

CAR CARE

Q&A

The Car Owner's Complete Problem-Solver

**The creator of *Popular Mechanics*'
"Car Clinic" column
answers the 300 most common
questions and problems**

- *Are some brands of motor oil really better than others?*
- *How exactly should I jump-start a car's dead battery?*
- *Do platinum-tipped spark plugs provide more power and last longer than conventional plugs?*
- *How can I remove hardened tree sap from my car?*
- *Why do I smell gas in my car?*
- *What can I do to keep my radio antenna from binding?*

MORT SCHULTZ

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**The Auto Owner's
Complete Problem-Solver**

Mort Schultz



John Wiley & Sons, Inc.

New York • Chichester • Brisbane • Toronto • Singapore

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Library of Congress Cataloging-in-Publication Data
Schultz, Morton J.

Car care Q&A: the auto owner's complete problem-solver /
by Mort Schultz.

p. cm.

Includes bibliographical references and index.

ISBN 0-471-54479-5 (pbk. : alk. paper)

1. Automobiles—Maintenance and repair—Miscellanea.
2. Automobiles—Equipment and supplies—Miscellanea. I. Title.
TL 152.S384 1992
629.28'7-dc20

91-34887

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Printed and bound by Courier Companies, Inc.



Introduction

In 1963, I started writing the monthly column “Car Clinic” for *Popular Mechanics*, continuing until 1988. In 1984, I started writing “Handyman Garage Service” for *The Family Handyman*, a *Reader’s Digest* publication.

The questions I answered in “Car Clinic” and those I currently address each month in “Handyman Garage Service” are submitted by people who have problems with their vehicles, who are spending money needlessly to purchase products and services their vehicle may not need, and who are interested in increasing the longevity of their vehicles by following important maintenance practices. Most of the letters I receive voice the common complaint that trained automotive

technicians failed to resolve a problem. In turning to my column as a last resort, owners are rarely disappointed. With the information provided—information they weren’t able to find elsewhere—they can bring their cars, trucks, or vans back to technicians; this time to have a successful repair finally made.

In keeping with this tradition, this book provides answers to some 250 of the most serious, most important, and most complex questions that owners have asked about their vehicles in the more than 30 years I’ve been at this work. You will (hopefully) find that this book answers most questions you have—or are likely to encounter—about your car, truck, or van.

This compendium of automotive questions and answers provides you with the information you need to get malfunctions repaired properly the *first time* you take your vehicle to a mechanic. There are also answers to questions that will help you in purchasing the products your vehicle actually requires—not those that advertisements urge you to use. Equally important is the information that can guide you in maintaining your vehicle so it can give you satisfactory performance at minimum cost for the life of the car. “The life of the car” is defined as that period between the time you purchase the vehicle and the time you sell it or otherwise get rid of it.

This book is divided into 10 chapters to help make it easier for you to track down the information you need. The Contents includes the specific questions that are addressed in each section.

In the order of presentation, the chapters are as follows:

1. What you need to know about buying *the right* products and services.
2. Maintenance: How to help your vehicle achieve senior citizen status by undertaking important, yet relatively simple and inexpensive, maintenance steps.
3. Behind-the-scenes solutions to engine performance problems—hard starting, stalling, hesitation, lack of power, and the like. Many of the repair procedures offered in this section are not included in the general service instructions tech-

nicians use of troubleshoot a glitch in performance. The result in these cases, therefore, is often failure on the part of the technician to resolve the complaint. By using the information contained in this section, however, you will be able to steer your technician to the root of the problem, and have that problem fixed.

4. Simple, inexpensive ways to resolve an annoying noise, vibration, or odor problem.
5. Information that can help you beat the high cost of repairing engine mechanical failures.
6. Your car’s brakes, steering, suspension, and tires.
7. What you’re facing when a drive train (transmission and differential) repair has to be made.
8. Keeping your vehicle’s body in great shape—inside secrets you won’t get from a body shop.
9. Getting rid of annoying problems with your vehicle’s accessories—heater, air conditioner, defroster, windshield wipers, radio, power door locks, cruise control, and even the digital clock.
10. Information on emergency and safety problems.

If you don’t find a solution for your particular problem within the chapter that is most applicable to the question, refer to the index. It will lead you to other pages that may hold the key to solving your problem.



