroy the second, third and fourth waves before they have time to group and advance. Antitank helicopters, along with fixed-wing fighter/bombers and long-range ballistic missiles, would play a major role in these behind-the-lines assaults, helping to prevent the enemy from amassing its full might.

Operation Deep Strike is also seen, somewhat paradoxically, as a deterrent to nuclear warfare. The reasoning goes

*(Please turn to page 138)*



Proposed Navy version of Hughes Apache carries antiship Harpoon missiles and has a target-spotting radome above rotor.

## HOW A HELICOPTER CAN ATTACK WITHOUT BEING SEEN



**1** SCOUT HELICOPTER PINPOINTS TARGET WITH LASER BEAM

**2** ATTACK HELICOPTER, HIDING BEHIND HILL, FIRES ANTITANK MISSILES, WHICH HOME IN ON LASER BEAM, DESTROYING TARGET

LASER-GUIDED HELLFIRE MISSILES

**3** LASER BEAMS SPOTLIGHT TOPS OF TANKS SO MISSILES STRIKE WHERE ARMOR IS THINNEST

**4** GROUND-BASED LASER DESIGNATOR CAN ALSO FINGER TARGET FOR ATTACK HELICOPTER

How to hit what you can't see: Armed with laser-guided Hellfire antitank missiles, a helicopter gunship hovers unseen behind a hill. It can't see the enemy, but other eyes can. A high-intensity laser beam, called a target designator, is directed at the quarry from either

a second, scout helicopter or a hidden ground unit. The gunship's missiles, with a range of more than 7,500 yards, then home in on the laser light, destroying the target while the gunship remains safely concealed as far as four miles away.

Under the stubby styling of the MR2 body beats a 16-valve, 1.6-liter heart of gold.



## ITS BEAUTY IS UNDER THE SKIN

### TOYOTA'S MID-ENGINE MR2 IS SO DAZZLING TO DRIVE, YOU CAN ALMOST FORGIVE ITS LOOKS.

BY MICHAEL LAMM  
West Coast Editor

**T**oyota calls this a sports car, and there's no doubt about that. The MR2 runs and handles with the best. Too bad, though, that its styling turned out so bland.

Toyota started with all the right mechanical stuff: twin-cam, 16-valve engine placed amidships, five-speed transaxle, all-independent suspension, four-wheel disc brakes, rack-and-pinion steering, full instrumentation and multi-adjustable sport seats. Who could ask for more?

Well, I could for one, and so could Akio Yoshida, head of Toyota's design staff. Mr. Yoshida understands English but speaks it haltingly. When I asked him if the MR2 turned out as he'd envisioned it, he pointed to a big design sketch on the wall—a sketch that was recognizably MR2 but with a lot more character and flowing lines. He then looked back at me with the saddest eyes I've ever seen.

That's how I feel, too: sad that Toyota decided to make the MR2 custard pie instead of chili picante. To me, a mid-engined sports car ought to look the part. All but two do, the other being the Porsche 914.

I should explain that back in October, Toyota asked a dozen American auto journalists—me among them—to go to Japan to test-drive the MR2. The test



Angular front end with flip-up lights looks like any one of a dozen recent sports cars.



Rear view is the most distinctive, with its ample spoiler, high deck and droop snoot.

drive itself took place on Yamaha's motorcycle test track near Iwata. The track is a dog-bone-shaped, supertight course that has modified hairpin turns at both ends.

What I *can't* tell you is how the MR2 performs in normal, everyday traffic. We didn't get a chance to drive much below 60 mph nor to simulate real-life road conditions. I can tell you, though, that the MR2 handles very well at speeds ranging from 60 to 120 mph.

The MR2 sails through high-speed corners with good control and no problems up to the limit of tire adhesion. You have to push it very hard—harder than any sane person would—before you reach that limit. Even then you get plenty of warning, because as you approach breakaway you first feel some understeer, then a quick transition to oversteer and, if you still stay on it beyond that, you eventually force all

four tires to let go at pretty much the same time. That's when the rear starts to come around and the car begins to slide sideways, tail first. The only way to regain control is *not* to lock up the brakes, but rather to steer into the direction of the travel.

The MR2 uses 185/60R14 tires on 5.5-in-wide wheels, and these give plenty of footprint for all but dedicated racing. Wider rubber in the rear, as on most mid-engined exotics, would probably boost the stock MR2's 0.85-g cornering power to, I'd say, around 1.00 g. Toyota points out, though, that it purposely made all four tires the same size so they can be rotated.

Steering response is quick and right on the mark, with 3.1 turns lock to lock and no power assist offered or needed. The four-wheel disc brakes are smooth, positive and free of fade. The

*(Please turn to page 144)*

## Looking at snow under a microscope

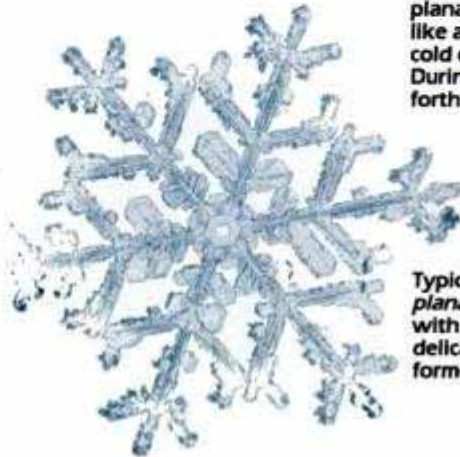
Scientists studying snow crystals under a microscope (right) can now discuss cloud temperature and dust conditions by looking at distinct classes of snowflakes. The crystals shown on this page were gathered in hexane liquid to preserve their shape for days so that scientists could trace their origin.



This snowflake, shaped with both planar (flat) and needle-like arms, fell through a very cold cloud with a strong updraft. During fall, shape moved back and forth between planar and needlelike.



Heavy, fluffy snow crystals form in very moist clouds with relatively warm bases. These are the flakes scientists would like to induce in snow-cloud seeding operations.




Typical snow crystal is a planar dendrite, a flat body with delicate branches. The most delicate of these flakes are formed in cloud's gentle updraft.

Age-old mysteries are rapidly melting away as we learn how to clone snow, predict avalanches and make snow clouds.

Charles Knight's heart leaped as he saw it falling—first in a light, powdery dust, then in a howling torrent. Winter had come to the Colorado Rockies a month early, and Knight excitedly ran into the National Center for Atmospheric Research lab offices. He grabbed his down coat and ran up to the small laboratory with the hole in the roof. Closing the door behind him, and adjusting to the room's chill, he began gathering petri dishes half-filled with hexane fluid. Each was placed carefully under the hole in the roof, where snowflakes could be collected for study.

Knight is one of a dozen scientists across the nation studying the nature of snow. The snow science already has led to the creation of "cloned" snow crystals formed on the surfaces of tiny bacteria. Snow science is also developing an avalanche warning system expected to save hundreds of lives a year. And, in the not too distant future, researchers hope to be able to "seed" productive snow clouds to produce more than twice the water that can be squeezed from a "seeded" rain cloud.

Writer: Dennis Eskow, science editor  
Contributors: Bob Sherman, Ottawa; Lee Green, New England; Dianne Driever, Squaw Valley, Calif.



# MAKING IT AND BREAKING IT

"The structure of snow crystals tells us a great deal about the conditions under which snow is made," Knight says. "We now have a pretty good idea of how the basic snow cloud mechanism works. But there are gaps in our knowledge we're just beginning to fill in." On a practical level, the most serious question is whether the size and number of dust particles in a cloud or the distribution of temperature in the cloud is the determining factor in how snow crystals form. Once the mystery is unraveled, snow seeding will move from an art to a science.

Knight's lab is located on a mountain in Boulder, Colo. The room is refrigerated like a walk-in meat locker down to minus 15° C. Single snowflakes are collected in the hexane-filled petri dishes, where the crystalline shape is maintained for days. After gathering the crystals, Knight places them under a light microscope, photographing each crystal for future study.

Knight and other researchers work at the microscopic level. Over the years, they have connected

Footprints lead away from dual dynamite explosion. The blasts were set off to start a mini-avalanche, preventing a major catastrophe on a California ski slope.

Both chunks of snow (right) are artificial. Chunk at left is made of water and air. The larger chunk uses "cloned" snow technique to make more flakes for a given water volume.



Single water pipe and set of cooled compressed-air pipes are housed in artificial snow shed (left). Computerized snow gun (above) sprays finished product. Water for the process is chilled (right) before entering system.



snow-crystal form with physical properties of the clouds that produce them. The most important general property of snow is that all crystals are six-sided, reflecting the arrangement of atoms in a water molecule.

The typical snowflake is a *planar dendrite*, a flat body with delicate branches. The most delicate of this group are formed in gentle updrafts inside a cloud. At the cloud base, a water droplet picks up a speck of dust around which the crystal will form. Moving up through the cloud, the crystal begins to take the shape of a fleck of ice and finally becomes a snow crystal as it reaches the supercooled upper part of the cloud and begins a slow descent buffeted by an updraft. (You can perform an interesting supercooling experiment in your kitchen. We'll explain at the end of this article.)

If the water content of the cloud is higher, and if temperatures at the base are somewhat warmer, the crystal formed will be heavier and fluffier. It's the heavier, fluffier crystals many scientists would like to generate in future seeding operations, since these would provide more spring runoff and a bigger water supply.

As temperatures throughout the cloud fall, depending upon how strong an updraft the flakes face, the crystal changes from the flat planar form to a more needlelike shape. Longer exposure to colder temperatures returns the shape to planar, and then back to

needlelike as the exposure to extremely low temperatures becomes even longer.

While researchers move along with their work on the relationship between snowflake shapes and cloud conditions, others have been working on ways to create artificial snow on the ground.

The traditional method—simply mixing chilled water with compressed air—has been used for decades on the ski runs of New England and Colorado. It produces something that is almost, but not quite, as good as the real thing for skiing. The real drawback with artificial snow is the waste of water and energy it takes to make it. But new, genetically engineered SnowMax is changing all that this year. The product, made from *Pseudomonas syringae* bacteria, produces at least 20 percent more snow from any given amount of water than the old compressed-air and chilled-water method alone.

SnowMax, created five years ago by Advanced Genetic Sciences of Greenwich, Conn., is a freeze-dried powder made from the crushed bacteria that were raised under laboratory conditions in a fermenting tower. The "broth" in which these bacteria grow is designed to kill off other bacteria so that all you get from the fermented soup is *Pseudomonas syringae*, a one-celled creature that grows naturally on the plants normally found near ski slopes. The bacteria produce a chemical catalyst that speeds up the formation of ice

## BUILDING AN IGLOO



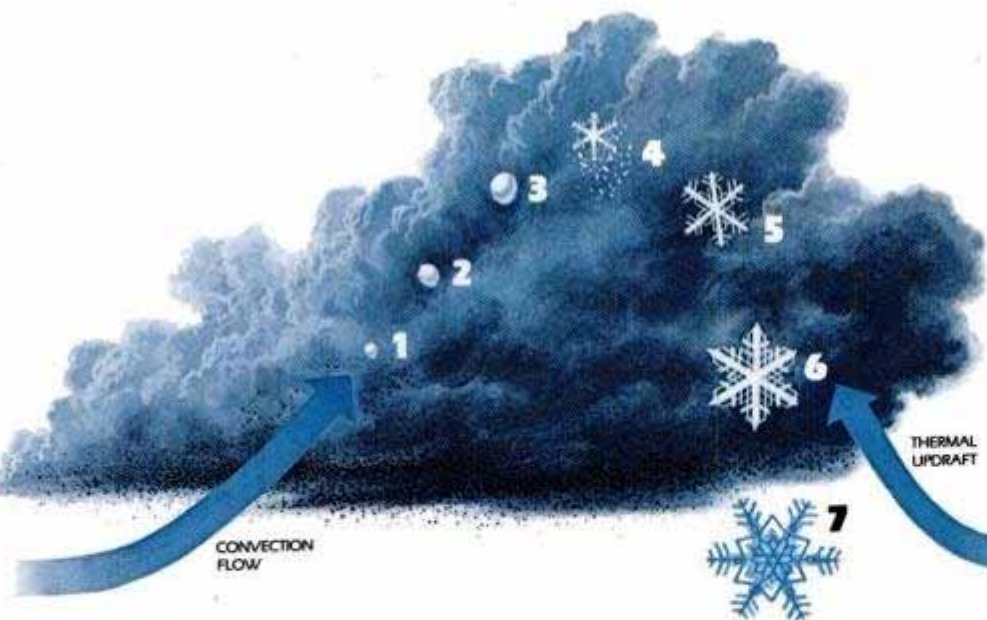
Igloo is made of bricks from snow similar to the type that helps start avalanches. Bricks are cut in blocks 2 feet long, a foot high and 6 inches thick. A typical igloo is 10 feet in diameter.



As courses of brick are laid, bottoms are cut at increasingly steeper angles, causing the walls to bend toward the middle. Wood placed atop platforms made of snow provides sleeping area.

## BIRTH OF A SNOWFLAKE

Convection carries water droplet through cloud base, where it picks up dust particle around which crystal forms (1). As it rises in cloud, crystal picks up moisture and freezes (2). In higher, cooler region of cloud, it reaches largest mass (3). As it begins descent, crystal picks up supercooled water vapor, forming branches (4). Depending on strength of updraft and local temperatures, crystal will continue development (5) or go from flat planar form (6) to needlelike structure (7) several times before it leaves ice condensation level just below cloud. Research is leading to new cloud-seeding technique.



crystals. Add the bug to the compressed-air/water system and you have snow that is the closest yet to the real thing. The cloned snow has been tested for three years at Colorado's Copper Mountain and for one year at Stratton Mountain in Vermont. For the current ski season, the first commercially available SnowMax is being used at a dozen resorts in New England and Colorado. With or without cloned snow, a vast majority of ski spas will resort to artificial snow sometime this season.

"Snowmaking is scientifically planned and brutally executed," says snowmaking pioneer Jeff White, consultant for the 1988 Winter Olympics. His Group Delta engineering firm, based in Ottawa, has helped design snowmaking systems for ski runs from New England to Austria. One of the sleekest systems inspired by White is running at the Killington ski area in Vermont.

Electric-powered vertical turbine pumps bring chilled water into the system. Compressed air, cooled in water-jacketed devices and dried out in a cyclone separator tower, runs through a pipe parallel to the water pipe. The air and water are mixed at a hydrant. A 1½-inch fire hose runs the mixture from the hydrant to a snow gun designed at Killington. Under optimum conditions, it takes about a foot of manmade snow to create skiing conditions provided by 3 or more feet of natural snow.

Even natural snow varies in its packing ability. And that is the root of understanding avalanches, something U.S. Forest Service researchers are on the verge of doing near Fort Collins, Colo. Monitoring avalanches along Berthoud Pass about 130 miles from town, Dick Sommerfeld and his colleagues think they've developed a system that will warn of a deadly snow slide hours before it happens.

Avalanche forecasters to date have watched weather conditions and taken reports of small avalanches from a network of observing stations to get their data. But usually deadly avalanches arise so quickly that the existing system fails to make a prediction.

Summerfeld's team places sonar sensors on the experimental station path and then reads a computer printout. "Noise" from nearby roads and ski lifts is accounted for. The remaining noise is recorded as a subsurface, avalanche-causing crack.

"Noise from snow has very little character," Sommerfeld says, noting how difficult it is to pick out the pre-avalanche sounds from the background. But after eight years of research, he believes the experiments have yielded a mathematical system to spot a subsurface crack forming hours before an avalanche starts. The sonar system may be in commercial use before the end of this decade.

The deadliest avalanches are "dry slab" events in [\(Please turn to page 120\)](#)



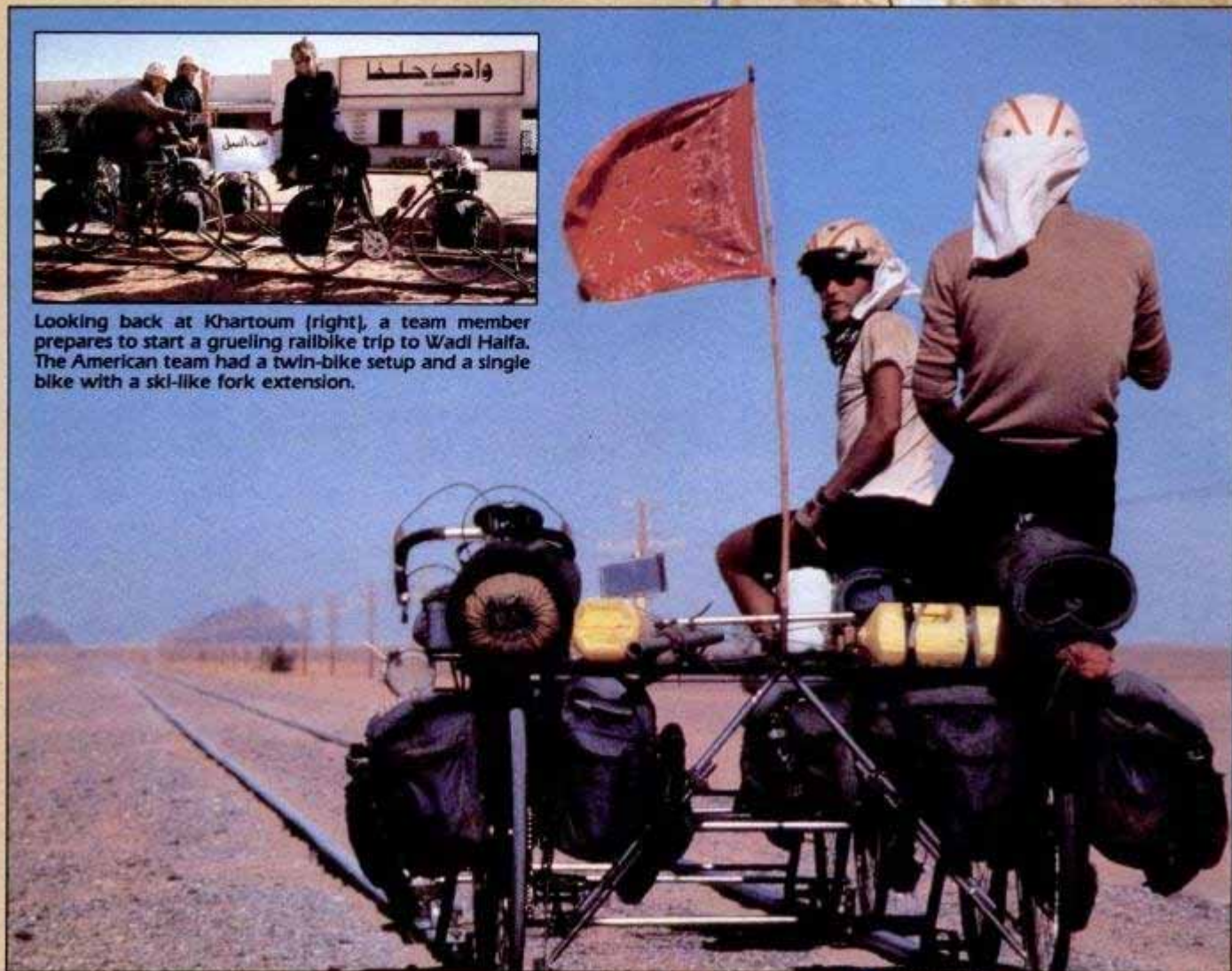
Final igloo shape includes an entrance crawlway. Inside can be lined with insulating animal skins. Temperatures inside rise up to 80° F. The walls melt so slowly that no puddles form.



A side-facing entrance can be attached to the crawlway to help cut down arctic wind entry to igloo. Windows made of frozen lake water also are added. Some igloos even contain a hanging heater.



Looking back at Khartoum (right), a team member prepares to start a grueling railbike trip to Wadi Halfa. The American team had a twin-bike setup and a single bike with a ski-like fork extension.

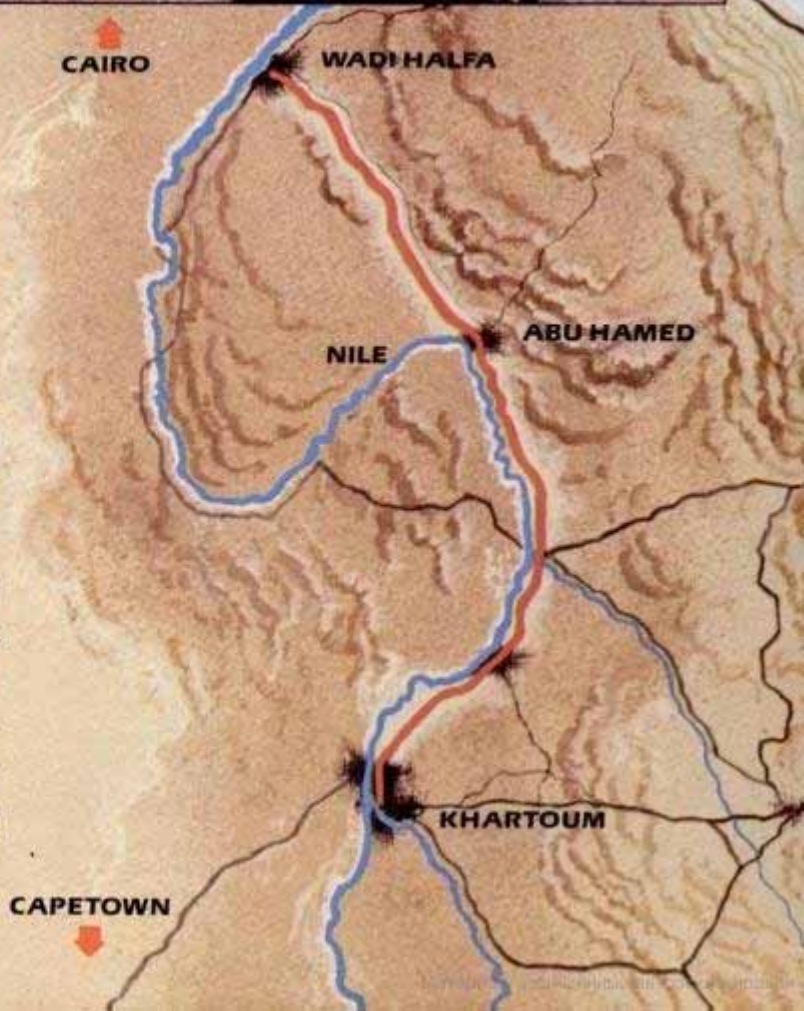


# BIKING THE NUBIAN DESERT

Their bicycles were rigged  
to ride the rails across  
500 miles of African desert.

TEXT AND PHOTOS BY TIMOTHY YOUNG

Red line on map shows railbike route from  
Khartoum to Wadi Halfa in Sudan. Cairo,  
Egypt, is 600 miles north of Wadi Halfa.







Using homemade welder and mask, team member builds a part to guide the wheel.



Guide bars were built to run along inside of the railroad track up to the bike's axles.



Team member compares guide-wheel adjusters after recutting to ride switch track.

*The author is part of an American team touring the world on foot and on modified vehicles of every conceivable kind. Last year, the team crossed the Nubian Desert of East Africa on bicycles. They found the sandy earth inhospitable to two-wheelers, but with a little modification, and that old railroad line . . .*

**W**e knew the 500-mile journey across the Nubian Desert would be a challenge when we set out on our bicycles from Khartoum, the capital of Sudan. Still, we pressed on for six days, carrying and dragging our bikes through the sand at a crawl of about 10 miles per day. In exhaustion, we stopped at a small village in the northern outskirts of Khartoum to rethink our plan. Staring us in the face was a seemingly endless stretch of hostile sand with few streets and one hardly used and very ancient railroad line. The rails, cleared of sand by occasional passing trains, gnawed at our imaginations until a plan began to emerge. We would have to scramble for nuts, bolts and piping, but the idea of modifying the bikes to ride those old rails quickly became our only option. It took us 10 days and \$25, but the delay was worthwhile.

When we had first rolled into the village, completely exhausted at the end of the sixth day, the first person we met was Abdel Hamid, an ancient carpenter who greeted us in Arabic. With a friendly clasp, his enormous hands took us in for a huge Sudanese meal and hot sweet tea.

Later, the smell of lumber shavings filled his shop, our first stop on a tour of the town, and we told him our ideas. We went past the mosque and market areas and found a collection of fix-it shops and small manufacturing shops. At one shop, people were working on Bedford truck bodies half-built on old but working frames, engines out here and there. There were chair factories where steel was twisted to shape as welder's sparks flew in the air. And there were supply stores, like Mohammed's auto parts store. Mohammed was a graduate in physics and mathematics from Khartoum. Against the odds of the Sudanese supply system, he was able to keep his store stocked full.

The next day Mohammed showed us his private shop, where we could work. "You have to have a name for this," he said. "How about *Bint el Nil*? It means daughter of the Nile in Arabic." And so, our strange vehicle was christened even before we started building it.

We settled on doing two machines out of three bicycles—one a parallel

double, and one single. A trip to the track revealed the rail was 43 in. inside to inside measure and 2½ in. wide. This old British narrow-gauge system was put in 50 years ago to carry goods and people over the Nubian Desert—one of the harshest places on the globe, with summer temperatures of 120° F. common.

The parallel double was first. Two of our bicycles are the same size, so we stood these up 44¾ in. apart at the tire center line. Armed with tubular steel, angle iron, threaded bar stock, nuts, bolts and brazing rods from the fix-it area, we started.

Bicycle-to-bicycle support bars were attached at four places on each bike: the front and rear axles, head tube and rear carry rack. We measured the correct distance, then added a small amount of length adjustability in the clamp system.

This kept the bikes upright. Now we had to create a way to steer on the track, and it took us 14 tea stops and the better part of a day to get across in Arabic what we wanted. A breakthrough came when we found that Nile river water pumps used a bearing that might do the trick. And best of all, the used bearings could be had for free.

Armed with a stack of "beelies," or driveshaft bearings, we manufactured a fork extension. From the front axle it extended at an angle to the rail, an identical one on each side, and it ran in wheelbarrow-like fashion on the rail top using the old water pump bearings. An additional bearing was attached on the extension. This ran along the inside of the rail, perpendicular to the top bearing. An adjustable tie rod connected the new forks rail to rail. Rear guides were added that ran from rear axle to rail, with a guide bearing on each inside rail edge.

Another bicycle, the single one, was next. In most ways it was similar, but because it was a single, we first had to build a narrow 4-foot "ski" with a bearing wheel rolling the rail on each end. Supports were made from ski to bike to act as an outrigger for balance. The rectangular pattern of four guide wheels on the inner track edges—limiting travel in four directions—was the same.

On test day, we lashed the steel tubes to our bicycles and rode 5 kilometers to Mohammed's father's house, which, as luck would have it, sat next to the tracks. "Whoever thought of this is a very smart man," said a dust-covered friend of Mohammed's as he climbed off his camel for a closer look. Moham-

*(Please turn to page 137)*

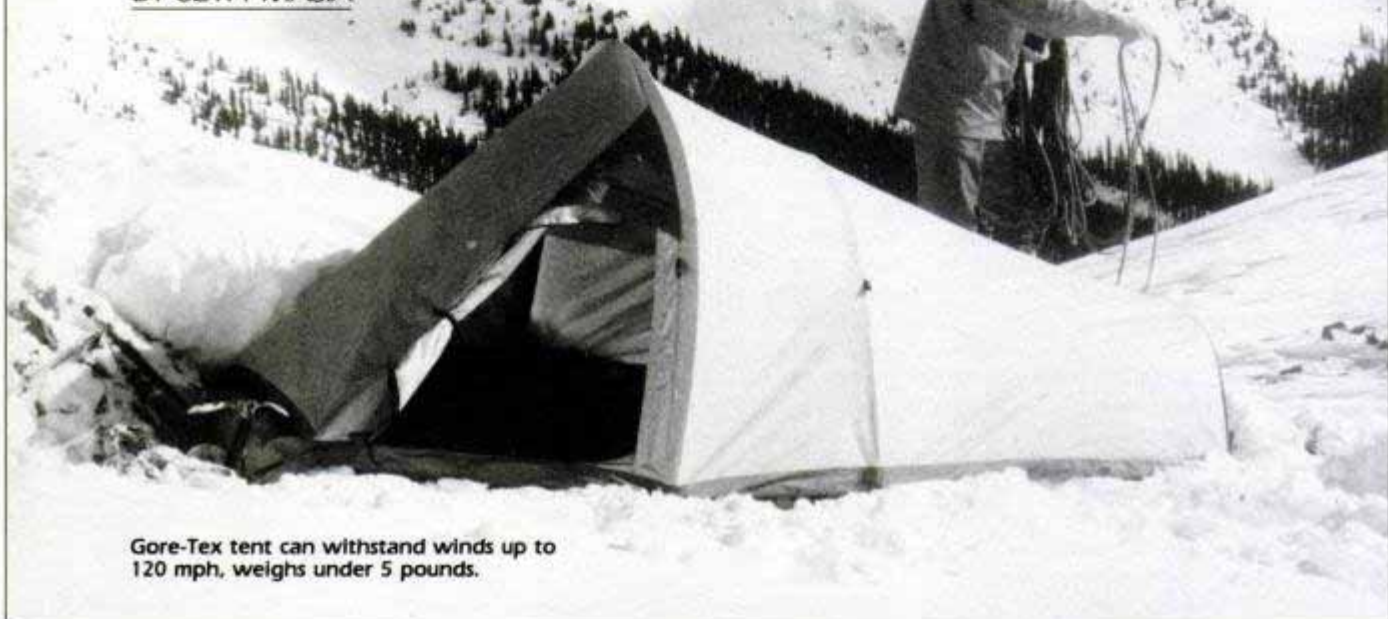


The single bicycle rode the tracks with its fork extension on one rail and an outrigger for balance attached to the other rail.

# New Gear For **COLD WEATHER CAMPING**

New technology can expand your camping season to 12 months a year.

BY SETH MASIA



Gore-Tex tent can withstand winds up to 120 mph, weighs under 5 pounds.

**W**hen autumn fades to winter, the crowds disappear from America's national parks and forests. Heavy snow makes much of our mountain wilderness inaccessible by car, but you can still see ski and snowmobile tracks disappearing into the woods. There are intrepid campers out there, savoring the wintertime silence. If you're equipped to camp in the snow, the wilderness is truly yours alone.

During a week-long ski trek through Idaho's Sawtooth Wilderness last winter, we had a chance to try out some of the newest snow-camping gear. Among a 15-member group led by Bob Jonas of Sun Valley Trekking Co., we toured the 10,000-foot Sawtooth Range. Jonas and the guides who work for him try out new equipment on most trips. "We're always looking for gear to make back-country travel safer and more fun," Jonas says.

Winter camping should not be taken lightly. Winter weather can be fatal to the camper who doesn't have the skills to protect himself. Winter search and rescue is difficult and dangerous. Avalanches kill back-country travelers each

year. But camping equipment manufacturers, especially the makers of high-quality mountaineering gear, have designed tents, sleeping bags, packs, stoves and ancillary equipment to make winter camping an exhilarating sport instead of a struggle to survive.

The most important thing to remember when camping is to stay dry in order to stay warm. Most insulation used in camping gear can lose half to all of its insulating value when soaked. Fortunately, unless you fall through the ice into a lake or stream, it's relatively easy to keep your gear dry. The colder the weather, the drier the snow. In freezing rain, the most hazardous winter camping weather, sleeping bags and parkas should be protected by waterproof shells.

The second key point is to stay out of the wind as much as possible. The wind-chill factor is a reliable index to the risk of hypothermia, a condition where exposed body parts actually begin to freeze as a result of subnormal body temperatures. Modern winter camping gear is designed to minimize exposure to both wind and wet.

## Sleeping bags

The key to a comfortable winter camp is a good high-lofting sleeping bag. Loft simply refers to the thickness of the insulation, and most winter mountaineers agree that 3 to 4 inches of loft is adequate for snow-camping. The insulation can be top quality goose down, in a bag weighing about 3 pounds, or it can be one of the good polyester fibers—DuPont's Quallofil or Hollofil, or Celanese PolarGuard—in a bag weighing 5 pounds or more. Down, the favored choice among expert climbers, is lighter and more durable than the polyester insulations. It also compresses into a smaller stuff sack for easy packing. But it's expensive. A well-made goose down bag costs \$300 to \$500.

Manufacturers of polyester bags, selling in the \$120 to \$150 range, point out that their products dry out quickly after a wetting, which provides a significant margin of safety. Down bags, once soaked, lose all their insulating value, and can take days to dry properly. For this reason alone, polyester bags are the logical choice for summer camping

*(Please turn to page 114)*



Classic Hispano Suiza replica is built on a '28 Chrysler chassis.

## COACHBUILDER'S

# TOUR DE FORCE

**L**ike the mythical Camelot, some cars live in a never-never land. They are more than mere transportation. Some are true works of art.

Such a car was the 1924 Hispano Suiza built to run in the Targa Florio road race in Italy. The eight-liter H6C was driven by Andre Dubonnet, and it finished a respectable fifth overall. But the racing record of this Hispano Suiza is not what interested most people. The true center of attraction was its unique wooden body made by the Nieuport aircraft factory. It was a one-off tulip-wood masterpiece highlighted with bright copper rivets.

This special car provided the inspiration and challenge for a new company called Camelot Classics of Ventura, Calif. Camelot was formed by Fritz Huntsinger to showcase the coachbuild-

ing talents of Ray Kinney. The challenge was to reproduce the Hispano Suiza faithfully in light of modern technology. "If I could build that," said Kinney, "I could build anything."

He had to study woodworking skills to match his already proven metalworking skills (Kinney was part of the Clenet and Sceptre design teams). Learning how to select and match grains, steam-shape and finish hardwood paid big dividends. Kinney's work rivals that of the original Nieuport aircraft body.

The replica is named Phariance in honor of the French Knight of the Round Table who greeted King Arthur in France. The name fits well with the Camelot theme. The Phariance is built on a 1928 Chrysler towncar chassis with a 136-in. wheelbase and 63-in.

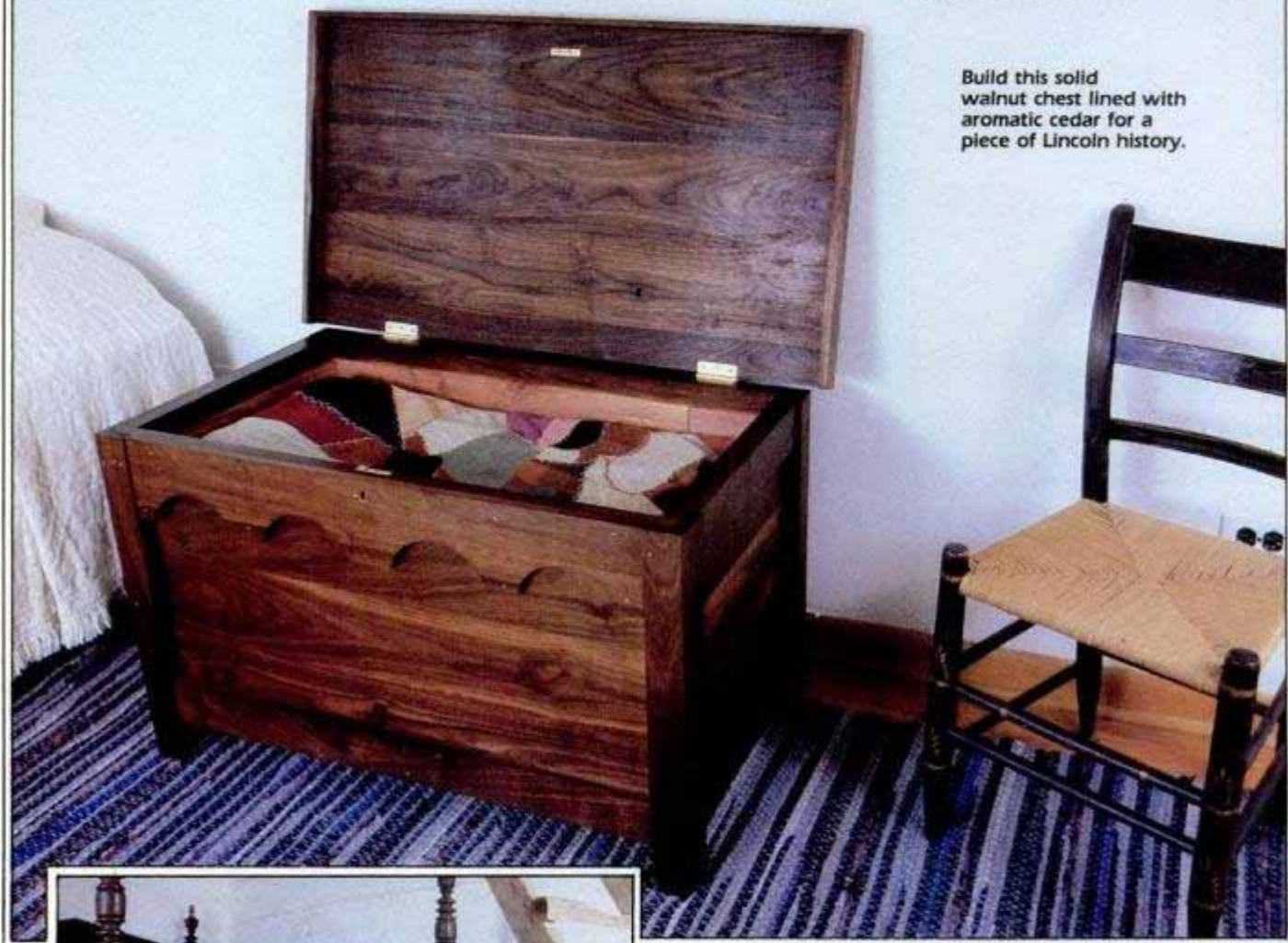
(Please turn to page 117)



Aluminum boat tail speedster body is covered with carefully matched mahogany strips, riveted in place (above). Rumble seat has lift-up cowling. Interior features dash levers recast from Hupmobile designs, and a mock shift lever attached to the Ford automatic transmission (left). A velvet-lined tool drawer fits under the front seat. Sun glints off mahogany, brass rivets and chrome.



Build this solid walnut chest lined with aromatic cedar for a piece of Lincoln history.



Original blanket chest built by Thomas Lincoln in 1845.

## Thomas Lincoln's BLANKET CHEST

Crafted by Abe Lincoln's father, this simple chest makes an appealing reproduction.

BY DAVID A. WARREN

In the early 1840s, when Abraham Lincoln was a newly married young lawyer in Springfield, Ill., his father, Thomas, occupied a farm in the east-central part of the state where he built a two-room cabin. It was there that a neighbor helped him cut down a large black walnut tree, saw it into boards, and stack it for seasoning.

After curing the lumber, Thomas and his neighbor, Rueben Moore, used it to build two identical blanket chests, one for each of them. Thomas designed the chests, using the rich black walnut grain primarily as decoration. Each chest stood 22½ in. high, 37 in. long and 20½ in. wide.

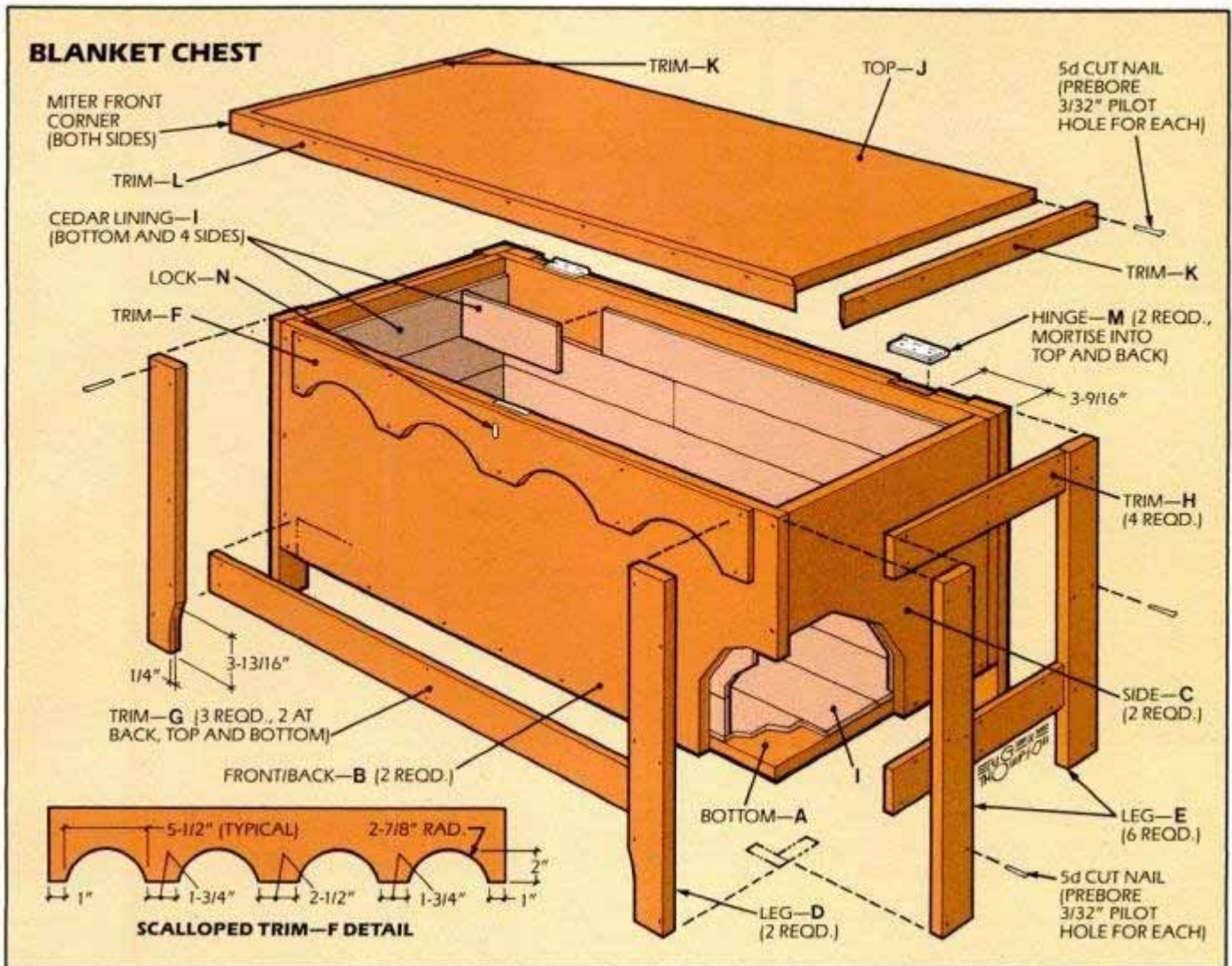
Thomas died five or six years after the chests were built, making these among his last furniture pieces. He had

been an outstanding furniture maker for much of his life.

Thomas Lincoln's farm, 8 miles south of Charleston, Ill., is now restored as the Lincoln Log Cabin State Historical Site. One of the two surviving blanket chests is preserved at the site. PM was

**Construction:** David J. Warren  
**Photos:** William Lasky  
**Photo styling:** Virginia Howley  
**Technical art:** Eugene Thompson

## BLANKET CHEST



### MATERIALS LIST—BLANKET CHEST

Key	No.	Size and description
A	1	1 <sup>3</sup> / <sub>16</sub> × 17 × 31 <sup>1</sup> / <sub>8</sub> " walnut (bottom)
B	2	1 <sup>3</sup> / <sub>16</sub> × 17 <sup>7</sup> / <sub>8</sub> × 32 <sup>3</sup> / <sub>4</sub> " walnut (front and back)
C	2	1 <sup>3</sup> / <sub>16</sub> × 17 × 17 <sup>7</sup> / <sub>8</sub> " walnut (sides)
D	2	5/8 × 2 × 21 <sup>1</sup> / <sub>16</sub> " walnut (legs)
E	6	5/8 × 2 × 21 <sup>1</sup> / <sub>16</sub> " walnut (legs)
F	1	1/2 × 4 <sup>3</sup> / <sub>4</sub> × 30" walnut (scallop trim)
G	3	1/2 × 2 <sup>3</sup> / <sub>4</sub> × 30" walnut (front and back trim)
H	4	1/2 × 2 <sup>3</sup> / <sub>4</sub> × 15 <sup>1</sup> / <sub>4</sub> " walnut (side trim)
I	18	3/8" tongue and groove cedar plank (lining)
J	1	1 <sup>3</sup> / <sub>16</sub> × 19 <sup>7</sup> / <sub>8</sub> × 35 <sup>3</sup> / <sub>4</sub> " walnut (top)
K	2	5/8 × 1 <sup>1</sup> / <sub>2</sub> × 20 <sup>1</sup> / <sub>2</sub> " walnut (top side trim)
L	1	5/8 × 1 <sup>1</sup> / <sub>2</sub> × 37" walnut (top front trim)
M	2	Stanley No. 289 (with nonremovable pin) 2 <sup>1</sup> / <sub>2</sub> × 2 <sup>1</sup> / <sub>2</sub> " butt hinges
N	1*	brass chest-lid lock

Misc.: 2d, 4d and 5d common cut nails, 120- and 220-grit abrasive paper, orange shellac, boiled linseed oil, 4/0 steel wool.

\*No. 32H11B, available from Constantine's Inc., 2050 Eastchester Rd., Bronx, N.Y. 10461.

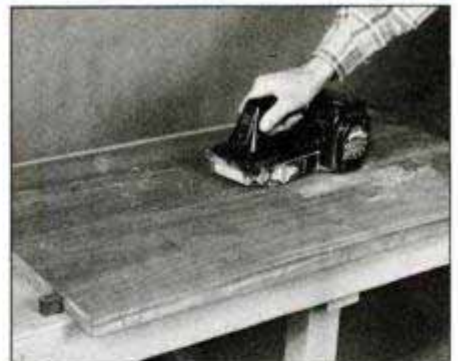
granted special permission to photograph and measure this easily crafted relic for reproduction.

The blanket chest looks like panel construction, but in fact, it's a simple box nailed together. There are no dovetails or other complex woodworking joints in Thomas's design. This greatly simplifies reproduction. Our chest is an

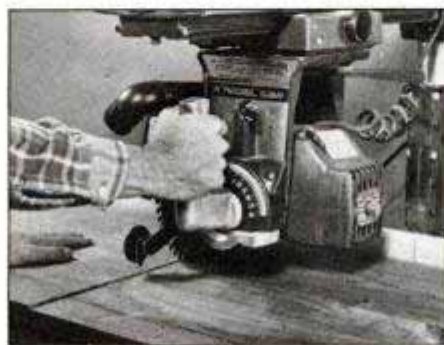
(Please turn to page 128)



Straighten board edges with a jointer, then match for pleasing grain. Glue and clamp, alternating clamps top and bottom.



Use a belt sander with 120-grit sandpaper to remove excess glue and level joints. Sand entire surface evenly to avoid low spots.

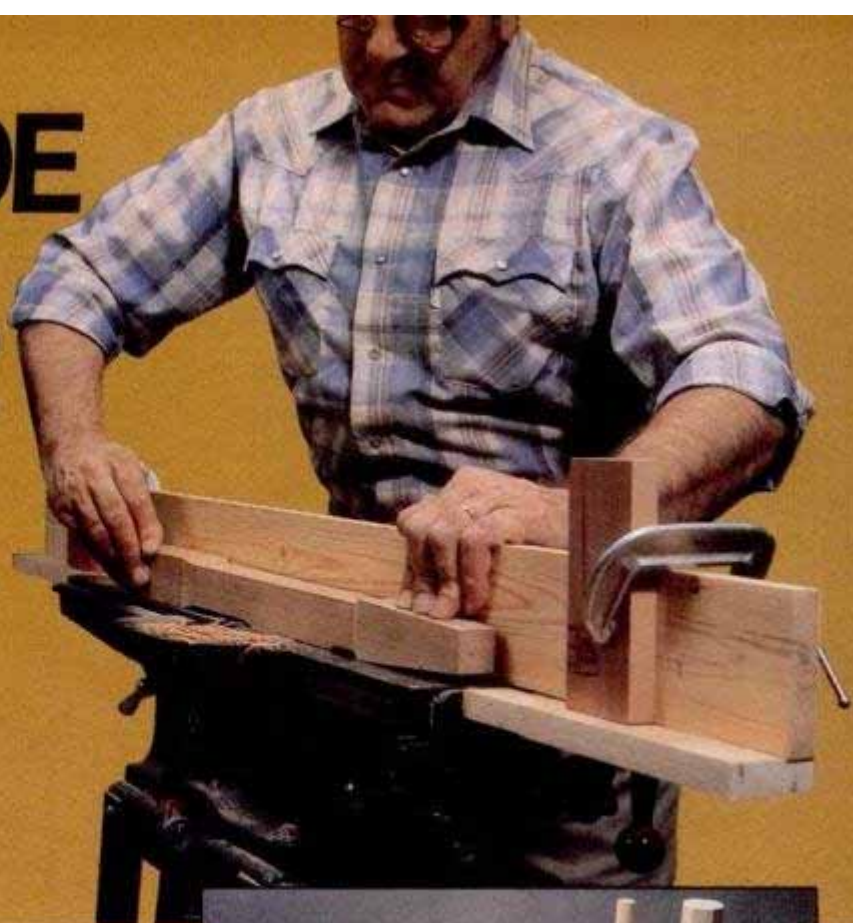


Cut front, back, sides, bottom and top boards to widths and lengths in materials list using a radial-arm or table saw.



Assemble chest with glue and 5d cut nails; attach trim with glue and 4d cut nails. Bore 1/32-in. nail holes to avoid splitting wood.

# PM's GUIDE TO USING THE JOINTER



From jointing board edges to cutting precise cabinet joints, here's how to get the most out of your jointer.

TEXT AND PHOTOS  
BY ROSARIO CAPOTOSTO

**A** jointer may not be the *first* tool to buy for a woodworking shop, but it is a versatile woodworking machine and a valuable complement to a table or radial-arm saw.

A jointer is used primarily to smooth rough, irregular board edges prior to edge-gluing into panels or ripping on a saw. Cut the boards with the straight, jointed edge against the saw fence. You can also use the jointer like a planer to smooth the faces of narrow boards.

## Jointer mechanics

A jointer is simple in both design and operation. A base supports two independently adjustable tables. Positioned between the tables is a cylindrical-steel cutterhead that holds removable knives. The cutterhead is driven by a belt connected to the motor. An adjustable, tilting fence guides the workpiece and a retractable guard covers the cutterhead. *Caution:* In several photos the safety guard has been removed for photo clarity. Never operate any power tool unless the protective guards are in place.

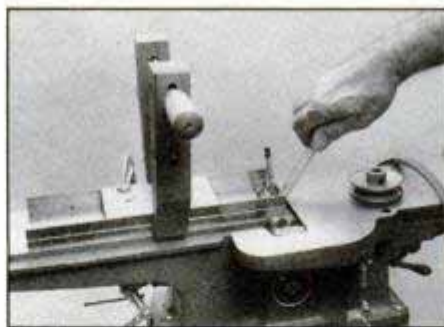
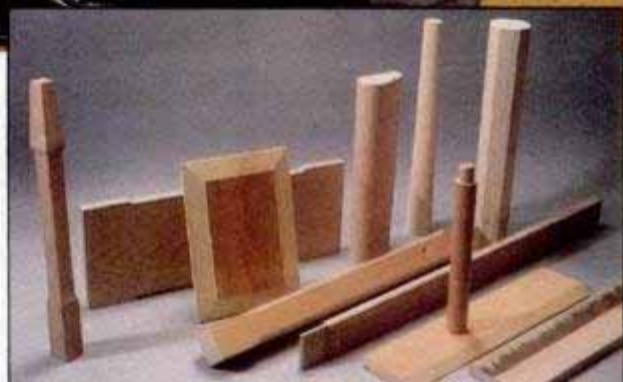
The jointer's front, or infeed, table is adjusted for the depth of cut. The rear, or outfeed, table is, for most operations, positioned at the same height as the knives to support the workpiece as it passes the cutterhead.

A jointer requires few adjustments, but these must be made carefully to obtain optimum performance.

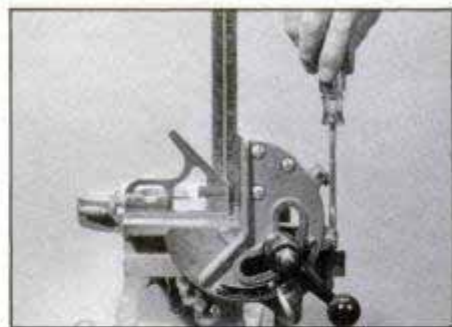
First, check the position of the knives in the cutterhead. The knives must

Technical art by Eugene Thompson

The author executes a recess cut on the jointer while making a furniture leg (above). Note use of an extension table and auxiliary fence to support the work. Clamp stop blocks to the fence to control the length of the recess. The assorted workpieces shown to the right were all shaped on the jointer.



Check knife alignment by clamping two steel rules to the rear table, as shown. Pencil wedged alongside cutterhead keeps it from rotating. Adjust knife to touch both rules.



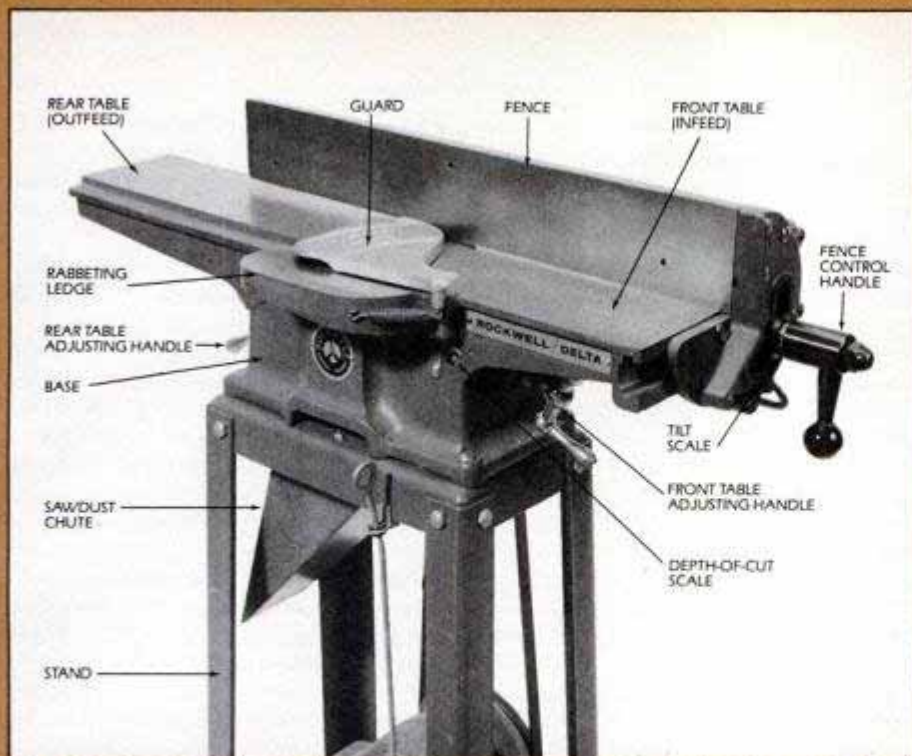
Use a square to check the accuracy of the tilting fence. Fence should be exactly perpendicular (90°) to the table. Adjust the automatic stops and indicator, if necessary.



Make a test cut in a premarked board to check the accuracy of the depth-of-cut scale. If cut and line don't match, adjust the front table accordingly, and set indicator.



Keep knife edges keen between sharpenings by honing them with a fine stone. Clamp pulley so that stone rests on knife bevel. Paper around stone protects table.



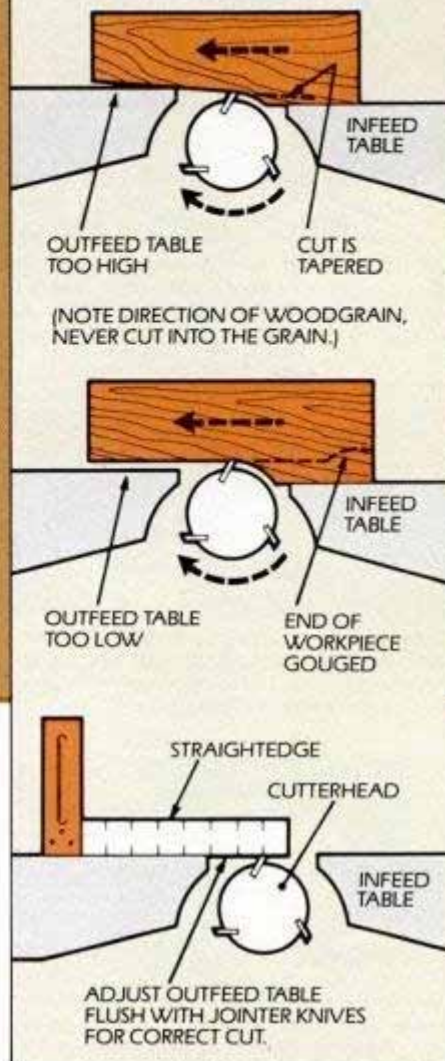
The 4-in. jointer, shown with its major parts identified, is a good choice for the home shop.

align with each other and be level with the table. To check knife alignment, clamp two 12-in. steel rules to a wood block that's about 1 in. narrower than the cutterhead. Unplug the power cord and remove the guard. Next, elevate the rear (outfeed) table slightly above the knives. Then, clamp the rules/block assembly to the rear table, so the rules overhang the knife edge by  $\frac{1}{8}$  in.

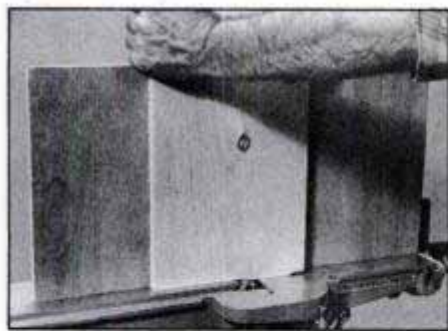
Now lower the jointer's outfeed table until the rules touch the knife. If only one of the rules makes contact, then the knife isn't level with the table. Loosen the locking screw and adjust the knife so it touches both of the rules. Rotate the cutterhead and align the remaining knives to the same  $\frac{1}{8}$ -in. marks.

Next, check the front (infeed) table's depth-of-cut scale and indicator, or

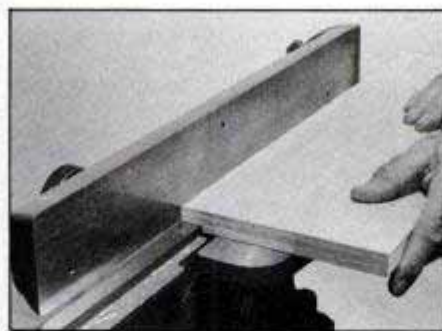
## OUTFEED TABLE ADJUSTMENTS



The illustrations above show how a misaligned rear, or outfeed, table affects the workpiece. Adjust the jointer so that the table is at the same height as the knives. Use a straightedge to check table height.



Joint end grain with slow, shallow passes. To prevent splintering the rear edge, first make a short cut, then turn the workpiece around and make a full pass, as shown.



Cut a rabbet by passing the workpiece over the end of the cutterhead. Support the work on the rabbeting ledge. Position the fence to control the width of the rabbet.



The safest way to cut bevels is with the fence tilted in to form a closed angle. This makes it easier to keep the workpiece in close contact with the fence and table.



Here's a quick and easy way to make an octagon: Set the fence to  $45^\circ$ . Then, chamfer the corners of a square workpiece. Make the same number of passes for each corner.

pointer, for accuracy. Set the jointer for a  $\frac{1}{8}$ -in.-deep cut. Then, accurately scribe a  $\frac{1}{8}$ -in. line on a test board. Make a partial cut and see if the line and cut match. If not, adjust the table as required. Repeat until the cut is exactly  $\frac{1}{8}$  in. Now set the indicator to  $\frac{1}{8}$  in.

Check the accuracy of the tilting fence using a square. At  $0^\circ$  the fence should be exactly perpendicular ( $90^\circ$ ) to the front table. Also, check the fence at  $45^\circ$ . Adjust the fence and indicator as necessary.

### Jointer operations

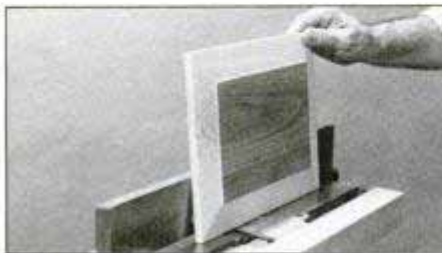
**Edge-jointing** is the most common of all jointer functions. First, determine the wood grain direction. Whenever possible, you should cut with the grain, not against it.

Next, hold the stock firmly on the front table and against the fence. Advance the workpiece into the cutter and

# JOINTER



Cut raised panels for cabinet doors on the jointer with the aid of a push stick. Clamp a wood block to the rabbeting ledge to support the workpiece at the desired angle.



Cut the cross-grain bevels first; any splintering will be removed by the edge-grain bevel cuts. Then, make light, edge-finishing cuts to complete the door panel.

onto the rear table while applying pressure with your left hand. As the rear end of the stock nears the cutter, apply pressure with your right hand.

When edge-jointing extra long pieces, employ the aid of a helper or build the extension table shown in the color photo on page 100. First, set the jointer to the desired depth of cut. Then, run a long 1 x 4 halfway through the jointer to form the auxiliary fence. Screw short 1 x 3 sections to the bottom ends of the auxiliary fence to act as extensions of the jointer tables. Now screw through the jointer fence and into the auxiliary fence.

End-grain jointing is a little trickier than edge-jointing. Feed the work slowly and take shallower cuts to avoid kickback. To prevent the workpiece back edge from splintering when the knives exit, first make a short cut into one end. Then, turn the workpiece around and make a full pass.

Rabbeting on the jointer is possible if your machine has a rabbeting ledge.

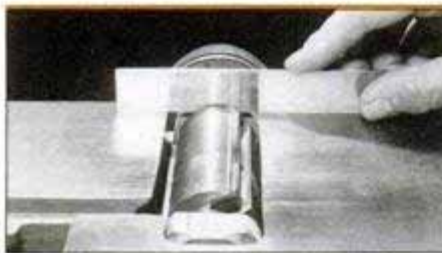
The ledge extends from the front table around the end of the cutterhead. **Caution:** Since the guard is removed when cutting rabbets, keep your hands well clear of the cutterhead.

Position the jointer fence to control the rabbet width. Adjust the depth of cut to determine the rabbet depth.

Bevels and chamfers are executed with the jointer fence tilted in (closed angle) or out (open angle). Whenever possible, tilt the fence in to form a closed angle. When working with the fence tilted out, be careful not to exert too much downward pressure or the work will slide away from the fence.

Raised panels can be made using any of several woodworking tools, including the jointer (see *How To Build Cabinet Doors*, page 104, Jan. '85).

First, set up for standard jointing operations—rear table level with the knives, front table adjusted for a shallow cut. Next, clamp a wood block to the rabbeting ledge to support the workpiece at the desired angle. Make a



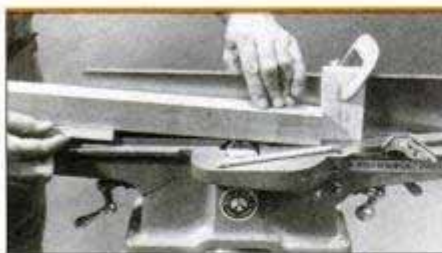
Lower the front and rear tables equally when cutting recesses or stopped chamfers. Check the table alignment by placing a straightedge across the table tops.



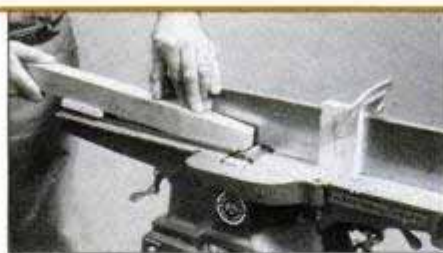
To control the length of a recess cut, clamp start and stop blocks to fence. Then, butt the workpiece end against the start block and lower it slowly onto the cutterhead.



Advance the workpiece slowly past the cutterhead to the stop block. Install an auxiliary fence with extension tables, as shown, to support oversized workpieces.



Here's how to cut end tapers: Butt the workpiece against a stop block clamped to the fence. Then, slip a wood block under the raised leg end to maintain this angle.



Now, with the block nailed to the workpiece underside, stand in front of jointer and pull the work across cutterhead. Block thickness determines the degree of taper.



After tapering the ends, cut recesses to form a furniture leg. Cut a short recess, then turn the leg around and splinter it in the other direction to prevent splintering.



Contouring workpieces into irregular, free-form shapes is possible on the jointer. First, make a series of shallow chamfer cuts to form the basic shape of the piece.



Continue to make shallow cuts while rotating the workpiece slowly. Keep a firm grip on the workpiece at all times. Decrease the depth-of-cut as the piece takes shape.



Finally, finish-shape the workpiece with the jointer adjusted for very shallow cuts. Use the fence to guide the piece straight. Hand-sanding completes the project.





The featherboard hold-down is a necessity when jointing thin stock. Cut the feathers on a band saw. Clamp the hold-down directly over the cutterhead and rear table.



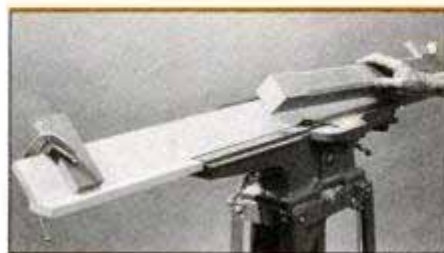
Make a wide push block for cutting tenons. Assemble the block using glue only. Masking tape applied to fence indicates where to stop advancing the push block.



A push block should always be used to surface plane boards on a jointer. Shape this block on a band saw from a 2 x 4. Add stop block to the underside with glue only.

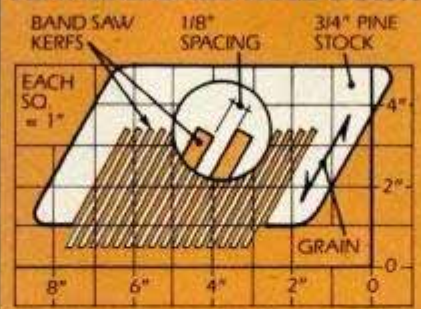


Make the three-handle block for surface planing long stock. As the work advances across the cutterhead, shift your hand from the lead handle to the middle position.

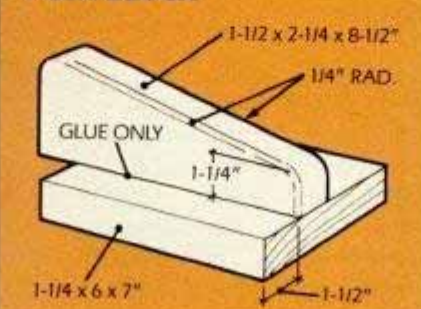


Build this auxiliary fence with extension tables at a 45° angle for chamfering long pieces. Note that a small cut is made in the fence center to clear the cutterhead.

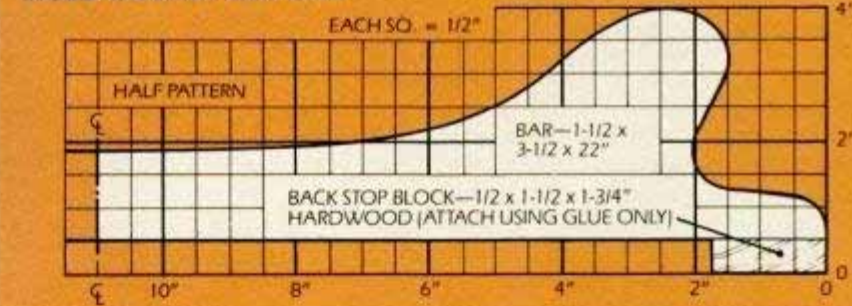
### FEATHERBOARD HOLD-DOWN



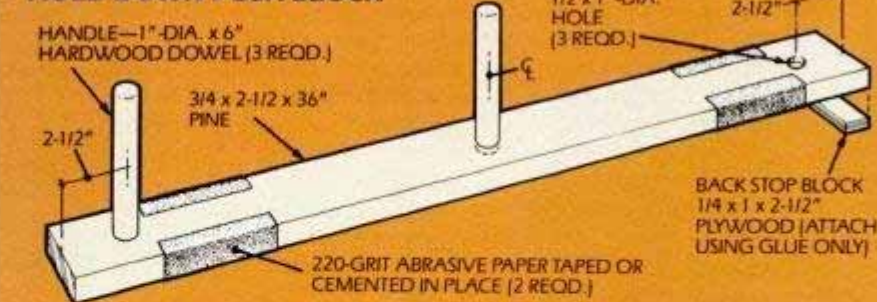
### PUSH BLOCK



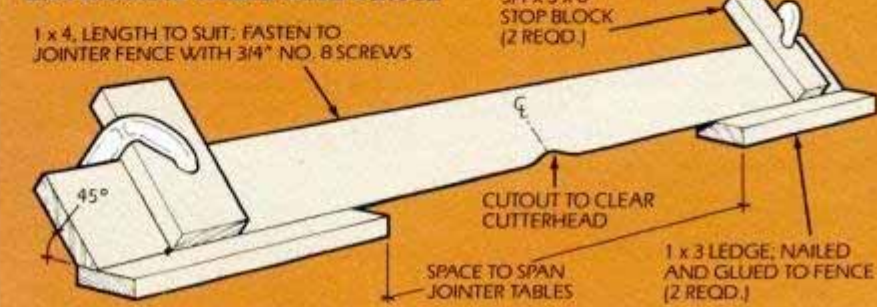
### HOLD-DOWN PUSH BAR



### HOLD-DOWN PUSH BLOCK



### EXTENSION TABLE AND FENCE



shallow cut on all four panel edges. Lower the front table and repeat until the bevel is raised.

**Recesses** are stopped cuts (cuts contained within the workpiece) that are made on board edges with the fence perpendicular to the table. First, lower both the front and rear table equal amounts below the cutterhead. Then, clamp start and stop blocks to the fence to control the recess. Next, butt one end of the workpiece against the start block and hold the front end above the cutterhead. Once the piece is set, turn on the jointer, lower the workpiece and make a short cut. Then, lift the board, turn it around and feed it in the opposite direction. This two-cut technique prevents splintering the trailing end.

**Tapering** stock on a jointer is a safe, accurate technique. The most common is the straight taper, which tapers the entire length of a workpiece. When tapering a board that is shorter than the front table, carefully place the front end

*(Please turn to page 118)*

# 4 HANDSOME CLOCKS FROM KITS

Clock building from kits has become a popular pursuit. It will save you money and time.

**A**ssembling a clock from a kit results in an heirloom-quality timepiece without the big price tag of a store-bought clock. Kit assembly is also very satisfying for those who don't want to build a clock from raw materials because of limited time, experience or tools. Since most kits are pre-cut, you won't spend time measuring and cutting parts. In many cases, assembly can be done on a worktable with screwdrivers, a drill and clamps. The many suppliers who offer kits and parts are an indication of the popularity of clock kits. Some of these suppliers are listed at the end of this story.

## VIENNA REGULATOR

This Vienna Regulator is a reproduction of those elegant clocks built during the 19th century, primarily in Vienna, Austria. It has the characteristic tall slender case, graceful turnings and moldings seen on many of the originals.

The 1340-W42 Vienna Regulator kit (\$379 plus \$20 shipping) comes with walnut parts, movement, dial, glass and hardware. A separate finishing kit (\$8.95 plus \$2 shipping) contains paste stain, paste varnish, sandpaper, gloves and instructions. You provide glue.

The assembly directions are easy to follow. A helpful addition would have been to list the tools needed to assemble the clock—for example, the diameter of the drill bits and the sizes of C-clamps—so you could round up these tools before beginning work.

Also, the brief comments at the end of the case instructions about installing the movement should be deleted, since there is a separate and quite detailed booklet of movement installation instructions.

The pediment, door, side and bottom frames are entirely preassembled, and the other parts fit together beautifully, with many of the fastener holes already bored. The only

hitch I found in this area was that the counterbored holes for the gong fasteners were too small to accommodate their washers—I substituted washers that had smaller outside diameters.

As with many kits, only finishing is required. But you should take extra care with this step to achieve a uniform surface. The final finish on the clock will look better for the effort.

The paste stain and paste varnish provide a lustrous, nearly fail-safe finish. The paste consistency allows you to work on a small area at a time without fear of leaving drips or overlap marks.

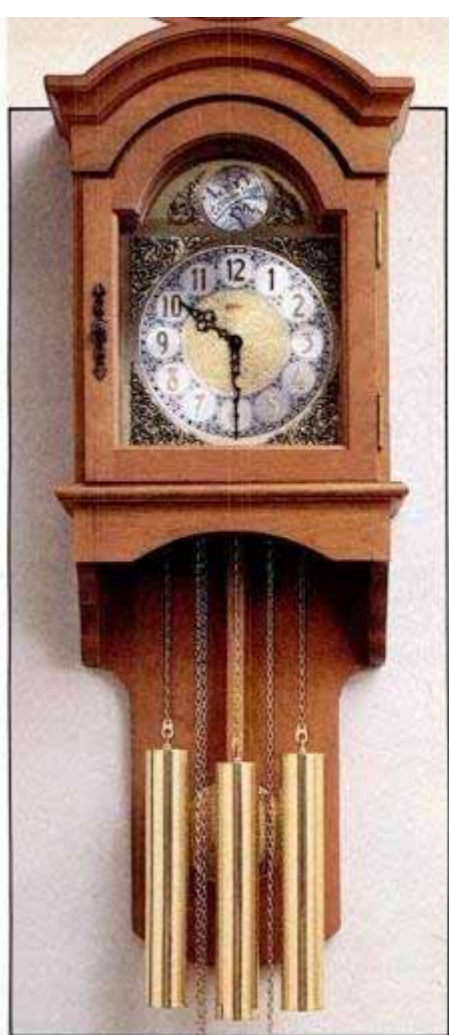
The instructions for installing the movement leave no guesswork, and since movement installation is such a specialized job, this is particularly important.

The final result is an heirloom treasure with design details such as a solid-brass movement and full-length, side-glazed openings found on the authentic clocks.

The Vienna Regulator is from Craft Products Co., which is located at 2200 Dean St., St. Charles, Ill. 60174; 32-page catalog, free; 100-page catalog, \$2.—P.S.

**Photos:** Harry Hartman  
**Stylist:** Gabe Herrick





### WESTMINSTER CHIMING WALL CLOCK

The Emperor Clock Co.'s Westminster Chiming Wall Clock Kit comes with nearly all you'll need to make a striking timepiece. Instructions are in short, simple steps and are accompanied by clear, detailed illustrations. The kit (\$199.50 plus shipping) includes precut and mitered cherry wood, hardware, an attractive solid-brass dial face and movement. A replacement suspension spring is included, so be on the lookout for this small but critical link between pendulum and suspension arm. You supply glass for the door, wood filler and finish.

Finish-sand all wood pieces as the company recommends. You may have to trim pieces slightly for a good fit.

The company's finishing kit (\$10.95 postpaid) includes complete directions, your choice of finish, sanding materials, a bristle brush and foam brush that makes applying a thin, even coat of varnish easy. My kit contained a walnut stain which, when tested, did not take well to the cherry wood. (It left black streaks.) I finished the clock with an antique cherry stain; however, the manufacturer was quite willing to send a replacement. The Westminster Chiming Clock is available assembled for \$299.50. For a free catalog, write to Emperor Clock Co., Emperor Industrial Park, Fairhope, Ala. 36532.

—Maryann Calendrille

### SHAKER TALL CLOCK

Most novice woodworkers shy away from a project of this size, even in kit form.

But in this case, the manufacturer, Mason & Sullivan, has designed the clock so that any do-it-yourselfer can obtain satisfactory results.

I ordered the precut kit, No. 7612C (\$366 plus shipping), which contains all the cherry parts cut and ready for assembly, hardware, and instruction booklet. The dial (\$14.85), clock movement (\$114) and weights (\$22) are



purchased separately. You provide glue and finish.

The Shaker Tall Clock is also available in an uncut kit (\$296) and a components-only kit (\$78) that contains no flat lumber. Or you can buy the hardware (\$34.50) and a blueprint (\$9).

Start assembly only after reading the instructions thoroughly. As invaluable as the instruction booklet is, I found that it could be improved by clearer, more detailed step-by-step writing.

The cabinet joints are assembled with Lamello spline fasteners. These football-shaped compressed beech splines fit into prerouted recesses. Apply glue to the cabinet parts, insert the splines into the recesses and clamp the cabinet together.

After assembly, finish-sand the clock and bolt the fully assembled movement in place. Then, hang the weights and pendulum. I applied two coats of varnish to bring out the cherry's natural beauty.

For a catalog of clock kits, movements and hardware, send \$2 to Mason & Sullivan, 586 Higgins Crowell Rd., West Yarmouth, Mass. 02673.—J.T.



### EARLY AMERICAN WALL CLOCK

This Early American Wall Clock is made of solid white oak and can be used as either a mantle clock as we show it or—with the addition of an extra base piece—as a wall-mounted clock. It has a battery-operated quartz pendulum movement.

The kit I received included all the parts necessary for building the clock, along with glue and sandpaper. The optional finishing kit contained steel

(Please turn to page 133)



# A CLASSIC DESK FOR YOUR COMPUTER

**O**ur goal when we designed this desk was to create a traditional furniture piece that could sensibly accommodate today's home computer equipment. We also wanted a piece that would function on its own as a home office desk, unlike most computer furniture. The result is shown on these pages with a discussion of the design process on pages 110 and 111.

We chose a secretary desk because its configuration provides the most interior space for our components. The drop-down lid works as a spacious writing surface when the computer is not in use, and the desk style complements the furnishings of nearly anyone's home. By mounting the processor and monitor on one slide-out shelf and the printer and paper tray on another, the desk achieves maximum versatility.

If you're working at the keyboard but not printing, the adjacent lid surface is available for taking notes or holding reference books. If, on the other hand, you are printing a great deal of material, but not working at the keyboard, the components on the left side of the compartment can be pushed back into the cabinet, leaving the lid surface underneath free for work.

If you are right-handed, this setup will probably work best; however, if you're left-handed you may want to reverse the position of the components so you can write on the left side when working at the keyboard.

The computer chosen for this desk was the IBM PC, which has a remote keyboard. But other popular home computers will work in this unit as well—even those with a built-in keyboard like the Apple IIe. For the latter, the only

This mahogany secretary desk—designed in the American Chippendale style—has room for all the components of a modern home computer.

BY ROSARIO CAPOTOSTO

change required is to make the sliding shelf longer to accommodate the keyboard/processor unit and to build a separate sliding shelf above for the monitor so it can be adjusted for comfortable viewing.

The pigeonhole storage compartment at the upper right is great for storing mail, bills and small notes. But, if you use a telephone modem in conjunction with your home computer, eliminate the pigeonhole dividers and

use the remaining shelf for storing the modem unit. Then, simply slide the phone receiver into the appropriate spot on the modem.

Last but not least, we incorporated a full lateral file drawer that holds over 40 in. of files and a utility drawer above for stationery supplies and assorted home office paraphernalia.

With all this said, the one great advantage of this piece over other examples of computer furniture is that if you don't have a home computer, you may want to build this attractive desk anyway. Just follow the construction details.

## Construction procedure

Build the desk from 3/4-in.-thick, ribbon-stripe Philippine mahogany and lauan mahogany-veneer plywood. Select straight, warp-free lumber, since edge-joining is necessary to form the wide desk parts. Make the desk sides and top by edge-gluing two or three solid mahogany boards together. But, note that the three desk shelves and bottom are made from birch, or fir, plywood with a solid mahogany front edge. This is a less expensive alternative to using solid mahogany or mahogany-veneer plywood throughout.

Cut the boards for the sides and top slightly longer and wider than necessary to permit final trimming with a portable circular saw. Smooth the board edges on a jointer or with a hand plane to produce tight-fitting edge joints. If the boards are cupped slightly, alternate the cup direction of each board during assembly to prevent cumulative, gross cupping (see *Three Simple Ways To Join Boards*, page 113, Oct. '84).

**Black and white photos:** Rosario Capotosto  
**Technical art:** Eugene Thompson  
**Color photos:** George Ratkai  
**Photo stylist:** Gabe Hemick  
**IBM Personal Computer:** Courtesy of IBM Corp.



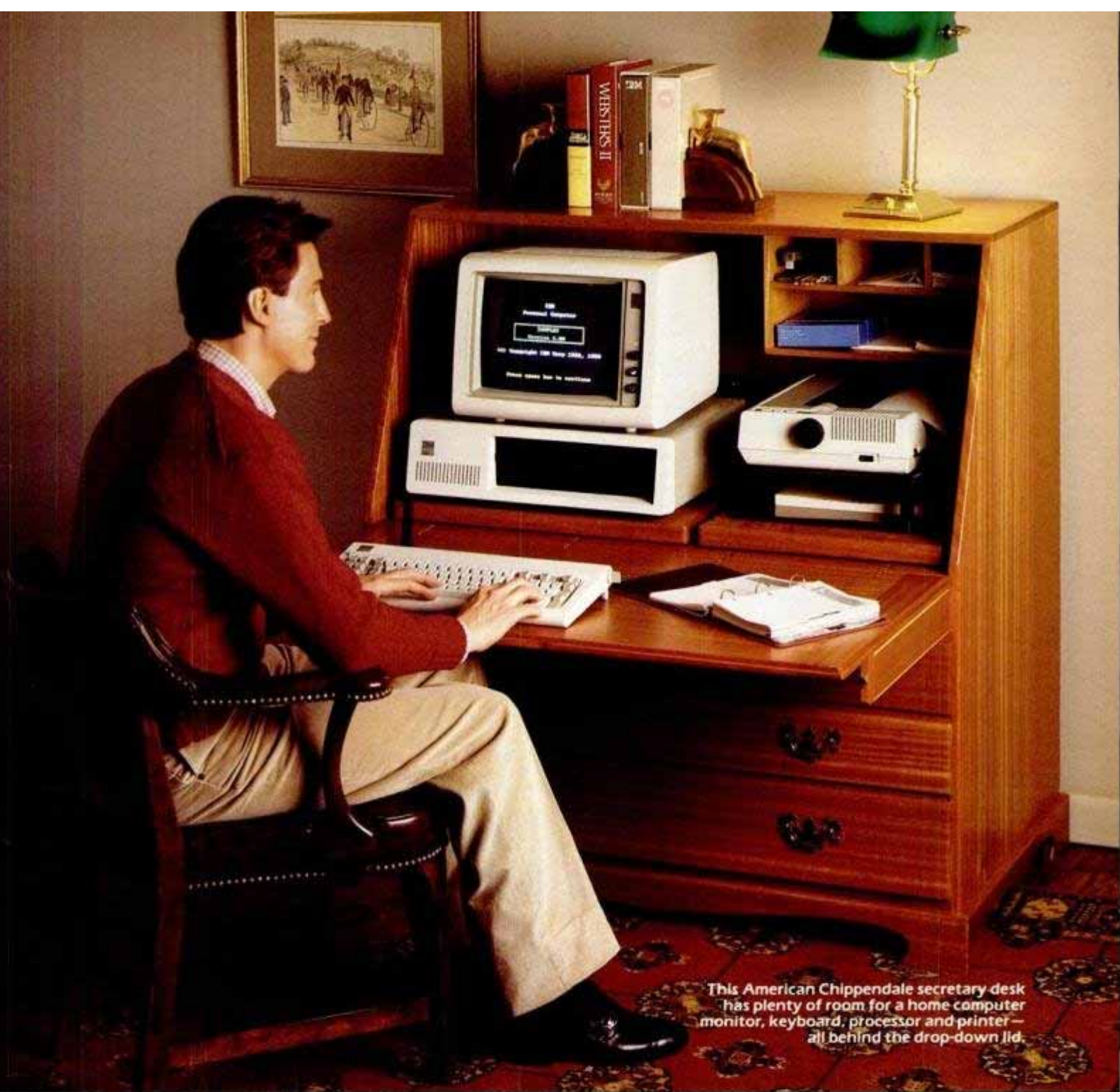
When closed, this computer furniture piece looks like a traditional secretary desk that complements any room in your house.



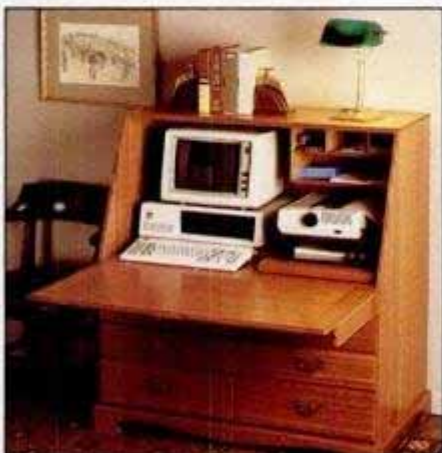
As the piece unfolds, it yields a 40-in.-wide lateral file (bottom) and a standard drawer (above) for supplies and manuals.



After removing reference material from the drawers below, close the drawers then pull out two solid-wood lid supports.



This American Chippendale secretary desk has plenty of room for a home computer monitor, keyboard, processor and printer—all behind the drop-down lid.



When the desk lid is pulled down on the supports, all components are immediately accessible from the user's sitting position.



To begin work, place the keyboard on the desk lid, then pull the monitor and processor into a comfortable viewing position.



To print documents, pull the paper tray and printer over the desk lid until both clear the side of the upper desk compartment.

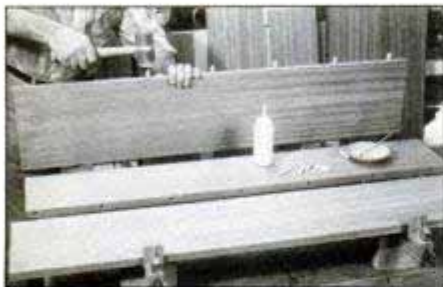
Next, arrange the boards with their edges butted together. Then, mark dowel pin positions approximately every 6 in. Be certain *not* to place a dowel pin where it will be exposed when the angled cut is made in the desk side pieces. Use chalk to key each board with

a letter or number to help arrange the boards properly during final assembly. Now, use a doweling jig to centerbore the board edges for accepting 3/8-in.-dia. x 2-in. fluted or spiral-grooved dowel pins.

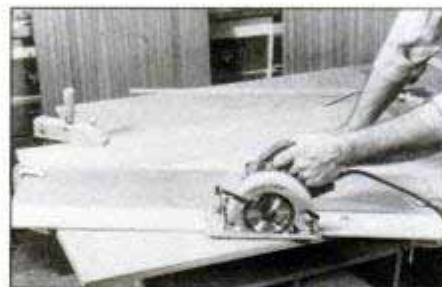
Apply glue to the walls of the holes

and insert the dowel pins. Then, apply glue to the board edges. Clamp the boards into panels using long bar or pipe clamps. Position clamps under and over the work to distribute clamping pressure evenly and to deter warping.

Next, assemble the desk shelves and



Form the desk sides and top by edge-joining mahogany boards into wide panels. Use a doweling jig to centerbore the board edges. Install 3/8-in.-dia. x 2-in. dowel pins.



Use a portable circular saw to trim the edge-glued panels to size. Make the angled cut in the desk sides with the help of a two-piece straightedge guide, as shown.



Cut the rabbets and dados in the sides using a router and straight bit. Be sure the interior surface is facing up. Build a guide, as shown, to keep router on course.



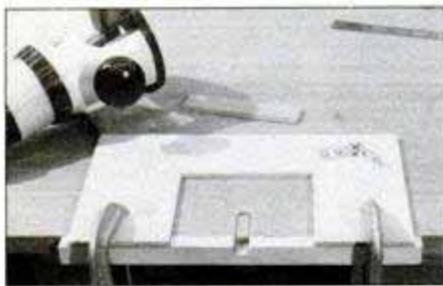
Bore screw pilot holes in the center of the dados and bottom rabbet. Position a scrap board under the desk side to prevent splintering caused by exiting bit.



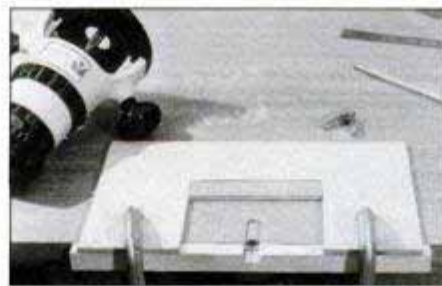
Turn the desk side over so that the dados face down. Now counterbore each screw location for 1/2-in.-dia. mahogany plugs. Use a drill guide to keep the bit perpendicular.



Assemble the desk with shelves and bottom in place. Then, bore screw pilot-holes. Place shims under the shelves to hold their front edges flush with the side pieces.



Make this jig for routing hinge mortises. Notch the 1/4-in. plywood piece to accept your router's base. Then, cut recess for the hinge leaf using a 1/2-in. straight bit.



Insert a narrow wood strip to limit the router's travel. Increase the depth-of-cut and make a second, deeper pass. This is necessary to accommodate hinge knuckle.



Transfer hinge mortise positions from main shelf to the lid using a utility knife. Tape parts to prevent shifting. Rout lid mortises using the knife marks as guides.

#### MATERIALS LIST—COMPUTER DESK

Key	No.	Size and description (use)
A	2	3/4 x 26" x 42 1/4" mahogany (side)
B	1	3/4 x 17 5/8" x 42 3/4" mahogany (top)
C1	1	3/4 x 16 11/16 x 41 1/2" birch plywood (main shelf)
C2	1	3/4 x 9 x 41 1/2" mahogany (shelf front)
D1	3	3/4 x 19 11/16 x 41 1/2" birch plywood (middle shelves and desk bottom)
D2	3	3/4 x 6 x 41 1/2" mahogany (shelf front)
E	1	3/4 x 3 x 38 1/8" mahogany (stiffener)
F	2	3/4 x 3 1/4 x 8 3/4" mahogany (divider)
G		1/8"-thick mahogany edge-band
H	1	1/8 x 3/4 x 38 1/8" mahogany (filler)
I	1	1/4 x 42 1/16-wide x 42 1/4" lauan mahogany plywood (back)
J1	2	3/4 x 2 13/16 x 25 3/8" mahogany (lid support)
J2	4	1/8 x 3/4 x 25 3/8" maple (edging)
J3	2	3/4 x 3/4 x 2 13/16" mahogany (facing)
J4	2	1/2 x 3/4 x 2 3/8" maple (stop block)
K1	1	3/4 x 22 x 36 1/4" mahogany (lid)
K2	2	3/4 x 2 3/4 x 22" mahogany (lid end)
L	1	3/4 x 4 x 44 1/4" mahogany (base front)
M	2	3/4 x 4 x 25 3/4" mahogany (base side)
N	1	3/4 x 3 1/2 x 44 1/4" mahogany (base back)

O	2	3/4 x 3 x 42 3/4" mahogany (cleat)
P	2	3/4 x 3 x 19" mahogany (side cleat)
Q	4	1 1/2 x 1 1/2 x 3" fir (corner block)
R	1	3/4 x 2 3/8 x 38 1/8" mahogany (false drawer face)
S	1	3/4 x 4 3/4 x 41 3/4" mahogany (upper drawer face)
T	1	1/2 x 3 1/8 x 40 3/8" lauan plywood (drawer front)
U	1	1/2 x 3 5/8 x 40 3/8" lauan plywood (drawer front)
V	2	3/4 x 3 3/8 x 24" lauan plywood (drawer side)
W	1	1/4 x 24 x 40 3/8" lauan plywood (bottom)
X	1	3/4 x 11 3/4 x 41 3/4" mahogany (file drawer face)
Y	2	1/2 x 9 x 39 7/8" lauan plywood (drawer front and back)
Z	2	3/4 x 9 x 13 1/4" lauan plywood (drawer side)
AA	1	3/4 x 12 1/4 x 39 7/8" lauan plywood (bottom)
BB	1	3/4 x 8 3/4 x 9 1/4" lauan plywood (file support)
CC	1	1/4 x 8 3/4 x 12" lauan plywood (base)
DD	1	3/4 x 16 1/2 x 21 1/2" lauan plywood (moni-

EE	2	3/4 x 1 3/8 x 16 1/2" mahogany (side)
FF	1	3/4 x 1 3/8 x 22" mahogany (front)
GG	1	3/4 x 16 1/2 x 22" lauan plywood (printer platform)
HH	2	3/4 x 1 3/8 x 22" mahogany (side)
II	1	3/4 x 1 3/8 x 17" mahogany (front)
JJ	2	1/2 x 9 7/8 x 17 1/2" lauan plywood (pigeon hole storage cabinet top and bottom)
KK	2	1/2 x 8 1/2 x 9 7/8" lauan plywood (side)
LL	1	1/2 x 9 7/8 x 16 3/4" lauan plywood (horizontal divider)
MM	2	1/2 x 3 3/4 x 9 7/8" lauan plywood (vertical divider)
NN	2 pr.	14" full extension drawer slide (Grant heavy-duty No. 3320)
OO	1 pr.	22" full extension drawer slide (Grant heavy-duty No. 3320)
PP	2	3/8"-dia. brass knob (No. 73A904)
QQ	8	3" Chippendale pull (No. KCS)
RR	4	flip-top hinge (No. FFT)
SS		3/8"-dia. x 2" dowel pin
TT		2" No.10 fh screw with wood plug
UU		1 1/2" No. 10 fh screw
VV	4	1" No. 8 roundhead screw
WW		3/4" No. 6 roundhead screw

Misc.: Carpenter's glue. Knobs, pulls and Wood-Glo finish available from Constantines, 2050 Eastchester Rd., Bronx, N.Y. 10461. Flip-top hinges are available from Armor Products, Box 290, Deer Park, N.Y. 11729. \*Edge-join boards into wide panel using dowel pins.

bottom. Join the mahogany front edges (parts D2 in the materials list) to the plywood panels using the glue and dowel-pin method used for the sides.

After edge-joining the desk top, bottom, sides, lid and shelves, trim the parts to size using a portable circular

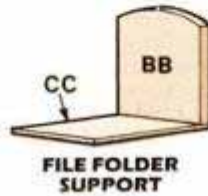
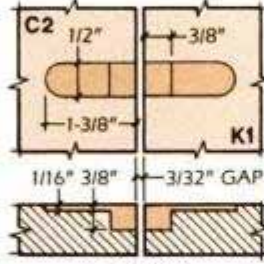
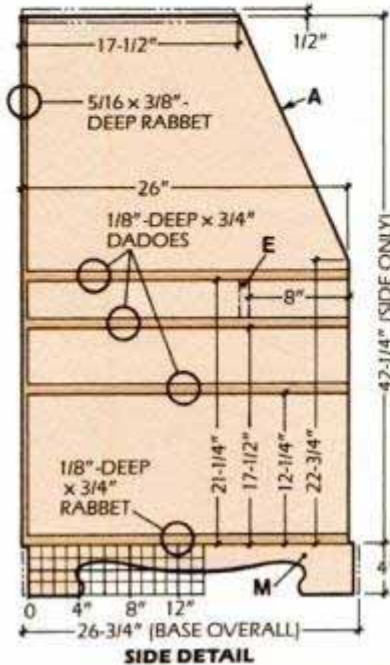
saw. Cut the desk top (B) to the finished length, but leave it about 1 in. wider than necessary. Then, bevel the top's front edge to match the slanted desk sides. Trim the width later, during assembly. Next, cut the desk lid (K1) to size and attach the lid ends (K2) with

dowel pins. Then, rout the rabbets and dadoes in the desk sides, lid and top with a 3/4-in. straight bit.

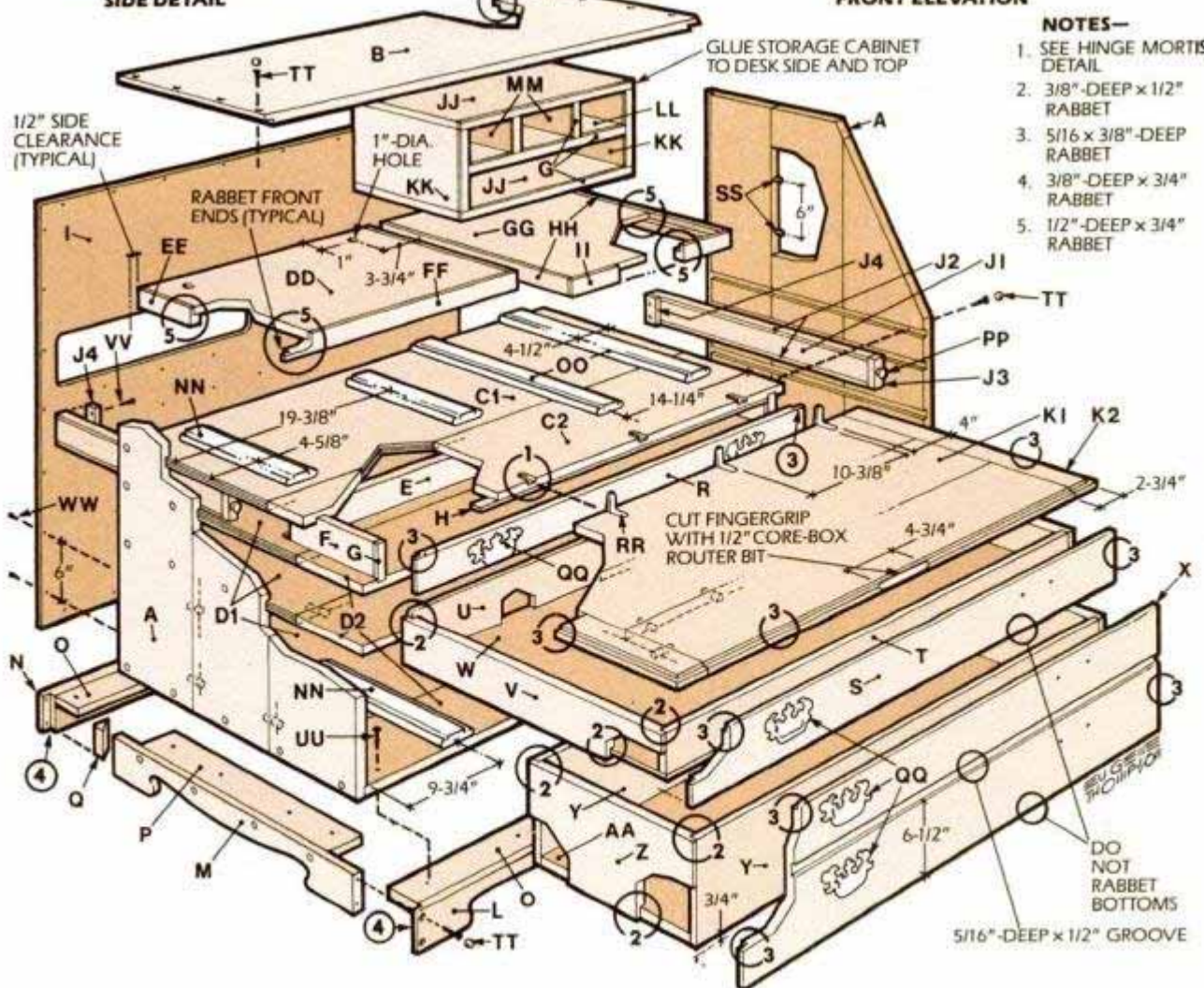
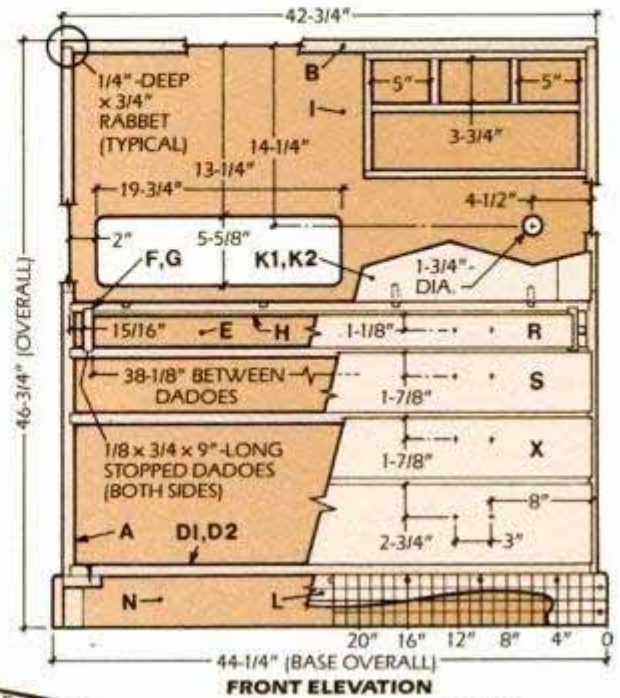
### Assembly

Bore pilot holes for No. 10 screws through the dadoes and rabbets in the

## COMPUTER DESK— 26-3/4" DEEP x 44-1/4" WIDE x 46-3/4" HIGH



5/16" WIDE x 3/8" RABBET



- NOTES—**
1. SEE HINGE MORTISE DETAIL
  2. 3/8"-DEEP x 1/2" RABBET
  3. 5/16 x 3/8"-DEEP RABBET
  4. 3/8"-DEEP x 3/4" RABBET
  5. 1/2"-DEEP x 3/4" RABBET

DO NOT RABBET BOTTOMS  
5/16"-DEEP x 1/2" GROOVE

sides and top. Then, counterbore  $\frac{3}{16} \times \frac{1}{2}$ -in.-dia. wood plug holes for each screw. Temporarily clamp the desk together and continue boring pilot holes into the shelves and bottom. Now bore screw-shank clearance holes.

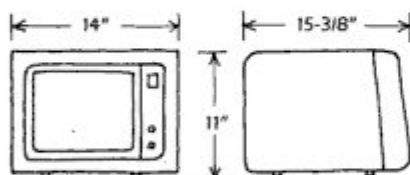
Next, position the desk top with its

beveled edge flush with the desk sides. Mark the back edge where it meets the sides and then trim the top to the finished width. Finally, rout a blind rabbet in the top's back edge to receive the desk back (I).

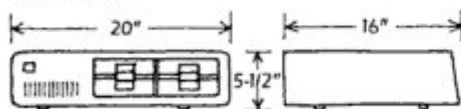
Disassemble the desk and rout the

hinge mortises in the main shelf using a  $\frac{1}{2}$ -in. straight bit and a router jig, as shown. Make the first cut to accommodate the hinge leaf. A second, deeper cut is necessary to accept the hinge knuckle. After routing the four hinge mortises in the main shelf, transfer the

## How To Design Your Own Computer Furniture

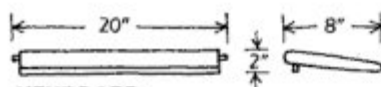


**MONITOR**

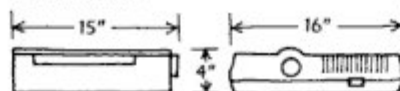


**PROCESSOR**

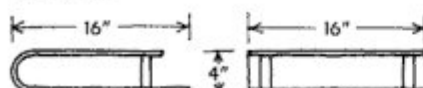
Our furniture piece was specifically planned to accommodate an IBM PC. But the design basics discussed here apply to any type of home computer.



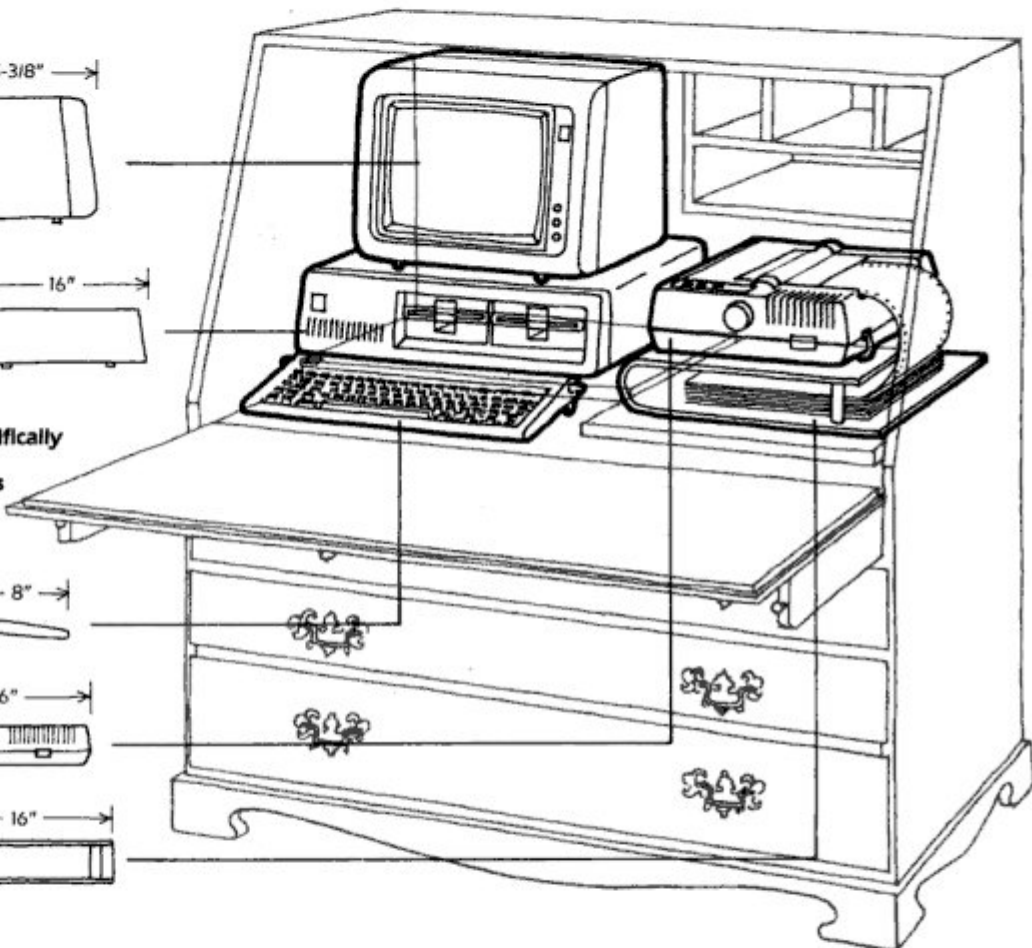
**KEYBOARD**



**PRINTER**



**PAPER TRAY**



**O**ur goal here was to design a system—a center for doing things—not just a piece of furniture for storing computer gear. Unlike a furniture designer in a factory who has to create an average piece for the average person doing the average thing, we all have a chance to design something that fits us, doing what we do the way we want to do it.

The first step is to assemble everything you intend to use when you work with your computer, not just the computer hardware itself. This means pencils, papers, files, a dictionary, instruction manuals, magnetic cassettes or cassettes, a desk light, and maybe pigeonholes for correspondence—even a convenient place to set a cup of coffee. In making this list, run through every step of an activity just to make sure you remember all the things you use when you do it.

Armed with this list, imagine for a moment that you can suspend everything in space without any physical support. Further, imagine that you could move these things around at will and they will stay in any position you choose. Of course, doing such a thing is impossible, but it can be simulated by making a "breadboard" model. It's not going to be pretty; it doesn't have to be. It's just a full-scale rough model that will help you refine your requirements.

The first thing needed is the chair you plan to use, because your computer furniture must be developed around your seated dimensions. The standard compressed height of the seat of a chair is about 17 in. However, this dimension can vary as much as 1 inch up or down. Pick a chair that's comfortable for you, preferably one with some vertical adjustment.

Once you are established in the

chair, begin to organize the items on your list. The two most important ones—the keyboard and monitor—come first. The top of the keyboard should be somewhere between 27 and 29 in. from the floor. The table height, of course, should be lower to allow for the height of the keyboard itself. Establish the table height by spanning a pair of sawhorses with a piece of  $\frac{3}{4}$ -in.-thick plywood or other material that's sturdy.

Put the keyboard on this "table" and sit down and try it. If it's too low, slip some blocks between the horses and the table top and try again. Keep going until you are comfortable. Remember, the final height probably will be found only after you spend a few hours working at the keyboard.

Next, experiment with the monitor. A good position for the top of the screen is about 15° below your eye level and about 20 in. away from your eyes. Use



mortise positions to the lid. Butt the main shelf to the lid on a flat work surface. Hold the two parts together with masking tape. Then, transfer the mortise positions to the lid using a utility knife. Use these marks as guides to rout the hinge mortises in the lid.

While the desk is disassembled, rout the short stopped dadoes in the main shelf and second shelf for installing the lid support dividers (F). Finish sand the interior surfaces of all the parts.

Reassemble the desk using glue and screws. First, attach the three shelves to

one desk side, then screw the second side in place. Attach the desk bottom and then the top. Now glue 1/2-in.-dia. mahogany plugs in place to conceal the screwheads. When the glue dries, belt-sand the plugs flush.

Glue the support lid dividers (F) into

this only as a starting point. Move the monitor up and down, back and forth, and side to side using wood blocks to support it.

Now, it's time to look at the other things that are frequently used. As you've been working with your equipment, you've probably noticed that the most used items end up close at hand while those less important migrate farther away. This is important. You may also have noticed that the processor—in our case—and the printer are really only used at the beginning and end of a job, while certain manuals seem to be open to one page or another almost all the time.

Now begin exploiting the unoccupied space above and on both sides of the table to accommodate these things. If you sit at the keyboard and extend your arms, you can define the space that's available. Nothing you use often should be any more than an arm's reach away. The processor, for instance, can go just about anywhere. It can even be

aligned vertically on its side—just be sure you don't obstruct any ventilation ports. Of course the most popular items should be the easiest to reach, while progressively less important items should move farther from the center.

Again use boxes and blocks of wood and plywood to support these items. The object is to gradually bring everything you need within reach so the furniture works for you.

As you utilize the storage potential, clutter on the table surface will diminish, as will the minimum table space you need to get everything done. This process won't happen in one night, but will evolve with every hour you use your equipment. And, because you have not invested a great deal of craftsmanship in this model, you won't be bashful about changing it.

The next component to consider is the printer. Its position depends on

what you intend to do with it. For instance, if you plan mostly word processing, you will probably be using single sheets of paper and inserting them manually. If you are using continuous-feed paper, you'll need allowance for new paper supply and a place to collect the paper after it's printed. Either way, you want to avoid putting the whole system into a restrictive cubby hole where it's difficult to operate.

Once again, try the printer in a number of different positions, then use it for a few days. Watch yourself and make notes as you go, then make changes until you are comfortable with what you have developed.

After the system has evolved for all the components and related items, it's time to move to the actual design. The first step is to measure the position of all the items supported by your breadboard model. Do this in three dimen-

sions, noting the height of each, the depth relative to a vertical plane—to correspond to a house wall—and the width of each including the space between components.

If you are not familiar with drafting, draw these on graph paper using the grid to maintain proper scale. Do not draw any of the breadboard model parts, just the computer system. You'll need a plan (top view), a front elevation (front view) and a side elevation. Make these drawings fairly large—a good scale is 1/4 in. equals 1 in.

Armed with these drawings, you are now ready to proceed with the design. The actual style of the furniture piece you choose will depend on your taste, your home furnishings, your budget and your ability as a cabinetmaker. You will also be limited by the space available in the room where you plan to use the piece. Other compromises are also inevitable. You will discover immediately that certain kinds of furniture do not lend themselves to being used for a home computer

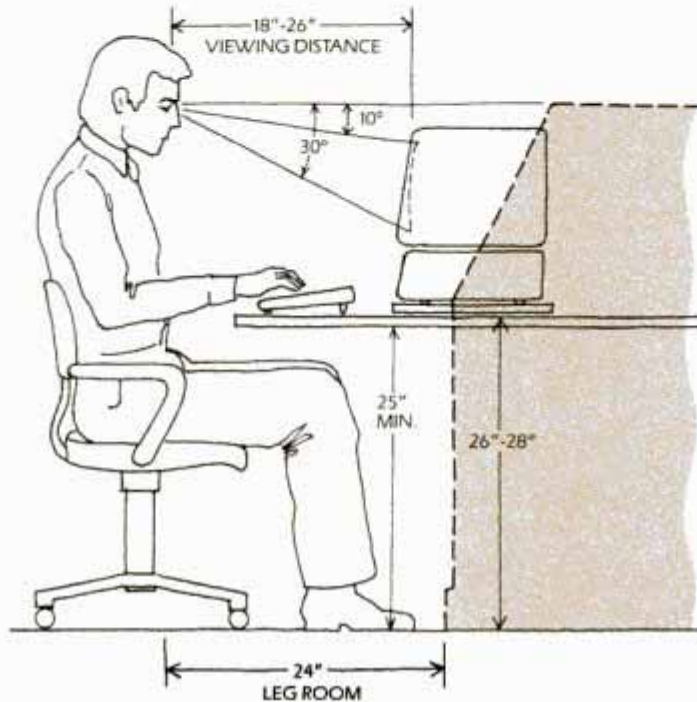
setup. They are too low, too shallow or too narrow.

To begin your furniture design, overlay the component drawings with a piece of tracing paper and draw your various furniture options—in scale—onto it. It's a good idea to establish a floor line on both the component drawings and the tracing paper, so the two will be easier to align. As you refine the furniture drawings, slide them over the component drawings to check for various fits.

You will find yourself pushing and pulling the components around, discovering what looks great from the front doesn't fit from the side at all, or vice versa. You will have to decide issue by issue whether the computer's function will be compromised to accommodate the furniture, or the other way around.

—Arthur T. Sempliner and S.W.

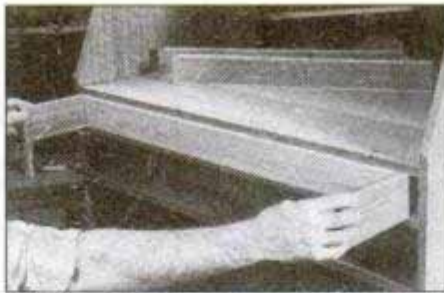
## The Basics Of Ergonomic Design



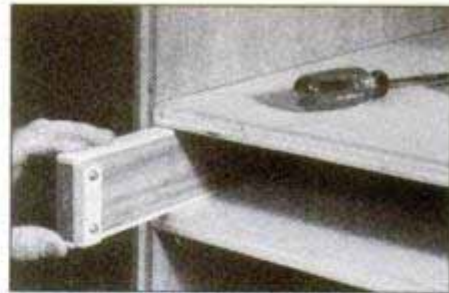
The dimensions given on this drawing should be used as a starting point when you design your own computer furniture. They were formulated to reduce body and eye strain that may be caused by prolonged use of this equipment. They were also formulated for the average person. If, however, you are taller or shorter than average, you should feel free to make adjustments that better suit your own needs. Also, plan on using an adjustable chair because a comfortable seating position should be the first requirement for any good desk design.



This close-up view shows the completed hinge mortise. Rout the long, shallow cut first, to accommodate the hinge leaf. The short, deep cut is for the hinge knuckle.



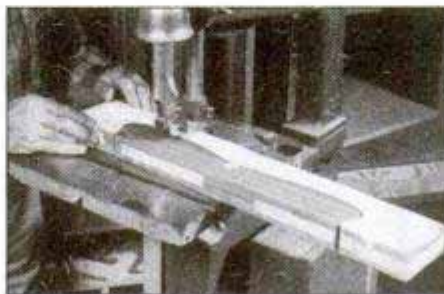
Install the lid support dividers and stiffener as one unit. Glue the dividers into the stopped dados routed in the shelves. The parts could also be installed separately.



Insert the lid supports from the rear of the desk after installing the dividers. Glue maple strips to the support edges. Then, attach a maple stop block, as shown.



Mount the hinges with the lid resting on the extended lid supports. Place 3/32-in.-thick spacers between the main shelf and the lid. Bore pilot holes for the mounting screws.



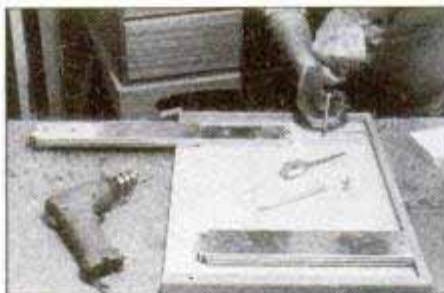
Since pencil lines on mahogany are difficult to see, make paper templates of the shaped base members. Here, the two base sides are cut simultaneously on a band saw.



Groove the file drawer face using a dado blade or router. Then, round the groove edges with a block plane. Rout the drawer face perimeter with a rounding-over bit.



Dry-fit the false drawer face in the upper opening, but don't install it until after the finish is applied. Install the file drawer, as shown, then mount the drawer face.



Mount the full-extension drawer slides to the underside of the sliding platforms, as shown. Then, extend the slides and screw them to the main shelf.



Bore holes in the rear of the monitor/processor sliding platform to gain access to the mounting screws. This is necessary because the platform overhangs the slides.

the stopped dados. Cover the divider ends with 1/8-in.-thick mahogany edge-band. Position the stiffener (E) between the dividers to prevent the main shelf from sagging under the weight of the computer. Install the stiffener separately, or nailed to the dividers, as shown. Drive a few finishing nails through the main shelf to hold the stiffener in place.

Next, install the two slide-out lid supports (J1). Veneer the supports' top and bottom edges in maple (J2) to help them slide easier. Then, mount the lid hinges (RR) with the lid placed across the extended lid supports. Insert 3/32-in. spacers between the main shelf and the lid. Now position the hinges in the mortises, bore screw pilot holes and install the hinge-mounting screws.

Next, cut the base members on a band saw. Attach the cleats (O,P) and corner blocks (Q) and assemble the base. Ease the edges of the desk with a router and a 1/4-in. rounding-over bit. Now you should rout the fingergrasp

the lid's top inside edge using a 1/2-in. core-box bit.

### Drawer construction

The desk houses two working drawers: a utility drawer, second from the top, and the bottom file drawer. Note that the file drawer's face (X) is divided to simulate two shallower drawers. The upper-most drawer face (R) is a false drawer that conceals the stiffener (E) and dividers (F). First, build the two drawers, as shown, from lauan mahogany plywood. Since the utility drawer operates without drawer slide hardware, cut the back (U) 1/2 in. higher than the sides. This prevents the drawer from tipping down when it's opened.

Next, make the drawer faces from 3/4-in. mahogany. Cut a 1/2-in.-wide groove in the file drawer face (X) with a dado blade on a table saw or with a router. Mount the drawer slides to the bottom of the file drawer and then screw the slide to the desk bottom. Install the

utility drawer between the second and third shelf. Now install the faces.

First, drive two 1-in. finishing nails through the drawer fronts from the inside so that the points project about 1/8 in. Next, hold the drawer face against the drawer and have a helper push on the back of the drawer until the nail points indent the face. Now install the drawer face with glue and nails using the nail-point marks as guides. Install the false drawer face (R) after the desk is finished using glue only. Glue a mahogany filler strip (H) to the underside of the main shelf front (C2) to close the space above the false drawer face.

Next, build the sliding platforms (DD,GG) from 3/4-in. mahogany plywood. Attach the drawer slides to the platform first, then to the main shelf. Construct the pigeonhole storage compartment separately, then glue it in place. Finally, cut the desk back (I). Cut out a section of the back to feed wires through and install the computer. **PM**

# Get into your own business with NRI at-home training in Air Conditioning, Refrigeration and Heating.

Now NRI's home study course in **Air Conditioning, Refrigeration and Heating** includes training in heat pumps and solar energy systems.

Prepare yourself for a whole new career in one of the fastest growing fields around. As energy needs continue to grow and energy sources become scarcer, the demand for skilled technicians will soar. NRI can get you started in this opportunity area, and you learn at home in your spare time, tailoring your training to your need with a choice of NRI's Basic or Master Courses.

## Includes Professional Tools

Either way, you'll get plenty of practical training, along with the tools you need for learning now, earning later. In NRI's Master Course, you get a high-quality system analyzer to help you troubleshoot and check out refrigeration and air conditioning equipment... a leak detector that spots escaping refrigerant... tubing and



joint tools for connecting and replacing tubing... and one of the most important pieces of equipment you can have, a top-quality vacuum pump for evacuating air and contaminants. It's a professional's "must," saving time, trouble, and callbacks.

You also get NRI's exclusive demonstration units... special kits that teach you the principles of electrical circuitry, controls and temperature sensing units, tubing fabrication, and joint making. These units give you the "hands-on" experience you need to reinforce your theory lessons. And NRI's "bite-size" lessons are specially

designed for home study, written clearly and simply to speed your learning.

## Optional Postgraduate Training at York Institute

Graduates of the Master Course are eligible for a concentrated week of resident training at the famous York Institute at no extra charge for tuition or training materials. Here, you'll work on advanced industrial equipment under the guidance of expert instructors. Only NRI includes this opportunity.

## Send for Free Catalog, No Salesman Will Call

Send the coupon today for NRI's free catalog showing all the equipment and describing the complete course. Over a million students have trained at home the NRI way. You can, too. If coupon has been removed, write to: NRI Schools, 3939 Wisconsin Ave., Washington, D.C. 20016.

## NRI SCHOOLS

McGraw-Hill Continuing Education Center  
3939 Wisconsin Avenue, Washington, DC 20016

We'll give you tomorrow.

Please rush me the one free catalog I have checked. I understand there is no obligation. **NO SALESMAN WILL CALL.**



All career courses approved under GI Bill.  
 Check for details.

- Air Conditioning, Refrigeration & Heating Courses including Solar Technology
- Small Engine Repair Course
- Automotive Mechanics Course
- Appliance Servicing Course

- Communications Electronics
- Color TV/Audio/Video Servicing
- Computer Electronics Including Microcomputers
- Telephone Servicing Course
- Locksmithing Course

Name \_\_\_\_\_ (Please print) Age \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Accredited by the National Home Study Council

513-025

## COLD WEATHER CAMPING

(Continued from page 96)

by boat or canoe. And wilderness outfitters like Jonas, who lend or rent sleeping bags to their paying guests on backcountry trips, prefer polyester bags because they are easier and safer to wash than down bags.

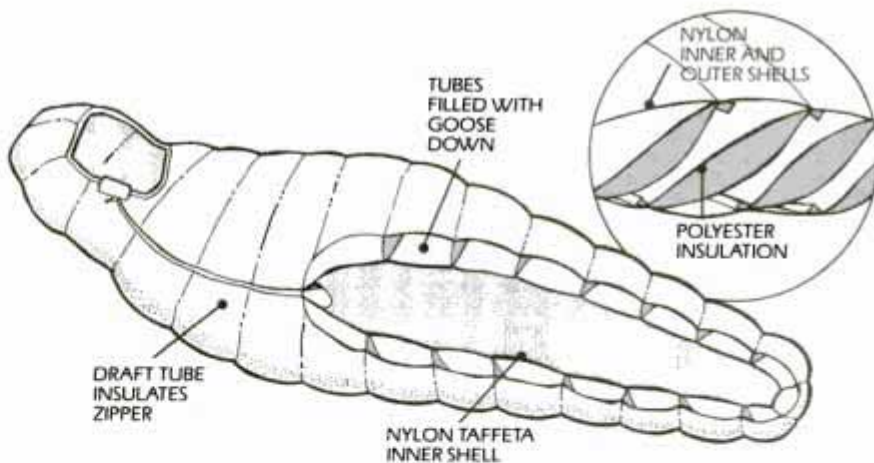
In recent years, many top sleeping bag makers have begun sewing down bags with exterior shells of nylon backed with a Gore-Tex laminate. Gore-Tex is the brand name for a thin film of expanded polytetrafluoroethylene (Teflon) glued to a fabric to make it waterproof. Because the film has been mechanically stretched to create microscopic pores, water vapor can pass through it if driven by osmotic pressure. That is, if the air is more humid on one side of the laminated fabric than on the other, water vapor will pass through the damp side to the dry side. Water won't pass through because the pores in Gore-Tex fabric are too small. Gore-Tex fabrics also are impervious to wind. Gore-Tex nylon fabric is used to protect down insulation from both snowmelt and wind chill. A Gore-Tex shell can add about \$80 to the cost of a bag. But when combined with two pounds of good goose down, the bag can be used comfortably in as low as 20° below zero temperatures—even without a tent.

You can't simply drop your sleeping bag on the snow and crawl into it, even if it does have a waterproof shell. If you do, the insulation under you will be pressed out flat, and body heat will be lost.

Like all backpackers, winter campers carry a foam pad, usually of Ensolite, for ground insulation. Jonas introduced us to a better product, a self-inflating air mattress called a Thermarest. The Thermarest contains a lightweight network of springy plastic fibers. When you open the rolled mattress flat and open its air valve, the fibers force the walls of the air mattress apart, inflating it. A couple of extra breaths into the air valve provides enough pressure for comfortable sleeping. In the morning, the air valve can be opened to let the air escape as the mattress is rolled back up for stowing. Then the valve is closed again so the pad won't reinflate while you travel.

### Tents and snowcaves

On this trip, we carried no tents. Instead, each of us brought along a lightweight collapsible snow shovel in order to dig snow caves each evening. The Life-Link shovel uses a blade of Lexan polycarbonate, with a breakdown aluminum handle. It stows easily on top of a rucksack or in its own fanny pack.



Cutaway of mummy-type sleeping bag shows construction details for a sub-zero rating.

A snow cave is simply a tunnel dug into the lee side of a stable drift. In a properly built snow cave, you're protected from the wind and, with several snoring campers cozily arranged on the sleeping shelf, the temperature in the cave may never drop below 25°. During dinner one night, with several candles lit and the stove roaring under the soup, we measured the air temperature in our cave at a comfy 45°. Naturally, some water dripped off our walls, but as soon as the stove went out it froze into a hard, protective skin of ice.

The terrain and snow conditions are not always right for snow-caving. Most expeditions do carry winter tents. Mountaineering tents are generally dome shaped, for several reasons. First, they are aerodynamic, and a few models have actually stood up to 120 mph winds.

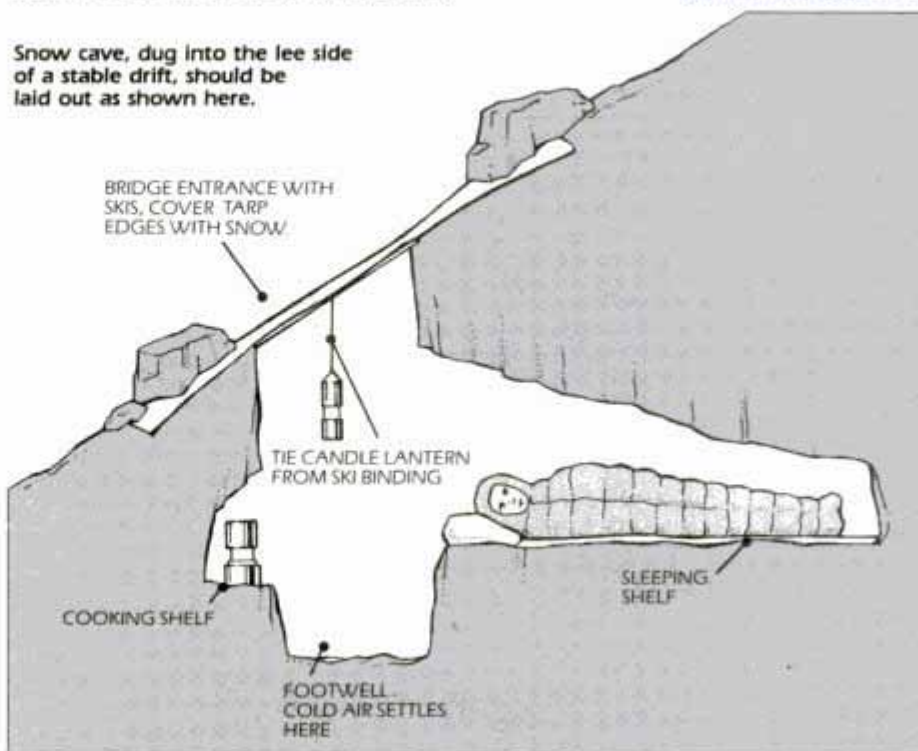
Second, they provide more internal room for the weight carried than a traditional A-frame or pyramid tent, with less surface area to radiate heat.

Igloos are dome-shaped for the same reasons. Winter campers require more space inside their tents than summer campers because they need their packs indoors and space to cook. Typically, two winter campers will use a three-person tent. It should be equipped with a zippered cook hole/waste hole so you don't have to prepare dinner directly on the nylon floor.

Most high-quality tents are of double-wall construction, with an uncoated nylon canopy and a waterproof, windproof coated fly to protect it. A few inches separate the two layers to provide a little insulation and allow the moisture passing through the inner wall to circulate out. A number of tent makers now offer single-wall tents made of Gore-Tex laminate. They are light, windproof and efficient. But, in many states that require tent fabrics to be treated with a flame-retardant chemical, Gore-Tex tents can't be sold. The Gore-Tex laminate is not flamma-

(Please turn to page 116)

Snow cave, dug into the lee side of a stable drift, should be laid out as shown here.





## When the weather gives you reason to worry, Eagle gives you good reason not to.

No matter how good a driver you are, a clap of thunder, a darkening sky or a threatening weather forecast can be quite unsettling...unless, of course, you're driving an American Eagle.

With the simple flick of a switch, Eagle gives you the confidence of 4-wheel drive.



You can even shift-on-the-fly, a feature you'll really appreciate when faced with a sudden shower, blizzard or stretch of bad

road. No wonder the National Ski Patrol has chosen Eagle as its Official Vehicle.

Of course, confidence isn't the only luxury you'll enjoy in an Eagle. With features like power steering, power windows and door locks, plush carpeting and reclining seats of genuine leather, Eagle seats five in total luxury.

The American Eagle. It's the luxury wagon that takes much of the worry out of bad weather driving.



### The 2-wheel/4-wheel drive American Eagle

AVAILABLE FOR PURCHASE OR LEASE AT PARTICIPATING AMC DEALERS.

SAFETY BELTS SAVE LIVES

# \$599<sup>95</sup>



## NEW REAR TINE TILLER

Powered by a 5 H.P. Briggs & Stratton engine with three forward gears (plus reverse) in an

inline pattern. Groundhog II GH-5RT cuts a 26" swath, 14" deep. Big 16" lug tread tires, not tines, do the pulling so the manual effort needed by most front tine tillers is eliminated. Mulch, mix and aerate with one-hand operation. Safety clutch is conveniently mounted on handlebar, not on a remote panel like the competition. Factory price saves you up to \$200 on competitive tillers.

For FREE brochure, call 1-800-253-1030 (in Michigan 616-849-3400)

or write: **Carl Heald, Inc.,**

Dept. N30 P.O. Box 1148, Benton Harbor, MI 49022

# AWARDED \$5 MILLION

## BY COURT FOR ORIGINAL AEROSOL SHAVE CREAM!

Rise® shaving foam — so original, so different that the Rise patent was upheld in 1955 by \$5,000,000 court award!

Try RISE SUPER FOAM... its beard-softening lather gives extra-close, extra-comfortable shaves.

© 1984 Carter-Wallace, Inc.

"I made \$1,300 in one weekend selling Mini Donuts" — B. Darrow, Delaware

"...expect to gross over \$112,000 first year combining soft drinks and coffee. We sell at Sporting Events, County Fairs, never made so much money and had so much fun!"



**IDEAL BUSINESS OF YOUR OWN!** Small investment, operate full time or spare time. Our years of experience will provide you with everything you need to make big money with Mini Donuts. Completely self-contained...

**OR, GO ANYWHERE WITH THE MINI DONUT FACTORY**



Lightweight, sturdy. Take your Mini Donut factory to different events every weekend.

Call for FREE BOOKLET

1 (800) 328-8213 TOLL FREE or write The Donut Man

FINANCING AVAILABLE

As little as 1¢ down

A Quantum Group Company 9851 - 13th Ave. North, Dept. 10E Minneapolis, MN 55441 (612) 545-1984

### Quality Inflatable Boats for \$110 and Up!

See Eagles last for years and can be used for fishing, sailing and camping. See Eagle, Dept. PM52B, P.O. Box 944, Smithtown, NY 11787



SEE EAGLE

FREE COLOR CATALOG!

### Precision Lathes

3-15" swing



COMPACT 5 - 5' x 14' 6" show w accessories

Milling Machines, Lathe Accessories, Precision Tools, Aluminum, Brass, Steel, Taps, Dies, and Drills.

108 Page Catalog-\$2.00 Refundable

We Accept Mastercard and Visa

**CAMPBELL TOOLS COMPANY**

2100-D Selma Road Springfield, Ohio 45505 513-322-8562

## COLD WEATHER CAMPING

(Continued from page 114)

ble itself. But, since it reinforces the nylon, it prevents the nylon from heat-shrinking away from a flame—a normal part of the flameproof quality of nylon.

### Cookstoves

Cooking is a critical issue in a tent or snow cave. Every snow camper needs a hot meal a couple of times a day, and the stove also is used to melt snow for water. Nylon fabrics have a low melting point, so it's important to keep your ministove away from the tent wall and away from sleeping bags. The stove should rest on its own small pad of Ensolite, to keep from melting through the snow and out of sight. In snow caves and tents alike, it's necessary to provide some ventilation when a gasoline stove is burning. The stove produces carbon monoxide. Sealing in the gas can be fatal. Coleman, Optimus and Svea white-gas ministoves are the most common choices for winter camping. By the way, propane gas cartridges often won't produce enough pressure at below-freezing temperatures to keep the fuel feeding.

### Clothing and footwear

On the move, the same rules apply. Stay dry and protect yourself from the wind. Staying dry does not mean overdressing. Jonas made us stop to take off clothing whenever a stiff climb threatened to soak our insulation with sweat. Most climbers and mountaineers dress in layers to permit fine adjustment of insulation to the work being done. Next to the skin is a thin knit suit of polypropylene, a hydrophobic fiber which will wick perspiration away from the skin.

Then, there's a layer of polyester or acrylic pile or bunting, which absorbs a fair amount of moisture and retains its insulating value—it was first popularized by North Atlantic fishermen who valued their foul-weather gear. In bitter cold, a goose down parka or vest can go over the pile jacket and pants. The outer garment is typically of Gore-Tex laminate, windproof and waterproof.

Traditionally, boots for outdoor use have been of leather. Mountaineers use double boots, with a leather shell and insulated wool felt innerboot. On this trip, we used heavy leather cross-country ski boots, covered with waterproof nylon knee-high gaiters.

In recent years, several boot makers have introduced mountaineering boots with outer shells of hard nylon plastic, much more rigid than leather but also impervious to water. Some leather boots now keep water out with a layer of Gore-Tex film built like a seamless sock, laminated to the inside of the leather shell.

PM

## AMAZING

### SCIENTIFIC and ELECTRONIC DEVICES

PHASER shockwave and invisible FORCE FIELD generators. LASERS for weapons, cutting, burning, cloud writing, holography and special effects. NUCLEAR particle accelerators and detectors. PLASMA, ION, HIGH VOLTAGE, HIGH FREQUENCY TESLA COILS and LIGHTNING generators. TRANSMITTERS and CONTROL devices for security, telephones, intrusion detection, nature listening. PLUS PLUS INFRASONICS, ULTRASONICS, ENERGY, CHEMICAL and PERSONAL PROTECTION and SAFETY DEVICES. SEND \$1 for catalog of plans, kits and completed items to:

**INFORMATION UNLIMITED, INC.**  
P.O. Box 716, Dept. M8  
Amherst, N. H. 03031

## TOUR DE FORCE

(Continued from page 97)

front/rear track. It's totally refurbished, yet contains the original Chrysler running gear, including Hartford friction shock absorbers and leather-bound semi-elliptical springs. The 19-in. wire wheels were specially made in England and mount 6.50 six-ply tires.

A rebuilt '63 Lincoln V8 with 430 cu. in. and a smooth-shifting Ford automatic transmission have been mated to the vintage Chrysler frame.

### Mahogany body

To build the body in true coachbuilding fashion, Kinney first steamed and hand-bent a "buck" frame of hickory. Then, an aluminum skin was laid over the hickory to provide anchor points for the rivets. Finally, the body of Honduran mahogany began to take shape.

Kinney built his own steam cabinet to facilitate the laminating and bending of the hickory and mahogany. The mahogany planks were chosen carefully, and some pieces run from grille to boat tail. To match the pieces and the grain, Kinney prepared a numbered grid and labelled the pieces.

Each piece was steamed and hand-fit to the body. When it was ready—and right—it was pop-riveted in position and allowed to cure. After curing, every pop-rivet was drilled out. The mahogany was sanded and an epoxy finish was applied to both sides. Then it was re-riveted into position for further curing. Once this was done, and every piece was examined for a perfect fit, Kinney drilled out the rivets, countersunk the holes, and reattached the mahogany with brass rivets—over 5,000 of them.