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One

What You Need to Know About Buying the Right Products and Services

WHAT YOU NEED TO KNOW ABOUT BUYING MOTOR OIL

Is it true that some brands of motor oil are better than others?

I know of no tests that prove conclusively that one brand of a nationally sold motor oil is any better than another brand. The most important factor in selecting oil is to make certain that the product meets the requirements for oil set by the manufacturer of your car. These requirements, which are spelled out in the owner's manual and are much the same for all cars, are divided into two parts: *Quality Rating* and *Viscosity Rating*.

Quality Rating

When selecting oil, first establish the oil's quality rating. It is printed on the container and should be preceded by the phrase "API Service."

API stands for American Petroleum Institute. Presence of these letters verifies that the oil has passed standards set by API, the American Society for Testing and Materials (ASTM), and the Society of Automotive Engineers (SAE).

Following "API Service" will be a series of letters. For vehicles equipped with gasoline engines, the most significant letters are SG. Oil designated SG has been formulated for

gasoline engines designed for vehicles of 1989 or newer vintage.

Prior to the development of oil bearing the SG designation, oil designated SF dominated. It was formulated for gasoline engines designed for 1980 to 1988 models.

As the quality of oil is improved and given a new designation, oil of lesser quality bearing the previous designation is phased out. Oil formulated for gasoline engines in 1970 to 1979 models had the designation SE. Before that, it was SD. You will no longer find oil having these designations or the SF designation by itself in service stations or auto supply stores. You will, however, find oil bearing both the SG and SF designations, as well as some others that refer to using the oil in a diesel engine. It's quite common to find the phrase "For API Service SG, SF/CC, CD" printed on containers of oil. Here's what these letters mean:

- SG and SF specify that the oil meets SG requirements as established by API, ASTM, and SAE, and exceeds the standards previously set for SF oil.
- S stipulates that the oil is formulated to meet the requirements of engines having spark (S) ignition systems—engines with spark plugs, that is.
- G informs consumers of the relative quality of the oil. Oil designated SG is of higher quality than oil designated SF.
- CC and CD indicate that the oil also meets the requirements for engines ignited by compression (C), which is the method of igniting fuel in a diesel engine.

Important: The manufacturers of some engines require that oil used in those engines bear both S and C symbols, for example, SG/CC; SG/CD; or SG SF/CC CD. Oil designated by one symbol—for instance, SG

by itself or CC by itself—should not be used in these engines since damage may result. Also keep in mind that damage caused by using an oil not recommended by the manufacturer of a car that's under warranty *will not* be covered by that warranty. Before you buy another quart of oil for your engine, check the owner's manual to make sure you're using oil the manufacturer wants you to pour into the engine. (See Figure 1.1.)

Viscosity Rating

Oil viscosity (thickness), which is sometimes called an oil's weight, affects fuel economy and cold weather engine starting. If oil has too high a viscosity for the ambient temperature, it will make starting more difficult in cold weather. But more serious is the fact that the thickness of the oil can prevent it from flowing over parts of the engine that need lubrication to prevent premature damage. Conversely, if oil is too thin (low viscosity), for weather conditions, it will flow over engine parts too rapidly, just like water, and not provide adequate lubrication.

The viscosity of an oil, which is printed on every container, is preceded by the letters SAE (for Society of Automotive Engineers). You will see designations such as SAE 5W-30 and SAE 10W-30.

The first number—5 or 10—identifies the cold weather temperature conditions under which the oil provides prompt cold engine starting. If oil thickens too much as it lies dormant in an engine overnight in cold weather, it won't flow readily in the morning when you try to start the engine. It will offer resistance, making it more difficult for the starter motor to turn the engine so it will fire up.