### Two years to build

It's that kind of persistence and attention to detail that separates the Phariance from other cars. It is also one of the reasons it took two years to build.

Huntsinger and Kinney believe this first effort is a resounding success and confirms their initial belief that a very special and one-of-a-kind car using the best Old- and New-World craftsmanship can be a viable proposition.

Calling themselves "Old-World coachbuilders for hire," Camelot will build one new car a year, each a different design, and every one presented in a collector's environment—at a museum or art gallery, for example.

Huntsinger will put no definite price on the Phariance, or on the cars to follow, but the best guesstimate runs well into six figures.

"You wouldn't set a dollar value on a Rembrandt," says Huntsinger, "because the value is determined by the appreciation of the purchaser. That is how I want the Phariance sold." **PM**

# \$12 AN HOUR

## YOU CAN EARN UP TO THAT AMOUNT

### PART TIME OR FULL TIME

#### IN YOUR OWN SHARPENING BUSINESS

**No Selling, No Inventory... Year Round Cash Profits and YOU Set The Hours!**

Yes, there's a lot of business waiting for the man who can sharpen saws, planer knives, jointer blades, wood chisels, scissors, axes and other garden, shop and home tools.

SHARP-ALL does all these jobs quickly with precision and at a big profit for YOU. You can become Sharpening Headquarters for carpenters, builders, lumber yards, factories, home workshop hobbyists. And, you can start this Money-Making business for less than \$50.

FREE BOOK tells how to start your own sparetime business while you are still working at your regular job. People bring in their work and pay Cash—over 90¢ of every dollar you taking in is cash profit.

**Does The Sharp-All Pay YOU BET**

**JOIN THESE SUCCESSFUL SHARP-ALL OPERATORS —**

**\$100.00 a day**

■ "Recently I had three days in a row here I made over \$100.00 a day."

William J. Mitchell  
Tempe, Arizona

**\$4,000 a Year**

■ "Think the world of my Sharp-All. Am now grossing about \$4,000 a year part time, and hope to expand shortly. Now doing work for the State of New York, Carrier Corp., and General Motors."

Lawrence Stevenson  
E. Syracuse, New York 13057

**Wanted to Retire**

■ "I had dreamed of retiring for years, but was afraid to quit my salaried job. I had never used this type of equipment, but the Sharp-All was real easy to learn. I sharpened 30 blades my first week — without advertising at all. Now, for the first time in my life, I can say that I am content."

Farris Cornelius  
Wellington, Texas 79095

**Had to Quit His Job**

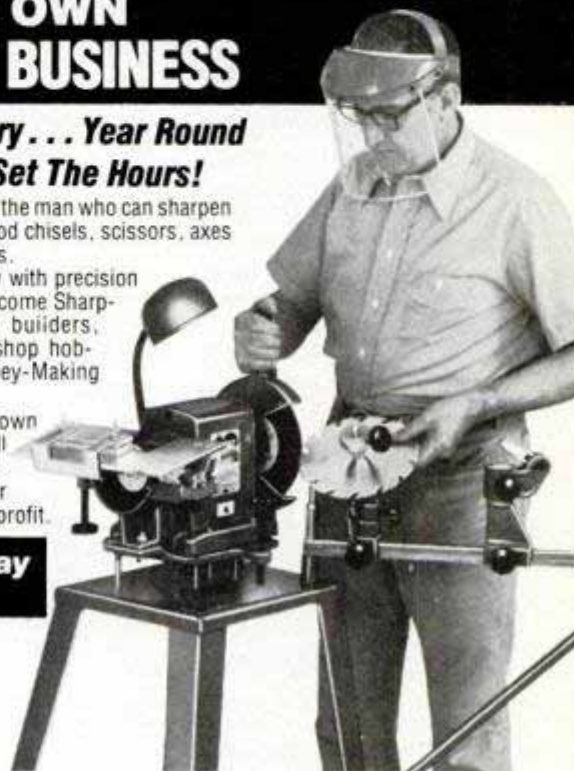
■ "Bought my Sharp-All four years ago, and it has done everything (and more) that you said it would. I never sharpened a saw in my life, but when I had to quit my regular job, I knew I had to have something to do. Now I have more work than I am able to do — I have as many as 100 saws ahead of me at a time."

Frank Sartin  
Grandview, Washington 98930

**\$32.00 in 2 hours**

■ "There's always work in a sharpening business of your own if you want it... Yesterday, I made \$32.00 in two hours."

Dave R. Lewis  
Hoquiam, Washington



**Let FOLEY BELSAW PROVE**

**You can do it too! On our 30-DAY FREE TRIAL OFFER**

You risk nothing by accepting this offer to see how easily you can turn your spare time into Big CASH Profits with your own Complete Sharpening Shop. Send coupon or mail postcard for full details on our exclusive 30-Day Free Trial Offer!

Our Free Book tells how to start a profitable, lifetime home sharpening business, how we help you grow, how we'll finance you.

**FOLEY-BELSAW CO.**

60426 FIELD BLDG.  
KANSAS CITY, MO. 64111



**RUSH COUPON TODAY FOR FREE BOOK**

**No obligation... No salesman will call**



**FOLEY-BELSAW CO.**

60426 FIELD BLDG.  
KANSAS CITY, MO. 64111

Please send my FREE copy of your book "Lifetime Security" and full details on your 30-Day Free Trial Offer!

Name

Address

City  State  Zip

## USING THE JOINTER

(Continued from page 103)

on the rear table just beyond the cutterhead. Then slowly lower the board onto the front table and advance it past the cutterhead.

When tapering long workpieces, there are two options: add an extension table to the jointer or use the following procedure. First, divide the board into equal parts. Make each part slightly shorter than the front table. For example, if the front table is 13 in. long, divide a 24-in.-long board in two. Then, divide the desired taper into the same number of parts. In this example, to obtain a 1/4-in. taper, set the depth of cut to 1/8 in. and make two passes.

Make the first pass with the division line positioned over the cutterhead. Lower the board and advance it past the cutterhead. Next, place the workpiece front end on the rear table just beyond the cutterhead. Lower the board and make a full-length pass. The resulting taper will equal 1/4 in.

The jointer also is the best tool for cutting end tapers. First, mark the workpiece where the taper is to begin. Rest the workpiece end on the front table with the starting line of the taper directly above the knives. Then, clamp a stop block to the fence against the end of the workpiece.

Now, while holding the workpiece at this angle, position a support wood block under it. Attach the support block to the workpiece with brads. Turn on the jointer, butt the workpiece end against the stop block and pull it over the cutterhead. Reposition the support block and repeat the procedure for the remaining sides.

Tenoning on a jointer is accom-



Cutting round tenons is handled easily with the aid of an L-shaped jig. Clamp the jig to rabbeting ledge. Push the work into the spinning knives and rotate clockwise.

## ROUND TENON JIG



plished with the aid of a push block. Assemble the simple block using glue only, as illustrated. Adjust the jointer fence to determine the tenon length. Advance the workpiece past the cutterhead with the push block firmly against the fence. To prevent splintering the workpiece rear edge, first establish the tenon shoulders by sawing a kerf on a radial-arm or table saw.

Round tenons are made easily with the aid of an L-shaped block. Clamp the block, as shown, to the rabbeting ledge so that the workpiece will engage the knives on the downward rotation.

**Tapering-in-the-round** is a quick way to produce round, tapered furniture legs. Build the sliding jig, as illustrated, to accommodate the workpiece.

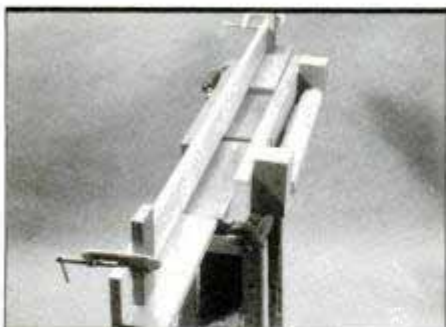
With the fence tilted 45°, shape the workpiece into an octagon. Then, mount the workpiece in the jig. Note that the locations of the pins that hold the stock determine the degree of taper. Position the rear pin lower to form the narrower, tapered leg end. Place the workpiece front end on the rear table just beyond the cutterhead. Then, lower the workpiece and make a full-length

pass on the jointer. Rotate the work slightly and repeat the procedure. After a full revolution, increase the depth of cut to reduce the taper more. **FM**

## SOURCE LIST

Contact the following jointer manufacturers and suppliers for specific information.

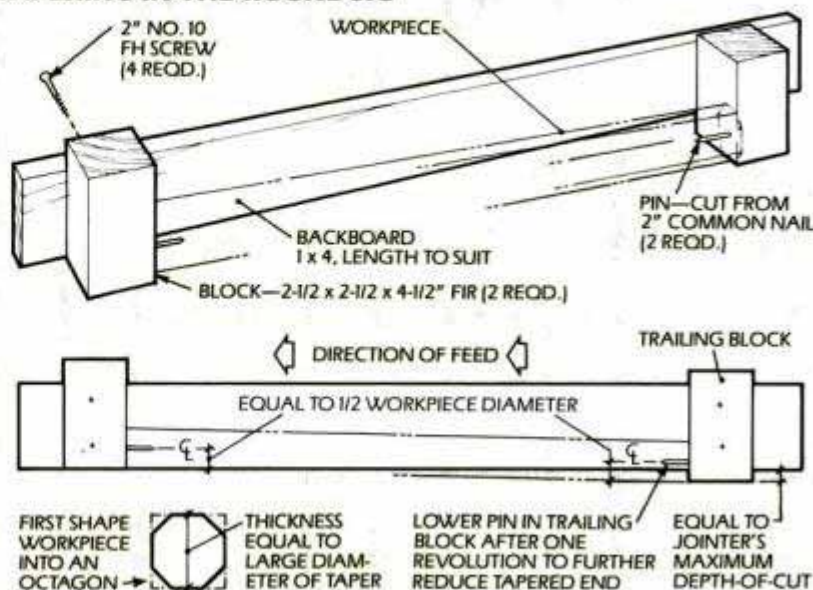
- Advantage Machinery Co. Inc., 40 Whites Path, South Yarmouth, Mass. 02664
- Black & Decker, Box F, 626 Hanover Pike, Hampstead, Md. 21074; combination planer/thicknesser
- Conover Woodcraft Specialties, 18125 Madison Rd., Parkman, Ohio 44080
- Delta Machinery Corp., 400 North Lexington Ave., Pittsburgh, Pa. 15208
- Foley-Belsaw Co., 95017 Field Building, Kansas City, Mo. 64111
- Hitachi Power Tools, 4487-F Park Dr., Norcross, Ga., 30093; planer/jointer
- Inca, Garrett Wade Co., 161 Ave. of the Americas, New York, N.Y. 10013
- Makita, Donna Robichaud, 12950 East Alondra Blvd., Cerritos, Calif. 90701; planer/jointer
- Powermatic, Morrison Rd., McMinnville, Tenn. 37110
- R.B. Industries, Box 108, Pleasant Hill, Mo. 64080; jointer attachment for a planer
- Ryobi, 1158 Tower La., Bensenville, Ill. 60106; planer/jointer
- Sears, Roebuck and Co., Sears Tower, Dept. 703-PM, Chicago, Ill. 60684
- Shopsmith, 6640 Poe Ave., Dayton, Ohio 45414; jointer operates off the Shopsmith Mark V.
- Wolfcraft, 1107 Lunt Ave., Schaumburg, Ill. 60193
- Woodmaster Tools, 2908 Oak St., Kansas City, Mo. 64108; jointer attachment for Woodmaster planer
- Woodworks International Inc., 2001 West Main St., Suite 140, Stamford, Ct. 06902



Use the tapering-in-the-round jig in conjunction with an auxiliary fence and extension tables (above). Mount the workpiece in the jig and slide it across the cutterhead. Rotate the stock and repeat.



## TAPERING-IN-THE-ROUND JIG





# Know your car inside and out.

Your car can run better, last longer and get better gas mileage.

Know how to fix it . . . to tune it . . . to keep it running right. The TOTAL SERVICE MANUAL for your car will show you how to do everything from a minor adjustment to a major repair.

TOTAL SERVICE MANUALS are digests of official

factory workshop manuals. Each one is carefully rewritten for use by the do-it-yourself car owner. Clear and easy to follow, yet complete and detailed enough even for professional use. You get all the important information plus hundreds of the best pictures, diagrams, and specifications.



## TOTAL SERVICE MANUALS

CREDIT CARD ORDERS CALL 516 676-8043

- 3713 Alfa Romeo 67-78 Guise, Spyder, plus \$12.95
- 9641 Alfa Romeo 73-80 all GT, GTV & sedans \$12.95
- 0448 Alliance 83 all models plus Fuego \$11.95
- 1144 AMC 70-83 all Gremlin, Sport, Hornet/Conquest \$12.95
- 8244 AMC 75-82 AMX, Eagle, Matador, Pacer, + \$11.95
- 0991 Arrow 76-80 covers all models \$12.95
- 8019 Aspen 76-80 for all 6 & V8 models \$11.95
- 7122 Audi 100 77-82 all models inc 100LS \$12.95
- 1229 Audi 4000 80-82 all sedan & coupe \$12.95
- 9699 Audi 5000 77-83 factory shop manual \$29.95
- 0726 Audi Fox 73-79 covers all models \$12.95
- 0379 Barracuda 65-72 all 6 & V8 inc Cuda \$11.95
- 1042 BMW 2002 59-77 all inc 160s, no CS \$12.95
- 9813 BMW 320i 75-82 covers all models \$12.95
- 8199 BMW 528i, 530i, 75-80 for all models \$12.95



- 9760 BMW 2300, 2800, 3.0 all models, no CS \$12.95
- 0504 Bronco 66-81 all 2 & 4 wheel dr mds \$11.95
- 8692 Bronco II 84 all 2 & 4 wheel dr mds \$11.95
- 6308 Buick 68-76 Electra, LeSabre, Wildcat \$12.95
- 8473 Buick 77-83 Electra, LeSabre, Estate \$12.95
- 8082 Buick 74-80 Century, Regal, inc Turbo \$12.95
- 8459 Buick 81-83 Century, Regal, rear whl dr \$11.95
- 9851 Buick 82-83 Skylark & Cad Cimarron \$12.95
- 0727 Cadillac 68-74 all except El Dorado \$12.95
- 6016 Cadillac 75-84 all full size models \$11.95
- 8678 Camaro 67-81 all 6 & V8 models \$12.95
- 1262 Camaro 82-84 covers all models \$12.95
- 9557 Capri 70-76 all 2000, 2600, 2800 mds \$12.95
- 9386 Capri 79-83 all engines & models \$12.95
- 9851 Cavalier 82-83 all + Pontiac J-2000 \$12.95
- 0465 Celebrity 82-83 all + fwd Century \$11.95
- 8379 Challenger 70-72 all 6 & V8 models \$11.95
- 9462 Challenger 78-83 all inc Sapporo \$12.95
- 8331 Charger 67-70 for all inc 3000 & R/T \$11.95
- 0383 Chevrolet 64-69 for all inc Malibu \$12.95
- 8469 Chevrolet 70-83 + Malibu, Monte Carlo \$11.95
- 0838 Chevrolet 76-84 all + Pontiac T-1000 \$12.95
- 1038 Chevrolet 29-40 all 6-cyl models \$22.95
- 0888 Chevrolet 49-54 reprint factory manual \$22.95
- 1001 Chevrolet 55-65 BelAir, Biscan, Impala \$12.95
- 0919 Chev 69-81 BelAir, Biscan, Capric, Impala \$12.95
- 8187 Chev 82-88 all 6 & V8 models \$11.95
- 0779 Chev LUV 72-82 all 2 & 4wd/Holster \$12.95
- 8464 Chev 82-83 10 pick-up & GMC S-15 \$12.95
- 8849 Chev 83 5.0, 15 Blazer & Jimmy \$11.95
- 8154 Chev 67-82 pick-up, subortn, Blazer, GMC \$12.95
- 1662 Chev 67-83 vans all models + GMC \$12.95
- 0020 Chrysler 74-79 factory manual, year \$23.95
- 9148 Citation 80-83 all mds + Buick Skylark \$12.95

## FUEL SYSTEMS

- 0706 Bypass Ford Emission Controls 73-77 \$15.95
- 8474 Bypass GM Emission Controls 71-77 \$14.95
- 9976 Carb Basics, troubleshooting, rebuild all US \$8.95
- 0882 Carter Carburetors all 4-bbl models \$10.95
- 8534 Holley Carburetors all 4-bbl models \$10.95
- 9411 Holley Carburetors all 2 & 4-bbls \$10.95
- 9652 Rochester Carbs all 1, 2 & 4-bbls \$10.95
- 9423 Stromberg CD Carburetors all thru 76 \$9.50
- 6354 SU Carburetors all models thru 76 \$9.50
- 1511 Weber Carburetors all models thru 79 \$9.50

## BOATS & MOTORCYCLES

- 8506 Chrysler 08 66-81 3.5-20 hp \$9.95
- 8507 Chrysler 08 66-82 25-140 hp \$9.95
- 8508 Evinrude 08 65-81 all 1.5 to 35 hp \$9.95
- 8509 Evinrude 08 65-82 all 40 to 140 hp \$9.95
- 8510 Johnson 08 65-81 all 1.5 to 35 hp \$9.95
- 8511 Johnson 08 65-82 all 40 to 140 hp \$9.95
- 8512 Mercury 08 64-82 all 4 to 40 hp \$9.95
- 1217 Mercury 08 64-82 all 50 to 200 hp \$9.95
- 8186 Stern Drive, repair, AMC, Merc, Volvo \$9.95
- 1085 Mercruiser stern drive shop manual 64-83 \$22.95
- 0929 Mercruiser Merc 68-81 all Japan & US \$24.95

## TV, HOME REPAIR, ETC.

- 8024 All About Home Satellite TV \$13.50
- 9959 Beginner's Guide to TV Repair, 224 pgs \$9.25
- 0533 TV Field & Bench Service's Handbook \$9.95
- 0450 Television Electronics: theory & service \$29.95
- 0530 Television Electronics: the best \$24.95
- 0809 Service Home Video Cassette Recorder \$13.95
- 0396 Videocassette Recorders Handbook \$10.25
- 8023 Home Video Equipment: all sys & compnt \$9.95
- 3752 Master Handbook of Telephones \$12.50
- 0568 Electrical Appliances, repair all \$12.95
- 7133 Repair Your Own 35mm Camera, all SLR \$10.25
- 1268 Sewing Machine Repair, 308 pages \$9.25
- 9404 Typewriter Repair, manual & electric \$12.50
- 8724 Locks & Locksmithing, 392 pages info \$15.50
- 9791 Di Barners, install, service, repair \$16.95
- 9426 Electrical Wiring house, barn, garage, + \$15.95
- 9447 Home Electricity from Wind, Water, Sun \$8.25
- 9525 Machining Fundamentals, 512 pages \$25.95
- 8397 Cast Small Metal & Rubber Parts \$7.25
- 8231 Welding Guidelines, gas & electric \$9.95
- 1652 General Carpentry, consist wood houses \$24.95
- 9419 Small Engine Service manual, under 15 cc \$12.95
- 0557 Chain Saw Service Manual, 24 top makes \$9.95

- 9588 Citroen ID, DS 67-75 all DS19, 20, 21 \$12.95
- 8732 Colt & Champ 78-83 front whl drive \$12.95
- 8212 Coronet 71-75 covers all models \$11.95
- 8032 Covari 60-69 all models inc turbo \$11.95
- 0478 Corvair 57-65 all 263 & 327 models \$12.95
- 9481 Corvette 66-82 all engines & models \$12.95
- 9585 Corvette 84 factory shop manual \$26.95
- 1756 Cricket 70-73 all + Halman Avenger \$12.95
- 8032 Darr & Damon 68-76 covers all models \$11.95
- 9592 Datsun 200SX 80-82 \$12.95
- 8005 Datsun 1200-8210 71-78 all models \$12.95
- 0783 Datsun 210 79-82 for all models \$12.95
- 8127 Datsun 240Z, 260Z, 280Z 70-78 all mds \$12.95
- 9152 Datsun 280ZX 79-82 all inc turbo \$12.95
- 1657 Datsun 310 76-81 all models + F10 \$12.95
- 9583 Datsun 510, 510, 710 68-77 all models \$12.95
- 0392 Datsun Nissan Sentra 82-83 all mds \$12.95
- 7138 Datsun Nissan Stanza 82-83 all mds \$12.95
- 9297 Datsun 70-81 pick-up all 2 whl dr \$12.95
- 0525 Datsun 80-82 pick-up all 2 whl dr \$12.95
- 0871 Dodge 68-77 all Monaco, Polara mds \$11.95
- 8006 Dodge Aries 81-83 for all models \$12.95
- 1259 Dodge Omni 78 84 all + 024, Chrg, Rmax \$12.95
- 0953 Dodge 67-84 pick-up all 4 whl dr mds \$11.95
- 1297 Dodge 71-82 pick-up all 2 whl dr mds \$12.95
- 2497 Dodge 79-81 D-50 pick-up plus Arrow \$11.95
- 8203 Dodge 67-70 vans all + Plymouth \$11.95
- 0670 Dodge 71-83 vans to 1 ton + Plymouth \$12.95
- 0801 Dodge Caravan 84-85 + Plymouth Voyager \$11.95
- 9112 Duster 70-76 all models inc Scamp \$11.95
- 8688 Escort 81-82 all mds inc EXP \$12.95
- 8189 Fairlane 62-70 for all models \$11.95
- 8366 Fairmont 78-83 for all models \$12.95



- 9776 Fiat 124 67-82 all, Spider, 2000, turbo \$12.95
- 9640 Fiat 128 72-79 all mds + SL, Rally \$12.95
- 9810 Fiat 131 75-80 all 1.8 & 2.0 engs \$12.95
- 0399 Fiat 13 91-92 covers all models \$12.95
- 0322 Fiat Strada 79-80 all models \$12.95
- 1073 Fiesta 78-80 covers all models \$12.95
- 9178 Fiesta 67-69 covers all models \$12.95
- 0960 Fiesta 70-81 all V8 mds + TransAm \$12.95
- 1262 Firebird 82-84 covers all models \$12.95
- 9611 Ford 71-82 Elite, LTD, Lincoln, Torino \$11.95
- 0872 Ford 68-83 Custom, Galaxie, LTD, Ltd + \$11.95
- 9369 Ford Courier 72-82 covers all models \$12.95
- 8205 Ford 65-68 pick-up 2 & 4 whl to 1 ton \$11.95
- 8451 Ford 69-83 pick-up 2 whl F-trim + diesel \$12.95
- 0458 Ford 73-79 pick-up 2 & 4 whl F-trim \$12.95
- 9322 Ford Ranger 83 all 4 cyl, 2 & 4 whl dr \$12.95
- 8204 Ford 81-88 vans all to 1 ton \$11.95
- 0453 Ford 69-83 vans all 6 & 8 cyl mds \$12.95

## BOOKS BY CAR MAKE

- 8094 Barracuda Challenger Source Book \$12.95
- 9534 Buick Power Manual, tuning the V6 \$8.95
- 0774 Buick Muscle Cars 65-70 road tests, more \$11.95
- 9409 Chevy Small-Block, How to Hotrod \$7.95
- 9410 Chevy Small-Block, How to rebuild \$9.95
- 8421 Chevy Racing Engine, prep small block \$10.95
- 1243 Chevy Small-Block, Racing the 152 p \$8.95
- 9795 Chevy Performance, from small block \$10.95
- 1601 Chevy Big-Block, How to Hotrod \$7.95
- 9938 Chevy Big-Block, How to Rebuild \$9.95
- 8303 Chevy Heavy Duty Parts Book \$5.00
- 0830 Chevy Super Sports 61-76 info on all \$14.95
- 0487 Chevrolet SS, A Source Book, factory info \$12.95
- 3725 Building the V6 Vega, step-by-step \$7.95
- 8060 Corvette Repr NOS Parts Book, 53-82 \$8.95
- 0949 Corvette Restor'n Source Book, 53-67 \$21.95
- 8683 Datsun, How to Hotrod & Race, 51-68, 02 \$15.95
- 0794 Ford: Source Book, factory info \$12.95
- 1725 Ford: Trans-Am High-Perf Hbook \$8.95
- 0946 Ford Small-Block, tuning & rebuilding \$9.95
- 8494 Ford Big-Block, How to Rebuild, 160 p \$9.95
- 9497 Ford V8, How to rebuild your \$9.95
- 8195 Ford Performance, from all V8 engines \$10.95
- 1076 Fearless Ford's 59-73 tech data, pics \$14.95
- 9498 Ford, Rebuild your OHC 4-cyl Pinto \$9.95
- 7115 How to keep your Honda alive, 73-82 \$14.00
- 0930 Mazda RX-7 road tests, tech data, plus \$8.95
- 8384 Mopar Small-Block, How to rebuild \$9.95
- 8706 Mopar Suspension Tuning \$10.95
- 8307 Mopar Performance, hi-perf eng bldg \$10.95
- 8532 Mopar Connection engine modifications \$15.00
- 8095 Nova SS, A Source Book, factory info, pics \$12.95
- 8144 Olds 4-4-2, Source Book, factory info \$12.95
- 9963 Opel GT, road tests, tech data, plus \$11.95
- 0758 Muscle Pontiacs, all hi-perf mds 55-85 \$8.95
- 9965 Pontiac Racer, hi-perf from 60s, 70s \$19.95
- 6012 GTO Source Book, factory info & hist \$12.95
- 8054 Big "Little" GTO Book, 64-74 mds \$14.95
- 6351 Porsche Buyer's Guide, 210 illus \$13.95
- 0877 Porsche 911 L-912 source book, factory info \$12.95

## LAWN MOWERS & TRACTORS

- 9651 Small Tractors 65-81, 9.0 hp, 960 pgs \$19.95
- 8301 Ais-Chalmers B. C. A. G. RC, WC, WD, WF \$10.95
- 8420 Ford 2N, 8N, 9N \$10.95
- 9892 Ford 501, 600, 1,900, 1,801, 2000 \$10.95
- 1028 IH A. B. C. H. M. MTA, 4, 6, W6TA, 9 \$10.95
- 8518 John Deere A, B, D, G, H, M, MT \$10.95
- 1020 Massey-Ferguson T20, T020, T030 \$10.95
- 8755 Riding Lawnmower Serv, all top makes \$9.95
- 9770 Lawnmowers, push-type, at 2 & 4 cyl eng \$8.95
- 9147 Excavator Operation, all earthmoving \$9.95
- 9607 Heavy Equip Repair, earthmoving \$19.95
- 9508 Large Air Cooled Eng, 15 cc & up \$9.95

- 8848 Honda Accord 76-82 covers all models \$12.95
- 9787 Honda Prelude 89-92 \$12.95
- 8694 Honda Civic 73-83 covers all models \$12.95
- 1259 Honda Civic 78 84 all + TC1, Turumo, Scamp \$12.95
- 8565 Infiniti 67-80 wagon, pick-up, Scout \$12.95
- 8206 Infil Scout 67-73 800 A, B 8 mds \$11.95
- 1043 Jaguar E-type 61-72 all 6-cyl models \$12.95
- 9399 Jaguar XJ6 68-79 for all models \$12.95
- 9617 Jaguar XJ12 78-80 all inc XJS \$12.95
- 9769 Jeep Willys 46-65 sta wagon & pick-up \$21.95
- 9805 Jeep 66-84 Cherokee, Wagoneer, Commanch \$11.95
- 8155 Jeep CJ 5, 7, 8, 9 all Cj 5, 6, 7 models \$12.95
- 0596 Lancia Beta 76-80 sedan, coupe & HPE \$12.95
- 1254 Lancia 59-77 2, 2A, 3 mds + diesel \$12.95
- 0481 Laverack 69-71 all 6-cyl models \$11.95
- 8207 Laverack 72-77 all models + Comet \$11.95
- 1550 Mazda GLC 77-82 rear whl drive mds \$12.95
- 0812 Mazda GLC 81-84 front whl drive mds \$12.95
- 0444 Mazda 71-78 includes RX4 & Cosmo \$11.95
- 9941 Mazda RX7 79-83 covers all models \$12.95
- 8105 Mazda 626 79-81 covers all models \$12.95
- 0843 Mazda 626 81-82 72-78 covers all mds \$12.95
- 9486 Mazda 72-82 pick-up 8, 1600, B, 1800 \$12.95
- 1746 Mercedes 220 59-65 for all models \$12.95
- 8197 Mercedes 65-68 1900, 2000, 2200, 250, + \$11.95



- 9485 Mercedes 250, 280 68-72 all plus 230 \$12.95
- 0730 Mercedes 280 77-81, 6-cyl, E & CE models \$12.95
- 0416 Mercedes 68-73 230, 300 + diesel mds \$11.95
- 8308 Mercedes 350, 450 71-80 for all mds \$12.95
- 8439 Mercedes 74-84 230, 240, 290, 300, dsl + \$11.95
- 9888 Mercury Lynx 81-82 all mds inc LN7 \$12.95
- 1098 MG Midget 68-80 all + Sprite 58-71 \$12.95
- 6038 MG MGB 62-67 covers all models \$12.95
- 1720 MGB MGBGT 62-81 roadster, coupe mds \$12.95
- 0917 Mini 59-78 all mds inc Mini-Cooper \$12.95
- 0884 Monza, Chev 75-80 + Aste, Strk, Skylk \$11.95
- 0479 Mustang V8 65-73 covers all models \$12.95
- 8272 Mustang 74-78 all 4, V6 & V8 mds \$12.95
- 9386 Mustang 79-83 all engines & models \$12.95
- 0951 Nova 71-79 covers all models \$12.95
- 6308 Oldsmobile 68-76 all 88, 98 models \$12.95
- 7107 Oldsmobile 74-84 88, 98, 100, 1000 \$12.95
- 8465 Oldsmobile Cutlass, Corsair 82-83 + Pont 6000 \$11.95
- 9851 Oldsmobile Delta 82 all mds + Pont 2000 \$12.95
- 9148 Olds Omega 80-83 all + Pont Phoenix \$12.95
- 8273 Opel 66-75 all GT, Admiral, Mantra, 1900 \$12.95
- 712 Peugeot 504 68-79 all gas eng models \$12.95
- 0111 Peugeot 504 Diesel 74-80 all models \$12.95
- 0883 Pinto 70-80 all mds + Mercury Bobcat \$12.95

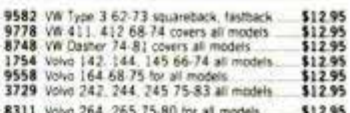
## CHASSIS & BODY REPAIR

- 8478 Customizing Cars, inside & out \$12.95
- 3720 Auto Body Repair, tech training manual \$22.95
- 1659 Auto Body Repair, the fundamentals \$14.95
- 8712 Wial Fabricator's Handbook, custom \$9.95
- 5104 Auto Body Repairing & Rebuilding, best \$14.95
- 0745 Auto Collision Work, vocat'l train manual \$19.95
- 0827 Automotive Refinishing, for the pro \$8.95
- 8470 Fiberglass Repair & Construction \$11.95
- 5106 Glass Fiber Auto Body Construction \$6.50
- 0906 Old Car Value Guide, 1900-69 all \$9.95
- 9780 Auto Restoration Guide, very complete \$17.95
- 0995 Car Interior Restoration, for any car \$7.25
- 8364 How to Restore Car Interiors \$14.95
- 8903 How to Restore Parkways \$14.95
- 8912 How to Restore Fiberglass Bodywork \$14.95
- 1223 Brakes, Steering & Suspension 76-83 \$14.95

## TUNING & REBUILDING

- 9671 Basic Car Maintenance & Repair \$4.95
- 9622 How to Tune Your Car for US cars \$7.95
- 7110 Weekend Mechanic's Handbook, excellent \$12.95
- 8152 Bot-On Performance, what you can buy \$10.95
- 0813 V-6 Performance, how to get maximum \$10.95
- 1146 Performance with Economy, realistic \$10.95
- 9877 Smokey Tuning's Power Secrets \$12.95
- 1766 Engine Power Book, hi-perf eng bldg \$8.95
- 5117 Design & Tuning Competition Engines \$14.95
- 8491 Practical Engine Swapping \$7.95
- 6316 Sports Car & Competition Driving \$9.95
- 9010 Bob Bonstrom on High Speed Driving \$11.95

- 0874 Plymouth 68-76 Fury, VIP, Gran, Suburban \$11.95
- Plymouth Reliant 81-83 all models \$12.95
- 0851 Pontiac 66-76 Bonneville, Catalina, GP, + \$12.95
- 8710 Pontiac 74-84 LeMans, GTO, GP, GrandAm, + \$11.95
- 1108 Pontiac Fire 84 factory shop manual \$27.95
- 0489 Pontiac Tempest 68-73 + GTO, LeMans \$11.95
- 9535 Porsche 911 65-82 inc E, SC & T \$11.95
- 9834 Porsche 914 70-76 all inc 914-6 \$12.95
- 0993 Porsche 924 76-82 all inc Turbo \$12.95
- 8008 Porsche 928 78-81 also covers 924 \$11.95
- 0372 Renault LeCar 75-83 covers all mds \$12.95
- 9429 Renault 12 69-79 for all models \$12.95
- 0645 Renault 15, 17 73-79 all except T, \$12.95
- 0506 Renault 18 78-81 all inc GTL, GTS, LS \$12.95
- 0750 SAAB 99 69-79 covers all models \$12.95
- 8131 SAAB 900 79-83 all mds inc Turbo \$12.95
- 8058 Subaru 72-82 all 1300, 1800, BRZ, MPV \$12.95
- 8584 Subaru 80-83 all mds, 2 & 4 whl dr \$12.95
- 8896 Subcom Alpine, 260 Taper, Rigor mds \$10.95
- 8189 Torino 68-75 all inc Elite, Ranchero \$11.95
- 0829 Toyota Celica 71-81 all except Supra \$12.95
- 9002 Toyota Celica 82-83 all except Supra \$12.95
- 9812 Toyota Corolla 68-83 all inc 5-spd \$12.95
- 7132 Toyota Corolla 70-82 all 4-cyl models \$12.95
- 8198 Toyota Cressida 78-82 all models \$12.95
- 0923 Toyota Starlet 81 covers all models \$12.95
- 0576 Toyota Supra 79-81 covers all models \$12.95
- 0901 Toyota Tercel 80-82 for all models \$12.95
- 8524 Toyota Land Cruiser 68-82 all mds \$12.95
- 8124 Toyota pick-up 79-83, gas, 2 & 4 whl dr \$12.95
- 1200 Triumph Spitfire 62-81 all models \$12.95
- 1015 Triumph TR5, TR6 67-76 all inc TR250 \$12.95
- 8693 Triumph TR7 75-81 for all models \$12.95
- 8192 Valiant 68-76 all inc Scamp, Signette \$11.95
- 0513 Vega 70-77 all mds except Cosworth \$12.95
- 8019 Volvo 760 80 covers all models \$11.95
- 1227 VW Beetle 54-67 for all models \$12.95
- 0140 VW Rabbit 68-77 for all models \$12.95
- 8300 VW Rabbit 75-83 gas & diesel mds \$12.95
- 8294 VW Scirocco 75-83 for all models \$12.95
- 8383 VW Jetta 80-81 gas engine models \$12.95
- 1125 VW Bus 61-79 all transporter mds \$12.95
- 9626 VW Vanagon 80-82 for all models \$12.95



## GENERAL REPAIR

- 0850 Chilton Auto Repair 78-85, all U.S. cars \$20.95
- 0932 Chilton Auto Repair 72-79, all U.S. cars \$22.95
- 7137 Chilton Auto Repair 64-71, all U.S. cars \$22.95
- 1763 Chilton Auto Repair 54-63 all U.S. cars \$22.95
- 8091 Chilton Import Car Repair 76-83 all makes \$20.95
- 1291 Chilton Truck Repair 61-71 all 1/2 to 2 1/2-ton \$20.95
- 8561 Chilton Truck Repair 61-71 all 1/2 & mid \$22.95
- 0858 Motor Truck Repair 70-81 heavy trucks \$24.95
- 2526 Engine Repair & Rebuilding, 300 pages \$14.95
- 7128 Convert your Car, Van, Pickup to diesel \$8.25
- 1260 Diesel Repair Man, all cars & trs \$19.95
- 0657 Diesel Fundamentals, Service, Repair \$19.95
- 9838 Diesel & high comb engs, all models \$22.95
- 9320 Automotive Trns, 57-79 adjust all U.S. \$14.95
- 1749 Automatic Trans 74-80 repair all U.S. \$14.95
- 0632 Auto Power Trns, rbd man trns, dthnt+ \$16.95
- 8174 Clutch & Flywheel Handbook, 184 pgs \$9.95
- 9658 Auto Mechanic's Conv serv text guide \$7.95
- 1557 Auto Mechanic's Fundamentals, textbook \$25.95
- 0492 Auto Repairs & Prices, flat rate 74-79 \$9.95
- 8901 Auto Troubleshooting Guide, entire car \$7.95
- 5549 Auto Diagnosis & Tune-up, pro textbk \$24.95
- 1165 Diagnosis & Repair GM Cars 70-83 \$14.95
- 8857 Understand Auto Electronic, all systems \$7.95
- 0653 Automotive Oscilloscope, how to use \$10.95
- 0565 Auto Electrical Systems, 393 pages \$18.95
- 0654 Auto Air Conditioning, vtech textbk \$22.95
- 7125 Auto Air Conditioning handbook, basic \$9.25
- 1102 Auto Air Conditioning, professional rbd \$15.95

## CarBooks, Inc.

181 Glen Ave.  
Sea Cliff, NY 11579

Name	BOOK NO.	PRICE

**NEW** **MAGNATrac Bulldozer Kit!**

LOW-COST  
CRAWLER  
POWER!

- **NEW ENGINE** - 18 hp Twin Cylinder
- **NEW POWER** - 4500 lbs. Max. Pull
- **NEW LOADER** - Lifts 750 lbs. to 7½ ft.
- **NEW BACKHOE** - Digs & Loads to 8 ft.

Catalog - showing Magnatrac - Kit construction & uses ..... \$1.00  
Plans - for building a Magnatrac from local materials .... \$7.00



SEND TO **STRUCK-KIT Dept: PM 25**  
Cedarburg, Wisconsin 53012

**EARN SHOES FOR YOURSELF!**

If you will take just five Mason Shoe orders a month, **YOU NEED NEVER BUY ANOTHER PAIR OF SHOES!** The "Earn Shoes for Yourself" plan makes it EASY! With our catalog of 400 fast-selling styles (dress, work, sport shoes) you'll have no trouble getting the orders. And you'll have your own private shoe store from which to select your **FREE SHOES**. You don't invest one cent, yet you earn up to \$100 a week showing friends and neighbors Mason Shoes. Fine quality air-cushion shoes in sizes 4½ to 16, widths AA to EEEE. Rush postcard for **FREE Starting Kit** plus exciting **Prize and Bonus Offers TODAY!** Call Toll Free 1-800-826-7030, Ext. 614, in WI 1-800-472-7003, Ext. 614, or write: **MASON SHOE MFG. CO., DEPT F-591** Chippewa Falls, WI 54774




**Make Clocks Easily! with Precision Quartz Movements**

**M88 Thinline**  
2-3/16" square x 5/8" thick  
Step sweep hand. Uses AA cell.

Made in Japan by the world's largest producer of quartz timepieces.



**NEW LOWER PRICES!**

1-2	\$6.95	25	50	\$3.65
3-9	\$4.95	@		<b>FREE HANDS</b>
10-24	\$4.35	\$3.95		

PRICES INCLUDE HOUR AND MINUTE HAND. ADD 25¢ FOR SECOND HANDS. Add \$2.00 per order for postage & handling.

BOOK - How You Can Make Battery Operated Clocks...Easily. 64 Pages. Fully Illustrated. By Charlie Plumb \$6.95

**QUARTZ MOVEMENTS** NEW CATALOG  
50 pages of clock movements, dials, accessories, hands, tools, and more! Catalog # 784 \$1.00 (Free with order)



**Cas-Ker Co.**  
BOX 2347-L CINTI, OH 45201  
PHONE (513) 241-7073

## SNOW: MAKING IT AND BREAKING IT

(Continued from page 93)

which a brittle layer of snow sits beneath a wetter outer layer. A weak surface in the snow—where two layers don't bond together well—can start cracking under the weight of the outer surface.

When the ground is much warmer than the surface air, the snow closest to the ground becomes "depthoar," a type of snow that looks like hoar frost and cracks easily.

### Avalanche guessing game

As a crack radiates outward, the bond between the outer layer and ground layer of snow is broken and the cracking undersurface begins to slip. Now an avalanche is in progress. The depthoar can build up over a period of days, but without sophisticated sonar equipment experts are really only guessing at the makeup of the snow on any mountain.

In California's Squaw Valley, Jim Mott and crews of up to 24 ski patrol members make regular visits to traditional avalanche sites. If the conditions suggest a snow slide, he places a 2-pound dynamite charge inside a hole in the mountain and uses no more than 45 seconds to take cover. The blast starts a mini avalanche that clears the heavy pack away from the depthoar before the snow ever amounts to full avalanche conditions.

"The stiff snow that makes up the depthoar might be good packing material for igloo building," Sommerfeld says, "but it is a disaster sitting on the side of a mountain."

### Secrets of the igloo

While physical scientists are working on the snow question in labs and on mountainsides, anthropologists are adding a new dimension to our knowledge of snow by studying Eskimo igloos.

Despite the fact that the snow the Eskimos use in many ways resembles depthoar, it still has great construction properties in arctic climates.

Eskimos build their igloos in areas where the snow is packed just loose enough to make a footprint, but not so loose that it blows away in a high wind. After construction, an igloo can house three to six people in temperatures ranging up to 80°F.

Why doesn't the igloo melt from the inside heat?

Why doesn't it fall in the face of strong arctic winds?

The igloo walls do melt, but very slowly. Heat absorbed in surface water droplets moves swiftly out through the igloo's snow-brick construction to the colder air outside. As the melted water trickles down the igloo's inside wall, it refreezes.

Eventually, the igloo is glazed over inside. Some igloos are lined with animal skins placed along the walls and floors. The insulation keeps heat flowing out very slowly so that the igloo stays warm and the walls melt at an imperceptible rate.

### Texture of the snow

The biggest reason why an igloo stands up to structural challenges is the texture of the snow from which it is made. Unlike the depthoar of avalanches, igloo snow is exposed to air directly. Chilly winds harden and strengthen the material.

A typical igloo is roughly 10 feet in diameter. It is built of several courses of well-packed blocks each 2 feet long, a foot high and 6 inches thick. The bottom surface of each block tilts slightly inward when set into position. The angling of the bricks gets steeper with each course until the dome is complete. Many Eskimos even add a window to their igloos, a section of frozen lake water.

In many ways, we are rapidly solving long-shrouded mysteries of both the making and breaking of snow. This form of precipitation may be a nuisance to drivers, and a plaything to children, but to science, snow is a key that is about to unlock many doors. **PM**

## Make Your Own Snow Crystals

Supercooled water freezes at temperatures below 32° F. If the water is free of particles and is frozen gradually, it can get down to below freezing temperatures before turning to ice. When it does freeze, supercooled water turns hard in the blink of an eye. To perform a supercooled water experiment you'll need a bottle of distilled water, a sterile test tube (available at most pharmacies), a mixing bowl, ice, table salt and water. Fill the bowl about one-third with tap water and put in enough ice cubes to bring the water line just above halfway. Liberally sprinkle salt over the ice cubes

and let stand a minute. With rubber-gloved hands, open the sterile tube and the distilled water. Pour in the water to the top of the tube and seal it. Very gently place the water tube inside the bowl with the top sticking out of the ice water. Insert the thermometer next to the test tube. When the temperature falls to 18° F., tap the test tube gently. Before you remove your finger, the water in the tube will turn to ice, and the cork should gently pop off the tube. Do this experiment and you'll have duplicated the formation of a supercooled snow crystal. —D.E.



GREAT NEW TRANSPORTATION IDEA

INDOOR/OUTDOOR

# Electric Car(t)

*Who says safe, quiet, electric-powered personal transportation is a dream for the future?*

*That dream is now—thanks to modern engineering—and ELECTRIC MOBILITY.*

In fact, there are thousands of electric vehicles out there right now—taking their satisfied owners to the store—the library—the park—even just around the house and yard and off to visit friends.

They use no gas or oil, go up to 20 miles on a single 10¢ battery charge, and recharge overnight just by plugging into any household electric outlet.

## *Meet CYCLE CHAIR and LITTLE RASCAL*

These peppy little three-wheelers go up to 12 mph, and are as much fun to ride as a Moped, but far safer. The wide rear wheelbase makes them virtually untipable. At the same time, having all the weight over the rear axle gives them excellent function on slopes, hills—even off-the-road surfaces like grass, sand, gravel or carpet.

Both the Rascal and the CycleChair have lightweight aluminum frames which are guaranteed for life, solid-state controls and modular design, which makes them easy to transport in the trunk of your car.

## *Ride 'em Indoors or Out!*

No garage? Never mind! You can ride your Cycle Chair or Little Rascal right into the house. They're great for gardening or doing lawn chores.

Going shopping? You won't have to worry about looking for a parking space. Ride your Cycle Chair or Little Rascal right into the mall and

through the stores! Only 21" to 28" wide, it goes up and down the aisles with ease to let you shop in motorized comfort.

Time to carry the bundles home—just load them into the big front and rear cargo baskets and wheel on home in style.

## *No License Needed*

Even if you've never learned to drive, you can operate one of these three-wheelers. And no drivers license is needed.

In fact, they're so easy to ride, even a child can do it. All the controls are right on the handlebar, so one hand is all it takes to speed up, slow down, stop, back up or make a turn.

## *A Variety of Sizes And Options Available*

Both Cycle Chair and Little Rascal are available in short or long frame models, with and without such deluxe accessories as a locking storage box, electric horn, rear view

mirror, padded armrests and surrey top.

Standard features include pneumatic tires, variable speed control, built-in battery chargers, rear differential drive, padded swivel seat, on-off switch with key, sealed beam headlight, heavy duty front drum brake and more.

## *Call Toll-Free 1-800-662-4548 for Complete Details*

Of course, with a 20-mile range, these vehicles won't replace the family car.

But for safe, reliable transportation around your neighborhood or town—with no gas to pump, no oil to change, no waiting for buses or helpful friends, they simply can't be beat!

So don't wait for the future to arrive . . . because it's already here! Mail the coupon below or call our toll-free number 1-800-662-4548 and arrange to test drive a brand-new Cycle Chair or Little Rascal today!

### **ELECTRIC MOBILITY** >>>>>>

Electric Mobility Corporation, Dept. 1271  
#1 Mobility Plaza, Sewell, NJ 08080

- SEND ME complete information on the electric-powered CYCLE CHAIR and LITTLE RASCAL so I can stop pumping gas, changing oil, and using a big, overpowered car for short trips around town.
- CALL ME to arrange a test drive at my convenience so I can see for myself how easy—and how much fun—they are to operate!

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Mail this coupon today or **CALL TOLL FREE 1-800-662-4548**

## WOODWORKERS CATALOG

SEE 116 pages of hard-to-find products to build, restore, refinish anything of wood! Choose from 14 fine hardwoods, 109 veneers, 76 inlays, Cabinet & furn. hardware, Pro finishes, Uphol. supplies, Chair & table legs, 33 pic. moldings, Cane, Lamp parts, Carving tools, Specialty tools, shop equipment, 100's plans, how-to books, 2,000 products. Send \$1 for Catalog now. Get DOUBLE your money back!

**CONSTANTINE** Est. 1812  
2051 Eastchester Road, Bronx, N.Y. 10461

★ Here's \$1 for 116-page Woodworkers Catalog  
**DOUBLE Your money Back!**

Get \$2  
BACK

Mail coupon now for dollar Catalog. We include \$2 refund Certificate good on 1st catalog order!

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_



### PHONE LISTENING DEVICE

Record telephone conversations in your office or home. Connects between any cassette or tape recorder and your telephone line. Starts automatically when phone is answered. Records both sides of conversation. Stops recorder when phone is hung up.

19<sup>95</sup> ea. Qty discounts available

**WIRELESS MIC** (super powerful)

10 times more powerful than other mics. Transmits up to 1/4 mile to any FM radio. Easy to assemble kit. 15V battery (not incl.). Call (305) 725-1000 or send \$12.95 + \$1 shipping per item to USI Corp., P.O. Box PM-2052, Melbourne, FL 32901. COD's accepted. For catalog of transmitters, voice scramblers and other specialty items, enclose \$2 to USI.



## Doric Mantle Clock Vintage 1880



A unique clock with matching ring drawer base (optional). The Doric Mantle assembles easily. It is carefully cut from solid oak. First-time builders should require no more than 4 to 5 hours. Solid brass key-wound, 8-day movement strikes the 1/2 hr., counts the hr. Movement eligible for Lifetime Guarantee.

**SOLID OAK  
KIT WITH MOVEMENT \$129**  
Ring drawer base kit 19.95

Kit contains: •Solid oak parts •Dial, hands & pendulum •Pre-assembled door •Brass hardware •Silk screened glass.

Write for **FREE** color catalog of grandfather, wall & mantle clocks. Credit card orders call **TOLL-FREE 1-800-321-1089.**

Create a family heirloom

# VIKING

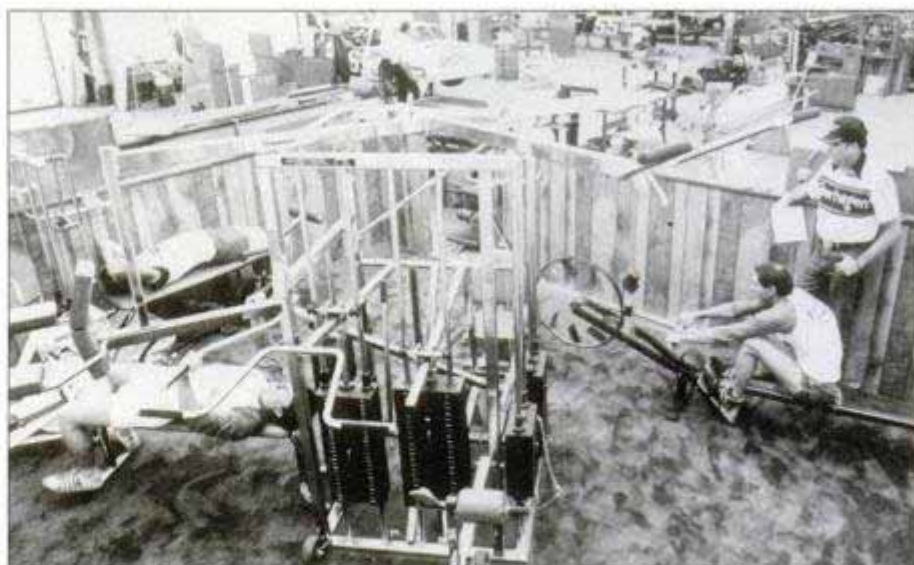
CLOCK COMPANY

Major credit cards honored

Phone 205/943-5081, Box 490  
Dept. PMD025, Foley, Alabama 36536

## THE WORLD'S FASTEST MECHANICS

(Continued from page 79)



The Johnny Hayes Racing shop has a complete gym for all of the crew members to work out in to develop the muscles that they need most to perform efficiently during pit stops.

### Dr. Impact Wrench



Howard Hurd tests a reworked impact wrench's output on his portable dyno.

If you want to be fast on the tire changes in NASCAR circles, you'll have to get to know Mr. Howard Hurd. As the traveling representative of Ingersoll-Rand Co., Mr. Hurd (the only proper form of address) is the dean of high-performance impact wrench science.

This 72-year-old grandfather of 11 started in the business by building a hot-rod tire wrench for the famous Wood Brothers team back in the early 1960s. That was all the advertising he needed.

Mr. Hurd modifies the wrenches by enlarging the airflow passages in the air motor. When he's done, the tool will spin 30,000 rpm and generate 600 ft.-lb. of torque. He specifies compressed nitrogen for power to eliminate the moisture problems of regular compressed air, and he's also responsible for the quick-lifting hydraulic jacks most teams use. Mr. Hurd is one of those background figures you rarely hear about, but without his innovations the pit stops would certainly go a lot slower.—N.S.M.

this weekend). Realizing that seconds saved in the pits were every bit as valuable as cutting lap times on the track, the crew underwent a motion-study analysis last winter by a team of sports researchers that also helps Olympic athletes hone their styles.

After the pit stops were filmed with high-speed cameras, the Olympic Sports Medicine team assembled a frame by frame reconstruction for study. At this pace it was easier to spot ways to trim tenths of seconds by eliminating wasted motion. Some jobs had room for major improvement. For example, the tire carrier now leaps over the jack to deliver the fresh rear rubber, and the jack man lifts the front tire into place while the tire man pushes the old one out of the way. Times are improved and far more consistent.

The study didn't stop there, though. The Hayes crew strives to excel, so the members underwent rigorous testing to determine endurance, strength and heart rate. Led by Dr. Charles Dillman, the consultants developed exercises for each man and an eight-station gymnasium was installed in the North Carolina shop.

Why stop there? The sports physicians also got the crew onto a proper diet appropriate for their short bursts of work. Their high fat, low carbohydrate diet was converted to a healthier regimen of fruits, salads and vegetables. Juices replaced soda, and sweets are nearly absent from the race-day pit area. The first sign of real results has been better showings in the Ingersoll-Rand Tools Pit Crew Championship contests, run at 10 of the NASCAR races through the season. Salt intake has also been cut down, and warm-up

(Please turn to page 124)

# In just a few hours you can build a collector's miniature masterpiece.

Few crafts are as satisfying to a man as working with wood. The beauty of the hardwood grain...the perfect smoothness from hand sanding...the gleam of the varnish finish—these are the pleasures you experience when you build our extraordinary museum quality miniature furniture kits.

## The standard of excellence for expert miniaturists

As you assemble each kit, see how the drawers fit precisely and slide smoothly...how the doors swing easily on their hinges and how the solid brass fittings add that professional touch. We precision scale each kit to 1/12 of the full size original (the scale most used by knowledgeable miniaturists). We only use furniture-quality hardwood, never veneers or plastic. And each kit comes with a layout sheet and easy-to-follow instructions.

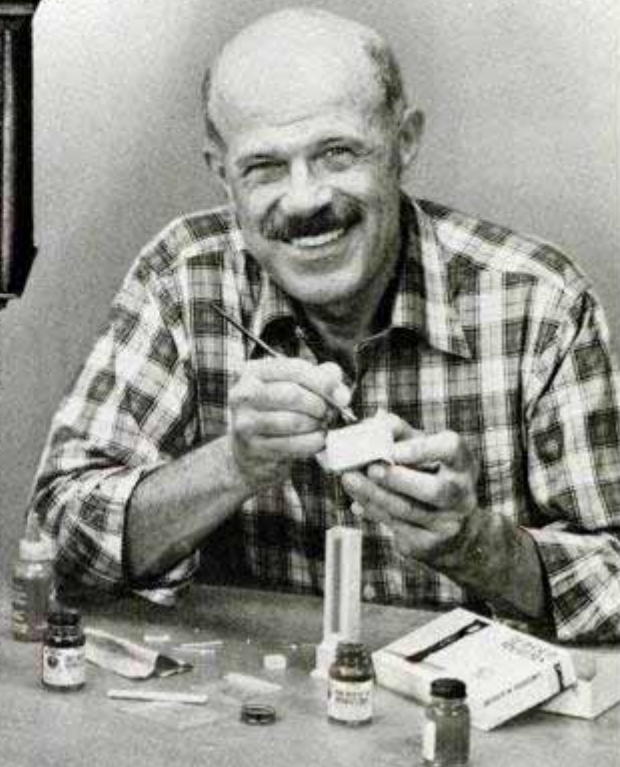


Begin your crafting adventure with our miniature reproduction of the William and Mary clock for only \$1, when you become a trial member of The House of Miniatures Collectors Society.

As a trial member, you will have the opportunity to purchase, *if you wish*, other museum quality miniature kits. However, you are not obligated to buy any additional kits—ever!

Remember, this William and Mary clock is available for \$1 by mail only. *With no further obligation on your part.* Mail coupon today.

A \$9.95 retail value



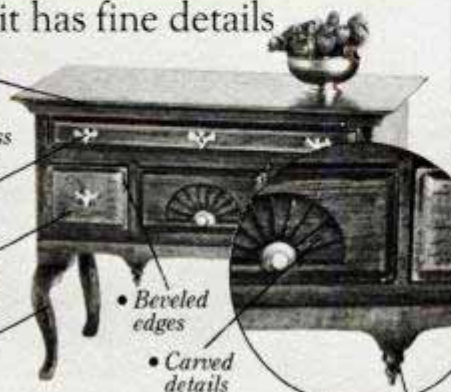
Start with this museum quality William and Mary Clock Kit for \$1\* with no further obligation

\*Clock measures 7 1/4 inches tall. Door opens to reveal the solid brass clock weights and pendulum! Kit has everything needed to assemble clock.

© 1985 Craftmark Inc.

## Each kit has fine details

- Elegant molding
- Solid brass hardware with key plates
- Drawers that open and close
- Cabriole legs



Chippendale lowboy

• Finales

## THE HOUSE OF MINIATURES

Division of Craftmark Inc., 80 Newbridge Road, Bergenfield, NJ 07621

Please enroll me as a trial member of the Society and send me the William & Mary clock kit. Bill me only \$1! If I am not completely satisfied, I may refuse delivery of the second shipment by writing "cancel me" on the shipping label. If I keep the second shipment, I will be a regular member and receive additional shipments every four weeks. Prices for each shipment, which will contain one or two kits, are \$9.95\* or less. I may return any shipment and I am not obligated to accept any minimum number.

Mr.  Mrs.  
 Ms.  Miss

All enrollments are subject to acceptance.

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

\*plus shipping and handling, and sales tax.

## Free Bonus

### Professional Quality Finishing Samples

Include tinted glue, oil base stain (for authentic color), glaze stain for antiquing and highlighting and other materials to professionally finish your kit to museum quality.

BR14

## It's a Bold New Miracle in Rural Home Heating with Wood!

- Warm-as-toast comfort day and night.
- Hot water for kitchen and bathroom.
- SAFE—no fire hazard, smoke or fumes in the home.
- Slashes heat bills.
- A fascinating do-it-yourself project.
- It's the HAUSA® —Heating And Heat Storage Apparatus.

HAUSA® is an outdoor wood burning system whose secret is sand: tons of sand completely surrounding a furnace and heat exchanger, all housed in a small insulated structure outside your home. Hot water flows from the HAUSA® into the home's hot water heating system thru buried insulated pipes. Where the existing heating system is hot air, only a heat exchanger need be added.

Sand stores heat for hours, providing warm comfort and hot water convenience! The furnace handles anything that burns, all outside the home. What a fuel saver!



You can construct the entire system from the HAUSA® PLANS PACKAGE. It contains complete drawings, step-by-step instructions and material costs lists. The complete package is only \$25.

Parts and pre-assembled kits are available with prices listed in the Plans Package.

HAUSA® Box 112-P (717) 388-6172  
Falls, PA 18615

I want to go HAUSA. Please send me complete plans, drawings, instructions, material, cost lists, and general information...\$25.00

- My check or money order is enclosed.  
 Visa or  MasterCard

# \_\_\_\_\_  
Exp. Date \_\_\_\_\_ Interbank(MC) \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

## IT'S IN THE SYSTEM!



The  
**REAL LOG HOMES**  
Difference —  
A Complete Building  
System  
which includes:

- Pre-cut and pre-engineered components of the highest quality.
- Pre-hung windows and exterior doors.
- The patented Interlock™ System — the most efficient log joinery system available.
- Current Research Reports from BOCA, SBCCI and ICBO — three major national building code agencies.

And, with six manufacturing plants across the country and over 170 local representatives, **Real Log Homes** makes it easier than ever for you. Get it right the first time with a **Real Log Home**.

Send \$6.00 for our complete catalog or call, toll-free, **1-800-451-4485** today!

**REAL LOG HOMES**  
P.O. Box 202, Dept. PMF  
Hartland, VT 05048

Manufacturing plants located in: Arkansas, Vermont, Nevada, Montana, N. Carolina.



Log Homes Council  
Charter Member

© 1985 Traditional Mgmt. Co., Inc. Dealer Inquiries Invited

## FASTEST MECHANICS

(Continued from page 122)

exercises help the guys spring into action after a solid week of wrenchwork and hauling around the country.

Of course, all this healthful preparation is just so much talk back in the garage—where it counts is when the car comes roaring in for a pit stop. Coordination between driver and crew is the key here, and that job has been made much easier with radio communications between pit and car. Skoal Bandit driver Phil Parsons has also been helped greatly by the tutoring of big brother (and NASCAR legend) Benny Parsons, driver of the Copenhagen car on the Hayes team.

**S**trategy still plays a key role, though. Stops are best under the yellow caution flag, when passing is not allowed due to a mishap. The driver has to come in as fast as possible, yet stop in just the right place so he won't be penalized for overshooting the pit spot. Ideally, he'll come in close to the wall if only right side tires are being changed, and be headed slightly outward in case another car pits directly in front of him. At 5 miles per gallon, and 20 to 24 tires to be changed in the course of the Talladega 500, a couple of seconds saved can be the difference between winning and losing.

Pit stops are often needed to fix other problems as well. Suspension adjustments of chassis load or "wedging" can be done through the rear quarter windows in a few seconds. Windshields are trashed by flying pebbles in a few laps, but if they crack badly the team can swap one in 40 seconds. Bigger jobs, like replacing the rear end in the Parsons car when a universal joint broke, can be whipped in nine minutes. That was using hand tools, because the job had to be done back at the team truck while all the pneumatic tools were out at the pit spot!

It took until the third or fourth stop of the 500 before I had enough confidence to look around and see what was going on in the brief seconds that the car was stopped. Then the realization hit me square between the eyes: these guys weren't hurrying at all. No, they are a well-practiced, expertly choreographed ballet of lightning fast mechanics, each doing their own job and never crossing paths with one another. The gas catch man has the catbird seat for all the action, never having to really move. But the rest of the crew covers a lot of territory in a little time, and making it all look easy because the routine is so well prepared. After all that practice and training, the speed just comes naturally.

PM

## PM's WATER SPORTSTER

(Continued from page 80)

forward, back-to-back passenger sleeper seat with storage amidships, drink holders, lockable glovebox and handsome wood trim on the console are standard, as are a 19-gallon aerated livewell, bow grab rail and plenty of locker storage. You can switch to a pure fishing boat easily by replacing the cushions with an optional bow platform and pedestal seat arrangement.

The hull form has a good deal to do with the utility of PM's Water Sportster. The design is called a modified-V and has a one-piece bottom to eliminate the possibility of through-hull rivet leaks caused by trailering or beaching. The modified-V hull shape means that the Grumman Skiddaddle runs somewhat bow (front) high. But the flared front of the hull rides far enough up in the air to catch most of the spray that you'd fling up on a reasonably bouncy day.

### Motor and controls

A monumental part of the appeal of our project boat is the easy-starting Mariner 75 outboard motor, manufactured by Mercury Marine. It kicks over about as easily and dependably as the family car, with a flick of the key. Shifting and tilting-trimming of the motor are a cinch, too, with the full-control remote box conveniently at the driver's right-hand position.

One thing we knew we wanted to add was some sort of top. We wanted emergency protection from unexpected inclement weather, and the capability of sleeping on the boat occasionally. Sort of like a beach camper.

The right type of top was available from Grumman Boats as a camper top. Completely snapped and zipped in place, the top complex—shelter, after cover, side curtains and tonneau—make the boat a snug, tight place in which to spend the night or wait out a thunderstorm. Installation of the top really was a snap.

### Setting up a trailer

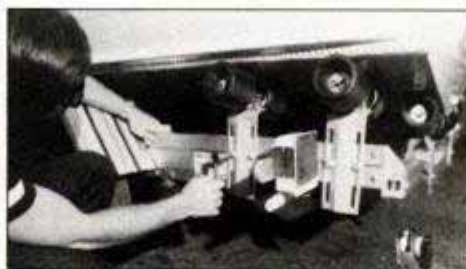
We went to the people at Cox Trailers of Grifton, N.C., for one of their Fisherman series Model CF-1600V trailers, which required no modification to fit the Grumman boat. We wanted a trailer that would guarantee economy and quality, have a tilt bed for stress-free launching and hauling of the boat, fully adjustable rollers and bunks, fenders we could stand on, and a completely galvanized frame to resist rusting.

First job of adjustment is to lay a long, straight wood 2 x 4 down the line of keel rollers, loosen the bolts which hold each roller and move them up or down to get level keel support.

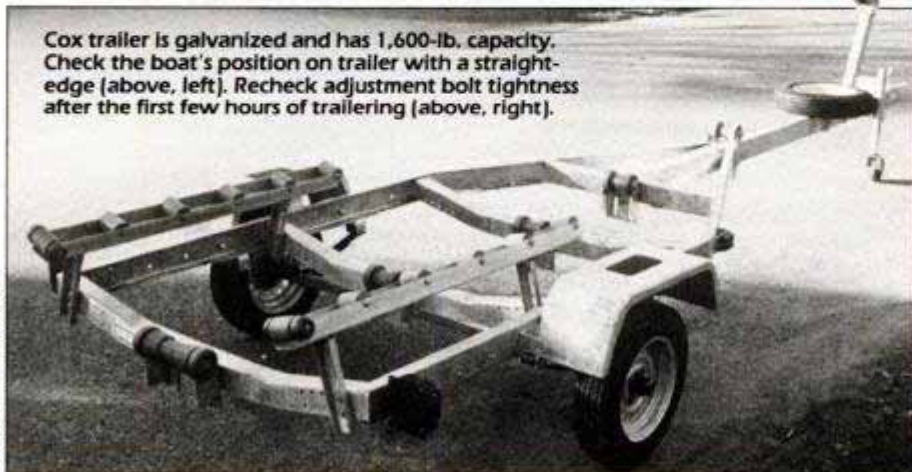
Then get the hull up onto the trailer. Position it so the rearmost roller comes just under the bottom edge of the transom (the back panel of the boat). Use a block of wood held against the transom as a straightedge and mark to fine-tune the boat's position. Then bolt the winch stand tightly to the tongue of the trailer.

To complete the adjustment, block the hull absolutely level with supports down to the ground, and adjust the side bunks to bear solidly against the hull at a point on either side that is equidistant from the centerline keel. At this point,

(Please turn to page 126)



Cox trailer is galvanized and has 1,600-lb. capacity. Check the boat's position on trailer with a straight-edge (above, left). Recheck adjustment bolt tightness after the first few hours of trailering (above, right).



PHOTOS BY CHER KENDALL

# GARDENERS...

You can drill a water well in your backyard...



Tap a lifetime supply of FREE water. Say goodbye to high water bills and summer watering shortages.

Easy to operate as your power lawn mower.

**THOUSANDS SOLD!**

For Free Brochure Call Toll-Free 1-800-821-7700 (Ask for Extension 5740)



Or clip coupon and mail TODAY!

5740 Anderson Road  
Opelika, Alabama 36602

Please mail your FREE Brochure.

Print Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Phone \_\_\_\_\_ © 1985 DeepRock Mfg. Co.



## Geodesic Home Kits.

Affordable. Highly Efficient. Ready to Assemble.

A Monterey Dome is the home for all seasons and climates. A home that is easy to afford and simple to build. Save up to 60% on building costs and 50% on utilities.

Engineered in kit form for the novice, first time builder. Ready to assemble, with all parts pre-cut, predrilled, color coded and lightweight.

Available in sizes from under 700 to over 3500 square feet with unlimited floor plan ideas. Prices start at \$3995.

Send today for Monterey Domes 100 page color Catalog & Plans Book of affordable kit homes. \$6.00.

- Yes, I want to begin my Monterey Domes experience. Please send my 100 page copy of Monterey Domes Catalog & Plans Book. Enclosed is \$6.00.
- Also, please send me the Monterey Domes Basic Home Assembly Manual for an additional \$5.00.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_

Send to: MONTEREY DOMES  
Dept. AO-2  
1760 Chicago Ave.  
Riverside, Calif. 92517



## Print For Profit

Cards, stationery, envelopes, advertising labels, tickets, QSL cards, announcements, greeting, sympathy, prayer cards, tags, etc. Save money. Own a Printing Business. We supply everything direct from factory. Easy instructions. Also raised printing like engraving. Have home shop. Add to income.