The numerals are comparison figures. An oil having a 5 (or a 10) does not mean that the oil should be used if the temperature is

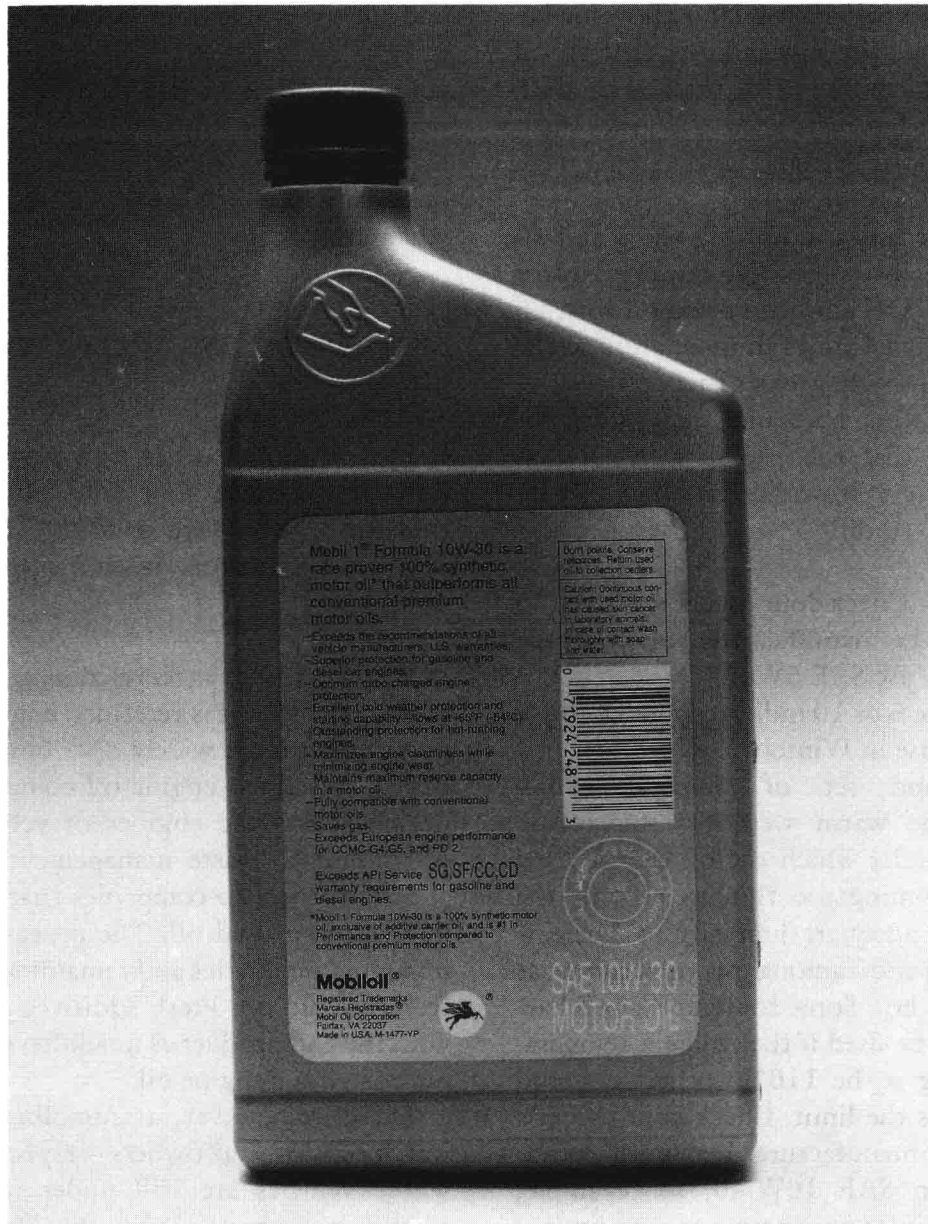


FIGURE 1.1. The two most important pieces of consumer information printed on the labels of containers of motor oil are the quality rating and viscosity rating symbols. The quality rating is preceded by the phrase “API Service”; the viscosity rating by the initials “SAE.” (Courtesy of Mobil Oil Corporation)

going to drop to 5°F (or 10°) above or below zero. The two only indicate that an oil with a 5 flows more readily than an oil with a 10. It offers less resistance to engines starting under more extreme cold temperature conditions.

With present-day motor oil, the 5 and 10 have all but lost meaning, however. Most manufacturers recommend using oil with a 5 designation at all times in most areas of the country to promote greater fuel economy. A 5 oil offers less resistance to an engine, which means that the engine won't use as much gasoline as it would if it was being lubricated by a 10 oil.

Important: Check your owner's manual to make sure the manufacturer of your car wants you to use SAE 5W-30.

W after the 5 or 10 indicates that the oil is suitable for use in Winter.

The second set of numerals—30—identifies the warm weather temperature conditions under which the oil can be used without becoming too thin to provide the engine with adequate lubrication. There is some discrepancy among manufacturers as to how hot is hot. Some contend that oil having a 30 can be used if the ambient temperature is going to be 110°F; others contend that 100°F is the limit. Check your owner's manual. The manufacturer may want you to switch to an SAE 10W-40, for example, when a particular upper temperature limit is exceeded. Oil bearing the SAE 5W-30 viscosity label will provide prompt cold starting and hot weather protection over a temperature range of approximately 30°F below 0 to about 100°F above 0.

Important: To avert engine damage and keep a warranty in force, you must use oil of the proper viscosity for the expected lowest

and highest ambient temperatures in your region as spelled out by the manufacturer of your vehicle in a chart printed in your owner's manual. If you've misplaced the owner's manual, ask the service manager at a dealership that sells your make of car to get you another copy.

SHOULD YOU USE REREFINED ENGINE OIL?

Recycled motor oil is being sold in the auto departments of several stores in this area, including a couple of nationally known stores. Is this stuff safe to use?

What you refer to as recycled motor oil—the correct term for it is rerefined engine oil—is going to be more widely distributed as time passes. Rerefined engine oil comes from oil drained from the engines of vehicles. The oil is sent to waste management facilities, and from there to companies that specialize in rerefining used oil. The process involves removing impurities and remaining additives from the old oil. Fresh additives are put in, with the end product as unadulterated and as pure as virgin engine oil.

There is, however, a stumbling block to watch out for. Car owners—especially those whose vehicles are still under warranty—should make certain that the rerefined oil they're purchasing has been licensed by the American Petroleum Institute (API) as having met that organization's requirements. The primary concern with a rerefined oil that doesn't meet this criteria is that the old oil used in making the base stock for the rerefined oil may contain oil not suitable for automobile engines, such as industrial machine oil. Techniques employed by some

companies for separating auto engine oil from this other oil may not be up to snuff.

Major vehicle manufacturers—Chrysler, General Motors, Honda, Nissan, and Toyota—state that rerefined engine oil is acceptable and will not affect the warranties *if* the oil meets the API requirements and the viscosity requirements established by the particular manufacturer. (Note: As this is being written, Ford is still deciding its policy.)

The API licenses companies to use the API's registered service mark "donut" for products meeting the API engine oil requirements. When an engine oil is licensed by the API, the oil marketer has certified that the oil meets all industry standards. The marketer is then authorized to display the API "donut" on the product's container.

Information printed within the "donut" includes the API service designation (SG, for example) and the SAE viscosity rating, such as 5W-30, 10W-30, or 10W-40. You may also find a statement in the bottom half of the "donut" concerning the "energy conserving" qualities of the oil.

As long as a car owner selects an oil that has this "donut" on the container, and the information within the "donut" corresponds with the API service designation and SAE viscosity grade rating recommended by the auto manufacturer, the warranty will be maintained.

The rerefined engine oils which have been licensed by the API at the time this book is being written are: America's Choice, Ecogard, Mohawk, Spartan, and Canadian Pride. America's Choice is distributed in the United States and Canada by Breslube of Breslau, Canada, a division of Safety-Kleen Corporation. This company has been rerefining engine oil since 1977.

Ecogard is distributed by Ecogard, Inc., of Lexington, Kentucky, which is a subsidiary

of Valvoline. This product is also marketed in the United States and Canada.

The other three rerefined oils licensed by API—Mohawk, Spartan, and Canadian Pride—are presently sold only in Canada. They are distributed by Mohawk Oil Company of Burnaby, British Columbia.

SYNTHETIC MOTOR OIL VERSUS NATURAL MOTOR OIL

I would like to use synthetic motor oil in the engine of my new car since I've read favorable comments on its overall superiority vis-à-vis natural motor oil. The service manager at the dealership where I purchased the car, however, has indicated that using synthetic motor oil could render a new car warranty null and void. When I asked why, he gave me some vague response. Do you know if he's correct in what he says and, if so, why?