MAIL THIS COUPON TODAY!

Kelsey Presses, Dept. 85BB, Meriden, CT 06450  
Send for our free catalog.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## DOWNLINK International



SATELLITE TV AT ITS BEST  
**SATELLITE SYSTEMS STARTING AT \$860<sup>00</sup>**

**DO-IT-YOURSELF and \$AVE**

JANET Agency CHAPARRAL GOULD

NOW

- YOU CAN BUY YOUR OWN COMPLETE HIGH QUALITY/NAME BRAND SATELLITE TV SYSTEM AT FACTORY DIRECT WHOLESALE PRICES
- YOU CAN INSTALL YOUR OWN SYSTEM WITH OUR FULLY ILLUSTRATED EASY TO UNDERSTAND EASY TO INSTALL "FACT PACK" INCLUDING:
  - ▶ SYSTEMS AVAILABLE - COST
  - ▶ LEGALITY/SCRAMBLING
  - ▶ HOW TO INSTALL/ FROM START TO FINISH
  - ▶ PROGRAMMING/ SELECTING A TV GUIDE
  - ▶ SHARING THE SYSTEM WITH A NEIGHBOR
  - ▶ MUCH, MUCH, MORE

FOR YOUR "FACT PACK", SYSTEMS CATALOGUE AND PRICING, PLEASE SEND CHECK OR MONEY ORDER FOR \$12.95 TO:  
**DOWN LINK INTERNATIONAL**  
P.O. BOX 518  
GLIDE, OREGON 97443

WHERE NAME BRANDS DO COST LESS!

## MOLDS

for making Ornamental Concrete Items...

Book about Aluminum Molds with prices and production trade secrets direct from world's largest mold manufacturer.



SEND \$5.00

CONCRETE MACHINERY COMPANY, INC.

P. O. BOX A99 - HICKORY, N. C. 23601

## BUY THIS 6-WHEELER FACTORY DIRECT AT DEALER COST\*

MAX ATV

6-Wheel drive Amphibious 2 and 4 passenger models



Call toll-free 1-800-255-2511 In N.Y. State 716-855-2226 Collect (21 years and over—please)

Recreatives Industries, Inc.  
60 Depot Street  
Buffalo, New York 14206

\*If no dealer in your area.

## PM's WATER SPORTSTER

(Continued from page 125)

we took the rig to Chic's Marina in Bolton Landing, N.Y. Ray Chicarella had his ace mechanics fine-tune the engine, check the installation of the steering and install a marine battery, fuel tanks and other safety equipment. Ray's assistant, Todd Leach, took our Water Sportster out on Lake George for a thorough test session and declared it fit and ready.

When the entire rig was completed, we checked the tongue weight of the trailer. We were aiming for a trailer tongue weight of approximately 50 pounds, plus or minus 5 pounds. It was right on the money—however, we could have varied the weight by moving the axle forward or back, as needed. Do not vary tongue weight by moving the boat on the trailer.

### Adding accessories

Now it was time for the real fun—adding all the special accessories that make a particular boat special to its owner.

We hate the standard boat boarding ladder setup, but on a boat as small and light as the Grumman Skidaddle, there just isn't enough space to install a large swim platform. And you need one, as you know, if you've ever tried to get back into a boat in deep water. So we installed a deluxe model Step-On fold-up boarding ladder and platform made by Step-On Inc. of Fort Pierce, Fla.

Because the Step-On has a stainless steel framework and would be down in salt water at least a part of its life, and because the boat is made of a dissimilar, nonferrous metal (marine aluminum), we knew that a galvanic or battery-like interaction between the two metals could take place.

Therefore, wherever the platform's stainless steel tubing or the mounting brackets might contact the aluminum hull, we placed a barrier plastic tab and a fiber washer under the head of each bolt or lag.

While our PM Water Sportster isn't any macho raceboat, it does have a nice turn of speed—better than 30 mph, depending on winds, seas and load—and it's nice to know how you're doing. Aqua Meter Instrument Corp. supplied us with an Aqua Meter Ensign surface-mounted tachometer specially adapted to wire directly into the front of the Mariner outboard's control box.

Our next quest, for both a depth and fish finder and a speedometer, netted us one of those surprising two-in-one finds which can be so rewarding. Aqua Meter also produces a brand new computerized fish flasher called the Graduate. It features a precise depth-finding capability and readout both on a three-

digit LCD display and on a traditional circular flasher display. It offers a total of eight depth ranges from 0-12 to 0-800 feet. The speedometer function is optional, but who could resist it?

Installation of the Graduate head, the part containing the memory, micro-processor and readouts, was very straightforward. The hot lead is fused for you. But there are some sticky installation points to watch out for.

For instance, rivets can cause turbulence over the face of the transducer, which will negate accurate performance. We were careful to locate the unit between rivets.

### Communications gear

When you have the equipment so you know how well you're doing, often it's fun to know how other people are making out. Are the fish biting, has the baby sitter arrived, when do you expect to be home?

That implies communications, and one of the top marine radiotelephones on the market is the CTX-2060 by Cybernet Marine division of Kyocera Corp. in Warren, N.J.

A handsome unit with its pushbutton controls and digital readouts, the Cybernet operates on the VHF-FM (Very High Frequency) marine channels. It gives a full 40-channel capability, and you can program the channels into four memory groups for easy access.

Of extra value aboard the PM Sportster is our ability to hail other boats over water, especially where other boats don't have radio communications or where the channels are too crowded, with traffic for other use. We used a 30-watt Electro-Voice PA30Am paging projector, connected to the HAIL jack on the back of the Cybernet VHF-FM amplifier/radio unit.

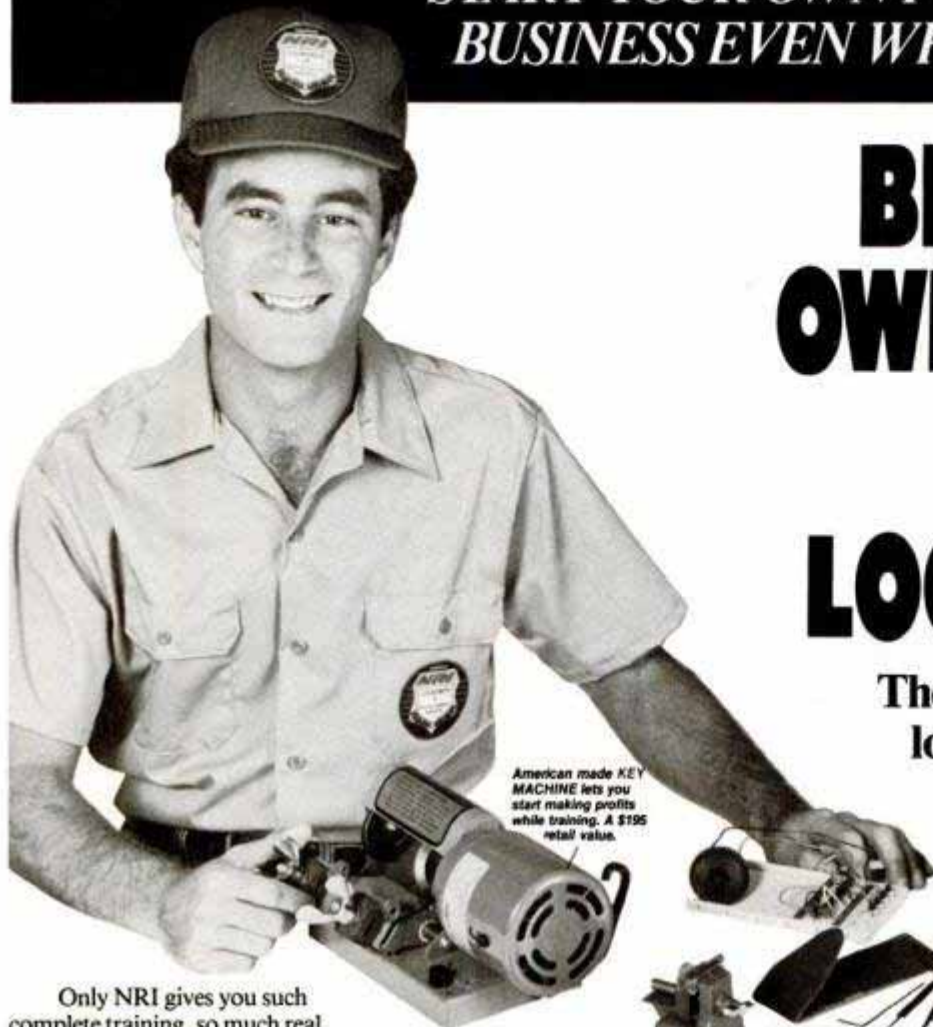
We asked Mitsubishi for their audio equipment recommendations for a small boat. The Mitsubishi people recommended their Model CZ-727 AM/FM cassette unit, Model CU-241 power amp and two Model SG-13CD speakers. The speakers were installed beneath the two consoles and, following an insider's tip from Mitsubishi, we sprayed the cones with Scotch-gard repellent so that they would be more moisture proof.

Topping off the PM Water Sportster were two pieces of equipment which did not need installation. One was a 54-quart Thermos cooler in bright red which can be used as an extra seat when we need it.

And stashed in the side-deck lockers, just for those times when the mood is right and the fish are biting, repose two special Zebco combination rod-and-reel setups. They're ready whenever the mood strikes and we're afloat in PM's exciting Water Sportster. **PM**



**START YOUR OWN PROFITABLE CASH BUSINESS EVEN WHILE LEARNING!**



# BE YOUR OWN BOSS... BE A LOCKSMITH

There is a difference in locksmithing training and the difference is NRI

American made KEY MACHINE lets you start making profits while training. A \$195 retail value.

LOCK TEST ASSORTMENT for hands-on training.

Only NRI gives you such complete training, so much real bench experience, and the confidence and all the tools you will need to earn cash money fast.

A well-trained locksmith earns money in many different ways—installing locks in apartments, homes, businesses, and automobiles, fixing broken locks, cutting new keys, and more. And this huge market is just begging for new qualified locksmiths. Today there is only one locksmith for every 18,000 people!

## The Newest, Most Advanced Course of Its Kind

Thorough step-by-step lessons and professional locksmithing equipment such as the Taylor KD5 Key Machine give you hands-on experience in this exciting growth field. You'll start earning huge cash profits of 800% to 900% duplicating keys. And only NRI offers you an Electronic Security Alarm training system.

Compare! NRI offers the only course that is nationally approved by the accrediting commission of the National Home Study Council.

Compare! NRI's course training has been broken down into 10 learning modules, each with the right number of lessons to keep your training at an easy-to-follow pace. All the lessons, hands-on training, and experiments have been developed to ensure that you begin practicing from the very first

day... and can begin making cash as soon as you like. All the money-making secrets of a locksmithing trade will become yours with your NRI training.

Plus, only NRI gives you training in both locksmithing and electronics security systems in one complete course.

## Start Your Own Business, Full or Part-Time, Even From Your Home

Add to your income with part-time work with established locksmiths. Start your own part-time or retirement business in your own home. Make locksmithing and security a full-time career as a skilled technician in your own growing business. There is opportunity everywhere!

NRI's free 4-color booklet will show you how quickly you can train to be your own boss in a profitable locksmithing business and gain the respect you deserve as a trained technician like other professionals in your community.



200 KEY BLANKS can earn you cash right away! Retail value of up to \$250.

Locksmith files, clamps, and impression materials for duplicating keys without originals.

LOCKSMITH SET includes broken key extractor, torsion wrench, other tools in a handy storage case.

ELECTRONIC ALARM TRAINER is optional and lets you plan, construct and experiment with security controls.

**SEND FOR FULL INFORMATION BOOKLET TODAY! COMPARE. THERE'S NO OBLIGATION AND NO SALESMAN WILL CALL!**

**NRI SCHOOLS**  
McGraw-Hill Continuing Education Center  
3939 Wisconsin Avenue  
Washington, DC 20016  
We'll give you tomorrow.

For Career courses approved under GI bill  
 check for details.

- CHECK ONE FREE CATALOG ONLY
- |  |   |
|--|---|
| <input type="checkbox"/> Locksmithing & Electronic Security          | <input type="checkbox"/> Basic Electronics  |
| <input type="checkbox"/> Data Communications                         | <input type="checkbox"/> Telephone Servicing  |
| <input type="checkbox"/> Robotics & Industrial Controls              | <input type="checkbox"/> Small Engine Servicing                                       |
| <input type="checkbox"/> Color TV, Audio, and Video System Servicing | <input type="checkbox"/> Appliance Servicing  |
| <input type="checkbox"/> Electronics Design Technology               | <input type="checkbox"/> Automotive Servicing   |
| <input type="checkbox"/> Digital Electronics                         | <input type="checkbox"/> Air Conditioning, Heating, Refrigeration, & Solar Technology |
| <input type="checkbox"/> Communications Electronics                  | <input type="checkbox"/> Building Construction  |
| <input type="checkbox"/> Industrial Electronics                      | <input type="checkbox"/> Computer Electronics with Microcomputers                     |

Name (Please Print) \_\_\_\_\_ Age \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_  
State/Zip \_\_\_\_\_ 1701-025  
Accredited by the National Home Study Council

# Classic Carriage



SOLID 3/4" WALNUT  
**Save \$50**  
 Kit with solid brass chiming movement  
 Reg. \$219  
 Sale **\$169**

Viking's Classic English Carriage is fashioned of solid American black walnut. Solid brass 8-day, key-wound movement chimes like a full-size grandfather. •1-year warranty •Parts pre-cut & sanded •Antiqued hardware •Brass dial with silvered chapter ring.

Write for **FREE** color catalog of grandfather wall & mantle clocks. Credit card orders call **TOLL-FREE 1-800-321-1089**.

Create family heirloom

**VIKING** Major credit cards honored  
 CLOCK COMPANY

Phone 205/943-5081, Box 490  
 Dept. PMC025, Foley, Alabama 36536

## 1985 GOVERNMENT SURPLUS DIRECTORY



BUY FOR AS LITTLE AS 1c ON THE DOLLAR

Moneyback Guarantee

**JEEPS, CARS** as low as \$30. **BOATS, HELICOPTERS, TYPEWRITERS, TRUCKS** You can still buy **5,000,000** items from the U.S. Government. This manual shows you how to find these bargains in your area at **TREMENDOUS SAVINGS**. Some actual prices: **CARS \$30, PICKUPS \$40, SHIRTS 22¢, 50 POWER BINOCULARS \$3, and MORE**

**THIS NEW 1985 up-to-date directory** includes a Bidders List Application and listing of Defense Sales Offices. Our **BIGGEST MOST COMPREHENSIVE DIRECTORY** Only \$4.00. Cut out this ad and send to: **SURPLUS, DEPT. A859, 4620 WISCONSIN AVE. N.W. WASHINGTON, D.C. 20016**

## Make \$25 to \$100 per hour

with

### Badge-A-Minit

Yes, it's really possible by making and selling bright, colorful Badge-A-Minit buttons. Buttons are proven money-makers at fairs, flea markets, conventions, or anywhere people congregate. Buttons are fast and easy to make with Badge-A-Minit, and inexpensive. Button parts cost only pennies each, finished buttons sell for much more.

Send for a **FREE 48 page catalog PLUS a FREE 24 page idea book.**

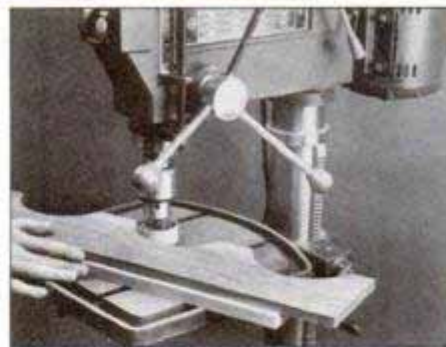


Badge-A-Minit, Dept. PM285, Box 800, LaSalle, IL 61301

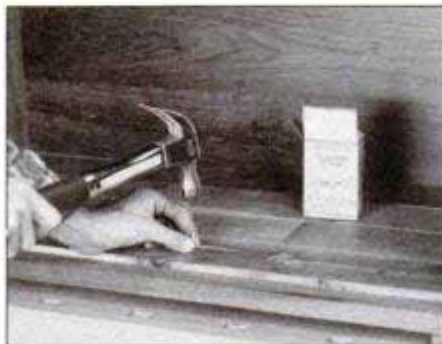
## BLANKET CHEST (Continued from page 99)



Lay out the scallop pattern for the front horizontal trim as shown in the drawing. Cut with a band saw or sabre saw.



Sand the scallop with a 3-in. drum sander installed in a drill press. Check with a straightedge for uniform valleys in scallops.



Line interior with tongue-and-groove aromatic cedar, working from bottom. Use either 2d cut nails or 2d finishing nails.



Mark locations for brass butt hinges in both the chest top and the upper back edge. Cut mortises for hinges using a 3/4-in. chisel.

exact replica, except that it has been lined with aromatic cedar. It is assembled with cut nails in the manner that Thomas used. However, if you're not concerned with replication, you can avoid the exposed nailheads by simply gluing and clamping the trim and legs in place. If you use this method, mount a triangular 1 x 1-in. glue block in the lower inside corner of each leg.

The chest is built of American black walnut; about 40 board-feet are required. It pays to shop around for this beautiful but expensive wood. Using the Yellow Pages, we located a lumber dealer who would sell walnut, milled to 13/16-in. thickness, at about one-third the usual mail-order cost. Another possible source might be local cabinetmaking shops that buy wholesale. Common cut nails are available from Tremont Nail Co., Box 111, Wareham, Mass. 02571, at \$1.95 per 1-pound box.

If you elect to line the chest with cedar, the 18 board-feet required can be obtained through the Home Closet Planning Service, 221 North LaSalle St., Chicago, Ill. 60601.

### Building the chest

We had to glue up several boards to achieve the widths needed for the six sides of the box. Run the boards through a jointer to achieve flat, square edges. Match color and graining, then edge-glue and clamp the front, bottom,

back, sides and top boards. Alternate the direction of the end growth rings of the boards. Also, alternate clamps from top to bottom, as shown in the photo, so that the glued panels stay flat. Scrape off excess glue with a chisel after it has set for about 30 minutes. When the glue has dried, surface the boards with a belt sander.

Cut the back, front, ends, top and bottom components to the proper sizes given in the materials list. Consider graining in choosing boards. For example, use uninteresting grain or blemished boards for the back and bottom. Use the best for top and front.

Horizontal and vertical trim strips and legs are thinner material than the boards that form the chest. If these thicknesses are not available from your wood supplier, use a planer to bring stock down to proper thickness, or have these pieces milled to thickness when you purchase the lumber. Rip to width the pieces needed for legs, top trim and horizontal trim and cut to length.

To make the scallop design, pencil in the pattern on the horizontal trim piece according to the dimensions given in the drawing. Cut the scallop with a band saw or sabre saw, and smooth with a drum sander. Lay a straightedge across the scallops to check for uniformity. Next, cut out the curved portions in the lower ends of the front legs.

(Please turn to page 132)

# FREE

# high tech catalog

**Heathkit**



The most complete  
Satellite Receiver  
high technology

**Metal  
Detector**



**Triple-Trace  
Oscilloscope/Time-  
Voltage Display**



**Ham Radio  
Transceiver**



**Computerized  
Weather Station**



**Discover  
the pride.**

With Heathkit, you'll discover the pride of accomplishment that comes with creating handbuilt quality that is uniquely yours.

And you'll develop skills and abilities in many technologies as you follow the step-by-step directions through the building process.

You work confidently, always backed by our simple promise, "We won't let you fail."

If you don't have the latest Heathkit Catalog, you're missing something great, so mail the coupon now, while you're thinking about it.

**Microprocessor  
Trainer & Course**



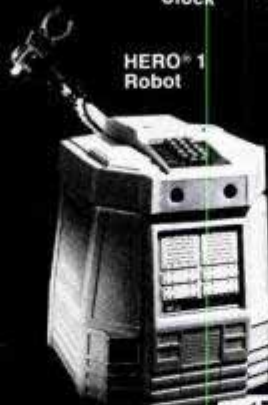
**Real Time  
Spectrum Analyzer**



**Most  
Accurate  
Clock**



**HERO® 1  
Robot**



What sets the Heathkit catalog apart is its range of high quality products and accurate information on every product offered. And that's a lot of products — over 450 separate items, including:

- Computer hardware and software
- Robots
- Precision test instruments
- Computerized weather instruments
- Solar hot water systems
- Automotive and home energy products
- Security devices
- Color TVs and video accessories
- Quality stereo components
- Amateur radio gear
- Educational courses that lead from the basics of electronics all the way to high tech.

**IBM-PC Compatible  
Computers**



**40-Channel  
Scanner**



**Send NOW for your  
FREE Heathkit Catalog**  
It's the beginning of something great  
for the whole family.

**Heath Company**  
Dept. 017-264  
Benton Harbor, Michigan 49022  
Please send me the latest  
Heathkit Catalog Free.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_

CL774D

**Heathkit®**  
**Heath  
Company**

A subsidiary of Zenith Electronics Corporation



**It's true!**  
A lifetime supply of C-Clamps for only

**\$9.99**  
Limit 3 sets at this low price.

**MAILBAG BUSTER SPECIAL OFFER EXPIRES FEB. 28, 1985**

**FULL LIFETIME WARRANTY**

A complete 8-piece set of industrial-quality C-Clamps... A clamp for every job... gluing... sawing... drilling... welding... planing... any kind of holding job.  
Truly heavy-duty. With cast-iron "I" frame... precision tooled, copper-plated steel screw... copper-plated, swivel pad... copper-plated, sliding tommy bar... large, cast-iron anvil. Complete size range. Includes 2 each of the most popular sizes... 1", 2", 3" & 4".

## FREE CATALOG!

With your order we'll send you our latest catalog... filled with over 1500 fasteners, tools and organizers. You'll discover why 3 million people have made D.R.I. the Hardware Store In Their Mailbox.

**100% Guarantee Of Satisfaction**  
...if not totally satisfied, return your order for a complete refund.

**FULL LIFETIME WARRANTY**  
...with product or write for advance free copy to: D.R.I. Industries, Inc., Dept. 72983, 11300 Hampshire Ave. So., Bloomington, MN 55438-2498

72983 **MAILBAG BUSTER SPECIAL OFFER COUPON** MAG-124  
SEND TO AND MAKE REMITTANCE PAYABLE TO:  
D.R.I. INDUSTRIES, INC., 11300 Hampshire Ave. So., Dept. 72983, Bloomington, MN 55438-2498

Ship me  8-pc. sets of C-Clamps @ \$9.99 = \$ \_\_\_\_\_  
Add shipping & handling, \$1.50 for one set = \$ \_\_\_\_\_  
\$2.00 for 2 sets, \$2.50 for 3 sets

Offer Expires Feb. 28, 1985

**PAY THIS AMOUNT—TOTAL = \$ \_\_\_\_\_**  
(MN residents add 6% sales tax)

**CHECK**  Check or money order  
**METHOD**  Charge it to: (check one)  VISA  MasterCard  
**OF**  American Express  Diners Club  Carte Blanche

**PAYMENT** Card No. \_\_\_\_\_ Exp. Date \_\_\_\_\_  
Signature \_\_\_\_\_ (Need sign only if charging order)

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Street & No \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

I don't wish to order now. But please send me your catalog. I've enclosed \$1 (refundable with first order). (00005823)

## BLANKET CHEST

(Continued from page 128)

Finish-sand all surfaces and edges of both chest and trim pieces, first with 120-grit then 220-grit abrasive paper. Round over the outside corners of the trim slightly with 220-grit sandpaper.

When all boards have been carefully cut to size, begin assembly. Bore  $\frac{3}{32}$ -in. holes for cut nails as shown in the photo. This will prevent the possibility of splitting the walnut. Then, glue and nail the front to sides using 5d cut nails. Join the back in the same way. Finally, nail the bottom in place within the sides, front and back.

Bore nail holes in trim pieces, and



Use three coats of linseed oil applied with 4/0 steel wool. Then rub on several coats of shellac mixed with 10 percent linseed oil.

glue and nail each in place with 4d cut nails. Attach the legs first, then mount the horizontal trim. Miter top trim and glue and nail to the  $\frac{13}{16}$ -in.-thick walnut top. Set nailheads flush using a nailset.

When glue has dried, cut tongue-and-groove cedar pieces to lengths needed. Line the floor and four interior walls of the chest, working from bottom up, using either 2d finishing nails or cut nails. Prebore pilot holes for cut nails.

Carefully measure and mark locations for hinges on the top and the upper edge of the back, and use a chisel to mortise to the proper depth as shown. Next, locate and mark the position of the lid lock and catch. Mortise out to proper depth, and bore the key hole. Do not apply hardware until after finish has been applied.

### Finishing

Begin finishing process by using a diluted walnut stain just to blend in any white sapwood streaks that may be present. Then, using a 4/0 steel-wool pad, rub in a boiled linseed oil finish to bring out the rich color typical of walnut. We used three coats, allowing a day between coats for the linseed oil to dry. Then we rubbed on a thoroughly mixed polishing solution of orange shellac lubricated with 10 percent linseed oil. Use a 4/0 steel-wool pad and apply the polishing solution with long, even strokes to level out rough spots. **PM**



## Step up to DC with a Lincoln AC/DC Arc Welder.

Big brother to the Lincoln AC-225-S. It's the ideal welding tool for do-it-yourself fabricating, maintenance, farm repair and construction, piping, and hardsurfacing.

And, it's great where DC works best: where high quality is required, for all-position welding, and sheet metal welding where a smooth arc is essential. Plus, it's ideal with stainless, low-hydrogen, non-ferrous, and many other electrodes.

The Lincoln AC/DC gives you a choice of DC or AC and runs on single phase 230-volt power. Standard features include input plug and receptacle, electrode holder, work clamp, and cables.

**LINCOLN**  
**ELECTRIC**

The power in welding since 1895.

Ask for a **FREE Welder's Guide** complete with illustrated instructions and tips for better AC/DC welding. For your copy, write: The Lincoln Electric Company, Cleveland, Ohio 44117.

## CLOCKS FROM KITS

(Continued from page 105)

wool, applicator pads, gloves and a very workable three-step finishing system of sealer, stain and finish.

The clock case parts were well-sanded and straightforward to assemble. It seems the manufacturer took pains to make this kit an easy project for beginners. Only slight trimming of some parts with a utility knife was required to achieve professional fits. Pilot holes had to be prebored for all screws and brads.

My only serious complaint was with the method chosen to install the door glass. A vinyl retaining strip must be toe-nailed into the door frame with small brads. Because the oak is so hard, this task is risky. It seems another method would have made more sense, even something as simple as conventional glazing points. This kit, which is No. 34007, sells for \$59.95 plus \$3 postage; the finishing kit is \$14.95. They are from Klockit, Box 629, Lake Geneva, Wis. 53147.—S.W.

### SOURCES—CLOCK KITS AND PARTS

American Time Horological Products, 6 Middle Neck Rd., Roslyn, N.Y. 11576. Kits and quartz movements; free catalog.

The Antique Nook Inc., Box 338, 6226 Waterloo Rd., Atwater, Ohio 44201. Parts; catalog \$2, ppd.

C & R Clock Shop, 11906 Q Drive North, Battle Creek, Mich. 49017. Old clocks and movements; catalog \$1 with S.A.S.E. and two 20-cent stamps.

Campbell Tools Co., 2100-D Selma Rd., Springfield, Ohio 45505. Clock metals and lathes; catalog \$1.

Cas-Ker Co., Box 2347, Cincinnati, Ohio 45201. Movements and accessories; catalog \$1.

Clockwerkes, 2419 Foster Ave., Janesville, Wis. 53545. Kits and parts; free catalog.

Constantine, 2050 Eastchester Rd., Bronx, N.Y. 10461. Parts; catalog \$1.

Craft Products Co., 2200 Dean St., St. Charles, Ill. 60174. Kits and parts; 32-page catalog free, 100-page catalog \$2.

Craftsman Wood Service, 1735 West Cortland Ct., Addison, Ill. 60101. Kits and parts; catalog \$1.

Diplomat Clocks, 1148 Hwy. 31 North, Spanishford, Ala. 36527. Kits and parts; free brochures.

Emperor Clock Co. Industrial Park, Fairhope, Ala. 36532. Kits and parts; free catalog.

Empire Clock Inc., 1295 Rice St., St. Paul, Minn. 55117-4591. Clock parts; catalog \$5 refundable with \$30 order.

King Arthur Clock Co., P.O. Drawer K-A, King Arthur Buildings, Fairhope, Ala. 36533-0949. Movements and accessories; free catalog.

Klockit, Box 629, Lake Geneva, Wis. 53147. Kits and parts; free catalog.

Kuempel Chime Clock Works and Studio, 21195 Minnetonka Blvd., Excelsior, Minn. 55331-8605. Kits; free catalog.

S. La Rose Inc., 234 Commerce St., Greensboro, N.C. 27420. Kits and parts; catalog \$2.50.

Marshall-Swartchild Co., 2040 North Milwaukee Ave., Chicago, Ill. 60647. Kits and parts; catalog \$2.50.

Mason & Sullivan, Dept. 1199, 586 Higgins-Crowell Rd., West Yarmouth, Mass. 02673. Kits and parts; catalog \$2.

Merritt's Antiques, Route 2, Douglassville, Pa. 19518. Kits and parts; catalog \$1.50.

Modern Technical Tool & Supply Co., 211 Nevada St., Hicksville, N.Y. 11801. Parts; catalog \$3.50 ppd.

Newport Enterprises, 2313 West Burbank Blvd., Burbank, Calif. 91506. Kits and parts; free catalog.

Southwest Clock Supply Inc., 2442 Walnut Ridge St., Dallas, Tex. 75229. Kits and parts; catalog \$3.

Turncraft Clock Imports Co., 7912 Olson Memorial Hwy. 55, Golden Valley, Minn. 55427; kits and parts; catalog \$2.50, or \$4.50 first class.

Viking Clock, Box 490, Foley, Ala. 36536. Kits and parts.

Westwood Clocks 'N Kits, Box 93004, Long Beach, Calif. 90809. Kits and parts; free catalog.

NOW—END GUTTER PROBLEMS FOREVER WITH NEW

# THERMAR WEATHER-FOIL™

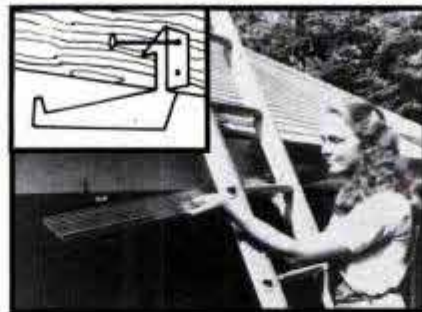
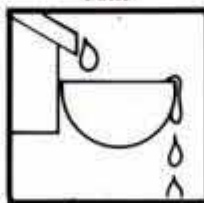
THE AMAZING GUTTER ALTERNATIVE



- Can't clog
- Stays clean automatically
- Eliminates downspouts and dry wells
- Works to prevent ice damage
- Helps stop water leaks
- Installs easily in 3 hours (average home).

Ordinary Gutter

THERMAR Weather-Foil



### STOPS TRENCHING. EROSION.

Air Foil designed THERMAR WEATHER-FOIL breaks up water sheet which usually runs from roof edge. Weather-Foil DISPERSES WATER—produces millions of tiny droplets which fall harmlessly to earth—pleasantly as a light spring rain. NO DOWNSPOUTS NEEDED! Eliminates TRENCHING, EROSION. Helps prevent basement water leakage too.

### AVOIDS SNOW & WATER DAMAGE.

In winter snow can freeze on roof edge making gutters ineffective. Heat "leaking" from inside home and through roof causes some melting where ice and roof meet. Water trapped inside this ice blanket can then flow under shingles causing costly damage. WEATHER-FOIL'S "WEB" design helps prevent ice dams.

### NO CLOGGING, NO CLEANING.

Gutter maintenance can be a constant problem. Gutters tend to fill with leaves, twigs, and debris. WEATHER-FOIL design avoids these problems. If cleaning should ever be necessary just use ordinary garden hose—right from ground level... Amazing—because it's so very simple!

### INSTALLS IN JUST THREE HOURS.

First Really New Advance In Gutter Design In 100 Years. Units snap in place using simple mounting brackets. Installation for an "average" home can be made in three hours or less—with just a hammer and screwdriver. No experience necessary. WEATHER-FOIL is rustproof, corrosion proof—should last the life of your home. AND THE COST IS MODEST TOO—usually less than the cost of a traditional gutter system with its downspouts and leaders. WEATHER-FOIL IS VIRTUALLY INVISIBLE ONCE INSTALLED.

If your gutter system is more than ten years old, you should investigate  
**THE THERMAR WEATHER-FOIL NOW!**

Protected by US patents — Made in USA

SEND COUPON TODAY FOR SIMPLIFIED LAYOUT AND ORDERING INFORMATION. DETAILS FREE



JOHNSON POWER TECH  
Melrose Square  
Greenwich, CT 06830

Call Toll Free  
1-800/228-6505

YES, please rush—FREE—all details of the new THERMAR WEATHER-FOIL system, designed to end old fashioned gutter problems forever! I understand that I am under NO obligation whatever and that NO SALESMAN will call.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

PMR385




The Only  
**ONE-MAN  
PORTABLE**

**SAWMILL of Its Kind in The World!**

If you need good, high-quality lumber, don't let inflated lumber prices stop your important building projects. The Foley-Belsaw goes right to the trees and turns out smooth, true-cut lumber... even beginners get excellent results. Just one man (no crew needed) can easily cut enough on weekends to save hundreds of dollars over high lumberyard prices. For power use tractor PTO or other low HP diesel or electric unit. Factory-direct selling keeps price low, and convenient time payments may be arranged.

**Send for FREE BOOK!** Just mail coupon below for "How To Saw Lumber" booklet and complete facts on the One-Man Sawmill. There is NO Obligation and NO Salesman Will Call on you. Do it TODAY!

**FREE BOOK** 

Foley-Belsaw Co.  
30483 Field Building  
Kansas City, Mo. 64111

Please send all facts and details in your FREE BOOK "How To Saw Lumber". I understand there is No Obligation and that No Salesman will call on me.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City-State \_\_\_\_\_ Zip \_\_\_\_\_

## Overstock Sale

### Famous South Bend Industrial Quality Metallturning Lathes



**20%** off list price!

#### 10" SWING, BENCH OR CABINET MODELS

Turn precision parts for models, prototypes; cut up to 48 different thread pitches; make replacement parts for tools, equipment and much more. You'll get industrial precision and ruggedness with hardened and ground bedways and 12 easy-to-change speeds, now at a special one-time price! Includes motor, control, one-year warranty.

BENCH MODELS: 3 1/2' bed—was \$2744, NOW \$2195.

CABINET MODELS: 3 1/2' bed—was \$3271, NOW \$2617.

 VISA accepted.

**IMMEDIATE DELIVERY**

Phone collect to place order, 1-219-289-2253.

**SBL South Bend Lathe**

400 W. Sample Street, South Bend, IN 46625

## THIRD-GENERATION TV

(Continued from page 83)

image beyond your view. The lower the overscan percentage, the better. Inferior TVs hide as much as 18 percent of the picture from your view, to compensate for puny built-in power supplies that can't ride out a brown-out. Look for that low 5 or 6 percent overscan spec.

### Horizontal resolution

Perhaps the most important specification with regard to TV image definition is horizontal resolution. This is expressed in lines, and determines a unit's ability to separate closely spaced details that appear beside one another. It's measured by projecting vertical stripe patterns of varying number onto a picture tube, then counting how many stripes are visible before they become so narrow and close together that they appear to merge into a solid span of gray. The more lines, the better. In some rare instances, you'll see horizontal resolution measured in megahertz (MHz). To translate this to lines, multiply the figure preceding MHz (as in 4.2 MHz) by 80. Thus,  $4.2 \times 80 = 336$  lines.

Today's "hi-res" TVs have 330 to 350 or more lines of horizontal resolution, compared to about 250 in a conventional TV. They achieve this not by digital wizardry, but by comb filters and by fine-pitch tube designs that enable more picture elements to hit the screen. With regard to pitch, think of the dots that make up a newspaper photograph. The more dots, the more detailed the picture. Comb filters aid resolution by separating the color information from the black-and-white (contrast and brightness) information, before project-

ing them on the screen. This preserves much of the original picture definition carried in the broadcast signal, yielding higher fidelity reproduction.

### Vertical resolution

Vertical resolution is often confused with horizontal resolution, but it's not a TV specification. It's a broadcasting standard set in the early days of telecasting and still used in the United States and elsewhere.

Measured from the top of your screen to the bottom, there are 525 lines that make up a picture. Actually, the picture is composed of two interlaced fields of 262 1/2 lines each, which follow one another by 1/60th of a second.

This 525-line standard does limit TV's vertical resolution—that is, its ability to reproduce fine details that appear above and below one another on the screen. Because it's a broadcast standard, filters and improved fine-pitch tubes can't be used to increase the number of vertical lines as they can for horizontal lines. To do this, the broadcast transmission method would have to be changed. An easier solution would be to use digital technology to increase vertical resolution at the TV receiver—and that's the path some TV manufacturers are now pursuing.

### From hi-res to high definition

When you can get 1,050 to 1,125 lines of vertical resolution, projected on a wider screen with 5-to-3 width-to-height ratio (compared to the current 4-to-3 ratio), that's High Definition TV (HDTV).

At this moment in Japan, Sony is selling 14- and 21-inch component monitors that, when connected to an

(Please turn to page 136)

## Specs For Your Eyes: Judging A TV

**N**umbers can be trusted to measure a TV's horizontal resolution and overscan, but other aspects of television performance are best judged by what meets the eye and ear.

- **Color tracking**—If it's poor, it'll be obvious. Follow a picture through several scene changes and watch for continuity of color. The less a given hue seems to shift, the better the TV's ability to track it.

- **Color distortion**—Whites should be pure, without tint. Impure whites will appear blue, red or green. Blacks should be opaque—never washed out or tinged with brown or green.

- **Geometric distortion**—This will be apparent in long lines that should be straight but are visibly curved, or in circles that appear oval.

- **Convergence**—If a set's red, green and blue projection elements aren't

precisely aligned, the set will exhibit poor color convergence. Look out for red, green or blue borders around images at the center of the screen.

- **Audio**—The sound should be natural—not boomy, raspy or piercing—at the volume level you're likely to listen at when home. This might be difficult to judge in a noisy, crowded department store, but don't judge sound quality through earphones (on sets so equipped) unless this is the way you intend to use the set regularly. Headphones won't tell you anything about the loudspeakers or the amplifier.

- **Video noise**—Makers' specs for video signal-to-noise ratio (expressed in decibels) are difficult to compare. But video noise is easy to spot. In its mildest form, it appears as graininess in the picture. Severe video noise will blanket the screen with snow.

# Why are we giving away these nationally advertised **SWIFT-660/F Autocast Spinning Reels** for only \$4?

*Hard to believe, but true.*

As part of its Anniversary Publicity Campaign, the giant New York outfitting firm of Abernathy & Closther will distribute one million (1,000,000) of its most expensive spinning reels—the famous SWIFT-660/F Autocast Spinning Reel—for the astonishing “Anniversary Price” of only \$4 each to the first one million persons who write to the company address (below) before Midnight, April 25, 1985.

**This original Anniversary Ad must accompany your request. Copies or photostats are *not* acceptable.**

These are the same famous SWIFT-660/F Autocast Spinning Reels nationally advertised in leading media. They give you fast “thumbs-off” (one-handed) casting, over longer distances than you ever dreamed possible. And you can cast even light baits without backlash.

Compatible with virtually every plug or lure, the new high-speed gear ratio gives you fast “pop”-action, yet is powerful enough to reel in fish without “pumping”.

The new open-face design (and desirable skirted spool) eliminates friction and prevents tangles. The anti-reserve is “whisper” silent. And the Microdisc Surge-Free Drag System won't let your fish run away.

Not only the most expensive, but also the fastest selling spinning reel ever sold by this multi-million dollar New York firm, it is ideal for both trolling and casting in both salt and fresh water. Precision crafted of newest space-age materials, it is built to last. Yet, unbelievably, it weighs just 7 ounces, making it the perfect reel for your ultra-light rig.

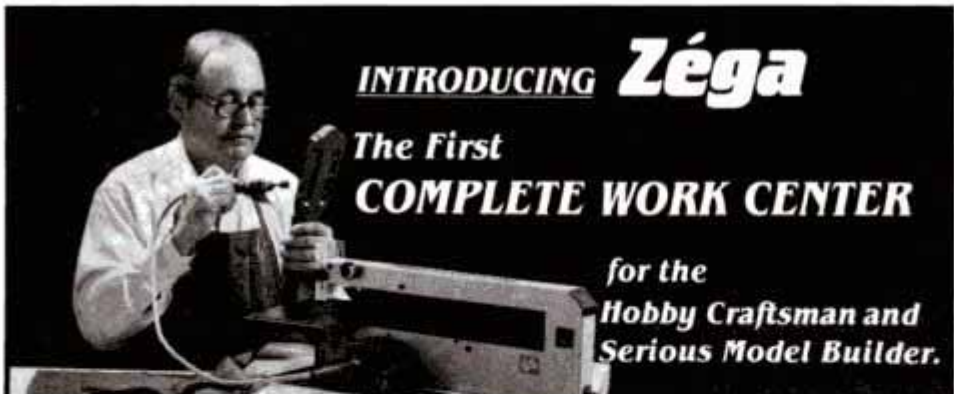


These famous SWIFT 660/F Autocast Spinning Reels will not be sold at this price by the company in any store. To obtain one at this special Anniversary Price, mail this *original* printed ad to the company before Midnight, April 25, 1985.

Each reel is covered by a full one-year money-back guarantee and will be replaced by the company, free of charge, if it ever fails to function. There is a limit of two (2) reels per address at this price, but requests which are mailed early enough (before April 17) may request up to five.

To obtain your SWIFT-660/F Autocast Spinning Reel, mail this original Anniversary Ad together with your name and address and \$4 for each reel. Add only \$2 shipping and handling no matter how many reels you are requesting. (New York residents add sales tax.) Allow up to 6-8 weeks for shipment. Mail to: **Abernathy & Closther, \$4 Spinning Reel Offer, Dept. 114-18, Box 1736, Hicksville, New York 11802.** (A25160)

**FREE BONUS:** We will also wind 250 feet of our special 6-lb-test monofilament line onto your reel, free of charge, if your request is mailed before April 17



# INTRODUCING **Zéga**

## The First COMPLETE WORK CENTER

for the **Hobby Craftsman and Serious Model Builder.**

**T**he new Zéga multi-purpose precision work center is for the serious model builder or hobby craftsman. With Zéga, you'll be able to cut, carve, grind, shape, drill, sand or polish even the smallest pieces — perfectly!

If you've ever tried to use a full-sized saw or power tool for your detailed model projects, you know what a poor job they do.

Now, thanks to the remarkable design and engineering skills of German craftsmen, Zéga changes all that!

You'll get a new degree of precision and versatility never before available in a model or hobby craft saw — all from the unique, multi-purpose Zéga Model Center.

Zéga provides more professional features, more precision applications and a more complete workshop capability than anything else on the market.

Best of all, Zéga's attachments add a remarkable degree of versatility. With the power take-off and flexible power shaft, you'll have as comprehensive and varied

a model work center as you need — simply by adding accessories!

### Try Zéga for 30 Days — At Our Expense!

Try the Zéga Model Center in your own home for a full month. If you don't agree that it is all we say it is (and much more!) simply return it and we'll promptly refund your money!

### SPECIAL INTRODUCTORY PRICE AND FREE BONUS (If You Hurry!)

**Zéga model center**  
 A Division of Mantis Manufacturing Co.  
 1458 County Line Road, Dept. 112Z  
 Huntingdon Valley, PA 19006

Rush me FREE information on the remarkable Zéga Model Center PLUS special prices and FREE bonus!

Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_ Zip \_\_\_\_\_

©MAMC 1985

## THIRD-GENERATION TV

(Continued from page 134)

external digital processor, can display double the 525 vertical scanning lines. The processor, at high speed, studies both incoming 262½-line fields to estimate how much of the original image is missing. It then interpolates this missing information between each of the 525 lines, creating in effect a 1,050-line frame.

Sony has yet to reveal when it might market such sets in the United States. They're quite expensive: The processor alone costs about \$800. The 21-inch monitor costs the same—and because it's a monitor, you'll still need a TV tuner, amp and speakers.

Most TV manufacturers agree that further development of digital technology can make HDTV a reality without having to replace the current broadcast system. Research is under way to adapt HDTV signals to the existing broadcast standard by compressing them digitally at the transmitter, then expanding them at the receiver end.

While the world waits for HDTV, one element of home theater is here already: stereophonic sound.

The Multichannel Television Sound (MTS) system celebrates its first birthday next month. By the time you read this, more than 40 stations around the United States plan to be transmitting programs in stereo. Another 80 plan to do so by year-end. Most of these stations broadcast from the 100 largest metropolitan areas.

### Multimedia home theater

Besides two channels of stereo sound, the MTS system includes a third, monaural, channel for broadcasters who wish to offer a Separate Audio Program (designated SAP on your TV). This can be a foreign language translation of a program, or a specialized soundtrack (for example, for the blind). Most of the new TV models coming on the market have this Stereo/SAP feature. Many, too, have a synthesized stereo switch to enhance the sound of monaural programs.

Compared to older TVs, the latest models incorporate multiple loudspeakers and more powerful amplifiers for high-fidelity reproduction of the FM-quality broadcasts. Any VCR videodisc and cable programming run through your new TV will sound better too. To accommodate households with hi-fi systems and other external electronic entertainment sources, most TVs of recent vintage have sprouted multiple input and output jacks on their back panels. In this way, you can use your TV to integrate audio, video and computer components and create your own high-tech home theater.



# Melt Metal!

## Pour custom castings!

**Rediscover the secrets of early craftsmen!**

You can melt metal, pour castings, and a whole lot more! Electroplate! Tan hides! Make paper! Spin metal! Rewind motors! You can! At a low cost! Learn steam engine design, locksmithing, hydraulics, blacksmithing, and much more. Extract power from common auto alternators.

Design crystal radios! Make cheese! Explosives! Build lathes! Learn calculus, machine shop skills, embalming, more! Make knives! Magnets! Design Stirling engines!

Build a precision metal lathe, milling machine, shaper, drill press, sheet metal brake and more from scrap materials! Complete plans, instructions & photos! Rare, rare, rare info!

You'll be amazed at the things you'll be able to do with your own two hands using technical secrets you'll discover in Lindsay's Technical Books catalog. Imagine the pride of learning a new skill! Impress your friends! Get a better job! Or just have fun.

**Write for a catalog!**

Write for your personal copy of Lindsay's Technical Books catalog. This is NOT a book club. Buy what you want, when you want. No obligation. You get fast service, reasonable prices, and fair dealing. Highest quality books. Guaranteed! Send \$1.00 US & Canada (\$3.00 foreign airmail) to cover fast first class postage and handling. Send a dollar and see for yourself. Write today!

## Lindsay Publications

Box 12-XJ BRADLEY IL 60915-0012

Send a catalog! I've enclosed \$1.00 US & CAN (\$3.00 foreign)

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

### Rediscover "Lost Technology"!

Few people know that metal can be melted with ordinary charcoal, yet it has been done for the last 6,000 years! We'll show you how, and a whole lot more! Melting metal is just one of dozens of interesting and useful skills you'll learn.

Rediscover "low-tech" craftsmanship that died out decades ago. You don't need expensive tools. Use your hands, your head, low cost materials, and our secrets instead. You'll be doing things you never thought possible! Send for a catalog and discover page after page of rare "how-to" publications almost never seen in bookstores! Rediscover "lost technology!" Write today!



# NEW!

## Woodmaster Variable Speed Power-Feed

# PLANER/MOLDER JOINTER/SANDER

**SAVES YOU MONEY!** Put this versatile power-feed tool to work in your own shop. See how fast it **pays for itself!** Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect quarter-round, casing, base mold, tongue & groove ... all popular patterns ... any custom design. Joints super-true edges, squared stock, bevels and chamfers.

**MAKES YOU MONEY!** Now you can start your own high-profit business selling all types of millwork to lumberyards, carpenters, contractors, picture framers, do-it-yourselfers. Use it to make grandfather clocks, gun cabinets, furniture, toys, planters, porch swings, benches, paneling, flooring, etc. In fact, this one power-feed tool opens up a truly astonishing range of products you can make and sell.

**FREE  
30-DAY  
TRIAL!**



### New Sanding Attachment

Quickly converts machine to one of the finest drum sanders available. Consistent power feed eliminates "low spots" and irregularities caused by hand sanding method.

### Revolutionary Quick-Change Molding Head!

Exclusive patented design lets you mold up to six patterns in a single pass! Eliminates time-consuming set-ups. Uses low-cost cutterbits. Makes it easy to produce patterns impossible to duplicate on any other planer.



Jointer lets you move back to planing without changeover.



Produces tongue & groove with one set-up, two boards in same pass.



Turns out high-value, satin-smooth custom moldings plus all popular patterns.



Optional sanding head converts planer to power-feed drum sander!

**FREE  
INFORMATION  
KIT**



**WOODMASTER TOOLS, INC., DEPT. PP41  
2908 OAK • KANSAS CITY, MO. 64108**

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_ ZIP \_\_\_\_\_

**YES!** Please rush me your FREE Information Kit plus details on your 30-DAY FREE TRIAL GUARANTEE!

## BIKING THE DESERT

*(Continued from page 95)*

med smiled encouragingly on the side of the sandy rails. After two days of special meals and last-minute adjustments, we set off to balance on the rails for more than 300 desert miles toward the Egyptian border.

Balancing proved to be the least difficult part of the long journey. The Nubian Desert was empty of life, plants and water. With the sandy silence came an unrelenting heat and a monotony that would be broken about every third day when a train rumbled down the tracks and we had to scatter, pulling our railbikes with us.

In 10 days we made Abu Hamid, where the Nile makes a great bend southwest, and we continued through the heart of the desert. We had covered almost 200 miles, and by this time had the railbikes in fair tune. Riding a bike on rails proved to be far more taxing than tooling down the pavement. But the alternative was to slog through the sand.

At Abu Hamid, we loaded our panniers with 10 days of food and fuel (for a cooking fire at nighttime stopovers). We wandered through the market area that wound through the center of town.

Fresh dates from the Nile shores, dried rice and beans, onions and what fresh vegetables we could find would be our bill of fare for the rest of the trip. We added all the bread we could carry and the last straw, 10 liters of water each. Our bicycles were at maximum weights—320 pounds for the double and 170 pounds for the single.

Word quickly spread that men from Mars had ridden bicycles in on the rail, and most of the town came to see us off. Robes snapping in a stiff north wind, it was like riding the circus train out as they cheered us on. But about two miles out of town, we crested the ridge of the Nile and the silence hit us. The town was gone. It was as if nothing existed at all. Sand and sky filled the entire view, broken only by low, barren rocks.

Along the way we would pass an occasional railroad station; most were stark and empty. Near one station, however, we met a work crew which challenged us to a spirited, if one-sided, race—they on hand carts on a side rail and we on our bikes. It was easy to see that legs are stronger than arms as we dusted them.

Whenever there were people at a train station, there was an invitation to dine. We would wash our hands, because hands are the forks and spoons of

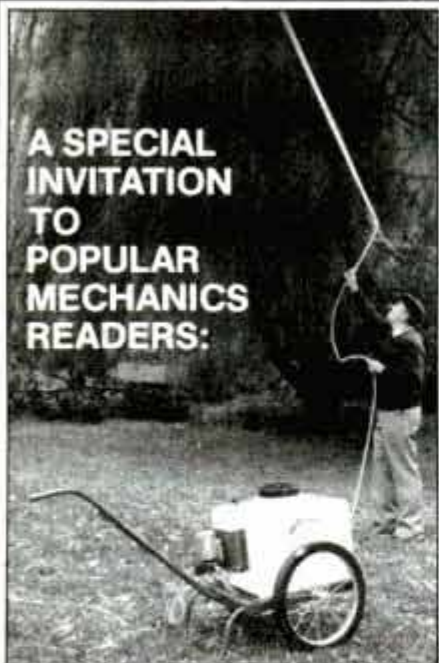
Sudan, then would come the Kisera, a flatbread served with lentils and vegetables.

But, the greatest reception of all came on the 18th and last day of our journey. At first, we saw a mosque towering in the distance above the sand. Slowly, other buildings began to appear on the horizon and other sets of railroad track turned in to parallel us. The echo of steel on steel rang in our ears as we approached the railway switch yard. Just as we saw the platforms coming up, the track ahead of us switched over to carry us to the central platform of the train station. The station master waved excitedly as we pulled in. Were we in some kind of trouble?

As we jumped onto the platform at Wadi Halfa, prepared to make peace with the station master, he told us in hurried tones how much he admired our work. He wanted a ride on a railbike. So, off went the station master on the single with the ski bottom, cruising the yard like a kid on a new toy.

Our desert journey was finished, and the Sudanese had been such wonderful hosts there seemed only one thing to do. We presented the bikes to the station master as a gift to all those who had shared their food and supplies on our fantastic desert bike ride. **PM**

**A SPECIAL INVITATION TO POPULAR MECHANICS READERS:**



**Try this all-new PORTABLE POWER SPRAYER at your home for 3 full weeks ...FREE!**

You'll find 1,001 uses for the versatile Spray Mate:

- Fertilize your lawn
- Eliminate backyard mosquitoes
- Spray fruit trees
- Kill wasps and hornets
- Disinfect swimming areas
- Safely spray vegetables
- Control Japanese beetles
- Clean out gutters
- And, lots more!

Spray Mate pulls along easily on its two big rubber-tired wheels. A pistol-grip wand shoots a jet up 30 feet! The big 12-gallon tank means fewer trips back and forth. The lifetime battery and compact electric motor run silently for hours between charges. *Special introductory price!*

This remarkable sprayer is available to Popular Mechanics readers on a FREE 3-Week Home Trial (for a limited time only!). Mail coupon today for the exciting details.

**BONUS EXTRA: FREE BATTERY AND CHARGER**

**MANTIS SPRAY MATE**

1458 County Line Rd., Dept. 108P  
Huntingdon Valley, PA 19006

Rush details on SPRAY MATE, FREE 3-Week Trial, and FREE Bonus.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

**HELICOPTERS SHOOT BACK**

*(Continued from page 88)*

like this: If NATO forces can repulse their attackers with conventional weapons, they would not have to resort to the use of nuclear arms, and the invaders, already severely weakened, would not dare to employ them either, fearing swift retaliation. Thus, so the theory goes, both sides would be spared the horror of nuclear escalation.

**Built to survive**

Despite the calculated losses anticipated by NATO experts, the U.S. Army does not consider its gunships expendable, even at a kill ratio of 16 to 1 and certainly not at \$10 million a throw. Survivability in an attack helicopter is as crucial as its weapons—if it can't take abuse, it won't live long to fight.

The Hughes Apache, like many other new designs, puts the pilot and copilot/gunner in separate cockpits, one behind the other, instead of the older single-cockpit layout with side-by-side seating. Each cockpit is surrounded with heavy armor plating like a steel bathtub, and the two are divided by a transparent blast shield.

The tandem cockpit arrangement not only narrows the fuselage, making it a harder target to hit, but it isolates the crewmen for greater safety. If one should be hit, there's a good chance the other will survive. Twin turbine engines provide backup power if one engine should fail, and special sand filters in the intakes prevent clogging in desert regions, one of the problems that plagued the ill-fated attempt to rescue the U.S. hostages in Iran.

The Apache carries up to 16 laser-guided Hellfire missiles for destroying tanks or as many as 76 rockets for use on less heavily armored targets. It also mounts a fearsome 30-mm nose cannon capable of firing 600 rounds a minute. It has a forward speed of nearly 200 mph, moves sideways or backward at 60 mph and can pull high G-forces in tight turns and steep climbs, making it a fast and nimble dogfighter.

**Electronic eyes**

The eyes of the modern attack helicopter consist of three electronic marvels that could have come straight from a Star Wars movie—the Martin Marietta TADS/PNVs targeting and night-vision navigation system, the Honeywell helmet-mounted day/night gunsight and the McDonnell Douglas/Bell mast-mounted day/night target-tracking sight. These permit a chopper pilot to see in the dark, spot targets normally hidden from view and skim over rough terrain at treetop level even at night and in bad weather. The ability to hedgehop at speeds approaching 200

mph—called nap-of-the-earth maneuvering—is what enables a gunship to strike with such devastating swiftness and surprise, using natural ground features to mask it from enemy radar and anti-aircraft fire.

Looking like beetle eyes bulging from a gunship's nose, the TADS/PNVs consists of two glass-faced optical scanners held in movable mounts so they can be aimed in any direction. One contains the TADS optics, the other the PNVs optics. TADS, which stands for Target Acquisition Designation Sight, includes a TV camera for daylight viewing, an infrared imager for night vision and a laser beam generator for spotting targets and guiding missiles. All a pilot or gunner has to do is aim the laser at a target and his laser-seeking Hellfire missiles will automatically home in on the beam, destroying whatever it's pointed at. The missiles can even be guided by a remote laser source, such as from a scout helicopter or a portable ground generator.

PNVS, the other half of the system, stands for Pilot Night Vision Sensor and contains an infrared imager that provides a brightly illuminated view of the terrain below at night or in heavy rain and fog. It's used primarily by the pilot for navigating close to the ground in darkness, but can also detect thermally active targets.

The Honeywell helmet sight is used in conjunction with the TADS/PNVs system to permit the pilot or gunner to aim the scanners merely by moving his head. It is electronically coupled to the servo motors that drive the scanners so they automatically follow his line of sight—wherever he looks, they look. (see *The Look That Kills*, page 84).

Both the TADS/PNVs system and the helmet sight were designed especially for the Apache, but are adaptable to other gunships. The McDonnell Douglas/Bell mast-mounted sight contains day/night optics and a laser beam generator similar to those in the TADS/PNVs system, but it puts them in an eyeball-like housing on top of a post above the helicopter's rotor. Being elevated, the sight can peer over trees and ridges, spotting enemy targets, while the helicopter itself remains hidden from view. Although adaptable to gunships, it is intended primarily for use on scout helicopters, enabling them to ferret out targets without being seen. Once a target is pinpointed by the scout's laser beam, it is handed off to a nearby attack helicopter, such as an Apache, to make the actual kill.

**The opposition**

The Apache had better be good because it faces stiff competition in the Russian Mi-24 Hind, an advanced-de-

*(Please turn to page 142)*

# EXPAND YOUR CAREER HORIZONS...



*The CIE Microprocessor Trainer helps you to learn how circuits with microprocessors function in computers.*

## START WITH CIE.

Microprocessor Technology. Satellite Communications. Robotics. Wherever you want to go in electronics ... start first with CIE.

Why CIE? Because we're the leader in teaching electronics through independent study. Consider this. We teach over 25,000 students from all over the United States and in over 70 foreign countries. And we've been doing it for over 50 years, helping thousands of men and women get started in electronics careers.

We offer flexible training to meet your needs. You can start at the beginner level or, if you already know something about electronics, you may want to start at a higher level. But wherever you start, you can go as far as you like. You can even earn your Associate in Applied Science Degree in Electronics.

Let us get you started today. Just call toll-free 1-800-321-2155 (in Ohio, 1-800-362-2105) or mail in the handy coupon.



**Cleveland Institute of Electronics**  
1776 East 17th St., Cleveland, Ohio 44114

**YES** I want to get started! Send me my FREE CIE school catalog ... including details about the Associate Degree program ... plus my FREE package of home study information.

Print Name \_\_\_\_\_

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Age \_\_\_\_\_ Area Code/Phone No. \_\_\_\_\_

Check box for G.I. Bill bulletin on Education Benefits

Veteran  Active Duty

**MAIL TODAY!**

Материал, защищенный авторскими правами PM-01

# Finally, a way to bring hair back to life: P/80 ReConditioner.™

Announcing a major breakthrough in the battle against male pattern baldness.

Introducing America's first ReConditioner.™ P/80, a unique new formula that gives hair a second chance to grow.

No magic here. Just basic chemistry. Medical researchers know that the male hormone dihydrotestosterone can disrupt the normal function of certain scalp hair follicles in genetically predisposed people. The growth phase of the affected follicles becomes continually shorter...resulting in the production of progressively shorter and thinner hairs.

To counteract this condition, researchers have been looking for a way to inhibit the production of dihydrotestosterone in scalp hair follicles.

A way has finally been discovered. It's called P/80 ReConditioner. With regular use, P/80 not only counteracts the production of dihydrotestosterone, but it also dissolves waxy sebum deposits that can accumulate in and around hair follicles. So follicles can function in a more normal and effective manner.

In short, P/80 ReConditioner gives hair a second chance to grow. Try it for 12 weeks. If you are not completely satisfied, you'll get your money back.

To order P/80, call toll-free today 1-800-621-2047. (In Colorado, call collect 837-9410) or send in the coupon below.

Try P/80 ReConditioner. You've got nothing to lose, and everything to gain back.



Yes, Please send me a 12-week supply (3 8oz. bottles) of P/80 ReConditioner.™

Please send me more information, including a list of publications by medical researchers.

Enclosed is my check or money order for \$32 including postage and handling. (Residents of Alaska, Hawaii, and Canada please send \$39, to cover additional postage.)

Bill my:  Visa  MasterCard acct. no. \_\_\_\_\_ exp. date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone \_\_\_\_\_ Business Phone \_\_\_\_\_

Signature \_\_\_\_\_

Send to: P/80 Products, Inc., 1660 Lincoln Street, Suite 785, Denver, Colorado 80295

©1984 P/80 Products, Inc.

## HELICOPTERS SHOOT BACK

(Continued from page 138)

sign gunship already proved effective in the Soviet invasion of Afghanistan. Like the Apache, it's a heavily armored tandem-seater equipped with laser-homing missiles. It may have at least one weakness, however. Unlike the Apache, it apparently is not designed for high-G maneuvers. Several have crashed when rotor blades sliced into tail booms due to abrupt changes in direction.

The Hind also is a huge machine, making it difficult to conceal, and is one of only a few combat models the Russians are known to have. By contrast, the United States and its NATO partners abroad are turning out more than a dozen different types and sizes suited to varying mission requirements and battlefield conditions. Sikorsky's UH-60A Black Hawk, though technically a utility transport, can be equipped with Hellfire missiles for antitank sorties and is a fast, rugged performer. Some 1,100 Black Hawks and 675 Apaches are already on order by the Army.

Other U.S. combat models include the Hughes 530MG Defender, a day/night, all-weather gunship with a mast-mounted sight; the Bell 406 Combat Scout, a combination scout/attack helicopter; the Sikorsky multirole H-76, a troop transport with antitank capability; and the Bell AH-1S HueyCobra, a tandem-seat tank killer that's a highly sophisticated and heavily armed derivative of the Vietnam-vintage Huey.

From France comes the Aerospatiale Gazelle, a mean-looking machine that, in modified form, starred as the miracle-performing supercopter in the science-fiction movie *Blue Thunder*. An even more formidable version, the Dauphin, will have advanced avionics and heavier armament. Britain's contribution is the new Westland Lynx-3, a versatile day/night, all-weather gunship equipped with both TADS/PNVS avionics and a mast-mounted sight.

West Germany's PAH-1, made by Messerschmitt-Bolkow-Blohm, carries antitank missiles, but will soon be replaced by the PAH-2, an upgraded tandem-seat model equipped with both air-to-ground and air-to-air missiles, TADS/PNVS avionics and a 30-mm nose cannon similar to the Apache's. Italy's Agusta A-129 Mangusta (Italian for mongoose) is also a tandem-seater and, like the Apache, has both night-vision avionics and laser targeting.

Today's helicopter gunships may not be able to see through walls like the fictional *Blue Thunder*, but they can do some pretty wild things. And tomorrow's versions, with still more advanced avionics and more powerful weapons systems, may even make the *Blue Thunder* look tame. **PM**

VISA/M.C./Am.Ex.C.O.D.-TOLL FREE-24 hrs: 800-824-7888 AK/HI 800-824-7919 Opr. 720

USE 30 DAYS AT OUR RISK

AMAZON SURVIVAL BLOW-GUN

EXTRA DARTS FREE! BUY 2 GET 1 FREE!

NEW TAKE-DOWN BLOW-GUN!!

NOW GET 3 OR 4 BLOW-GUNS FOR \$9.97!

COME DARTS!!

RAZORBACK 112-95-901

BROADHEADS \$10-95

SILENT, POWERFUL, ACCURATE. Hits like bullet! Kills varmints, pests, target, plinking, thrilling sport! Astound friends! Compressed breath gives amazing power! Fits 1/2" plywood! Rugged .38 cal. aluminum, 135 steel darts, carry case, instructions, 2 razorback targets! Carry box (322 freebies)! Buy 3 SAME + cleaning rod = 900532 freebies! Buy 4 SAME = 1100 + Mini-gun \$51 free! Buy 5 SAME = 1300 + free 7th gun \$65 free! Buy 6 SAME = 1600 + free 8th gun! Add \$1.95 per gun EACH rd. and 30-day moneyback if not delighted! If broken in Lifetime we'll replace! HOUSE OF WEAPONS, INC., Box 794-M Provo, Utah 84603. Send cash, check, Visa, M.C. Buy 17.5% only \$147 P/P!

**SAVE!**

**Electric Scooter \$878**

- Portable (fits in a car)
- Battery Operated
- Medicare Eligible

Ride everywhere with ease and comfort! home, stores, parks, church! No-Risk 30 day guarantee.....Write To:

C. F. STRUCK CORP.  
Dept: PM 55  
Cedarburg, WI. 53012

**MAKE THIS SHADE FOR LESS THAN \$75.00**

Send \$1.00 for our big catalog of stained glass supplies.

**WHITTEMORE,**  
Box 2065EM, HANOVER, MASS. 02339

# TOOL DISPOSAL

**PHONE TOLL FREE:**  
1-800-423-2567

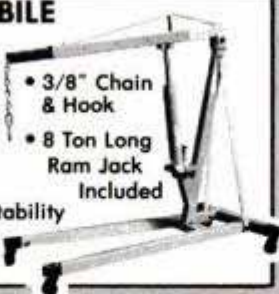
**PRICED FOR IMMEDIATE SALE!**

## 2 TON MOBILE SHOP CRANE

**CENTRAL HYDRAULICS**

- Lifting Capacity: 1 Ton With Boom Extended, 2 Ton With Boom Closed
- 4 Easily Adjustable Legs For Greater Stability

- 3/8" Chain & Hook
- 8 Ton Long Ram Jack Included



Lot No. 74210 **\$299.00**

## HEAVY DUTY BENCH GRINDER

- All Ball Bearing Motor Single Phase 110 Volt, 3450 RPM
- Precision Balanced Wheels 5/8" x 5"
- Drill Bit Sharpener Groove
- Spark Deflectors & Rear Dust Ejectors



Lot No. 65110 **\$29.50**

## POWERLOCK® II 25' RULE

- Thumblock Holds Blade In Place
- Mylar Protected Blade



- Belt Clip Case
- Lifeguard Yellow Blade Has Large Numerals & Stud Markings Every 16 Inches
- Remains Rigid Up To Seven Ft

Lot No. 90610 **\$8.99**

## AIR IMPACT WRENCH 1/2" DRIVE

- Forward & Reverse
- 90-100 Operating PSI
- 1/4" Air Inlet
- 250 Ft. Lbs. Average Torque

w/Standard Ext.