The service manager was probably alluding to the fact that using synthetic motor oil will render a warranty null and void if you do not follow the oil change recommendations of the vehicle manufacturer. Producers of synthetic motor oil claim that synthetic oil, which costs \$2 to \$3 more per quart than natural motor oil, can remain in use for as many as 25,000 miles. Car manufacturers, on the other hand, say that to keep warranties in force car owners must change oil much more frequently—in your case once every six months or 7,500 miles (whichever occurs first), if you drive under normal service conditions, or every three months or 3,750 miles (whichever occurs first), if you drive under severe service conditions. (For a discussion of normal and severe service, see page 27–28.)

If you don't follow the car manufacturer's recommendation and something happens to the engine, even if it has nothing to do with motor oil, your warranty can be declared null and void. In short, car manufacturers do not recognize the prolonged oil change span recommendations of synthetic motor oil marketers.

CONVERTING A CAR TO RUN ON NATURAL GAS

During the gasoline crisis of 1979, I read a series of magazine articles written by you in *Popular Mechanics* on alternatives to gasoline. One mentioned converting a gasoline engine to run on natural gas. I would like to know the status of this technology. Can I have the engine in my car converted to use natural gas? If so, can I hook a hose to the gas line in my house to fill the fuel tank?

Natural gas is being used in cars as an alternative for gasoline by an increasing number of companies, particularly natural gas companies (Figure 1.2). Among them are Brooklyn Union Gas Company in New York and Columbia Gas Company in Missouri. Their experience proves that natural gas is a viable alternative to gasoline.

However, there are several obstacles to its use by the general public. Chief among them is the cost of the project. Modifying the fuel system in a car so it will handle natural gas and installing a tank to hold natural gas costs between \$1,500 and \$2,000 (Figure 1.3).

A more formidable obstacle is finding a technician who is trained in making the conversion. There aren't many around. To locate the one nearest to you, ask a representative from your local gas company. If you strike

out there, get in touch with the Natural Gas Vehicle Coalition, 1515 Wilson Boulevard, Suite 1030, Arlington, Virginia 22209, phone number (703) 527-3022. This organization has a list of facilities that are qualified to convert vehicles to run on natural gas. This is not a job you would want an ordinary auto technician to do, no matter how competent that technician happens to be.

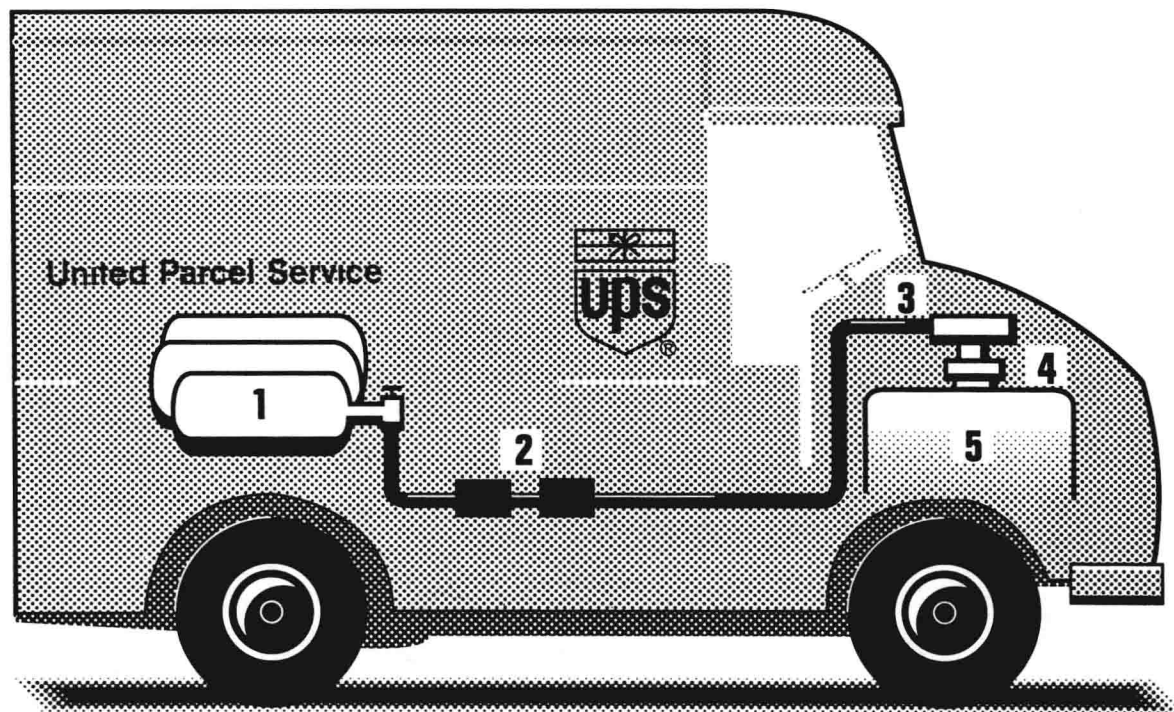
The final obstacle you will face in doing a conversion is getting natural gas from the pipeline into the tank of the car. You can't just connect a hose to the gas pipe in your home. You need a compressor that is rated at no less than one cfm (cubic foot per minute) to pump the natural gas from the gas pipe serving your home into the car's tank. It takes a one-cfm compressor from three to five hours to fill an empty tank.