Lot No. 959-210 • 3-1/2 CFM

w/2" Ext. • 8,500 RPM

Lot No. 960-210 **\$27.00**



**CHICAGO ELECTRIC**

Power Tools

## REVERSIBLE 1/2" DRILL

- 50-60 Hz, 115 V, 6 Amp, 500 RPM, 650 W

- 1/2" Chuck

- All Ball Bearing Motor

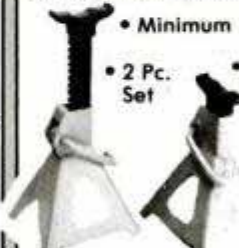
**\$49.00**

Lot No. 998-510



## 5 TON JACK STANDS

- Minimum Height 12"
- 2 Pc. Set
- Maximum Height 17-1/2"



- Base Dimensions: 7-1/2" x 7-1/2"

**\$24.00**

Lot No. 691-110

## 21 PC. 1/4" DRIVE

**PITTSBURGH FORGE**



- Heat Treated and Fully Hardened
- Chrome Vanadium Alloy Steel

SAE Lot No. 722-110

MET Lot No. 723-110

## 3 INDIVIDUAL SOCKET SETS

- Chrome Plated And Polished
- Fully Guaranteed

## 21 PC. 3/8" DRIVE

## 17 PC. 1/2" DRIVE



**ALL 3 FOR \$37.50**

## Milwaukee Twist 29 PC. DRILL BIT SET

- 1/16" Thru 1/2"
- Straight Shank, Jobber Length
- Black Oxide Finish
- M-2 Steel

Lot No. 986-110

**\$17.50**



## 5 SPEED DRILL PRESS

- 1/2" Chuck
- Spindle Speeds: 620 - 3100 RPM
- Motor: 1/3HP Ball Bearing, 6 Amp, 110V, 60 Hz, 1720 RPM Single Phase

**CENTRAL MACHINERY**

Lot No. 98710

**\$79.50**



## 3/4" DRIVE SOCKET SET

- 6 Pt. Sockets 3/4" to 2"
- 17" Ratchet, 15-1/2" Sliding T-Bar, 3" & 6" Ext. and Metal Box

21 PC. • Cold Forged

Lot No. 67410 **\$35.00**

## BIG TOP TARPULINS • Meets All OSHA Requirements • Brass Plated Grommets Spaced Every 3 Feet

TARP SIZES	Lot No.	Price
6' x 8'	95310	\$3.00
8' x 10'	877-310	\$5.50
10' x 12'	878-310	\$7.50
12' x 16'	926-310	\$11.50
16' x 20'	879-310	\$19.50

- Mildew Proof, Safety Brite Color

Item No.	Quant.	Price	Order by Phone Toll Free (1-800-423-2567) Or Mail In Form Below.
			<input type="checkbox"/> Check or Money Order Enclosed.
			Charge My: <input type="checkbox"/> M/C <input type="checkbox"/> Visa
			Acct. No. _____ Exp. Date _____
			Name _____
			Address _____
			City _____
			State _____ Zip _____
			Phone _____
			Sign Here _____
Subtotal			
Sales Tax for CA & KY Residents			
Shipping			
Total			

## HARBOR FREIGHT SALVAGE CO.

3491 Mission Oaks Blvd., P.O. Box 6015, Camarillo, CA 93011-6015

PHONE TOLL FREE 800-423-2567 Dept. 10-A Advertising Dept.

YOU CAN CHARGE IT WITH MASTERCARD OR VISA!



# SURPLUS CENTER

Worldwide  
Equipment  
Suppliers

## 1650-RPM, 1/12-HP Capacitor Motor



• ITEM 10-965 -- Use with blowers, small pumps, fans, etc. Equipped with removable cog type pulley, oil bearings, resilient cradle mount. Capacitor run, rated continuous duty.

• Single-phase, 60-cycle, 1.1-amps. Rotation CCW (facing shaft). Shaft 5/16" diam. x 3". Size 7" x 5" x 4".

ADD \$3.00 POSTAGE AND HANDLING \$7.00 NEW CONDITION USED SURPLUS

**FREE!**  
Equipment  
Catalog

• Money saving bargains featuring brand new factory lines, Gov't and factory surplus specials. USE VISA, MASTERCARD OR THE AMERICAN EXPRESS CARD.

Box 82209 / Dept. PM-025 / Lincoln, NE 68501  
For Ordering Only Call 800-228-3407



## Gas to Electric Conversion Kit

GAS LAMP BURNS \$72 TO \$120 OF GAS PER YEAR. OUR CONVERSION KIT OPERATES ON THE COST OF GAS. Easy to install 2-bulb fixture duplicates the charm and increases the light output of any gas light. Includes automatic On-A-Dusk — Off-A-Dusk photo electric control. Available in 12 volt or 115 volt.

FOR MORE INFO WRITE:

**Gaslight Conversions, Inc.**

1039 CHARLES AVE. ST. PAUL, MN 55104

## CLOCK COMPONENTS



We Feature Battery, Pendulum, Chime Quartz Movements of All Types. Types, Hurdle Grandmother, Grandfather, Cable Drive and Chain Drive, Key Wind Movements of All Types, 400 Day Clocks, Music Box Movements, Flat and Bezel Type Dials — Plus a Vast Assortment of Weather Instruments. Hundreds of Clock Items. Very Competitive Prices. Write or Call for Free 75 Page Catalog. (818) 940-0950

**NEWPORT ENTERPRISES INC. Dept. P.M.**  
2313 W. Burbank Blvd., Burbank, Calif. 91506

## HYDRAULIC JACK REPAIRS

A Business of your own.

Earn while you learn at home. Millions of jacks in gas stations, trucking firms, etc. need servicing. We show you HOW. Start spare time in your basement or garage. Big opportunity for mechanics.

Write for folder No. PM2 and free bonus offer.

**HYDRAULIC JACK INC.**

P.O. BOX 18, ACCORD, NY 12404

Computer/Road Tests Verify

**Big 400 cid Chrysler  
Sedan Gets 72 Mpgg  
With "Super Carb!"**



## Join Road Test Team! Build New High — Mileage Vaporizer, Get Know-How FREE

Ray Covey's new vapor carb is incredibly simple, easy to build. Provides 100% fuel vaporization at LOW heat with full-power under load. It's like driving on regular carb, but what a mileage difference! Fits under hood. Only 10" to 12" long, 3" high, 5" wide. All parts but vaporizer "box" are stock, low cost! Runs on high as 100-to-1 air/fuel ratio.

### DUAL SYSTEM, INSTANT CHANGE-OVER

Pre-carburetion is the secret! Small side (or top) mounted auxiliary carb sprays air/fuel mix into exhaust-heated tubes; it's instantly vaporized, sucked into modified air cleaner and present carb. Simple under-dash manual controls divert air and fuel simultaneously, to regular or auxiliary carb, regulate exhaust flow and heat. Options include: automatic, vacuum-activated controls, vapor line heater for cold winters. They're all made from inexpensive stock components! We furnish specs, the "step-by-step."

### BOLT-ON A BREAKTHROUGH

Run on vapor NOW! Build your own Lo Temp vaporizer or have it built, at local metal shop. Discover how you may vastly increase MPG of your car, truck, boat, or RV. Parts Kits planned, but pre-production data needed. Install unit, provide test info requested, and big Covey Manual (3rd Edition) costs you nothing. FREE Road Test Application, complete details. Offer limited. Write today!



**Carb Research Center, Dept. PM-2**  
Box 1 Foyll, OK 74031

## DRIVING TOYOTA'S MR2

(Continued from page 89)



Midship-mounted 16-valve engine (left) is a real screamer, developing all of its power between 4,500 and 7,500 rpm. The rear trunk is able to hold five grocery bags upright.

front discs are vented, the rears solid.

I found the passenger compartment eerily devoid of engine noise. In more exotic mid-engined cars, you expect at least a little hum or rasp or *something* back there to let you know what's going on, but not in the MR2. You have to check the tach, and then you're amazed to note that the engine loves to run at and above 5,000 rpm. In fact, until you wind her out to about 4,500, not much happens. After that, though, the ram-tube butterflies flip open and the car takes off like a shot.

This is the same 16-valver that Toyota introduced in the rear-drive GT-S sport coupe (*Driving Toyota's Corolla GT-S*, page 109, Nov. '84). As in the GT-S, this engine feels relatively weak at the low end but comes on very strong above 4,500 rpm. Redline is an honest 7,500 rpm, so you have to learn to keep the engine wound up tight.

The MR2's transaxle comes directly from the front-drive Corolla sedan. But, like the Corolla GT-S, the MR2's gearbox has a little too much of a gap between second and third gear ratios. Clutch action is silky smooth, and the shift lever feels as though it's bolted directly to the transaxle. Actually, it's a remote system using dual flex cables.

The MR2's front suspension is by MacPherson struts located by transverse links and rubber-bushed diagonal tie struts, and the rear uses a modified MacPherson setup, this time with twin trailing arms.

To me, the MR2's ride felt mighty good; not jiggly but controlled and pleasingly firm. Toyota suspension engineers managed to remove most of the

body's tendency to roll. They did this partly by attaching the front and rear stabilizer bars directly to the MacPherson-strut housings through a ball joint-and-link arrangement.

Performance feels great in every dimension. Factory figures put 0 to 60 time at 8.7 seconds, with the quarter mile coming up in 16.2 seconds. Where the car probably shines best, though, is in overtaking on the highway. Shift down, keep the engine humming and third gear winds out to an easy 85 mph.

Fuel economy turns out to be another of the MR2's long suits. Its estimated EPA figures are 26 mpg in the city, 29 on the highway.

Inside the car, the seats are great. The rest of the interior—to me, at least—reflects the same custard pie as the exterior. The passenger's side of the dashboard slopes rearward at 45°, rendering it neither useful as a parcel shelf nor distant enough to give the illusion of greater interior spaciousness.

There is a surprising amount of luggage space in the MR2's two stowage compartments. The 2.8-cu.-ft. forward hatch under the hood contains a mini spare and has room for a couple of small soft-sided carry-ons. The 5.1-cu.-ft. rear trunk behind the engine is deep and uncluttered. In all, the MR2's carrying capacity measures 7.9 cu. ft. versus 6.8 for the Fiero.

Even with my reservations about the MR2's styling, I don't see Toyota having any trouble selling the 36,000 units it plans to import during 1985. The MR2's price wasn't set at press time, but it's expected to be in the neighborhood of \$11,500. **PM**

EXCLUSIVE FORMULATION USED BY AIRLINES—NOW AVAILABLE TO CAR OWNERS

# Glass Shield™ KEEPS ALL CAR WINDOWS PERFECTLY CLEAR AT ALL TIMES... ABSOLUTELY NOTHING CAN STICK TO THEM...



- NOT SNOW ● NOT SLEET
- NOT ICE ● NOT GRIME
- NOT DIRT ● NOT RAIN
- NOT BUGS ● NOT TAR
- NOT SALT SPRAY

One Application lasts for up to Six Months!

GLASS SHIELD utilizes the formulation now used by most commercial and private planes to insure a perfectly clear windshield regardless of how foul the weather.

### WORKS LIKE MAGIC

You'll be amazed as you watch the elements hit your windshield and actually roll and bounce off every area of glass. It's not magic... it's GLASS SHIELD!

### IMPROVED FOR CAR & BOAT OWNERS

The plane formulation was enhanced by adding ingredients that not only prevent snow, sleet and ice formation on cars, but also grime, dirt, bugs, tars and salt spray from adhering to your windshield and all glass areas, including side mirrors. You can now drive in the worst of weathers with the assurance that you'll enjoy even clearer visibility at all times without even using your wipers. AND, because GLASS SHIELD protects the entire glass area of your car, you enjoy far greater visibility than merely depending on your windshield wipers. Clearer and wider visibility insures elimination of "blind spots" and provides greater protection against road accidents for you and your family.

GLASS SHIELD is made by the manufacturers of famous GLO-SHIELD, America's finest car finish. We guarantee that GLASS SHIELD will do everything we claim for it, or return the remaining contents within 30 days after receipt for refund of product cost.

© Copyright 1983 Howe Co.

## Glass Shield™

- STOPS ICE, SNOW AND SLEET FROM FORMING ON WINDSHIELD, ETC.
- ROAD TARS, GRIME, SALT SPRAY, DIRT AND BUGS ROLL RIGHT OFF.
- FULL WINDSHIELD, SIDE AND REAR WINDOW VISIBILITY PERFECTLY CLEAR AT ALL TIMES (not just wiper area).
- GREATER PROTECTION AGAINST ACCIDENTS FOR YOU AND YOUR FAMILY.
- ONE APPLICATION LASTS FOR UP TO 6 MONTHS.
- ONE BOTTLE PROTECTS SEVERAL CARS.
- SAFE FOR ALL CAR FINISHES.
- EXCELLENT FOR HOME WINDOWS. ELIMINATES CONSTANT WASHING
- PERFECT FOR BOATS, TOO. KEEPS SALT SPRAY OFF WINDOWS



### 30 DAY MONEY BACK GUARANTEE

Howe Co., Dept. 6648  
10-10 44th Ave., L.I.C., NY 11101

Please rush me \_\_\_\_\_ bottles of GLASS SHIELD @ \$7.95 (2 for \$13.90, 4 for \$25.95) Add \$1.00 per order for postage & handling. N.Y. residents add sales tax. Enclosed is check or M.O. for \$\_\_\_\_\_, or charge to my  VISA  MASTER CARD

No. \_\_\_\_\_ Expire Date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

# OLSON

## Band Saw Blades Now finest made-in-America quality costs up to 50% less

For fast, accurate cutting in metal, wood or plastic, our premium quality blades are made from the finest high carbon steel to our own exacting standards. Precision set, filed or milled teeth provide clean, sharp cuts, longer blade life. We've got the blade length and tooth style that fits your saw and your cutting requirements.



Ask about our new blades for popular bench-top band saws.

**FREE. SEND TODAY**  
for price sheets and Catalog 35P.

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_



THE OLSON SAW COMPANY  
A DIVISION OF BLACKSTONE INDUSTRIES, INC.  
Bethel, CT 06801 • 203-792-8622

BUILD THE ENERGY INDEPENDENT

SUN COTTAGE FOR UNDER \$24,000

*no more fuel bills!*



ONLY \$5 SEND FOR PLAN BOOK OF LOW COST PASSIVE SOLAR, EARTH TEMPERED, & SUPER INSULATED HOMES

SURVIVAL CONSULTANTS

P.O. BOX 21 RAPIDAN, VA. 22753

AND FREE INFORMATION ON HOW TO PLAN YOUR OWN PASSIVE SOLAR HOME WITH ARCHITECT ANGUS MACDONALD'S

**ALTERNATE ENERGY  
DESIGN KIT**

*you create the design  
and we do the working drawings*

## PHOTOGRAPHY UPDATE (Continued from page 70)

electronics. Its new M-6—a range-finder—has through-the-lens electronic exposure metering.

Electronics governs flash output today, too. Most program cameras use "dedicated" flashes of the same brand to read the camera's settings and mete out just the right amount of light. Now, Vivitar is offering a universal "dedicat-



ed" flash, the 5200 Easy Reader, for use with several popular brands of program cameras.

Many of these automated electronic "program" features now can be found in the so-called "medium-format" cameras, which use 120-size roll film for 6x4.5-cm exposures. This is nearly three times the size of a 35-mm frame, thereby making superior enlargements possible. Fuji's GS645S and Pentax's 645 are typical of this breed. Rollei added sophisticated medium-format features (such as dual, eye-level/waist-level viewfinders) to its 35-mm SLR Rolleiflex 3003.

A similar hybridization has emerged in the "auto-everything" 35-mm compact field. The half-frame 35-mm camera returns with Konica's AA-35—in a size no larger than a disc-film camera. The company's reasoning: disc-format portability with better enlargements,



Electronics adapts Vivitar flash (above) to most program cameras, and lets Fuji put many features in 1/4-lb., 8-mm camcorder.

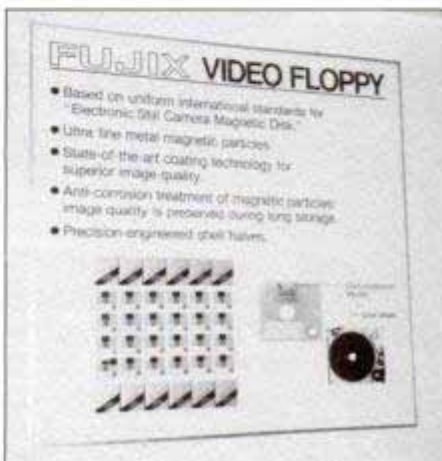
because the exposure is five times larger than a disc-film frame.

Other noteworthy entries among 35-mm compacts hail from Yashica and Fuji. Yashica's T-AF and T-AF/D are the first compacts whose built-in flashes automatically meter light output by the distance from the subject.

Fuji's DL-200 presents two "firsts" for compacts. One is through-the-lens light metering. The other is "film prewinding"—film is loaded and automatically extracted from its canister. As frames are exposed, the film feeds back into the canister.

Most auto-everything compacts introduced at Photokina now accommodate film speeds up to 1000 ASA (Fuji's

Disk player for Fuji's TV-Photo system (above) uses 2-in.-dia. floppy disk shown in display at right.



go to 1600). Also, many new compacts feature "DX" film sensing, enabling them to adjust automatically for correct film speed according to the "DX" code embedded on the take-up leader of most new color films.

Virtually every film manufacturer introduced new papers at Photokina, promising better color resolution and longer-lasting prints. Konica says its paper's color stability lasts 100 years.

In optics, Pentax introduced fish-eye (180°) and ultra-wide-angle lenses with much-reduced peripheral distortion. **PM**





# How to buy the best products instead of the best advertising.



**FREE!**

Everybody's advertising promises you, "Ours is the best." But they can't all be best. So how do you decide which to buy?

Today, more than three million consumers decide by reading *Consumer Reports* magazine.

For nearly fifty years, *Consumer Reports* has lived by one basic objective: *to be objective* in order to protect you, the consumer. Each issue brings you detailed brand-name ratings. Warnings against unsafe or defective products. Sound money management advice. Authoritative answers to health questions. Page after page of unbiased, reliable information to help you make *informed* buying decisions. To help you get *the truth* about those thousands of products and services everybody's trying to sell you.

Our exclusive ratings and recommendations take the guesswork out of going shopping. We name names. List model numbers. Provide prices. Tell you precisely what you need to know *before* you buy. For example, whether the product really performs as well as they claim. Whether it's convenient. Effective. Economical. Safe to use. Whether it's likely to last. Facts that enable you to select the best quality every time—and *save money*, too—possibly hundreds of dollars in savings every year.

How do we remain objective? By remaining a nonprofit organization. By refusing to accept outside advertising. We don't even accept free samples of the products we test; we buy them at retail just as you do. No wonder our readers trust *Consumer Reports*!

Why not join them? Simply mail the coupon for two free gifts. First, our 384-page 1985 Buying Guide Issue, filled with money-saving facts on more than 2,000 brand-name products. Plus *The Medicine Show*, our informative 255-page health and drugs handbook. A combined \$11.45 value, now *free* with your introductory subscription.

*Consumer Reports*. We show you how to buy the best products instead of the best advertising.

**Consumer Reports**

Subscription Department  
Box 2479  
Boulder, Colorado 80322

Yes, please enter my one-year subscription to *Consumer Reports*, and send my *free* 1985 Buying Guide Issue and *free* copy of *The Medicine Show*. In addition, I'll receive 11 regular issues plus the 1986 Buying Guide Issue (when published) all for only \$16.

Payment enclosed     Bill me later    5DAA4  
(mail in envelope)

Name \_\_\_\_\_  
(please print)

Address \_\_\_\_\_ Apt. No. \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Please allow 6-8 weeks for delivery.

**MONEY-BACK GUARANTEE:** If you decide to cancel for any reason, we guarantee to refund the unused portion of your subscription. Your two free gifts are yours to keep in any case.

## FIRSTHAND REPORT



Decent seats and fine controls (above) add to the Cimarron's sport sedan ambience. D'Oro trim package includes fluted rockers.

# PM DRIVES THE CIMARRON V6

Chevrolet's 129-hp V6 lets Caddy's J-car finally compete in the Audi/BMW league.

BY MICHAEL LAMM, West Coast Editor

The new V6 and four-speed manual transaxle finally move the Cimarron from the minors into the majors. Here's the Cimarron Cadillac should have been offering all along.

The original 1981 Cimarron was an unsatisfactory repackaging job. GM took its four-door, four-cylinder J-car, added Cadillac badges, made a lot of options standard, and sold it for \$4,000 above the basic Chevrolet Cavalier CL: virtually the same automobile. No one felt particularly good about the early Cimarron. The Honda Accord and Mazda 626, both less expensive, outdid it in every way. So did such intended rivals as the Audi 4000, Saab 900, Volvo DL, Nissan Maxima, Toyota Cressida and BMW 3-series.

Well, the Cimarron comes a lot closer to the best of those cars now. By the

simple expedient of adding the Chevrolet-built, 2.8-liter, fuel-injected, 60° V6, the 1985 Cimarron becomes a remarkably likable sport sedan. The V6 adds nearly 50 percent more horsepower (129 versus 88)—a dose of oomph the car needed from the start. Equally important, the V6 makes the Cimarron considerably smoother, quieter, more flexible and more refined in the way it feels and handles in traffic. Anyone who test-drives the V6 and the Four back to back won't be happy with the Four ever again.

Personally, I prefer the V6 with the four-speed manual transaxle. But you can also get the V6 with the THM-125 three-speed automatic, and that's not a bad combination either. I found the automatic more tractable and user-friendly than most—no annoying

quirks; no torque-converter lockup ambivalence; and it upshifted and downshifted at my slightest throttle command, almost instinctively. It's an excellent automatic.

Still offered is the 2-liter Four with either automatic or five-speed manual. This Isuzu-built five-speed, though, isn't up to the torque of the V6, so the V6 comes with the beefier Muncie FX-125 four-speed instead.

The 2-liter pushrod Four, also supplied by Chevy, sticks with a single-point throttle body injector, while the V6 uses Bosch K-Jetronic multiport fuel injection and tuned intake runners. The V6 has a single serpentine belt for all accessories except air conditioning, which uses its own V-belt.

Besides improving performance, the  
*(Please turn to page 150)*

# Your home workshop

# can PAY-OFF ....

## 3-in-1 Power Tool!

This one power-fed tool—  
**SAWS** to desired Width...  
**PLANES** to desired Thickness...  
**MOLDS** all popular Patterns...  
 — all in one fast operation!

Only Complete Workshop Tool Of Its Kind In The World!

From the day it arrives the Planer/Molder/Saw will make and save you money. With shortages and inflation driving lumber prices skyhigh, this versatile power tool quickly pays for itself by easily converting low cost rough lumber into high value finished stock. Make your own quarter-round, base mold, door and window stop, casing, tongue-and-groove... all popular patterns. Other operators turn out picture frames, fencing, clock cases, furniture, bee hives, bed slats, surveyor's stakes... all kinds of millwork. Handles tough oak and walnut as easily as pine using only one small motor, and so simple to operate even beginners can use it.

**YOUR OWN BUSINESS**  
Part Time or Full Time—  
Right At Home!

Men and women everywhere are using this one-low-cost power-feed machine to start and build their own new businesses... and YOU can do the same. Supply lumberyards, carpenters and contractors in your area with door and window trim... base shoe... bed mold... cove and quarter round... ALL of their trim. You can sell picture frame to custom framing shops, paint stores, department stores and direct to users. All patterns available or design your own.

**Get FREE Booklet with facts and full details... RUSH COUPON TODAY!**



# ...BIG!

Try The  
 Foley-Belsaw In Your  
 Own Shop On Our  
**30-DAY FREE TRIAL OFFER**  
 Mail Coupon Below  
 For Complete  
 Details!

Send TODAY  
 for this  
 fact-filled  
**FREE BOOKLET!**



### Does The Foley-Belsaw Pay? YOU BET!

#### READ WHAT OWNERS SAY:

"I bought a batch of walnut in the rough, and after planing it on the Foley-Belsaw I figured I saved enough money to pay for two-thirds the cost of the Planer. It really does a good job."  
**R. S. Clark — Springfield, Ohio**

"This machine pays for itself making money out of scrap boards. It is a very well built machine and I confess it is more than I really expected for the price. It does everything you say it will."  
**Stephen Schultz — Orangeville, Penna.**

"I've been a planer man for years and am now retired. The Foley-Belsaw has earned me \$60,000 in eleven years... It's the best investment I ever made."  
**Robert Sawyer — Roseburg, Oregon**

"I recommend the Foley-Belsaw as the most useful shop tool any craftsman could own. We use one every day in the Workbench model shop... couldn't get along without it."  
**Jay Hedden, Editor Workbench Magazine**

There is **NO OBLIGATION** and **NO SALESMAN** Will Call—ever!

If coupon has been removed, just send postcard with name and address to:

**FOLEY-BELSAW CO.**  
 90609 FIELD BLDG.  
 KANSAS CITY, MO. 64111

**FOLEY BELSAW**

**FREE BOOK**

**YES, please send me the FREE Booklet that gives me complete facts about your Planer-Molder-Saw and full details on how I can qualify for a 30-Day Free Trial right in my own shop. I understand there is No Obligation and that No Salesman will call.**

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

## FITNESS EXPERTS AGREE CROSS COUNTRY SKIING BEST EXERCISE



**BETTER THAN CYCLING, JOGGING AND EVEN SWIMMING.**

The enjoyable sport of cross country-skiing is cited by leading physiologists as the most perfect form of aerobic exercise. Its rhythmic total body motion uniformly exercises more muscles than other forms of exercise and its smoothness causes no joint pain or damage. NordicTrack lets you get the same top fitness building benefits year round in the convenience of your home. NordicTrack eliminates barriers of time, weather, chance of injury, etc. Very effective for weight control.

**More Complete Than Running**  
 Adds arm and shoulder exercise. Jarless—doesn't injure the joints.

**More Effective Than Exercise Bikes**  
 More complete. Adds important upper body exercise and provides more uniform leg muscle usage. Higher pulse rates, necessary for building fitness, seem easier because more muscles share the exercise.

**Even Better Than Swimming**  
 When swimming, the water supports the body allowing major leg muscles to loaf. The stand up position on the NordicTrack exercises the leg muscles much more uniformly.

**Features**  
 Simple motorless mechanism. Independently adjustable arm and leg resistances.

Speedometer, odometer included. Pulse-meter optional. Red oak frame for quiet operation and fine furniture appearance. Pelvic pad provides user stability.

**Exclusive Patented Flywheel Action**  
 Provides unmatched smoothness and continuity from stride to stride. Motion and resistances are same as in real skiing.

- Fits in your home or office
- Folds and stands on end to require only 15" x 17" storage area



Two year warranty, 30 day trial period. Call or Write for Free Brochure.

**TOLL FREE—**  
**1-800-328-5888**  
 Minnesota 612-448-6987

PSI 124-PM Columbia Court, Chaska, MN 55318

**NordicTrack**  
 The Jarless Total Body Exerciser.

# MUST LIQUIDATE AT FAR BELOW DEALER COST! FAMILY PAGER Communication System

Up to 1/2 mile  
range or more!



Factory new!  
First quality!

High Technology paging systems have long been available to doctors and executives at an expensive price. Now you can bring that same technology into your home at a very small fraction of the cost! Due to a bankruptcy, we are now authorized to liquidate this family communication system at FAR BELOW dealer cost!

#### At Home:

Call children home from the neighborhood playground with the push of a button! Signal your child to merely "phone home" from the neighbor's house for a message! Stay in touch with family members at home while you are out in the yard! Bring your "family" mechanic in from the garage for important phone calls!

#### On the Farm:

Call farm hands in from the barn, instantly!

- **Home-Based Transmitter!** Plugs into standard household outlet.
- **Two Portable Receivers!** Durable vinyl covering and belt clips. 12-hour rechargeable batteries and charger are included.
- **Personalized Coding!** Prevents interference with similar paging systems in neighborhood.
- **Electronic "Beeps"!** You can send TWO different signals: for "come home" or "phone home."
- **1/2 Mile Range or More!** Depending on local geographic conditions.
- **Warning "beep"!** Lets receiver/wearer know when he/she has wandered out of range!



Mfr. List \$80.00

Liquidation Price **\$18**

Item H-277-63124-02  
Price subject to change after 60 days. Offer void outside original 48 states.

Credit card customers can order by phone,  
24 hours a day,  
7 days a week



Toll-Free: 1-800-328-0609

Your check is welcome!  
No delays in orders paid by check.

C.O.M.B. CO.® Item H-277-63124-02  
14615 28th Ave. N. / Minneapolis, MN 55441-3357

Send \_\_\_\_ Family Pager(s) at \$18 each plus \$4 each for shipping and handling. (Minnesota residents add 6% sales tax. Allow 3-4 weeks for delivery. Sorry, no C.O.D. orders.)

My check or money order is enclosed. (No delays in processing orders paid by check, thanks to TeleCheck.)

Charge:  MasterCard®  VISA  Am. Ex.  Diners Club

Acct. No. \_\_\_\_\_ Exp. \_\_\_\_\_

PLEASE PRINT CLEARLY

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone \_\_\_\_\_

Sign here \_\_\_\_\_

**C.O.M.B. CO.®**

Authorized Liquidator

14615 28TH AVENUE NORTH  
MINNEAPOLIS, MINNESOTA 55441-3357

## DRIVING THE CIMARRON V6

(Continued from page 148)

V6 engine has changed the Cimarron in several physical ways. First, because the transverse V6 is wider than the Four, both cars have been made 4.8 in. longer. All this extra length is added ahead of the firewall.

Second, the V6 Cimarron comes standard with what amounts to a handling suspension package: 2-mm thicker front stabilizer bar, gas-filled front MacPherson struts and rear Delco-Bilstein shock absorbers, stiffer spring rates, plus larger wheels and tires. The V6 uses Goodyear Eagle GT P205/60R14s on 14-in. alloy wheels, while the Four stays with 13-in. alloy wheels and P195/70R13 tires.

### Handling Los Angeles

The wider tires and stiffer suspension definitely translate into better handling for the V6. I compared three Cimarrons on Los Angeles streets and freeways—two V6s and a Four. No contest. The V6s handled traffic in an easy, confident manner while the Four tended to feel slightly clumsy by comparison. I couldn't test all-out cornering, but in brisk driving over twisty stretches of Sunset Boulevard in Beverly Hills and along nearby Mulholland Drive, the V6 felt surefooted, steady, stable and certainly on a par with any of its imported peers.

Cimarrons with either engine have good, quick, responsive, precise rack-and-pinion power steering. I appreciated the variable-ratio feature, in addition to ample feedback through the leather-wrapped steering wheel. The V6's ride, while slightly firmer than the ride the Four delivers, is supremely comfortable, particularly at freeway speeds. I got the impression that the V6 Cimarron would make an excellent long-distance touring car.

### Standard equipment

You still get a fair complement of accessories in the '85 Cimarron, including automatic air conditioning, an AM/FM stereo with four 4-ohm speakers, voice reminder, pulsed wipers, full gauges, fog lamps and courtesy lights everywhere. Among the Cimarron's options are digital vacuum-fluorescent instruments, glass sunroof, power seats/windows/door locks, leather upholstery, cruise control, various sound systems and tilt wheel.

The Four uses GM's new variable-displacement air-conditioner compressor, which doesn't cycle in and out and thus gives smoother performance. The V6, however, gets the DA-6 carry-over compressor, and while it does cycle, you hardly feel the power drain.

This year's D'Oro model is available



Transverse 2.8-liter V6 has a ribbed fuel-injection plenum that looks like a finned oil pan, leading to upside-down motor jokes.

in white or red with golden accents, 14-in. wheels, Eagle GT tires and a fluted-metal rocker molding. This stylized molding is optional on other Cimarron models as well.

The V6's projected best EPA mileage estimates are 20 mpg city, 26 mpg highway, as against 25/33 mpg for the Four. Due to a higher (numerically lower) final-drive ratio, the V6 with automatic delivers 2 to 3 mpg more than the stick.

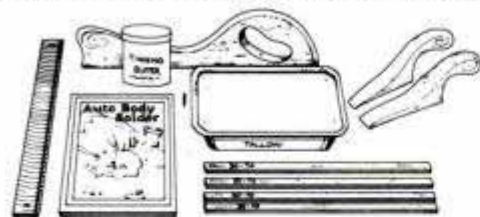
And despite a \$400 to \$600 higher price tag, Cadillac expects to sell three to four times as many V6 Cimarrons as Fours. Makes sense. **PM**

### THE PM REPORT CARD

Cadillac Cimarron V6	GRADE	COMMENTS
Acceleration	B	More than adequate.
Handling	B	Excellent in normal traffic.
Braking	A	Sure, fade-free stops.
Steering	A-	Variable ratio, good feedback.
Transmission (manual)	A-	Good 4-speed; should be a 5.
Ride	A	Smooth but not mushy.
Fuel economy	B	Quite competitive.
Seating	B	Could use more support, adjustments.
Vision	A	Good views in all directions.
Gauges/controls	A	Fine positioning, prefer analog.
Ventilation	A	Great standard air conditioning.
Noise @ 55 mph	A	No wind roar with windows up.
Cargo capacity	A	Deep, usable trunk.
Engine serviceability	B	Tightly packed.
Fit and finish	A	Prototypes look great.

# Eastwood's Home Autobody Repair Shop

## Body Solder: The Permanent Panel Repair



Body solder makes a permanent professional-quality repair that won't crack, lift, or shrink. Easy to apply with a household propane torch and can be shaped to any contour. Great on patch panels, seams, and edge work. Accepts paint just like sheetmetal. Far more durable than synthetic fillers. The craftsman's method still used today by the best body shops, restorers — even by auto manufacturers. The complete kit includes four 1/2 lb. sticks body solder, 2 paddles, 1 lb. tallow, 1/2 lb. tinning butter, 14" body file with holder, and FREE instruction book "Auto Body Solder" containing 50 pages, with over 50 illustrations (the most complete source of body solder techniques available!).

- #6730 Home Craftsman Body Solder Kit ..... \$58.00
- #6400 Extra Sticks 30-70 Body Solder 1/2 lb. .... \$ 3.50 ea.

## The Sure Way to Kill Rust. Eastwood's Sandblaster.



Featured in Oct. '83 Hot Rod

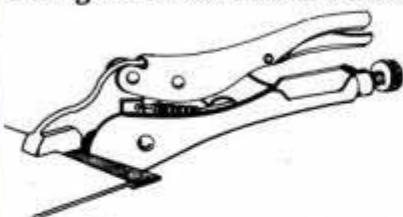
When rust cuts deep, the only way to get it out **completely** is with a sandblaster. With thousands sold, our sandblaster is field-proven and cost-effective. This tool will let you do the jobs you once had others do: Dispose of rust, scale, paint and corrosion in minutes.

The Eastwood professional sandblaster package includes our all-metal, power gun (same as used on our larger units), ten-foot hose, 14" pickup tube, spare nozzle and detailed instructions. Just hook up to a one H.P. compressor, insert the pickup tube into dry sand or other abrasive and you're ready to go. The blaster's suction head draws abrasive easily. No surging. No skipping.

**Three operations in one:** Sandblaster, liquid blaster, air gun. With degreasing solutions, you can use it to remove buildup on engines and parts. Also get a high-velocity flow of air to dry or clean parts. All spare parts are available through our catalog.

- #8532 Sandblast Gun ..... \$30.95
- OPTIONAL: Sandblast hood with replaceable lens.
- #9536 Sandblast hood and lens ..... \$19.95

## Flangers Make Patch Panels Fit Flush

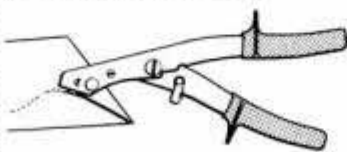


Just adjust tool to metal thickness, flange repair area and lay in patch panel. Your weld will be flush with body metal, which minimizes grinding and uses less filler. Works in tight areas to make sharp curves. Requires little effort for perfect flanges.

- #6286 Panel Flanger ..... \$29.95

## Eastwood Nibbler Cuts Body Metal Fast

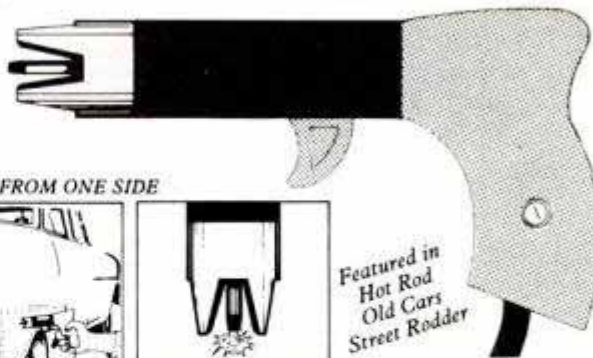
Our nibbler cuts straight lines, curves—any shape you need. Leaves a flat, no distortion, burr-free finish. Uses less effort than ordinary snips. Chromed steel construction with cushioned vinyl grips. Cutting jaws made of heat-treated tool steel. Will cut up to 18 gauge steel and 16 gauge aluminum. Jaws replace easily after long, hard use.



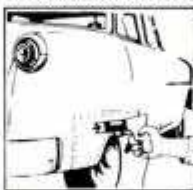
- #6281 Nibbler ..... \$28.95
- #6284 2 Replacement Blades .... \$ 9.95

© 1984 The Eastwood Company

## Spot Weld Perfectly In Just 6 Seconds



WELD FROM ONE SIDE



ARC FUSES METAL

Featured in Hot Rod Old Cars Street Rodder

## MAKE FAST DISTORTION FREE WELDS

Spot welding has some distinct advantages. It's very fast - a few seconds for a sound weld. Because the heat is confined to a small area (the 1/4" dia. electrode) it avoids warpage or distortion. Allows for accurate control that lets you make consistently uniform welds.

## EASY TO USE - EVEN FOR BEGINNERS

Become a pro in just a few minutes. Hook it to the electrode holder of your arc welder (set at 50 amps) and ground to car body. Just pull back the trigger to retract electrode, line up weld point and press head against the metal. Metal must be free of paint, rust or grease. Release the trigger and allow the electrode to contact the metal and glow for 1-2 seconds. Then raise the electrode with the trigger and allow an arc to form a molten puddle of metal (always use welding goggles or shield). Each weld takes about 5-6 seconds. Automotive manufacturers used spot welds to build your car and you can restore it with the same authentic technique.

## CONVERTS AN ARC WELDER TO A SPOT WELDER

It welds any steel between 18-26 gauge. (Auto body steel metal is between 18 and 22 gauge). Ideal for welding replacement panels, floors, brackets, clips, braces, channels, etc. Welds from one side so it can even do blind panels that ordinarily can't be spot welded. Comes with two pressure heads — four prong for control on flat areas and two prong for reaching into edge and recess work. Proper replacement electrodes available through Eastwood. Gun comes complete with connection wire, spare electrode, 2 pressure heads and complete instructions.

- #4355 Spot Weld Gun ..... \$35.95
- #4321 Package of 10 extra electrodes ..... \$9.75
- #4367 Welding Goggles ..... \$6.95

**FREE 64 PAGE CATALOG**  
With Each Order

TO ORDER CALL TOLL FREE

**1-800-345-1178** In Penn. (215) 644-4412

**30 DAY MONEY BACK GUARANTEE**

Send me the following: Code C011PM25

Item(s) # _____	\$ _____
Item(s) # _____	\$ _____
Item(s) # _____	\$ _____
Item(s) # _____	\$ _____
Item(s) # _____	\$ _____

**Packing and Guaranteed Delivery Charge if your order is:**  
 \$1.00 to 20.00 - \$3.50    30.01 to 40.00 - \$4.40    50.01 to 75.00 - \$6.00  
 20.01 to 30.00 - \$3.95    40.01 to 50.00 - \$4.95    75.01 and up - \$6.50

Send me your 64-page catalog — \$2.00

Check Enclosed. **TOTAL \$ \_\_\_\_\_**

VISA     MasterCard     C.O.D. (Add \$2.00)

Credit Card \_\_\_\_\_ Expiration Date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

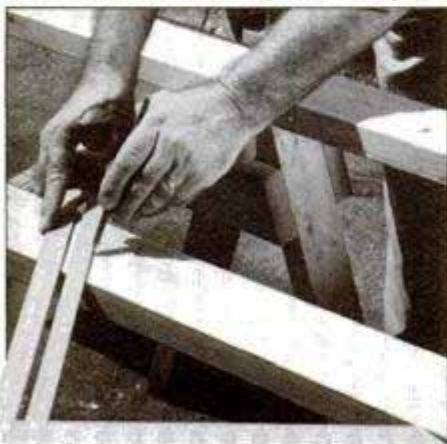
**EASTWOOD COMPANY** (PA residents add 6% sales tax)  
 147 Pennsylvania Ave., Box 296, Malvern, PA. 19355 (215) 644-4412

# PM LOOKS AT...



## Orem Super Square

Beveling one corner of the tongue and machining a slot in the blade has turned the tried-and-true carpenter's square



To lay out rafters, butt tongue bevel to edge of stock. Pivot square so angle mark in slot aligns with same edge. Then mark cut line.

into Super Square—able to determine all angle cuts and inches-rise-per-foot-run at a single measurement.

Roof framing, stair risers and other hard-to-figure angle cuts become a simple matter of pivoting the 11 $\frac{1}{4}$ -ounce aluminum square on the beveled corner at the tongue's 12-in. mark and reading the angle in degrees in the blade's slot, or in inches-per-foot-slope along its inside edge.

Super Square also determines exact deductions for ridge beam thickness when working with the compound lateral angles required for hip and valley rafters.

Super Square is made by Orem Research Inc., located at 513 North Elm St., Hinsdale, Ill. 60521. The manufacturer's suggested retail price for the tool is \$24.95 plus \$2.65 shipping.

—Rosario Capotosto



Instructions and functions are anodized onto Super Square's scratch-resistant surface.



Slot reads angles in degrees and directly measures deductions for material thickness.

## SOTZ MONSTER MAUL



### FAST-N EASY WOOD SPLITTING

- Ends broken handles, stuck axes and flying wedges.
- Hardened splitting edge lasts and lasts. Resists deforming.
- Splits most logs in one lick.
- No struggling lifting heavy logs up to high priced power splitters.
- No gasoline, no set-up, no takedown.
- Shape of head prevents sticking.
- Drop'em, saw'em, stand'em up and split'em.
- No gimmicks, just simple physics.

**\$19.89**  
FACTORY PICK-UP



VISA or MASTERCARD RUSH ORDERS  
CALL TOLL FREE 1-800-321-9892  
Inside Ohio 1-216-236-5021  
or SEND CHECK OR MONEY ORDER  
Sorry No C.O.D.'s

WOODSTOVE KITS	TOTAL WEIGHT	FACTORY PICK-UP	ADD FOR SHIP. & HNDLG.
15-30 Gal. Bottom		\$27.47	\$4.00
55-Gal. Bottom		\$34.99	\$4.00
Top Kit Fits Both		\$17.93	\$3.00
8 Lb. Lady's Maul	11-lbs.	\$18.49	\$3.00
12 Lb. Monster Maul	15-Lbs.	\$19.89	\$5.00
Cushion Grip		\$3.50	\$1.00

**Guarantee:** 1-year trial offer.  
10 years against failure.

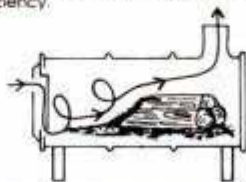
## GARAGE SHOP HEATER

USED BY U.S. ARMY

- PRODUCES MORE HEAT THAN 2 OR 3 HIGH PRICED WOOD STOVES
- TREMENDOUS RADIATING SURFACE AREA GIVES YOU MORE HEAT WITH LESS WOOD
- Airtight design and draft control engineered to limit the amount of oxygen entering stove for controlled, safe, efficient heat. Prevents overfiring so drums can't burn up.
- Use of draft control allows you to heat large or small areas. Basement installation heats your entire home. Great for your garage, workshop, or cabin.
- Top drum squeezes 60% more BTU's from heat normally lost up the chimney. Heavy steel kit bolts together quick and easy.

Kit converts 55 gal. or 30 to 15 gal. drum (not supplied) into high capacity stoves.

Patented INTERNAL DRAFT CHANNEL—Air entering top draft control is preheated as it is drawn down inside of door and is sucked into bottom of heater with a turbulent action, mixing with the wood gases. This makes the Sotz stove tops in efficiency.



SPARK-PROOF DESIGN. Because of our internal draft channel, hot sparks cannot jump out of heater as in others with draft straight open to fire.

AS LOW AS  
**\$27.47**



55 KIT  
SHOWN

Burns over 24 hours

**SPECIFICATIONS:** Door, door frame, flue collar, draft control, internal draft channel of 13 ga steel, legs, 1/8 in. steel hinges, latch, catch of 3/16 in. steel nuts and bolts. Top Drum, Connector flanges, pipe assembly, 4 nesting brackets, nuts and bolts.  
55 Gal. stove has KING SIZE 15 1/2" diagonal door opening.  
30 Gal. stove has 9 1/2" round door.

Now Also Made In Canada  
Prices: Call 1-807-222-2323 or write  
"SOTZ" P.O. Box 1000, Dept. 43  
Ear Falls, Ontario POV10

Sotz Inc., 13643-NA Station Rd., Columbia Station, OH 44028

Call 1-800-533-5545 today and ...

# SAVE 20-50%

## On These Brand Name Parts, Tools & Equipment!



### HEAVY DUTY LOG SPLITTER SALE!

- 8 1/2 TON, 110 Volt, Electric Splitter, Item # 1110.....**ONLY \$459.00**
- 12 1/2 TON, Homeowner Special, Item # 1128.....**ONLY \$704.00**
- 15 1/2 TON, Low Profile, Item # 1138.....**\$819.00**
- 15 1/2 TON, High Profile, Item # 1130.....**\$819.00**
- 15 1/2 TON, Vertical, Item # 1160.....**\$1140.00**
- 24 1/2 TON, Low Profile, Item # 1142.....**\$1324.00**
- 24 1/2 TON, High Profile, Item # 1140.....**\$1524.00**
- 24 1/2 TON, Vertical, Item # 1162.....**\$1820.00**



**12 1/2 TON HOMEOWNER SPECIAL**

### GAS ENGINES

(HORIZONTAL)

- 5 HP Tecumseh, 1/2" shaft, #6051.....**\$134.95**
- 5 HP Briggs, 1/2" shaft, #6052.....**\$138.95**
- 8 HP Tecumseh, (Cast Iron Sleeve), #6081.....**\$188.95**
- 8 HP Briggs, 1" shaft, Item #6080.....**\$195.95**
- 10 HP Tecumseh, Cast Iron Sleeve, #6010.....**\$219.95**
- 10 HP Tecumseh, Elec start, #60101.....**\$259.95**
- 3-20 HP Horizontal and Vertical engines available at **SUPER LOW DISCOUNT PRICES!**



### LOG SPLITTER PARTS



- 11 GPM 2 Stage Pump, #1011.....**\$93.50**
- 13 GPM 2 Stage Pump, #1013.....**\$119.95**
- 16 GPM 2 Stage Pump, #1015.....**\$139.95**

- Standard 4-Way Control Valve, #2010.....**\$45.50**
- Auto-Detent Valve, #2020.....**\$48.50**
- 4x24x2" Cylinder (Welded Type), Item #902424 (Can ship UPS).....**ONLY \$99.95**
- 5x24x2" Cylinder (Tie Rod Type), Item #909524 **ON SALE NOW.....\$222.00**
- Many Other In Stock at Low Discount Prices!

### AIR COMPRESSORS

5 HP, 60 Gal, Vertical Campbell/Hausfeld 2 cylinder single stage. #15954.....List \$1160.....**\$599.00**  
(Will ship 45 states for \$50), Cal., Oregon & Washington \$60, (Prepaid with order).

5 HP, 60 Gal, 2 Stage air compressor. #15975...**ON SALE NOW...\$898.50**

1 HP, 11 Gal. Tank, Campbell/Hausfeld single stage compressor. #15951...**ON SALE NOW...\$249.95**  
Many Other Compressors & A Full Line of Air Tools Available at Discount Prices!



### TRAILER PARTS



High speed hub and spindle set, 2000 lb. capacity, 4" bolt circle, 4 hole, 2 hubs & 2 spindles, dust caps, tapered bearings, lug bolts & cotter pins...**\$37.50/set**

High speed trailer wheels & tires, fit all 4 hole boat and snowmobile trailers

Item #	Size	Ply	Cap	SALE	Tire Only
1211	570x8	4	590 lb	<b>\$19.95</b>	<b>\$15.50</b>
1212	570x6	4	715 lb	<b>\$29.95</b>	<b>\$22.00</b>
1216	480x12	4	780 lb	<b>\$32.95</b>	<b>\$29.00</b>

Trailer Springs, 1 1/4" wide w/eye center of 25 1/2"

Item #	Capacity	Springs	Leafs	Sale
1250	1000 lb	2	2	<b>\$22.00/pr</b>
1251	2000 lb	2	3	<b>\$24.00/pr</b>
1252	3000 lb	2	3	<b>\$27.00/pr</b>
1253	4500 lb	2	4	<b>\$29.00/pr</b>

### TARPS



Strong rot/rust proof polyethylene tarps w/ brass plated grommets every 3 feet

Item #	SIZE	SALE!
1770	6x8	<b>\$2.69</b>
1771	8x10'	<b>\$4.95</b>
1772	10x12'	<b>\$5.95</b>
1773	12x16'	<b>\$9.95</b>
1774	12x20'	<b>\$12.95</b>
1775	16x20'	<b>\$19.95</b>
1776	20x30'	<b>\$39.95</b>
1777	30x40'	<b>\$69.95</b>
1778	30x50'	<b>\$89.95</b>

### UTILITY TRAILER KIT



Complete road ready kit. Easy assembly with basic tools. Load cap 1060 lbs. Bed size 40" x 48"

Item # 12542 **Sale \$147.95**  
List \$279 (Will ship 48 states for \$25)

### GENERATORS

4000 Watt 8 HP Briggs 33 amps @ 120 volts, 16.6 amps @ 240 volts. Item # 16402 Lists \$1009... **SALE \$449.95** (With Elec Start).....**\$539.95**

5000 Watt 11 HP Briggs 42 amps @ 120 volts, 21 amps @ 240 volts. Item # 16404 Lists \$1174... **SALE \$699.00** (With Elec Start).....**\$799.00** (Will Ship 48 states \$45)



### WHISTLER® RADAR Detectors

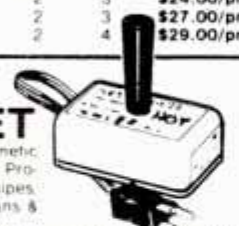
Whistler has high sensitivity for earlier warning. Comes ready to install with hardware. #33052, List \$139.95.....**\$99.95**

**SPECTRUM** Whistler's top of the line detector. The highest sensitivity for the earliest warning. Has filter modes to eliminate false alarms caused by burglar alarms, garage door openers, traffic lights, etc. #33051, List \$299.95.....**ONLY \$208.95**



### HEAT MAGNET

Cling to any magnetic iron or steel surface. Provides heat for pipes, pumps, engine oil pans & many other uses.



Item #	Ship Wt	List	Sale
17101	1 Lb.	\$25.00	<b>\$15.50</b>

# NH Northern Hydraulics INC.

We Ship UPS, Bus or Truck  
801 East Cliff Road, Box 1219, Burnsville, MN 55337  
Call our order dept. at 1-800-533-5545  
In MN 612-894-8310

- Log Splitters & Parts
- Air Compressors and Tools
- Gas Engines and Generators
- Trailer Parts and Tarps
- Lawn and Garden Power Products

**SALE EXPIRES FEB. 28th 1985!**



**ORDER TOLL FREE 1-800-533-5545**

Send for free catalog or send \$6.00 and receive catalog and splitter design booklet.

Mail To: Northern Hydraulics, 801 E. Cliff Rd., Box 1219, Burnsville, MN 55337, Dept. #9025

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

Please rush me my FREE Discount Catalog!

Use your Mastercard or Visa



## DO YOU NEED A NEW CAR? BUY ONE AS LOW AS \$200.00!!!



### UNLIMITED INVENTORY AVAILABLE IN EVERY STATE

OWN AND DRIVE THE VERY BEST! CHOOSE FROM CADILLACS, CORVETTES, 4x4'S, VANS, PICKUPS AND MORE. YOU CAN EVEN HAVE THE LUXURY OF OWNING SAILBOATS, SPEEDBOATS, YACHTS, OR YOUR VERY OWN PLANE!!

TO OWN A PRESTIGIOUS PIECE OF PROPERTY YOU DO NOT HAVE TO LOSE \$\$\$ ON DEPRECIATION AND HIGH COST OF UP-KEEP. IN FACT, YOU CAN OWN AND ENJOY NICE CARS THEN RESELL THEM FOR LARGE PROFITS!

NAME \_\_\_\_\_ ZIP \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

BUY THESE NEW AND LATE MODEL CARS, VANS, TRUCKS, BOATS, AIRPLANES, MOTOR HOMES DIRECT FROM THE U.S. GOVERNMENT. THESE ITEMS ARE CONFISCATED BY THE U.S. DRUG ENFORCEMENT AGENCY AND ARE SOLD FOR AS LOW AS \$200.00 TO THE PUBLIC. THIS IS A GREAT MONEY MAKING OPPORTUNITY AVAILABLE IN EVERY STATE.

TO PURCHASE VEHICLES IN YOUR AREA ORDER YOUR SALES CATALOGS BY FILLING IN THE COUPON AT THE LEFT AND RETURN WITH YOUR CHECK OR MONEY ORDER FOR \$10.00 (SHIPPING AND HANDLING INCLUDED) TO:

AUTOMANIA DIST.  
66 BROADWAY/BOX 133P  
SAUGUS MA 01906

ISSUES WILL BE SENT PERIODICALLY  
SATISFACTION GUARANTEED

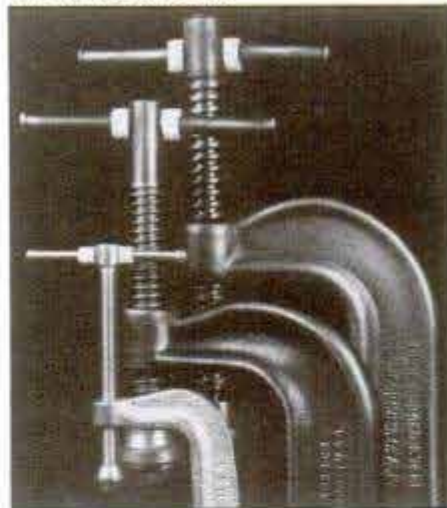
# HINTS FROM READERS

## Furniture crack filler



The inevitable cracks that develop at furniture joints can be closed neatly with a small amount of clear silicone rubber sealant. Using a fingertip, apply the silicone sealant directly from the tube. It will form a cove that scarcely shows, yet fills the crack. This treatment keeps dust and dirt out, permits joint movement, and won't break up as a solid filler would. Apply the sealant after the final finish. The finish will show through as though the sealant weren't there.—Richard Day

## Handle brakes



To hold a C-clamp handle or a bench vise handle in place as it is turned, cut 1/8- to 1/4-in. lengths of appropriately-sized elastic tubing. Place a length on each end of the crossbar and slide the tubing to the middle. The tubing should fit the clamp or vise handles tightly enough to hold the bar in place, yet slide easily to facilitate use when the crossbar is in the maximum leverage position.—Martin L. Fackler

SPECIAL  
OFFER!

"AA" Battery  
Not  
Included



Hour & Minute  
Hands Included!

Mini-Quartz  
Clock  
Movements

NOW ONLY  
**\$3.95\***  
POSTPAID

\*Free Hour & Minute Hands Included!

Famous Junghans quartz mini-movement from West Germany at an unbelievable introductory price. Only 2 1/4" square x 1/2" thick! Pick the shaft for your dial thickness... choose from 1/8", 3/16", or 1/4". Accurate performance guaranteed for THREE YEARS! Order as many as you wish at this amazing low introductory price. Major credit cards accepted. WRITE OR CALL TOLL-FREE.

FREE CRAFT CATALOGUE  
CLOCK MOVEMENT  
AND ACCESSORIES

WRITE:

Clockwerkes, Dept. PM2  
2419 Foster Avenue  
Janesville, WI 53545

Wisconsin residents call (608) 755-1000

Out of state customers  
CALL TOLL-FREE  
1-800-356-4011

**CLOCKWERKES**™

Tempus Instrument Corporation  
2419 Foster Avenue, Janesville, WI 53545

## OFFER EXPIRES MAY 31st

Hardened Steel. For filing, drilling, milling, carving, routing any metal or wood. Cutting edges from 1/2" to 1", all shanks 1/2". Brand new in air-tight G.I. packs.



22-Tool Set, G.I. cost \$295<sup>00</sup> now \$269<sup>00</sup>  
 14-Tool Set, G.I. cost \$126<sup>00</sup> now \$118<sup>00</sup>  
 Save Even More, Both Sets now \$138<sup>00</sup>  
 Two \$38 Sets (Limited Time) \$58<sup>00</sup>  
 Money Back Guarantee. Add \$3<sup>00</sup> for shipping.  
 Texas orders add 5% tax. Export orders add 14.  
 U.S. SURPLUS CENTER, Dept. 503  
 715 Camden, San Antonio, Texas 78215

## CATALOG of FULL-SIZE FURNITURE PLANS \$2<sup>00</sup>

Wonderland for woodworkers! Over 180 full-size furniture plans! Tables, desks, curio cabinets, chairs, etc. Everything in full-size detail just like the plans fine furniture manufacturers use. Early American, Danish, Modern, Mediterranean, Spanish, English. Your remittance credited against first order. Send today.

1425 Sherman Avenue,  
Evanston, IL 60601  
FURNITURE DESIGNS, Dept. PF-25

**Dupli-Carver**™  
Affordable Precision  
Wood Carving  
Machines

Our machines let you duplicate virtually anything:  
 • Gunstocks  
 • Signs & Plaques  
 • Figures & Statues  
 • Furniture restorations  
 • Double curved moldings  
 • 2 Models Available

1000 W. 30th St.  
 Dept. No. 512  
 61500 W. 30th St.  
 Minneapolis, MN 55428  
 612/251-1111

## BOAT KITS

SAVE 1/2 FACTORY-BUILT COST! 20 trailerable POWER & SAIL models, 11'-30'. Factory molded fiberglass hulls & decks factory assembled. You install interior - no experience required. Performance same as factory-built. FREE 48 pg catalog.

LUGER BOAT KITS, Dept. B-25

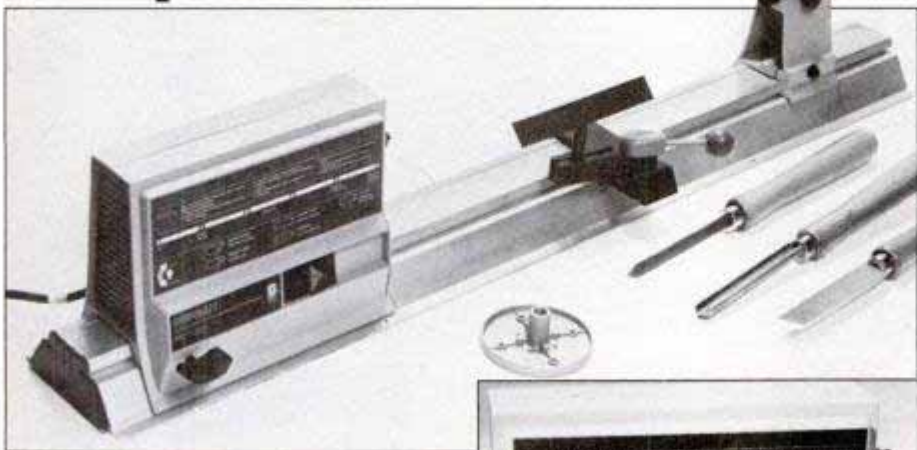
3800 W. Hwy. 13,  
Burnsville, Minnesota 55337 612-890-3000





# PM LOOKS AT...

## A compact lathe



The Shopcraft lathe is a reasonably priced compact tool, but it will do a fine job.

I admit I was skeptical about a compact lathe. But the Shopcraft Model T6750-20 earned my respect after a few trial turnings.

Its capacity is 27 in. between centers and 7 in. in diameter. A self-contained universal motor delivers a maximum  $\frac{1}{3}$  hp and it is electronically controlled to vary the speed from 700 to 1,800 rpm. The speed control is a sliding lever that contains an integral on-off switch. Behind the headstock is a handy spindle lock which makes it easy to remove the spur center or faceplate.

I began testing this tool with a 4-in.-square block of soft cedar. At the beginning of the roughing cuts with the gouge, the motor stalled a little. But this is normal for a universal motor when it is strained. After the workpiece was fully rounded, it was quickly and easily reduced to a slender spindle without further strain on the motor.

Next, I tried a 4-in.-square block of walnut. This harder wood caused too much strain for the initial rounding. After beveling the corners on a band saw and remounting the walnut workpiece in the lathe, further rounding was much easier.

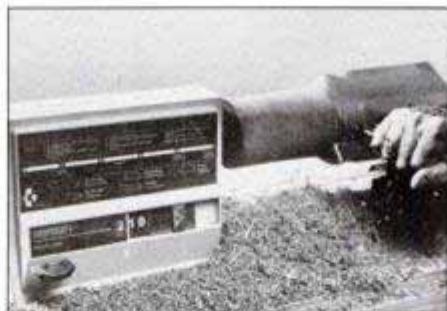
I used a piece of tough ash stock in a faceplate turning with good results.

In sum, it is a relatively low-cost lathe (\$200 faceplate \$10), good as a starter tool or to shape moderately sized turnings. The Chisel set is \$50. Benchmark Tool Co., 2601 Industrial Dr., Jefferson City, Mo. 65101, makes it.

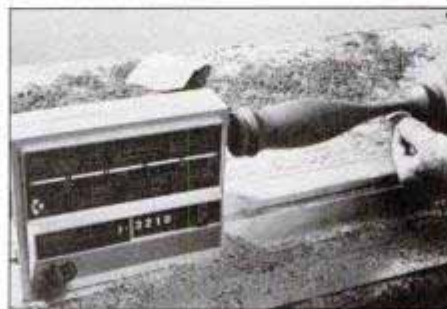
—Rosario Capotosto



Slide lever turns on the power and regulates speed. The left handle is a safety lock.



Roughing cuts on square softwood blanks are no problem, but hardwoods require preliminary beveling of corners.



Sand at maximum rpm. This is the same softwood blank shown in the previous photo. Turning required no more time or effort than on a large lathe.



## Kemp's Total Recycling System

- Grinds for instant compost
- Shreds for valuable mulch
- Chips for decorative wood chips
- Saves fertilizer costs
- Reduces clean-up time
- Enriches soil... naturally
- Boosts garden yields
- Beautifies your yard

**T**HE remarkable Kemp Shredder/Chipper is one of the best investments you will make in your lifetime. A Kemp is a shredder for leaves, weeds and leafy material... a grinder that pulverizes cornstalks, tough vines, overripe crops, kitchen throw-outs (even steak bones!)... virtually anything... into nutrient-rich mulch and compost — *instantly!* Plus, it's a chipper that cuts brush and limbs (up to 3" thick!) into beautiful, decorative wood chips. No other home Shredder/Chipper does it *better... or faster!* Discover how Kemp's "Total Recycling System" can benefit you. Send for the exciting Kemp story today... and start enjoying natural, carefree gardening!



The Standard of the Serious Gardener Since 1890.

### KEMP COMPANY

160 Koser Rd., Dept. 27025  
Lititz (Lancaster Co.), PA 17543

Please RUSH me full information on the Kemp Shredder/Chipper and "Total Recycling System."

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

© 1985 KEMP

# Preparation: Key To A Super Paint Job

Adequate preparation is the basis of a professional paint project. Here's how to prepare for the best job in the least time.

BY PENELOPE A. SPANGLER  
Home Improvement Editor



## REPAIRING CRACKS IN PLASTER

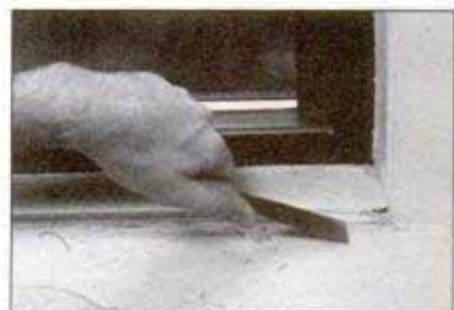


Use a punch-type can opener to widen the crack into a V shape so joint compound will adhere. Dust off any loose plaster.



After moistening the crack area, apply joint compound with a putty or taping knife, exerting pressure downward.

## PREPARING WOODWORK



Scrape off raised paint with a putty knife or a specialized scraping tool. Then sand the area smooth with the adjacent surface.

Let's face it, few of us really enjoy painting—yet we're willing to take up a paintbrush because we can look forward to a fresh-looking room, whose new appearance will last for several years. Proper preparation of walls and ceiling prior to painting will help you achieve a smooth, durable painted finish. Admittedly, this all-important first step takes time. However, efficient planning will help you reduce preparation time and still put a room in good order for painting.

Begin by making a list, then gathering the tools and supplies you will need. A few helpful tools are: punch-type can opener, 2-in. putty knife and/or pull scraper, 4-in. taping knife, screwdrivers and a ladder. Some helpful supplies include: joint compound or other filler compound; wood filler for woodwork; 60-80-grit silicon carbide sandpaper and 120-grit abrasive; deglossing solution; wall washing detergent; pigmented shellac to seal water stains; plastic sandwich bags, paper and pencil to label hardware; masking tape; drop-cloths and newspapers.

If preparation takes several weekends, you may want to keep the furniture in the room. Push it away from the

(Please turn to page 158)

## PATCHING MEDIUM SIZED HOLES IN PLASTER



To repair medium, doorknob-sized holes in plaster where the lath isn't visible, first dust the area to remove loose plaster.



Moisten the area and apply joint compound with a putty knife or wide-blade taping knife in 1/4-in.-thick layers.



Sand between layers after each has dried. Moisten surface before applying successive layers, making final one flush with wall.



Top layer of compound has been feathered into the surrounding wall surface and is now ready to be primed and painted.

# HINTS FROM READERS

## Wet mounting prints



Cut scrap paper for back to size. When glued in place, it will prevent panel from curling.



Apply diluted glue or wallpaper paste. Smooth print on board with wet sponge.

Wet mounting is an economical way to mount inexpensive reproductions of works of art for framing. First, make sure that the ink on the reproduction won't run by testing a small corner with a little water. Next, roughen the smooth side of a piece of hardboard with 220-grit sandpaper. To keep the board from curling when it dries, glue a scrap piece of paper to the back of the board: the two forces—scrap paper and print—will work against each other to hold the board flat. Make sure the scrap backer paper is about the same thickness as the print paper.

Mount the print with wallpaper paste, or with white carpenter's glue mixed with about 10 percent water. Use a wet sponge or paper towel to smooth the print flat and to remove any glue that finds its way onto the face. Then put paper towels, another sheet of hardboard, and books or other weights on top for about 20 minutes drying time.—Ron Jegerings



## Why Buy A Big, Expensive Tiller...

### For a Small Back Yard Garden?

You wouldn't buy expensive road equipment just to lay a blacktop driveway... or a big rig to drill a water well... or a pick-up truck to haul in a few loads of manure.

So why buy a big, expensive tiller for a back yard vegetable garden and a few flower beds? Hire someone once a year with a farm tractor or a big Troy-Bilt tiller.

Then buy a Mantis Tiller/Cultivator — the 20 lb. wonder — to do all the rest of your gardening for you! Mantis starts with the flick of a wrist... tills and weeds and cultivates a practical 6"-9" wide (big tillers till 20" or more!)... turns on a dime... and runs all day on a gallon of gas!

Mantis is wonderfully light in weight and easy to operate. Our files are filled with letters from lady gardeners and older folks telling us that Mantis is the answer to their prayers.

Discover the miracle of Mantis... and make gardening fun again!



**BIG EARLY SEASON BONUS FOR ORDERS PLACED BEFORE MARCH 15th!**

Please RUSH information on the Mantis Tiller/Cultivator and Early Order Bonus.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

**Mantis Manufacturing Co.**  
1458 County Line Rd., Dept. 631  
Huntingdon Valley, PA 19006

## MUST LIQUIDATE AT BIG SAVINGS TO YOU!

### Genuine Australian Lamb's Wool Rugs



A temporary overstock at the factory enables us to offer you these luxurious rugs at a low, liquidation closeout price! These lush, plush skins are from Merino lambs... prized for the excellent quality of their extremely fine-textured wool. Raised in Australia, the lambs were then shipped to the Middle East for lamb meat.

The hides were processed into rugs in Yugoslavia! Special chrome tanning was used to lock the fur into the skin. Then the fur was moutonized (straightened) to give it a soft, silky feel.

Each luxurious rug is approximately 8 square feet. Coloring is a lovely shade of cream, accented with darker brown at the tips. Buy several for your hearth, den or cabin at this unusually low price!