Your local gas company might rent you a compressor, if it has any available. Your only other alternative is to try and buy one, and that will cost you another \$3,000 or so.

Let's suppose that money is no obstacle, all potential problems seem to fall into place for you, and you decide to have the conversion done. You now have to decide whether you want to install a bifuel or dedicated system.

Bifuel means you can have the engine converted to run on either natural gas or gasoline. The bifuel engine won't run as well as it would with a dedicated system, however.

Dedicated means you'll be able to use only natural gas to run your car. Natural gas is rated at about 130 octane. Thus, the engine compression ratio will be increased to 13:1 from 8:1 or 9:1, which means that your engine will run superbly. Furthermore, since natural gas is a clean burning fuel, it won't contribute to a buildup of deposits inside the engine as gasoline does. By using natural gas, therefore, you lessen considerably the possibility of having to overhaul an engine during the time you own the car.

**1**

Compressed natural gas is formed by compressing natural gas to 3,000 pounds per square inch into **CYLINDERS** installed in the rear, undercarriage or top of the vehicle.

2

When natural gas leaves the cylinders, it passes through a master shut-off valve into a high-pressure fuel line to a **REGULATOR** to reduce pressure.

3 & 4

Then, the gas passes through a specifically designed **MIXER** to mix the natural gas with air; it enters the **CARBURETOR** at atmospheric pressure.

5

Next, the natural gas flows into the combustion chamber in the **ENGINE** and is ignited to create the power required to drive the vehicle.

FIGURE 1.2. The future will see vehicles using fuels other than gasoline. One of them will undoubtedly be natural gas. This drawing provides an overview of a natural gas system as employed by a number of United Parcel Service vans. (Courtesy of Brooklyn Union Gas Company.)



FIGURE 1.3. In vans and pickup trucks, natural gas cylinders can be installed under the vehicle. In cars, they can be placed in trunks. In either case, the tanks are put into a position where they are well-protected from rupturing in the event of a collision. The three cylinders shown in this photograph were installed in a UPS van and supply that vehicle with the equivalent of 15 gallons of gasoline. (Courtesy of Brooklyn Union Gas Company)

Another advantage to using natural gas is that it is practically nonpolluting. Furthermore, it is much less expensive than gasoline. At the time of this writing, a quantity of natural gas equivalent to a gallon of gasoline costs 42 to 80 cents, depending upon the area of the country, as compared to \$1.10 to \$1.40 for gasoline.

CONVERTING A CAR TO RUN ON PROPANE

Can you tell me where to get parts and do-it-yourself information for converting my car to run on propane?

Converting an engine so it can run on propane is *not* a job to do yourself. It must be done to precise safety and mechanical requirements so those in the car, as well as motorists traveling near that car, are safe. A poorly done job can cause an explosion. Only a technician who has been trained in doing propane conversions should undertake this task.

To find someone in your region who has been trained as a propane conversion technician, contact IMPCO Technologies, Incorporated, 16804 Gridley Place, Cerritos, California 90701, telephone (213) 860-6666. IMPCO Technologies is the major manufacturer of propane conversion equipment in the United States. However, it will sell this equipment only to qualified technicians.