Mfr. Suggested Retail . . . . . **\$99.00**

**\$38**

Liquidation Closeout Price . . . . . Item H-278-62330

Price subject to change after 60 days. Offer void outside original 48 states.

Credit card customers can order by phone, 24 hours a day, 7 days a week. **AMERICAN EXPRESS** **DINERS CLUB**

**Toll-Free: 1-800-328-0609**

Your check is welcome! No delays in orders paid by check.  
**C.O.M.B. CO.®** Item H-278-62330  
14615 28th Ave. N. / Minneapolis, MN 55441-3357

Send \_\_\_\_\_ Lamb's Wool Rug(s) at \$38 each, plus \$3.50 each for shipping and handling. (Minnesota residents add 6% sales tax. Allow 3-4 weeks delivery. Sorry, no C.O.D.)

My check or money order is enclosed. (No delays in processing orders paid by check, thanks to TeleCheck.)

Charge:  MasterCard®  VISA  Am. Ex.  Diners Club

Acct. No. \_\_\_\_\_ Exp. \_\_\_\_\_

PLEASE PRINT CLEARLY

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ ZIP \_\_\_\_\_

Phone \_\_\_\_\_

Sign here \_\_\_\_\_

**C.O.M.B. CO.®**  
Authorized Liquidator  
14615 28TH AVENUE NORTH  
MINNEAPOLIS, MINNESOTA 55441-3357

## SUPER PAINT JOB

(Continued from page 156)

walls during preparation. If the ceiling needs work or you plan much sanding, cover the furniture. Don't use newspapers—the ink can rub off. If possible, move the furniture to an adjacent room.

Wear loose-fitting clothes and a long-sleeved shirt. For big sanding jobs, wear a hat and a face mask. Complete one type of repair job before beginning the next.

### Filling plaster cracks

To repair a crack in plaster, enlarge it with a punch-type can opener so that joint compound will adhere. Dust the crevice to remove debris; then moisten with a damp sponge and work joint compound firmly into the crack to fill it from top to bottom.

If you must add more compound, wait until the first coat is dry, and sand any rough spots with 60 to 80 silicon carbide abrasive paper. Then feather the final layer of compound into the wall and sand later. New crack-filling products that makers claim need no sanding can reduce preparation time. Such a product is Onetime spackle by Red Devil, Union, N.J.

### Patching holes

To patch a hole in plaster, first brush away loose plaster. If the lath isn't showing, moisten the hole and cover it with several 1/4-in.-thick coats of joint compound, using a putty or taping knife, depending on hole size. Let compound dry and sand between coats.

In larger plaster holes where lath is visible, undercut the edges of the hole. Dampen the lath and plaster edges with water. Use a 4-in. taping knife to apply patching compound firmly into the hole so part of the compound passes through spaces between the lath and part attaches to the edges of the hole. Fill the hole in front of the lath about 1/4 in. deep.

Score 1/8-in. grooves in a crisscross pattern in the first coat to ensure adherence of the next coat. When the first coat is dry, moisten the area with water and apply a second coat of patching plaster feathered into the adjacent wall surface. Sand smooth.

Patching a hole in drywall is somewhat trickier—there is no lath or other backing to support a patch.

To patch a medium-sized hole in drywall such as that made by a door-knob, first cut away the damaged area with a keyhole saw. Cut a piece of cardboard larger than the hole, yet small enough to pass through it. Punch a small hole in the center of the cardboard with a finishing nail. Then pass a 5-in. length of string, knotted at one end, through the cardboard. Apply glue



Remove hardware rather than taping it and trying to paint cautiously around it. It's faster and you get a smoother paint job.



To facilitate hardware replacement, keep all parts for a door or window in a plastic sandwich bag with identification.



If you can't remove a fixture such as a ceiling fan or light, cover it with newspaper or plastic to avoid paint splatters.



Scrape loose flecks of paint off metal surfaces with a wire brush. Or use a chemical stripper to remove all of the paint.

## HOW TO REMOVE WALL COVERING



In most cases, it is best to remove wall covering before painting, unless the wall plaster is in poor condition or the wall covering is over drywall. In these cases, resurfacing the walls with 3/8-in. drywall is recommended.

Two widely used techniques to remove nonstrippable wall covering are soaking with wallpaper stripping solution, or using a wallpaper steamer. Both are followed by scraping.

Spraying on stripping solution can be

less messy than steaming. Apply solution with a pump-type garden sprayer or hand-sprayer bottle (photo, upper left). When scraping, change the scraper blade often to avoid damaging the wall (photo, lower left). The steamer shown above was rented for \$12.50 a day. The glass vial shows water level in the machine.

Before painting, sand or scrape off remaining residue and wash the wall with detergent containing trisodium phosphate, following directions.—P.S.

to the front surface perimeter of the cardboard patch. Then pass the cardboard through the hole and pull the string taut so the board will make firm contact and adhere to the adjoining drywall surface.

When the glue dries, cut the string. Moisten the edges of the hole and apply joint compound with a taping knife.

### Repairing a large section

To repair a larger section of damaged drywall, cut away the area in a square or rectangular shape, to expose enough adjacent stud surface for nailing. Cut a matching patch of drywall the same thickness as the damaged portion and nail it in place with plasterboard nails, letting the last hammer blow make a slight dimple in each nailhead. Spot prime the area and fill the dimples and crevice around the patch with joint compound.

As a last check for wall smoothness, slip an old stocking on your hand and run it lightly across sanded areas. Where the hose snags, sand again.

### Treating woodwork

Before preparing woodwork, remove as much hardware as possible. Place all pieces for a particular opening in a small plastic bag with identification—for example, "liv. rm., middle window, s.w. wall." This is an ideal time to polish hardware.

Remove peeling or blistered paint with a putty knife or paint scraper. Dust and fill gouges or dents with joint compound. Sand the patches smooth and prime the area.

If the woodwork has been previously treated with a gloss or semigloss paint, the surface should be roughened to accept new paint. Sand the surface—dust and wipe with a tack cloth before repainting—or use a deglossing agent.

To shield glass and other areas while painting, use a trim guard when possible. Masking tape can leave a tacky residue if left on more than a half hour.

For radiators, radiator covers and other metal items, use a wire brush to remove loose paint. If paint is thick and very uneven, remove all of it with a chemical stripper. Roughen glossy areas with sandpaper. Dust and clean with turpentine before painting. Remove lighting and other fixtures or carefully cover those you can't remove.

### Cleaning surfaces

Clean all surfaces thoroughly so paint will adhere. Use a vacuum or broom to remove sanding residue, cobwebs and clinging soil. Wash ceilings with a powdered cleaning detergent such as Sol-lax. Then wash walls beginning at the bottom and working toward the ceiling. Use a damp sponge and be careful not

(Please turn to page 160)

# YOU DON'T NEED CASTRO'S PERMISSION TO SMOKE CUBAN-SEED HANDMADE CIGARS!

## HANDMADES FOR THE MAN WHO THOUGHT HE COULDN'T AFFORD THEM!

I'll send them to you from Tampa, the fine cigar capital of the world. Sample the cigars in my new Silver Medallion Sampler and enjoy a wonderful new smoking sensation. I'll include a generous sampling of Honduras handmades plus a nice selection of vintage-leaf, long-filler and cut filler cigars, all perfectly blended for mildness and flavor.

These superb smokes are made with expertly blended Cuban-seed-leaf tobaccos grown and cured the old Cuban way in Honduras from seed smuggled out of Cuba. They're mild, flavorful and extremely satisfying to the cigar smoker who's looking for something new, something better, something exceptionally tasty. Experts can't tell them from Havana. You won't be able to either, when you try them. Natural wrapper. If you're ready for a luxuriously enjoyable smoking experience, try them now.



GIFT IDEA!  
SEND CIGARS  
TO A FRIEND

### MY OFFER TO CIGAR LOVERS

I'll send you postpaid a selection of 42 factory-fresh cigars—a special selection of Honduras handmades, vintage-leaf long-filler and cut filler smokes. If these cigars aren't all you expected, return the unsmoked ones by United Parcel or Parcel Post within 30 days and I'll refund your money. No questions asked. Your delivered cost is only \$10.90 for 42 factory-fresh, Cuban-seed-leaf cigars.

OFFER GOOD IN U.S. ONLY  
CREDIT CARD USERS  
SPEED DELIVERY BY CALLING

To order, fill in and mail coupon to B326

### THOMPSON CIGAR CO.

5401 Hanger Ct., Dept B326, Box 30303, Tampa, FL 33630  
O.K., TOM! Ship me the Silver Medallion Sampler under your money-back guarantee for only \$10.90.

- Check for \$10.90 enclosed (Fla. residents add 5% sales tax)  
 Charge \$10.90 to my  VISA  American Express  
 MasterCard  Diners Club

Credit Card No. (Print all digits)

EXP DATE

name

street

city

state

zip

**TOLL-FREE 1-800-237-2559**  
**IN FLORIDA, CALL 1-800-282-0646**

## SERIOUS TRACTOR.

Start up a new Power King garden tractor and you sense something different. Right away.

**Serious power.** From 12, 14 or 17 hp engines with automotive type components. On a welded steel frame. With up to 300 lbs. more working weight.

**Serious performance.** From 4 or 8-speed all gear drive, or dual-range dual-control hydrostatic drive. With 12", 16" or big 24" rear wheels for up to 18" ground clearance.

**Serious value.** With a refreshingly fair price. And an army

of attachments to mow, blow snow, doze, load, plow, haul, and more.

Seriously, if you want to sail through tough yard and garden chores, Power King's the way to do it.

## FREE MOWER!

Get a free mower deck and hitch (\$650 to \$700 value) when you buy a new Power King tractor! See a participating dealer for details. For a color brochure and name of your nearest dealer, send a dollar to Power King,

2021-PM-2, MacArthur Road,  
Waukesha, WI  
53186.

270-101



**POWER KING**

# OUT THEY GO!

# SAVIN PLAIN PAPER COPIERS

## AT FAR BELOW ORIGINAL PRICE OF NEW MODELS

### PUBLIC NOTICE!

These are previously leased units that have been thoroughly refurbished by Savin technicians or Savin dealers! Now we are authorized to offer these units at a drastically reduced price!

Delivery and installation by your local Savin branch/dealer.

Refurbished models.

Warranted by Savin!



SAVIN Model 770

**A top name brand!**  
**Now priced so LOW, you can consider getting one for family and business use at home . . . in addition to ordering enough units for your company offices!**

Every busy company can use extra copiers to avoid time-consuming "bottlenecks" at the current copier . . . thereby increasing employee productivity. But the high price of brand new models can quickly make you forget about your need for extra copiers.

Here's an easy solution. Now you can enjoy the efficiency and reliability of genuine SAVIN copiers at an extremely low liquidation price! For small offices, large corporations, or family and business use at home, this offer is just too good to pass up!

These copiers are previously leased units that have been thoroughly refurbished by Savin! Delivery will be made by a Savin factory branch or authorized dealer. (Over 600 locations nationwide.) The units are covered by Savin's limited 30 day warranty. And Savin has agreed to offer you several service plans . . . including the one they use for brand new models!

- **DUAL CASSETTES!** Each holds 250 sheets. Upper one for 8½" x 5½" or 8½" x 11". Lower one for 8½" x 14" or 10" x 14".
- **FAST WARMUP!** First copy within 5 seconds. Copy speed of 20 per minute.
- **SAVES ENERGY!** Automatic shutoff after 60 sec. non-use.
- **HIGH PRODUCTIVITY!** For up to 10,000 copies per month.
- **PATENTED TONER TECHNOLOGY!** For excellent quality reproduction on plain paper. You get dry, sharp copies.
- **HIGHLY DEPENDABLE!** Few moving parts plus simplified electronics provide greater reliability; less maintenance.
- **SO VERSATILE!** Unlike many small copiers, this Savin unit copies on both sides of the paper. Makes transparencies. Prints on colored paper. Copies mailing labels.

#### SPECIFICATIONS

Size: 29"W x 21"D x 14"H. Weight, 173 lbs. Power: 115V, 13 amps. Original size: up to 10" x 14". Copy size: 8½" x 5½" minimum; 10" x 14" maximum. Dial for 1 to 20 copies plus continuous. Automatic reset to zero saves on wasted paper. Toner density electronically controlled. Semi-automatic exposure control for light and dark. Magnification of 1 to 1.

Savin's Original Suggested Retail  
**\$5495.00**

OUT THEY GO AT ONLY:

**\$ 698**

Item H-279-62784-01

**PLUS DELIVERY . . . . . \$50.00**  
**PLUS STARTUP KIT: Must be ordered with copier. Includes operational setup, 2 cartridge-load toner pacs, 500 sheets letter-size and 250 sheets legal-size paper. (A \$75.00 value) . . . \$50.00**

Price subject to change after 60 days. Offer good in all 50 states, Puerto Rico, Canada.

### SUPER PAINT JOB

(Continued from page 159)



With a vacuum or broom, go over all ceilings and walls to remove sanded debris, cobwebs and any clinging grime.



Before painting, wash ceilings and walls with a powdered detergent, preferably one containing trisodium phosphate.



Check ceilings for water stains. Seal the stains with shellac or pigmented shellac so they don't bleed through the paint.

to soak the wall. Wash woodwork too. Seal water stains with a pigmented shellac such as Enamelac.

Surfaces previously painted don't usually need a prime coat, but patches and new work should have a prime coat to ensure a good bond. Follow the recommendations for a primer on the paint can or patching compound can. In some cases, the prime coat will simply be an initial coat of paint. As you paint, keep a small tube of caulking at hand for any cracks you discover.

PM

Credit card members can order by phone, 24 hours a day, 7 days a week.



Toll-Free: 1-800-328-0609



Your check is welcome! No delays on orders paid by check.

**C.O.M.B. CO.**

Authorized Liquidator

14615 28TH AVENUE NORTH  
 MINNEAPOLIS, MINNESOTA 55441-3357

C.O.M.B. CO.® Item H-279-62784-01  
 14615 28th Ave. N. / Minneapolis, MN 55441-3357

Send \_\_\_\_ Savin Copier(s) at \$698 each, plus \$50 each for delivery and \$50 each for Startup Kit. (Minnesota residents add 6% sales tax. Allow 3-4 weeks for delivery. Sorry, no C.O.D.)

My check or money order is enclosed. (No delays in processing orders paid by check, thanks to TeleCheck.)

Charge:  MasterCard®  VISA  Am. Ex.  Diners Club  
 Acct. No. \_\_\_\_\_ Exp. \_\_\_\_\_

PLEASE PRINT CLEARLY

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

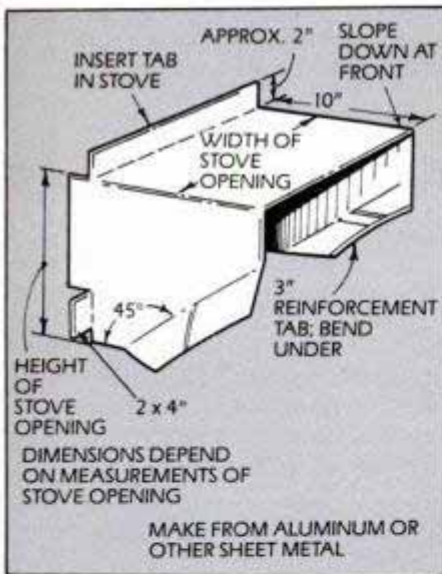
Sign here \_\_\_\_\_

# HINTS FROM READERS

## Hood reduces ash dust



A sheet-metal hood over the stove opening channels ash dust to the ash receptacle.



Removing ashes from a wood stove is a dusty job. You can reduce the amount of dust that gets on furniture and carpets by opening both the pipe damper and the front draft control before opening the door. A simple sheet-metal hood cut with metal shears also can channel dust into the ash receptacle. Make a pattern out of kraft paper to fit the height and width of your stove. Then scribe the pattern outline onto the sheet metal, cut it out and bend to shape.—*Ralph S. Wilkes*

# Warm and Gracious...Emperor's Westminster Chiming Wall Clock



Do-It-Yourself Kit **\$199.<sup>50</sup>**

**Factory Direct Sale Price**  
Regular Factory Direct Price **\$299.50**

**Completely Assembled and Finished**  
**\$249.<sup>50</sup> Factory Direct Sale Price**  
Regular Factory Direct Price **\$399.50**

Beautiful in its well-proportioned simplicity, this wall clock of solid 3/4" Pennsylvania cherry has all the features you admire in a grandfather clock. There's the traditional bonnet crown, arched-cove molding, deeply sculptured dial face door and side panels, and the brass Tempus Fugit dial face. Like our grandfather clock, its West German movement with solid brass weight shells plays the famous Westminster chimes each quarter-hour and sounds the hour with a Big Ben tone. Kit parts are pre-cut, including miters, mortises and tenons, and sanded smooth. Easy-to-follow instructions and hardware are provided, but due to possible breakage in shipment glass is not included. Each piece may be reordered separately.

**ORDER TODAY! SALE ENDS MAY 31, 1985**

Emperor Clock Company, Dept. 119  
Emperor Industrial Park, Fairhope, Alabama 36532

Credit Card Telephone Orders  
Welcome. Call 1-205-928-2316

QTY	DESCRIPTION	WT	REG. PRICE	SALE	EXT.
	Westminster Chiming Wall Clock: Do-It-Yourself Kit	49	\$299.50	<b>\$199.50</b>	
	Completely Assembled	49	\$399.50	<b>\$249.50</b>	

MasterCard  VISA  Diners Club  
Card No. \_\_\_\_\_ TOTAL \$ \_\_\_\_\_  
Expiration Date \_\_\_\_\_ Alabama residents,  
add 4% sales tax.  
We accept personal checks. CA, GA, NC, TN, WI residents,  
add applicable sales tax \$ \_\_\_\_\_  
Enclosed \$ \_\_\_\_\_  Check



**EMPEROR**  
**CLOCK COMPANY**

WORLD'S LARGEST MANUFACTURER  
OF GRANDFATHER CLOCKS

©1985 Emperor Clock Company All Rights Reserved

Name \_\_\_\_\_ GRAND TOTAL \$ \_\_\_\_\_  
Street \_\_\_\_\_  Please send  
FREE color catalog  
City, State, Zip \_\_\_\_\_ Telephone \_\_\_\_\_  
(Please Print)

# THE 5 MOST IMPORTANT WOODWORKING OPERATIONS... IN ONE COMPACT MACHINE

- 1 • 34" LATHE
- 2 • 10" TABLE SAW
- 3 • 11 3/4" DISC SANDER
- 4 • 16 1/2" VERTICAL DRILL PRESS
- 5 • HORIZONTAL DRILL PRESS

Presenting The New  
**CENTURY 21 WOODMASTER**



These special accessories  
also fit similar machines

ONE PLACE FOR ALL YOUR NEEDS.

**MAIL NOW!!!**

VISA  MASTERCARD  MONEY ORDER

YOUR NAME \_\_\_\_\_ PRINT  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_  
PHONE ( ) \_\_\_\_\_ BEST TIME TO CALL \_\_\_\_\_

PLANT  
**MASTER WOODCRAFT CO.**  
(A Republic-Lagun Group)  
800 SPRUCE LAKE DRIVE • P.O. BOX 669  
HARBOR CITY (Los Angeles), CA 90710

Toll Free (1-800) 421-2467  
in California (213) 549-0761

Dealership Available

## FIRSTHAND REPORT



Two body styles of the Spectrum are: the four-door sedan (left) and three-door hatchback (available mid-year).

# DRIVING THE Chevy Spectrum

Built by Isuzu and sold by GM, this is the low end of the price and performance spectrum.

BY DANIEL CHARLES ROSS, Detroit Editor

**D**etroit carmakers, and General Motors in particular, have groused long and loudly over the so-called "\$2,000 advantage" Japanese carmakers have. It's said that, because of the difference in labor costs, Japan can build a small car for \$1,500 to \$2,000 less than the United States. This information is interesting because the 1985 Chevrolet Spectrum appears to be a Chevette recreated by Isuzu with front-wheel-drive.

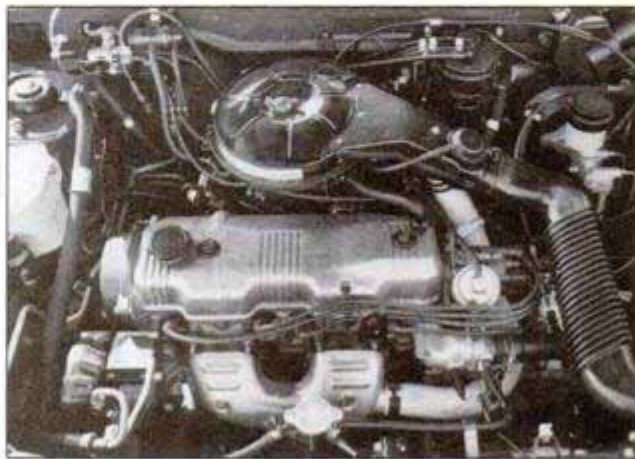
In outward appearance, the Isuzu-built Spectrum three-door hatchback has styling cues reminiscent of the Honda Accord as well as the Chevette. In terms of layout, the Spectrum sits on a 94.5-in. wheelbase, 0.2 in. longer than the Chevette, but overall the car is shorter, narrower and lighter by 236 pounds. But the Spectrum's front-seat legroom of 41.7 in. is identical to the Chevette. The Spectrum's 1.5-liter Four gets the best EPA fuel economy of a respectable lot. Its 38 city/43 highway EPA estimate for five-speed manual cars bests not only the Chevette, but the gas-engined Ford Escort, Nissan Sen-

tra, Mazda GLC, Toyota Tercel, Honda Civic 1500CX and Dodge Omni, according to GM. A five-speed transaxle with overdrive FOURTH and FIFTH helps to achieve these figures.

Chevy sources indicate a diesel engine, achieving 55 city and 72 highway mpg, may be introduced if the Voluntary Restraint Agreement (VRA) limiting the importation of Japanese cars is lifted or amended upward. Only 29,500 Spectrums can be imported through May under current plans, and these will be distributed by Chevy dealers in 16 East Coast states. Though the model lineup includes the three-door hatchback we drove, as well as a four-door sedan, the sedan will debut first, to be followed by the hatchback at or about mid-year.

### On the road

In normal road operation, we found the Spectrum as capable as the Chevette and other cars in its class. Acceleration is brisk, if not exciting. Braking is fine, with good pedal pressure and feel to the power front disc/rear drum brakes. Handling is average, meaning that it's fairly soft and compromising, as



Overhead-cam 1.5-liter Four with a tiny air cleaner produces 70 hp at 5,400 rpm and 87 lb.-ft. of torque at 3,400 rpm.





## GREAT SAUSAGE RECIPES

227 page illustrated book explains sausage making plus home curing and smoking of meat, fowl and fish. Over 100 recipes. We now have Low Salt Seasonings. Free equipment and supply catalog has more information.

### The SAUSAGEMAKER

177-6 Military Road Buffalo, N.Y. 14207

## At Last a New Amazingly Simple GAS TURBINE JET ENGINE

Build from easy to follow plans. Length 15", Dia. 8 1/2", Wt. 15 lbs. Fuel: Gasoline or Kero. "Screaming Demon" develops 20 H.P. Ideal project for serious-minded hobbyists, students; scientific and industrial arts classes. Make on 9" metal cutting lathe with milling attachment. For use on small racing boats, midget cars, etc. Full size assembly drawings with critical dimensions, bill of materials and photos. Price \$6.00. No. C.O.D. 1510 268 St. P.O. Box 1398

SAVOY SCIENTIFIC SANTA MONICA, CALIF. 90408



## PRODUCE

### BRASS & COPPER SIGNS

- ANYONE CAN BE A CRAFTSMAN
- REAL METAL • LOW COST • GREAT PROFITS
- NO SPECIAL TOOLS OR EXPERIENCE NEEDED
- A UNIQUE AND BEAUTIFUL PRODUCT
- LOW COST START UP KITS AVAILABLE

Signet, 50 High St., Suite LL7F, Buffalo, N.Y., 14203

### Portable Steam Cleaner

Steam in 60 seconds

**CLEAN:** Engines, Air Filters, Lawn Mowers. 3-yr. guarantee on fire box, coils. Uses liquid soap, propane fired. Wt. 120 lbs. Auxil. pump required on low water pressure.

WEDCO MFG. INC., Dept. M-15  
P.O. Box D, 940 West Broadway,  
Jackson, Wyoming 83001



## BASEMENT TOILET

FLUSHES UP To Sewer or Sump Tank

No Digging Up Floors—Installs Easy, Anywhere!

Write McPherson, Inc., Dept. 16

Box 15133 Tampa, Florida 33684



## EARN \$\$\$\$ REPAIRING CAMERAS!

Learn in your spare time. No experience needed. Home-study course includes SLR camera, tools, electronic shutter tester kit, easy-to-follow instructions. Send for free facts. No obligation.

NAME \_\_\_\_\_ AGE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY-STATE-ZIP \_\_\_\_\_ PHONE \_\_\_\_\_

National Camera, Inc. Dept. P14 Since 1952  
1550 South Pearl St. Denver, Colorado 80210

## Pay For Your Hobby!

With White's NEW Series 3 Metal Detectors



Sensitive detectors locate the rare and valuable for fun and profit. \$99.95 & up!

Call Toll Free: 1-800-547-6911

WHITE'S ELECTRONICS  
Dept. PA-5 Sweet Home, OR 97386

## Wood-Mizer

Bandsaw Mill

Turn Logs Into Lumber — And Cash  
Portable • Precise

Accurately cuts a log  
30" dia. X 16' long

"We manufacture quality sawmills so you can cut quality lumber. That's why we sell more portable bandsaw mills than anyone else in the world."



For more information send \$1.00 to: WOOD-MIZER, Dept. D13  
1980 W. 10th Street  
Indianapolis, IN 46224  
Or Call: (317) 271-1543

# Get in on the profits in a MONEY MAKING BUSINESS OF YOUR OWN!

NO Obligation—  
NO Salesman Calls!

Start your own money making business!



Do it TODAY!



You too can own your own highly profitable money-making business. It's easier than you think. We have guided thousands of men into their own successful carpet cleaning, wall washing and upholstery cleaning businesses. Most started in their spare time,—many went full time when profits exceeded their full time jobs. No experience necessary. Everything you need to build your own growing lifetime business is included. You'll be pleasantly surprised how easy it is to **BE YOUR OWN BOSS**. Just mail this coupon for your **FREE FACT KIT**. No obligation . . . No salesman will call.

### RUSH COUPON TODAY

Since 1935  
Von Schrader Company, Dept. 1025  
1600 Junction Ave., Racine, WI 53403  
Please send me your FREE FACT KIT showing how easy it is to own my own Von Schrader business. No obligation. No salesman will call.

Print Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

## CHEVY SPECTRUM

(Continued from page 163)

liter, three-cylinder engine of 48 hp that seemed to pull a lot stronger on acceleration and handle much better than the Spectrum.

On a test track, the Spectrum's performance was rubbery. The steering wheel and shifter are vague in operation and the 1,875-pound car's wooly handling gave neither confidence nor comfort. In contrast, the Suzuki/Chevy Sprint is a barrel of fun on the track. You can chirp the tires in second gear, throw the car into turns and always feel that it is under control. The Spectrum, on the other hand, always felt like it was going to get away. No one should drive this way on the road, of course, but faced with an emergency evasive maneuver, we'd rather try it in the Sprint than the Spectrum.

While the Sprint represents a new car, Spectrum merely redefines—albeit adequately—the capable Chevette at presumably less cost to build. Any manufacturing savings from this version, however, will apparently not be passed along to the buyer.

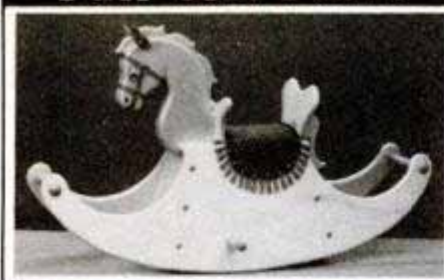
At this writing, Chevrolet hasn't pegged the selling price of the Spectrum, but we understand that the target is around \$6,300. This compares poorly to the '84 Chevette price of \$4,990 and the '85 Sprint at \$5,151.

In all, the Spectrum is a decent car for what will probably be a decent price. We can't help but wonder, though, if America really *needs* another Chevette, even if it does have front-wheel drive and a transverse engine. **PM**

### THE PM REPORT CARD

CHEVY SPECTRUM	GRADE	COMMENTS
Acceleration	C	Average for its class.
Handling	C	Decent city car; easy parker.
Braking	B	Good pedal pressure.
Steering	B	Responsive, not over-boosted.
Transmission	B	Clean shifts, good feel.
Ride	B-	Slightly choppy.
Fuel economy	A+	EPA 38 mpg city.
Seating	B+	Snug, but good legroom.
Vision	A	Good view all around.
Gauges controls	C+	Average layout with good readability; needs tach.
Ventilation	B+	Four vents, good flow.
Noise @ 55 mph	B	Engine loud when pressed.
Cargo capacity	A-	Lots of it, but split-seats don't fold flat.
Engine serviceability	B	Tight fit, but everything's reachable.
Fit and finish	A	Japan's usual high standard.

## Full Size Plans



Two great toys to make for your youngster or to sell at craft shows. Easy to build from pine using our full-size plans. Just trace, cut and assemble. Unique, delightful gifts.

The New England Rocker is 26" x 44". The parts kit contains foam, vinyl, rings, eyes, buttons & tacks. Wood, fabric & fringe are not included in kit.

Plan-338—\$9.00 Plan & Parts Kit—\$15.00

The Name Train spells out child's name in 3" tall letters. Complete full-size alphabet is included. Makes a personalized gift.

Name Train Plan-323—\$3.50 Catalog—\$1.00

N.Y. Residents please add sales tax to order

ARMOR PRODUCTS (516) 462-6228  
Dept. C, Box 445, E. Northport, NY 11731

# POSTURE SUPPORT THE BACK CHAIR

NOW ON  
SALE

FROM  
**\$29.95**

The ORIGINAL Genuine Oak Chair



Standard Version,  
SALE PRICE: \$29.95!



New 3-Position  
Adjustable On  
Wheels: \$49.95!

The First "Intelligent" Chair, FORMERLY \$89.95! Now on sale from \$29.95. REDUCE THE EFFECT OF GRAVITY ON YOUR BACK.

Sitting regularly in a conventional chair your lower back is supporting the TOTAL WEIGHT of your body, plus additional weight due to the downward effect of gravity. Unfortunately most chairs are designed for appearance, not for comfort.

**THE BACK CHAIR SOLUTION**—Sitting on the Back Chair relieves your back from supporting the total weight of your body by distributing your weight between your lower back and legs. Your legs support you when standing, your lower back supports you when sitting. Combine them both in a comfortable sitting posture and you relieve the unnecessary stress on your back. When sitting on the Back Chair you'll feel more relaxed and sit up perfectly straight.

Standard Chair made of hardwood layers with final layer of Genuine Oak. Adjustable Chair made from solid hardwood with Oak Finish. Both come with padded seat and knee pads upholstered in Chocolate Brown.

SHOP FASTER BY PHONE  
**1-805-966-7187**

Or send a check or your credit card # (Diner's Club, VISA, MasterCard, American Express) for THE BACK CHAIR (Standard Model, \$29.95 ea.; Adjustable Model, \$49.95 ea.—please indicate below) plus \$9.95 shipping (Canadian orders, \$13.00 shipping). CA residents add 6% sales tax. Sorry no C.O.D. If not satisfied return within 15 days for refund (less shipping).

ITEM NO.	QUAN.	ITEM	PRICE EA.	SHIPPING	TOTAL
825		Stan. BACK CHAIR	\$29.95		
808		Adj. BACK CHAIR	\$49.95		

**STARSHINE GROUP**

816 B State Street, Dept. BC224, Santa Barbara, CA 93101  
America's Premium Direct Mail House Now In Our 8th Year

## BUILD YOUR OWN ROCKET MOTORS!

- \* 40 POUNDS THRUST!
- \* FIFTY CENTS EACH!
- \* BUILD A DOZEN IN AN EVENING!

Write for our catalog and we'll send you a WORKING SAMPLE of an electric igniter that YOU CAN MAKE YOURSELF from materials you'll find around the house.

Send \$2.00 to:  
Dept. PM2, THE TELEFLITE CORPORATION,  
11620 Kitching St., Sunnyvale, Calif. 92388

# I CLEARED \$3,800 ON JUST ONE JOB IN LESS THAN A WEEK

—NO—  
FRANCHISE  
FEES AND  
—NO—  
EQUIPMENT  
TO BUY

Make Big Money Fast  
Applying Insulating  
Paints — Unlimited  
Customers For Your  
Services.

### OPPORTUNITY IS KNOCKING

Now you have the opportunity to make up to \$3,800 per week applying ENERGYWAVE's new line of insulating paints and coatings. These space age paints come in a variety of colors and are applied just like any other paint with brush, roller, or spray. ENERGYWAVE paints were tested and certified by a laboratory accredited by the United States Bureau of Standards and Department of Commerce. These tests proved energy savings up to 40%. Articles about this most important discovery have appeared in *Industry Week*, *Mother Earth News*, *Journal of Commerce*, *Workbench*, *Energy Management*, *Construction Specifier*, many newspapers and even on CBS TV Newscape. The list of customers that have had these new insulating paints applied to their buildings is equally prestigious: Ford Motor Co., NASA, the U.S. Dept. of Interior, U.S. military bases, Coca Cola, Ashland Oil, Exxon, Ramada Inns, Holiday Inn, and many other giants.

### THE NEED IS NOW MORE THAN EVER

While the latest government statistics show both inflation and unemployment down, these same statistics show energy costs continue to steadily rise.

Imagine the incredible need for paint that protects, is more attractive and is longer lasting than other paints, and at the same time will reduce energy consumption up to 40%. Every building in the United States would save energy and save money — a lot of money by having ENERGYWAVE Insulating paint applied to walls, ceilings, and roofs. Homes, schools, hotels and motels, commercial buildings, mobile homes, metal buildings... every building in your community wants and needs to save energy.

### GET IN ON THE GROUND FLOOR WHILE IT'S AVAILABLE

This is a genuine ground floor opportunity! Nothing of this magnitude has ever been available to you until now. You can make more money than you have ever made and at the same time have the satisfaction, freedom, and security of owning your own business.

Today ENERGYWAVE Corporation is forming a nationwide network of insulating paint and coating applicators. People like you who want their own business, but with the prestige and profitability of a well-publicized and recognized name. People who want to provide a valuable service to their community while making a lucrative income for themselves and their families.

### WHEN OPPORTUNITY KNOCKS

ACT! Fill out the coupon or call now. You will not have to invest thousands of dollars. We have no equipment for sale. Our complete step-by-step training program is explicit and easy. Anyone that can paint, can apply ENERGYWAVE insulating

STEVE ZIEBARTH  
DID IT — AND NOW  
YOU CAN TOO!



paint and the training is free. You can start part time or full time. However, it is vitally important that you start NOW while opportunity is knocking.

Our success is totally dependent on your success. But act now, do not delay. Once our nationwide network of applicators is established, this ground floor opportunity will no longer be available.



ENERGYWAVE CORPORATION  
954 S. Highway 41 Dept. PM  
INVERNESS, FLORIDA 32650

ENERGYWAVE I understand there is absolutely no obligation and no salesman will call.

YES! PLEASE RUSH TO ME THE FREE  
ENERGYWAVE INFORMATION PACKAGE.

Name \_\_\_\_\_

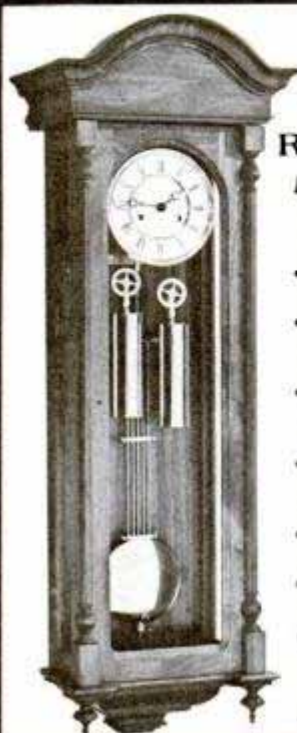
Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Send for free facts — Do it today. Your risk is nothing. Just fill in coupon (or send postcard with name and address).

For fast service call toll free 1-800-824-1397 (Florida Residents call 904-726-9568).

# Clockmaking ... at its Best!



## Solid Walnut Vienna Regulator

Do-It-Yourself and SAVE OVER 50%

- Retail Value Over \$800.00
- It's Simple—All Parts Are Pre-Cut
- Solid Brass West German Movement
- Deep-Tone, 1/2 Hour Gong Strike
- Enameled, Brass-Rimmed Dial
- Kit Even Includes Pre-Cut Glass

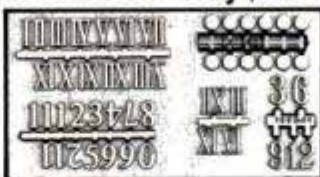
COMPLETE KIT Only \$379.00

44"H x 13-1/2"W x 7"D

## Numerals to Make 30 Clocks

Gold finished numeral set—Only \$9.95

SAVE 60%



A REAL PROFIT MAKER! Precision molded with brilliant gold finish. Permanent self-adhesive backs. #43700 Numeral Set (Purch. Sep. \$23) Only \$9.95

## Quartz Movement "Six Pack"



Reg. \$5.95 ea.

SAVE \$12.00!

LOWEST PRICES EVER! Special savings on our versatile "Ultra-Thin" (only 5/8" thick) movement. Includes minute and hour hands.

Order by the "Six Pack"—Only \$23.70  
#90201 for dials to 1/4" thk. #90202 for dials to 5/8" thk.

## Incredible Value!

Complete Pre-Cut Kit—ONLY \$15.90



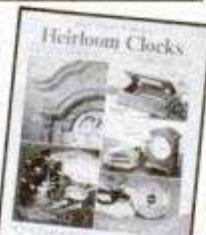
Richly grained, 1" solid hardwood octagon surrounds floral accented ivory dial. Includes ultra-accurate quartz movement and convex glass. A superb gift!

#1767 W47 Octagon Clock Only \$15.90

## FREE!

### NEW! 32-Page Clock Kit Catalog

HUGE SELECTION! Clock kits from \$15 to \$1400. Over 80 quartz movements and a vast variety of dials and clock hardware. Music box and barometer kits too!



### Qty. Satisfaction Guaranteed!

- [ ] 1340 W42 Vienna Kit ..... \$379.00  
(Shipping and Handling — add \$14.00)
- [ ] 1767 W47 Octagon Kit ..... \$15.90  
(Shipping and Handling — add \$1.50)
- [ ] 90201 Quartz Six Pack ..... \$23.70  
(Shipping and Handling — add \$1.50)
- [ ] 90202 Quartz Six Pack ..... \$23.70  
(Shipping and Handling — add \$1.50)
- [ ] 43700 Numeral Assortment ..... \$9.95  
(Shipping and Handling — add \$1.50)

Illinois residents, please add 6.25% tax.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

CHECK ENCL.     VISA     MASTERCARD

Charge Card No. \_\_\_\_\_ Expiration \_\_\_\_\_

# Craft Products Co.

Serving America's Craftsman Since 1940  
Dept. PM5F, 2200 Dean Street, St. Charles, IL 60174

Write or Call (312) 584-9600



## BUILD YOUR OWN BOAT



### SAVE 50% OR MORE!

HUNDREDS of designs, power & sail, 8' to 55'. Build in WOOD, STEEL, FIBERGLASS. GLEN-L frame kits, plans, & full size patterns are especially for amateurs. Easy, proven methods with instructions assure PROFESSIONAL RESULTS!

### HUGE 152-pg CATALOG SHOWS HOW

Order \$3 catalog now & also receive FREE "BOATBUILDING SUPPLIES" catalog. OR SEND FOR FREE "DESIGN SAMPLER".

GLEN-L MARINE DESIGNS (Phone 213: 630-6258)  
9152 Rosecrans, Box 756T, Belflower, CA 90706

### GLEN-L MARINE DESIGNS

9152 Rosecrans, Box 756T, Belflower, CA 90706

- GLEN-L catalog in \$3.00 (sent SLOWER 4th CLASS), OR
- GLEN-L catalog in \$4.00 (sent FASTER AIR MAIL), OR
- FREE "DESIGN SAMPLER"
- "EPOXY TECHNICAL MANUAL" ..... \$ 2.00
- "FIBERGLASS BOATBUILDING—AMATEURS" ..... \$22.95
- "BOATBUILDING WITH PLYWOOD" ..... \$15.95
- "INBOARD MOTOR INSTALLATIONS" ..... \$14.95
- "HOW TO FIBERGLASS BOATS" ..... \$ 8.50
- "RIGGING SMALL SAILBOATS" ..... \$ 6.50
- "HOW TO BUILD BOAT TRAILERS" ..... \$ 6.50

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

## HOW TO FIND GOLD NUGGETS ELECTRONICALLY



Finding gold nuggets or coins is now made easy with a new patented gold finding detector. Before with other detectors it was virtually impossible because of interference from black sand. This new detector is unaffected by black sand and can detect pinhead size gold nuggets at great range. Its maximum range is 17 feet. It is very lightweight and has perfect balance. One of our customers who had tried five other makes and couldn't find a single nugget now reports finding up to six nuggets in one hour with his Gardiner detector. Recently a 400 ounce gold nugget was found with a detector. Free catalog.

### GARDINER ELECTRONICS

Dept. 31 • 4729 N. 7th Ave. • Phoenix, AZ 85013

## You can own this

automatic shift ATV

### HEALD SUPER BRONC 3

shown with optional accessories



for only \$949.95!

when you build it yourself from a KIT By HEALD. Also available assembled through dealers.

For FREE brochure with complete details, contact:  
**Carl Heald, Inc.** Dept. N6D, P.O. Box 1148  
Benton Harbor, MI 49022-1148  
1-800/253-1030 (in Michigan 616-849-3400)

## 2nd MOST IMPORTANT TOOL FOR EVERY WOODWORKING SHOP

### VERSATILE W&H MOLDER-PLANNER

Almost as basic as your saw ... molds, planes, rabbets.



From \$470

- Master Charge
- VISA

FREE BROCHURE

**WILLIAMS & HUSSEY MACHINE CO.**  
Dept. 17, Milford, N. H. 03055  
(603) 673-3446

## 1983 & 1984 Popular Mechanics Indexes Now Available

- 12-page easy to use reference.
- Arranged by editorial departments.
- Short description of article, month, page number and length provides a quick way to locate subject.
- Convenient size allows you to keep index with your year's set of issues.
- \$2.95 each.

1971, 1973 and 1975-1982 indexes also available—Price for each index—\$2.95. Order index by year. Send check or money order to:

**Popular Mechanics**

P.O. Box 1014  
Radio City Station  
New York, NY 10101

## Popular Mechanics PLANS



**Barn/Garden Shed** Our well-designed yard building provides handsome storage for yard tools, hand tools, power equipment, gardening supplies and a gardening center for the whole family. It also has an upstairs loft! Dim.: 12 x 16 ft. Plans, instruction manual & material list. (1 plan: PL-1278—\$10.50) (2 plans: PL-1278A—\$17.50)

Send your name and address with check or money order payable to **POPULAR MECHANICS**. Mail to: Popular Mechanics, Box 1014 Radio City Station, New York, N.Y. 10101



**MICRO COMPUTERS**  
Olivetti, OISC. Manuf. built in the Far East. See how U.S. cards. New from profit opportunity. Samples include printer software from \$22.

**DOLLS**  
Buffed dolls, porcelain dolls, plastic dolls, new made to order dolls. 1983's designs.

**LOCK BLADE KNIFE**  
Handful other models below wholesale.

**FIELD GLASSES**  
Clear and powerful. 100x. Beautifully balanced. \$3.55

**DIAMONDS AND GEMSTONES**  
Low. Low prices from Europe.

**B.L. MELLINGER, Famous World Trader, Internationally-known Mail Order Expert, President, Mellinger Co.** "I started only a few years ago, part time, in my garage with less than \$100. Today my business empire spans the globe. I will help you succeed using my personal experience. Mail coupon for **FREE REPORT!**"

**START WITH 24,221 PRODUCTS!**

Many you can buy one at a time or order in quantity. Example: one 35 mm camera with hot shoe and carry case \$13.00 ppd or 12 for \$74.11 ppd. Price drops to only \$5.80 in larger quantities. New government ruling makes thousands of imports free of any duty whatsoever. You deal direct my International Traders way. Cut out greedy U.S. specialty merchandise middlemen. Really deal direct.

**EXERCISE MACHINE**  
Buy below wholesale to cash in now on today's booming health care market. I.T. membership gives you confidential source.

**COMPUTER DOOR LOCK**  
No keys. Can't be picked. For homes, offices. Millions sales possible.

**35 mm CAMERA**  
with hot shoe and carrying case. \$5.80

**1000's more dazzling products you can buy DIRECT!**

Confidential information on these products is currently given to I.T. members. Monthly reports change product offers to give you latest money making discoveries.

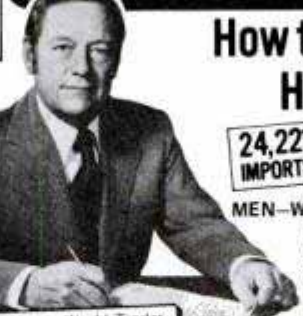
**PERSONAL GUIDANCE!**  
I believe in giving you my personal help! Regularly I meet I.T. members at regional closed door Seminars across the country. You will be invited to these meetings.

**THE MELLINGER CO., 6100 Variel Ave., Dept. T2252**  
Woodland Hills, CA. 91367-3779

# SAMPLE IMPORT FREE!

...and I'll tell you exactly how to turn it into big money!

CLIP COUPON, MAIL TODAY PUT AD IN WALLET AS REMINDER OF BIG PROFITS AHEAD!



## How to start your own big profit HOME IMPORT BUSINESS

MY PLAN STARTS YOU FAST... Shows you how to **Buy Below Wholesale**

24,221 IMPORTS

MEN—WOMEN... Turn Spare Hours or Full Time into INCOME!

**DISCOVER PROFITS OF IMPORT!** My Home Mail Order Import Business Plan guides your every step... it is based totally on my personal success. Shows how to deal direct and cut out costly middlemen... so you keep all the profits! I do the "hard work" for you... by traveling the world to find dazzling "first time offered" new imports. The actual sample I will send you Free is typical of my import discoveries. You can pick and choose from more than 24,000 products. Deal in one product or 1000's. Buy below wholesale.

**YOU CAN START IMMEDIATELY.** I arrange free membership in exclusive International Traders organization... instantly puts you in direct contact with suppliers abroad. I show how to operate anywhere. Age no barrier. Ideal for spare time husband/wife or retirement business. My report, "How to Import and Export" tells how to do it. No obligation. No salesman will call. Certificate brings your free gift sample import and everything else.

**FREE CATALOGS!**  
Now! Quick Double Profits  
As a Member of International Traders you also get free catalog of specialty merchandise to order at rock-bottom prices from big U.S. Warehouse.  
Products subject availability, price fluctuation.

**BENCH DRILLS**  
Power! In all types. Buy top quality below wholesale. Make big profits.

**RECONDITIONED CARS AND TRUCKS**  
Toyota, Nissan, Isuzu, Mitsubishi. Reconditioned to perform like new. Make great profits shipping to Africa, India, Caribbean Islands, England etc.

**WAX COATS**  
Many styles. Below wholesale.

**SUNGLASSES**  
Hundreds high-fashion styles. Set for big markup.

**GRAND-FATHER CLOCKS**  
Old world workmanship from Italy & Germany.

**Exciting lingerie in new wet and stretchy fabric and black leather!** From Midnight Lady, England. Buy below wholesale.

**SEXY PUNK BEANS**

**MICRO LIGHT AIRCRAFT**  
EASY TO FLY!  
2 and control. 50 mph or less than 1% gas. Made in U.S. Shows diversity of import opportunities.

**CORDLESS DRILL**  
Superior quality below wholesale.

**ONLY \$8.60**  
GENUINE JADE NECKLACE

**NET CARRIERS COLLAPSIBLE**  
6 size for cash. Up to 150 lb. load. Easy clean polyvinyl. Cash in hot offering to pet shops & markets.

### This Certificate Good for ONE SAMPLE IMPORT - FREE

B. L. Mellinger/The Mellinger Co.  
6100 Variel Ave., Dept. T2252  
Woodland Hills, CA 91367-3779

Send **FREE REPORT**, "How to Import and Export"... also actual Free Sample Import. Everything you send me is mine to keep without obligation. Show me how I can start a profitable home business of my own.

Name \_\_\_\_\_ Age \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

**IMPORTANT!**  
Your initials must appear below to qualify for Free Sample Import. Because of high cost and limited supply, I hereby agree to limit my request to one, and one ONLY. Free Sample Import. I have not previously requested this Free sample. I am over 18 years of age.  
Initial here \_\_\_\_\_

# THE HEAVYWEIGHT

BUILT FOR THE PROFESSIONAL / PRICED FROM \$239

The Heavyweight is entirely American-made with top-quality materials and construction. It's priced for the hobbyist, but tough enough for the professional wood worker. A 1/2HP motor with four-step pulley provides power to spare for turning, sanding, grinding, buffing and... drilling. Accessories include a... complete tool turning set and a face plate and sanding disk for outboard turning.

**12" Wood Lathe**  
Ground steel ways.  
100% American-made.  
Cast iron head & tail stocks.  
52" long; 38" between centers.  
Sealed ball bearing head stock.

Free brochure on request.

**WILLIAMS & HUSSEY MACHINE CO.**  
Dept. 51, Milford, NH 03055  
Toll-free: 1-800-258-1380 In NH: 1-673-3446

## DISH ANTENNA DOWNCONVERTER RECEIVER

**\$397**

NEW Multichannel MDS complete receiving system ready for TV hookup.

**\$250 DOWN!** LOW PAYMENTS

The featuring of any systems in this ad is for the sole purpose of highlighting and illustrating the latest technology in our best selling BOOK. We present the Multichannel MDS system and describe TVRO compatible services.



## Satellite TV 4 FT. PKG.

This total package will receive TV signals directly from the satellites. It is ready for TV hookup with all TV cables included. "WE HAVE IT ALL" — OVER 100 CHANNELS LNA's • ANTENNAS • RECEIVERS • SOURCES

Satellite TV Inc.

P.O. Box 3108, Dept. M-2, Delray Beach, FL 33447. Send for REFERENCE BOOK, \$11.95 plus \$2.95 shipping & insurance (U.S. funds) or call our 24-hour C.O.D. Order Line (305) 276-2941.

### BUILD YOUR OWN JET HELICOPTER

EASY TO FLY—INEXPENSIVE TO BUILD!



- Carries one person-plus
- Simple hand-tool assembly
- Uses low-cost fuel

PLANS—completely illustrated: \$9.00

HELICOPTER EXPERIMENTER'S HANDBOOK

Filled with data, designs, methods and suppliers for the rotary-wing hobbyist (illus.). Only \$9.00

BOTH ABOVE BOOKS: only \$15.00

P.O. Box 16488

Baltimore, MD 21217

HELICRAFT

## QUALITY CLOTH SANDING BELTS

HOME—WORK—HOBBIES



	Per Doz.	Per Doz.	
1 - 42 Mead, etc.	\$ 7.95	3 - 27 Porter Cable	\$11.00
1 - 44	9.10	4 - 21 3.4 Skel	12.90
2 - 17 3.8 Burgess	9.25	4 - 24 Mac	13.50
2 - 21 Porter Cable	8.50	4 - 27 Porter Cable	14.50
2 - 14 - 21 5 16 Skel	8.95	4 - 12 x 26 Skel	15.50
2 - 12 - 16	9.25	4 - 36 Hammond	17.75
3 - 18 Wren, etc.	9.50	4 - 37 13 16 Atlas	18.25
3 - 21 Porter Cable	10.00	4 - 52 1/2 Walker	20.95
3 - 23 3.4 Skel Thor	10.85	4 - 54	21.75
3 - 24 Porter Cable	10.90	6 - 48 Delta-Sears	39.75

1. Specify for wood or metal
  2. Will ship assorted—or specify grit
  3. Others sizes available—Please Inquire
  4. MONEY BACK GUARANTEE
- include \$2.75 for postage & handling. Send check or money order. American Express honored (send card no. & exp. date). NYS res. add tax.

\*\*Ask for FREE CATALOGUE with more savings and offers\*\*

JACKSON TOOL CORP. Dept. JSD

27-55 Jackson Ave., Long Island City, NY 11101

(718) 392-4330

### BUILD A BIKECAR

The Amazing Mini Car Built with Bicycle Parts! Electric-Pedal Powered! Fun to Drive! Easy to Build!

PLANS \$7.95

Finished and Mailed First Class

Send To:

SPORTRAN CO.

P.O. Box 7077-R, Endicott, NY 13760



## Mason & Sullivan YOUR BEST CLOCKBUILDING SOURCE

- Great projects for any skill level.
- Plans, hardware, flat lumber.
- W. German movements with 36-month guarantee.
- Widest selection of competitively priced quality quartz movements.
- Solid brass dials.
- Tools, books.
- Customer service to help your project go smoothly.

No matter what your clockbuilding needs, come to Mason & Sullivan first. We want you to be a great clockbuilder too.

- Send \$2.00 to receive a one year subscription to our 56-page color clockbuilding supply catalogue. Includes clock kits, dials, movements, weather instruments, hardware, tools, books, and accessories.



NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

**Mason & Sullivan**

"Fine Clockmakers Since 1947"

Dept. 1135, W. Yarmouth, Cape Cod, MA 02673

## ALL NEW LIGHTWEIGHT SAND-O-FLEX



POWER SANDS CURVES WITH GREATER EASE!



A new sanding attachment for electric drills. The fast, easy way to sand paint, moldings, furniture, carvings. New lighter Sand-O-Flex, made of hi-impact resistant plastic, weighs only 9.5 oz. 87" of abrasive cloth is fed out from center of wheel. 8 revolving brushes support slashed abrasive to sand most irregular surfaces. Turning cover feeds out new abrasive as needed.

ORDER BY MAIL 6 1/2" overall dia. 8-brush wheel and coil of abrasive only \$15.95. Extra 87" Abrasive Refills \$4.50 ea. in Coarse, Med. or Fine. Add \$1.50 p. & h. **\$15.95**

**MERIT** ABRASIVE PRODUCTS, INC.  
201 W. Manville, Dept. PM, Compton, CA 90224

## STOP KEROSENE ODOR



New pure-a-fire™ Catalytic Filter for Kerosene Heaters eliminates odors and oily residues. Hangs easily over burner. Satisfaction guaranteed. \$19.95 plus \$3.00 shipping. Credit card buyers call toll free 1-800-554-8000, ask for operator 282 or send check to Catalytic Damper Corp., Dept. PM02, Flint Hill, VA 22627.

**pure-a-fire™**

A Family Tradition Since 1916

**Kuempel Chime**

BUILD THE FINEST  
We Know You Can Do It!



Easy to assemble quality Red-i-Kut Clock kits. A variety of designs hand made by our Grandfathers in solid 3/4" cherry, oak or walnut with beveled glass. Tubular Bell or Rod movements. Original bronze etched dials and hand painted moonwheels.

Or start from scratch.  
American Classic Plan - \$3.00

Write for Free Literature  
or Call

1-800-328-6445

Between 8 a.m. & 4 p.m.

**Kuempel Chime**

Dept. 521, 21195 Minnetonka Blvd.  
Excelsior, MN 55331

## Save time & money TIRE CHANGER

Only \$199.00  
Complete  
We Pay Shipping Charges



Do your own tire changing with the Self-Change 100 manual tire changer. Changer breaks bead, demounts and mounts all your vehicle tires. All steel construction...Heavy duty. Guaranteed...Full Refund if not satisfied. Send check or money order to:

**WIKO INDUSTRIES, INC.**

Dept. PM Rt. 2 Box 154

Broken Bow, NE 68822

(308) 872-5327

Call or write for information

## Car Problems Frustrating You?

Here's Your Answer!

**POPULAR MECHANICS  
MASTER KEYS TO CAR CARE!**

Save money by fixing basic car problems yourself. Keep this handy packet in your car, refer to it at a moment's notice, wherever you are. Step-by-step instructions, all shown on numbered sheets, photos and diagrams show you how to handle each problem that arises. So convenient, and money saving too! INSTANT CAR REPAIR!



Send \$4.95 to Popular Mechanics, Dept. PL, Box 1014, Radio City Station, New York, NY 10101.

For more on interesting projects send for Popular Mechanics Plans and Ideas Catalog. \$1.00

Material, защищенный авторским правом

# Popular Mechanics PLANS

## WOODWORKING AND GIFTS



**Master Craftsman Toolbox:** This TOOL-BOX will organize, protect your tools and add a touch of class to any workshop. (Dimensions 20 1/8" x 9 1/4" x 12 3/8") Built with cherry or walnut wood, styled with brass corners caps and lock. This solid wood toolbox will last for generations and become a family heirloom. Plans include step-by-step instructions and materials list. (PL-1826 \$4.95)



**Colonial Garage Barn:** Holds two full size cars each in separate bays. The structure measures 24 x 26 ft. with an additional 350 square ft. on the second floor. A 3 ft. overhang on the side provides excellent storage for wood and garden equipment. Plans include an 8-page instruction manual and 4 blueprint-size layout sheets: • Overall perspective • Basic wall building steps • Construction details for framing loft, floor, roof and end gables. • Exterior finishing details and suggestions for alternate versions of the barn. **Materials List Included** PL-1277 \$30.00 Each additional Plan \$20.00 when purchased with the first Plan.

Send your name and address with check or money order payable to POPULAR MECHANICS. Mail to: Popular Mechanics, Box 1014, Radio City Station, New York, N.Y. 10101



**Doll Cradle:** Build your daughter or granddaughter a beautiful DOLL CRADLE. A reproduction of an 18th century cradle made from pine with a varnish finish. Hand-crafted with your own personal touch it will be cherished for generations. (PL-1820 \$3.95)

**Calliope:** Create the exciting sounds of circus music. Build a mini-CALLIOPE crafted from pine and easy-to-find materials. This nostalgic music maker is a great gift for the budding musician. Recreates the sound of an orchestra of flutes and whistles. Plans and materials lists included. (PL-1830 \$3.95)



**Boy-Powered Digger**  
This is an ideal project for the craftsman who wants to build an exceptional toy for his youngster. The digger works beautifully and provides hours of fun and exercise for its proud young owner. Plans and materials list. (PL-1822 \$4.95)

Popular Mechanics is a publication of Hearst Magazines, a division of THE HEARST CORPORATION.

## TILLER USERS...

Can your machine do all of this?

- Handle with just ONE HAND.
- EVENLY break, turn & till soil.
- Shred vegetation without tangling.
- Leave NO WHEELMARKS or FOOTPRINTS.

The TROY-BILT® ROTO TILLER-POWER COM-POSTER can do all this and more! That's why serious gardeners consider it the finest tiller available. See for yourself! For complete details, "OFF-SEASON" SAVINGS, and FREE 32-page booklet clip this and mail today to:



**TROY-BILT® Tillers**  
102nd St. & Ninth Ave.,  
Troy, N.Y. 12180

TROY-BILT® Roto Tiller-Power Composters  
Dept. A2388  
102nd St. & 9th Ave., Troy, NY 12180

Please send the whole wonderful story of TROY-BILT® Roto Tillers including prices and "OFF-SEASON" SAVINGS now in effect for a limited time.

(Please Print Clearly)

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_

© 1986 Garden Way

## START YOUR OWN TELEPHONE SERVICE & REPAIR BUSINESS



### NRI's new training will get you started!

Cash in on this new business opportunity for the trained technician & independent service person. Only NRI offers you at-home training in telephone repair and installation—hands-on experience with start-up equipment: phone-line analyzer, latest memory phone and cordless phone—all yours to keep.

**Opportunity is ringing. Answer by sending coupon today for free fact-filled catalog.**

**NRI SCHOOLS**  
McGraw-Hill Continuing Education Center  
3929 Wisconsin Ave., N.W., Washington, DC 20016

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

114-025

# CLASSIFIED ADVERTISEMENTS

Sophie Gronowicz, Classified Sales Manager Dorothy Nolan, Classified Service Manager

Rate: \$6.25 per word payable in advance each insertion. Minimum insertion ten words.

Bold face capitalized words—\$1.00 per word additional (First word set in Bold Face at no extra charge, Zip Code Free.)

The next available issue to place an advertisement in America's No. 1 Classified Section is **APRIL**. The closing is **FEBRUARY 5th**. Send remittance payable and order to Popular Mechanics, Classified Department, 224 West 57th Street, New York, New York 10019.

Please indicate Heading under which ad is to appear. As a consumer service and in cooperation with our mail-order advertisers who use post office box addresses for their convenience in handling your order, Popular Mechanics maintains a register of such mail-order advertisers containing their complete names and street addresses.

Advertisers using P.O. Box number must furnish complete name and street address for our records.

To avoid delay in the publication of your ad, please send samples and descriptive materials with your request.

## PUBLISHER'S MART BOOKS & PUBLICATIONS

**PUBLISH Your Book!** Join our successful authors. All subjects invited. Publicity, advertising, beautiful books. Send for fact-filled booklet and free manuscript report. Carlton Press, Dept. PMN, 11 West 32 Street, New York 10001

**PUBLISHERS' OVERSTOCKS, BARGAIN BOOKS** 2,000 titles, all subjects! Free catalog: Hamilton, Box 15-A, Falls Village, CT 06031

**ONE HUNDRED GREAT TIPS** and ideas for home, shop, auto. \$5.00 to: KITLY, Box 635, Winfield, Ill. 60190

**OFF-PRICE BOOKS, TREMENDOUS SAVINGS.** All subjects. Free catalog, Campbell's, 10151 Nottingham, Suite 25A, Westminster, CA 92683

**FREE catalog**—booklets, unique problem-solving service. Custom How-To, Box 660M, Riverhead, NY 11901

**SELL BOOKS BY MAIL.** Details—25¢. S.S., 2311 4th St., Peru, Ill. 61354

**EIGHTY CHALLENGING PUZZLES, BRAINTEASERS.** \$5.00. Pastime (PMA), 16 Cedarwood Place SW, Calgary, Alberta, Canada T2W 3G6

**FREE CATALOG.** How-To, Information Books. Reports. Youngers, Princeton, Iowa 52768

**BUILD YOUR OWN GUN** and save money! New book shows you how to build blackpowder, modern & exotic weapons. Giant kit-gun directory included. \$11.97 to: Kit Guns & Hobby Gunsmithing, P.O. Box 2204, Dayton, OH 45429. Satisfaction guaranteed.

**FOUR Antique Auto Posters \$5.** Devmark, 1414 Park Avenue, Peoria, Illinois 61604

**FREE SURVIVAL CATALOG** - 50+ Survival Publications - Energy, Weapons, Computers, Medical, Financial!!! **CONSUMERTRONICS**, 2011-PM Crescent Dr., Alamogordo, NM 88310.

**COMPUTER Books.** Many Below List Prices! Free Price List. Kolano's, 4210 North Lilly, Brookfield, Wisconsin 53005

**SELL Books By Mail 100% Profit. FREE Starter Kit.** Books Wholeservices, Box 7415, Ponce, P.R. 00732

**BOOKS How To Start Your Own Profitable Home Business** Free Literature Information Service. Route 3, Linton, In. 47441

**AIRCRAFT HYDRAULIC SYSTEMS,** Bill Neese (1984) Fully Illustrated \$19.50. Krieger Publishing Co., Inc., P.O. Box 9542, Melbourne, FL 32902

## MAGAZINES

**ADVERTISERS.** 25¢ word. Inch \$9. Circulation 50,000. **WORLD CLASSIFIED,** Box 2535, Saint John, New Brunswick, Canada E2L 4S8

## CATALOGS

**SMALL ENGINES,** Troy-Bill Tillers, Honda generators, Snowmobile Parts, McCulloch Chainsaws, much more. **FREE CATALOG:** Small Engine City, 2612 Lyndale South, Minneapolis, Minnesota 55408

**SUBLIMINAL STATIONERY-** Scientifically supported. Usable samples/Catalog \$5.00. Michael Studios, Box 4236, North Ft. Myers, Fla. 33903

**FREE tool catalog.** Tool Line, 817 New York Ave., Martinsburg, W.V. 25401

**WIGS - Toupees,** 24 pages "Headstart/Adolfo Edition" \$3.50. (203) 853-9844. Wigs, 10 West, So. Norwalk, Conn 06854

## FREE CATALOG - BEST IN THE INDUSTRY A COMPLETE CAMERA STORE IN A CATALOG

**ONE of the World's Great Catalogs,** and it is photographic. Send to Porter's Camera Store, Inc., Box 628, Dept. PM, Cedar Falls, Iowa 50613 for your Free Copy (U.S. Only). 112 tabloid size pages filled with 4,000 items many of them exclusive and very unusual. Plus popular brand cameras, lenses, flash, etc., at discount prices. Huge inventory, fast service, great packaging. You must see it to believe it. Order your Free copy today.

## AUTOMOBILES

**MODIFY Exhaust Improve MPG Instructions** \$1.50, Kit \$19.95. Burger Enterprises, 512 Royal, Jackson, Michigan 49202

**SAVE GASOLINE!!** Bypass pollution devices—easily, reversibly! Posco/B, LaGrangeville, NY 12540

**GASOLINE Mileage Engineering Guide,** \$8.95 starts you saving. BLS/Eng, 11256 Browningsville, Ijamsville, Maryland 21754

**PLANS To Convert VW's, Chevettes & Pintos To Battery Power.** Plans feature detailed drawings and step-by-step instructions. \$4.95 plus \$1.55 postage. Flight Systems-EVC, P.O. Box 25, Mechanicsburg, PA 17055. (717) 697-0333.

**CHEMICALLY TREATED SPONGE** Keeps away windshield fog. \$3.00. Creative Products, P.O. Box 2174, Arnold, California 95223.

**UNIQUE IDEA EXTENDS CARBURETOR LIFE! SASE.** Miller, Box 291323, Los Angeles, CA 90029

**FREE AUTOMOTIVE SECURITY CATALOG:** Largest selection available. Do-It-Yourself. Pagers, alarms, hood/locks, glass detectors. Allow 4 weeks. Immediate Delivery. Send \$1.00. Automotive Security Equipment, Dept. 2, P.O. Box 382, Plainview, New York 11803

## MIDGET CARS

**MINI-JEEP /PU Plans!!** . . . Convert Garden Tractors! . . . Realistic! . . . Write: Ezbody, Box 22601, Minneapolis, Minnesota 55422

## AUTO SUPPLIES & EQUIPMENT

**ALTERNATOR Generator Rebuilding Book.** Information: \$5.00 (Refundable). Hedelund Engineering, Box 26024, Las Vegas, NV. 89126.

**HYDRAULIC JACK Repair Manuals and Kits.** Catalog \$2.00. Hydraulic Jack Inc., P.O. Box 18, Accord, NY 12404

**PARTS:** Army Jeep and truck parts. Spare Parts & Equipment Co., P.O. Box 751, Lexington, Kentucky 40587-0751

**IMPORT Auto Parts - New and Remanufactured at Bargain Prices.** Send \$1.00 for catalog - Refundable with Order. Please State Year, Make & Model of Car. Same Day Service. **SECH-A-DEAL,** P.O. Box 23621, Rochester, NY 14623

**STOP Frost From Forming On Car Windows.** Refundable. To Order Send \$5.50 To: Barthel Products, Box 290010, Dept. PB5, Minneapolis, Minnesota 55429

**PROTECT YOUR HOME AND CAR.** Advanced electronic alarm. **EASY TO BUILD.** Send \$3.00 for information (refundable on purchase). Plans \$9.95. Kit \$49.95. MTC Electronics, Dept. 107, P.O. Box 863715, Plano, Texas 75086.

**NEW Product Improves Oil. Makes Changing Unnecessary.** **DRAIN'T,** Apartado 2215J, Monterrey, México 64810.

**\$9.95 Can Save A Life.** Backup Warning Alert Beeper. Bob's, 4646 Park Street, Jacksonville, Fla. 32205

**STOP Speedometer, Cruise Control Cable Noise!** Thousands Used It. Saves Time, Money. American Cars, Trucks. Send \$8.95: Speedo-Cable, Box 5877, Glendale, AZ 85312.

**SUPER Soap-NATURAL Mechanics' Hand Soap.** 1 lb., \$4.50 includes shipping. Box 24262, San Francisco, Ca. 94124.

**CARPETS,** top, shocks, suspension parts for all cars 1935-1980. Free catalog. Kanter Auto Products, 76P Monroe, Boonton, NJ 07005. 800-526-1096.

## MOBILE HOMES

**REPAIR Made Easy.** Learn How. JD, Box 60, Pawpaw, Mich. 49079

## MOTORCYCLES, MOTORSCOOTERS & SUPPLIES

**GO Karts, Minibikes, Atv's. Kits, Parts, Engines.** Lowest Prices. Largest Selection. 64 Page Catalog \$3.00. Refundable. Kart World, Dept. C., 1488 Mentor Ave., Painesville, Ohio 44077

**\$49-Mini-Bike Kit.** Go-Karts, Frames, Engines, Wheels Clutches, Tires. Including Moped Parts and Accessories. More Parts-Lower Prices. 1985 Wholesale Catalog-\$2.00. Karts & Kits, P.O. Box 1028, Maywood, NJ 07607

**MOPED - Motorscooter Parts.** Accessories. Mayfield Mopeds, 5651 Mayfield Rd., Lyndhurst, Ohio 44124

**PLANS: GO-KART \$3.00, MINI-BIKE \$2.50, TRACTOR \$10.00.** Vehicle, Chazy, N.Y. 12921.

## AVIATION, HANG GLIDING

**GYROCOPTER™ BUILD and FLY the ORIGINAL "ULTRAIGHT"** rotorcraft yourself! Flies when all others are grounded! Quality manufactured since 1953. 3-view drawings, specifications, flight test reports, complete catalog: \$10. New Pilot's Manual: \$35. Send to: Bensen Aircraft Corp., Dept. PM285, P.O. Box 31047, Raleigh, N.C. 27622

**BOOMERANGS—INCREDIBLE RETURNS!** You can do it. Exciting! Order your FREE Catalog Now! BoomerangMan, 306 Park, Monroe, LA 71201.

**HOBBY HELICOPTER.** "Choppy" Ultralight Single-Seat Helicopter. Simplified Construction—Motorcycle Engine. Brochure \$3.00. Polynova, Box 670M, St. Remi, Quebec, Canada JDL 2L0

**DESIGN Build Airplanes, Hang Gliders, Simplified Publications.** Brochure 20¢. McCoy Aircraft, 12820 S. Figueroa, Los Angeles, CA 90061.

**SURPLUS SNOWMOBILE ENGINES - BRAND NEW BARGAINS** 22HP, complete with electric starter, many uses free brochure. Hydrotech, Box 14444, Long Beach, Calif. 90803

**HELICOPTERS:** Gasoline And Jet Powered. From \$899.00. Kits/Plans. Information \$3.00. BW Rotor, Towanda, Kansas 67144.

## SPACE & ASTRONAUTS

**ANTIGRAVITY Propulsion Device!** Free Brochure. RDA, Box 873NM, Concord, NC 28025

## HOVERCRAFT

**HOVERCRAFT Plans All Sizes.** Catalog \$1.00. Universal Hovercraft, Box 281, Cordova, Illinois 61242

**AERO-CAR** Amazing Hovercraft built easily with ordinary tools. Lawnmower engine power. Carries one man plus. Hovers, flies forward, backward. Sideways over land/snow/water. Complete construction plans and brochure. \$9.95. Aero-Projects, Box 5118PM, Clinton, New Jersey 08809.

**HOVERCRAFT PLANS & PUBLICATIONS!** Catalog. \$1.00. Ventura, 13820B Greenland, Uniontown, OH 44685



## CB'S, RADIO & HAM EQUIPMENT

**POLICE** Scanners, Bearcat, Regency, HPR, Box 19224, Denver, CO. 80219.

**CB MODIFICATIONS**, Conversions, Books, Plans, Kits. Catalog \$2. CBCI, Box 31500M, Phoenix, AZ 85046

**CB MODIFICATIONS**, Linear Planbook, Kits \$1.00 refundable. APS, POB 263, Newport, RI 02840. 401-846-5627

**BEARCAT** Scanners. Discounted. **CRYSTALS**: \$2.95. **RADIO SALES**, 3462 Oakland, Oshkosh, WI 54901

## ELECTRONICS

**LINEAR** Transistors, Tubes, Hard - to - find parts. MRF454 \$16.00, MRF455 \$12.00, MRF477 \$13.00. Catalog Available. R.F. Parts, 1320-4 Grand, San Marcos, CA 92069. (619)744-0728.

**ELECTRONIC EAVESDROPPING DEVICES. SURVEILLANCE AND COUNTERSURVEILLANCE. GIANT CATALOG \$1.00. HUNTEREX, BOX 3132, WINSTON-SALEM, NC 27102.**

**GOVERNMENT** Surplus receivers, transmitters, snooper-scoopers, parts. Catalog 25c. Meshna, Nahant, Mass. 01908.

**DIGITAL KLOCK KIT** Plays One-Of-Twelve Melodies Each Quarter Hour. Displays Time, Date And Other Features. Send \$3.00 For Assembly Plans And Pricing To: **KERBER KLOCK COMPANY**, 36117 Hillcrest, Eastlake, Ohio 44094

## COMPUTERS & SOFTWARE

**TI-99/4A** Software/Hardware bargains. Hard to find items. Huge selection. Fast Service. Free Catalog. Dynamic, Box 690, Hicksville, N.Y. 11801

**COMMODORE 64** and Vic-20 **21 FREE PROGRAMS. PUBLIC DOMAIN, INC.**, P.O. Box 190L, West Milton, Ohio 45383

**COMPLETE** CBasic program printouts with explanation of steps. Biorythms, amortization schedule, checking. Send \$5.00 each, or 3 for \$10.00. MFI, Box 30698, Amarillo, TX 79120

## CALCULATORS

**NEW FOR FIRST TIME**, a very economical \$7.95 precision **FRACTION CALCULATOR**. Adds and subtracts messy fractions in seconds. Designed and quality made. For **FREE** details, write: **GRAPHIC SYSTEMS, DEPT. MP, BOX 881, MELVILLE, N.Y. 11747.**

## STEREO, CASSETTE TAPES, ETC.

**THOUSANDS OF OLDIES!** Hard-to-find 45rpm hit records from the last 40 years including pop, country, rock, and soul. Send \$2.00 for catalog to: American Pie, P.O. Box 66455, Dept. PM, Los Angeles, CA. 90066

**CHANGE AUDIO TAPES WHILE YOU DRIVE!** Unique dash or glove comp't mounted cassette "Caddy-Stack" compactly displays 5 tapes. 1-hand access. Tapes can't unwind. Dust cover 2 only \$3.95. Wilmac, Box 647, Berwyn, Pa 19312

## TV & VIDEO EQUIPMENT

**NOTICE: USE OF CERTAIN ITEMS IN THIS CLASSIFICATION REQUIRES STATION AUTHORIZATION.**

**SATELLITE TV RECEIVER BREAKTHROUGH!** Build your own system and save! Instruction manuals, schematics, circuit boards! Send stamped envelope: XANDI, Box 25647, Dept. 28C, Tempe, AZ 85282.

**COLLECT VIDEO MOVIES!** VHS. Beta. Catalog \$2.00. Tower, Dunkirk, MD 20754-0213

**12" SATELLITE DISH** plans \$5.00. **BOYD**, Box 1463, Oakdale, California 95361

"**SATELLITE** Indicator For Your Crank Type Dish, SASE For Information." Satrepair, Box 360, Rte. 3, Abbeville, Ala. 36310

**SATELLITE TELEVISION ANTENNAS** complete detailed plans for home construction by anyone. \$5.00. Jansen Electronics, P.O. Box 168-M, Dundee, OR 97115

**ENJOY SATELLITE TELEVISION.** Save money with easy, guaranteed, do-it-yourself antenna plans/kits. Electronic knowledge not necessary. Send \$1.00 for catalog or \$8.95 for "Consumer Guide to Satellite Television." GFI-36, Box 9108, Missoula, MT 59807.

**MICROWAVE** Antennas. Exclusive Snow-Free Probe. \$35.00. Complete System \$89.00. Brochure \$1.00: JCR, Box 20607, Denver, Co. 80220

**CONVERT** Videotapes PAL - SECAM - NTSC (Overseas). 110-220 Audio, Videorecorders, Televisions. (718)507-5800

**HOME SATELLITE TELEVISION** Wholesale to the public. Send \$3.00 for catalog. Dealers Wanted. Wholesale Satellite Supply, Box 1044, Lake Oswego, OR 97034. 503-248-8335

## CAMPERS & TRAILERS —KITS, PLANS

**FIBERGLASS TOPPER. SAVE 50%/70%.** Detailed Plan. Brochure \$1.50. Holner Designs, 2710 Nathan Lane, Plymouth, Minn. 55441.

**BUILD YOUR OWN—Travel Trailer—Fifth Wheeler—Motorhome—Camper—Pickup Cover—Plans—Patterns—Kits—Catalog \$1— Glen-L R-V's, 9152PM Rosecrans, Box 756, Bellflower, CA 90706**

**TRAILER** plans build your own 16 ft. flat bed box or car hauler. Three in one easy to build, \$9.95: W. W. Jennings, 436 Leach St., Englewood, Fla. 33533

## BOATS, OUTBOARDS, TRAILERS, & KITS

**BOATKITS - PLANS - PATTERNS - FRAMEKITS** - Largest Catalog - 300 Designs 8' 80" - Plywood - Fiberglass - Steel - Strip Planking - **POWERBOATS** - Inboards - Outboards - Cruisers - Sportfishers - Houseboats - Hydroplanes - Duckboats (Canoes Kayaks) - **SAILBOATS** - Daysailers - Trailer-sailers - Multihulls - **SUPPLIES** - Epoxyplus - Epoxyglue - Cloth - Resins - Foam - **CATALOG \$2.00** (Airmail \$4.00) - (Book "Amateur Boatbuilding" - Fiberglass - Plywood Epoxy - Steel - \$6.00). **CLARKCRAFT**, 16-P Aqualane, Tonawanda, NY 14150

**BOAT PLANS - PATTERNS - KITS** - Hundreds of designs - Wood - Fiberglass - Steel - Sailboats - Powerboats - Canoes - Kayaks - Rowboats - Duckboats - Dories - Houseboats. Simple, amateur-proven methods. Instructions assure professional results! Huge 152-page catalog \$3.00 (\$4.00 Airmail). Includes Free "Boatbuilding Supplies" Catalog - Discount Prices! - Fastenings - Fiberglass - Resins - Glues - Books. Investigate "Poxyshield"/"Poxygrip" wood epoxy system - Manual - \$2.00. **GLEN-L** Marine, 9152 Rosecrans, Box 756MP, Bellflower, CA 90706.

**FIBERGLASS - RESINS** - Foams - cloth - epoxies - mat - etc. Factory prices - **CATALOGUE \$1.00** - (Book "COMPLETE FIBERGLASSING" \$6.00) - Clarkcraft, 16-PI Aqualane, Tonawanda, NY 14150

**COVER YOUR BALL!** Chromed Brass Dome Protects Trailer Hitch. **FREE** Brochure. Topcap, 3719 Fremont, Chicago, 60613

**BOAT KITS - POWER/SAIL - 11'-30"**. **FIBERGLASS**. Save half. Anyone can assemble. **FREE** 48-page catalog. **LUGER**, Dept. BC-85, 3800 West Highway 13, Burnsville, Minnesota 55337. 612-890-3000

**EVINRUDE** - Mercury 1984 Bargains... all sizes... \$2.00 handling... Scott McCulloch parts... Electra Marine, 610 Merrick Road, Lynbrook, New York 11563

**TRAILER BOOKS.** Enlightening. Buy/Evaluate...\$12.00; Tow/Maintain...\$12.00. **TRAILERS/KITS CATALOGS:** Utility...\$3.75; Car...\$3.75. **TRAILER TREASURY**, 1326 Santa Anita H3, So. El Monte, CA 91733. (818)575-3224.

## ATHLETIC EQUIPMENT AND BODY BUILDING COURSES

**BIGGER**, More Powerful Muscles - faster!! Free Booklet! Universal, Box 6694A, Detroit, Michigan 48240

**KUNG-FU** Free Lessons. Send \$1.00 for Postage. McLisa, Box 1755, Dept. PM85-B, Honolulu, Hawaii 96806

## SPORTING GOODS AND EQUIPMENT

**CROSSBOWS** and **SLINGSHOTS**. Most Complete Catalog Available \$1.00. **M&M ENTERPRISES**, Box 64, Dept. PM, Island Lake, IL. 60042

**CONVENIENT!! KEY-CHAIN WALLET** Combination for Sports, Beach, Outings. Genuine Leather, 5" x 3" \$7.95. Satisfaction Guaranteed. Consumer Enterprises, Dept. S255, 15502 Woodfair Place, Tampa, FL 33612

**GOLD SLUCE** (Portable) Carry Anywhere, Under \$10.00. Vary Productive. For Easy Plans Send \$4.50 to: Federal Distribution, 4B 18445 San Bernardino, Bloomington, CA 92316

## FISHING, TACKLE, LURES

**1985 CATALOG** - Lure Parts, tackle, accessories. Send \$1.00 (Refundable). D & R Distributors, Department-2P, 3 Deck Court, Howell, New Jersey 07731

**FISHING, CAMPING, BOATING.** Great discount prices. Color Catalog. Send \$1.00, refundable on order. Fish'n Shack, Box 546-L, Camdenlon, Mo. 65020.

**FREE** Sinkers Mold Catalog over 100 molds 25 shapes. Camen's, Box 220PM, West Newton, PA 15089

## BATTERY REBUILDING SCHOOL

**BATTERY** Rebuilding Tools, Instructions \$544.00. Manual \$65.00. Training Available. Sun Battery, 10415 9B, Sebring, Florida 33870

## ENGINES, MOTORS

**ENGINES** For Mowers, Tillers, Etc. Free Discount Catalog. Engines, 166PM, Ashland, MO 65010.

## TOOLS FOR SALE

**AIR** Tools - Buy One Of The Best At A Discount Price - Send for Free Catalog And Prices: A & E Tool, 4597 Pearl Road, Cleveland, Ohio 44109

## UPHOLSTERY SEWING MACHINES

**UPHOLSTERY** Sewing Machines with Walking Feet, complete ready to use—only \$489.00. Thompson Model PW200-AVAILABLE FROM YOUR LOCAL DEALER, or order direct. (Master Charge-Visa). Datho Mfg., Inc., P.O. Box 12110, Lubbock, Texas 79452—Phone: (806) 744-6774

## MACHINERY, TOOLS & SUPPLIES

**CHUCKKOK** (patent 4095811) **FREE ELECTRIC DRILLS** from separate chuck keys! Chucklok ends key hunting and hazardous key attachments. Tightens accessories securely. Simple mounting. \$5.00 for 1/4" drills, \$5.50 for 3/8" drills. Chucklok Company, P.O. Box 1350PM, Keene, NH 03431.

**SMALL FOUNDRY** Furnaces, Supplies. Free literature. Pyramid Products, 3736 South 7th Avenue, Phoenix, Arizona 85041

**4" METAL** Cutting Lathe \$87.25. Taig, 15048 Proctor, Industry, CA 91746

**BOLTS, SCREWS, TOOLS, WHOLESALE, DIRECT.** Guaranteed. Catalog \$1.00 (Refundable). Camelot, Dept. 44, Box 65, Bristol, Wisconsin 53104

"**SHARPENERS REPORT**" Monthly Newsletter, Sharpening Guidebook, Wall Chart. Send for brochure. Skog Company, Dept. PM2, P.O. 22559, Minneapolis, MN 55422

**STEEL**, Brass, Aluminum. Catalog: \$1.00. **MBM**, 3719 Fremont, Chicago, IL 60613

**PARTS WASHING TANK**-Portable, polyethylene with U.L. approved pump. \$119.00. More information, Write: Direct Edge Products, Box 838, Dept. P, Orangevale, California 95662

**JEMCO LEVER-PUSHES, PULLS, CLAMPS, LIFTS.** Inexpensive. Free Brochure. **JEMCO**, Box 91726, West Vancouver, B.C. Canada V7V 4S1

**BANDSAW BLADES**, Any Size. Free literature. King Saw, 6541 Tidewater Drive, Norfolk, Virginia 23509

**STEEL**, Aluminum, Brass—Sheet, Bar, Shop Supplies. Plans. Write: **CEL RR1**, Box 163, Cameron, IL 61423.

**BRASS**, Steel, Aluminum, Stainless, Acrylic, Nylon, Teflon. No minimum. Catalog \$1.00 (Refundable). **METALS**, Box 11204, Clayton, MO 63105

**SILVO** Hardware, 188-page Hand & Power Tool Catalog \$1. **PM-5-2**, 5301 Tacony St., Philadelphia, PA 19137-2399

**BEST** Prices, Woodworkers Machinery Catalog, Free. McKiligan, P.MC85, Johnson City, N.Y. 13790

**NEW** Industrial-Mechanics-Machine Shop supplies. Factory overflows, overstocks, etc. Fantastic prices. Write: Alan Tools, 2516 1/2 W. Rosecrans, Dept. PM-5, Gardena, Ca. 90249

**DRILL CHUCKS**, Easy instructions to disassemble and recondition, \$3.00. Chuck, P.O. Box 14603, Portland, OR 97214

**BANDSAW BLADES** any size **SAVE 20-30% EUROPEAN** Wood and Metal Working Machinery. Free information. Suffolk Machinery, Suite 8, 16 Shore Road, Patchogue, NY 11772

**SPACE LUBE** stops squeaks, dissolves rust, loosens screws, protects freezing Deices, cleans metal, displaces moisture. Guaranteed satisfaction. \$4.95 prepaid. Aerogon Research, 1726 45th St., Brooklyn, N.Y. 11204

## ENERGY SAVING

**SOLAR, GREENHOUSE, AND ENERGY SAVING PRODUCTS CATALOG!**

**COMPONENTS**, Complete Systems. 88 pages, 18 sections. Our 11th year! Order from one expert source — the country's largest energy saving mail order house! Send \$1.00 postpaid. Solar Components Corporation, Dept. M, P.O. Box 237, Manchester, NH 03105

**SAVE 35%** On Central Airconditioning Costs. Guaranteed. Tested By A University in Boca Raton, FL. Product Information \$1.00 (Refundable). Sentry Control Products, 6064 Okeechobee Blvd., West Palm Beach, FL 33409

## SOLAR & ALTERNATE ENERGY

**SOLAR** panel heats water to 160° on 60° day. Build for \$100.00. Information \$1.00. Marco Enterprises, 7339 Reiston Ave., Indianapolis, IN 46240

**FUEL BILLS HIGH?** Build your own solar panels. Send \$5.00 for detailed plans. Luan Designs, Box 473, Deerfield, MI. 49238.

**PASSIVE SOLAR HOME PLANS**, From 1008 Sq/Ft. catalog \$2.05. Dove Design, P.O. Box 1456, Belen, N.M. 87002.

**FREE ENERGY** Build your own Solar Collector. Low cost. Send for complete picture. Simple instruction book. \$6.00 includes all shipping & handling. Money order or cashier's check. Send To: JAD Solar c/o Murray's, 740 W. King Blvd., Los Angeles, Calif. 90037

**GAS WELLS** 44 pages know all \$18.95. Wells, R.D. #1, Box 77, Albion, Pa. 16401

## HOME CRAFTSMAN

**FIVE FREE PLANS** Furniture Toys Shop Equipment With Illustrated Catalog, 700 Items. Send \$1.00 For Details. May Co. Sales, Box 2931PM, Mesa, Arizona 85204

**MUSIC BOX WORKS** 700 Tunes. Free List. Music Box World, Dept. MB, Avon, NJ 07717

(Continued on next page)

## HOME CRAFTSMAN

(Continued from preceding page)

**WOODEN** Toy Parts and Patterns, Fun With Wood Catalog \$1.00. Howard Co., Dept. PM, Box 442, New Albany, IN 47150

**CATALOG FULL-SIZE FURNITURE PLANS** - \$2.00. Refunded with first order. Traditional, Early American, over 180! Furniture Designs, 1425 Sherman, Dept. CP-85, Evanston, IL 60201.

**FAVORITE WOOD TOYS**, Patterns, Parts, Wheels, Catalog \$1. Toys And Joys, Box 628M, Lynden, Wash. 98264

**MAKE WOODEN TOYS-PROJECTS**- 100's plans, kits, hardwood parts (toy, craft, furniture)- Catalog \$1.00. Cherry Tree Toys, Belmont, Ohio 43718

**TOYMAKERS!**... Free catalog... patterns, wheels, dowels, parts, supplies! Hurry!! Morgan, P01B15, 1123 Bardstown, Louisville, Kentucky 49294

**WOODCRAFT PATTERNS**, Windmills, Wishing Wells, Bird Houses, Feeders, Flying Duck, Pheasant, Outdoor Planters, Catalog \$1.00. Crafters, 11840 US. 27 North, DeWitt, Michigan 48820.

**UNFINISHED** picture frame moulding, Factory closeout. 50% discount. 200 styles. Write: Japs, 126-PF Seventh North, Hopkins, MN 55343

**HARDWARE CATALOG** \$1.00 Refundable with first order. The Bever's, P.O. Box 12, Wilts Point, Texas 75169

**BATTERY CLOCK MOVEMENTS**. Below wholesale prices. Best Quality Catalog \$1.00 (refundable). Yankee, Box 26, Thompson, Connecticut 06277

**FOLDING** Sawhorse Workbench, Strong, Saves Space. Complete Drawings \$1.00. Chuck Eberly, RR1, Box 48, Archbold, OH 43502

**INFLATABLE FAN OPERATED**, Winter Fun Solar House Under \$100.00. Send \$5.00. Engineering, Box 266, Owls Head, Maine 04854

**OVER 75 FULL SIZE PATTERNS!** Create profitable wooden gifts, toys, household accessories, PLUS "Shop Secrets" Only \$6.00. Accents (P-25), Box 262, Danvers, MA 01923

**OVER 50 "FOLK ART" PATTERNS!** Create profitable "Country Cut" woodworking designs. Hundreds of unique projects! Only \$6.00. Accents (CP-25), Box 262, Danvers, MA 01923

**MINIATURE GOLF GAME** Plans Big Profits \$3.00: Tom Lee, 600 Hopkins Rd., Kernersville, N. C. 27284

**WALNUT** Lumber cabinet grade. Squares, Gunstock blanks, Veneer. Iowa-Missouri Walnut Co., Dept. M, Station A, Box 66, St. Joseph, MO 64503

## WOOD, WOODWORKING

**FREE** supplies catalog!!... Hundreds veneers, toymaking, hardwoods, patterns, books, cane, dowels, pegs, spindles, more! Bargain offers included!! Hurry!! Morgan, P01M18, 1123 Bardstown, Louisville, Kentucky 40204.

**FREE** Catalog, Hardwoods, Plywood, Veneers. Timberline Forest Products, Box 858A, Lake Elmo, MN 55042

**WOODEN** Toy Plans, Catalog \$1.00. Free Plan With First Order. Toy Craft, 601-PM East Main, Waynesboro, PA 17268

**FREE** List of Toy Plans. Toy Parts, Box 133, No. Attleboro, MA 02761

**PEG-1000 WHOLESALE** - 10 pounds Polyethylene Glycol green wood stabilizer for \$12.50 plus \$2.40 shipping. FREE wood finishing products catalog from: General Finishes, Box 14363, West Allis, WI 53214. Phone 414-774-1050.

**MAKE** Pipes. Information: PIMO, Inc. P25, Box 59211, Chicago, Illinois 60659

**40 FULL-SIZE** wooden project patterns \$4.00. Box 161, Tama, Iowa 52339

**TOY CAR PLANS:** 50 profile cars, \$4.00. MTD Co., Box 59, Summerfield, N.C. 27358

**MULTI-DRIVER**- Converts electric drill into power driven screwdriver that drives and removes screws quickly. Ballbearing chuck adjusts to any sized screw. Can drill flush, exposed or counter-sunk screws. Comes with four bits... #1 and #2 Phillips and 1/4" and 3/16" slotted head. Guaranteed. \$6.95 ppd. HORIZON HOUSE, 52 Baldwin, Wayne, N.J. 07470.

**FREE WOODWORKERS CATALOG.** Your best source for quality woodworking tools. Everything from bit braces to wood borers, from saws to sharpening stones. Full color, 32 pages, \$3 discount coupon. Satisfaction Guaranteed. Woodcraft Supply, Dept. PM01, Box 4000, Woburn, Massachusetts 01888.

**PROUDLY HANDCRAFT FURNITURE** with 2x4's. Illustrated Guide. \$2.00: Chelsea House, 5571 North University Drive, Suite 103-PM1, Lauderhill, Florida 33321

## PLANS, BLUEPRINTS, PROJECTS

**12 PVC** Pipe Furniture Plans. \$9.95. J&L Casual Furniture, Box 208, Tewksbury, Mass. 01878

**AUTOMATIC DICE TUMBLER.** Plans \$2.00. Stallionher Co., Box 615, Lemoore, Ca. 93245

**BUILD** Economical De-Humidifier. For home, RV, Boat. Plans \$5.00. Airing, Suite M407P, Caller Box 1, Marysville, WA 98270

**CONCRETE** Block molds, plans 4'-6'-8" \$6.00. Three Worlds, P.O. 2521, Loves Park, Illinois 61111

## FOR THE HOME

**HIGHEST PROFESSIONAL QUALITY. FIREFIGHTER DESIGNED. PET(S) INSIDE EMERGENCY \*ALERT REFLECTIVE RESCUE EMBLEM. \$4.95 POSTPAID. PROTECT\*MY\*PET EMBLEM, BOX 5030A, SUFFOLK, VIRGINIA 23435- DEALERS WELCOME.**

## HOUSE PLANS

**10 PROVEN DESIGNS** 2 And 3 Bedroom Homes, Complete Working Drawings. Send \$19.95 Plus \$2.00 Postage And Handling. Or Call (904)428-2999 Master, Visa, COD: Certified Home Construction Inc., 931 Ridgewood Ave., Edgewater, Florida 32032

## PLASTICS

**CASTOLITE** Liquid Plastics. Crystal clear, colors. For casting, embedding, coating, fiberglassing; in industry, laboratories, craft work. Reproduce your designs with our mold materials. Catalog \$1.00. CASTOLITE, Dept. 85B/PM, Box 391, Woodstock, IL 60098.

**PLASTIC** Bags. All Sizes. Small and large quantities. Free Catalog with prices. Call SAKet Toll Free 1-800-45-SAKET; in California 1-800-44-SAKET.

## DO IT YOURSELF

**BELT BUCKLES** for coins or stones, specialty buckles, jewelry mountings, cut stones, clock works. Wholesale catalog 25c. Eloxite Corp., 806 1/2 10th Street, Wheatland, Wyoming 82201

**20 EASY**, Useful And Inexpensive Plywood Projects. Illustrated Book Only \$5.00. Atlantic Publishing, P.O. Box 725, Montreal, Quebec, Canada H4A 3S2

**1600 CATALOGS** Every Subject Imaginable!!! Many FREE! Directory \$4.00, Catalogs Galore, 7914-M2, Springfield Village, Springfield, VA 22152.

**REPAIR YOUR OWN TV... IT'S EASY.** Write, Research, Rt. 3, Box 601B, Colville, WA 99114

**ELECTROPLATING**. Complete amateur's textbook. All metals Electroplate metallic/nonmetallic items \$11.95. Details free. Tropic, Box 95-P3, Palm Bay, Florida 32905.

**UPHOLSTERING SUPPLIES** \$1.00 for Prices. Variety Products, Box 566P, Lathrup Village, Mich. 48076-0566

**HOME** repair guide. Money saving, illustrated instructions. \$4.95: Rustic Pines, P.O. Box 721, Andover, N.J. 07821

**PROJECTION TV**... Convert your TV to project 7 Foot picture... Results comparable to \$2,500 projectors... Total Cost less than \$30.00... **PLANS AND 8" LENS** \$19.95... Illustrated information FREE. Macrocoma-BF, Washington Crossing, Pennsylvania 18977. Creditcard Orders 24HRS. (215) 736-3979.

**3667 CATALOGS** listed and described. Every conceivable source for everything. FREE details. Write now. Hilltop Directory, Box 1364 P2, Chula Vista, CA 92012-1364

**3 INGENUOUS DESIGNS!-T.V. EXERCISER** converts bicycle exercisers. T.V. operates only while pedalling exerciser weight loss, healthy children! Big demand! **INSTAHEAT** Start auto on cold morning, enjoy instant defrosting, heating! Save gas, time, safer visibility, warms motor too! **BUILT-IN** wet/dry powerful vacuum. \$800. system for under \$100! Big demand, earn \$\$\$ installing. **PLANS** \$5 Each, \$12.00 All. S. Lavelle, Box 2550, Portland, OR 97208

**SHOE** Repair For Fun/Profit. Valuable Easy-To-Understand Illustrated Manual. Free Details. **SHOE** Doctor, Box 458, Forest Lake, MN. 55025

**JIG** For Cutting Circles or Discs with Your Acetylene Torch Adjustable 1/2" to 7" \$5.00 Postpaid. Mill Machine Shop, 7684 SR514, Big Prairie, Ohio 44611

**SHARPEN SAW BLADES**, Make Fixture Under \$10.00. Complete Instructions, Plans, for \$3.00. Tom's Sharpening, 13214 Johnson Road, Churubusco, IN 46723

**PREPARE** Your Own Will. Forms And Manual. \$5.00. B. Smith, POB 1923C, Hartsville, SC 29550

**TELEPHONES!**... Install your own to save... others for profit!... Complete Guide \$3.00 **GUARANTEED**. Signal Research, Box 5285 P2, Albany, New York 12205

**REPAIR** Your Refrigerator, Furnace, Heat Pump, Information \$2.00 each. Corbett Inc., 3469 Hickory Ave., Baltimore, MD. 21211

**2003 Catalogs** listed. Sources for Anything! \$4.95. Directory, Box 92452N, Atlanta, Georgia 30314

**"EASY WOODWORKING"** Instruction Manual. Fast expert results for Home Woodworkers and beginning craftsmen. Easy step instructions help you complete excellent projects \$10.95. From Sallack Publications, RD 6, Box 86B, Punxsutawney, PA 15767.

**SAVE** on parts for Lawnmowers, Minibikes, Karts, Chainsaws, Small Engines. **THOUSANDS OF PARTS.** Send \$3.00 For Catalog. Sav-On-Parts, P.O. Box 231, Somerville, Mass. 02145

**AMAZING WATER POWERED PUMPS!** Hundreds of uses. Information - Embee, Box 4866, Oak Brook, IL 60521

## ARTS, CRAFTS, SUPPLIES

**CLOCK WORKS**, Wood clock blanks, rockhound supplies, belt buckles, cut stones, etc. Wholesale catalog 25c. Eloxite Corp., 806 1/2 10th Street, Wheatland, Wyoming 82201

**BUY METAL PICTURE FRAMES THE WAY PROFESSIONALS DO. BUY DIRECT AT WHOLESALE PRICES. FOR GREAT PRICES CHECK US OUT. EXAMPLE: STANDARD FRAME 16 x 20 \$7.00. ORDER HIGH QUALITY METAL PICTURE FRAMES CUSTOM CUT, SHIPPED PROMPTLY AT COST THAT ARE ABOUT 1/3 OF RETAIL PRICES. SEND \$2.00 FOR CATALOG AND MOULDING SAMPLES. AMERICAN FRAME CORPORATION, 1340-A TOMAHAWK DRIVE, MAUMEE, OHIO 43537**

**"GETTING Started in Stained Glass"** \$1.00. Whittemore, Box 2065T, Hanover, Mass. 02338.

**STAINED GLASS SUPPLIES: EXCITING SUPER CATALOG-PM \$3.00. CORAN-SHOES INDUSTRIES, 509 E. SECOND, BOSTON, MA 02127.**

**STAINED GLASS SUPPLIES** Complete Catalog \$2.00 (refundable). Sunshine Glassworks, 3690 Harlem, Dept CT, Buffalo, NY 14215

**WOODCRAFTS** Galore... Wheels, Plans, Toy Parts, Catalog-\$3.00. Larson Wood Manufacturing, Box 672 P, Park Rapids, MN. 56470

**LEARN GLASS ETCHING!** Easy kit contains photo-illustrated instructions, tools, supplies, everything needed \$6.00. O'Reillys, Box 283H, Osseo, Minnesota 55369

**CLOCKS**, Quartz battery movement, from \$2.50. Catalog \$1.00. Clocks, Route 3, Box 94EP, Foxworth, MS. 39463

**EVERYTHING - You - Need**, Stained Glass Catalog \$1.00. Craftsmen, Hobbyist. Saylescrafts, 171 Main, Nyack, NY 10960

## CARTOONING, COMMERCIAL ARTS, SIGN PAINTING

**CARTOON** for Fun and Money!!! Free booklet!!! Cartoons, Box 40614A, Detroit, Michigan 48240

**35 LESSON** cartooning course. Cartoonist's Magazine, both \$4.00. Hartman, Box 30367, Lincoln, Nebraska 68503-0367

**SIGN** Painting—Easy method. Free catalogue. Kaufmann Company, Centertown, Missouri 65023

## MODELS, MODELS SUPPLIES

**RADIO CONTROL-** Airplanes, Boats, Helicopters, Supplies. Big Discount Catalog \$5.00 (Refundable). Modelers Supply, Box 7185, Montgomery, AL 36107.

**FIRING CIVIL WAR** Model CANNON Plans: Catalog \$1.00. Green—PM25, Box 892, Shalimar, Fla. 32579

**SCALE SHIP MODELS** Since 1905 our Model Ship Kits and Fittings have been the Favorites of Discriminating Modelers. Send \$2.00 for Big Catalog. **BLUEJACKET SHIPCRAFTERS**, Box 533P, Shelton, CT 06484

## TOYS, GAMES, KITES, PUZZLES, NOVELTIES

**DOMINIQUE'**... A new way to play dominoes with 56 playing cards (through double-nine). A wild card is included for madness! \$3.95 prepaid. Dominique', Box 2865, Nacogdoches, Texas 75963-2865

## MAGIC TRICKS, JOKES, VENTRILOQUISM

**LEARN VENTRILOQUISM!** Guaranteed instruction. Supplies, **DUMMIES**. Information Free! Maher, Box 420-PM, Littleton, Colorado 80160.

**FREE!** World's Leading Novelty Catalog. 1600 Jokes, Tricks, Science, Sports, Hobbies. Johnson-Smith, C-6013, MI. Clemens, MI 48043

**FREE!** Catalog Of Magic. \$1.00 Postage And Handling. 1248 Rosewood, Deerfield, Illinois 60015

## HOBBIES & COLLECTIONS

**MILITARY** Medals Catalogue 50c. Yearly Subscription \$4.50. Vernon, Box 1387PM, Baldwin, NY 11510

**NAZI** war souvenirs. FREE illustrated catalog. Delta, Box 31224PS, Honolulu, Hawaii 96820

## DECALS, EMBLEMS, PATCHES

**GUARANTEED** Lowest Emblem Prices! Free Catalogue. Stadri, 61P Jane, NYC 10014. (212) 989-0009.

**CUSTOM IMPRINTED CAPS**—We print anything! No minimums! Free Brochure. Custom Cap Co., Box 341C, Westminster, Md. 21157

**EMBLEMS**, Embroidered—Your Design. Low Minimum. Free Catalog with Prices. Southern Emblem, Box 8P, Toast, NC 27049

## ANTIQUES, RELICS, INDIAN GOODS & CURIOS

**FREE** List to Serious Collectors. 30,000 Indian Artifacts, Pots, Spears, Axes, Stone, Beadwork. Caddo Trading, Box 669, Murfreesboro, AR 71958

**ARROWHEADS** \$16.50 Doz. Identification Guide \$8.81. Artifacts List 40c. Secor's, Box B, Deerfield, MO 64741

## STAMP COLLECTING

**50 YEARS** Old fifteen different United States, over fifty years old—25c with approvals. Jaxon, Box C11-P, New Rochelle, New York 10804

**FREE** Worldwide Packet. Penny approvals. Froehlich, Drawer 968A, Morton Grove, IL 60053.

**DISCOUNT** 50%—Approvals by country. Gains, 716-S Sixteenth, Mattoon, IL 61938

**1,000** Different World + 100 different Mongolian beauties \$3.00. Attractive approvals (pictorials). Cancel service anytime. **ADULTS ONLY.** Gouge, Box 1320-MA, Elizabethton, Tennessee 37643

**WOW!** 50 All Different Germany 25c! Super collection of genuine Germany Commemoratives, Definitives, Airmails, High Values. Free Big Catalog. Also fine stamps from our approval service. Buy what you like. Return balance promptly! Send 25c today! Thank you. Jamestown Stamp Co., Dept. A 15PM, Jamestown, NY 14701

**UNITED** Nations 3 Complete Mint Sets 25c, Approvals, Cornetta, POB 1509-M, Lake Placid, Florida 33652

**BREATHTAKING** Beautiful. 50 Different mint Monaco pictorials commemoratives only \$1.50 with mint complete set approvals. Pagoda, Box 132P, Sidney, Ohio 45365.

**FREE**—U.S. Discount Catalogue. Shelton, Box 547B, North Miami, Fla. 33161.

**WORLD** Wide Stamps mounted in books on approval 2c and up. **TRUST STAMP COMPANY**, P.O. Box 100-P, Jamaica, N.Y. 11435

**50 DIFFERENT** Old U.S. between 1861 and 1939 - \$1.00. Ed Roush, 423 Shepard, Mansfield, Ohio 44907.

**BARGAIN** 100 World-wide Stamps 25c. Quality Approvals. R. Parker, Box 143, West Brookfield, MA 01585

**FREE** Surprise Collection with approvals. Gould, Box 2130, Petaluma, CA 94953

**100** Different U.S. 25c, Approvals. Bradley, Box 425P, Midlothian, VA 23113

**"INVERTED ERROR"** + 100 Different United States, 50c with approvals. Lurray, P.O. Box 7088, Silver Spring, MD 20907

**FREE** U.S. Mint Set. Approvals. Hildebrand, Box 4867, Santa Clara, California 95954

**101** Large Pictorials 50c when requesting worldwide approvals. Benat, P.O. Box 210244, Dallas, TX 75211.

**300** Worldwide 50c to approval applicants. Send today. J. MARTIN, P.O.B. 245, New York, NY 10023

**CANADA.** 50 different 25c. Approvals. Oroszky, Box 1-C, Sarnia, Ontario, Canada N7T 7H8

**50 RUSSIA** 25c. Worldwide Approvals. Birrell, 8525 North Lamar, Suite 185-P, Austin, Texas 78753

**"WHOLESALE"** U.S.—Foreign Pricelist and catalog Free! Everything Guaranteed. No Approvals. Schneider, Box 1240, Grand Rapids, Michigan 49501

**US** 6 commemorative plate blocks or 30 mint commemoratives \$1.00! Approvals. Gordon Davison, Nokomis, FL 33555.

**ONE! Two! Three!** Cent Stamp Approvals! Regardless Catalog. Kloster, 4164 52nd, San Diego, CA. 92105

**HOW** to make money collecting coins or stamps. Manuals \$3.00 each. Mail Order Fair, Dept. 1249, Aliquippa, Pa 15001

**ABSOLUTELY FREE!** 50 Different British Colonies **COMMEMORATIVES**. Approvals. Gobestamps, Box 1236, Saco, ME 04072.

**ISRAEL** 15 Different 10c Approvals. Sam Chazen, Box 686, Delray Beach, Florida 33444

**CANADA** Ten Late Commemoratives 10c Canadian approvals. Harley Boardman, Little Valley, New York 14755

**FREE** 100 Canada with request of World Wide Approvals. Briner's, P.O. Box 5607, San Mateo, Calif. 94402

**35 DIFFERENT** Old U.S. Revenue Stamps \$1.00. Winchester Stamps, Box 3592, Mansfield, Ohio 44907

**FREE** Gift With First Purchase. U.S. Approvals And Want List Service. 20c for Handling. The Stamp Boutique, P.O. Box 456, Madison, N.J. 07940

**U.S. SUPER SAVERS! SENSATIONAL, AFFORDABLE, APPROVALS FOR ADULTS. SCARCER OLD TIMERS, SMALL FAULTS, COLLECTORS LOVE THESE BARGAINS. (ASK FOR SPECIAL 15% DISCOUNT, FIRST SELECTION). RIVERTOWN, BOX 152P, ADA, MICHIGAN 49301.**

**25 RAILROADS** 20c With Foreign Approvals. Weblor, Box 3180M, Leeds, ME 04263

**FREE** S/S to try my U.S. Approvals. REM, 2312 Nebraska, Ft. Pierce, FL 33450

**FREE!** Big Bargain Catalog — New Edition listing thousands of bargains including U.S. & B.N.A. stamps, packets, albums, accessories and supplies. Also fine stamps from our approval service. Buy only what you like. Return balance promptly! Thank you. Jamestown Stamp Co., Dept. E25PM, Jamestown, NY 14701

**SCANDINAVIA** Approvals 2c And Up. Bobb, Box 4218, Sunland, CA 91040

**FREE** Packet Reasonable Approvals. Reva Sales, Box 11647, Phoenix, AZ 85061

**EARLY** beautiful stamps of **FRANCE, USA or WORLD-WIDE** \$50 value send \$10. Name your numbers or take ours. Wilson Sales, Lockhart, SC 29364.

**107** Different Triangles, Space, Animals, Etc. \$4.00 Value. Only 10c. Approvals. Fayette Stamps, Dept. 418M, Fayetteville, NY 13066

**OUTSTANDING!** Mint complete Western European, Cataloging over \$3.00 only 50c with quality approvals. Bergman, Box 231, Weymouth, Mass. 02188.

**50 DIFFERENT U.S. PLATE BLOCKS \$10.00**, 100 different \$20.00, 200 Different \$42.00 Free Pricelist. **EBERLING**, Box 2216, Neptune City, N.J. 07753

**100 WORLDWIDE PLUS 50 MINT** british colonies 50c with approvals: Mid-Atlantic Stamps, Box 476, Edgewater, Maryland 21037

**101 DIFFERENT** Worldwide Packet 25c with pictorial Approvals. Donald Allen, Box 217, Waterville, ME 04901

**FREE**—The 1931 U.S. Red Cross Stamp. Mint is Yours Free With Your Request For Approvals. Colonie, Box 12113, Albany, 12212

**101** Different Worldwide 25c with approvals. Commonwealth Stamps, Box 2108, Dept. PM 2, Merrifield, VA 22116

**25 BEAUTIFUL** Pictorials 10c with Approvals. Mayfield, Box 13698M, Atlanta, GA 30324

**FIFTY FREE** Stamps With Approvals. J&D Stamps, Box 747, Melbourne Beach, FL 32951

## COINS, TOKENS, CURRENCY

**SILVER DOLLARS.** Morgan; Peace. 1/\$19.00. 3/\$49.00. \$1.00 postage. SRS, P.O. Box 201043, Bloomington, MN 55420

## PHOTOS & PHOTO SUPPLIES

**PHOTOGRAPHY'S** Finest Products At Nationally known low prices from a small town dealer you can trust. Free Catalog. Norman's, 3602 South Westledge, Kalamazoo, Michigan 49008. Since 1957.

**YESTERDAYS PHOTOGRAPHS**, Have your Grandmothers Black and White Negatives Printed the Old Way, by People. For Price Listing Write: Post Office Box 389, Gaithersburg, Maryland, 20877

## PLAYS, SONGS, MANUSCRIPTS

**POEMS**, Songs Wanted. Free Recording/Publishing. Broadway Music Productions, Box 7438PM, Sarasota, FL 33578

## MUSIC INSTRUCTIONS & INSTRUMENTS

**ACCORDIONS, NEW, USED.** Electric, electronic, Cordovox, concertinas, Button Boxes, Hohners We Buy, Sell, Trade, Exchanges, Repair, Tune, 50 Years Experience. If Dealers unavailable, Call or Write for Brochures, Mastercard And Visa Accepted. **CASTIGLIONE ACCORDIAN**, 12644 E. 7 Mile, Detroit, MI 48205. 313-527-1595

**INSTRUMENT KITS!** Build Appalachian and hammered dulcimers, banjos, mandolins; even harps, harpsichords. Free Catalog. PM Hughes, 4419 West Colfax, Denver, CO 80204

**INTERNATIONAL VIOLIN COMPANY**, Catalog for instrument makers, repairers. Imported tonewood, tools, varnishes, parts, accessories, strings, cases. European instruments, bows. Assemble yourself violin and guitar kits. Catalog \$1.00 includes 10% discount certificate. Dept. GN, 4026 W. Belvedere Ave., Baltimore, Md. 21215.

**PIANOS, PLAYERS, PUMP ORGANS.** Rebuild and repair. Catalog of "How-To" books, \$2.00 (refundable). Vestal Press, Vestal 11, New York 13850.

**ACCORDION** Top Brands, cordovox. Buy Direct. Tremendous Discounts. Trades accepted. Free brochure. PM. Accordion-O-Rama, 16 West 19th Street, New York, NY 10011

**ELECTRIFY** Player Pianos, Pump Organs Quickly. Inexpensively with Lee Silent Suction Units. Write: Lee Music, P.O. Box 308F, Culver, Oregon 97734

## SELF IMPROVEMENT

**"THINK and Grow Rich"**—\$4.50 Ppd. Write for free catalog self-improvement books. Order Now! Bart Glynn Enterprises, 279-A West Cedar, Cherokee, Iowa 51012

**SELF-PAY MOTIVATIONAL IDEA.** Learn how to discipline yourself, exercise, improve work habits through the principle of self-pay. Send \$2.00 to: Paul Simons, Box 233, Sheboygan, WI 53081.

**CONSTITUTIONAL** Secrets - Your Specific Rights To Sue City, State, If Rights Violated. \$6.50: DA-ABLA, Esq., 1630-Worcester Rd., Suite 528C, Framingham, Ma. 01701

## EDUCATION & INSTRUCTIONS

**BECOME** a specialist technician. **FREE** catalogue describes 200 different correspondence courses. Granton Institute, 263A Adelaide Street West, Toronto, Canada. 1-800-268-1121.

**ELECTRICIAN.** Learn at home in spare time with no previous experience. Installation, maintenance, construction, lighting, heating, air conditioning applications. Get free facts. Write: ICS Electrician School, Dept. PBC15, Scranton, Pennsylvania 18515.

**BE A PARALEGAL** - Handle Your Own Legal Affairs. Accredited Attorney Instruction. Home Study. **FREE CATALOG.** Southern Career Institute, Drawer 25PM-2158, Boca Raton, FL 33427. (305) 368-2522.

**DEGREE** Studies Off Campus Law School. Qualify for CA Bar. Bachelor's, master's, doctorate in business, engineering, health service management and public administration. Prepare for CPA, CMA, CFA and CIA exams. In engineering, E.I.T. and P.E. exams. Credit for work experience. Southland University, 35 No. Craig Ave., Dept. M-8, Pasadena, CA 91107. Toll free 800-423-4530, CA toll free 800-362-7052, national 818-795-5558.

**"JET/GAS TURBINE CAREERS!"** Homestudy courses — theory, maintenance, overhaul — Established 1957. **AMERICAN JET SCHOOL**, Department PM-3, Darby, Montana 59829. (406) 349-2100

**LEARN** Asleep or awake. Records, tapes, equipment! Free catalog! Drawer PM-400, Ruidoso, New Mexico 88345

**LEARN** Sewing Machine repairing. A profitable Trade. Easy to learn. Free details. Sewing Center, 187 FR, Rochelle, GA 31079.

**LOCKSMITHING**, Universal School of Master., Correspondence and Shop Training. Box 214652PM, Sacramento, CA 95821

**AUTOSUGGESTION.** Sleep-learning headquarters! Tapes, records, books, Gigantic catalog free. Research Association, Box 24PM, Olympia, Washington 98501.

**UNIVERSITY DEGREES BY MAIL!** Accredited Bachelors, Masters, Ph.D.s... Free revealing details. Counseling, Box 317-PM2, Tustin, California 92680.

**RADIESTHESIA**, Radionics, Dowsing E.S.P. Courses and Equipment Illustrated Catalog \$1.00 (refundable) Established 27 years. Dept. PM/R, Bruce Copen, Highfield, Danehill, Sussex, England RH17 7EX.

**EXTENSION** And Post-Graduate Awards in Philosophy, Art, Science, Botanic, Medicine, Homeopathy, Radionics, and others. 30 subjects Curricular free (airmail \$1.00 refundable). Registrar, Sussex College of Technology, Highfield, Danehill, Sussex, England.

**FREE** Catalog. Learn Auctioneering. Nashville Auction School, Box 190, Lawrenceburg, Tennessee 38464

**LEARN SAFE LOCK SERVICING.** Home Study. Serving The Locksmith Industry For Over 30 Years. Free Brochure. Lockmasters School, 5065 Danville Rd., Nicholasville, Ky. 40356

**LEARN** Gun Repair at home in spare time. Special tools, charts, exploded views, lessons and exams all included. Accredited. VA/GI approved since 1940. Call (602)990-8346 or write NOW! Modern Schools, Dept. MC25, 2538 N. 8th St., Phoenix, AZ 85008

**HIGH SCHOOL DIPLOMA AT HOME. NO CLASSES.** Low cost. Information FREE. Call toll free 1-800-228-5800 or write: American School, Dept. #30245, 850 E. 58th St., Chicago, IL 60637

**PREPARE** to better handle your business, political and social opportunities. The Blackstone School of Law has met the law training demand for almost a century. Information: P.O. Box 790906, Dallas, Texas 75379

(Continued on next page)

## EDUCATION & INSTRUCTIONS

(Continued from preceding page)

**SUPER-INTELLIGENCE** Amazing method sent Free! **EDEMP**, Box 1462, Glendora, CA 91740

**UNIVERSITY DEGREES BY SPECIAL EVALUATION** of **EXISTING** Job Experience, Education, Achievement. Fast, Inexpensive. Call (614-863-1791). Or Write: Box 13151-T2, Columbus, OH 43213

**SCHOLARSHIP** Money Available! All Fields! Write: National Scholarship Services, Box 62, Ballardvale, MA 01810

**PIANO TUNING PAYS** - Piano tuning - Electronic organ servicing. Learned easily at home. Free booklet. Niles Bryant School, P.O. Box 20153, Sacramento, CA 95820

**SKI INSTRUCTOR IN YOUR POCKET.** For one tenth the price of a personal ski lesson, you can learn to ski at your convenience. Free Brochure. Private Lessons, P.O. Box 2361, Dept. 04, Redmond, WA 98052

**CASSETTES** with Wealth-Building Ideas. Catalogue: Edutape, 5C Algonquin, Medfield, Ma. 02052

**LEARN** domestic refrigeration, 25 billion dollar Repair Industry. \$5.00 for taped Lesson & Information refundable on enrollment. Iceberg Refrigeration, P.O. Box 19931, Houston, Texas 77024

**EFFECTIVE SPEAKING. HOME STUDY. FREE DETAILS.** Power/Speak, Dept. PM2, Box 1505, Bloomfield, N.J. 07003

**PRAY:** Each Thought About Soon Following Next Water Washing Continue Acts 8:12-17 Spirit Led. 1127 NE Fifth St., Ocala, Fla. 32670

**CANADIAN UNIVERSITY DEGREES BY MAIL!** Accredited! Directory \$10.00 Guaranteed! Box 41, Suite 306, 1430 Mass. Avenue, Cambridge, MA. 02138

**MINISTERIAL DEGREES** Correspondence courses. BD, DD, PhD. Accredited Theological Seminary. Science of Mind College, Dept. OM, Box 86637, San Diego, CA. 92138.

**UNIVERSITY DEGREES** By Mail. Accredited Bachelors, Masters, PhD's. Free Facts Revealed. Careers-PM2, Box 470886, Tulsa, OK 74147.

**DETECTIVE** training home-study program. Free information. Global, Box 191 PM, Hanover, Mass 02339

**TERMPAPER CATALOG**—306 pages—15,278 papers available. Rush \$2.00. **RESEARCH**, 11322 Idaho, #206PM, Los Angeles, 90025. (213) 477-8226.

## SCHOOLS

**WHY NOT INVESTIGATE COMMERCIAL DEEP SEA DIVING AS YOUR CAREER?** Our Graduates are working worldwide making excellent money. Send for free catalog containing disclosures, credentials, course outline, employment statistics, instructor qualifications, progress standards, financial assistance to: Divers Institute of Technology, Inc., P.O. Box 70312, Dept. PM, Seattle, WA 98107

**WORLD WIDE COLLEGE** of Auctioneering, Inc. The original—50-yr.—World's largest! Term soon. Approved for V.A. Free catalog. **COL. GORDON E. TAYLOR**, Box 949, Dept. 19, Mason City, IA 50401. 515/423-5242.

## EMPLOYMENT INFORMATION

**CONSTRUCTION OVERSEAS** Send resume to: Overseas, 4732 South Victor, Tulsa, Okla. 74105

**SAUDI ARABIA WANTS YOU!** Excellent Pay! Transportation! Guide \$2.00. **ARAMACO**, Box 820AB, Port Alice, B.C. V0N 2N0

**ROCKY MOUNTAIN EMPLOYMENT NEWSLETTER!!** Colorado, Idaho, Montana, Wyoming! Current openings - ALL occupations! **FREE INFORMATION!!** Intermountain-L, 3115 N. Hancock, Colorado Springs, Colorado 80907.

**THERE MAY BE AN OVERSEAS JOB FOR YOU.** Most Skills And Occupations Needed Worldwide. Free Valuable Report. Directory, Box 801, Tonawanda, NY 14151

**100 JOB OFFERS?** A complete list of hi tech companies compiled by executive with inside knowledge of companies on the move. Updated monthly listing contains employers located in California's famous Silicon Valley. Only \$5.00 — "Career," P.O. Box 221, Sunnyvale, CA 94086

**INDUSTRIAL** maintenance coatings and single-ply roofing sales, for 102 year old manufacturer, provide Top Earnings, Cash Bonuses, Merchandise and Travel Incentives. Free Details. No Investment Ever! Call Toll Free (outside Ohio) 1-800-321-8353 or write: Tropical Industrial Coatings, Inc., Pearl Road, P.O. Box 444/PM2, Brunswick, Ohio 44212-0015.

**SHIPS, TUGS, CRUISESHIPS, RIVERBOATS** Women, men, \$15,000-\$60,000 Expenses paid. Work month, home month. Experience unnecessary. U.S. 112 Countries. Free report. Send stamped envelope. Marine Employment, B207, Central, IN 47110

**WORK** overseas \$20,000 - \$60,000 opportunities! For info, call 317-839-8900 EXT. 24

## HELP WANTED

**HEAR Us Out!** Texas Refinery Corp. offers an opportunity for high income Plus cash bonuses and fringe benefits in your area. Regardless of experience, write W.E. Sears, Pres., Box 711, Ft. Worth, TX. 76101

**AUSTRALIA** — Openings Now! Top pay! Transportation. Plus Worldwide listings: \$2.00. Jobworld, Box 681E, Cypress, CA 90630.

**AUSTRALIA WANTS YOU!** Jobs! Big Pay! Transportation! Newest Handbook — \$2.00. **AUSTRALIAN INTERNATIONAL**, Box 19107-AB, WASHINGTON, DC 20036.

**OVERSEAS** Employment . . . \$20,000 - \$60,000+. Free Report! Employment, Box 19760-AB, Indianapolis, Indiana 46219.

**OVERSEAS, U.S. JOBS AVAILABLE. UNLIMITED OPPORTUNITIES.** Write for application. Employers, Box 387-G, Orange Park, FL 32067.

## FOR INVENTORS

**INVENTORS BEWARE:** Tired of Invention Companies that promise you everything, but just take your money and deliver nothing? **AFRAID** of disclosing your Ideas Before They're Protected? There is an alternative! You can do it all yourself. Inquire: Associated Inventors Assistance, Inc., 2166 E. Greenway Dr., Tempe, AZ 85282. (602) 897-6060.

**BOOK.** Successful megabuck inventor reveals secrets of selling inventions. Information write: **RICHSER**, Box 34828, Bethesda, Maryland 20817

**PATENT IT ECONOMICALLY!** Free Details. N. Raner, 2008 Fondulac, Richmond, VA 23229

**INVENTORS! IDEAS HAVE VALUE!** Ever think of an idea, forget it and see it later on the market? Many people don't forget, act quickly and are rewarded by American industry. Write down your idea! We offer free disclosure registration and initial consultation regarding your idea's potential value. Call or write without delay for your free information package. **AMERICAN INVENTORS CORPORATION**, 82 Broad Street, Dept. PM, Westfield, MA 01086. (413)568-3753. A Fee Based Marketing Company. Offices Coast to Coast.

**PROTECT YOUR INVENTIONS AND TRADEMARKS.** Registered Patent Attorney. **FREE** Preliminary Review. Box 392PM, Millwood, NY 10546

**INVENTORS:** How to market your inventions. Revised edition still only \$9.95: **Inventors Handbook**, 340 Moon Court, Casnovia, Mich. 49318

**PROTECT** Your invention. Registered Patent Attorney. Many Years Experience, all Fields. Individual Inventor's Problems Given Special Consideration. Very Reasonable Charges. Write for Free information. Paul H. Gallagher, 2530 Crawford Ave., Evanston, Illinois 60201

**NONPROFIT** Foundation helps inventors. Widest range of services. Free recording forms. Free evaluation. Affiliated Inventors Foundation, 501-B Iowa, Colorado Springs, CO 80909, Or Call 1-800-525-5885.

**INVENTING.** The government will help you! Send \$4.50 money order to: Cole's V.I.P., 6551 Warner Ave. #81 Dept. I, Huntington Beach, California 92647

**REGISTERED PATENT ATTORNEY** Washington D.C. Suburb. Donald A. Kettlestrings, 414 Hungerford Drive, Rockville, Maryland 20850

**INVENTORS:** If you have an invention for sale or license, write for free booklet explaining how we can help you. Kessler Sales Corp., C-5-FI, Fremont, Ohio 43420

**PATENT AND DEVELOP** Your Invention. Registered Patent Agent and Licensed Professional Engineer. Send for **FREE PATENT INFORMATION** Every Inventor Should Have. Richard L. Miller, Woolworth Building, 233 Broadway, Suite 3612-M, New York, NY 10007. (212) 267-5252

(415) 886-4440

**PATENT PROTECTION BY ATTORNEY.** Silicon Valley Patents, 3732 Oakes, Hayward, California 94542

## INVENTIONS WANTED

**INVENTION MARKETING. FREE INFORMATION. REPRESENTING MANUFACTURERS.** Patmart, 77 Fulton, 26D, Financial District, New York, NY 10038

**EARN ROYALTIES.** **MUPRODUX INTERNATIONAL**, 1377 K. NW 182, WASHINGTON, DC 20005

**INVENTORS!** Have an idea? Don't know what to do? Call AIM for free information kit. Toll Free 1-800-225-5800

**INVENTORS:** Publish your invention for sale or license in **TODAY'S INVENTION**, read by over 15,000 manufacturers monthly. Green Tree Publishing, 4974 N. Fresno, Suite 378, Fresno, CA 93726. (800) 457-9805; in California (209) 227-4300.

**LEARN** how to offer your invention for sale or license. Free booklet outlines procedures, royalty rates, requirements. Kessler Sales Corporation, C-5-IW, Fremont, Ohio 43420

## REAL ESTATE & FARMS

**SMALL** town country living in Anza, Southern Calif. 5 to 10 acre homesites. (714) 763-5612.

**CANADIAN** Country Properties. Our 70th year. Terms available. Catalogue airmailed \$1.00. Dignam Corporation, Suite 496, 85 Bloor East, Toronto, Ontario M4W 1B5.

**PEACE** Community. New concept. Information \$2. Lehman, Box 110PM, Yachats, 97498

## YOUR OWN FISH AND HUNT LAND

**LOW AS \$29.00 ACRE—\$50.00 DOWN!** **BEST** areas for fish and game. Government report more fish and game per square mile. **TITLE GUARANTEE. BUY BACK GUARANTEE.** Bought thru **ESTATE LIQUIDATIONS** across Canada. **EASY PAYMENTS.** Get your Free catalogue **NOW!** **CANADIAN ESTATE LAND**, Dept. PMC, 2411 Yonge Street, Suite 303, Toronto, Ontario M4P 2Z1. Phone any time: 1-416-488-0444.

**ORANGE GROVES**, hunting land, winter properties farms, acreages and more in FL and 15 other states. **FREE** catalog #60 lists 100's of properties. Call or write today! (include phone number.) American Farm Digest, 3546 Watson, St. Louis, MO 63139. (800) 325-9943

**BECOME** Real Estate Inspector - Large Income Potential. Be Boss. Home Operation Minimizes Investment. Simplified Instructions. Assistance. Free information. Box 400PM, Arnold, MO 63010.

**WESTERN NORTH CAROLINA** Mountain Acreage, Farms, Cabins, Homes, Waterfront Property. **FREE** Brochures. Call Toll-Free: 1-800-438-8159. Raper Realty Inc., P.O. Box 619, Murphy N.C. 28906

**FLORIDA KEYS** Homesites from \$5,995.00. Call or write: S/E Investment Realty, P.O. Box 888PM, Key Largo, Florida 33037. (305) 451-0425

**CALIFORNIA.** Lots. Acreage. \$40 Down. \$40 Monthly. Box 35291, Los Angeles, 90035.

**FREE REAL ESTATE CATALOGS.** Midwest and Southeast Sun Belt States. Specify Property and Area Desired. Call or Write: **COUNTRY NETWORK**, Box 368PM, Gainesville, MO 65655. 417-679-4632.

## BUYING & SELLING

**BUYING** E.C.M. \$80/lb., T.C. you throw away \$3/lb. 3,000 others. Free details. Salvage, 2071 NE 64th St., Ft. Lauderdale, FL 33308

## EXPORT-IMPORT

+ 2500 "Fast Sellers." Free Brochures! Allprodo, Box 91309 B4, Cleveland, Ohio 44101

## PLASTIC BAGS

**HUNDREDS** of Sizes, Plain and Ziplock. Lowest prices! Immediate delivery! Free Catalog. Action Plastic Sales, 16900 94th Lane NE, Minneapolis, Minn. 55434. Tollfree: 1-800-328-8484.

## BUY IT WHOLESALE

**EARN MONEY** selling rings, jewelry, buckles, watches—buy direct. 130% below retail. Catalog \$1.00 (refundable). Anka-PM, 90 Greenwick Ave., Warwick, RI 02886

**BELTS** and Buckles. Complete line fast sellers, including truckers, motorcycles, wildlife, westerns etc. Big Profits. Complete dealer set up. Catalog \$1.00. Anchor Specialties, Box 3958-BPM, North Providence, RI 02911

**CLOSEOUTS!** Discounts! Below Wholesale! Freebies! Information/stamp: DDN, Box 20152K, Ferndale, Michigan 48220.

**CLOSEOUT** Jewelry 55c dozen. (Catalog 25c), Roussels, 107-1631 Dow, Arlington, MA 02174

**400,000 BARGAINS** Below Wholesale: Many Free! Liquidations . . . Closeouts . . . Job Lots . . . Single Samples. Free Details. Bargainhunters Opportunities, Box 730-A, Holland, Michigan 49423.

**WORLDWIDE BARGAINS** . . . Imports — Dropship — Closeout — Surplus — Freebies — (Stamped Envelope). Mamees, Box 1717PM, Highland, Ind. 46322

**500,000** Items Below Wholesale—Everything Imaginable! Free Outline Catalog! Bargains, Box 931P, Cullman, AL 35055

**1,000,000** ITEMS! Lowest Prices! \$1.00 Shipping! "Bonanza", # "D-P", Luquillo, PR. 00673

**500,000** ITEMS BELOW WHOLESALE—EVERYTHING IMAGINABLE! **FREE** Catalog of Bargains! World Bargains, Box 931PM, Cullman, AL 35055

## ADVERTISING AGENCIES, ADV. SER. MAILING LISTS

**FRESH** Hot Responsive Name Lists of Mailorder Buyers. Most Categories. Computerized in Zip Code Order. Peel and Stick labels Guaranteed Deliverable! For Brochure Send SASE to: D.R.B., Box 270, Rte. 2, Wilmington, Illinois 60481

(Continued on next page)

Материал, защищенный авторским правом

## ADVERTISING AGENCIES, ADV. SER. MAILING LISTS

(Continued from preceding page)

**MAILORDER BUYERS!** Most categories. These people WILL respond to mailorder offers. Computerized ZIP code order. Peel and stick labels. Guaranteed deliverable. For details send SASE to: RLS Marketing Services, 305 West Magnolia #335, Fort Collins, CO 80521.

**OPPORTUNITY SEEKERS/MLM NAMES. FREE SAMPLE.** Venture-PM, Box 336, Riviera, AZ 86442

**MAILING LISTS GUARANTEED DELIVERABLE.** Computerized in zip code order. Peel and stick labels. Rush SASE: J.D. Brewer Co., Box 467395, Atlanta, GA, 30346

**FREE Mailing List Analysis.** Details. GOC-12P, Box 1107, Stuart, FL 33494. (305)334-5205. 1-800-554-5478

**MAILORDER NAMES!!** All Categories. Computerized on Peel and Stick labels in ZIP CODE ORDER. **GUARANTEED DELIVERABLE!** Write: Santos Publishing Company, 6213 Chapel View Lane, Citrus Heights, Ca 95621.

**MAILORDER BUYERS LISTS GUARANTEED DELIVERABLE SASE.** 1013 Gates Street, Warminster, Pa 18974

## BUSINESS SERVICES

**HOW TO ADVERTISE** -Professional Secrets - Easy guide to newspaper advertising-small businesses. Full, money-back guarantee. \$3.95. Unicorn Studio, Harrison, Maine 04040

**INCORPORATE** without legal fees! Free booklet tells how, includes forms. Call now 800-345-CORP.

**MAILORDER BUYERS LISTS** Computerized On Peel and Stick Labels Zipcode. Guaranteed Deliverable. Free Brochure. Beattie Mailing Services, P.O. Box 524, Vancouver, WA 98666

## RUBBER STAMPS

**BARCO** Type Founders. Type and Rubber Stamps catalogue. Mail \$2.00 refundable on first order. 237 S. Evergreen, Bensenville, 60106

## PRINTING PRESSES, RUBBER STAMP OUTFITS

**TYPE** for printing. Catalog \$1.00/deductible 1st order. Quaker City Type, R.D. 3, Box 134, Honeybrook, PA 19344

**COMPLETE** Rubber Stamp Outfits, Supplies. Same day shipment. Sign Engraving Machines, Wholesale Catalog \$1.00 Deductible. Star Stamp, 1720E N. Marshfield, Chicago, 60622

**TYPE** Fonts. Hand Printing Presses, Supplies. 120 Pages. \$1.00 Deductible first order. Acme Type, 1720 N. Marshfield, Chicago, 60622

**PRINTING** Presses, new and used supplies. List 50c: Turnbaugh Printers Supply, Mechanicsburg, Penna. 17055

## PRINTING SUPPLIES

**PRINT FOR PROFIT** - Earn extra money; printing press, type, supplies, direct from factory. Famous since 1872. Write for free catalog and samples to: Kelsey Company, DM, Meriden, CT 06450

**QUICK** Copy Printing. Low Prices. Write: Nationwide, 614 North Main, Bloomington, Illinois 61701

**THERMOGRAPHED BUSINESS CARDS**, Low Prices. P.J.W., Box 134, Barberton, Ohio 44203

## GIFT SHOPPING

**PLANS—N—PRODUCTS:** Perfect Gifts By Mail. Satisfaction Guaranteed! Catalog \$1.00 Plus This Ad. (Refundable). 303 Welton, Baytown, Texas 77520

## CLOCKS, WATCHES, OLD GOLD, JEWELRY

**HIGHEST CASH** for Gold, Jewelry, Gold Teeth, Rings, Diamonds, Watches, Silver, Platinum. Mail Articles Today. Free gift with information. Chicago Gold & Precious Metals, 10 South Wabash, Dept. 658, Chicago, 60603.

**CLOCK WORKS**, wood clock blanks, rockhound supplies, belt buckles, cut stones, etc. Wholesale catalog 25c. Eloxite Corp., 806 1/2 10th Street, Wheatland, Wyoming 82201.

**CYPRESS LOG CLOCK.** Natural shape. Unusual finish. Quartz accuracy. Details: Oakview, Rt 2, Box 143, Goochland, Va. 23063

**TAKE NO CHANCES.** Deal with oldest, most reliable firm in old gold business. Established 1934. We buy Gold, Silver, Platinum, Diamonds. Highest Cash. Free Information. Rose Industries, 29-A East Madison, Chicago, 60602

**CLOCK** plans, movements, dials, parts, 72 page catalog \$2.50 (refundable). Turncraft Clocks, 7912 Olson Hwy., Minneapolis, MN 55427, Dept. PS85.

## TREASURE FINDERS

**FIND** coins, jewelry, nuggets, treasure. New revolutionary patented detector. Astounding range. Unaffected by black sand, mineralized ground. Rejects metallic trash. Free Catalog. Gardiner, 4729M N. 7th Avenue, Phoenix, AZ. 85013

**TREASURE** - Locate quarter mile away with ultra sensitive locator - brochure free. Research Products, Box 270270 - AMC, Tampa, Florida 33688

**SAVE** up to 40% on new metal detectors. All major brands including White's and Garrett. **FREE** discount price list. Northwoods General Store, P.O. Box 9674PM2, Madison, WI 53715. (608)274-4680.

## PROFITABLE OCCUPATIONS

**FT. SMITH** Auction School, Ft. Smith, Ark. 72903. Resident & Home study. Veteran Approved.

**REPAIR** lawnmowers thousands of parts and tools wholesale list 40c. Eltwanger's, PM, P.O. Box V, Port Jervis, NY 12771

**PLASTERCRAFT** . . . Profitable Home Business 3000 Molds Available. Details. Lynette, 6251C Mentpark, Mentor, Ohio 44060.

**PHOTOSKETCHING** Profitable, Easy, Creative. Details \$3.00. Hillers, Flournoy, CA 95029

**FREE** Brochure. Repair air conditioning Refrigeration. Tools, supplies, full instructions. Doolco, Inc., 2016 Canton, Dallas, Texas 75201.

**BECOME A PROFESSIONAL WRITER!** 10 Lesson course. Writing assignments, criticism of your work, lists of magazines and rates they pay. Earn money before you complete lesson 3. \$9.95: Phase I, Box 375W, Parma, Id. 83660

**MAKE MONEY IN SPARE TIME.** Earn Generous commissions as a subscription sales representative for leading magazines. For full details and instructions, send this ad with your name and address to: **POPULAR MECHANICS**, Dept. AB-M, 250 W. 55th St., New York, NY 10019

## SALESMEN-DIST.

**SALESMEN**— Hand Crafted Bells Custom Engraved 20% Commission. Our 62nd Anniversary Send 2-20c Stamps For Catalogue. Damon's Glass Engraving, Sistrerville, W. VA 26175

**MAKE EXTRA MONEY DURING YOUR SPARE TIME!** Earn Weekly Commissions showing our Exciting Line of Calendars, Pens and other popular Advertising Gifts. Plus other Bonuses and Contests you'll like! Prompt, Personal Service from AAA-1 firm. Our 78th year. Be your own boss. Set your own hours. Full time potential! Write to: Kevin Peska, **NEWTON MANUFACTURING COMPANY**, Dept. CPM2, Newton, Iowa 50208

**DISTRIBUTORS WANTED.** Start sales team. Sell Business Incentive Promotions. Write: Consumer Promotions, 719 Lakeview Rd., Clearwater, Florida 33516

**BIG WEEKLY COMMISSIONS.** 29% (A). Sell advertising gifts to businesses. Full or part time. Write: Allen Travis, 2062 McGregor, Ft. Myers, Florida 33901

## AGENTS WANTED

**WITH** Mason Shoes, pay day is when you want it! Take orders from friends and neighbors. Watch your business build, without risk or investment. Call Toll Free 1-800-826-7030, Ext. 648; in WI 1-800-472-7003, Ext. 648, or write: Mason Shoes, K-851, Chippewa Falls, WI 54774.

**SPARE TIME CASH.** Sell Famous Hanover Shoes. Samples, sales kit free. No experience needed. No age limit. Big commissions. Hanover Shoe, Dept. 3781, Hanover, PA 17331.

## BUSINESS OPPORTUNITIES

**IMPORT-Export** opportunity, profitable world-wide, mail order business from home, without capital. We ship plan for no risk examination. Experience unnecessary. Free Report. Mellinger, Dept. R2703, Woodland Hills, California 91367

**\$100,000 YEARLY** !!! Assemble "PROFESSIONAL" **GIANT SCREEN PROJECTION TVS**—"Don't be fooled by imitations!" . . . "Build the best with lenses and screens utilized by Sony, Zenith, Sylvania, and Magnavox!" . . . Simple construction! . . . Illustrated information and complete parts catalog \$2.00 . . . Money back guarantee! . . . **POLI-VISION**, 187-X Cypress St., Throop, PA 18512

**PREPARE** Tax Returns. Earn high fees, dignified work. Train at home. Accredited Program. National Tax Training School, Monsey, 2BS, New York 10952.

**MAKE MONEY WOODWORKING** - Easy profits making unusual gifts, toys, novelties. Free details. Williams, 32K Titus, Glen Cove, NY 11542

**OWN YOUR OWN BUSINESS.** Detailed books explain vast opportunities. Catalog \$1.00 (refundable). CRC, 12021 Wilshire, #197L, Los Angeles, CA 90025

**MAKE MONEY.** Discover how over 90% of wealthy people began. Free details: S.H. Enterprises, Dept 1, Box 189, Clarksville, Tn. 37040

**GET RICH IN MAIL ORDER** without experience or capital. Free information. S & J Merchandise, Dept. 1613, Box 33277, Northglenn, CO 80233

**MAKE HOMEMADE BOOKLETS.** I've earned \$187,000 with mine. Free information: Falcon, Box 37169, Ft. Worth, TX 76117

**MAKE \$500.00 Weekly** Mailing Our Burglar Alarm Advertisements! RBM Merchandising, P.O. Box 59314, Chicago, Illinois 60659.

**HIGH PROFITS WITH CUSTOM T-SHIRTS AND CAPS.** Inexpensive, professional heat transfer machines. All supplies. **PRESS MAGIC**, P. O. Box 22809 (GC), Tampa, FL 33623

**MAKE** Rubber Stamps. Highly Profitable Business. Free Details. Stamper, POB 22809 (GC), Tampa, FL 33622.

**BUMPER STICKER PRINTING DEVICE.** Cheap. Simple. Portable. Free details. Bumper, POB 22791 (GC), Tampa, FL 33622.

**SCREEN PRINT T-SHIRTS.** Inexpensive kits. Free Details. "T-Printer," POB 23991 (GC), Tampa, FL 33623.

**PROFITABLE GOLD FOIL PRINTER.** Personalize business cards, pencils, matches. Free Details. Gold, POB 24986 (GC), Tampa, FL 33623.

**HOW to Make Up To \$750 Next Weekend.** FREE Details. BRP, 505 Churchill Circle, Greenville, South Carolina 29605

**VINYL'S** Where the money is! Professionally repair, refinish, recolor furniture, luggage, car tops. Quick, easy. Two small \$20 jobs a day earn you \$1,000 a month. Homes, cars, offices, restaurants, unlimited customers. Start earning after a few days practice. Sensational details free. VIP, 2007 Montrose, Chicago, 60618

**TAKE** Catalog Orders. We drop-ship 2500-best-selling specialty products. Lowest below wholesale prices. Immediate delivery. Spectacular home business opportunity. Free Book. SMC, 9401 De Soto Ave., Dept. 20-50, Chatsworth, CA 91311-4991

**ALUMINUM SCRAP** - Recycle Yourself - **MAKE \$25.00/ POUND!** Free Information: Industrial - PMS2, Box 127, Alexandria Bay, New York 13607

**ASSEMBLE PRODUCTS AT HOME.** Many opportunities paying High Weekly Profits presently available without investment. Write: Businesses, 92B Brighton 11th, Brooklyn, New York 11235.

**PIANO** Tuning quickly learned with home study courses. Diploma granted. American Tuning School, 17050 Teller Drive, Morgan Hill, Calif. 95037.

**PICTURE** Framing—Profitable full or spare-time business. Easy to learn with handbook-course "Guide To Picture Framing Profits." \$3.00 Guaranteed. Free framing-supplies catalog included. Japs, 126-PM Seventh North, Hopkins, Minnesota 55343.

**CONCRETE** Block Machines: Catalog \$1.00. Route One, Box 3740, Rapid City, South Dakota 57702-3740

**REPAIR HYDRAULIC JACKS — DETAILS FREE.** WRITE: HYDRAULIC PARTS SUPPLY, BOX 4157, BROWNSVILLE, TEXAS 77520.

**VENDING MACHINES.** No selling. Routes earn amazing profits. "Big Catalogue FREE." Parkway Corporation, 1930 PMB Greenspring Drive, Timonium, Maryland 21093

**NEW** Mercedes Benz, \$120.91 monthly, or BMW, \$81.51. . . . Guaranteed. . . . Write: FoxCo, Box 2655-52, Springfield, VA 22152

**ALTERNATOR/ Starter** Rebuilding Made Easy Start Without Capital. ADM, Box 33, Buffalo, N.Y. 14207

**ARAB BUSINESSMEN** Have money to buy & invest. Top finders fees paid. International MiddleEast Associates, 8291 Flaxman, Dept. 285PM1, Huntington Beach, CA 92646.

**BATTERY RECONDITIONING** made easy. Proven big cash profits! Spare time. Free details. Owen, 771 PM, Battle Ground, Washington 98604

**\$1,000.00 WEEKLY** Possible Bronzing Baby Shoes **FREE BROCHURE SHOWS HOW.** NBPM, 398 Airport, Sebring, FL 33870

**MAKE** Money Fixing Typewriters. Free Information: RCS Systems, P.O. Box 45, Simsbury, Conn. 06089

**HUGE** profits! Reconditioning used car batteries. Secrets others don't tell. Stamp please. Battery Outlet, Box 3300, Hickory, N.C. 28603.

**1000'S** Weekly. Mailorder. Details: Delights, 210 Welch 1014 PM, Ames, IA 50010

**LEARN** Sewing Machine Repairing. Men. Women. Lucrative Profits. Grasslin Correspondence School, Box 5104, Spencer, Iowa 51301.

**SEIZED IN GOVERNMENT NARCOTICS RAIDS!!** Automobiles . . . Vans . . . Boats . . . Furniture . . . Thousands other items. Buy Dirt Cheap - Resell for Big Profits! Free Information: Marcel, Box 7557-M, Monroe, LA 71211

(Continued on next page)

## BUSINESS OPPORTUNITIES

(Continued from preceding page)

**FACINATING Home Businesses!** "Guaranteed Successful!" FREE Report!! Regency, 1811-A Fuquay, Newburgh, IN 47630.

**CASH Loans** \$500-\$25,000! All Eligible! Any Purpose! American, Box C-16, Lynbrook, New York 11563

**TAKE PICTURES** for profit. Photomoney, 1459K West 32nd, Golden, CO 80401.

**MULTILEVEL MAILORDER!** You Too, Can "MAKE BIG MONEY" At Home. FREE Cassette Reveals How! SSCA, 6940 1/2 70 Avenue, Pinellas Park, FL 33565

**MULTI-Level Mailorder, Two Opportunities.** Details. O'Neil-M, 10 Oak Lane, Suisun, CA 94585

**\$700** Per month earnings possible filling out income tax forms at home or tax office during tax season. We show you how. Simple, quickly learned. Details mailed free. No salesmen. Hurry. Big demand. Federated Tax, 2064 Montrose, Chicago, 60618.

**SELL** Books by Mail. Dealership-25c. Midwest, Box 44R2-PM, Shawano, Wis. 54166

**MAKE BIG MONEY REPAIRING WINDSHIELDS** & Plate Glass! Up to \$60,000 yearly! Call TOLL-FREE for Valuable FREE report. 1-800-321-2597. Glas-Weld Systems, Box 5755D, Bend, OR 97708.

**FANTASTIC FUEL-BOOSTER. MILEAGE PLUS. MLM OPPORTUNITY. SAMPLE, DETAILS, \$3. HALLCO, BOX 143, STONEHAM, MA. 02180.**

**PROFITABLE BUSINESSES FROM DESKTOP** - Guaranteed - Details free. Allied Publishing, Box 4791 Toms Rivers, N. J. 08754-4791

**\$480** Weekly. Home mailing program. Goodworld, Box 26233-R, Tamarac, Florida 33320

**FREE!** "... TREASURY OF HOME BUSINESS OPPORTUNITIES" ... MAILCO, BOX 34370, BARTLETT, TENNESSEE 38134-0370

**MAKE MILLIONS MANUFACTURING BATTERIES!!!** Supplies available. Everlast, Box 365, Bogota, NJ 07603.

**\$100,000 PER YEAR** possible as a money broker. Associates needed. Experience unnecessary. Big demand everywhere! Free proof of income and details. Wes-State, 834 Pearl, Dept. LO, Eugene, OR 97401.

**GROWING** demand for this profitable home business. Complete details \$3.00. Timberhill Co., Dept. 125, Box 51, East Aurora, N.Y. 14052

**\$25,000 LOANS INTEREST FREE!!** Secret Federal law WIPES OUT DEBTS!! Details FREE!! Moneywise/B, LaGrange, NY 12540

**GET RICH** using OTHER PEOPLE'S MONEY!! Unique—amazing business!! Details FREE!! Finance Consultants/B, Billings, NY 12510

**CLIP** newspaper items—\$2 - \$25 EACH!! FREE Report! Clippings/B, Billings, NY 12510

**NEW** Idea? American Patent in Washington, D.C. Gets Results! Best References - Free Kit - 1-800-257-7880. 1377 K Street, N.W. #400, Washington, D.C. 20005

**GET RICH!!** Secret law smashes debts—brings Cash, Credit! FREE report!! WealthKit/B, Billings, NY 12510

**MAIL** Order Profits! For Disclosure. CRIA, Box 257, Stuart, FL 33495

**MULTI-LEVEL ENTHUSIASTS!** Unique product - only company to carry it. Be sponsored by the Best! BOB HOLKER. Interested? Write! Triber, 427 Piedmont Rd., Valparaiso, IN 46383

**55 UNIQUE,** easily started businesses making over \$50,000! Details: Marr, 3425 Overhill, Roanoke, VA 24018.

**NEW** discovery in battery reconditioning. Eighteen months guarantee means "Big Profits Fast"! Electone, 7415 Gable Dr., Little Rock, AR 72205

**MAILORDER BUYERS** Thousands of MAILORDER BUYERS LISTS Are Now Available For IMMEDIATE USE! Computerized On Peel And Stick Labels In ZIP CODE ORDER. GUARANTEED DELIVERABLE! FOR Complete Details RUSH TO: DAVID DINIGHT AND ASSOCIATES, 1004 MARS DR., COLORADO SPRINGS, COLORADO 80906

**ARABS** HAVE MILLIONS to Loan, Invest, Purchase! FREE DETAILS! PRS-PM, 935 Main, Vidor, TX 77662

**MAKE** and/or DISTRIBUTE—BALANCE the BUDGET TOYS. Send \$5.00 for details and sample toy to: Bell Cantalever, P.O. Box 1703, Tybee Island, Ga. 31328

**HIGH PROFITS** IN SNOBALLS. Detailed instructions, recipes, information on extracts and machines. Price lists, \$2.00: Snak Shak Distributors, 2010 Crestmont, Norman, OK 73109

**MAILORDER** Opportunity! Start profitable home business without experience or capital. Write for free book, plus details. No obligation. Mail Order Associates, Inc., Dept. 540, Montvale, NJ 07845.

**\$1,000,000 CYPRESS INDUSTRY** offers person wanting their own business the opportunity assembling our product and becoming Independent Manufacturer, supplying mail orders and sales crews. I.C.M., Box 42101, Fayetteville, NC 28309

**TREMENDOUS** Sparetime profits. Dropship mailorder book dealership available. Write: Caverly, 216 C2 McLean, Wilkes-Barre, PA 18702.

**NATURE'S "GARBAGE" IS WORTH THOUSANDS!** Take it! Free information. Floyd's, Box 1657, Brenham, TX 77833

**MAILORDER** Income! \$40,000 Yearly! Write: Frontier, Box 40836, Tucson, AZ 85717.

**RECYCLE METALS. NO, NOT BEER CANS!** Easy \$458 weekly! Free information, Recycler, Box 1657, Brenham, Tx. 77833

**PROJECTION TV** ... Make \$\$\$'s assembling Projectors ... Easy ... Results comparable to \$2,500 projectors ... Your total cost less than \$20.00 ... PLANS, 8" LENS & Dealers information \$17.50 ... Illustrated information FREE ... Macrocoma-BFX, Washington Crossing, Pennsylvania 18977, Creditcard orders 24HRS. (215) 736-2880.

**GIANT** Wholesale Color Catalog, Stuffed With Over 3000 Best-Selling Flea Market Items. GREAT FOR RESALE. Complete Satisfaction Guaranteed. Send \$3.00 Refundable: Wessels Products, PM-0285, 9638 Kernwood, Houston, TX 77060.

**\$40,000 ON 1/3 ACRE!** New Hydroponics—inexpensive, pleasant, practical! Free information. Robin's, Box 1657, Brenham, TX 77833

**WORLD TRAVEL FOR FUN AND PROFIT.** Men, women, start your own profitable import/export business! Even part-time from home. No capital or experience required. Dynamic, successful program from England provides the "how-tos" and the contacts. 25,000+ satisfied clients in 120 countries since 1946. Brochure \$1. Wade, Department B610, 6715 Seegers, Houston, Texas 77066.

**MAILORDER PRO REVEALS SECRETS OF SUCCESS.** Free details. M&W Company, 193 Silas Ave., Newbury Park, CA 91320

**SELL** Unique High Profit Retractable Ball Point Pen In Key Chain And Necklace Novelties. Southeast Industries, Inc., P.O. Box 361, Dept. PM2, Coffeyville, KS 67337

**GUARANTEED PROMPT DELIVERY** of your Name to Every LEGITIMATE Business and Money-making Listing Here. Send \$2 to: Page Services, 936 Kern, Missoula, MT. 59801

**\$10,000** in one month. Powerful new book tells how step by step. Money-back guarantee. \$12.95 to: Newlife 106, 550 Larsen, Aptos, California 95003

**\$50,000** in three months without leaving home, in your spare time. Anyone can handle it after reading our detailed Plan. Don't lose this chance to make big money. Send \$10.00 check or money order to: Construction Consultants, Inc., 35 E. Wacker Drive, Chicago, IL 60601

**BOOKLET MAKING** - Profitable full or spare-time business. Easy to learn with handbook-course by Sal Paraacandolo (includes mailorder techniques). \$3.95 Guaranteed. Free suppliers directory included. Realmhill House, 30-55-B 33rd Street, Astoria, N.Y. 11102.

**START YOUR OWN BUSINESS AT HOME.** Free Details Write: Beck, 812 Tulane, Benton, Ark. 72015

**PROVEN** Mail Order Business Patented Product-Educational, Consumer Market, Box 429, Claremont, Ca 91711

**AMAZING** profits. Below wholesale gifts, toys, tools, jewelry. 2400 items. Giant catalog \$2.00 Refundable. Connections, 8411 NW 8th Street, Suite 105C, Miami, FL 33126

**\$3,000 MONTHLY.** Home Business Brings. Details: Box 10179, Alexandria, VA 22310

**"FREE" \$10,000** mailorder INCOME Opportunity!! (PI-H) 25c. Moinctr, 1424 Irishill-Ball, Biloxi, MS. 39530

**TIRED** of PUNCHING TIME CLOCK? Weekend profits help achieve financial independence! Info-packed booklet \$3.00. Lake, 9212 NE. 144th Ct., Silver Springs, Fla. 32688. Dept. pmf

**FRANCHISES** 1100+ named, Information Sources. Send \$1.00. Box 12013, Birmingham, Mich. 48012-2013

**AUTO INTERIOR CUSTOMIZING AND UPHOLSTERY** are today's high demand skills - yet easily learned at home! Fabulous profit potential. Send for FREE Opportunity Kit, details. Auto Upholstery Institute, 2118 S. Grand, Dept. SA504, Santa Ana, Ca. 92705.

**BECOME** a successful SMALL INVESTOR! For help write: Amity Group, Box 31A, Branford, CT 06405.

**ACQUIRE** Wealth-Learn Fascinating Way!! Details ... Rizzo, SR105, Cloudland, Georgia 30709

**OPPORTUNITIES** In Mailorder, Real Estate, Home Businesses. Write Free Report, Box 39021PF, Redford, Michigan 48239

**FAST** Money-making Opportunity. No Capital. Free Detailed Information. Saxon Publishers, P.O. Box 444, Saxonburg, PA 16056

**\$1000'S WEEKLY!** Unlimited Income. Pioneer, Box 966(L), Tualatin, OR 97062

**SENSATIONAL FUEL ADDITIVES. SAMPLE \$3. HALLCO, BOX 143, STONEHAM, MA 02180**

**BIG SAVINGS!!** \$1.00 Sends Your Name To Every Business And Money-making Opportunities Ad - February Issue. Free Bonus! AdSaver, Box 58310, Philadelphia, Pennsylvania 19102-8310.

**WASHERS** for Japanese hose clamps 17 per bag 1/8", 5/32" or 3/16" holes resale \$1.20 no resale \$1.53 and tax. A Alp Electric, 2080 East Hillcrest, Thousand Oaks, Cal 91362

**PIANO** Tuning learned quickly at home! Free information. Empire School, Box 1014, Jupiter, FL 33458

**LEARN MIRROR RESILVERING** free information. Silvercraft, Box 127, Lansdowne, PA 19050.

**FREE!** "Janitorial Business Money-making Secrets." Rush name, address. MBM, Box 1087PM, Valley Center, CA 92082.

**TRADE SECRETS OF BOOMING! ... HOME REMODELING BUSINESS, REVEALED! ... EARN TREMENDOUS PROFITS! ... DETAILS \$2.00 ... HANLEYCO, DEPARTMENT JR1, BOX 262, MASSAPEQUA, NEW YORK 11758**

**WOODWORKERS** - Profitable Home Business. No selling! Free Brochure. Pine Shop, 2 P Morrill, Hooksett, NH 03106

**MAKE MONEY BY THE MINUTE** around the clock for doing 8 hours a week paperwork from home. Grows to lifetime income. Totally new ultramodern project unlike anything before. Still ground floor. No experience or education requirements. 10,500 people already doing. Division of major U.S. corporation. For details dial (216) 452-2171, 24 hrs., 7 days. Ask for ext. 118.

**HOME** Wholesale Business, Immediate Profits. McKinley, 6913 Mexico, Concord, N.C. 28025

**MULTILEVEL** Mailorder! Great Opportunity Details. Gunter, 913 Jennifer, Tuscaloosa, Ala. 35404

**PROFITABLE HOME BUSINESS.** Free Booklet. Hageman, 604 Sunside, St. Louis, MO. 63125

**IMADE** \$350.00 in one week by mail order. Helped others. Jaydee, 2320D Crabtree, Woodridge, IL 60517

**HONEST MONEY.** Not A Gimmick. Good Pay. CALL REFUNDED. 513-898-5152.

**PROFITABLE BUSINESS AT HOME GIFTS, ITEMS, GENERAL MERCHANDISE WE DROP SHIP FOR YOU.** Send \$3.00 For Giant Color Catalog-Refundable With First Order. My-Cull Enterprise, 137 Kensington Ave., Jersey City, NJ 07304

**GET** Rich with your Microcomputer. Free Details: JC Publications, Box 609, Arvada, Colorado 80001

**EARN BIG PROFITS PART-TIME.** Little starting investment. Keep your present job. Start a cleaning maintenance business from your home. BE AN EMPLOYER, not an employee. EASY, Detailed How to Guide. \$6.50. D. Depot, 1010 Profit Road, Charlottesville, VA 22901

**\$192.00** From Square Foot Plywood. (Huge Demand) Revealing Proof 25c. (Refundable). Woodwin, Bridgewater, Mass. 02324

**SAVE!** \$1.00 Sends Your Name To Every Business Opportunities Ad In This Issue—Plus! Krause, Box 6232, Flint, MI. 48506

**I COLLECTED \$50 MILLION CASH. LET ME TEACH YOU.** DKSH, Box 465, Fellsmere, FL 32948

**FREE REPORT.** Home money-making success guide. Demorrion Press, 3245 Franklin, Sterling Hts., MI. 48078

**COULD** you use \$50,000? Write: Chruszch, Box 66, Greenbush, Min. 56726

**CARDS ON TABLE.** \$42.00 per 3 hours work PLUS your name sent every opportunity here. Compare all: \$3.00 refunded PLUS \$20.00 certificate if bested. Send \$3.00. Direct, Box 5112B, Jacksonville Beach, Fla. 32240

**MAKE MONEY SELLING KNIVES.** Factory Prices - Closeouts - Free Samples. Duffy Enterprises, P.O. Box L, Dept. PM, Bayville, NJ 08721

**SELL** Books by Mail. 400-900% Profit. Free Sales Kit. Speedbooks, 23860-4C Miles, Cleveland, Ohio 44128

**RINGS, WATCHES, JEWELRY** - 400% profit. Free Sales Kit/Catalog. Spotlight, 2305, 600 Third Avenue, New York, N.Y. 10016

**START** a SUPER PROFITABLE BUSINESS from scratch. Free Subscription to Opportunity Magazine tells how. Write: Opportunity, Dept. E04, 6 N. Michigan, Chicago, IL. 60602.

**MAIL** Order - Extra Income Opportunities. Start your own business at home. Free Details. L&M Publishing, P.O. Box 925, Flushing, NY 11354.

**EARN** Steady Income operating your own Collection Agency. Free Details! Credit Network, Dept. PM-700, 210 Fifth Ave., New York 10010. (718) 768-6803 Ext. 70.

(Continued on next page)

## BUSINESS OPPORTUNITIES

(Continued from preceding page)

**\$1,000 Weekly Home Business Directory**, Box 2019-PM, New York, New York 10163.

**PROFITABLE Home Business**. Free Details. Matthes, 5493 So. 670 West, Murray, Utah 84107

**I MADE \$40,000 Year** by Mailorder! Helped others make money! Details 25¢. Torrey, Box 318YY, Ypsilanti, Michigan 48197.

**IMMEDIATE IMPORT BUSINESS!** Hong Kong, Taiwan Companies Looking for Agents/Representatives/Importers. Over 10,000 Products. Our Telex Service Starts You At Once. Write: Artek-D, 127 East 59th Street, New York, NY 10022.

**MEN-WOMAN EARN \$2000 EACH WEEK FOR LIFE!** Guaranteed easy work at home. **FREE DETAILS:** Write to Highland Productions, P.O. Box 1888, Blowing Rock, NC 28605

**QUIET FORTUNES** being made by **NEW MLM** mailorder method! **YOUR** spectacular income starts **NEXT MONTH**, not later, as 99% do! Free report and cassette. PEC, 510d N. East, Oak Park, IL 60302.

**129 BUSINESSES** Requiring No Investment. All 129. \$1.00. Income, 141 Tishman, Columbus, OH 43228

**MULTILEVEL MAILORDER CAN MAKE YOU RICH!** Ground floor opportunity. **FREE** cassette reveals how! **WMC-1**, 7249 Arnhurst Way, Clearwater, FL 33546

**FIFTEEN "ANTI-CRIME"** Reports with reproduction rights. \$12.00. Check, Money Order. New World Enterprises, P.O. Box 44444, Columbus, OH 43204

**INGENIOUS** invention protects plumbing to -60°. Unlimited potential! Free brochure to dealer, distributor inquiries. (Investment required.) Winterizing Systems. 1-800-621-4330. 1304 NE 3rd, Dept. PM, Bend, OR 97701.

**SAVE!** \$1.00 sends your name Firstclass to every Business Opportunities and Moneymaking Opportunities ad in this issue + \$2.00 Bonus - Plus! Wellspring, 306 West 38th, Austin, TX 78705

**MAKE BIG MONEY** very little investment in Roofing Business. Full Details Send \$10.00 to: J's Roof, 1693 Nashville Hwy., Lewisburg, Tn. 37091

**YOU Can Make Money At Home!** Make \$750 Next Weekend. Free Details. NT&J Enterprises, 11107A Teaberry Way Court, Clinton, Maryland 20735

**LEARN TO REPAIR YOUR OWN 35mm CAMERA** Send \$11.50 to: Dublin Inc., 271 Dover Ln., Des Plaines, Illinois 60018

**YOU can be a SUCCESS!** Valuable (new) information **FREE!** Life Success, Box 292073-PF, Columbus, OH, 43229

**SELL SENSATIONAL LOW-COST BURGLAR ALARM.** Lightning seller. Exceptional Margin. Samples for trial. Northwest Electric-PM2, Box 1046, Mitchell, S. Dak. 57301.

**\$10,000. MONTH MULTILEVELING YURIKA FOODS.** **FREE PARTICULARS.** MIDWEST, MILLER, MISSOURI 65707.

**CONCRETE BLOCKS** Make by hand for business or own project. Little investment, only basic skills needed. \$5.95. D. Norman, P.O. Box 16144, Clayton, MO 63105

**GLASS REPAIR Kits** From \$99.00 Visa, M.C. CGA Inc., 263 W. 3rd Place, Mesa, Ariz. (602) 253-0005

**PRODUCE BEAUTIFUL COPPER OR BRASS SIGNS.** Fast, inexpensive, Profitable. Details. Signet, 50 High, Suite LL 7-C, Buffalo, N.Y. 14023

**NEED Credit Cards? Bankrupt? Slow Credit? No Credit?** Let us help. Call Now! 1-317-839-8900 Ext. C-5E

**\$50-\$90 AN HOUR PROFIT!** Make rubber stamps at home. Satisfy heavy demand by dealers, business, individuals. Easy work, full-time or part-time. Write today for **FREE** Booklet. Star Stamp, 1720B N. Marshfield, Chicago, 60622

**NEW Luxury Car** without cost! Write: AMCO 9, 1601 Main, Plainfield, IN 46168

**BORROW** By Mail \$500-\$25,000 Fast! Easy! Confidential! For Info Application Write: Accurate, 2120 Crestmoor, Nashville, TN 37215

**LEARN** The secrets of repairing junk batteries. "Fabulous Profits." **FIRST ESTABLISHED COURSE.** Apex Engineering, 5454 Bolsa, Atascadero, Calif. 93422

**START YOUR OWN OFFICE CLEANING BUSINESS** while studying our comprehensive 10 volume course. Free information: Executive Directors Inc., 11111 Katy Fwy, Suite 320, Houston, Texas 77079

**101 easy businesses** you can start now even if you're just about flat broke. Sunrise Books, Box 54006, Phoenix, Az. 85078-4006

**OUT OF WORK? NEED MONEY?** \$1.00 booklet shows you how to start your own business through classified advertising. Popular Mechanics, Dept. KC, 224 W. 57th St., New York, NY 10019.

## MONEYMAKING OPPORTUNITIES

**GUARANTEED** Sparetime Money-maker! \$1.00. Wilhelmina Publishers, Box 502P2B, Mena, AR 71953

**MAKE** Money in your own business. Free details. J. Flores, Box 14PM, Rosemead, CA 91770

**PROFITABLE GOLD FOIL PRINTER.** Personalize business cards, pencils, matches. Free Details. Gold, POB 24986 (GG), Tampa, FL 33623.

**MAKE** Rubber Stamps. Highly Profitable Business. Free Details. Stamper, POB 22809 (GG), Tampa, FL 33622.

**FREE** Information on Big Money Profits \$100,000.00 and Up. Immanuel, Co., P.O. Box 10320, West Hartford, Ct. 06110

**FANTASTIC** earnings mailing from home! Offer: Rush Stamped Addressed Envelope. Imperial, P-8 X17410, Fort Lauderdale, FL 33318

**BARGAINS!** Buy Wholesale and Below! Name Brands. Appliances... Furniture... Sports Equipment... Televisions... Cameras... Watches... Jewelry... Thousands More. Free Details. Worldwide Bargainhunters, Box 913-A, Holland, Michigan 49423.

**MAKE PVC PIPE FURNITURE.** \$30,000 year, spare time! Easy. Free information. Owen, 771PF, Battle Ground, Washington 98604

**FREE!!!** Money-making Details. Wilhelmina Publishers, P.O. Box 502P2B, Mena, AR 71953

**VINYL'S** where the money is! Professionally repair, refinish, recolor furniture, luggage, car tops. Quick, easy. Two small \$20 jobs a day earn you \$1,000 a month. Homes, cars, offices, restaurants, unlimited customers. Start earning after a few days practice. Sensational details Free. VIP, 2063 Montrose, Chicago, 60618.

**EXTRAORDINARY PROVEN UNDERWATER CEMENT AND QUICK SET GROUTS.** Formulations privately held as Trade Secret offered 1st time in 35 years by inventor/marine contractor. Has been advertised in major concrete magazines worldwide. Used by state municipalities. Repairs highways, swimming pools, seawalls, pilings, tanks, basements, etc. Start your own profitable business using these formulations. Send \$5.00 for preliminary information package refundable with order. Professional Marketing Co., 7580 W. Amherst, Suite 3A, Denver, CO 80227.

**GET RICH!!** Secret law smashes debts—brings Cash, Credit! **FREE** report!! WealthKitB, Billings, NY 12510

**BUMPER STICKER PRINTING DEVICE.** Cheap, Simple, Portable. Free details. Bumper, POB 22791 (GG), Tampa, FL 33622.

**HIGH PROFITS WITH CUSTOM T-SHIRTS AND CAPS.** Inexpensive, professional heat transfer machines. All supplies. **PRESS MAGIC**, P. O. Box 22809 (GG), Tampa, FL 33623

**\$500.00 WEEKLY** From Junked Tires. (Rush Stamp). LeValleys, Fountain, FL. 32438

**FIFTY Ways To Profit From Sawdust.** \$5.00. Grose, 2621 Sybil, Ft. Worth, Tx 76118

**INDEPENDENCE, Wealth!** Expert shows which opportunity ads make you Rich! Free Details: Capital, 6344 Fallriver, Sacramento, CA 95824

**FREE** Prospector reveals how to find gold. Welco, Elkton, OR 97436

**HOTTEST NEW IDEAS - THAT COULD MAKE YOU RICH!** Be the first to get your copy and receive **FREE** plans: World's smallest jump-rope fits in a thimble and really works! **RUSH \$6.95 plus \$2.00 postage & handling to: WORLD IMPORTS**, Dept. K1292, 213 North Bellinger Street, Herkimer, New York 13350

**WANT OUT?** All you may need is the **TRUTH** about home businesses. Free Details. **FRESCO**, 53 Cuesta Vista, Monterey, CA 93940

**HOME BUSINESSES.** Write: Lamar Enterprises P, Box 394, Anderson, Calif. 96007

**OWN a COMPANY FOR** under \$100.00. Complete instructions \$8.00. Franco (50), Box 3776, Vancouver, BC, Canada V6B 3Z1

**MONEY MACHINE** Guaranteed! methods of making serious money at home. Free Details. Conrad Publishing, 828 Royal St.-186, New Orleans, LA. 70118

**EARN** money manufacturing soap-products. Homeward, 303 C Highland, Richmond, Indiana 47374

**REAL** Estate Fortunes without investment. My Strategy, \$4.00. Success, P.O. Box 176, Plainfield, IN 46168

**YOU CAN DO IT. WRITE A HOW-TO BOOK. FOR GUIDELINES SEND \$3.95 'TO: THARP PUBLICATIONS, GUIDELINES**, Dept. PM, Box 1046, Lancaster, Ohio 43130

"**HOW To Get Rich In Mail Order**," by the legendary author, Melvin Powers. \$15.50 Postpaid. Send: Sydoryk, Box 1483, Elmhurst, Illinois 60126

**FREE MONEYMAKING KIT:** \$500 weekly possible! Send stamped envelope. Dunne, 7 White, Arlington, Massachusetts 02174-8834.

**GOTCHA!** Money Making Products Cost Pennies Sell For Dollars! **NAMROK**, Box 6901, Marietta GA 30065

**HOW to Make Money On Government Surplus.** Report reveals where to buy and sell for fabulous profit! Send \$3.00 Guaranteed. Eva's Books, 1685 Sperry's Forge, Westlake, OH 44145

**STARTING YOUR OWN SUCCESSFUL BUSINESS.** **FREE** Subscription to Opportunity Magazine tells how. Write: Opportunity, Dept. E16, 6 N. Michigan, Chicago, IL. 60602

**LIVE THE GOOD LIFE! THE 10 BEST MONEY-MAKING BOOKS EVER WRITTEN! FREE INFORMATION:** EXPRESS, 3315 SACRAMENTO, SAN FRANCISCO, CA. 94118

**YOU CAN MAKE \$60,753 IN 3 MONTHS. FREE DETAILS.** I. P. C., 446 MCKINLEY, CEDAR HILL, TEXAS 75104, DEPT. 100.

**500 MONEYMAKING** Mailorder Ideas! Write: Ideas, 141 Tishman, Columbus, OH 43228

**BEING A Bailbondsman Is Interesting And Profitable!** My Booklet Shows You How. Don't Miss This Opportunity. Rush \$10.00 To: Ray Lovell, PM1, 4301 East Main, Farmington, New Mexico 87401

**MAILORDER SUCCESS.** Book shows you how to start profitable home business. Free details. Rhoberly Enterprises, 5670 Ash Street, Suite #1, Dept. PMB, Los Angeles, Ca 90042

**HOMEWORK**, telephoning. No selling. Steady income. Box 5334, San Antonio, TX 78201

**MONEY** from discarded tires! Details, Brownie, Box 53, Fishers, Indiana 46038

**BORROW** By Mail! \$500-\$25,000 Fast! Easy! Confidential! For Info Application Write: Accurate, 2120 Crestmoor, Nashville, TN 37215

**NEW** Luxury Car Without Cost! Write: AMCO 9E, 1601 Main, Plainfield, IN 46168

**HOW TO MAKE MONEY THROUGH CLASSIFIED ADVERTISING.** Booklet shows you how to start your own business with Classified Advertising. **ONLY \$1.00 FOR BOOKLET** — (\$2.00 coupon refundable with first order). **S.S. GRONOWICZ, POPULAR MECHANICS, DEPT. PMC1, 224 WEST 57TH ST., NEW YORK, NY 10019**

**HOW to start SEVEN** Highly profitable home businesses. **FREE** information! Lakeside Publishing, 990 Lakeside Drive, Lake Havasu, AZ 86403

## MAILORDER OPPORTUNITIES

**SELL INVENTORY FAST!!** Proven Mail Order Buyers List! Send SASE: Success Marketing, 7895 Charlesmont Rd., Baltimore, Maryland 21222

**FOR** Fast Big Profits Sell How to Make Money Books by Mail. Unusual Opportunity. Details \$1.00. Bailey and Co., 12A Greentree, Monroeville, AL 36460

**EARN \$7,000 MONTHLY!** Easy, exciting mail order business. Fast Profits! Free details. Peterson Enterprises, 510 N. East Ave. 4, Oak Park, IL 60302.

## RABBITS-CHINCHILLAS-FUR BEARING ANIMALS

**AMAZING** Profits! \$10,000 Yearly Raising Rabbits for Wool and Breeding. Details—\$2.00. American Angora, Malta 12, Montana 59538.

**RAISE** Chinchilla for profit. Ten Acre Chinchilla Ranch, Cave City, Arkansas 72521

**\$500-\$1000** Month Plan raising rabbits for us. Free details. White's Rabbitry, Box 908PM, Palm Harbor, FL 33563-0908

**RAISE RABBITS SUCCESSFULLY** 68 Page Booklet Tells How. \$1.00. American Rabbit Assn., H1, P.O. Box 426, Bloomington, Illinois 61701

## EARTHWORMS, LIVE BAIT

**FREE** Literature. Raise Fishworms, Crickets, Redworms—1000-\$8.95, 5000-\$42.50. Book on How and Where to Sell with Order. Carter Fishworms, Plains, GA. 31780.

## OF INTEREST TO ALL

**CREDIT CLEANED UP.** Obtain Visa, MasterCard. Free information. Blackwood Company, P.O. Box 8833F, Riverside, Calif. 92515.

(Continued on next page)

## OF INTEREST TO ALL (Continued from preceding page)

**VACUUM** Cleaners "Discount Prices" "New" Rainbow \$399.95, Kirby, Filter Queen, Compact, Details: ABC Vacuum Warehouse, 6720 Burnet-PM, Austin, Texas 78757.

**LEGALLY** End Personal Income Tax! Details: \$2.00, 942 Yale, Salt Lake City, Utah 84105

**FLASHLIGHT- FLEXIBLE GOOSENECK.** Clips Anywhere! Pocket-sized. (2AA NII) \$4.50. TLC, 13 Rockwood, Conway, AR 72032

**ALIEN CULTURE CAPSULE** in far Earth orbit could have gone undetected so far since its arrival millions of years ago. It could contain vast quantities of data about other civilizations and the primeval Earth. For report send \$4.00 to: Paul Simons, Box 233, Sheboygan, WI 53081.

**TELEPHONE** Equipment: Residential/Commercial. \$1 Catalog. Galco Telephone Alarm, 3740 El Cajon, San Diego, CA 92105

**PARADISE** Found! Navy Just releases beach property on beautiful undiscovered Caribbean Island Commonwealth "start up" cash and unparalleled assistance for new small business and job opportunity. Escape! We can help. Send \$6.00 for complete information package. Matthews, Monte Santo Sta., Vieques, P.R. 00765

**FAKE NEWSPAPER** Your Headline \$4.00. Free Details. Quality Printing, Box 355, Bradford, Mass 01830

**SAVE** \$20.00 to \$30.00 a month on utilities. No Gimmicks. Satisfaction Guaranteed. Directions \$1.00 and a SASE. Dorseys, Lamoni, Ia. 50140

**HOW** to get rid of roaches permanently for pennies. Free proof. Stevens, Box 1045, Haddonfield, NJ 08033

**SAVE \$100's** with tips in "CAR BUYING SECRETS" proven methods, \$2.00: Salzer Enterprises (PM), 19719 Deer Lake Road, Lutz, Florida 33549-0916

**2500 +** Discount Gifts. Catalog \$2.00 (Refundable). Cannon Creek, Rt. 2, Box 286, Newberry, S.C. 29108

**PRIVACY CATALOG—FREE!** Low-profile techniques. As-set protection. Secret loans. New identity. Eden, Box 8410-PC, Fountain Valley, CA 92728.

**GENUINE RATTLESNAKESKIN BELTBUCKLES** \$14.95, guaranteed. Hatbands, belts, wallets, custom made from Rattler, Python or Cobra. Send for photos-prices: Snakeskin Products, Box 4318, Dept. PM, S. Daytona, FL. 32021

**DISNEY** artist shows you how to draw. First easy lesson **FREE!** Get yours today! AVIES-PM2, 1014 North Wright, Santa Ana, CA 92701

**FREE** Promotional Albums, Concert Tickets, Stereos, etc. Information: Barry Publications, 477 82nd Street, Brooklyn, NY 11209

**FREE ROAD MAPS** and other travel information from all 50 states. Learn how. Send \$3.00 to: Voyagers, Box 258, Brighton, MI 48116

**MASTERCARD/VISA** cards. Been rejected? 95% accepted through program. Savings account, fees required. Free details: Orion, P.O. Box 973, Hartford, CT 06143-0973.

## WOMEN'S INTERESTS

**SECURITY** Whistle attracts attention, scare attackers, \$8.35: 101285P, 720 Wellington, Elk Grove, Illinois 60007

## GOVERNMENT SURPLUS

**IS** it True You Can Buy Jeeps For \$44 Through the U.S. Government? Get The Facts Today! Call (312) 742-1142 Ext. 7133.

**G.I. Surplus**, Hunting and Camping Equipment, 56 Page Catalog \$2.00. Red Bank Army Navy, 12-M Monmouth Street, Red Bank, NJ 07701

**MILLIONS OF SURPLUS BARGAINS!** Jeeps included! Many 1% original cost. "Nationwide Government Directory" — \$2.00 (Guaranteed). **DISPOSAL**, Box 19107-AN, WASHINGTON, DC20036.

## LOANS BY MAIL

**BORROW** \$25,000 "overnight." Any Purpose. Keep indefinitely! Free Report! Success Research, Box 19739-AN, Indianapolis, Indiana 46219.

**MONEY** Problems? Free Book describes Loans, Cash, Government Grants, Other benefits, available to individuals. Write: Associates, Box 98-A4, Brooklyn, New York 11235

**8 1/2%** Loan Grant \$1,000 to \$5,000. Nobody Refused. P.O. Box 420, Brookhaven, Miss. 39601

**CASH** Loans-\$500-\$25,000! All Eligible! Any Purpose! American, Box C-15, Lynbrook, New York 11563

**LOANS** \$30,000! Interest Free! Repay Anytime—All Eligible! Details Free! Millionaire, Dept. A-40, P.O. Box 607, Elk Grove Village, IL 60007

**BORROW** \$100-\$100,000! Instant Reply! No Co-signers! Rush Stamped Envelope! Financial, Box 5487(P), Richardson, TX 75080

**BORROW** up to \$25,000 at 8 1/2% interest. Send \$1.00 to: KWK, Downs, IL 61736-0126.

**BORROW** By Mail! Free Details! MBG-PM285, Box 2298, Sandusky, OH. 44870

**BORROW** \$400 - \$40,000 overnight on your signature! Everyone eligible. Repay anytime. Free details! Infohouse-PM, 808 Post, San Francisco, CA 94109.

**UNSECURED** Loans-By-Mail \$1,500-\$10,000, Major Credit Cards Even If Previously Rejected. Details Free: Central Credit Bureau, 1841 Dolphin, Seabrook, TX 77586

**SLANSS** On Signature To - \$100,000! Most purposes. Write: Elite, Box 206 - P, East Rockaway, New York 11518.

**NEED** credit cards? Bankrupt? Slow credit? No credit? Let us help. Call now! 1-317-839-8900 Ext. C5

**LOANS** By Mail Guaranteed! Borrow Any Amount! Free Details, Applications Rushed! Creditmasters, Box 507-PP, Floral Park, New York 11002

## DIVORCE

**WINNING** Information \$1.00 **MEN'S RIGHTS ASSOCIATION**, 17854 (Lyons), Forest Lake, MN 55025

## PERSONAL

**HANDWRITING ANALYSIS** - Learn personality traits! Send writing sample, signature, age, \$8.00. Handwriting Experience, Box 154, Sykesville, Md. 21784

**MAKE** Friends worldwide through international correspondence. Details free! Hermes-Verlag, Box 110660/PM, Berlin 11, W. Germany

**ASIAN**, European friendship! Free details: Inter-Pacific, Box 304PM, Birmingham, Michigan 48012.

**WORLDWIDE** Friends. Free information. Femina, Box 1021UM, Honolulu, Hawaii 96727

**UNIVERSITY DEGREES BY SPECIAL EVALUATION** OF EXISTING Job Experience, Education, Achievement. Fast, Inexpensive. Call (614-863-1791). Or Write: Box 13151-T2, Columbus, OH 43213

**ORIENTAL** singles seek correspondents. Free information. Filam, Box A3713PF, Chicago, Illinois 60690

**BIBLE** Questions answered. Stamped envelope. Bylon, 17167 Bentler, Detroit, Michigan 48219

## REMAILING SERVICE

**CALIFORNIA** mailing address. VAS, 122 Viking, Brea, CA 92621. (213) 990-3214

**TRUSTWORTHY**, confidential, reliable forwarding remailing. Diamond-H, Box 129A, Caddo, Texas 76029

**REMAILS** \$1.00. Gerald's, Box 167, Bell, CA 90201

**UNLISTED ADDRESS** Discreet and confidential. Remail \$1.00 Single. Mail Forwarding Service, 8050 S. Main, Houston, Texas 77025

**FREE** Details! Postal Shoppe, 396 East 900 South, Salt Lake City, UT 84111

**WASHINGTON DC** Remails, \$1.00. Receiving, Forwarding Also. Enterprise, Box 15614, Alexandria, VA 22309

**SASKATCHEWAN** Remailing. Central, Box 101, Foam Lake, Saskatchewan, Canada S0A 1A0

**FREE** Remailers List. Agents Needed. PS, Box 29656, San Antonio, Texas 78229

**VIRGINIA** Full Service. Confidential, Dependable. Mailon, Box 22, Dilwyn, VA. 23936

**MAILERS CHOICE** Saves Money, Privacy, Dependable, Reasonable. Box 504, North East, Md 21901

**NATO MAIL FORWARDING** Dependable service nationally and internationally for 27 years. Write: NATO, Box 1418, Sarasota, Fla. 33578

**CONFIDENTIAL** Mail Receiving/Forwarding. Mail Drop, Box 18039PM, Orlando, FL 32860

## MISCELLANEOUS

**PHOTO ID.** Sealed in plastic. Good in all states, Canada. Fast. **GUARANTEED.** Send \$6.00 (2/\$10.00), photo, name, address, height, weight, hair, eyes, birthdate. Cardinal Publishing, 2071-46 Emerson, Jacksonville, Florida 32207.

**ORNAMENTAL** Iron Designs. Book of 1600 beautiful practical designs for railings, columns, etc. Free Literature. Cunningham, Box 20005, Salt Lake City, Utah 84120-0005 — (3881 South 3200 West)

**CENTRAL VACUUM SYSTEM.** All components available wholesale. Works with any brand tubing system. Easy installation. Detailed Instructions. Vacu-Kleen, P.O. Box 8870, Richmond, VA 23225. (804) 276-0269 Collect.

**1908 SEARS CATALOG.** Reproduction 450 illustrated Pages 20,000 Items. Collectors Item. Stroll Through Time \$10.00: Berk, 184 Edgerton Blvd., Avenel, N.J. 07001

**YOUR CHILDREN CAN BE HIGH ACHIEVERS, CREATIVE, AND MORE. FREE DETAILS.** TRAVISS, RT. 1, BOX 582, CHICO, CA 95926

**NEW** Key chain tire gauge. Durable brass. Always handy. Keep tires inflated and save. Send \$2.95: Weinkle, Dept. 5A2, P.O. Box 13017, Gainesville, FL 32604

## WANTED MISCELLANEOUS

**GOLD**, Silver, Platinum, Mercury, Tantalum. Samples evaluated free. Ore assaying service. Call Wholesale Terminal toll free: 1-800-932-1010.

**SCRAP SILVER CONTACTS, FORKLIFT CONTACTS,** Silver Solder, Sterling, Gold Plated. Robert Leszczak, 652 Myrtle St., Elizabeth, NJ 07202

**BUYING** Old Pulp Magazines. Send List. Ray Bowman, Box 5845, Toledo, Ohio 43613

**BUYING** Tungsten Carbide, Tungsten, Molybdenum, Silver Solder, Silver Contacts, Gold, Platinum. 800-321-6914 Ohio 216-531-8333 collect.

## FOR SALE MISCELLANEOUS

**FLAGS**-All Types. US, State, World Nations, Marine, Historic And Custom Made. Catalog \$1. Broward Flag, P.O. Box 8593-PM, Asheville, N.C. 28814

## HEARING AIDS

**HUGE SAVINGS** Eliminate Dealer Markups. Free Trial. Batteries Wholesale. Terms Arranged. Call Toll Free 1-800-323-1212. Or Write: Lloyds-PMC, Rockford, IL 61110

**SAVE** Half Buying Aids by Mail. All Major Brands Available. REA Company, Box 364, Bridgeport, Ohio 43912

**FREE HEARING AID CATALOG** - Save 1/2 by mail! Write: "MoneySavers", 9530-PM-2, Langdon, Sepulveda, California 91343.

## TOBACCO

**CIGARETTES** - Roll Your Own Custom Tobaccos, Papers, Filters, Rolling Machines, Accessories. Free Catalog And Sample. Green River Tobacco, P.M., Box 1313, Owensboro, Kentucky 42302

**FREE** Cigars-Try Our Handmade Long Filler Imported Cigars, You'll Like Them. Send \$1.00 Postage For Free Samples. Crathworks, 4021 Alhambra Circle, Coral Gables, FL 33146.

**"BETTER CIGARS AT BETTER PRICES,"** factory fresh direct from Tampa, Nations fine cigar capital. **FREE** information. Thompson, Dept. SO2, Box 30303, Tampa, FL 33630.

## SCIENCE & CHEMISTRY

**1985 CATALOG**, 200 pages. Thousands of chemicals, glassware, science-hobby equipment. \$2.00. Merrell Scientific, 1665 Buffalo Road, Rochester, New York 14624

**LABORATORY** Chemicals, Glassware—Apparatus, Catalogue \$1.00. Deluxe Scientific, 934 S. 13 Street, Manitowoc, Wisconsin 54220

**1985 CHEMICAL CATALOG** Lab Equipment-Glassware \$3.00 Refundable. Scientific Supply, P.O. Box 490, Ranger, Texas 76470

**COMPLETE** Catalog \$1.00. Current bargain lists: Laboratory Sales, Box 161-A, Brighton, Mass. 02135

## FORMULAS, PLANS, ETC.

**ANY FORMULA** \$10.00. Catalog \$1.00. J. Belfort, Box 568, Chicago, 60690

**MONEYMAKING FORMULA CATALOG \$5.00 (REFUNDABLE!)**: GWA3, Box 193, Brookfield, Wisconsin 53005-0193.



# Popular Mechanics

224 West 57th Street, New York, N.Y. 10019  
Classified Advertising Dept. (212) 262-4825

Order  
Form  
F85

**DEADLINE FOR ADS:** Copy and Payment must be in by the 5th day of the 2nd preceding month for the issue in which the ad is to appear. See Head of Classified Section.

**HOW TO COUNT WORDS:** Name and address must be included in counting the number of Words in your ad. Each initial or number used counts as 1 word: J.J. Smith, 224 West 57th Street, New York, New York 10019: 9 WORDS. Zip codes are not counted. Phone #: 2 Words. Symbols used as keys are charged for. City or State count as 1 word each: New Brunswick, New Jersey: 2 words. Abbreviations such as C.O.D., F.O.B., R.P.M., U.S.A., P.O., 5x7, 16mm are counted as 1 word. (P.O.Box 392 counted as 3 words) Webster's International Unabridged Dictionary will be used as our authority for spelling, compound words, Hyphenations, abbreviations, etc. Please make checks payable to **POPULAR MECHANICS**.

Only \$62.50 for 10 word minimum

\$6.25 each additional word

**BOLD FACE CAPS add  
\$1 per word**

(First Word: No Charge For Bold Face)

Remittance of \$\_\_\_\_\_ is enclosed to cover \_\_\_\_\_ insertion(s) in the \_\_\_\_\_ issue(s) \_\_\_\_\_ Classification

No Charge for CAPS	2	3	4	5	6	7
8	9	10-\$62.50	11-\$68.75	12-\$75.00	13-\$81.25	14-\$87.50
15-\$93.75	16-\$100.00	17-\$106.25	18-\$112.50	19-\$118.75	20-\$125.00	21-\$131.25
22-\$137.50	23-\$143.75	24-\$150.00	25-\$156.25	26-\$162.50	27-\$168.75	28-\$175.00
29-\$181.25	30-\$187.50	31-\$193.75	32-\$200.00	33-\$206.25	34-\$212.50	35-\$218.75
36-\$225.00	37-\$231.25	38-\$237.50	39-\$243.75	40-\$250.00	41-\$256.25	42-\$262.50
43-\$268.75	44-\$275.00	45-\$281.25	46-\$287.50	47-\$293.75	48-\$300.00	49-\$306.25
50-\$312.50	51-\$318.75	52-\$325.00	53-\$331.25	54-\$337.50	55-\$343.75	56-\$350.00

YOUR NAME \_\_\_\_\_ PHONE: \_\_\_\_\_

FIRM (NAME IN AD) \_\_\_\_\_ (PLEASE PRINT)

YOUR ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

DATE: \_\_\_\_\_ YOUR SIGNATURE \_\_\_\_\_

(PLEASE PRINT OR TYPE COPY • FOR ADDITIONAL WORDS ATTACH SEPARATE SHEET)

## SPECIAL SERVICES

**INFORMATION** On anything. Ferguson Research Specialists, 60-15 Woodside, Woodside, New York 11377.

## HEALTH, VITAMINS

**BACK PAIN?** Send for free back support aids catalog. The Back Catalog, One Lenway Road, Byfield, MA 01922

**BRAIN FOOD!** Powerful algae extract helps revitalize physical and mental alertness. Free Brochure. NNC Labs, Box 74PM, Merrick, NY 11566

**WHAT** Chiropractors . . . MDs hide from you. Free details. Report, 21 Country Village, Clinton, CT 06413

**BACK** To Nature Remedies For Body Ailments. Proven German Herb Tea Cures. Free information. Amlight, 639 West Joel, Lincoln, Nebraska 68521

## GARDENING & LAWN CARE

**LEARN** Gardening and Landscaping at home. Free booklet. Lifetime Career Schools, Dept. A-151, 2251 Barry Avenue, Los Angeles, California 90064.

**CAREFREE TOMATOES.** Unique growing system is neighborhood marvel. Guaranteed results. Plans \$4.00. Oakview, Rt 2, Box 143, Goochland, Va. 23063

**TILLS!** Hoes! Saves Work! Keeps garden clean, productive. Low priced tiller/power hoe. 30-day trial offer. Free information. Write: Auto Hoe, P.O. Box 3035H, DePere, WI 54115

## FLOWERS, PLANTS & NURSERY SUPPLIES

**GINSENG! GOLDENSEAL!** Profitable plants. Have choice seeds, roots. Free information. K. Collins, Viola, Iowa 52350

## RECIPES, COOKING, ETC.

**OVER 100 DRINK RECIPES!!! EASY!!!** Many EXOTIC!!! \$3.95. Buckeye Publishing, Box 56P, Avon Lake, Ohio 44012

**TRADITIONAL ENGLISH RECIPES** 10 British favourites - \$2.00. Ashgrove, Dept PM, 2821 E. Arthur, Thunder Bay, Ontario, Canada P7E 5P5

**NON - COOK'S** complete meal recipes. \$3.00; Eddy, Durham Point Road, Durham, N.H. 03824

**LOW** Calorie appetizers-desserts, 250 recipes, \$7.35; IOI285P, 720 Wellington, Elk Grove, Illinois 60007

**FINEST LIQUEURS** Homemade. Big Savings. 15 Recipes. **MOCHA CREME**, Cocoa Creme, Kahlua, Amaretto, Much More! Exotics, Old Favorites. Easy, Detailed Delicious. Guaranteed. Send \$5.00 To: J. M. Cromwell, 11684 Ventura Blvd., Studio City, CA 91604

**100 COCKTAIL BEVERAGE RECIPES.** \$1.00. M. Lopes, 201 Warren Street, Jersey City, NJ 07302

**10 QUICK INEXPENSIVE MAIN DISHES.** \$3.00; K&H, Box 1334, Woodward, OK 73802.

**OLD FAMILY RECIPE**, irresistible Devil's-Food Cake. \$1.00; Saizer Enterprises, (PM), 19719 Deer Lake Road, Lutz, Florida 33549-0916

## WINEMAKING, BEERMAKING, ETC.

**WINEMAKING-BEERMAKING-GASOHOL.** Free Supply Catalog. Yeast Equipment. Continental, Box 188PM, Casselberry, FL 32707

**WINE/BEER MAKING** Catalog: B&J Enterprises, 1845 South 19th, Springfield, Illinois 62703

**WINEMAKERS-BEERMAKERS**— Free Catalog—Fast Service—Large Selection: Kraus, Box 7850-L, Independence, Missouri 64053.

**WINEMAKERS-Beer**makers: Free illustrated catalog of supplies. Semplex, Box 12276R, Minneapolis, Minnesota 55412-0276

**BEERMAKERS ONLY!** Free Catalog Newsletter. Williams's, Box 461M, Oakland, California 94604.

**WINEMAKING HOMEBREWING HERBS SPICES FREE** catalogue. 1535 Windsor Street, Cornwall, Ontario K6H 3N6

**BEERMAKING-WINEMAKING** We're #1. Free Catalog. Vineyard & Brew, P.O. Box 401-B, Sault Ste. Marie, MI 49783

**MAKE QUALITY BEER.** Wine. Free catalog. Village Store, Box C-51PM, Westport, MA 02790.

**WINEMAKERS-BEERMAKERS** Fresh Stocks, Fast Service. Free Catalog. O'Briens, Box 284D, Wayne, IL 60184

**BEER MALTS**, wine concentrates, yeast, books, barrels, illustrated catalog. Mountain Cellar Supplies, 346 Weaverville Highway, Asheville, N.C. 28804

**WINEMAKING/BEERMAKING**, Equipment, Supplies, Free Catalog, Large Selection, Fast Service: ASC, P.O. Box 335, Berwyn, Illinois 60402

**FREE BEERMAKING BOOK** Plus Catalog. Finest Equipment, Ingredients. Fully Guaranteed. SPI, Box 784-M, Chapel Hill, NC 27514

**BEERMAKERS-WINEMAKERS. LARGE SELECTION. LOWEST PRICES. FAST SERVICE, HOMEBREW, BOX 158M, HASLETT, MI 48840**

**FREE ENCYCLOPEDIA** Winemaking, Beer-making Supplies, Equipment, Ingredients. Vynox, P.O. Box PM15498, Rochester, NY 14615

## BURGLAR ALARMS & HOME PROTECTION

**SIREN ALARM**, air-intake, 110 volt AC motor with mount, assembled, 3x5 1/2". \$29.95 COD Dealer inquiry welcome. Back Bay Associates, Box 16383, Rocky River, Ohio 44116.

**PREVENT BURGLARY.** Crimeproof your home. Free Information. Security, Box 11553, Lynchburg, Virginia 24506

# PM'S TIME MACHINE

75 YEARS AGO: February 1910



Carpet looms go automatic.

## Technology looms

In February 1910, we marveled at an "automatic loom" which weaves and cuts carpets to uniform size with a uniform design pattern. Perpendicular wires moving up and down against the warp of the rug allowed alternating of yarn colors to make complex patterns on the carpets. Carpet color and design could be reset after stopping the press. On a recent visit to the Fashion Institute of Technology in New York, we found that looms still operate on those principles, but computers have speeded up the process.



## Eternal ships

The battleship *Delaware* passed sea trials in 1910. The ship could get up to just under 20 knots, although she couldn't sustain the speed without a pipe leaking in her steam system. The Del-

aware had a 20,000-ton displacement and carried 10 12-inch guns. Battleships went into mothballs after World War II, but have been recommissioned periodically. Two are in service today in the Mediterranean.

50 YEARS AGO: February 1935



First snowmobiles of wood.

## First snowmobiles

The snowmobile of 50 years ago was a streamlined sled with a 2.5-hp outboard motor. The sleds moved along snow at a "fast" 20 to 25 mph. The front end was snub-nosed and the engine was mounted as on a boat. Warm air from the radiator flowed into the single-seat cockpit through dash vents. A brake lever was mounted in the dashboard, but the driver had to reach over the front to adjust the throttle. The body was spruce and plywood. Today's snowmobiles would dust their forerunners.

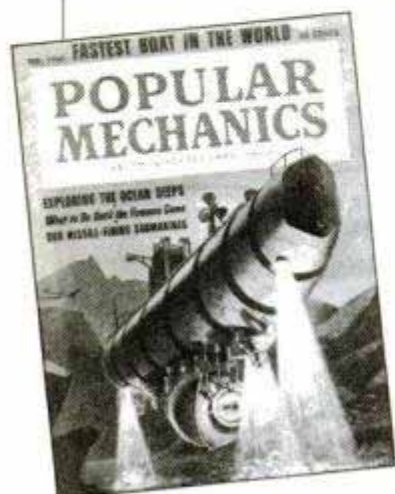


## Supertrain breaks 55-mph speed record

Passenger trains that were going from New York to Washington, D.C., were running an average 55 mph back in 1935. Then a new electric "super" locomotive that averaged well over 60

mph was introduced. The twin-frame locomotive still operates on freight lines. However, today's passenger locomotives travel much faster than 100 mph and promise to go even faster.

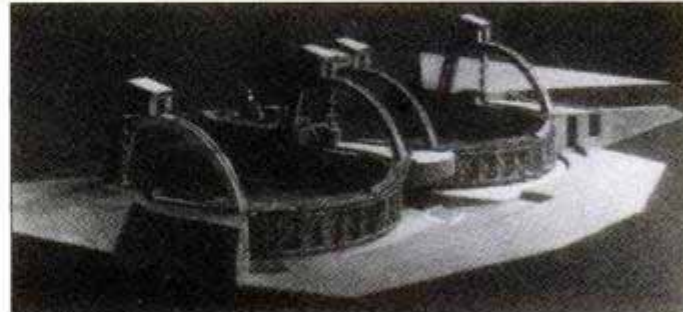
25 YEARS AGO: February 1960



America launches Polaris sub.

## Polaris sub launched

America's first missile-firing submarine—the *George Washington*—was undergoing final tests 25 years ago this month. The 380-ft. vessel carried gas-launched Polaris missiles that could be fired singly or all at once from eight hatches. The Navy now has more than 50 missile-firing atomic subs, most built similarly to the *George Washington*. New targeting systems and improvements in the Polaris boosters have made the missile-firing subs far more lethal, and a key to America's national defense strategy.



## New armor holds back river in Holland

Constructed like the visors on armor built for knights, a pair of dams was constructed in Holland's Lek River to regulate the flow of water. The 174-ft.-wide steel visors moved up and down on an

arc of steel, driven by hydraulic motors. The gates proved so successful that the design is being copied by a 12-unit dam which is now under construction near Amsterdam. **PM**

11 mg. "tar", 0.7 mg. nicotine av. per cigarette by FTC method.

# Winston America's Best.

Excellence.  
The best live up to it.



Warning: The Surgeon General Has Determined  
That Cigarette Smoking Is Dangerous to Your Health.

A worker like this has no trouble carrying his share of the load.

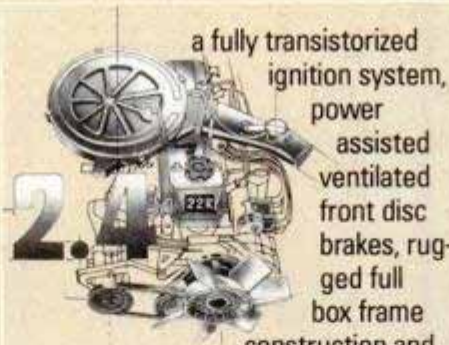
The new 1985 Toyota Standard Bed holds 1400 honest pounds of payload.\*\* No ifs. No buts. No sweat.

Part of the reason is the heart under the hood—a 24 liter engine. Its relentless 103 horses with high torque push it from job to job. No standard grade small truck has a more powerful engine. Not one.

There are no overtime charges for the overtime extras Standard Bed brings to the job, either. Standard on the Standard is

**1400 lbs.  
PAYLOAD**

the overtime extras Standard Bed brings to the



construction and steering column controls designed to let you work them without working.

And the cab space offers a full-bench seat for three, side-by-side, without skimping on head room or leg room.

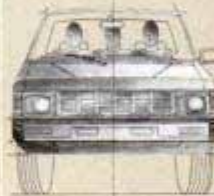
But the best thing about getting a worker like this may be the knowledge

a fully transistorized ignition system, power assisted ventilated front disc brakes, rugged full box frame

OH WHAT A FEELING!  
**TOYOTA**

that Toyota owners reported the lowest incidence of repairs for any small truck—imported or domestic.\*\*\*

Hire the truck. You'll never be sorry you did. Just ask the man that owns one.



\* Manufacturer's suggested retail price. Dealer's actual retail price may vary. Price does not include tax, license, transportation, optional or regionally required equipment.  
\*\* Including occupants, equipment and cargo.  
\*\*\* 1984 J.D. Power Compact Pickup Truck Survey.

TOYOTA TRUCKS. MOST POWERFUL EVER!

**THE 1985 TOYOTA STANDARD BED. \$5,998.  
HARDWORKING, RELIABLE, NO CHARGE FOR OVERTIME.**



**\$5998!\***