Note: Generally, the advantages that natural gas provides (see page 6) are also provided by propane. Neither presents a danger if the equipment is properly installed. They are comparable in performance. It is easier at this point in time, however, to find technicians who are qualified to install propane equipment than those who install natural gas equipment. Propane (and natural gas) is

a cleaner burning fuel than gasoline, is much less polluting, and costs a little less. There are ample facilities throughout the country that are equipped to pump propane into a vehicle's fuel tank. There aren't many as yet for filling a car with natural gas. The cost of conversion to propane is roughly comparable to the cost of converting to natural gas, that is, \$2,000 to \$2,500.

USING GASOLINE THAT CONTAINS ALCOHOL

I drive my car, which gets 15 miles to the gallon, 128 miles per week. Gasoline that contains alcohol, which is available in this area, currently costs 20 cents per gallon less than straight gasoline. The savings over a year would be significant, but I'm concerned that alcohol will harm the engine. Will this be the case?

You can safely use gasoline containing ethanol or methanol, which are the two types of alcohols blended into gasoline . . . but you have to be careful.

Ethanol, which is made from a grain product such as corn, alfalfa, or soy beans, is also referred to as ethyl alcohol or grain alcohol. As long as the manufacturer of your car specifies in the owner's manual that it's okay to use ethanol (practically all manufacturers sanction its use), you can safely put a fuel composed of 10 percent ethanol and 90 percent unleaded gasoline into your car's fuel tank.

Methanol, which is made from wood, coal, and even garbage, is also called methyl alcohol or wood alcohol. As long as the manufacturer specifies in the owner's manual that it's okay to use methanol, you can safely put a fuel consisting of 5 percent methanol, 93 percent unleaded gasoline, and a co-solvent of 2 percent into your car's fuel tank.

The cosolvent prevents methanol and gasoline from separating in the fuel tank, as they characteristically do when they are combined. The cosolvent also helps prevent an attack by caustic methanol on fuel system parts. An excessive amount of methanol or the absence of a cosolvent will result in methanol corroding metal parts in the fuel system and causing plastic and rubber parts to deteriorate.

Stations selling gasoline that contains alcohol should have data displayed on the pump concerning the percentage of ethanol or methanol blended into the gasoline. In the case of methanol-gasoline blends, the presence of a cosolvent should also be specified. If labels are not present, it's best not to use the fuel.

WHEN TO REPLACE ANTIFREEZE (COOLANT)

The maintenance schedule for my car recommends draining and flushing the cooling system and putting in fresh ethylene glycol-base antifreeze every 30,000 miles or 24 months, whichever occurs first. The antifreeze now in my car has been in use 30,000 miles, but looks as good as the day I took delivery of the car. Why should I have it replaced?

A margin of safety is built into maintenance schedules, so you can probably get several thousand miles more from this coolant before its corrosion-inhibiting chemicals dissipate. Then again, maybe you won't. If not, the few dollars you save now by not replacing the coolant, plus perhaps a considerable amount more, may have to be spent for a new radiator or heater if the deteriorated coolant condition goes untreated and leads to a restriction of your present radiator or heater. Coolant depleted of corrosion inhibitors

may cause an engine to overheat and break down on the road when the radiator clogs with corrosion.

Given these possibilities, you may now decide that it isn't worth your while to put off cooling system maintenance. But if you don't come to this decision, keep a watchful eye on the coolant. "Watchful" means to examine it every week or two for signs of rusty discoloration. If you see rusty-looking particles floating in the solution or if the coolant changes color, inhibitors have weakened and you should install fresh coolant as soon as possible.

Caution: To examine coolant, you have to remove the radiator cap. Be sure the engine is cold and is not running. After inspecting the surface of the fluid for particles and a change of color, see that the radiator cap is secured firmly to the radiator filler neck. Consult your owner's manual for additional information on how to remove the radiator cap in your particular vehicle.

WARNING: DON'T USE RECONSTITUTED COOLANT (ANTIFREEZE)

I found two types of antifreeze on a supermarket shelf. One was called reconstituted antifreeze, and it cost half the price of the other type that is a popular brand of ethylene-glycol base coolant. The less expensive antifreeze claims to be every bit as good and as safe to use as the popular brand. Can this be so?

I'll let an advisory from General Motors answer the question for you. This advisory is similar in wording to advisories issued by other car manufacturers that presently warn against the use of reconstituted (recycled) antifreeze. It says this: